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Insights into the provenance of the Chinese Loess Plateau from joint zircon U-Pb and garnet geochemical analysis of last glacial loess

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Abstract:	The Chinese Loess Plateau, the world's largest and oldest loess record, preserves evidence of Asia's long-term dust source dynamics, but there is uncertainty over the source of the deposits. Recent single-grain detrital zircon U-Pb age analysis has progressed this issue, but debates remain about source changes, and the generation and interpretation of zircon data. To address this, we analyse different groupings of new and existing datasets from the Loess Plateau and potential sources. We also present the results of a first high resolution sampling, multi-proxy provenance analysis of Beiguoyuan loess using U-Pb dating of detrital zircons and detrital garnet geochemistry. The data shows that some small source differences seem to exist between different areas on the Loess Plateau. However, sediment source appears to be unchanging between loess and palaeosols, supporting a recent material recycling hypothesis. However, our zircon and garnet data demonstrates that Beiguoyuan experienced a temporary, abrupt source shift during the last glacial maximum, implying that local dust sources became periodically active during the Quaternary. Our results highlight that grouping data to achieve bigger datasets could cause identification of misleading trends. Additionally, we suggest that multi-proxy single-grain approaches are required to gain further insight into Loess Plateau dust sources.

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18 August 2017

Dear Editors,

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We here submit a revised version of all figures for an original research article entitled “Insights into the provenance of the Chinese Loess Plateau from joint zircon U-Pb and garnet geochemical analysis of last glacial loess”. We wish to thank the editors for all your feedback.

Thank you for your consideration.

Yours faithfully

Kaja Fenn

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18 August 2017

Dear Editors,

Detailed response to the reviewers' comments - Manuscript reference QUA-17-34.

As per Editors comments all figures have been now converted into pdf files and the grey background in Figures 2, 3 and 9 removed. We hope you will find that these amendments acceptable.

Many thanks.

Yours faithfully

Kaja Fenn

Insights into the provenance of the Chinese Loess Plateau from joint zircon U-Pb and garnet geochemical analysis of last glacial loess

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ABSTRACT

The Chinese Loess Plateau, the world's largest and oldest loess record, preserves evidence of Asia's long-term dust source dynamics, but there is uncertainty over the source of the deposits. Recent single-grain detrital zircon U-Pb age analysis has progressed this issue, but debates remain about source changes, and the generation and interpretation of zircon data. To address this, we analyse different groupings of new and existing datasets from the Loess Plateau and potential sources. We also present the results of a first high resolution sampling, multi-proxy provenance analysis of Beiguoyuan loess using U-Pb dating of detrital zircons and detrital garnet geochemistry. The data shows that some small source differences seem to exist between different areas on the Loess Plateau. However, sediment source appears to be unchanging between loess and palaeosols, supporting a recent material recycling hypothesis. However, our zircon and garnet data demonstrates that Beiguoyuan experienced a temporary, abrupt source shift during the last glacial maximum, implying that local dust sources became periodically active during the Quaternary. Our results highlight that grouping data to achieve bigger datasets could cause identification of misleading trends. Additionally, we suggest that multi-proxy single-grain approaches are required to gain further insight into Chinese Loess Plateau dust sources.

INTRODUCTION

The vast loess sequences of the Chinese Loess Plateau cover an ~440,000 km^2 area, stretching back over the last 22 Ma and potentially to 40 Ma (Guo et al., 2002; Licht et al., 2014). They represent the world's most important terrestrial climate and environmental change archive. They also provide an unparalleled opportunity to investigate past dust activity, which in turn gives insights into the past dust sources and their controlling factors (Merkel et al., 2014). However, currently our understanding is limited by uncertainties over the source of this material, and hence the fundamental controls on dust generation, transport pathways, and therefore its climatic significance. In turn, these affect our interpretation of the past influence of Asian dust on climate change and vice versa (Stuut and Prins, 2014), the climatic signal recorded in loess, and our knowledge of long-term climate change in Asia.

The provenance of the Quaternary Chinese loess deposits has been the subject of multiple competing hypotheses that include potential dust sources from erosion of both primary (i.e., proto-source rocks) and secondary (i.e. sediment from rivers draining primary source areas, sedimentary basins, deserts) source material. Most studies, including this one, have necessarily examined a combination of both types of sources in attempts to reconstruct the likely proto-source origins, transport pathways, and stages in sediment transport and deposition (sedimentary basins, desert/dune sediment 'holding areas' or 'pass zones' etc). Thus, both previous studies and this study examine an amalgamation of source types, from distant to local and direct to multi-step transport, predominantly focusing on the relative importance of mountain, playa, or desert sources across north and northwest China and Mongolia.

Multiple approaches to understanding Chinese loess provenance have been taken, including: analysis of spatial trends in loess characteristics (Lu and Sun, 2000; Sun, 2002), grain size analysis (Prins et al., 2007; Qiang et al., 2010), bulk-sample geochemistry (Jahn et al., 2001; Maher et al., 2009), and modelling (Zhang, 2003). Recently there has been an increase in the number of provenance studies using single grain detrital zircons. Studies have generally undertaken U-Pb dating of zircon grains, representative of an igneous event in which grains have crystallised or a high pressure-temperature metamorphic event during which the grains have been recrystallised. The advances achieved through application of this method to Chinese loess (Bird et al., 2015; Licht et al., 2016; Nie et al., 2014; Stevens et al., 2013b; Stevens and Lu, 2010; Zhang et al., 2016) have shown that previously widely accepted hypotheses of dominant loess sources to the north of the Plateau (e.g. Mu Us, Hobq, and Gobi deserts (Chen et al., 2007; Sun, 2002) may need revising. Instead, the northern Tibetan Plateau, the Yellow River and other fluvial systems may play crucial roles in sediment production and delivery, which likely also bring sediment to some adjacent desert areas (e.g., Mu Us). However, within the Tibetan Plateau, multiple specific primary areas have been proposed, including the Songpan Basin, the Qilian Mountains (Chen et al., 2007), and the Qaidam Basin (Licht et al., 2016; Pullen et al., 2011). In addition, some studies also suggest the addition of Gobi Altai or northern/northwestern desert-sourced dust to the loess (Bird et al., 2015; Che and Li, 2013; Zhang et al., 2016).

One of the most important yet polarised aspects of recent single-grain studies of Chinese loess source is the question of source variability through time (c.f. Che and Li, 2013; Xiao et al., 2012). Related to this is the problem of whether the source changes spatialy over the Loess Plateau. These conflicts in part stem from methodological issues such as sampling, laboratory analyses and statistical representativity, as well as inherent limitations with the sole use of zircon U-Pb analysis, such as differential zircon fertility in source rocks and overlapping age peaks in different source areas. Previous single grain studies have generally relied on the untested assumption that individual provenance samples taken from a single loess or soil unit are representative of that entire unit, time period or site. No quantification of the variation of single-grain provenance data within individual units has yet been attempted. Given that attempts to boost analysis numbers include combining data from multiple samples, this is important to constrain. Indeed, a recent quartz luminescence (OSL) and heavy mineral study by Stevens et al. (2013a) highlighted an abrupt shift in provenance within the last glacial loess unit L1 at Beiguoyuan, on the NW of the Chinese Loess Plateau. Despite the clear advantages of single-grain analyses, at present no sites have been examined for provenance using single-grains at a high sampling resolution within single sedimentary units. As such, the sub-orbital variability of single-grain dust source information is unknown and the degree to which individual samples can be considered representative of a unit is unclear. Furthermore, the minimum number of grains required to properly characterise a sample is the subject of debate, with numerous studies suggesting a range of analysis numbers depending on the complexity and degree of overlap of source rock zircon ages (Che and Li, 2013; Licht et al., 2016; Pullen et al., 2014; Vermeesch, 2004; Xiao et al., 2012; Zhang et al., 2016). Thus, major questions remain over whether samples with greatly varying numbers of analysed grains (<100 to >1000) are comparable and whether a consensus is possible if each study uses different statistical approaches.

To address these issues, “Big Data” (Vermeesch and Garzanti, 2015) datasets are created here for potential source regions and the Chinese Loess Plateau to simultaneously examine the effect of grouping data on age assemblages and provenance assignments, potentially gain better statistical representativity, and determine if any additional information can be gained from large, n>800 sample datasets. We also utilise new high sampling resolution multi proxy single-grain provenance analysis data from a typical Loess Plateau section at Beiguoyuan to investigate source changes with depth, including both detrital zircon U-Pb ages and garnet geochemistry, the first use of the latter in Chinese loess.

Garnets are a detrital heavy mineral, relatively resistant to weathering, burial or mechanical abrasion, and relatively common in the heavy mineral assemblage (Morton et al., 2004). They make up around 10% of the heavy mineral population of Chinese loess samples, whereas zircon makes up less than ~1% (Bird et al., 2015). While fifteen geochemically distinct compositional end-members can be found in nature, there are six types that commonly form solid solutions, namely (in descending order of their abundance): almandine ($Fe_3Al_2Si_3O_{12}$), spessartine ($Mn_3Al_2Si_3O_{12}$), pyrope ($Mg_3Al_2Si_3O_{12}$), grossular ($Ca_3Al_2Si_3O_{12}$), andradite ($Ca_3(Fe,Ti)_2Si_3O_{12}$), and uvarovite ($Ca_3Cr_2Si_3O_{12}$). Garnets are usually formed in metamorphic rocks and it is the metamorphic history (temperature and pressure conditions) along with composition of the source rock that defines garnet geochemistry and therefore the end-member type (Alizai et al., 2016; Krippner et al., 2014; Stutenbecker et al., 2016). These source rock diagnostic geochemical characteristics combined with their rarity in igneous rock (von Eynatten and Dunkl, 2012) enable identification of the metamorphic setting, and make them very useful in provenance studies (Andò et al., 2013; Krippner et al., 2014; Mange and Morton, 2007; Morton, 1991; Morton et al., 2011, 2004; Suggate and Hall, 2013). The application of garnet geochemistry also complements zircon datasets, as the minerals provide information on two different source rock types, metamorphic (garnet) and igneous/high pressure-temperature metamorphic (zircon), and therefore provide a broader overview of different possible loess source areas.

SAMPLES AND METHODS

Sample collection

New samples

New samples were collected from the main loess section at Beiguoyuan (36°37'21.3"N, 107°17'12.2"E), located in the western area of loess tableland of the Chinese Loess Plateau (Fig. 1). This site was previously investigated and has existing grain size and magnetic susceptibility data, along with a quartz OSL chronology (Stevens et al., 2008; Stevens and Lu, 2010). Additionally, a number of samples have been investigated for provenance using zircon U-Pb dating; a single sample from the top (2.1 m) of unit L1LL1 by Stevens et al. (2010) and 11 samples spread across S0, L1LL1, L1LL2, S1, L2, S2 by (Bird et al., 2015). However, as with all loess sites, Beiguoyuan's provenance has never been investigated at high sampling resolution across two sedimentary units using single-grain methods. As noted above, luminescence and heavy mineral data from unit L1 of the site suggests that a potential abrupt change in provenance may occur at between 3.1 to 5.4 m depth in the sequence (Stevens et al., 2013a). Here we investigated a 5.1 to 11 m depth of the Beiguoyuan loess section, comprising parts of the L1LL1 and L1SS1 units of last glacial loess, with samples taken every 40-60 cm. The samples were subject to standard heavy liquid and magnetic separation methods to extract heavy minerals (see Supplementary Data for more detail).

Existing datasets

The results of our U-Pb analysis were combined with existing published datasets (Supplementary Table 1) from the Chinese Loess Plateau and its potential sources. In many cases, published potential source area and loess samples contain relatively low numbers of zircon grains (<100). These were combined with the aim of creating datasets of sufficient size to be 95% confident of recording all age peaks representing >5% of grains in a population (Vermeesch, 2004; number of zircon grains >ca.100-120). To investigate the effects on provenance interpretations of grouping data in different ways, and potential errors stemming from this, the grouping of data into samples followed a series of stages, starting at the broadest geographical and temporal level, and progressing to grouping of samples at higher temporal and spatial resolution:

1) Source data representing the main geomorphological settings. Where multiple datasets from specific locations exist, these were combined, for example Tarim Basin, east Mu Us (E), west Mu Us (W), Qaidam Basin, Songpan Basin, Cretaceous Sandstone, Gobi Altay Mountains, Pamir, and Kunlun Mountains (Fig. 1). In the case of the desert areas, data was combined into groups based on geographical and geomorphological settings, e.g. the Northern Deserts and Central Deserts. The Northern Deserts group represent the deserts to the immediate north and east of the Chinese Loss Plateau and comprise datasets from Horqin, Otindag, NE sandy lands, and Central Mongolia. The Central Deserts group includes the Tengger and Badan Jaran Deserts and forms the area to the west and northwest of the Plateau. Only data from the upper reaches of the Yellow River were used, to avoid the effects of recycling of Loess Plateau material in the middle and lower reaches. This dataset is termed Yellow River throughout for simplicity. Lastly, loess datasets were combined to create an average for the entire Quaternary Chinese Loess Plateau (Supplementary Table 1).
2) Next, loess samples were grouped by site (Fig. 1), with averages from each site containing data from both loess and palaeosol units.
3) The Chinese Loess Plateau samples were then re-grouped into two categories; loess and palaeosol, representing average values for each of the units across multiple sites.
4) Finally, data from the two sampled individual units at Beiguoyuan were combined, in addition to individual sample analysis by depth/age.

Laboratory analysis

Zircon U-Pb dating

Zircon enriched mounts were subjected to U-Pb dating in the London Geochronology Centre at Birkbeck and University College London, using a New Wave NWR193 excimer laser coupled to an Agilent 7700x quadrupole-based, inductively coupled plasma mass spectrometer (ICP-MS) following Jackson et al. (2004). Due to the small grain size of wind-blown dust particles, a 20 μm laser spot was used and cores were preferentially targeted for spot location. Plešovice zircon (Sláma et al., 2008) and National Institute of Standards and Technology (NIST) 612 silicate glass (Pearce et al., 1997) standards were cyclically measured as references to correct for instrument mass bias and depth dependent inter-element fractionation of Pb, Th, and U. The Plešovice standard has a U-Pb concordant age of 337.13±0.37 Ma determined by a thermal ionisation mass spectrometer.

Data reduction software for the ICP-MS, GLITTER 4.4.3, was used to analyse real-time data. Age interpretation was based on uranium series isochrons; the $^{206}Pb/^{238}U$ series for grains <1.1Ga and the $^{207}Pb/^{206}Pb$ series for grains >1.1Ga. Ages were plotted along a concordia line and data outside +5% and -15% of the curve were rejected from further analysis. See Supplementary Information for raw data including element concentrations, ratios, and ages.

Garnet Raman Spectra

The Jobin-Yvon Horiba "XploRA" apparatus equipped with an Olympus confocal microscope was used to determine garnet Raman spectra (in six diagnostic frequency regions between 210-245 cm^{-1}, 340-380 cm^{-1}, 515-560 cm^{-1}, 800–870 cm^{-1}, 870–927 cm^{-1}), by focusing the 532 nm solid-state laser beam directly on the garnet surface in the grain mounts. The system was calibrated measuring the position of a diagnostic peak in fluorescent light at 545.8 nm for each spectrum and by use of the 520.7cm^{-1} Raman band of a silicon wafer, several times during each experimental session. Polynomial background and Canada balsam peaks were removed prior to wavenumber analysis. The Matlab analysis software MIRAGEM (Bersani et al., 2009) was applied to Raman peak wavenumbers to determine the relative abundance of garnet end-members in each grain and verify the miscibility allowed within the garnet solid solution. The final output provided the relative abundance of the main garnet end members (Almandine, Spessartine, Pyrope, Grossular, Andradite) in individual grains.

Statistical analysis

Multi-dimensional scaling (MDS) (Vermeesch, 2013) was used to aid precise comparison and interpretation. Despite its relative novelty in provenance studies, MDS is already an essential tool for comparing detrital zircon age distributions (Bird et al., 2015; Che and Li, 2013; Nie et al., 2014; Stevens et al., 2013b), as it provides an opportunity for effective comparison of large and complex datasets in a visually attractive way. Closely related to Principal Component Analysis (PCA), Multi-dimensional scaling produces two-dimensional ‘maps’ as output, in which similar samples plot close together and dissimilar ones plot far apart, based on the Kolmogorov-Smirnov (KS) statistic (Vermeesch, 2013). There are a number of different ways to estimate an MDS configuration from a matrix of KS-dissimilarities. All the MDS configurations presented in this paper use a so-called ‘non-metric’ algorithm. The details of this are not important for the interpretation, although it is useful to point out that the resulting plot coordinates are rescaled to unity. However, the visual assessment of age distributions by comparison of Kernel Density Estimation (KDE) diagrams (Vermeesch, 2012), while more difficult, is still essential for full provenance interpretation.

RESULTS

Zircon U-Pb ages

The KDE diagram of the U-Pb zircon age distribution of the averaged Chinese Loess Plateau sample shows a very characteristic double peak in the younger part of the age spectrum (250-500 Ma), with the first one at *c.* 270 Ma and the second at *c.* 450 Ma (Fig. 2). However, three additional age groups can be seen, albeit much smaller, at 500-1000, 1500-2000, and ~2500 Ma, as can a comparative absence of grains over 2750 Ma old. The younger age double peak has been described by numerous authors before (e.g. Bird et al., 2015; Che and Li, 2013; Stevens et al., 2010) and is seen in all loess and palaeosol samples analysed to date. The second peak is the more dominant one in most samples. The only exception relates to data showing loess site averages, which are discussed later. To a greater or lesser degree, many of the age peaks seen in the loess data are also seen in numerous (but not all) potential source regions, as noted previously (Licht et al., 2016).

When comparing the separate averaged loess and palaeosol age distributions across the Loess Plateau (Fig. 2) there is a small difference in the double peaks, with a larger proportion of Ordovician-age grains in the combined palaeosol sample, while the three smaller peaks at ~750-1000 Ma, ~1700 Ma and ~2500 Ma are replicated to some extent.

The results of the comparison of site averages show a much larger variability, both in terms of the shapes of the double peaks as well as in the distribution of the Cambrian and Precambrian ages (Fig. 3). Jingbian and Heimugou show increased relative importance of the 290 Ma age peak, while Lingtai and Heimugou also have few young (50-100 Ma) grains. The first peak expressed at Lingtai, Weinan and Xifeng is not as well defined, as it has a wider spread. Caoxian, located on the far west of the Loess Plateau, has relatively large numbers of grains of 1000-1500 Ma age in comparison to other sites. Xining’s double peak has a slightly different shape, with a dominant and narrow Ordovician peak (the second peak) and fewer grains contributing to the *c.* 250 Ma peak.

Garnet geochemistry

A total of 468 garnet grains in 11 samples were analysed (Fig. 4). It is stressed that these are preliminary data to show the validity of the technique and therefore only a small number of grains per sample (average 42) have been measured. Although the garnet samples show a lot of variability in the percentage of the garnet end-members, all samples contain primarily almandine, spessartine and grossular. The relatively large proportion of the easily weathered grossular end member suggests that it's variation throughout the profile reflects provenance change or longer transport distance rather than increased weathering. Additionally, all samples apart from CH4/1/49-52, CH4/1/57-60, CH4/1/65-68 contain small proportions of andradite. Particularly interesting is the presence of the pyrope garnet end-member in samples CH4/1/53-56 and CH4/1/77-80, associated with ultrabasic igneous and high-grade metamorphic rocks.

The Mange and Morton (2007) garnet evaluation scheme was applied to help distinguish and classify the data (Fig. 5). Krippner et al. (2014) qualitatively evaluated various garnet classification diagrams in separating metamorphic source lithologies showing that the Mange and Morton's (2007) system to be relatively good in distinguishing between garnet-bearing rocks. The majority of the data from all samples can be found in areas A, Bi, and D. Type A garnets are low Ca, Mn, and high Mg. They come predominantly from high-grade granulite-facies metasediments or charnockites and intermediate felsic igneous rocks. Type Bi garnets are from intermediate to felsic igneous rocks, whereas type D garnets are from metasomatic rocks, very low-grade metamafic rocks and ultrahigh temperature metamorphosed calc-silicate granulites. Sample CH4/1/53-56 is the only one with the majority of type B grains, which are produced by amphibolite- facies metasedimentary rocks, as well as type A garnets. Sample CH4/1/61-64 also looks different as it contains a large proportion of almandine and spessartine (Fig. 4). The difference is also seen on the ternary diagram (Fig. 5) with a different distribution of grains in the Type A and Type D areas as well as the presence of grains from amphibolite-facies metasedimentary rocks (Type B).

DISCUSSION

Chinese Loess Plateau dust sources

Creating a single average zircon U-Pb age distribution for all loess and palaeosol samples from the Chinese Loess Plateau has the advantage of 5500 data points, which increases the statistical representativity of the dataset. However, any hypothetical spatial and temporal variation is removed in this process, potentially leading to erroneous conclusions, as discussed below. From the KDE (Fig. 2) and MDS plots (Fig. 6A), this Chinese Loess Plateau average is most closely aligned with the Western Mu Us desert, the Roushui River (draining the Qilian mountains, NE Tibet, towrds the Alashan plateau (Fig. 1)) and the upper reaches of the Yellow River (labelled Yellow River for simplicity) potential sources. The similarity is seen not only in the double peak in <500 Ma grains, but also in the 500-1000 Ma and 1500-2000 Ma age groups. The analysis strongly reinforces the hypothesis that the NE Tibet Plateau (including Songpan and Qaidam which also closely match the single Loess Plateau average sample) is the main source of loess to the Chinese Loess Plateau, via the Yellow River, reinforcing depositional models proposed by Nie et al. (2015), Stevens et al. (2013b) and further supported by Bird et al. (2015), and Licht et al. (2016). The Western Mu Us also shows a very strong similarity to the Loess Plateau and the upper reach of the Yellow River averages, which is likely to be because it shares the same Yellow River-Tibetan Plateau sources as the Loess Plateau, rather than acting as a major source itself. Sediments from the Tarim Basin are also fairly closely matched to the Loess Plateau average. However, we suggest that this is likely due to the fact that Tarim Basin-Taklamakan sediments are derived predominantly from Northern Tibetan plateau terranes (Rittner et al., 2016) that also appear to provide sediment to the Loess Plateau. Critically, the analysis again underlines the major differences between the Northern and Central Deserts and the Chinese Loess Plateau. The view that the North and Central Deserts act as the main dust source to the Loess Plateau and the associated transport model is inconsistent with these results. The large number of grains for almost every major source make this conclusion very robust (Pullen et al., 2014). However, this still leaves room for lesser periodic inputs from these sources.

Spatial variability

Several geochemical and zircon single grain studies (Che and Li, 2013; Jahn et al., 2001; Maher et al., 2009) have suggested a lack of significant differences between the dust provenance of sites across the Plateau. However, changes from northeast to west across the Loess Plateau have also been suggested (Xiao et al., 2012), and source signatures may show shifts from the Yellow River to the North China Craton in the northeast of the Loess Plateau (Bird et al., 2015).

Our results and existing published data (Fig. 6B) offer a chance to analyse the spatial variability between sites on the Loess Plateau using large sample sizes. It appears that the differences seen between loess sites are much smaller than the variability between potential sources, suggesting that for the most part all sites ultimately have the same north Tibetan Plateau origin. Three sites appear further away from the rest of the loess sites on the MDS diagram; Xining, Caoxian, and Xifeng. The closest relative to Xining on the MDS plot is the Qaidam Basin, which is likely due to the similarity in the shape of the second of the double peaks on the KDE (Fig. 3). This result is not entirely surprising considering the location of the site outside of the main part of the Chinese Loess Plateau on the eastern edge of the Tibetan plateau. Caoxian, which is located on the western edge of the Loess Plateau, again plots closer to the potential source compared to other loess sites. The position of the Xifeng site on the MDS plot is a little bit more puzzling. Despite its geographical location, relatively near Beiguoyuan and Lingtai (Fig. 1), Xifeng plots away from these two sites on the MDS diagram and closer with Xining and Caoxian. In this case, the geographical location of the site is clearly not the driver behind the observed difference. The KDE diagram offers no distinguishing clues as to the source of this variability, therefore at present we cannot explain the reason behind the placing of Xifeng on the MDS plot. It could also be argued that Jingbian and Heimuoguo form a separate group on the MDS diagram. Their eastern position on the Loess Plateau is consistent with the suggestion by Bird et al. (2015) that mixing of NE Tibet material with eastern Mu Us material occurs at these sites, as evident by the larger proportion of the grains in the first part of the double peak.

Simply plotting age distributions as cumulative percentages (Fig. 7A) provides answers about drivers of the sample variability in grain age distribution. By far the most dominant part of the KDE diagram, the 0-500 Ma bin, provides 43-57% grains for the age distribution. In most cases in that age group on the cumulative percentage diagram, the differences are already established in the very young age bin (0-250 Ma), with the largest variation of 14% between Weinan and Caoxian. The “classic” double peak (250-500 Ma) also contributes to sample variability with the divergence in this part varying between 4 and 10%. Intriguingly though, a lot of variability between sites can be seen in the parts of the zircon age distributions with fewer grains (500-2500 Ma). This variation between age spectra groups is not consistent from site to site, although there is a group of sites that have quite similar frequency distributions. Some sites show very similar 0-500 Ma percentages yet diverge in the later part of the plot (500-1500 Ma). For example, the largest shift, 11%, between Jingbian and Lingtai occurs in the 500-1000 Ma age portion of the cumulative curve. This shows that less dominant peaks may discriminate between samples that are very similar (e.g. the same sites over time or multiple sites in the same region) rather than the parts of the distribution with higher proportions of grains. However, the analysis of differences in minor peaks raises some issues. For example, in the 750-1000 Ma bin there are 200 grains in the sample from Beiguoyuan but only 23 grains in the sample from Caoxian. Given this order of magnitude difference, if these smaller peaks are the source of the variation on the cumulative age distribution diagram, it should be questioned whether these are true variations in the population, or just a sampling effect. Given that it is impractical to increase the number of analyses up to values where these smaller peaks all have similar or more statistically robust numbers of grains, we suggest that the probability of fully characterising these smaller peaks and using them in robust provenance determination remains low. Thus, if differences in smaller peaks are the only differences between samples, it may not be possible to robustly assign source differences and we are therefore at the limit of the utility of the technique.

Temporal variability

Temporal variability between loess and palaeosol units

The temporal variation in dust source on the Chinese Loess Plateau through glacial and interglacial periods has been debated for a long time. Results of both the bulk geochemical (Jahn et al., 2001) and single grain approaches (Bird et al., 2015; Che and Li, 2013) have tended to indicate that no real changes can be seen on Quaternary timescales. This was further supported by the recent work of Licht et al. (2016) who suggested that recycling of older pre-deposited loess occurred under an 'aeolian cannibalism' model. On the other hand Sun and Zhu (2010), Sun et al. (2008), and Xiao et al. (2012) argue for a shift in dominant atmospheric circulation patterns between glacials and interglacials, based also on bulk and single grain approaches. Zircon age distributions (Fig. 2), for the two averaged loess and palaeosol samples over the Chinese Loess Plateau, do indeed show striking similarity. However, the KDE diagram suggests a small degree of variation, particularly in the <500 Ma double peak shape, but also in the 500-1000 Ma age range. This is also shown in the MDS diagram (Fig. 8) that slightly separates loess and palaeosol samples, though this difference is smaller than the variation between them and the potential source regions. The two combined loess and palaeosol samples comprise 4204 and 1302 grains respectively, which would suggest that the number of grains in each is statistically robust (Pullen et al., 2014). On the surface, these results imply a very similar source between loess and soil units, yet at the same time suggesting that the small differences could result from subtly different dust pathways between glacials and interglacials. To examine this further we also plotted age distributions as cumulative percentages (Fig. 7B). Over 50% of the grains are found in the 0-500 Ma bin and this is again where the first order divergence between the two samples is observed. This is much smaller than the differences seen between individual sites (2.3%). In older parts of the distribution the difference between the two samples increases only very slightly until the 1000-1500 Ma bin, where another 2% shift apart is observed. However, here again relatively few grains represent these potentially diagnostic smaller peaks and it is therefore possible that these differences may not be meaningful. In any case, at least some of the differences between loess and soil samples appear in the dominant 0-500 Ma age peaks and are not explained this way. This begs the question as to whether this genuinely indicates a small source difference between glacial and interglacial periods on the Loess Plateau. One possibility is that this difference is real, given the large numbers of grains. However, here we argue that in fact the differences seen in the two age distributions are an artefact of grouping together samples from different sites. As shown above, the different sites have different total numbers of analysed grains and appear to show statistically significant differences in age distributions (Fig. 3 and 7B). As such, if a site or sites are contributing disproportionately more grains to one unit type (e.g. providing proportionally more grains to the combined loess sample than other sites do) then in theory this will introduce a bias to the grouped dataset leading to an artificial difference in the loess and soil distributions. For a theoretical example, take two sites that have different overall zircon age distributions, but where both sites individually show no differences between their own loess and palaeosol units. Under the data grouping process above, the data from the loess units from these two sites produce one overall loess value, and this process is repeated with the palaeosols. However, if one site contributed proportionally more grains to the loess sample, and the other contributed more from palaeosols, then the resulting averaged loess and palaeosol samples would show an artificial difference in age distribution. This difference likely results from sites heterogeneity and grouping data from sites with varying proportions of grains from loess and palaeosol units, rather than any real changes between loess and palaeosol sources. In this example, at both sites individually, loess and palaesol units show the same age distributions, yet there is a difference in the combined loess and palaeosol samples. In the real data presented here, given the differences between the sites shown in Figure 3 and the different proportions of grains in loess and palaeosol units at these sites (Supplementary Table 1), we propose this process of introducing an artificial difference, between the two combined loess and palaeosol samples, is likely to have occurred. For example, Beiguoyuan contributes the vast majority of the grains to the combined palaeosol sample (n=963). By contrast, sites such as Caoxian and Lingtai only contribute samples from loess units. These three sites show general differences in overall source (Fig. 3, 6B), which would therefore drive artificial differences in the combined loess and palaeosol samples. Thus, this shows that extreme caution is required when grouping data in this way, as artificial differences between grouped samples can be introduced due to the varying proportions of grains included from individual sites that show apparent age distribution differences.

When comparing the palaeosol and loess units at Beiguoyuan, the zircon age distributions look very similar (Fig. 9). This supports the idea that loess and palaeosol units on the Chinese Loess Plateau have the same ultimate source, and that either there have been unchanging dust transport pathways between glacial and interglacial periods, and/or that there has been aeolian recycling of pre-deposited Loess Plateau material (e.g., Licht et al., 2016). This lack of difference in loess and palaeosol units is also seen in the garnet end-member data. For the most part the proportions of end-member groups are similar. While there are some small differences, such as the presence of pyrope and larger percentage of almandine in the loess sample, these are too small to be considered significant. The similarity between Beiguoyuan loess and soil units also strongly reinforces the suggestion above that the differences between the combined loess and the combined palaesol age spectra are artefacts of mixing together data from multiple sites with different source signatures and different relative analysis numbers between loess and soil units.

Abrupt source shifts?

We further examine whether differences between multiple individual samples can be seen in zircon ages at the Beiguoyuan section, the first time this has been attempted. When comparing the new zircon ages (Fig. 4) from the multiple samples in L1 and S1 at Beiguoyuan, there are hints of more variability in the loess samples throughout the section than in the palaeosols. Plotting this data on an MDS map (Fig. 10) alongside the published loess data suggests that one of the largest differences can be seen between CH4/1/49-52 and CH4/1/53-56, two stratigraphically adjacent samples. The former has a much stronger c. 450 Ma peak and also larger numbers of >1.5 Ga grains. Sample CH4/1/53-56 shows the most similarity to the Gobi Altay Mountains found to the northwest of the Loess Plateau, whereas sample CH4/1/49-52 shows a large degree of similarity with the samples from the Songpan Basin (west of the Loess Plateau) (Fig. 10). While we cannot discount the possibility that these differences are due to the effect of small sample size (Pullen et al., 2014), the source shift is broadly coincident with a change in source at Beiguoyuan proposed by Stevens et al. (2013a) using luminescence, elemental chemistry and heavy mineral composition data.

To further test whether changes in source are occurring in the Beiguoyuan samples we have also analysed garnet geochemistry. The garnet end-member percentage summary is quite variable down section. The presence of the ultrabasic igneous and high-grade metamorphic garnet end-member pyrope in samples CH4/1/53-56 and CH4/1/77-80 suggests a different metamorphic source to other samples. Further, sample CH4/1/53-56 contains andradite (11%), which is commonly associated with metasomatic and calcareous metamorphic rocks. It also has the highest proportion of spessartine (45%), and the smallest percentage of grossular (11%) in the whole section, therefore appearing considerably different from the rest of the samples analysed. Particularly interesting is that this sample is “sandwiched” between samples CH4/1/49-52 and CH4/1/57-60, which show very similar garnet end-member composition. While the effect of differential garnet dissolution is a potential factor, as is low analyses numbers, the uniform loess stratigraphy and the marked differences in garnet composition of sample CH4/1/53-56 support the general conclusion from our zircon analysis of the occurrence of short-term source change. However, the shift in source does not appear entirely consistent with the zircon data. The latter indicate an anomalous shift in both samples, CH4/1/49-52 and CH4/1/53-56, while garnet data only point to a differing CH4/1/53-56 composition compared to the rest of the sampled sequence.

The only other detrital garnet dataset from the area is the results of geochemical analysis of garnets from the Northern China sandy lands, Mongolia, and Tarim (Xie and Ding, 2007). As the dataset is unfortunately not available for re-analysis, in order to test links between it and our garnet data, the latter were re-plotted following Xie and Ding's (2007) scheme (Supplementary Fig. 1). This only allows a visual comparison of the datasets, but even so some patterns are notable. For example, the Northern sandy lands (including Otindag, Horqin, Hulun Buir) lack grossular and andradite type grains, present in each of our datasets. Due to different watersheds and the nature of prevailing dust transporting winds, these sandy lands are unlikely to be Loess Plateau dust sources and this data supports this conclusion. The data also show that different areas can be distinguished using garnet end-members and reinforces the potential power of the approach. North China Craton khondalite comprises only Type- A grains and therefore is not a likely source of our Beiguoyuan samples. However, as all of our Beiguoyuan samples contain a proportion of Type- A grains, mixing of these khondalites with other grains, or episodic contributions from that area, cannot be completely excluded on the basis of these data alone.

As noted above, sample CH4/1/53-56 shows also a visible difference to the other samples under Xie and Ding's (2007) scheme, with a marked majority of grains plotting in areas A and C (Supplementary Fig. 1). The same trend is seen when plotted using Mange and Morton's (2007) tertiary diagram scheme (Fig. 5), with CH4/1/53-56 looking distinctly different from other samples. For most samples, the grains are predominantly associated with Types Bi and D with some samples also having a proportion of grains in Type A. These reflect a range of intermediate to felsic rock, and low-grade metamafic rock sources, ranging in origin from the North China Block (Zhai et al., 2007), the eastern Tianshan and Tarim Basin (Su, 2014), and the Qilian Mountains (Pirajno, 2013). On the other hand, the majority of grains in CH4/1/53-56 are associated with areas A, B, and Ci – all linked to high-grade metamorphic facies. High-grade metamorphic rocks in Central Asia are associated with the Central Asian Orogenic Belt, e.g. the eastern Tianshan or Altay Mountains. This result combined with the detrital zircon data for the same sample suggests that a shift to a more Gobi-Altay Mountains dominant source occurred in sample CH4/1/53-56. Therefore, we argue that dust provenance can shift substantially within individual sedimentary units and therefore within individual glacial stages. This may indicate changes in dominant storm tracks or dust producing areas, or indeed changes in dynamics of river transported dust material. The timing of the change in the garnet data also contrasts with results from Stevens et al. (2013a). In that study the abrupt change in source occurs in samples above CH4/1/53-56 in the section, corresponding to CH4/1/49-

52, and was shown in heavy mineral, bulk geochemical, quartz luminescence data. The shift in sample CH4/1/49-52 is also seen in zircon U-Pb ages in our study. The source change in the sample CH4/1/53-56 occurred between 20.6±0.8ka and 19.5±0.9ka, when sedimentation rates were at their highest, c. 57.42cm/ka (Stevens and Lu, 2009). This also corresponds with shifts in grain size and magnetic susceptibility. These differences are puzzling and could be explained in a number of ways. Firstly, it is possible that the change in metamorphic garnet source may occur slightly earlier than the shift in source of the major component of the dust material (as indicated by quartz luminescence). Secondly, the source change in CH4/1/53-56 may actually be showing the beginning of the provenance change in Stevens et al. (2013a), perhaps because we here combine sediment samples taken over a 60 cm depth interval that corrsponds with the level proposed as having different provenance in Stevens et al. (2013a). Another possibility is that there are dust sources operating at the same time, and that a shift in the dominant sources may occur even when a shift in metamorphic source does not, and vice versa. This is not entirely unreasonable as a change in erosion in dust source areas may be rather localised, potentially only affecting a garnet producing rock assemblage. If this is true it reinforces the need for multi-proxy approaches in provenance studies to identify the range of source types and when different types of source change may occur. The closeness in depth of the two changes may though still indicate some link, with potentially highly dynamic dust source variability over this cold, dry, peak last glacial interval. Unfortunately, a lack of data prevents this being explored further. In any case, the source shift appears in the middle of a relatively colder and dryer (stronger winter monsoon) climate phase during MIS 2, reported in mollusc assemblages (Wu et al., 2002) and pollen (Feng et al., 2007) from the Chinese Loess Plateau, lake water levels in Central Asia (Yu et al., 2013), and desert advancement (Yang and Ding, 2008). Modelling analysis by Chabangborn et al. (2014) further suggests a distinct intensity change in the winter phase of the East Asian Monsoon which coincides with our source shift at c. 20-19 ka. These changes also broadly coincide, in timing and climatic behaviour, with the North Atlantic climatic shifts including Heinrich events (Rasmussen et al., 2016).

IMPLICATIONS FOR PROVENANCE ANALYSIS

Over the last 10 years, interest in loess provenance has increased, especially on the Chinese Loess Plateau. This interest has resulted a conceptual shift of the main source of sediment from the desert areas to the North of the Plateau to the North Tibetan Plateau, with the Yellow River likely playing a key role (Licht et al., 2016; Nie et al., 2015; Stevens et al., 2013b). While there is certainly scope for continuing debate about the precise major source region, a key question now is how much more information can be obtained from detrital zircon U-Pb analyses. Given the discussion above, current practice alone may not allow further insights into source hypotheses due to limitations in resolving less common age peaks with sufficient statistical representativity, and potential bias inherent in mixing samples together to obtain a large sample size. Clearly, much can be done by undertaking high sample size analyses on multiple individual samples, but this is extremely labour intensive and the complexities of characterising possible source regions in this way are significant. As such, there is a need for the development of single-grain loess provenance methods that will complement these zircon analyses. Indeed, multi-proxy approaches may be the only way to resolve complex provenance questions such as loess sources (Tyrrell et al., 2012), and are being shown to be effective in European loess deposits (Újvári et al., 2013). Here we have presented the results of the first garnet geochemistry application to loess sediments. This pilot study demonstrates that garnet end-members can provide information regarding parent metamorphic rocks as well as identify source shifts that may not be visible in some other methods. This approach has also a benefit of only needing much smaller samples, as garnets are more common in loess than zircons (Bird et al., 2013). The integrated application of garnets and zircons is therefore a potentially powerful provenance tool that is worth further investigation. It is stressed however, that these results come with a few limitations. The RAMAN spectral analysis processing software is still unable to resolve the six garnet end-members, which are most commonly used in provenance studies. Further, the number of grains analysed per sample would ideally be higher to achieve more statistically representative results. However, it is noted that the presence of some rarer grains, such as pyrope or uvarovite, is often sufficient to point to a specific metamorphic setting. The development of garnet type or other single grain provenance indicators requires substantial investment in characterising potential source rocks, for which few datasets exist currently. Additional lines of approach would be to obtain multiple lines of data from single zircon grains, as through the application of Hf isotopes to zircons dated using U-Pb (Újvári and Klötzli, 2015), as well as the use of other indicators such as heavy mineral assemblages (Bird et al., 2015; Stevens et al., 2013b) or rutile chemistry (Újvári et al., 2013). In any case, a key challenge now in loess provenance research is to identify complementary approaches that can address ambiguities inherent in U-Pb zircon dating results.

CONCLUSIONS

The approach of using large zircon U-Pb age datasets taken in this study shows that the deserts north of the Chinese Loess Plateau are not the main source of dust to the Plateau, in agreement with Bird et al. (2015), Nie et al. (2015), Pullen et al. (2011), and Stevens et al. (2013b). Some spatial variation between loess sites is seen. However, it is hard to definitively determine whether these differences reflect true source variations or a statistical artefact due to differing numbers of analysed grains at each site, particularly as in some cases the only differences in age spectra are seen in the poorly constrained uncommon age peaks. The small variation in site age spectra combined with the differential numbers of analyses in loess and soil units also most likely explains the (albeit small) zircon U-Pb age distribution variation between loess and palaeosols. Within the limits of the technique, this shows there is no or limited source difference between glacials and interglacials. As such, this demonstrates that increasing the number of zircons analysed by grouping datasets together will not elucidate any further information on the source(s) of Chinese loess.

This study also presents the results of the first high resolution, multi-proxy provenance investigation of loess from the Beiguoyuan site. The detrital garnet geochemistry combined with detrital zircon dating show that Beiguoyuan experienced a temporary, abrupt provenance shift at 20.6±0.8ka and 19.5±0.9ka supporting the suggestion of Stevens et al. (2013a) that abrupt changes to specific dust sources are possible in the Quaternary. The precise nature of this shift in relation to the one seen in Stevens et al. (2013a) remains unclear however. It is likely that this time period was arid and windy, characterised by highly variable dust sources.

These results have significant implications for loess provenance studies. Firstly, showing that zircon U-Pb dating alone is likely unable to distinguish further source detail for Quaternary loess, and implying a need to complement zircon U-Pb analysis with provenance methods like garnet geochemistry. Secondly, rapid changes in provenance within single loess units imply that the way sites are sampled needs to be reconsidered, as a single sample from an extensive sedimentary unit may not be truly representative of the source, and source variability, of sediments forming that unit.

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LIST OF FIGURES

Figure 1. Map of source group used in this study, insert shows location of sites across the Chinese Loess Plateau. CS – Cretaceaus Sandstone, BYN – Beiguoyuan, WN – Weinan, LT-Lingtai, JBN – Jingbian, LCN – Heimugou, XF – Xifeng, XN – Xining, CXN – Caoxian. The details of the nature location and the number of samples used see Supplementary Table 1.

Figure 2. Zircon U-Pb Kernel Density Estimator (KDE) diagram for potential dust sources and the Chinese Loess Plateau. Source data and the loess and palaeosol samples are grouped from multiple samples. See Supplementary Table 1 for the data sources.

Figure 3. Zircon U-Pb Kernel Density Estimator (KDE) diagram for potential dust sources and the grouped data for each loess site.

Figure 4. Stratigraphic log of the analysed Beiguoyuan section, OSL dates for each sample (original data adapted from Stevens et al., (2008)), zircon U-Pb Kernel Density Estimator (KDE) diagram and percentage of garnet end-members for each sample from Beiguoyuan.

Fig 5. Garnet data from this study using Morton and Mange (2007) scheme. Samples are presented in stratigraphic order with beige colour denoting loess and brown palaeosol. A — mainly from high-grade granulite-facies metasediments or charnockites and intermediate felsic igneous rocks, B—amphibolite-facies metasedimentary rocks, Bi—intermediate to felsic igneous rocks, Ci—mainly from high-grade mafic rocks, Cii—ultramafics with high Mg (pyroxenites and peridotites), D—metasomatic rocks, very low-grade metamafic rocks and ultrahigh temperature metamorphosed calc-silicate granulites.

Figure 6. A. Multi-dimensional Scaling (MDS) diagram for zircon data in the Figure 2, showing average Chinese Loess Plateau sample and source data. B. MDS map for data in the Figure 4, showing source data and the average values for loess sites across the Chinese Loess Plateau. Solid and dashed lines connect samples with the smallest and second-smallest KS-distances, respectively.

Figure 7. Age distributions presented as a cumulative percentage. A - averages for each loess site (BYN – Beiguoyuan, WN – Weinan, LT- Lingtai, JBN – Jingbian, LCN – Heimugou, XF – Xifeng, XN – Xining, CXN – Caoxian). B – averages for grouped loess and palaeosol samples. Numbers in parentheses are number of grains per sample.

Figure 8. Multi-dimensional scaling (MDS) map for data in the Figure 2, showing source data and the grouped loess and palaeosol samples. Full lines connect the two most similar samples, whereas dotted lines show the second closest data matches.

Figure 9. Kernel density diagram of zircon ages and percentage of garnet end-members for the L1LL1 loess and the L1SS1 palaeosol from Beiguoyuan.

Figure 10. Multi-dimensional scaling (MDS) map for potential source areas as well as individual Beiguoyuan samples based on zircon ages. Full lines connect the two most similar samples, whereas dotted lines show the second closest data matches. The insert shows an enlarged the part of the graph. Hexagons represent data from this study and circles show published datasets. For clarity, sample codes for samples analysed in this study are shortened (e.g. CH4/1/49-52 is B(49-52). The previously published data from Beiguoyuan is referred to as ‘B’ with the stratigraphic location denoted in the parentheses.

Figure 1

Click here to download Figure Figure 1.pdf

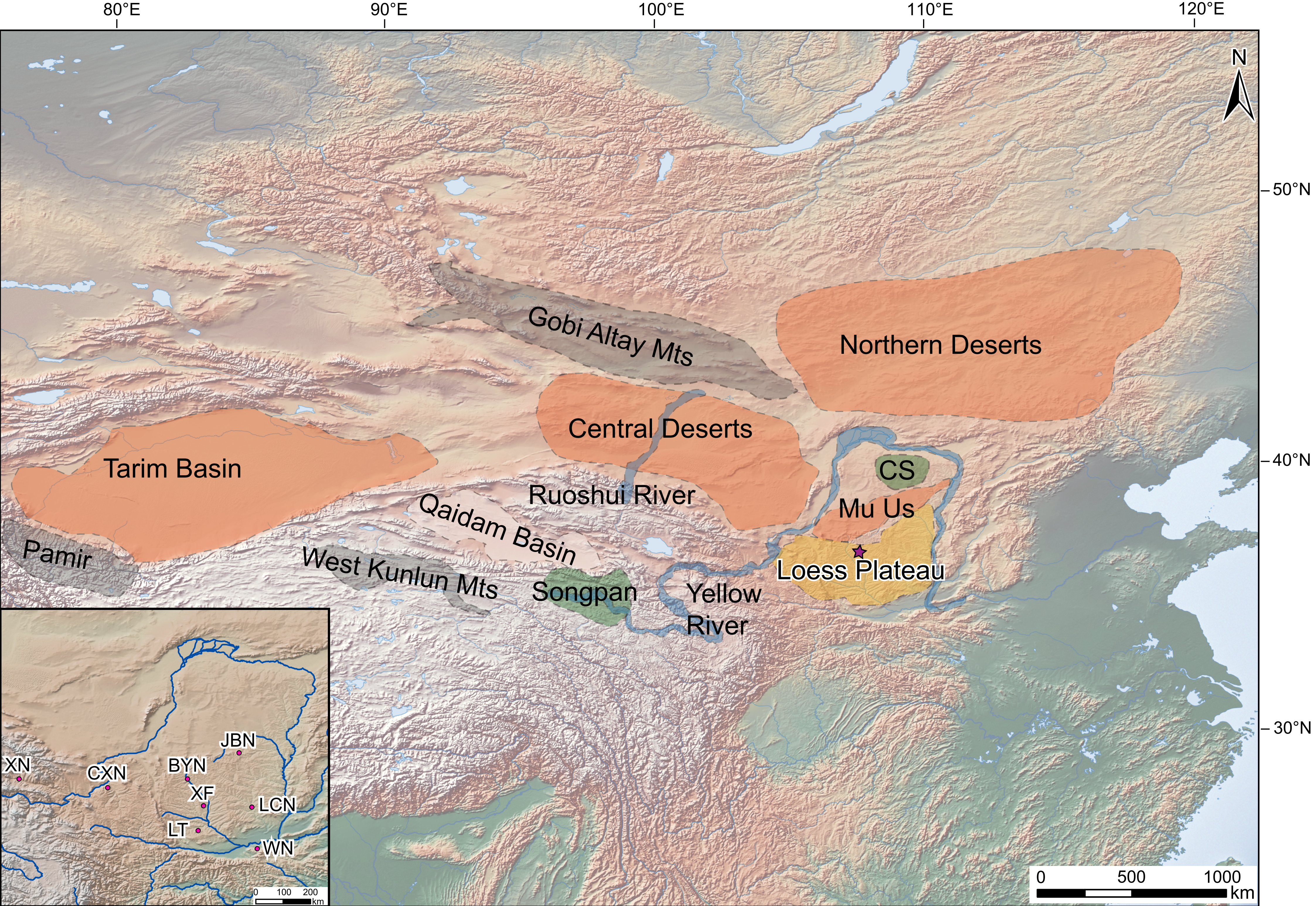


Figure 2

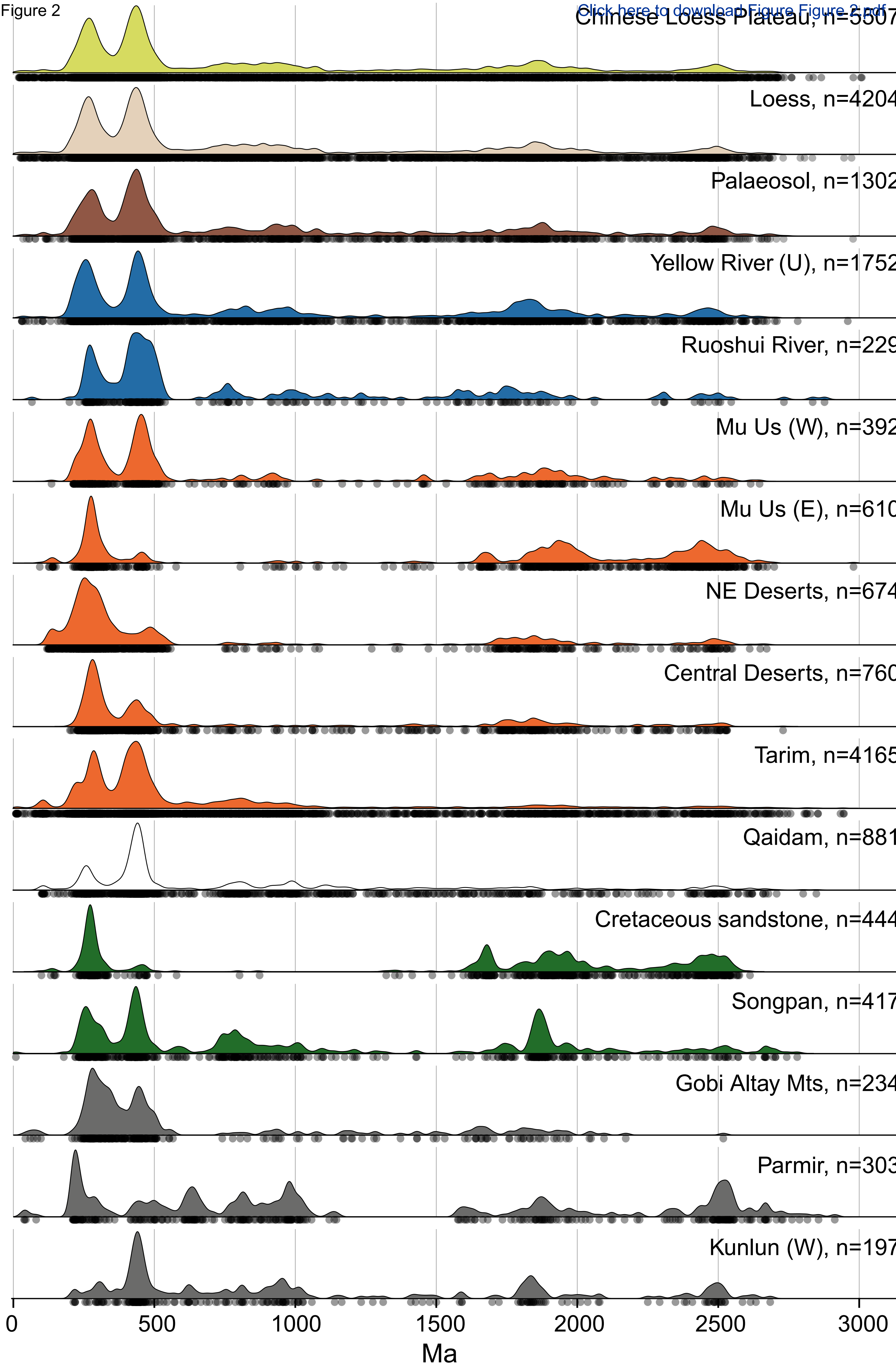

Chinese Loess Plateau, n=5507
Loess, n=4204
Palaeosol, n=1302
Yellow River (U), n=1752
Ruoshui River, n=229
Mu Us (W), n=392
Mu Us (E), n=610
NE Deserts, n=674
Central Deserts, n=760
Tarim, n=4165
Qaidam, n=881
Cretaceous sandstone, n=444
Songpan, n=417
Gobi Altay Mts, n=234
Parmir, n=303
Kunlun (W), n=197
0
500
1000
1500
2000
2500
3000
Ma

Figure 3

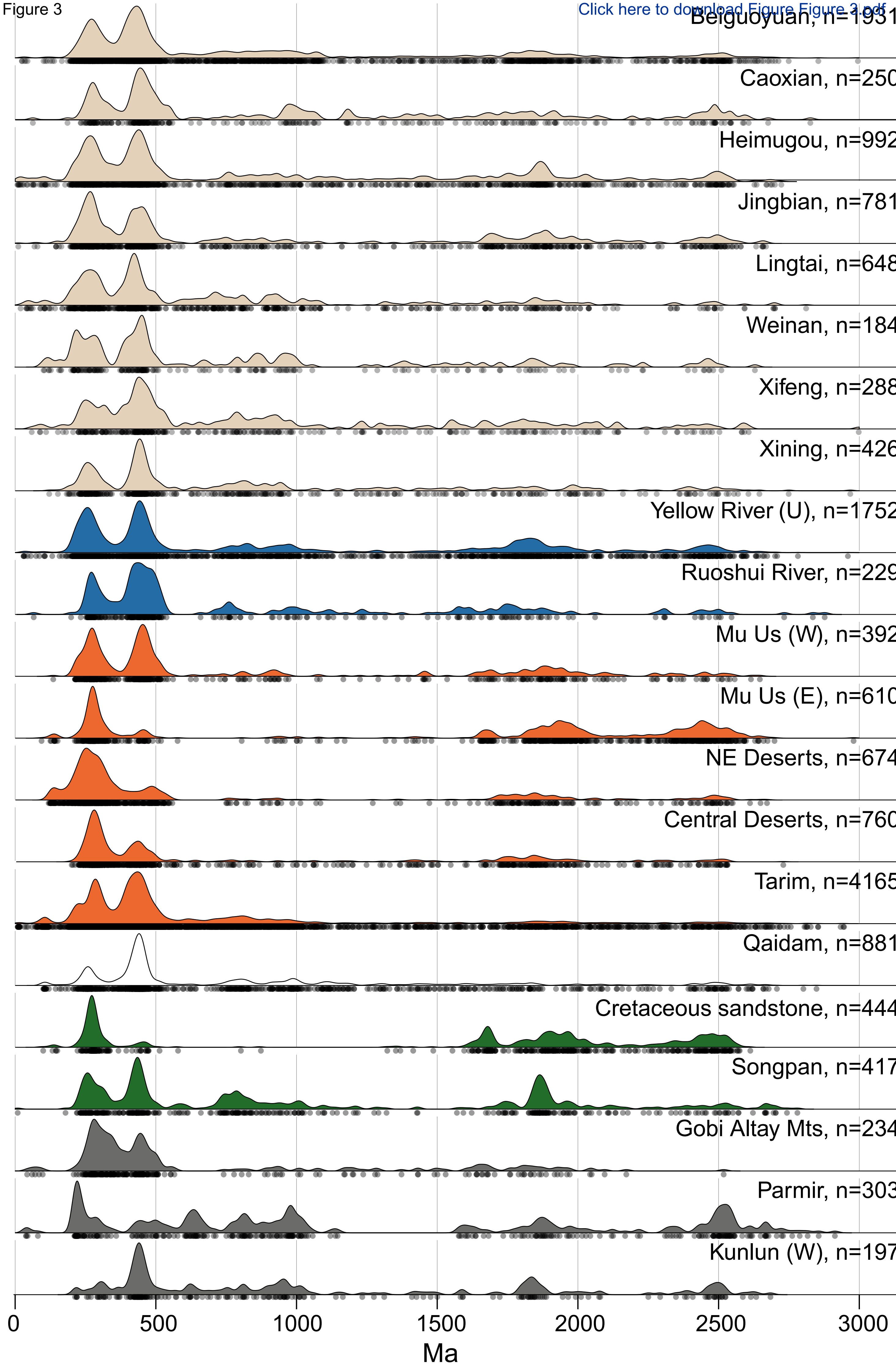

Beiguoyuan, n=1931
Caoxian, n=250
Heimugou, n=992
Jingbian, n=781
Lingtai, n=648
Weinan, n=184
Xifeng, n=288
Xining, n=426
Yellow River (U), n=1752
Ruoshui River, n=229
Mu Us (W), n=392
Mu Us (E), n=610
NE Deserts, n=674
Central Deserts, n=760
Tarim, n=4165
Qaidam, n=881
Cretaceous sandstone, n=444
Songpan, n=417
Gobi Altay Mts, n=234
Parmir, n=303
Kunlun (W), n=197
0
500
1000
1500
2000
2500
3000
Ma

Figure 4

Click here to download Figure Figure 4.pdf

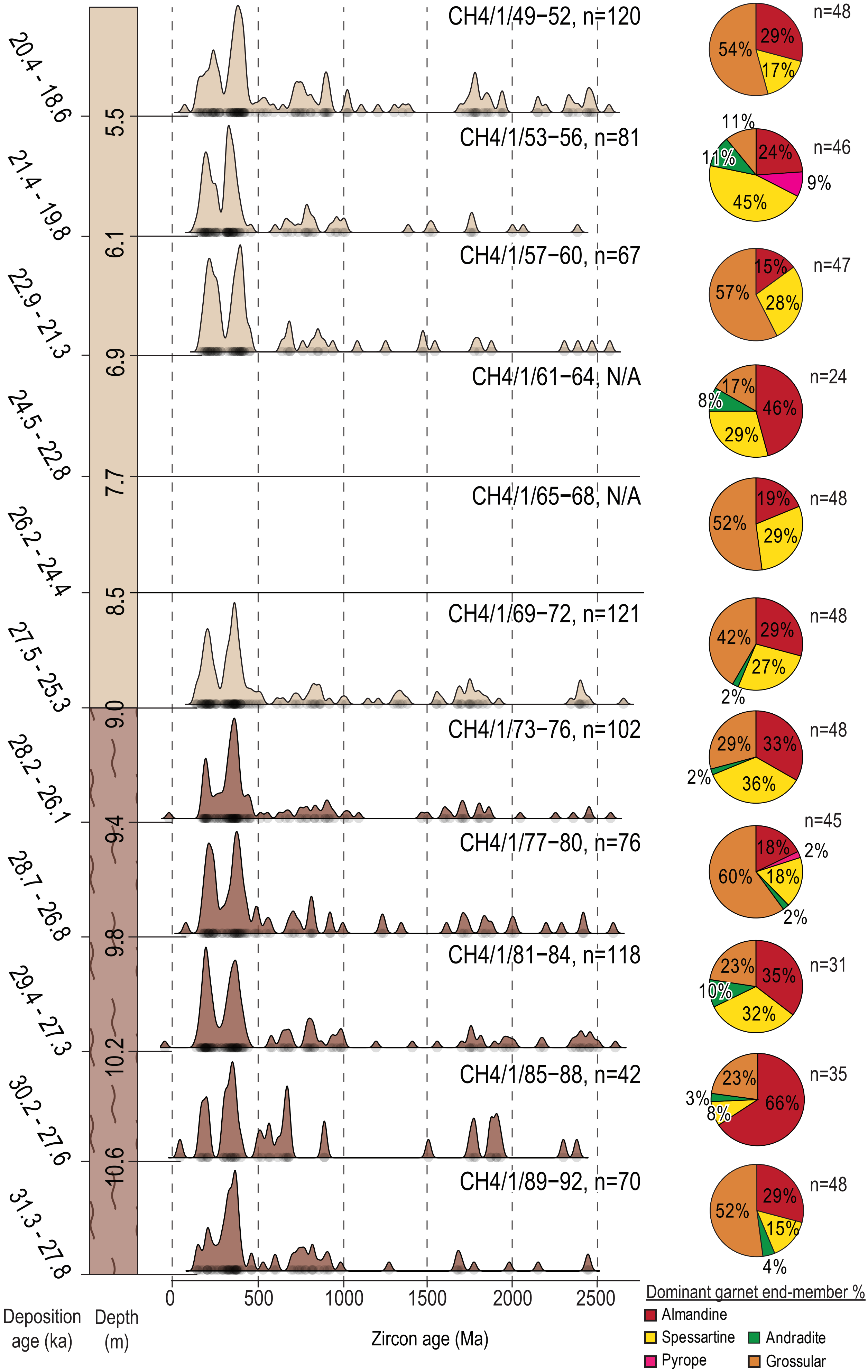


Figure 5

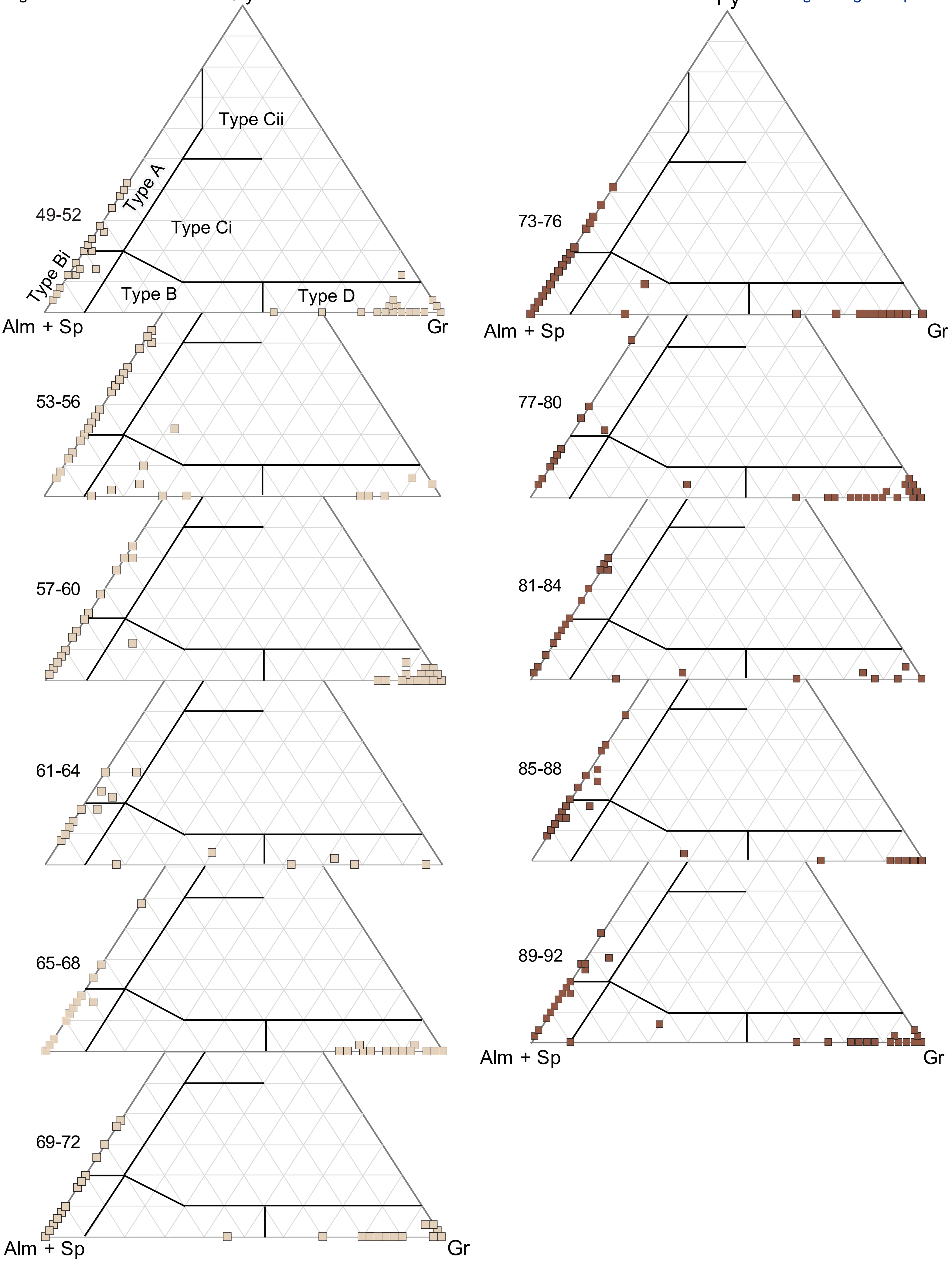

Py
Type Cii
Type A
Type Ci
Type Bi
Type B
Type D
Alm + Sp
Gr
49-52
53-56
57-60
61-64
65-68
69-72
73-76
77-80
81-84
85-88
89-92

Figure 6

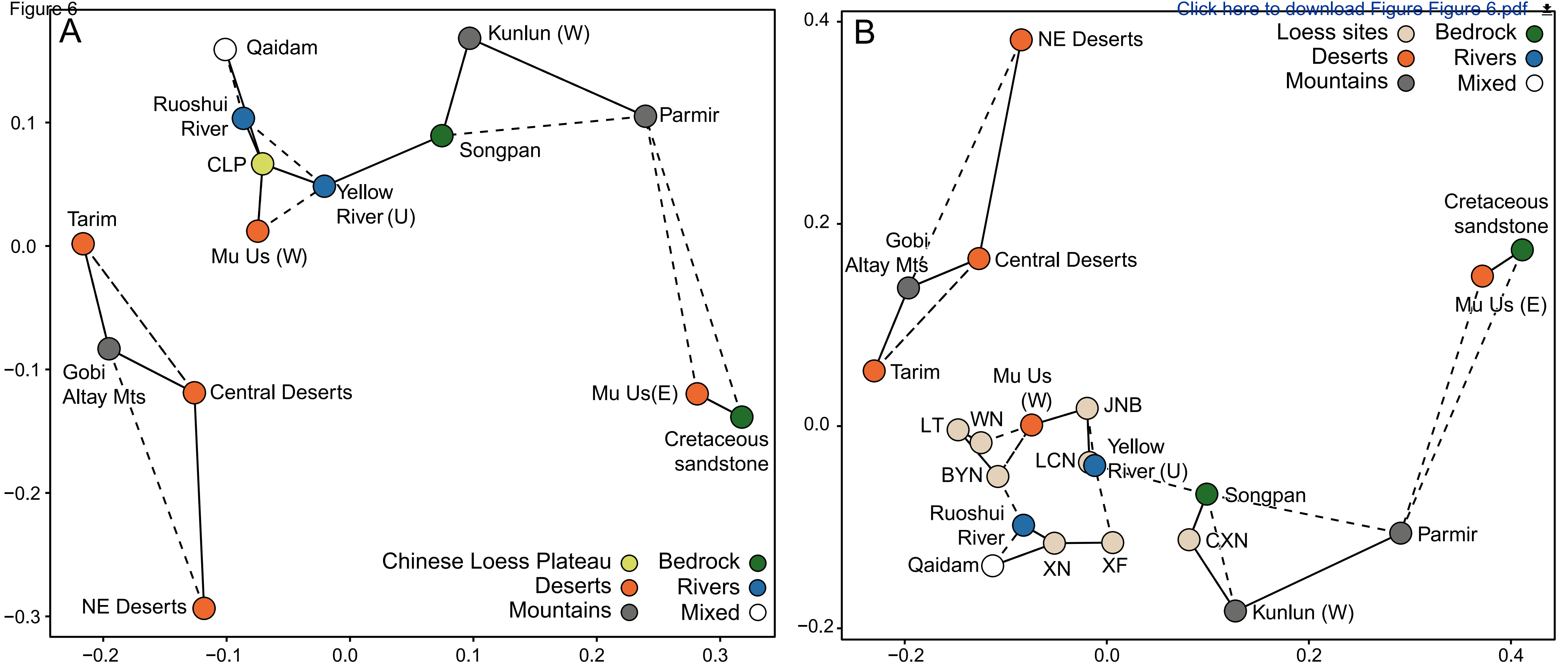
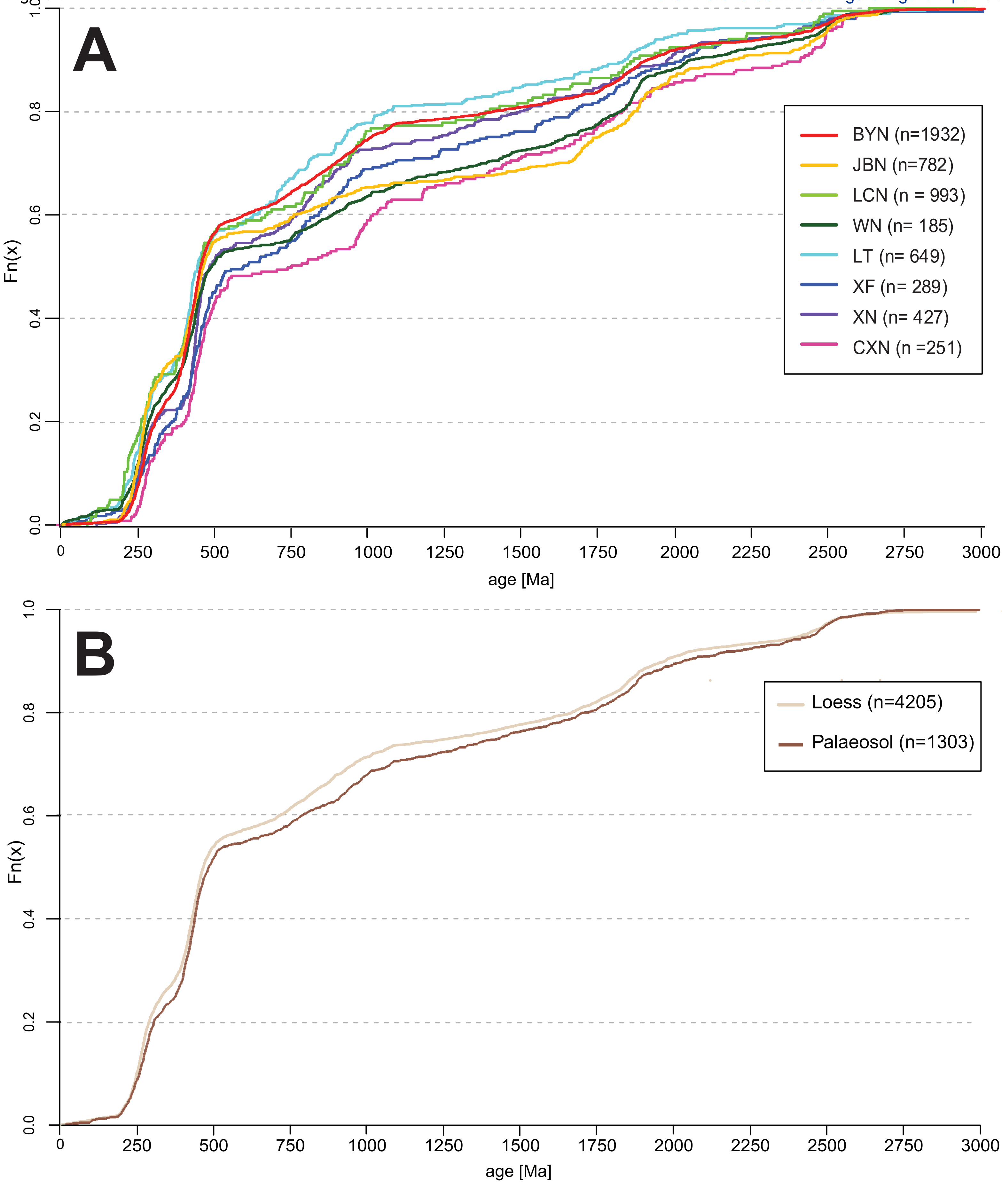
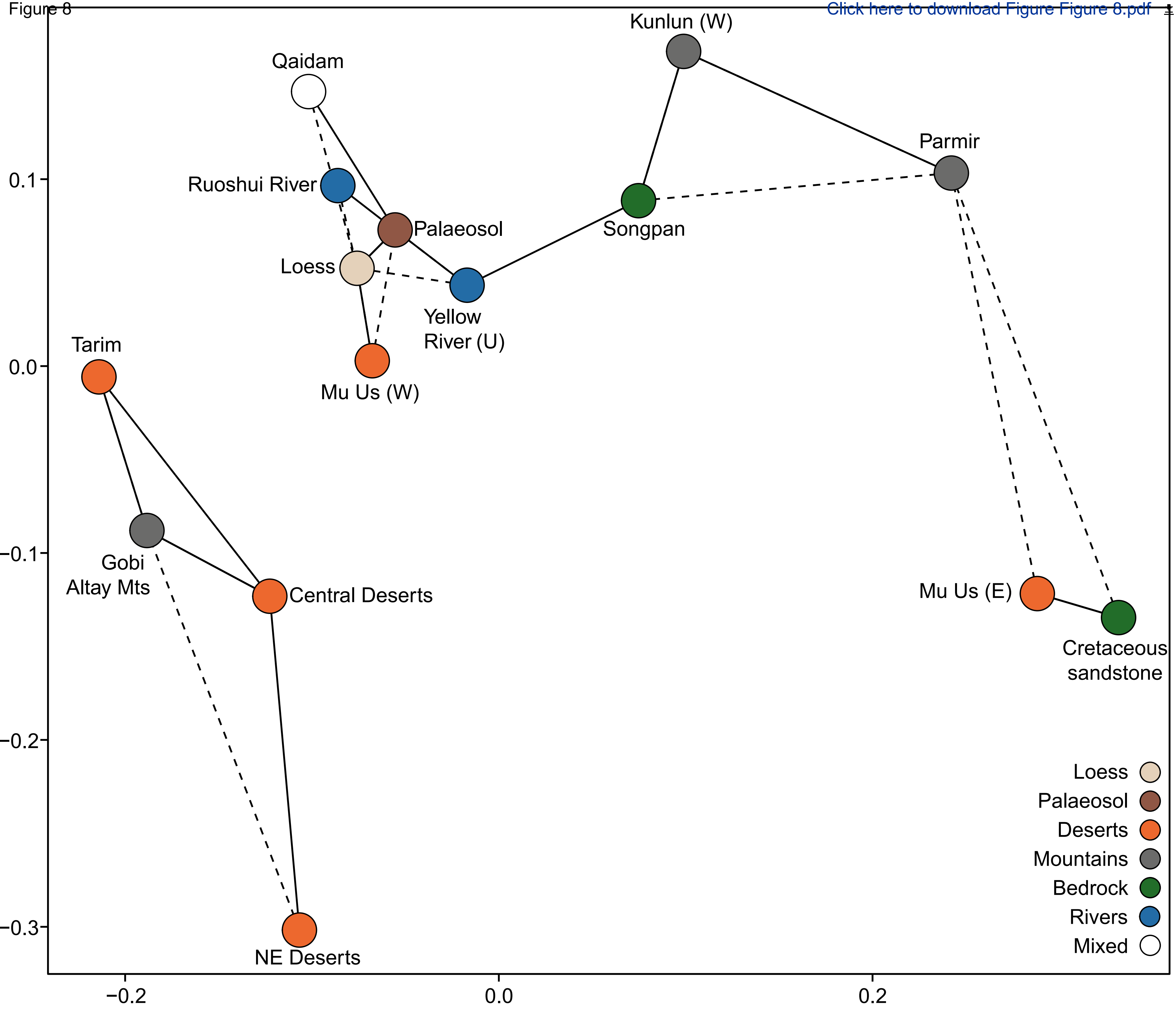

A
Qaidam
Kunlun (W)
Ruoshui River
Parmir
Songpan
CLP
Yellow River (U)
Tarim
Mu Us (W)
Gobi Altay Mts
Central Deserts
Mu Us(E)
Cretaceous sandstone
NE Deserts
Chinese Loess Plateau
Deserts
Mountains
Bedrock
Rivers
Mixed
0.1
0.0
−0.1
−0.2
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
B
NE Deserts
Loess sites
Deserts
Mountains
Bedrock
Rivers
Mixed
Gobi Altay Mts
Central Deserts
Cretaceous sandstone
Mu Us (E)
Tarim
Mu Us (W)
JNB
LT
WN
Yellow River (U)
LCN
BYN
Songpan
Ruoshui River
CXN
Parmir
Qaidam
XN
XF
Kunlun (W)
0.4
0.2
0.0
−0.2
−0.2
0.0
0.2
0.4

Figure 7

Click here to download Figure Figure 7.pdf





Kunlun (W)
Qaidam
Parmir
0.1
Ruoshui River
Palaeosol
Songpan
Loess
Yellow
River (U)
Tarim
0.0
Mu Us (W)
Gobi
Altay Mts
−0.1
Central Deserts
Mu Us (E)
Cretaceous
sandstone
−0.2
Loess
Palaeosol
Deserts
Mountains
Bedrock
Rivers
Mixed
−0.3
NE Deserts
−0.2
0.0
0.2

Figure 9

Click here to download Figure Figure 9.pdf

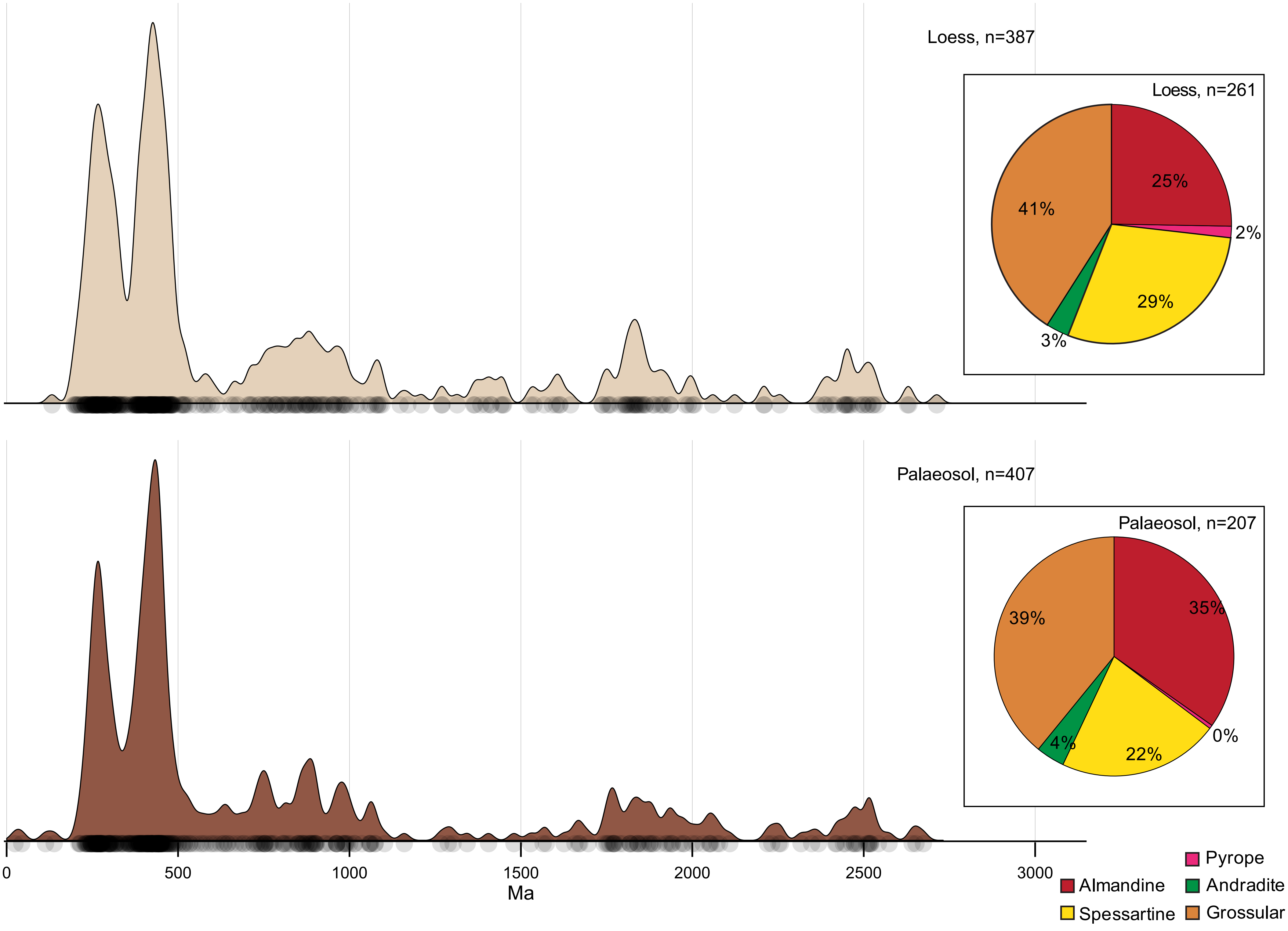
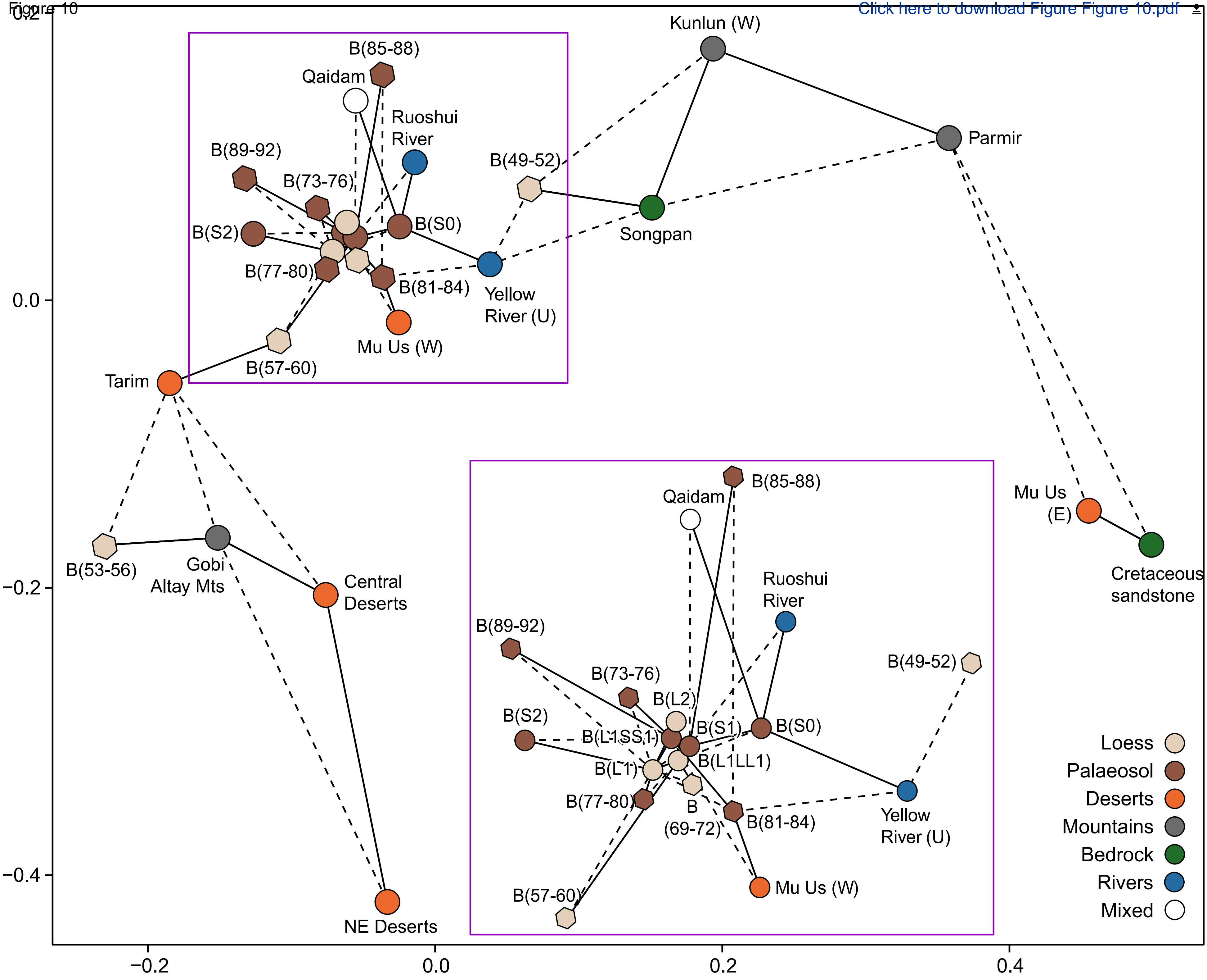
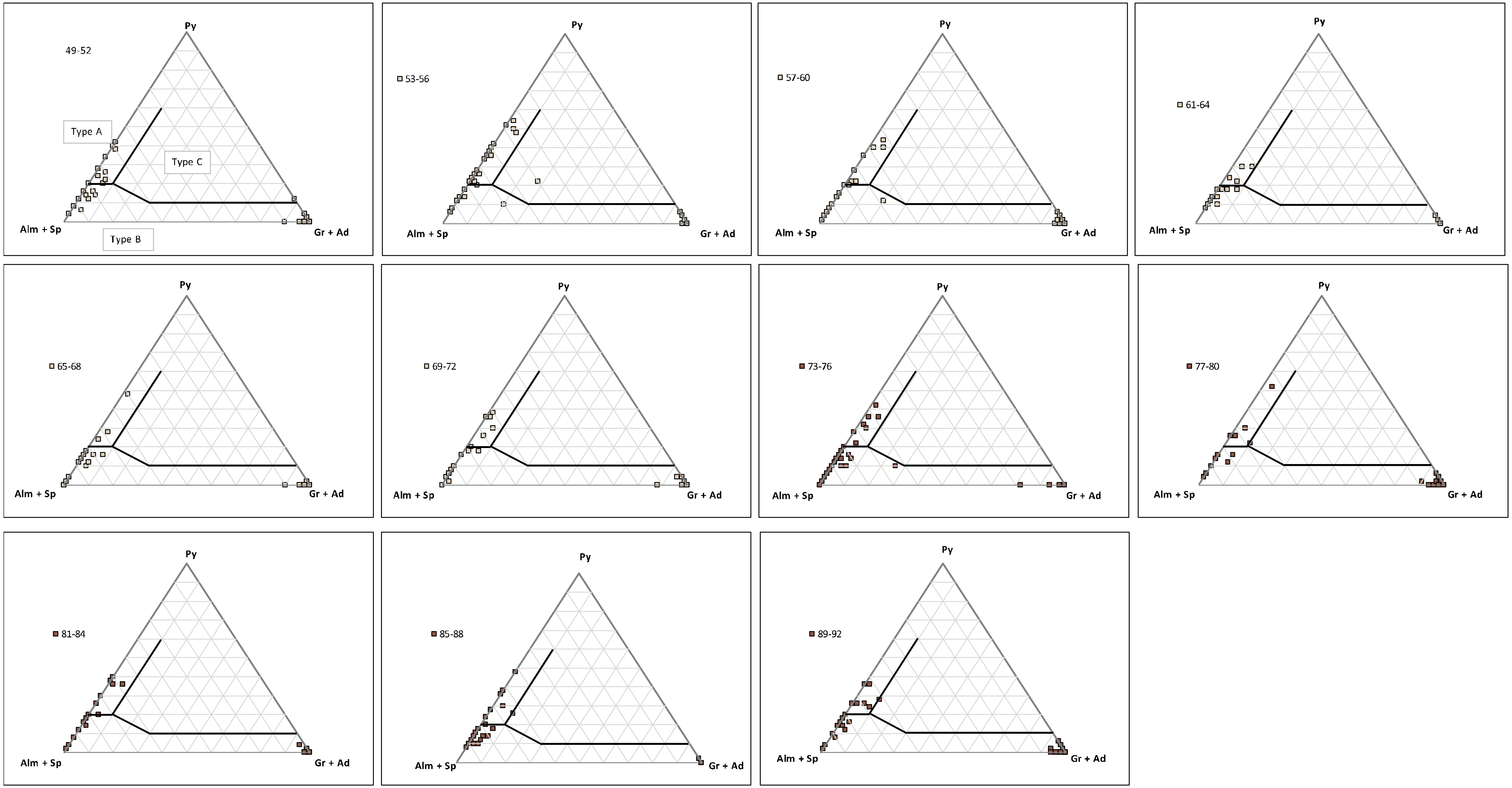


Figure 10

Click here to download Figure Figure 10.pdf



SUPPLEMENTARY FIGURES



Supplementary Figure 1. Garnet data from this study plotted using (Xie and Ding, 2007) scheme. Type-A garnets are low Ca-Mn, high Mg derived from high-grade (granulite facies) metasediments and charnockites. Type-B are Low Mg, variable Ca and Mn typical of metasediment sources with intermediate metamorphic grade, and intermediate to acidic gneisses and granites. Type – C are high Mg, high Ca derived from high-grade gneiss, eclogites, and ultrabasic rocks e.g. peridotites and pyroxenites.

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Nature, location, sample names and number U-Pb ages used in this analysis			
Sample name	**n**	**Nature**	**Reference**
Loess			
Beigoyuan			
B(49-52)	120	Loess (L1LL1)	This study
B(53-56)	81	Loess (L1LL1)	This study
B(57-60)	67	Loess (L1LL1)	This study
B(69-72)	121	Loess (L1LL1)	This study
B(73-76)	102	Palaeosol (L1SS1)	This study
B(77-80)	76	Palaeosol (L1SS1)	This study
B(81-84)	118	Palaeosol (L1SS1)	This study
B(85-88)	42	Palaeosol (L1SS1)	This study
B(89-92)	70	Palaeosol (L1SS1)	This study
CH04/01/16-19	84	Loess (L1LL1)	Stevens et al. (2010)
CH11-05-01	96	Palaeosol (S0)	Bird et al. (2015)
CH11-05-02	89	Palaeosol (S0)	Bird et al. (2015)
CH11-05-03	102	Loess (L1LL1)	Bird et al. (2015)
CH11-05-06	107	Loess (L1LL2)	Bird et al. (2015)
CH11-05-07	91	Palaeosol (S1)	Bird et al. (2015)
CH11-05-08	95	Palaeosol (S1)	Bird et al. (2015)
CH11-05-09	125	Palaeosol (S1)	Bird et al. (2015)
CH11-05-10	84	Loess (L2)	Bird et al. (2015)
CH11-05-11	121	Loess (L2)	Bird et al. (2015)
CH11-05-12	76	Loess (L2)	Bird et al. (2015)
CH11-05-13	65	Palaeosol (S2)	Bird et al. (2015)
Caoxian			
CaoxianL1	251	Loess (L1)	Che & Li (2013)
Heimugou			
HL1	84	Loess (L1)	Pullen et al. (2011)
HL9	165	Loess (L9)	Pullen et al. (2011)
HL15	239	Loess (L15)	Pullen et al. (2011)
HL33	39	Loess (L33)	Pullen et al. (2011)
S-0	94	Palaeosol (S0)	Licht et al. (2016)
S-1	108	Palaeosol (S1)	Licht et al. (2016)
S-9	103	Palaeosol (S9)	Licht et al. (2016)
S-15	105	Palaeosol (S15)	Licht et al. (2016)
S-22	95	Palaeosol (S22)	Licht et al. (2016)
Jingbian			
CH11-04-01	124	Loess (L3)	Bird et al. (2015)
CH11-04-05	203	Loess (L4)	Bird et al. (2015)
CH11-04-09	76	Loess (L16)	Bird et al. (2015)
CH11-04-10	113	Palaeosol (S17)	Bird et al. (2015)
CH11-04-11	97	Loess (L18)	Bird et al. (2015)
Lingtai			
CH11-06-01	104	Loess (L1)	Bird et al. (2015)
CH11-06-02	85	Loess (L2)	Bird et al. (2015)
CH11-06-03	105	Loess (L3)	Bird et al. (2015)
CH11-06-04	76	Loess (L4)	Bird et al. (2015)
CH11-06-05	80	Loess (L5)	Bird et al. (2015)
Weinan			
Weinan-10YG-L1	96	Loess (L1)	Xiao et al. (2012)
Weinan-10YG-S1	88	Palaeosol (S1)	Xiao et al. (2012)
Xifeng			
Xifeng-XF-L1	90	Loess (1)	Xiao et al. (2012)
Xifeng-XF-S1	68	Palaeosol (S1)	Xiao et al. (2012)

XifengL1	131	Loess (L1)	Che & Li (2013)
XifengS1	261	Palaeosol (S1)	Che & Li (2013)
Xining			
Xining-CJB-S0	81	Palaeosol (S0)	Xiao et al. (2012)
Xining-CJB-L1	103	Loess (L1)	Xiao et al. (2012)
XiningL1	243	Loess (L1)	Che & Li (2013)
<u>Sources</u>			
Rivers			
RSH02	230	Ruoshui River	Che & Li (2013)
YD-1	121	Upper reaches Yellow River	Stevens et al. (2013)
CH12–16	145	Upper reaches Yellow River	Nie et al. (2015)
CH12–17	125	Upper reaches Yellow River	Nie et al. (2015)
CH12–18	129	Upper reaches Yellow River	Nie et al. (2015)
CH12–19	134	Upper reaches Yellow River	Nie et al. (2015)
CH12–20	128	Upper reaches Yellow River	Nie et al. (2015)
CH12–21	119	Upper reaches Yellow River	Nie et al. (2015)
YR-1	121	Upper reaches Yellow River	Nie et al. (2015)
CH11YR03–04	111	Upper reaches Yellow River	Nie et al. (2015)
YR-9C	107	Upper reaches Yellow River	Nie et al. (2015)
BY	120	Upper reaches Yellow River	Nie et al. (2015)
YL	89	Upper reaches Yellow River	Nie et al. (2015)
13YELLOW01	367	Upper reaches Yellow River	Licht et al. (2016)
Deserts			
TD1	86	Tengger - Central Deserts	Stevens et al. (2010)
13DUNE03	81	Tengger - Central Deserts	Licht et al. (2016)
13DUNE05	88	Tengger - Central Deserts	Licht et al. (2016)
13DUNE06	91	Tengger - Central Deserts	Licht et al. (2016)
13DUNE02*	82	Tengger - Central Deserts	Licht et al. (2016)
13DUNE07*	94	Badain Jaran - Central Deserts	Licht et al. (2016)
13DUNE09*	90	Badain Jaran - Central Deserts	Licht et al. (2016)
13YARD01	82	Badain Jaran - Central Deserts	Licht et al. (2016)
13YARD02	66	Badain Jaran - Central Deserts	Licht et al. (2016)
MD01	152	Mu Us East	Stevens et al. (2010)
MD-2	117	Mu Us East	Stevens et al. (2013)
MD-5	116	Mu Us East	Stevens et al. (2013)
MD-7	93	Mu Us East	Stevens et al. (2013)
13DUNE01	94	Mu Us East	Licht et al. (2016)
MD-3	113	Mu Us West	Stevens et al. (2013)
MD-4	74	Mu Us West	Stevens et al. (2013)
MD-9	108	Mu Us West	Stevens et al. (2013)
MD-10	98	Mu Us West	Stevens et al. (2013)
Horqin Sandy Land	54	Horqin - Northern Deserts	Stevens et al. (2010)
Otindag Sandy Land	84	Otindag - Northern Deserts	Stevens et al. (2010)
H1-1	119	Northeast Deserts - Northern Deserts	
H1-5	119	Northeast Deserts - Northern Deserts	Xie et al. (2007)
H4-1	119	Northeast Deserts - Northern Deserts	Xie et al. (2007)
EEDT-1	119	Central Mongolia - Northern Deserts	Xie et al. (2007)
ELN-1	60	Central Mongolia - Northern Deserts	Xie et al. (2007)

TZ-1	119	Tarim	Xie et al. (2007)
multiple	4047	Combined Tarim Basin and Rivers within Tarim	Rittner et al. (2016)
Mixture of settings			
10QBAP04	88	Qaidam Basin	Pullen et al. (2011)
MT226	268	Qaidam Basin	Pullen et al. (2011)
MT97	186	Qaidam Basin	Pullen et al. (2011)
4–18–09–1	86	Qaidam Basin	Licht et al. (2016)
4–17–09–1	90	Qaidam Basin	Licht et al. (2016)
4–27–09–1	161	Qaidam Basin	Licht et al. (2016)
Bedrock			
MD-6	58	Cretaceous sandstone	Stevens et al. (2013)
MD-8	119	Cretaceous sandstone	Stevens et al. (2013)
13COSMO01	84	Cretaceous sandstone	Licht et al. (2016)
13COSMO02	92	Cretaceous sandstone	Licht et al. (2016)
13COSMO03	90	Cretaceous sandstone	Licht et al. (2016)
UTYa3	60	Songpan Basin	Enkelmann et al. (2007)
02UTZ4	48	Songpan Basin	Enkelmann et al. (2007)
02MTZ1	48	Songpan Basin	Enkelmann et al. (2007)
02UTZu1	38	Songpan Basin	Enkelmann et al. (2007)
10HXAP02	81	Songpan Basin	Pullen et al. (2011)
10HXAP03	78	Songpan Basin	Pullen et al. (2011)
10HXAP04	72	Songpan Basin	Pullen et al. (2011)
Mountains			
YG02	234	Gobi-Altay Mountains	Che & Li (2013)
Pamir	303	Pamir	Pullen et al. (2011)
Kunlun	197	Kunlun	Pullen et al. (2011)

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input: 49-52.csv
n samples: 150
concordant to +5/-15%: 120 (80.0%)
cut-off at 1100 Ma (85 younger | 35 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/U	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	312.4	27.6	0.6775	0.07008	0.00091	0.74985	0.00993	0.07761	0.00088
G002	504.6	47.9	0.4338	0.07214	0.00086	0.88199	0.01087	0.08868	0.00099
G003	260.8	113.2	0.4518	0.13861	0.00153	7.48612	0.08738	0.39174	0.00435
G004	666	26.5	0.4393	0.05503	0.00074	0.28693	0.00392	0.03782	0.00043
G005	369.9	110.5	0.1366	0.11242	0.00125	4.66215	0.05462	0.3008	0.00334
G006	139.9	55.8	1.1526	0.13346	0.00155	5.66449	0.06893	0.30784	0.00349
G007	1183.7	46.5	0.4476	0.06089	0.00073	0.31443	0.00393	0.03745	0.00042
G008	524.8	75.4	0.5977	0.07132	0.00082	1.26588	0.01527	0.12875	0.00143
G009	193.5	17.8	1.0778	0.05629	0.00083	0.57025	0.00853	0.07348	0.00085
G010	710.5	233.3	0.5377	0.11346	0.00124	4.64929	0.05369	0.29723	0.00328
G011	185.6	12.8	0.4739	0.06053	0.00093	0.53985	0.00829	0.0647	0.00076
G012	654.9	186.7	0.2283	0.11784	0.0013	4.54113	0.05293	0.27953	0.0031
G013	352.9	58	0.2927	0.07038	0.00083	1.5645	0.01927	0.16125	0.00181
G014	218.3	11.6	0.4641	0.05464	0.00091	0.37634	0.00626	0.04996	0.00059
G015	400	35	1.0713	0.05586	0.00074	0.54333	0.00742	0.07055	8.00E-04
G016	280.4	14.9	0.5226	0.09446	0.00133	0.62027	0.00876	0.04763	0.00056
G017	233.3	36	1.0011	0.06686	0.00086	1.15294	0.01529	0.1251	0.00143
G018	541.8	44	0.8787	0.05579	0.00071	0.52366	0.00685	0.06809	0.00077
G019	656.2	50.4	0.7029	0.06322	0.00078	0.59633	0.00761	0.06843	0.00077
G020	779.1	65.2	0.0251	0.42591	0.00848	4.89647	0.08438	0.0834	0.00142
G021	1845.1	309.6	0.6522	0.07149	0.00079	1.48502	0.01735	0.15069	0.00167
G022	624.2	107.6	0.5536	0.07192	0.00083	1.56858	0.01901	0.15822	0.00177
G023	217	18.1	0.8277	0.05427	0.00082	0.53344	0.00816	0.0713	0.00083
G024	517.6	93.1	0.1469	0.08119	0.00092	2.06033	0.02472	0.18408	0.00206
G025	2444.4	267.9	0.5143	0.06755	0.00076	0.93336	0.01108	0.10024	0.00112
G026	202	61.7	0.5284	0.1093	0.00127	4.16605	0.051	0.27649	0.00313
G027	533.3	173.6	0.1636	0.1129	0.00125	5.02645	0.05921	0.32298	0.0036
G028	319	50.6	0.5239	0.0703	0.00085	1.40684	0.01788	0.14518	0.00165
G029	169.3	7.8	0.495	0.06383	0.00119	0.37365	0.00686	0.04247	0.00053
G030	466	61.5	0.2146	0.07565	0.00092	1.39111	0.01775	0.13339	0.00152
G031	325.5	22.3	0.4779	0.05666	0.00083	0.50379	0.00748	0.0645	0.00075
G032	476.5	35.6	1.0356	0.05549	0.00075	0.4591	0.00635	0.06002	0.00069
G033	917.6	42	0.5614	0.05208	0.00067	0.30066	0.00399	0.04188	0.00048
G034	1415.7	108.3	0.3212	0.059	0.00068	0.62847	0.00768	0.07728	0.00087
G035	137.9	45.4	0.4273	0.1072	0.00128	4.49679	0.05672	0.30433	0.0035
G036	993.5	62.6	0.2403	0.06886	0.00082	0.59692	0.00749	0.06289	0.00071
G037	396.7	21	0.6516	0.05195	0.00079	0.34077	0.00524	0.04758	0.00056
G038	905.2	30.1	0.1681	0.05726	0.00077	0.27062	0.00374	0.03429	0.00039
G039	410.5	172	0.5461	0.15343	0.00171	7.92805	0.09462	0.37488	0.00422
G040	781	39.7	0.1225	0.05338	0.00068	0.39355	0.00521	0.05349	0.00061
G041	1838.5	151.6	0.7476	0.05604	0.00066	0.55789	0.00692	0.07222	0.00081
G042	280.4	37.1	0.7114	0.07775	0.001	1.24768	0.01664	0.11643	0.00135
G043	139.9	6.8	0.42	0.16079	0.00278	0.94139	0.01553	0.04248	0.00057
G044	142.5	51.3	0.5843	0.11658	0.00139	5.16887	0.06513	0.32166	0.00371
G045	143.8	8.7	0.6796	0.06265	0.0012	0.46064	0.00873	0.05334	0.00068
G046	3.3	NaN	1.6235	0.84319	0.01767	52.09131	1.11448	0.44821	0.01053
G047	960.1	324.9	0.4156	0.11203	0.00125	4.84777	0.05811	0.31394	0.00353
G048	4177.7	1367.3	6.7081	0.76758	0.00885	39.70624	0.48748	0.3753	0.00442

G049	124.8	8.8	0.6308	0.06352	0.00121	0.55594	0.0105	0.0635	0.00081
G050	675.8	96.3	0.3204	0.06995	0.00083	1.34428	0.01683	0.13942	0.00158
G051	1518.9	96.9	0.1463	0.06157	0.00073	0.56128	0.00705	0.06614	0.00075
G052	407.8	42.8	0.6801	0.06748	0.00088	0.87041	0.01183	0.09358	0.00108
G053	1066	41.7	0.5258	0.0682	0.00095	0.33824	0.00482	0.03599	0.00042
G054	863.4	59.3	0.0361	0.0568	7.00E-04	0.58026	0.00756	0.07412	0.00085
G055	112065.8	39315.8	0.004	0.11862	0.00137	5.8678	0.07254	0.35891	0.0041
G056	401.3	30.5	0.4917	0.08041	0.00122	0.7783	0.01192	0.07022	0.00085
G057	356.9	37.6	1.5736	0.06296	0.00087	0.65931	0.00938	0.07597	0.00089
G058	143.1	86.2	1.1761	0.16397	0.00192	10.28601	0.12905	0.45515	0.00527
G059	3086.9	146.9	0.3459	0.15046	0.00173	0.90415	0.01109	0.0436	5.00E-04
G060	624.8	49.6	0.6208	0.05518	0.00073	0.54509	0.00755	0.07167	0.00083
G061	341.2	25.2	0.4982	0.08209	0.0014	0.76874	0.01301	0.06794	0.00086
G062	834	59.9	0.346	0.05745	0.00072	0.5554	0.00732	0.07014	0.00081
G063	171.2	93.8	1.1802	0.13847	0.00163	7.88166	0.09936	0.41298	0.00478
G064	328.8	92.4	0.8722	0.08722	0.00104	2.82335	0.03598	0.23487	0.0027
G065	335.3	27.5	0.7776	0.11033	0.00148	1.04988	0.01449	0.06904	0.00082
G066	195.4	15.5	1.0712	0.05782	0.00099	0.51055	0.00879	0.06406	0.00079
G067	104.6	26	1.0759	0.07893	0.00114	2.15408	0.03202	0.198	0.0024
G068	655.6	23.2	0.6105	0.05362	8.00E-04	0.23752	0.00363	0.03214	0.00038
G069	297.4	7.6	1.0198	0.05274	0.00115	0.15071	0.00322	0.02073	0.00027
G070	96.7	33.4	0.7216	0.11046	0.00144	4.58595	0.06299	0.30122	0.00361
G071	813.1	72.8	0.572	0.07852	0.00097	0.86988	0.01137	0.08038	0.00093
G072	292.2	90.1	0.4766	0.42372	0.0097	18.10931	0.39728	0.3101	0.00665
G073	1090.2	106.6	1.4727	0.06946	0.00085	0.70486	0.00919	0.07363	0.00085
G074	535.3	33.6	1.3662	0.05377	8.00E-04	0.34893	0.00531	0.04709	0.00056
G075	235.9	43	1.5953	0.06526	0.00089	1.16832	0.01669	0.12989	0.00154
G076	46.4	22.3	0.4796	0.15384	0.00202	9.10465	0.1269	0.4294	0.0053
G077	686.3	273.8	0.0978	0.14226	0.00165	7.83147	0.09811	0.39941	0.00459
G078	734.6	56.4	0.3507	0.05599	0.00072	0.59762	0.00812	0.07744	9.00E-04
G079	651	46.6	0.438	0.05707	0.00076	0.53488	0.00745	0.068	8.00E-04
G080	696.7	35.7	0.0928	0.05299	0.00073	0.39791	0.00569	0.05449	0.00064
G081	299.3	52.8	0.4476	0.07013	9.00E-04	1.59503	0.02168	0.16502	0.00193
G082	249.7	22.2	0.8086	0.06478	0.00096	0.68235	0.01041	0.07643	0.00092
G083	574.5	46.6	0.3894	0.05573	0.00074	0.5997	0.00841	0.07807	0.00092
G084	435.9	66.5	0.4661	0.07139	0.00092	1.42564	0.01943	0.14489	0.0017
G085	199.3	15.9	0.8733	0.05336	0.00091	0.49448	0.00855	0.06724	0.00083
G086	308.5	26.2	0.8445	0.05677	0.00087	0.56885	0.00895	0.0727	0.00088
G087	183	107	0.7705	0.17729	0.00215	11.85733	0.15466	0.48528	0.00571
G088	323.5	52.3	0.1819	0.07271	0.00094	1.64338	0.02251	0.16399	0.00193
G089	333.3	90.7	1.0207	0.08944	0.00112	2.68264	0.03582	0.21762	0.00255
G090	420.3	37.1	1.1289	0.05695	0.00081	0.55127	0.00814	0.07024	0.00084
G091	563.4	24	0.3655	0.05162	8.00E-04	0.29557	0.00469	0.04154	5.00E-04
G092	294.8	41.5	0.3599	0.06953	0.00097	1.30189	0.01901	0.13586	0.00163
G093	809.1	39.9	0.7624	0.06703	0.00091	0.39441	0.00563	0.04269	0.00051
G094	616.3	195.6	0.3312	0.13278	0.0016	5.55319	0.0723	0.30344	0.00354
G095	1637.2	57	0.2644	0.05112	0.00069	0.24764	0.00354	0.03515	0.00041
G096	83	16.2	0.953	0.07412	0.0012	1.63125	0.02703	0.15969	0.00201
G097	314.4	24.9	0.5546	0.06156	0.00094	0.61494	0.0097	0.07248	0.00088
G098	579.7	39.4	0.686	0.05932	0.00085	0.49669	0.0074	0.06075	0.00073
G099	356.9	29.4	0.3251	0.09386	0.00131	1.01208	0.0147	0.07823	0.00094
G100	386.3	173.2	0.1902	0.15919	0.00195	9.47869	0.12506	0.43203	0.00507
G101	177.1	10.4	1.1196	0.05245	0.0011	0.33784	0.00704	0.04674	0.00061
G102	330.1	55.4	0.3507	0.06869	0.00092	1.53885	0.02183	0.16255	0.00194
G103	390.8	144.2	0.3906	0.11272	0.0014	5.30139	0.07095	0.34123	0.00402

G104	1074.5	41	0.1557	0.06277	0.00087	0.33817	0.00492	0.03909	0.00047
G105	349	194.7	0.7983	0.1668	0.00206	10.58361	0.14117	0.46036	0.00544
G106	485.6	36.9	0.423	0.05979	0.00085	0.60152	0.00894	0.073	0.00088
G107	1654.2	112.2	0.2217	0.05792	0.00075	0.55438	0.00766	0.06945	0.00082
G108	725.5	78.3	0.2873	0.06519	0.00086	0.95933	0.01342	0.10678	0.00127
G109	572.5	10	0.6004	0.06142	0.00125	0.13382	0.0027	0.01581	0.00021
G110	483	16.8	0.4467	0.05023	0.00085	0.2297	0.00399	0.03318	0.00041
G111	231.4	136.2	0.9549	0.16821	0.00211	10.93759	0.1483	0.47177	0.00562
G112	98.7	21.3	0.8467	0.07685	0.00119	1.93743	0.03114	0.18292	0.00229
G113	227.4	85.9	0.6804	0.1222	0.00157	5.51833	0.07609	0.32763	0.00392
G114	419	32.1	0.3565	0.05606	0.00083	0.57953	0.00895	0.07501	0.00091
G115	379.1	15.7	0.9556	0.12457	0.00193	0.59275	0.00934	0.03452	0.00044
G116	13.7	6.1	1.3582	0.11151	0.00263	5.03334	0.11918	0.32749	0.0055
G117	352.9	59.2	1.0408	0.08382	0.00114	1.55264	0.02233	0.13439	0.00162
G118	435.9	38.6	0.8192	0.06261	0.00092	0.66002	0.01019	0.07648	0.00093
G119	219	77.6	0.4994	0.15727	0.00203	7.19704	0.10013	0.33203	0.00399
G120	76.5	50.3	1.0698	0.16564	0.0022	11.29755	0.16118	0.49486	0.00608
G121	223.5	75.1	0.4617	0.12335	0.00162	5.2283	0.07365	0.30752	0.00371
G122	200	9.6	0.9499	0.07475	0.0014	0.41485	0.0078	0.04026	0.00053
G123	198.7	9.9	0.5345	0.05173	0.00101	0.32741	0.00647	0.04592	0.00059
G124	117	6.3	0.9425	0.05592	0.00129	0.34691	0.00794	0.045	0.00061
G125	158.2	8.5	0.6797	0.052	0.00111	0.34387	0.00737	0.04798	0.00064
G126	144.4	80.2	0.6021	0.16417	0.00216	10.49787	0.1488	0.46391	0.00563
G127	958.2	21.3	1.0937	0.07554	0.0012	0.18145	0.00296	0.01743	0.00022
G128	450.3	22.2	1.0493	0.05327	0.00089	0.29307	0.00502	0.03992	5.00E-04
G129	134.6	64.5	0.9938	0.12304	0.00167	6.42038	0.09342	0.37858	0.00464
G130	335.9	65.2	0.2852	0.07599	0.00105	1.9901	0.02941	0.19001	0.00231
G131	159.5	48.1	1.3344	0.08296	0.00121	2.57959	0.03971	0.2256	0.0028
G132	284.3	14.4	1.8066	0.07318	0.0014	0.34943	0.00672	0.03464	0.00046
G133	176.5	24	0.4185	0.06769	0.00108	1.20752	0.02006	0.12942	0.00163
G134	853.6	256.1	0.0999	0.11555	0.00151	4.87284	0.06886	0.30595	0.00367
G135	334.6	17.9	0.5529	0.05249	9.00E-04	0.3583	0.00632	0.04952	0.00062
G136	888.2	39.6	0.4839	0.05591	0.00084	0.32211	0.00509	0.0418	0.00051
G137	283	42.6	0.5286	0.06416	0.00096	1.22256	0.01925	0.13823	0.00171
G138	229.4	17.5	0.0131	0.05657	0.00095	0.64519	0.01122	0.08274	0.00104
G139	725.5	37.1	0.4011	0.05264	8.00E-04	0.35722	0.00569	0.04923	0.00061
G140	268.6	23.7	0.685	0.05596	0.00092	0.60459	0.01031	0.07838	0.00098
G141	158.8	65.8	0.6776	0.11733	0.00162	5.77095	0.08568	0.35682	0.0044
G142	3847	346.5	0.0304	0.05767	0.00077	0.77222	0.01113	0.09714	0.00117
G143	325.5	225.4	1.6613	0.15615	0.00208	10.08251	0.14578	0.46842	0.00569
G144	153.6	55.3	0.8959	0.09779	0.00138	3.98235	0.06033	0.29542	0.00366
G145	234	15.7	1.1273	0.05194	0.00096	0.38192	0.00722	0.05334	0.00069
G146	383	110.5	0.4823	0.09115	0.00125	3.32451	0.04909	0.26457	0.00323
G147	268.6	44.8	0.3879	0.07156	0.00105	1.57462	0.02457	0.15963	0.00198
G148	189.5	17.8	0.9519	0.05528	0.00098	0.58743	0.01073	0.07708	0.00099
G149	245.7	18.9	0.7206	0.05287	0.00092	0.49426	0.00892	0.06782	0.00086
G150	1228.1	55.5	0.3034	0.06898	0.00099	0.42122	0.00648	0.0443	0.00054

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
481.8	5.3	568.1	7.5	930.7	7.9	-15.2	-48.2		
547.7	5.9	642.1	7.8	989.9	7.5	-14.7	-44.7	547.7	5.9
2130.9	20.1	2171.3	14	2209.9	9.9	-1.9	-3.6	2209.9	9.9
239.3	2.7	256.1	4	413.4	4.6	-6.6	-42.1	239.3	2.7
1695.3	16.6	1760.5	13.1	1838.9	9.4	-3.7	-7.8	1838.9	9.4
1730.1	17.2	1926	14	2144	10.4	-10.2	-19.3		
237	2.6	277.6	4	635.4	5.7	-14.6	-62.7	237	2.6
780.7	8.2	830.5	9.1	966.6	7.2	-6	-19.2	780.7	8.2
457.1	5.1	458.2	6.9	463.8	5.5	-0.2	-1.5	457.1	5.1
1677.6	16.3	1758.2	13	1855.6	9.3	-4.6	-9.6	1855.6	9.3
404.1	4.6	438.3	6.9	622.6	7.2	-7.8	-35.1	404.1	4.6
1589	15.6	1738.5	13	1923.7	9.5	-8.6	-17.4		
963.7	10	956.3	10.1	939.5	7.2	0.8	2.6	963.7	10
314.3	3.6	324.3	5.7	397.5	5.5	-3.1	-20.9	314.3	3.6
439.5	4.8	440.6	6.2	446.8	4.8	-0.3	-1.6	439.5	4.8
300	3.4	490	7.1	1517.3	11.1	-38.8	-80.2		
759.9	8.2	778.6	9.4	833.4	7.3	-2.4	-8.8	759.9	8.2
424.6	4.6	427.6	5.9	444	4.6	-0.7	-4.4	424.6	4.6
426.7	4.6	474.9	6.3	715.6	6.3	-10.2	-40.4	426.7	4.6
516.4	8.4	1801.6	22.1	4003.2	19.8	-71.3	-87.1		
904.8	9.4	924.3	9.5	971.5	6.9	-2.1	-6.9	904.8	9.4
946.9	9.9	957.9	10	983.7	7.3	-1.1	-3.7	946.9	9.9
444	5	434.1	6.7	382.3	4.8	2.3	16.1	444	5
1089.2	11.2	1135.7	10.9	1226	8.1	-4.1	-11.2	1089.2	11.2
615.8	6.6	669.4	7.8	854.8	6.5	-8	-28	615.8	6.6
1573.7	15.8	1667.4	13.3	1787.8	9.8	-5.6	-12	1787.8	9.8
1804.3	17.5	1823.8	13.3	1846.6	9.4	-1.1	-2.3	1846.6	9.4
873.9	9.3	891.8	9.8	937.1	7.4	-2	-6.7	873.9	9.3
268.1	3.3	322.4	6.2	736	9.8	-16.8	-63.6		
807.2	8.6	885.2	9.8	1085.8	8.1	-8.8	-25.7	807.2	8.6
402.9	4.5	414.3	6.4	478.3	5.6	-2.7	-15.8	402.9	4.5
375.7	4.2	383.6	5.7	432	4.8	-2.1	-13	375.7	4.2
264.5	3	266.9	4	288.9	3.2	-0.9	-8.5	264.5	3
479.9	5.2	495.1	6.3	567.1	5	-3.1	-15.4	479.9	5.2
1712.7	17.3	1730.4	13.8	1752.4	10	-1	-2.3	1752.4	10
393.2	4.3	475.3	6.2	894.5	7.1	-17.3	-56		
299.6	3.4	297.8	5	283.2	3.8	0.6	5.8	299.6	3.4
217.3	2.4	243.2	3.8	501.6	5.3	-10.6	-56.7	217.3	2.4
2052.3	19.8	2222.9	14.3	2384.5	10.2	-7.7	-13.9	2384.5	10.2
335.9	3.7	337	4.9	345	3.7	-0.3	-2.6	335.9	3.7
449.5	4.9	450.2	5.9	454	4.3	-0.1	-1	449.5	4.9
710	7.8	822.4	9.8	1140.5	8.8	-13.7	-37.7	710	7.8
268.2	3.5	673.6	10.8	2464	16	-60.2	-89.1		
1797.8	18.1	1847.5	14.1	1904.4	10.3	-2.7	-5.6	1904.4	10.3
335	4.2	384.7	7.4	696.4	9.7	-12.9	-51.9	335	4.2
2387.3	46.9	4033.1	31.4	4996.5	21.1	-40.8	-52.2		
1760.1	17.3	1793.2	13.3	1832.6	9.5	-1.8	-4	1832.6	9.5
2054.3	20.7	3763.4	16.3	4862.7	11.6	-45.4	-57.8		

396.9	4.9	448.9	8.3	725.7	9.9	-11.6	-45.3	396.9	4.9
841.4	8.9	865.1	9.6	926.9	7.2	-2.7	-9.2	841.4	8.9
412.9	4.5	452.4	6	659.2	5.7	-8.7	-37.4	412.9	4.5
576.7	6.4	635.8	8.2	852.6	7.5	-9.3	-32.4	576.7	6.4
227.9	2.6	295.8	4.7	874.6	8.2	-23	-73.9		
460.9	5.1	464.6	6.3	483.8	4.7	-0.8	-4.7	460.9	5.1
1977	19.4	1956.5	14.1	1935.5	10	1	2.1	1935.5	10
437.5	5.1	584.5	8.6	1207.1	10.7	-25.2	-63.8		
472	5.3	514.2	7.3	706.9	7	-8.2	-33.2	472	5.3
2418.1	23.3	2460.8	15.2	2497	10.9	-1.7	-3.2	2497	10.9
275.1	3.1	653.9	7.8	2351.2	10.5	-57.9	-88.3		
446.2	5	441.8	6.3	419.5	4.5	1	6.4	446.2	5
423.7	5.2	579	9.4	1247.7	12.2	-26.8	-66		
437	4.9	448.5	6.2	508.8	5	-2.6	-14.1	437	4.9
2228.5	21.8	2217.6	14.9	2208.2	10.6	0.5	0.9	2208.2	10.6
1360	14.1	1361.8	12.4	1365.4	9	-0.1	-0.4	1365.4	9
430.4	4.9	728.8	9.3	1804.9	11.3	-41	-76.2		
400.3	4.8	418.8	7.2	522.9	7	-4.4	-23.5	400.3	4.8
1164.6	12.9	1166.4	13.1	1170.4	10	-0.2	-0.5	1170.4	10
203.9	2.4	216.4	3.7	355.1	4.5	-5.8	-42.6	203.9	2.4
132.3	1.7	142.5	3.4	317.6	5.9	-7.2	-58.4	132.3	1.7
1697.4	17.9	1746.7	14.8	1807	11	-2.8	-6.1	1807	11
498.4	5.5	635.5	8	1160.1	8.5	-21.6	-57		
1741.2	32.7	2995.6	30.2	3995.5	22.8	-41.9	-56.4		
458	5.1	541.7	7.1	912.4	7.4	-15.5	-49.8		
296.6	3.4	303.9	5	361.4	4.5	-2.4	-17.9	296.6	3.4
787.2	8.8	785.9	9.9	782.7	7.4	0.2	0.6	787.2	8.8
2303	23.9	2348.6	16.5	2389.1	12.1	-1.9	-3.6	2389.1	12.1
2166.3	21.1	2211.8	14.7	2254.9	10.5	-2.1	-3.9	2254.9	10.5
480.8	5.4	475.7	6.6	452	4.7	1.1	6.4	480.8	5.4
424.1	4.8	435	6.3	494.2	5.2	-2.5	-14.2	424.1	4.8
342	3.9	340.1	5.2	328.4	3.9	0.6	4.2	342	3.9
984.6	10.7	968.3	10.8	932.2	7.8	1.7	5.6	984.6	10.7
474.8	5.5	528.2	7.9	767.2	8	-10.1	-38.1	474.8	5.5
484.6	5.5	477	6.8	441.6	4.8	1.6	9.7	484.6	5.5
872.3	9.6	899.7	10.4	968.6	8	-3.1	-9.9	872.3	9.6
419.5	5	408	7.1	344.1	5	2.8	21.9	419.5	5
452.4	5.3	457.3	7.2	482.6	5.9	-1.1	-6.3	452.4	5.3
2550.2	24.8	2593.2	15.8	2627.7	11.4	-1.7	-2.9	2627.7	11.4
978.9	10.7	987	11	1005.9	8.3	-0.8	-2.7	978.9	10.7
1269.3	13.5	1323.7	12.7	1413.6	9.6	-4.1	-10.2	1413.6	9.6
437.6	5.1	445.8	6.7	489.6	5.5	-1.8	-10.6	437.6	5.1
262.4	3.1	262.9	4.5	268.6	3.7	-0.2	-2.3	262.4	3.1
821.2	9.3	846.6	10.6	914.5	8.4	-3	-10.2	821.2	9.3
269.5	3.2	337.6	5.2	838.7	7.7	-20.2	-67.9		
1708.3	17.5	1908.9	14.4	2135.1	10.7	-10.5	-20		
222.7	2.6	224.7	3.6	246.2	3	-0.9	-9.6	222.7	2.6
955.1	11.2	982.3	12.9	1044.7	10.6	-2.8	-8.6	955.1	11.2
451.1	5.3	486.7	7.5	658.9	7.4	-7.3	-31.5	451.1	5.3
380.2	4.4	409.5	6.3	578.9	6.3	-7.1	-34.3	380.2	4.4
485.5	5.6	709.9	9.4	1505.3	11	-31.6	-67.7		
2314.9	22.8	2385.5	15.6	2447.1	11.3	-3	-5.4	2447.1	11.3
294.5	3.8	295.5	6.3	305.1	5.5	-0.4	-3.5	294.5	3.8
970.9	10.8	946	11	889.4	7.9	2.6	9.2	970.9	10.8
1892.6	19.3	1869.1	14.6	1843.7	10.6	1.3	2.7	1843.7	10.6

247.2	2.9	295.8	4.7	700.4	7	-16.4	-64.7		
2441.1	24	2487.3	15.9	2525.8	11.5	-1.9	-3.4	2525.8	11.5
454.2	5.3	478.2	7.1	596	6.4	-5	-23.8	454.2	5.3
432.8	4.9	447.9	6.3	526.7	5.3	-3.4	-17.8	432.8	4.9
654	7.4	682.9	8.8	780.5	7.2	-4.2	-16.2	654	7.4
101.1	1.3	127.5	2.9	654	9.8	-20.7	-84.5		
210.4	2.6	210	4	205.7	3.2	0.2	2.3	210.4	2.6
2491.3	24.6	2517.8	16.1	2539.9	11.7	-1.1	-1.9	2539.9	11.7
1082.9	12.5	1094.1	13.3	1117.3	10.5	-1	-3.1	1082.9	12.5
1826.9	19	1903.5	15.1	1988.6	11.2	-4	-8.1	1988.6	11.2
466.3	5.5	464.2	7.1	454.7	5.4	0.5	2.5	466.3	5.5
218.8	2.7	472.6	7.6	2022.7	13.6	-53.7	-89.2		
1826.2	26.7	1824.9	24.5	1824.2	20	0.1	0.1	1824.2	20
812.9	9.2	951.5	11.2	1288.4	9.9	-14.6	-36.9	812.9	9.2
475.1	5.6	514.6	7.7	695	7.4	-7.7	-31.6	475.1	5.6
1848.2	19.3	2136.1	15.7	2426.5	11.9	-13.5	-23.8		
2591.7	26.2	2548	16.9	2514.1	12.4	1.7	3.1	2514.1	12.4
1728.5	18.3	1857.2	15.2	2005.2	11.5	-6.9	-13.8	2005.2	11.5
254.4	3.3	352.4	6.8	1061.8	12.3	-27.8	-76		
289.4	3.6	287.6	5.9	273.5	4.7	0.6	5.8	289.4	3.6
283.8	3.8	302.4	7	449.2	8.4	-6.2	-36.8	283.8	3.8
302.1	3.9	300.1	6.5	285.4	5.3	0.7	5.9	302.1	3.9
2456.8	24.8	2479.7	16.6	2499.1	12.2	-0.9	-1.7	2499.1	12.2
111.4	1.4	169.3	3.2	1082.9	10.6	-34.2	-89.7		
252.3	3.1	261	4.8	340.3	4.8	-3.3	-25.9	252.3	3.1
2069.6	21.7	2035.1	16.1	2000.8	11.9	1.7	3.4	2000.8	11.9
1121.4	12.5	1112.2	12.4	1094.8	9.3	0.8	2.4	1094.8	9.3
1311.4	14.7	1294.9	14	1268.3	10.6	1.3	3.4	1268.3	10.6
219.5	2.9	304.3	6.1	1018.9	12.3	-27.9	-78.5		
784.6	9.3	804.1	11.3	859.1	9.2	-2.4	-8.7	784.6	9.3
1720.7	18.1	1797.6	14.9	1888.5	11.2	-4.3	-8.9	1888.5	11.2
311.6	3.8	310.9	5.7	306.8	4.5	0.2	1.6	311.6	3.8
264	3.2	283.5	4.8	448.8	5.4	-6.9	-41.2	264	3.2
834.6	9.7	810.9	10.8	746.9	7.9	2.9	11.7	834.6	9.7
512.5	6.2	505.5	8.4	474.8	6.4	1.4	7.9	512.5	6.2
309.8	3.7	310.1	5.2	313.3	4.1	-0.1	-1.1	309.8	3.7
486.4	5.9	480.1	7.9	450.8	6	1.3	7.9	486.4	5.9
1967.1	20.9	1942.1	16	1915.9	11.9	1.3	2.7	1915.9	11.9
597.6	6.9	581	8	517.2	5.4	2.9	15.5	597.6	6.9
2476.6	25	2442.4	16.7	2414.4	12.3	1.4	2.6	2414.4	12.3
1668.6	18.2	1630.6	15.2	1582.4	11.3	2.3	5.4		
335	4.2	328.4	6.3	282.8	4.6	2	18.5	335	4.2
1513.2	16.5	1486.8	14.3	1449.7	10.6	1.8	4.4	1449.7	10.6
954.7	11	960.2	11.9	973.5	9.2	-0.6	-1.9	954.7	11
478.7	5.9	469.2	8.2	423.6	6.1	2	13	478.7	5.9
423	5.2	407.8	7.2	323.2	4.8	3.7	30.9	423	5.2
279.4	3.3	356.9	5.7	898.1	8.6	-21.7	-68.9		

e

input: 53-56.csv
n samples: 150
concordant to +5/-15%: 81 (54.0%)
cut-off at 1100 Ma (72 younger | 9 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	0.6	NaN	1.864	0.90625	0.02177	458.7471	24.40427	3.67247	0.20087
G002	0.6	NaN	1.8438	0.85426	0.02074	456.3028	24.87903	3.87523	0.21678
G003	0.6	NaN	1.9278	0.85171	0.02024	493.6196	27.09172	4.20471	0.23633
G004	0.6	NaN	1.9008	0.95919	0.02295	506.4821	27.34693	3.83086	0.21282
G005	0.6	NaN	1.8459	0.82871	0.01956	428.0871	22.38835	3.74769	0.2009
G006	0.6	NaN	1.8109	0.88203	0.02106	443.6361	23.23034	3.64904	0.19635
G007	0.6	NaN	1.9666	0.86862	0.02127	505.1053	28.81629	4.21879	0.24661
G008	0.6	NaN	1.8724	0.90546	0.02208	439.769	23.36397	3.52364	0.19274
G009	0.6	NaN	1.6706	0.84908	0.02005	419.1659	21.35974	3.58157	0.18744
G010	0.6	NaN	1.963	0.83835	0.02077	432.0884	23.71838	3.73924	0.2106
G011	0.6	NaN	1.8261	0.83581	0.0198	460.7642	24.40525	3.99951	0.21712
G012	0.6	NaN	1.9464	0.86964	0.02054	503.855	27.32558	4.20341	0.23359
G013	0.6	NaN	1.6982	0.88152	0.02127	445.8954	23.38994	3.66975	0.198
G014	854.1	147.3	0.1458	0.07873	0.00098	1.94377	0.02608	0.17912	0.00216
G015	0.6	NaN	1.8396	0.8451	0.02049	435.6738	23.42125	3.74014	0.20631
G016	0.6	NaN	1.9217	0.87381	0.02182	445.1331	24.864	3.69581	0.21202
G017	0.6	NaN	1.6974	0.86105	0.0207	421.1421	21.61395	3.54842	0.18722
G018	0.6	NaN	1.8158	0.82649	0.02015	413.6402	21.69421	3.63096	0.19555
G019	0.6	NaN	1.9358	0.8652	0.02098	455.9185	24.69898	3.82301	0.2125
G020	0.6	NaN	1.8186	0.87417	0.02126	422.1934	21.86357	3.50391	0.18669
G021	0.6	NaN	1.6819	0.84784	0.0202	441.0733	22.96349	3.77425	0.20167
G022	0.6	NaN	1.6946	0.80962	0.01894	423.2665	21.44593	3.79289	0.19682
G023	-1.1	-1.4	7.3238	1.0646	0.06772		7.27378	-0.82512	0.0616
G024	2739	765.2	0.4989	0.09826	0.00115	3.46447	0.04432	0.2558	0.00305
G025	409.5	27.8	0.6187	0.06032	0.00103	0.51642	0.009	0.06211	8.00E-04
G026	432.4	64.5	0.2337	0.07129	0.00099	1.46787	0.0214	0.14939	0.00184
G027	207.3	11.5	1.0454	0.06603	0.00157	0.40791	0.00945	0.04482	0.00064
G028	1.7	NaN	0.1176	0.85184	0.02873	139.8206	6.59684	1.19083	0.06044
G029	949.4	59.4	0.5824	0.05857	0.00085	0.46509	0.00705	0.05761	0.00071
G030	639.1	82.1	0.4523	0.07958	0.00108	1.29405	0.0185	0.11797	0.00145
G031	-10	NaN	3.8066	0.81227	0.01086	312.4114	5.81487	2.79037	0.05198
G032	670.3	102.5	0.5689	0.06934	9.00E-04	1.33141	0.0184	0.1393	0.00169
G033	35.1	8.3	7.3698	0.17004	0.00771	1.44687	0.05786	0.06173	0.00171
G034	493.1	64.3	0.2145	0.07023	0.001	1.27885	0.01905	0.1321	0.00164
G035	0.6	NaN	1.9631	0.85389	0.02106	458.5278	25.17051	3.89584	0.21931
G036	510.9	185.2	0.1939	0.12721	0.0015	6.1925	0.08012	0.35316	0.00425
G037	0.6	NaN	1.7155	0.86341	0.0223	431.6135	24.17082	3.62673	0.2089
G038	0.6	NaN	1.8959	0.8347	0.02081	402.4748	21.33027	3.49819	0.19036
G039	0	NaN	49.4688	0.82748	0.0523			398.8579	
G040	983.9	69.9	0.7759	0.0749	0.00106	0.6436	0.00955	0.06234	0.00077
G041	347.1	27.6	0.8231	0.05791	0.0011	0.54011	0.01028	0.06766	0.00089
G042	164.9	12.2	0.7206	0.05516	0.0015	0.48863	0.01296	0.06427	0.00096
G043	6.1	0.7	0.1007	0.53205	0.02702	10.30367	0.41499	0.1405	0.00621
G044	-3.3	2	-0.0484	0.89587	0.04334	-44.2556	1.66129	-0.35839	0.0174
G045	10.6	1	1.0149	0.19107	0.01384	1.99037	0.12499	0.07558	0.00336
G046	818.5	131	0.118	0.07668	0.00095	1.75229	0.02342	0.1658	0.002
G047	617.9	36.1	0.1621	0.05699	0.00099	0.47555	0.0084	0.06053	0.00078
G048	69.6	28	0.8474	0.13188	0.00209	6.03756	0.09958	0.33213	0.00459

G049	237.9	39.3	0.6938	0.0722	0.0012	1.46229	0.02497	0.14694	0.00192
G050	784.5	32.3	0.4516	0.05249	0.00095	0.2821	0.00515	0.03899	5.00E-04
G051	0.6	NaN	1.8908	0.82897	0.02	452.0895	24.17299	3.95662	0.21642
G052	596.7	39.2	0.4792	0.05732	0.00101	0.48789	0.00873	0.06176	8.00E-04
G053	0.6	NaN	1.8047	0.80841	0.01921	482.9085	26.38662	4.33384	0.24163
G054	0.6	NaN	1.7612	0.84442	0.02116	408.1955	21.60535	3.50713	0.19055
G055	0.6	NaN	1.7786	0.83669	0.02076	459.2044	25.59425	3.98181	0.22702
G056	515.9	42.2	1.1384	0.05522	0.00101	0.48659	0.00898	0.06393	0.00083
G057	539.3	33.2	0.3015	0.06042	0.00105	0.50546	0.00895	0.0607	0.00078
G058	779.5	62.6	0.8762	0.05509	0.00088	0.51381	0.00843	0.06767	0.00085
G059	318.1	14.6	0.5692	0.05553	0.00132	0.32236	0.00755	0.04211	0.00059
G060	-22.8	1.1	0.092	-0.52896	0.06806	-2.12421	0.18719	0.02913	0.00277
G061	1294.3	50.1	0.4956	0.05301	0.00086	0.26392	0.0044	0.03612	0.00045
G062	222.9	106.1	0.3171	0.15876	0.00203	9.64788	0.13355	0.44089	0.0055
G063	0	NA	NA	-0.12963	0.14365			555.3887	
G064	-2.2	28.8	-0.3659	0.87696	0.04633	-92.2131	4.59176	-0.76287	0.04623
G065	180.5	11.2	0.834	0.05492	0.00157	0.39682	0.01103	0.05242	8.00E-04
G066	811.8	84.5	0.0867	0.07152	0.001	1.07063	0.01581	0.10861	0.00135
G067	395.6	24.9	0.2834	0.05937	0.0012	0.51372	0.0104	0.06278	0.00085
G068	525.4	104.9	2.3466	0.06673	0.00103	1.11153	0.01786	0.12085	0.00153
G069	392.2	24.9	0.4257	0.05562	0.0011	0.46413	0.00917	0.06054	0.00081
G070	582.2	41.7	0.8873	0.05617	0.00102	0.46385	0.00852	0.05991	0.00078
G071	364.9	18.5	1.1443	0.05259	0.00127	0.2875	0.00682	0.03966	0.00056
G072	947.2	71.5	0.6753	0.12277	0.00174	1.089	0.01606	0.06435	0.00081
G073	1256.9	302.1	0.4629	0.10107	0.00127	3.15278	0.04302	0.22631	0.00275
G074	608.4	87.7	0.334	0.0694	0.001	1.33927	0.02036	0.14	0.00175
G075	852.5	30.9	0.4323	0.0511	0.00107	0.24175	0.00507	0.03432	0.00046
G076	145.4	10.7	0.9347	0.05804	0.00169	0.4853	0.01377	0.06066	0.00095
G077	0.6	NaN	1.8287	0.86431	0.02069	460.6933	23.96311	3.86711	0.20566
G078	0.6	NaN	1.5722	0.85691	0.0203	427.8023	21.33753	3.622	0.18485
G079	1737.8	282.4	0.0899	0.12756	0.00163	3.02703	0.04176	0.17216	0.00211
G080	493.1	24.5	0.6053	0.05501	0.0012	0.33972	0.00736	0.0448	0.00061
G081	0.6	NaN	1.6949	0.85817	0.02091	474.6183	25.8009	4.01248	0.22265
G082	707.6	28.1	0.4765	0.06591	0.00131	0.33891	0.00673	0.03731	5.00E-04
G083	0.6	NaN	2.9933	0.84736	0.06269	363.3412	59.67031	3.11092	0.52847
G084	1404	167	0.4156	0.10236	0.00137	1.6188	0.02314	0.11473	0.00142
G085	85.2	16.9	0.6949	0.07935	0.00176	1.89553	0.04173	0.17332	0.00258
G086	1073.1	321.3	0.0924	0.11071	0.00143	4.66002	0.06495	0.30537	0.00374
G087	427.9	103.6	0.0764	0.09705	0.00134	3.35464	0.04933	0.25077	0.00314
G088	-3.9	1.5	-0.1654	0.84514	0.07102	-32.1242	1.83316	-0.27577	0.02133
G089	3366.9	135.8	0.4242	0.05234	0.00076	0.27814	0.00427	0.03856	0.00048
G090	0.6	NaN	1.9124	0.81574	0.02104	464.5169	26.75521	4.13136	0.24265
G091	292.5	41.5	0.2606	0.07103	0.00119	1.38498	0.02384	0.14146	0.00185
G092	440.7	20.8	0.8217	0.06964	0.00146	0.38816	0.00807	0.04044	0.00056
G093	-2.8	4.9	-0.3566	0.8956	0.06232	-59.3729	3.54382	-0.48097	0.03585
G094	3.3	NaN	1.1562	0.61926	0.04079	19.07205	1.0469	0.22344	0.01383
G095	85.2	24	0.6731	0.13461	0.00236	4.49172	0.08019	0.24209	0.00345
G096	147.6	7.8	0.754	0.05182	0.00183	0.32748	0.0112	0.04585	0.00076
G097	323.2	17.8	0.6459	0.05613	0.00134	0.3826	0.00898	0.04946	7.00E-04
G098	685.3	136.6	0.7198	0.09599	0.0014	2.40375	0.03692	0.18168	0.00231
G099	329.3	30.6	1.2663	0.05811	0.00125	0.56501	0.01207	0.07054	0.00097
G100	386.1	31	0.9627	0.0592	0.00118	0.54393	0.01089	0.06666	9.00E-04
G101	401.2	24.6	0.1732	0.05619	0.00109	0.48944	0.00959	0.06319	0.00084
G102	1310.4	284.1	0.0394	0.09102	0.00122	2.86227	0.04121	0.22815	0.00281
G103	748.8	33.9	0.7545	0.05448	0.00103	0.29615	0.00567	0.03944	0.00052

G104	100.8	8	0.9381	0.05764	0.00218	0.52303	0.01901	0.06583	0.00119
G105	794.5	34	0.4158	0.05567	0.00103	0.31388	0.00586	0.0409	0.00054
G106	187.2	11.8	1.0479	0.05599	0.00153	0.39016	0.01044	0.05055	0.00076
G107	-1.1	41.2	-0.2273	0.95127	0.06661	-95.598	6.71993	-0.72911	0.06165
G108	536	20.4	0.4562	0.05272	0.00111	0.26278	0.00552	0.03616	0.00049
G109	1193.4	40.1	0.5571	0.05036	0.00093	0.21472	0.00403	0.03093	4.00E-04
G110	1972.9	168.6	0.6034	0.05867	0.00084	0.62782	0.00956	0.07764	0.00097
G111	0.6	NaN	1.1705	1.04568	0.0768	405.1827	66.02585	2.81128	0.47903
G112	334.3	26.4	0.7075	0.05574	0.00113	0.53133	0.01084	0.06915	0.00094
G113	412.9	20.4	0.7084	0.0511	0.00118	0.30707	0.00704	0.0436	0.00061
G114	588.9	227.5	0.2563	0.16246	0.00223	8.43397	0.12399	0.37664	0.0047
G115	139.3	59.5	1.3088	0.11201	0.00174	4.90286	0.07961	0.31758	0.00418
G116	-2.8	4.1	0.4698	0.77876	0.05657	-43.06	2.24054	-0.40116	0.02674
G117	502.6	40.4	0.5381	0.05727	0.00102	0.58343	0.01062	0.07391	0.00097
G118	331.5	25.5	0.6003	0.05794	0.00119	0.55459	0.01144	0.06944	0.00095
G119	-2.2	0.5	-0.186	0.43738	0.13698	-9.88716	2.48274	-0.16401	0.03166
G120	137.1	10.4	0.9451	0.05599	0.00167	0.47974	0.01397	0.06217	0.00098
G121	4421.1	217.7	0.2291	0.05857	0.00085	0.40273	0.00619	0.04989	0.00062
G122	448.5	21.1	0.5431	0.0547	0.00127	0.32441	0.00747	0.04303	0.00061
G123	676.4	101	0.3811	0.069	0.0011	1.35938	0.02251	0.14293	0.00184
G124	214.5	9	0.6924	0.0546	0.00169	0.27836	0.00837	0.03699	0.00059
G125	137.6	15.7	2.5306	0.0591	0.00163	0.54395	0.0147	0.06677	0.00102
G126	406.7	17.4	0.2023	0.05207	0.00122	0.31561	0.00733	0.04398	0.00062
G127	-2.8	2	-0.2611	0.85624	0.05532	-47.7873	2.22847	-0.40492	0.02486
G128	966.1	40.3	0.4299	0.06081	0.00108	0.33073	0.00601	0.03946	0.00052
G129	1626.3	78.7	0.3262	0.05829	0.00095	0.37759	0.00635	0.047	6.00E-04
G130	0.6	NaN	1.7639	0.79002	0.02001	460.1833	25.16848	4.22618	0.23404
G131	8164	NaN	1.6279	0.44847	0.0064	2.52905	0.03821	0.04091	0.00051
G132	521.5	34.5	0.4328	0.05629	0.00104	0.48778	0.0092	0.06287	0.00083
G133	449.6	58.9	0.3842	0.06505	0.00108	1.12597	0.01938	0.12559	0.00163
G134	1147.2	49	0.4093	0.05161	0.00095	0.2901	0.00545	0.04078	0.00053
G135	1165.6	74.2	0.1337	0.05834	0.00096	0.53422	0.00913	0.06644	0.00085
G136	531	28.2	1.1073	0.05832	0.00124	0.34145	0.00723	0.04248	0.00058
G137	131.5	10.4	0.5271	0.05861	0.00169	0.59043	0.01659	0.07309	0.00114
G138	251.8	15.2	0.7986	0.05481	0.00131	0.3926	0.00927	0.05197	0.00074
G139	495.3	41.1	0.18	0.06072	0.00108	0.70581	0.01281	0.08433	0.00111
G140	0.6	NaN	1.8661	0.82117	0.02083	477.4626	26.38242	4.21856	0.23588
G141	899.3	279.6	0.0879	0.11116	0.00164	4.845	0.07591	0.31622	0.004
G142	352.1	27.6	0.5253	0.05626	0.00115	0.56176	0.01158	0.07244	0.00099
G143	529.9	31.8	0.0761	0.0774	0.00149	0.67227	0.01303	0.06302	0.00086
G144	-1.7	115.7	0.2216	0.7862	0.04576	-96.031	5.19248	-0.88622	0.05573
G145	346	24.7	0.4925	0.0557	0.00119	0.51224	0.01093	0.06672	0.00092
G146	442.4	23.1	0.4415	0.05755	0.00122	0.39011	0.00828	0.04918	0.00068
G147	1413.5	182.2	1.0838	0.08219	0.00129	1.27156	0.02084	0.11225	0.00144
G148	1208.5	65.9	0.1057	0.06567	0.00115	0.52003	0.00934	0.05746	0.00075
G149	269.1	15.9	0.1664	0.05848	0.00146	0.49407	0.01214	0.06129	9.00E-04
G150	305.9	51.3	0.1775	0.07754	0.00134	1.8336	0.03275	0.17157	0.00228

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
9938.4	277.1	6225	60.5	5098.7	24.2	59.7	94.9		
10212.2	286.6	6219.6	61.8	5015	24.5	64.2	103.6		
10633.8	292.7	6299.2	61.8	5010.8	24	68.8	112.2		
10153.3	284	6325.3	61.3	5178.8	24.1	60.5	96.1		
10041.3	272.8	6154.9	59.3	4971.9	23.8	63.1	102		
9906	272.3	6191.1	59.6	5060.3	24.1	60	95.8		
10651.2	304.6	6322.5	64.2	5038.6	24.7	68.5	111.4		
9729.7	274.7	6182.2	60.7	5097.4	24.6	57.4	90.9		
9811.7	263.7	6133.6	58.2	5006.4	23.8	60	96		
10029.8	286.5	6164.3	62.3	4988.3	25	62.7	101.1		
10374.5	280	6229.4	60	4984	23.9	66.5	108.2		
10632.2	289.4	6320	61.2	5040.3	23.8	68.2	110.9		
9934.6	273.3	6196.2	59.9	5059.5	24.3	60.3	96.4		
1062.2	11.8	1096.3	11.6	1165.4	8.6	-3.1	-8.9	1062.2	11.8
10031.1	280.6	6172.7	61	4999.7	24.4	62.5	100.6		
9970.5	291.1	6194.5	63.4	5047.1	25.2	61	97.5		
9764.9	265.3	6138.3	58.7	5026.2	24.2	59.1	94.3		
9880.8	272.2	6120.1	59.9	4968.1	24.6	61.4	98.9		
10142.8	284	6218.7	61.4	5033	24.4	63.1	101.5		
9701.5	267.2	6140.9	59.3	5047.7	24.5	58	92.2		
10077.3	272.3	6185.2	59.3	5004.3	24	62.9	101.4		
10102.4	264.7	6143.4	57.7	4938.8	23.6	64.4	104.6		
-11240.3	2270.7	NA	100.4	5325.2	64.2	NA	-311.1		
1468.3	15.7	1519.2	13.2	1591.4	9.4	-3.3	-7.7	1591.4	9.4
388.4	4.9	422.8	7.4	615.1	7.9	-8.1	-36.8	388.4	4.9
897.5	10.3	917.3	11.2	965.7	8.7	-2.1	-7.1	897.5	10.3
282.6	3.9	347.4	8.2	807.3	13.2	-18.6	-65		
5055.8	177.8	5023.6	61.4	5011	34	0.6	0.9		
361.1	4.3	387.8	6.1	551.1	6.2	-6.9	-34.5	361.1	4.3
718.9	8.4	843.1	10.5	1186.6	9.5	-14.7	-39.4	718.9	8.4
8589.6	88.4	5835.9	23.2	4943.4	13.5	47.2	73.8		
840.7	9.6	859.5	10.3	908.9	7.8	-2.2	-7.5	840.7	9.6
386.1	10.4	908.6	31.9	2558	42.3	-57.5	-84.9		
799.8	9.3	836.3	10.8	935.1	8.7	-4.4	-14.5	799.8	9.3
10239.4	288.8	6224.5	62.3	5014.4	24.9	64.5	104.2		
1949.7	20.2	2003.4	14.7	2059.8	10.4	-2.7	-5.3	2059.8	10.4
9874.9	291.1	6163.2	63.9	5030.1	26	60.2	96.3		
9693.3	272.8	6092.4	60.6	4982.1	25.1	59.1	94.6		
38621.2	NA	NA	NA	4969.8	63.7	NA	677.1		
389.8	4.7	504.5	7.5	1065.8	9.3	-22.7	-63.4		
422	5.4	438.5	8.2	526.4	7.8	-3.8	-19.8	422	5.4
401.5	5.8	404	10.3	418.7	9.3	-0.6	-4.1	401.5	5.8
847.5	35.1	2462.4	62.3	4332.6	50.8	-65.6	-80.4		
-2860.8	174.8	NaN	71.2	5082.4	48.8	NaN	-156.3		
469.7	20.1	1112.2	57.4	2751.4	68.7	-57.8	-82.9		
988.9	11.1	1028	11.2	1112.9	8.4	-3.8	-11.1	988.9	11.1
378.8	4.7	395	7.1	491.1	6.8	-4.1	-22.9	378.8	4.7
1848.7	22.2	1981.3	18.3	2123.1	14.1	-6.7	-12.9	2123.1	14.1

883.8	10.8	915	12.8	991.6	10.5	-3.4	-10.9	883.8	10.8
246.6	3.1	252.3	5	306.8	4.8	-2.3	-19.6	246.6	3.1
10318.9	281.5	6210.2	60.6	4972.3	24.3	66.2	107.5		
386.3	4.9	403.5	7.3	503.9	7	-4.3	-23.3	386.3	4.9
10791.8	292	6277	61.4	4936.6	23.9	71.9	118.6		
9706.1	272.5	6106.7	60.6	4998.6	25.3	58.9	94.2		
10351.6	293.8	6226	63	4985.5	25	66.3	107.6		
399.5	5	402.6	7.5	421.1	6.3	-0.8	-5.1	399.5	5
379.9	4.7	415.4	7.4	618.6	8.1	-8.5	-38.6	379.9	4.7
422.1	5.1	421	7	415.9	5.5	0.3	1.5	422.1	5.1
265.9	3.6	283.7	6.8	433.6	8.4	-6.3	-38.7	265.9	3.6
185.1	17.4	NaN	306.9	NaN	NaN	NaN	NaN		
228.7	2.8	237.8	4.3	329.2	4.6	-3.8	-30.5	228.7	2.8
2354.6	24.6	2401.7	16.4	2442.5	11.8	-2	-3.6	2442.5	11.8
40750.8	NA	NA	NA	NaN	NaN	NA	NaN		
-9277.3	1256.8	NaN	82.5	5052.2	53.3	NaN	-283.6		
329.4	4.9	339.3	9.3	409	9.6	-2.9	-19.5	329.4	4.9
664.7	7.9	739	9.8	972.3	8.7	-10.1	-31.6	664.7	7.9
392.5	5.2	420.9	8.4	580.7	8.9	-6.8	-32.4	392.5	5.2
735.5	8.8	758.9	10.7	829.4	8.7	-3.1	-11.3	735.5	8.8
378.9	4.9	387.1	7.7	437.2	7	-2.1	-13.3	378.9	4.9
375.1	4.7	386.9	7.2	459.1	6.7	-3.1	-18.3	375.1	4.7
250.7	3.5	256.6	6.3	311.1	6.5	-2.3	-19.4	250.7	3.5
402	4.9	748	10	1996.9	12.4	-46.3	-79.9		
1315.1	14.5	1445.7	13.5	1643.9	10.2	-9	-20		
844.7	9.9	862.9	11.1	910.7	8.7	-2.1	-7.2	844.7	9.9
217.5	2.9	219.9	4.9	245.3	4.6	-1.1	-11.3	217.5	2.9
379.6	5.8	401.7	11	531.3	12	-5.5	-28.5	379.6	5.8
10201.5	272.4	6229.3	59.1	5031.6	24.1	63.8	102.7		
9868.3	257.8	6154.2	57	5019.4	23.9	60.4	96.6		
1024	11.6	1414.5	13.5	2064.6	11.3	-27.6	-50.4		
282.5	3.8	297	6.6	412.6	7.4	-4.9	-31.5	282.5	3.8
10391.2	286.3	6259.4	61.4	5021.5	24.6	66	106.9		
236.1	3.1	296.3	6.2	803.5	11	-20.3	-70.6		
9113	828.7	5988.8	187.6	5003.5	74.6	52.2	82.1		
700.2	8.2	977.5	11.4	1667.4	11	-28.4	-58		
1030.4	14.2	1079.5	17.8	1180.9	15.5	-4.6	-12.7	1030.4	14.2
1717.9	18.5	1760.1	14.9	1811.1	10.9	-2.4	-5.1	1811.1	10.9
1442.4	16.2	1493.9	14.6	1568.2	11	-3.4	-8	1568.2	11
-2079.9	189.9	NaN	119.7	4999.8	84.7	NaN	-141.6		
243.9	3	249.2	4.2	300.3	3.8	-2.1	-18.8	243.9	3
10542.3	304.8	6237.6	65	4949.5	26	69	113		
852.9	10.4	882.6	12.5	958.3	10.4	-3.4	-11	852.9	10.4
255.6	3.5	333	7.1	917.8	12.7	-23.3	-72.2		
-4227.5	445.3	NaN	105.3	5081.9	70.2	NaN	-183.2		
1300	72.9	3045.5	87.2	4553.9	66.1	-57.3	-71.5		
1397.6	17.9	1729.4	18.8	2159	15.7	-19.2	-35.3		
289	4.7	287.6	9.8	277.5	8.6	0.5	4.2	289	4.7
311.2	4.3	328.9	7.8	457.5	8.8	-5.4	-32	311.2	4.3
1076.1	12.6	1243.7	13.9	1547.6	11.6	-13.5	-30.5	1076.1	12.6
439.4	5.8	454.8	9.4	533.9	8.9	-3.4	-17.7	439.4	5.8
416	5.4	441	8.6	574.5	8.7	-5.7	-27.6	416	5.4
395	5.1	404.5	7.8	459.9	7.2	-2.4	-14.1	395	5.1
1324.8	14.7	1372	13.7	1447	10.3	-3.4	-8.4	1447	10.3
249.4	3.2	263.4	5.3	390.9	6.1	-5.3	-36.2	249.4	3.2

411	7.2	427.2	14.6	516.1	15.3	-3.8	-20.4	411	7.2
258.4	3.3	277.2	5.5	439.2	6.6	-6.8	-41.2	258.4	3.3
317.9	4.7	334.5	8.9	452	10	-5	-29.7	317.9	4.7
-8419.3	1467.1	NaN	112.7	5167.1	70.7	NaN	-262.9		
229	3	236.9	5.3	316.8	5.7	-3.3	-27.7	229	3
196.4	2.5	197.5	4	211.6	3.5	-0.6	-7.2	196.4	2.5
482	5.8	494.7	7.4	554.9	6.1	-2.6	-13.1	482	5.8
8625.1	810.2	6099.2	187.9	5300.1	74.2	41.4	62.7		
431	5.7	432.7	8.6	442	7.3	-0.4	-2.5	431	5.7
275.1	3.8	271.9	6.4	245.3	5	1.2	12.1	275.1	3.8
2060.6	22	2278.8	16.8	2481.4	12.7	-9.6	-17		
1777.9	20.5	1802.7	17.2	1832.3	13.2	-1.4	-3	1832.3	13.2
-3305.5	287.9	NaN	102.5	4883.4	73.2	NaN	-167.7		
459.7	5.8	466.7	8.3	501.9	7.1	-1.5	-8.4	459.7	5.8
432.8	5.7	448	8.9	527.5	8.4	-3.4	-18	432.8	5.7
-1154.8	244.1	NaN	415.6	4042.8	312.1	NaN	-128.6		
388.8	5.9	397.9	11.1	452	10.9	-2.3	-14	388.8	5.9
313.8	3.8	343.6	5.6	551.1	6.2	-8.7	-43.1	313.8	3.8
271.6	3.8	285.3	6.8	400	7.7	-4.8	-32.1	271.6	3.8
861.2	10.4	871.6	12	898.7	9.5	-1.2	-4.2	861.2	10.4
234.1	3.7	249.4	7.7	395.9	10.1	-6.1	-40.9	234.1	3.7
416.7	6.2	441	11.3	570.8	12	-5.5	-27	416.7	6.2
277.5	3.8	278.5	6.7	288.5	5.9	-0.4	-3.8	277.5	3.8
-3346.1	269.3	NaN	92.4	5018.3	65.1	NaN	-166.7		
249.5	3.2	290.1	5.6	632.5	8.4	-14	-60.6	249.5	3.2
296.1	3.7	325.3	5.8	540.7	6.8	-9	-45.2	296.1	3.7
10660.3	288.7	6228.2	61.7	4903.9	25.5	71.2	117.4		
258.5	3.2	1280.4	13.8	4080.1	14.2	-79.8	-93.7		
393.1	5	403.4	7.6	463.8	6.9	-2.6	-15.3	393.1	5
762.7	9.3	765.8	11.3	776	9	-0.4	-1.7	762.7	9.3
257.7	3.3	258.6	5.1	268.2	4.3	-0.4	-3.9	257.7	3.3
414.7	5.1	434.6	7.4	542.6	6.9	-4.6	-23.6	414.7	5.1
268.2	3.6	298.3	6.5	541.8	8.9	-10.1	-50.5	268.2	3.6
454.7	6.8	471.1	12.4	552.6	12.3	-3.5	-17.7	454.7	6.8
326.6	4.5	336.3	8	404.5	8	-2.9	-19.3	326.6	4.5
521.9	6.6	542.3	9.3	629.3	8.3	-3.8	-17.1	521.9	6.6
10650.9	291.4	6265.5	62.2	4958.9	25.6	70	114.8		
1771.2	19.6	1792.7	16.4	1818.5	12.5	-1.2	-2.6	1818.5	12.5
450.8	6	452.7	9	462.6	7.6	-0.4	-2.6	450.8	6
394	5.2	522.1	9.6	1131.5	13.1	-24.5	-65.2		
-14011.2	3157.5	NaN	87.9	4896.9	58.6	NaN	-386.1		
416.4	5.6	420	8.7	440.4	7.6	-0.9	-5.5	416.4	5.6
309.5	4.2	334.4	7.2	512.7	8.5	-7.5	-39.6	309.5	4.2
685.8	8.3	833.1	11.5	1250	11.3	-17.7	-45.1		
360.2	4.6	425.2	7.6	795.9	9.7	-15.3	-54.7		
383.5	5.5	407.7	9.7	547.8	10.6	-5.9	-30	383.5	5.5
1020.8	12.5	1057.6	14.3	1135.1	11.8	-3.5	-10.1	1020.8	12.5

e

input: 57-60.csv
n samples: 160
concordant to +5/-15%: 67 (41.9%)
cut-off at 1100 Ma (54 younger | 13 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	0	NaN	1.9379	0.82229	0.01812	402.9976	18.3275	3.55257	0.16571
G002	0	NaN	2.0066	0.82073	0.01839	384.6102	17.73556	3.39703	0.16075
G003	0	NaN	2.2807	0.79383	0.01765	426.4991	20.33723	3.89477	0.18992
G004	0.7	NaN	1.7431	0.78737	0.01749	360.1626	15.94819	3.31607	0.15061
G005	0	NaN	2.0275	0.84814	0.01958	408.41	19.5423	3.49099	0.17168
G006	0	NaN	2.1547	0.76304	0.01733	365.2206	16.8499	3.47009	0.16396
G007	0	NaN	1.9637	0.83897	0.01913	403.5718	19.00434	3.48755	0.16864
G008	0.7	NaN	1.7828	0.81695	0.01891	345.6136	15.61067	3.0673	0.14262
G009	0.7	NaN	1.4852	0.81217	0.01862	275.6471	11.21877	2.4608	0.10363
G010	0.7	NaN	1.7657	0.79676	0.01789	354.2723	15.71518	3.22401	0.14682
G011	0	NaN	2.1346	0.8387	0.01947	395.6609	18.88578	3.42067	0.16773
G012	0.7	NaN	2.012	0.79527	0.01874	328.4327	14.96663	2.99462	0.14043
G013	0	NaN	2.2359	0.84069	0.01876	421.462	19.67207	3.63536	0.17395
G014	938.9	68.9	0.7842	0.06066	0.00082	0.53735	0.00779	0.06424	8.00E-04
G015	734.3	51.1	0.2076	0.05391	0.00072	0.5286	0.00762	0.0711	0.00088
G016	0	NaN	2.0348	0.83113	0.01896	397.7604	18.67728	3.47066	0.1672
G017	0	NaN	2.1819	0.81965	0.01812	416.5631	19.20796	3.68572	0.17401
G018	0	NaN	1.9493	0.81863	0.01849	398.1383	18.49968	3.52719	0.16797
G019	7.8	NaN	3.6288	0.81882	0.01113	290.4808	5.57403	2.5729	0.04919
G020	0.7	NaN	2.0859	0.7876	0.01823	351.0226	16.09904	3.23248	0.15206
G021	0	NaN	2.045	0.8313	0.01957	378.8397	18.02477	3.30534	0.16156
G022	916.2	40.3	0.4215	0.05258	0.00093	0.3048	0.00552	0.04205	0.00055
G023	601.1	48.2	0.7538	0.06376	9.00E-04	0.61135	0.00918	0.06954	0.00087
G024	0.7	NaN	1.9308	0.76984	0.01758	362.8229	16.71164	3.41862	0.16111
G025	0.7	NaN	1.9236	1.52782	0.05971	383.3984	18.68027	1.82031	0.10707
G026	0.7	NaN	1.714	0.84844	0.02086	347.3533	16.62854	2.9698	0.14661
G027	0	NaN	1.8254	0.83174	0.01987	395.3908	19.41933	3.44849	0.17383
G028	0	NaN	2.3357	0.81278	0.01933	402.5941	20.11299	3.5933	0.18386
G029	0	NaN	2.0151	0.79698	0.01869	404.3164	19.88523	3.68029	0.18513
G030	0	NaN	2.1322	0.83404	0.01952	385.2192	18.21136	3.35076	0.16259
G031	0	NaN	2.0966	0.79796	0.01905	375.5098	18.23107	3.41406	0.16985
G032	0.7	NaN	1.8583	0.84341	0.01971	362.6177	16.61381	3.11926	0.14692
G033	0	NaN	2.1954	0.84295	0.01969	403.586	19.32357	3.47364	0.17057
G034	0	NaN	2.2249	0.84995	0.02037	442.3487	22.73864	3.77601	0.19883
G035	766.8	54.9	0.4947	0.05772	8.00E-04	0.53286	0.0079	0.06699	0.00084
G036	0.7	NaN	2.2734	0.81159	0.01963	351.9435	16.75958	3.14644	0.15382
G037	0.7	NaN	2.1106	0.76203	0.01264		48.52484	10.13024	0.46371
G038	0.7	NaN	1.9982	0.83456	0.01981	383.511	18.28824	3.33444	0.16317
G039	0.7	NaN	2.2544	0.82882	0.01996	361.7562	17.25077	3.16718	0.1551
G040	398.6	21.4	0.8428	0.05212	0.00094	0.33024	0.00609	0.04598	6.00E-04
G041	373.1	25.7	0.692	0.05477	0.00099	0.46604	0.00867	0.06175	0.00082
G042	126.7	8.7	0.548	0.07966	0.00175	0.68106	0.01475	0.06204	9.00E-04
G043	0.7	NaN	2.274	0.81019	0.01922	395.3213	19.23813	3.54108	0.17626
G044	599	199.6	0.4346	0.114	0.00143	4.93735	0.06848	0.31431	0.00391
G045	0.7	NaN	1.8286	0.81181	0.01979	276.7739	11.92757	2.47433	0.11001
G046	0	NaN	1.1438	0.85227	0.12924	127.8056	14.91172	1.08836	0.16176
G047	1094.7	65.6	0.1325	0.07489	0.00102	0.63598	0.00933	0.06163	0.00077
G048	0	NaN	2.1967	0.82108	0.01988	428.823	22.24878	3.79058	0.20084

G049	0.7	NaN	2.1092	0.83114	0.01971	424.8198	21.01923	3.70982	0.18761
G050	0	NaN	2.4542	0.8369	0.02052	449.5785	23.72247	3.89911	0.21022
G051	353.3	21.5	0.8655	0.05723	0.00138	0.40929	0.00981	0.05191	0.00075
G052	0.7	NaN	1.9296	0.84517	0.02115	367.4247	18.1538	3.15552	0.16007
G053	0.7	NaN	1.82	0.81642	0.02026	357.5869	17.41171	3.17922	0.15866
G054	0	NaN	2.232	0.80714	0.02011	425.8934	22.54597	3.83015	0.20702
G055	0.7	NaN	2.1256	0.83785	0.02157	363.2984	18.44464	3.1475	0.16411
G056	0.7	NaN	1.8127	0.80036	0.02053	326.3689	15.97314	2.96009	0.1487
G057	0.7	NaN	2.0972	0.84556	0.02065	380.0614	18.44982	3.26282	0.1623
G058	0.7	NaN	2.0385	0.82289	0.02041	373.9379	18.4244	3.29876	0.16638
G059	0.7	NaN	2.1151	0.84345	0.02118	366.8652	18.08569	3.15752	0.15965
G060	0.7	NaN	2.0487	0.81334	0.02007	370.6366	18.1353	3.30812	0.16555
G061	0.7	NaN	1.8063	0.85718	0.02216	364.5786	18.44836	3.08768	0.16051
G062	0	NaN	2.8267	0.85819	0.02162	507.0902	28.63386	4.28965	0.2471
G063	0	NaN	2.3121	0.88421	0.02136	467.235	23.97443	3.83624	0.20112
G064	1803.4	132	0.8711	0.24992	0.00369	2.15384	0.0331	0.06257	0.00084
G065	3.5	NaN	0.279	0.83398	0.02784	39.74366	1.51519	0.34598	0.01446
G066	0.7	NaN	1.852	0.84508	0.02264	338.092	17.05772	2.90459	0.15067
G067	891.4	40.7	0.5708	0.05798	0.00097	0.33766	0.00588	0.04228	0.00055
G068	356.9	88.2	0.9443	0.11645	0.00159	3.55783	0.05292	0.22182	0.00283
G069	0.7	NaN	2.208	0.84977	0.02368	345.0927	18.48433	2.9485	0.16256
G070	133.8	6.6	0.5392	0.0531	0.00155	0.33501	0.00961	0.0458	7.00E-04
G071	0.7	NaN	2.2309	0.85754	0.02134	396.4852	19.73185	3.357	0.17086
G072	1750.3	82.3	0.8967	0.06026	0.00092	0.33199	0.00537	0.04	0.00051
G073	477.9	248.4	0.8941	0.15897	0.00211	9.48824	0.13872	0.43337	0.00551
G074	0.7	NaN	2.3414	0.80648	0.02004	421.5796	21.78945	3.79559	0.19971
G075	0.7	NaN	1.8981	0.81041	0.02038	341.9431	16.35076	3.06373	0.14972
G076	809.3	184.1	0.1876	0.1517	0.00222	4.92776	0.07732	0.23586	0.00312
G077	0.7	NaN	2.3762	0.87767	0.02218	426.2893	22.05411	3.52681	0.18649
G078	0.7	NaN	1.8707	0.79705	0.02043	336.7392	16.43637	3.06776	0.15296
G079	0.7	NaN	2.4141	0.84402	0.02182	404.158	21.22237	3.47709	0.1865
G080	437.6	23.4	1.1874	0.05407	0.00104	0.31707	0.00624	0.04258	0.00058
G081	0	NaN	0.2057	0.91022	0.10248	273.6219	55.15421	2.18294	0.46191
G082	0	NaN	2.2963	0.86277	0.02318	397.2806	21.44717	3.34384	0.18468
G083	507	48.4	1.3849	0.05789	0.00096	0.58435	0.01022	0.0733	0.00097
G084	130.3	8.4	0.6625	0.16498	0.00357	1.25256	0.02612	0.05513	0.00087
G085	270.5	14.5	0.5927	0.06348	0.00153	0.43519	0.01045	0.04978	0.00074
G086	190.5	11.5	1.4257	0.09496	0.00234	0.59326	0.01428	0.04537	0.00071
G087	1029.5	58.6	0.8433	0.05218	0.00081	0.35316	0.00588	0.04915	0.00064
G088	778.9	29	0.433	0.05307	0.00092	0.26312	0.00476	0.03601	0.00048
G089	428.4	128.3	0.6937	0.11517	0.0018	4.10506	0.06843	0.25885	0.00348
G090	651.4	43.1	1.0676	0.06378	0.00111	0.48172	0.00872	0.05485	0.00073
G091	-2.1	-0.9	4.8665	0.82782	0.11946	-22.147	1.96426	-0.19429	0.02405
G092	583.4	199.3	1.0599	0.09891	0.0014	3.79206	0.05863	0.27842	0.00358
G093	841.9	36.9	0.527	0.05663	0.00105	0.32232	0.00619	0.04133	0.00056
G094	426.2	81.8	0.3731	0.10657	0.0016	2.71389	0.04382	0.18495	0.00243
G095	674.1	48.8	1.2255	0.07618	0.00129	0.60224	0.01067	0.05741	0.00077
G096	898.5	70.6	0.0956	0.0634	0.00099	0.72191	0.01202	0.08269	0.00108
G097	541.7	50	0.9968	0.05881	0.00098	0.62663	0.01105	0.07739	0.00102
G098	355.4	15.3	0.6187	0.0541	0.00111	0.29506	0.0062	0.03961	0.00055
G099	368.9	22.1	0.8421	0.05948	0.00112	0.42219	0.00824	0.05155	7.00E-04
G100	558.7	65.1	1.7536	0.05909	0.00095	0.67779	0.01162	0.08331	0.0011
G101	465.2	72.8	0.4413	0.07314	0.00113	1.53314	0.02554	0.15225	0.002
G102	722.9	197.9	0.488	0.09502	0.00139	3.3291	0.05304	0.25447	0.0033
G103	0	NaN	0.0102	0.84498	0.11957	321.5333	82.95456	2.7636	0.73803

G104	153.6	7.7	0.581	0.06971	0.00177	0.44228	0.01112	0.04608	7.00E-04
G105	0.7	NaN	2.398	0.84127	0.02217	370.5632	18.62124	3.19909	0.16354
G106	238.6	91.3	0.4538	0.11265	0.0017	5.44506	0.08946	0.35105	0.00464
G107	647.2	122.8	0.0798	0.07804	0.00116	2.13196	0.03449	0.19842	0.00258
G108	1.4	NaN	1.3741	0.85894	0.03031	99.22818	4.16233	0.83902	0.03783
G109	0.7	NaN	2.2982	0.85379	0.02268	437.8568	23.67873	3.72463	0.20443
G110	969.3	136.3	1.1051	0.06414	0.00101	1.02004	0.01723	0.11551	0.00152
G111	914.8	524.4	0.7245	0.17773	0.0026	11.83837	0.18996	0.48377	0.00629
G112	399.3	297.4	1.1174	0.23302	0.00342	18.77051	0.30219	0.58505	0.00763
G113	199.7	86.3	0.9404	0.11863	0.00184	5.80648	0.09779	0.35547	0.00475
G114	293.1	20	1.4063	0.05626	0.00127	0.4051	0.00925	0.0523	0.00075
G115	1329	67	0.6752	0.07661	0.00127	0.49326	0.00867	0.04676	0.00062
G116	493.5	37.1	0.6303	0.061	0.00117	0.57996	0.01157	0.06905	0.00095
G117	662.7	32.1	0.648	0.05697	0.00106	0.34661	0.00675	0.04419	6.00E-04
G118	188.3	56.7	0.9891	0.09551	0.00157	3.33446	0.0586	0.25356	0.00343
G119	315.1	23.7	0.7335	0.05709	0.00125	0.52882	0.01177	0.06728	0.00096
G120	0.7	NaN	2.3023	0.86106	0.02231	481.926	26.07767	4.06489	0.22213
G121	0.7	NaN	2.5302	0.88679	0.02527	377.2667	20.32849	3.08977	0.16959
G122	369.6	22.1	0.4691	0.07627	0.00145	0.59589	0.01175	0.05674	0.00079
G123	634.4	97.1	0.459	0.07413	0.00124	1.49243	0.02676	0.14621	0.00197
G124	1289.4	74	0.9585	0.09065	0.00148	0.6057	0.0106	0.04853	0.00065
G125	288.9	21.7	0.279	0.05827	0.00116	0.60691	0.01248	0.07564	0.00105
G126	645	43.7	0.017	0.05571	0.00098	0.56516	0.01052	0.07367	0.00099
G127	325	26.6	0.4822	0.06051	0.00116	0.64844	0.01294	0.07783	0.00108
G128	448.9	20.2	0.5893	0.07838	0.00153	0.44045	0.00889	0.04081	0.00057
G129	403.6	103.1	0.6349	0.08494	0.00138	2.6977	0.0474	0.23065	0.00309
G130	1188.8	139.8	0.1146	0.0692	0.00112	1.17884	0.02062	0.12371	0.00165
G131	861.7	76.8	1.0693	0.05857	0.001	0.59364	0.01085	0.0736	0.00099
G132	824.9	41.6	0.6019	0.06277	0.0012	0.40649	0.00813	0.04703	0.00065
G133	1086.2	44.8	1.2083	0.09346	0.00172	0.42767	0.00822	0.03323	0.00046
G134	0	NaN	1.1707	0.94689	0.06711	832.5841	179.0056	6.38547	1.39815
G135	588.4	360.1	0.9864	0.16702	0.00268	11.203	0.19541	0.48712	0.00653
G136	515.5	86.3	0.4704	0.07218	0.00123	1.58398	0.02893	0.15936	0.00216
G137	681.9	78.9	0.1427	0.07724	0.00131	1.28977	0.02346	0.12127	0.00164
G138	540.2	76.4	0.4124	0.06961	0.00122	1.31145	0.02456	0.1368	0.00186
G139	0	NaN	0.5186	0.78867	0.16262	244.3086	76.33649	2.24954	0.74446
G140	368.9	29	1.8123	0.05534	0.00115	0.42105	0.00906	0.05525	0.00078
G141	963.7	72.3	0.2512	0.05701	0.001	0.59929	0.01124	0.07633	0.00103
G142	592.6	44.7	0.853	0.05547	0.00105	0.50446	0.01007	0.06604	0.00091
G143	599.7	90.9	0.2478	0.07015	0.00121	1.47978	0.0274	0.15319	0.00208
G144	971.5	66.1	0.2377	0.06313	0.00114	0.60156	0.01152	0.06919	0.00095
G145	3697.5	311.1	0.7708	0.05564	0.00093	0.57758	0.01046	0.07538	0.00101
G146	776.7	54	0.1963	0.06381	0.00115	0.63211	0.01217	0.07193	0.00099
G147	391.6	37.3	1.0777	0.07279	0.00166	0.78725	0.01825	0.07853	0.00117
G148	265.5	133.7	0.8846	0.15171	0.00257	8.84834	0.16242	0.42349	0.0058
G149	2074.6	157.7	0.4838	0.05707	0.00099	0.57403	0.01074	0.07303	0.00099
G150	1566.2	63.1	0.6322	0.05407	0.00108	0.27878	0.00585	0.03743	0.00052
G151	735	63.5	0.8901	0.05847	0.00107	0.605	0.01181	0.07513	0.00103
G152	931.1	157.2	0.2832	0.07249	0.00125	1.682	0.03126	0.16847	0.00229
G153	133.8	6.2	0.4018	0.05731	0.00173	0.35812	0.01075	0.04537	0.00073
G154	1292.2	91.3	0.2454	0.07843	0.00139	0.76532	0.01454	0.07085	0.00097
G155	91.3	31.8	0.7039	0.11226	0.0021	4.76816	0.09503	0.30837	0.00441
G156	1419.7	214.2	1.6758	0.07395	0.00131	1.26146	0.02399	0.12385	0.0017
G157	657.8	42.5	1.4616	0.05423	0.00108	0.37336	0.00784	0.04999	7.00E-04
G158	295.3	16.5	1.3101	0.05644	0.00135	0.3463	0.00848	0.04454	0.00066

G159	0	0	0.1136	0.83392	0.25351	27.42484	6.30017	0.23876	0.06281
G160	410.7	46.4	0.1834	0.08186	0.00156	1.30928	0.02643	0.11612	0.00163

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
9770.8	234.6	6093.7	52.3	4960.8	22.2	60.3	97		
9546.7	235.7	6046.4	53	4958.1	22.6	57.9	92.5		
10238	250.1	6151.1	54.3	4910.7	22.4	66.4	108.5		
9426.9	224.9	5979.9	51.2	4899.1	22.4	57.6	92.4		
9683	246.4	6107.2	55	5004.8	23.3	58.5	93.5		
9652.9	236.5	5994	53.1	4854.3	22.9	61	98.9		
9678	242.3	6095.2	54.1	4989.4	23	58.8	94		
9044.2	226	5938.2	52.6	4951.6	23.3	52.3	82.7		
8003.2	193	5709.2	48.5	4943.2	23.1	40.2	61.9		
9287.9	224.1	5963.2	51.4	4916	22.6	55.8	88.9		
9581.2	244.6	6075.1	54.9	4988.9	23.4	57.7	92.1		
8928	226.6	5886.6	53.1	4913.3	23.7	51.7	81.7		
9887	241.9	6139.1	53.5	4992.3	22.5	61	98		
401.4	4.8	436.7	6.5	627.2	6.3	-8.1	-36	401.4	4.8
442.8	5.3	430.9	6.4	367.3	4.1	2.8	20.6	442.8	5.3
9653.7	241.1	6080.5	54	4976	23	58.8	94		
9956.6	239.4	6127.3	52.8	4956.3	22.3	62.5	100.9		
9734.7	239.2	6081.4	53.4	4954.5	22.8	60.1	96.5		
8208.7	88.8	5762.3	23.7	4954.8	13.7	42.5	65.7		
9300.8	231.6	5953.9	53.1	4899.5	23.3	56.2	89.8		
9410.8	241.9	6031.1	54.9	4976.3	23.7	56	89.1		
265.5	3.4	270.1	5.2	310.7	4.7	-1.7	-14.5	265.5	3.4
433.4	5.2	484.4	7.3	733.7	7.4	-10.5	-40.9	433.4	5.2
9578.3	235	5987.4	53	4866.9	23	60	96.8		
6683.9	244.7	6043.2	71.5	5826.3	39.6	10.6	14.7		
8887.8	238.1	5943.3	55.8	5005.3	24.8	49.5	77.6		
9621.7	251.9	6074.4	56.5	4977.1	24.1	58.4	93.3		
9828.2	258	6092.7	57.2	4944.3	24	61.3	98.8		
9949.1	255	6097	56.2	4916.3	23.6	63.2	102.4		
9478.5	240.9	6048	54.6	4981	23.6	56.7	90.3		
9571.6	248.1	6022.2	55.9	4918.1	24	58.9	94.6		
9126	229.9	5986.8	53.2	4996.9	23.6	52.4	82.6		
9658	245.8	6095.2	55.1	4996.1	23.5	58.5	93.3		
10079.6	268.4	6188.1	58.6	5007.8	24.2	62.9	101.3		
418	5.1	433.7	6.6	519.1	5.6	-3.6	-19.5	418	5.1
9168.4	239.1	5956.5	55.2	4942.2	24.4	53.9	85.5		
15533.7	268.6	NA	49.4	4852.4	16.7	NA	220.1		
9454.3	242.7	6043.5	55.1	4981.9	23.9	56.4	89.8		
9200.6	239.9	5984.4	55.3	4972.1	24.3	53.7	85		
289.8	3.7	289.7	5.6	290.7	4.6	0	-0.3	289.8	3.7
386.3	5	388.4	7.2	402.8	6	-0.6	-4.1	386.3	5
388	5.5	527.4	10.8	1188.6	15.4	-26.4	-67.4		
9754.5	250.2	6074.3	55.8	4939.8	23.9	60.6	97.5		
1761.9	19.2	1808.7	14.9	1864.1	10.7	-2.6	-5.5	1864.1	10.7
8028.4	204.1	5713.4	51.3	4942.6	24.6	40.5	62.4		
4747	499.3	4933	213.9	5011.7	152.9	-3.8	-5.3		
385.5	4.7	499.8	7.3	1065.6	9	-22.9	-63.8		
10099.3	270.3	6156.6	59	4958.7	24.4	64	103.7		

9989.7	256.8	6147.1	56.6	4976.1	23.9	62.5	100.8		
10243.7	276.6	6204.5	60	4985.9	24.7	65.1	105.5		
326.2	4.6	348.4	8.3	500.4	9.5	-6.4	-34.8	326.2	4.6
9182.5	248.3	6000.1	57.3	4999.8	25.2	53	83.7		
9219.2	244.7	5972.7	56.4	4950.7	25	54.4	86.2		
10152.3	276.3	6149.7	60.3	4934.4	25.1	65.1	105.7		
9170.1	255.1	5988.7	58.9	4987.5	25.9	53.1	83.9		
8872	242.1	5880.2	57.1	4922.4	25.8	50.9	80.2		
9346.9	245.4	6034.4	56.1	5000.5	24.6	54.9	86.9		
9401	249.5	6017.9	56.9	4961.9	25	56.2	89.5		
9185.6	247.5	5998.6	57.2	4996.9	25.3	53.1	83.8		
9415	247.7	6009	56.5	4945.3	24.9	56.7	90.4		
9076.4	253.1	5992.3	58.8	5019.8	26.1	51.5	80.8		
10738.1	301.1	6326.5	63.7	5021.5	25.4	69.7	113.8		
10160.4	268.1	6243.6	58.5	5063.8	24.4	62.7	100.6		
391.2	5.1	1166.3	13.8	3184.3	14.3	-66.5	-87.7		
1915.4	69.3	3764.3	53	4980.9	33.6	-49.1	-61.5		
8781	248.8	5915.9	59.1	4999.7	27	48.4	75.6		
267	3.4	295.4	5.4	529	6.9	-9.6	-49.5	267	3.4
1291.5	14.9	1540.2	14.8	1902.4	11.7	-16.1	-32.1		
8853.1	265.4	5936.6	62.5	5007.5	28.1	49.1	76.8		
288.7	4.3	293.4	8.4	333.1	8.3	-1.6	-13.3	288.7	4.3
9487.7	252.8	6077.2	57.4	5020.4	25.1	56.1	89		
252.8	3.2	291.1	5	612.9	7	-13.1	-58.7	252.8	3.2
2320.9	24.8	2386.4	16.9	2444.7	12.3	-2.7	-5.1	2444.7	12.3
10106	268.5	6139.4	58.9	4933.2	25	64.6	104.9		
9038.5	237.5	5927.4	55.6	4940.1	25.3	52.5	83		
1365.1	16.3	1807	16.7	2365.2	13.4	-24.5	-42.3		
9734.2	265.6	6150.6	59.4	5053.3	25.5	58.3	92.6		
9044.9	242.4	5911.8	56.8	4916.5	25.8	53	84		
9663	268.5	6096.6	60.3	4997.9	26.1	58.5	93.3		
268.8	3.6	279.6	5.8	374	6	-3.9	-28.1	268.8	3.6
7463.7	935.5	5701.8	242.5	5104.8	113.6	30.9	46.2		
9468.2	274.1	6079.3	62.2	5029.1	27.1	55.7	88.3		
456	5.8	467.3	8	525.6	6.8	-2.4	-13.2	456	5.8
345.9	5.3	824.6	15.1	2507.3	20.1	-58	-86.2		
313.2	4.5	366.9	8.7	724.4	12.5	-14.6	-56.8	313.2	4.5
286	4.4	472.9	11	1527.3	19.5	-39.5	-81.3		
309.3	3.9	307.1	5.4	293.3	4	0.7	5.5	309.3	3.9
228.1	3	237.2	4.6	331.8	4.9	-3.8	-31.3	228.1	3
1484	17.8	1655.3	16.8	1882.5	13.4	-10.4	-21.2		
344.2	4.5	399.3	7.2	734.3	9.1	-13.8	-53.1	344.2	4.5
-1392.6	192.4	NaN	202.2	4970.4	145.4	NaN	-128		
1583.4	18.1	1591.1	15.4	1603.7	11.4	-0.5	-1.3	1603.7	11.4
261.1	3.5	283.7	5.7	477.2	7.1	-8	-45.3	261.1	3.5
1094	13.2	1332.3	14.8	1741.6	12.5	-17.9	-37.2		
359.9	4.7	478.7	8.3	1099.8	11.4	-24.8	-67.3		
512.2	6.4	551.8	8.7	721.7	8.1	-7.2	-29	512.2	6.4
480.5	6.1	494	8.3	560.1	7.2	-2.7	-14.2	480.5	6.1
250.4	3.4	262.5	5.7	375.2	6.4	-4.6	-33.3	250.4	3.4
324	4.3	357.6	7	584.7	8.4	-9.4	-44.6	324	4.3
515.8	6.5	525.4	8.5	570.4	7	-1.8	-9.6	515.8	6.5
913.6	11.2	943.8	12.5	1017.8	9.9	-3.2	-10.2	913.6	11.2
1461.5	17	1487.9	15.3	1528.5	11.6	-1.8	-4.4	1528.5	11.6
8543.9	1264.1	5865.1	305.9	4999.5	142.6	45.7	70.9		

290.4	4.3	371.9	9.2	919.8	15.4	-21.9	-68.4		
9249.8	251.1	6008.8	58.2	4993.3	26.6	53.9	85.2		
1939.6	22.1	1892	17.2	1842.6	12.8	2.5	5.3		
1166.8	13.9	1159.2	13.7	1147.9	10.2	0.7	1.6	1147.9	10.2
3927.4	132.6	4678.3	57.6	5022.8	35.6	-16.1	-21.8		
10009.9	278.9	6177.8	61.8	5014.2	26.8	62	99.6		
704.7	8.8	713.9	10.5	746.3	8.3	-1.3	-5.6	704.7	8.8
2543.7	27.3	2591.7	18.3	2631.8	13.7	-1.9	-3.3	2631.8	13.7
2969.3	31	3030.1	18.9	3072.9	14.2	-2	-3.4	3072.9	14.2
1960.7	22.6	1947.4	17.7	1935.7	13.4	0.7	1.3	1935.7	13.4
328.6	4.6	345.3	7.8	462.6	8.4	-4.8	-29	328.6	4.6
294.6	3.8	407.1	7.1	1111.1	11.2	-27.6	-73.5		
430.4	5.7	464.4	8.8	639.2	9.1	-7.3	-32.7	430.4	5.7
278.8	3.7	302.2	6	490.4	7.2	-7.7	-43.2	278.8	3.7
1456.8	17.6	1489.2	16.6	1538.2	13	-2.2	-5.3	1538.2	13
419.7	5.8	431	9.2	495	8.6	-2.6	-15.2	419.7	5.8
10458.2	282.7	6274.9	61.3	5026.3	26.1	66.7	108.1		
9079.7	267.3	6026.9	62.6	5068	28.7	50.7	79.2		
355.8	4.8	474.6	8.9	1102.2	12.8	-25	-67.7		
879.7	11.1	927.3	13.1	1045	10.9	-5.1	-15.8	879.7	11.1
305.5	4	480.8	8.1	1439.3	12.6	-36.5	-78.8		
470	6.3	481.6	9.3	539.9	8.3	-2.4	-12.9	470	6.3
458.2	5.9	454.9	8.1	440.8	6.3	0.7	3.9	458.2	5.9
483.2	6.5	507.5	9.5	621.9	8.9	-4.8	-22.3	483.2	6.5
257.9	3.5	370.6	7.5	1156.5	13.5	-30.4	-77.7		
1337.9	16.2	1327.8	15.6	1314.2	12	0.8	1.8	1314.2	12
751.9	9.5	790.8	11.5	904.7	9.7	-4.9	-16.9	751.9	9.5
457.8	5.9	473.2	8.2	551.1	7.3	-3.3	-16.9	457.8	5.9
296.3	4	346.3	6.9	700.4	9.7	-14.5	-57.7	296.3	4
210.7	2.9	361.5	7	1497.2	14.4	-41.7	-85.9		
12889.7	1220.4	6829.2	233.4	5160.6	71.5	88.7	149.8		
2558.2	28.3	2540.2	19.5	2528	14.9	0.7	1.2	2528	14.9
953.2	12	963.9	13.6	991	10.8	-1.1	-3.8	953.2	12
737.9	9.4	841.2	12.4	1127.4	11.5	-12.3	-34.6	737.9	9.4
826.5	10.5	850.8	12.8	916.9	10.6	-2.8	-9.9	826.5	10.5
7597.2	1476.9	5587.2	394.3	4901.4	207.7	36	55		
346.7	4.8	356.8	7.6	426	7.2	-2.8	-18.6	346.7	4.8
474.2	6.2	476.8	8.4	491.9	6.8	-0.5	-3.6	474.2	6.2
412.3	5.5	414.7	8	431.2	6.7	-0.6	-4.4	412.3	5.5
918.8	11.6	922.1	13.3	932.7	10.5	-0.4	-1.5	918.8	11.6
431.3	5.7	478.2	8.7	712.6	9.2	-9.8	-39.5	431.3	5.7
468.5	6.1	462.9	8	438	5.9	1.2	7	468.5	6.1
447.8	6	497.4	8.9	735.3	9.4	-10	-39.1	447.8	6
487.3	7	589.6	12.2	1008.1	14.6	-17.3	-51.7		
2276.3	26.3	2322.5	19.9	2365.3	15.5	-2	-3.8	2365.3	15.5
454.4	5.9	460.6	8.2	494.2	6.8	-1.4	-8.1	454.4	5.9
236.9	3.2	249.7	5.4	374	6.2	-5.1	-36.7	236.9	3.2
467	6.2	480.4	8.8	547.4	7.7	-2.8	-14.7	467	6.2
1003.7	12.6	1001.7	14	999.7	11	0.2	0.4	1003.7	12.6
286	4.5	310.8	9.2	503.5	12	-8	-43.2	286	4.5
441.3	5.8	577.1	9.9	1157.8	12.2	-23.5	-61.9		
1732.7	21.7	1779.3	19.8	1836.3	15.9	-2.6	-5.6	1836.3	15.9
752.7	9.8	828.6	12.7	1040.1	11.5	-9.2	-27.6	752.7	9.8
314.5	4.3	322.1	6.7	380.6	6.3	-2.4	-17.4	314.5	4.3
280.9	4.1	301.9	7.4	469.7	9	-7	-40.2	280.9	4.1

1380.2	326.9	3398.8	393.9	4980.8	306.4	-59.4	-72.3
708.2	9.4	849.8	13.6	1242.2	13.7	-16.7	-43

e

input: 61-64.csv
n samples: 150
concordant to +5/-15%: 8 (5.3%)
cut-off at 1100 Ma (6 younger | 2 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	0.6	NaN	1.7523	0.85176	0.02037	463.2032	24.05904	3.94563	0.21036
G002	0.6	NaN	1.6283	-1.20642	0.053	508.5917	29.96318	-3.05867	0.21444
G003	0.6	NaN	1.5713	0.88205	0.02108	438.1475	21.95839	3.60406	0.18594
G004	0.6	NaN	1.6223	0.86163	0.0216	457.0305	24.89039	3.84845	0.21538
G005	0.6	NaN	1.7341	0.82977	0.02064	438.2328	23.57566	3.83184	0.21148
G006	0.6	NaN	1.5612	0.84922	0.01998	461.021	23.36971	3.93879	0.20485
G007	0.6	NaN	1.825	0.86782	0.02191	495.1907	28.0214	4.14006	0.24041
G008	0	NaN	2.0867	0.69052	0.01783	512.7785	30.73697	5.38786	0.32434
G009	0.6	NaN	1.6474	0.8721	0.02137	429.2231	22.07468	3.5709	0.18903
G010	0.6	NaN	1.7705	0.85022	0.02071	492.6012	26.9425	4.20365	0.23561
G011	0.6	NaN	1.5345	0.84117	0.02038	451.3729	23.68416	3.89325	0.20966
G012	0.6	NaN	1.493	0.88497	0.02119	439.8043	22.08705	3.60574	0.1864
G013	0.6	NaN	1.6292	0.87392	0.02145	447.3799	23.42438	3.71422	0.19994
G014	0.6	NaN	1.444	0.84514	0.02116	423.9326	22.42923	3.63943	0.19799
G015	0.6	NaN	1.667	0.85762	0.02094	468.0777	25.22014	3.95994	0.21886
G016	0.6	NaN	1.4245	0.79451	0.01975	398.0941	20.67795	3.63537	0.19384
G017	0.6	NaN	1.4455	0.86153	0.02156	442.5671	23.82813	3.72712	0.20625
G018	0.6	NaN	1.7794	0.36731	0.01532	205.0476	13.20888	4.05033	0.22876
G019	0.6	NaN	1.5008	0.8683	0.02114	459.7474	24.10537	3.84163	0.20701
G020	0.6	NaN	1.5794	0.81518	0.02019	453.8829	24.72757	4.03974	0.22544
G021	0.6	NaN	1.6779	0.88424	0.02236	494.8294	27.88762	4.0602	0.23503
G022	0.6	NaN	1.5942	0.86528	0.0218	484.6855	27.29962	4.06414	0.23482
G023	0.6	NaN	1.6465	0.82612	0.02084	436.0853	23.75854	3.82995	0.21404
G024	0.6	NaN	1.8533	0.79559	0.01947	451.0692	24.25235	4.11356	0.22639
G025	0.6	NaN	1.8313	0.82725	0.0198	451.4104	23.57327	3.95911	0.21175
G026	0.6	NaN	1.6098	0.84473	0.02168	438.5339	24.19009	3.76661	0.21349
G027	0.6	NaN	1.6116	0.82423	0.02026	438.514	23.2167	3.8601	0.20948
G028	618.8	31.8	0.546	0.05977	0.00104	0.39662	0.00725	0.04814	0.00065
G029	0.6	NaN	1.8212	0.84824	0.02215	422.1533	23.37691	3.61089	0.20557
G030	0.6	NaN	1.7027	0.84125	0.02114	480.781	26.94147	4.14654	0.23818
G031	0.6	NaN	1.7695	0.86573	0.02208	475.2274	26.77854	3.98273	0.2304
G032	0.6	NaN	1.7005	0.83509	0.02127	476.9063	27.17011	4.14348	0.2418
G033	0.6	NaN	1.3781	0.81888	0.02052	415.6737	21.84503	3.68294	0.19842
G034	0.6	NaN	1.7858	0.83971	0.02074	493.5002	27.47517	4.26407	0.2431
G035	0.6	NaN	1.844	0.8488	0.02113	503.2101	28.4334	4.30136	0.24883
G036	-79.1	0.2	-0.0085	0.84289	0.02151	-2.01556	0.03823	-0.01735	4.00E-04
G037	0.6	NaN	1.9532	0.82583	0.02097	545.6862	32.90562	4.79423	0.29525
G038	0.6	NaN	1.8526	0.81405	0.02013	540.2081	31.60729	4.81477	0.28753
G039	0.6	NaN	1.5675	0.85898	0.02403	422.9628	25.39862	3.57259	0.22077
G040	0.6	NaN	2.0083	0.84117	0.02065	520.0245	29.29077	4.48546	0.25835
G041	658.6	33.3	0.0977	0.05344	0.00087	0.39508	0.00681	0.05364	0.00071
G042	0.6	NaN	1.7409	0.78954	0.02112	483.1541	29.74107	4.43996	0.27931
G043	0.6	NaN	1.7942	0.86247	0.02209	458.6662	25.65006	3.8585	0.22146
G044	0.6	NaN	1.6022	0.80621	0.02162	434.7616	25.47937	3.91264	0.23495
G045	0.6	NaN	1.8788	0.8482	0.02271	473.3031	28.25304	4.04864	0.24787
G046	266	125.9	0.7519	0.15877	0.00199	8.90777	0.12708	0.40706	0.00533
G047	0.6	NaN	1.6174	0.84365	0.02112	437.3057	23.2775	3.76089	0.20551
G048	0.6	NaN	1.6773	0.8666	0.02275	495.4533	29.473	4.14809	0.25284

G049	0.6	NaN	1.6655	0.83305	0.02327	469.2766	29.49945	4.08718	0.26333
G050	0.6	NaN	1.7266	0.81497	0.02079	482.8685	28.02608	4.29888	0.25496
G051	0.6	NaN	1.8561	0.82808	0.02105	502.679	29.46484	4.40441	0.26382
G052	0.6	NaN	1.6538	0.81918	0.02181	432.2084	24.98985	3.82806	0.22682
G053	0.6	NaN	1.8284	0.81231	0.02019	560.4167	33.83375	5.00563	0.30782
G054	0.6	NaN	1.8209	0.81957	0.02077	475.0903	26.95	4.2059	0.24404
G055	213.3	15.2	0.5962	0.09992	0.002	0.90735	0.0182	0.06588	0.00097
G056	0.6	NaN	1.5018	0.85755	0.02229	435.633	24.12	3.68576	0.20963
G057	0.6	NaN	1.8293	0.80067	0.02186	459.7014	28.17394	4.16572	0.26109
G058	0.6	NaN	1.9289	0.82234	0.02024	510.2457	28.77096	4.50191	0.25913
G059	0.6	NaN	1.5316	0.86917	0.02192	470.3665	25.97268	3.92645	0.22227
G060	0.6	NaN	1.661	0.83785	0.02161	416.6946	22.51793	3.60844	0.2002
G061	0.6	NaN	1.8044	0.83137	0.02155	477.5357	27.74217	4.16753	0.24771
G062	0.6	NaN	1.571	0.82379	0.02249	455.6719	27.58212	4.01334	0.24881
G063	0.6	NaN	1.7134	0.85231	0.02265	467.8927	27.42505	3.98305	0.23933
G064	0.6	NaN	1.8127	0.8543	0.02331	473.8423	28.70015	4.02434	0.25002
G065	0.6	NaN	1.7221	0.81475	0.02163	455.8039	26.81913	4.05904	0.24434
G066	-190.4	-0.1	-0.0035	0.91342	0.02483	-0.90292	0.01754	-0.00717	0.00017
G067	0.6	NaN	1.6928	0.8382	0.02262	482.0851	29.2362	4.17298	0.25912
G068	0.6	NaN	1.8205	0.84634	0.02217	504.4242	30.13475	4.32436	0.26417
G069	0.6	NaN	1.8227	0.84033	0.02273	464.6625	27.86222	4.01199	0.24639
G070	0.6	NaN	1.8249	0.88417	0.02415	478.2519	28.94648	3.92458	0.24381
G071	0.6	NaN	1.8729	0.82152	0.02214	483.1423	29.48778	4.26703	0.2663
G072	0.6	NaN	1.7904	0.83136	0.02124	491.7299	28.31048	4.2915	0.25241
G073	0.6	NaN	1.6148	0.82785	0.02289	441.596	26.68084	3.87031	0.23962
G074	0.6	NaN	1.6792	0.85397	0.02395	437.7376	26.42304	3.71914	0.23049
G075	0.6	NaN	2.0316	0.82922	0.02202	566.9447	36.45444	4.96068	0.32506
G076	48.1	NaN	0.5979	0.75386	0.01421	94.93209	2.18511	0.91368	0.02162
G077	0.6	NaN	1.7407	0.86263	0.02283	466.7525	26.95521	3.92583	0.2324
G078	0.6	NaN	2.063	0.88032	0.02386	575.1933	37.37622	4.74076	0.31477
G079	314.1	15.3	1.2904	0.09651	0.00254	0.48755	0.01237	0.03665	6.00E-04
G080	0.6	NaN	1.6095	0.81751	0.02286	404.7898	23.77915	3.59261	0.21653
G081	0.6	NaN	1.6832	0.87258	0.02409	424.5798	24.52246	3.53043	0.20976
G082	-0.6	-13.2	2.8283	0.87114	0.0392		10.85956	-1.42321	0.09796
G083	0.6	NaN	1.6834	0.87365	0.02377	504.4206	30.97188	4.18918	0.26342
G084	0.6	NaN	1.9205	0.85744	0.02399	472.2746	29.38955	3.99637	0.25467
G085	656.9	102.4	0.1983	0.07024	0.00096	1.53252	0.02325	0.15832	0.00204
G086	0.6	NaN	2.0774	0.83778	0.0223	555.3059	35.12014	4.80924	0.31015
G087	0.6	NaN	1.7816	0.84998	0.02224	488.4686	28.47408	4.16967	0.24847
G088	1.2	NaN	0.536	0.68186	0.09597	70.72504	9.90253	0.75258	0.11697
G089	0.6	NaN	1.5191	0.85066	0.02439	420.3874	25.57606	3.58564	0.22399
G090	0.6	NaN	1.9431	0.8528	0.02354	473.0849	28.83675	4.02501	0.2512
G091	1398.7	96.6	0.5868	0.0574	0.00085	0.50228	0.00807	0.06349	0.00082
G092	0.6	NaN	1.7199	0.81909	0.02373	425.074	26.4983	3.7654	0.24045
G093	249	125	0.3047	0.19828	0.00265	12.93067	0.19336	0.47316	0.0063
G094	0.6	NaN	1.566	0.80557	0.02306	405.7671	24.27816	3.6547	0.22302
G095	0.6	NaN	1.9265	0.89057	0.02503	493.7247	30.86031	4.02249	0.25771
G096	0.6	NaN	1.8615	0.83195	0.02338	467.0259	29.50706	4.07305	0.263
G097	0.6	NaN	1.8591	0.89325	0.02482	494.9097	30.57806	4.02006	0.2545
G098	215.6	16.1	0.5671	0.06635	0.00154	0.62422	0.01449	0.06826	0.00101
G099	0.6	NaN	1.774	0.83925	0.02287	466.5785	28.13723	4.03376	0.2486
G100	581.3	28.1	0.7895	0.05755	0.00115	0.33567	0.00684	0.04232	0.00058
G101	0.6	NaN	1.617	0.86146	0.02424	446.3359	27.00186	3.75931	0.23314
G102	0.6	NaN	1.7891	0.86388	0.02371	514.4295	32.25681	4.32069	0.27675
G103	0.6	NaN	2.0014	0.85638	0.02317	498.2748	30.25778	4.22167	0.26191

G104	0.6	NaN	1.7899	0.84509	0.0246	418.2017	25.71036	3.59057	0.22647
G105	0.6	NaN	1.6545	0.84023	0.02228	465.8912	27.14972	4.02314	0.23943
G106	0.6	NaN	1.7467	0.81532	0.0218	466.6984	27.51483	4.15328	0.24974
G107	0.6	NaN	1.7872	0.89729	0.02647	467.9331	30.12364	3.78384	0.24998
G108	0.6	NaN	1.7163	0.80842	0.02125	435.3589	24.79106	3.90743	0.22686
G109	0.6	NaN	1.6759	0.85098	0.02243	467.2066	26.87351	3.98357	0.2341
G110	0.6	NaN	1.9353	0.84622	0.02242	488.2617	28.77204	4.18652	0.25172
G111	406.7	21.3	0.7543	0.06471	0.00141	0.4079	0.00897	0.04574	0.00066
G112	-1.8	-1	3.0996	1.03854	0.08273	94.77222	7.12942	0.66213	0.06243
G113	0.6	NaN	1.6368	0.8378	0.0231	419.7718	24.22686	3.63544	0.21476
G114	0.6	NaN	1.6615	0.85206	0.02318	452.4496	26.49507	3.85287	0.23067
G115	0.6	NaN	1.8068	0.82464	0.02328	452.6556	27.97691	3.98281	0.25142
G116	0.6	NaN	1.3463	0.87499	0.02364	318.3897	15.64683	2.64024	0.13396
G117	0.6	NaN	1.6693	0.85152	0.02424	462.6311	28.81138	3.94208	0.25105
G118	5169.5	176.4	0.1627	0.07069	0.00099	0.33877	0.0052	0.03477	0.00045
G119	0.6	NaN	1.537	0.80536	0.02219	419.4531	24.40681	3.77903	0.2245
G120	0.6	NaN	1.6848	0.81908	0.02257	451.9247	27.13672	4.00339	0.24527
G121	0.6	NaN	1.7542	0.81893	0.02299	413.1177	24.26219	3.6603	0.2197
G122	0.6	NaN	1.7627	0.86896	0.0253	436.2469	26.94638	3.64266	0.23055
G123	0.6	NaN	1.5891	0.88991	0.02593	433.0912	26.35925	3.5312	0.22066
G124	0.6	NaN	1.7362	0.87451	0.02447	498.7051	30.9729	4.13778	0.26252
G125	0.6	NaN	1.9344	0.85967	0.02327	516.9868	31.70859	4.36353	0.27275
G126	0.6	NaN	1.4815	0.8735	0.02515	422.2875	25.30323	3.50778	0.21541
G127	0.6	NaN	1.6278	0.86038	0.02502	430.8708	26.5107	3.63366	0.22891
G128	0.6	NaN	1.7192	0.82604	0.02342	455.101	28.3095	3.99758	0.25357
G129	0.6	NaN	1.9343	0.85305	0.02441	514.1707	33.37275	4.37343	0.28959
G130	0.6	NaN	1.6883	0.82636	0.02231	443.0106	25.61611	3.88986	0.22927
G131	0.6	NaN	1.8273	0.83659	0.02525	474.683	31.992	4.11701	0.2833
G132	0.6	NaN	2.0713	0.90235	0.02711	468.5288	30.43908	3.76748	0.25081
G133	0.6	NaN	2.0511	0.83897	0.02334	524.3101	33.55158	4.53453	0.29525
G134	0.6	NaN	2.2634	0.85332	0.02318	542.6612	33.88259	4.61435	0.29311
G135	0.6	NaN	2.0745	0.89267	0.02484	505.9168	31.08553	4.11228	0.25799
G136	0.6	NaN	1.5934	0.90413	0.02692	390.6885	23.11609	3.13538	0.19083
G137	0.6	NaN	1.867	0.802	0.02279	461.8382	28.86602	4.17841	0.26585
G138	0.6	NaN	1.5846	0.82486	0.02316	458.2363	28.46257	4.03091	0.25492
G139	0.6	NaN	1.9745	0.88862	0.02534	540.5964	35.67812	4.41421	0.29699
G140	0.6	NaN	1.6936	0.78154	0.02236	417.9213	25.42395	3.88007	0.24028
G141	0.6	NaN	1.7791	0.85485	0.02481	439.8155	27.0531	3.73316	0.23464
G142	0.6	NaN	2.2512	0.81426	0.02366	536.5429	36.58284	4.78118	0.33129
G143	0.6	NaN	1.5779	0.81202	0.02318	436.7847	26.55144	3.903	0.24176
G144	0.6	NaN	1.9223	0.96613	0.02817	518.0157	32.94993	3.89048	0.25371
G145	0.6	NaN	1.8169	0.85195	0.0253	485.6078	31.94869	4.13588	0.27768
G146	0.6	NaN	1.8449	0.84807	0.02419	459.1665	28.18096	3.92858	0.24583
G147	0.6	NaN	1.8242	0.86089	0.02381	470.3058	28.12698	3.96399	0.24153
G148	0.6	NaN	1.7095	0.84524	0.02443	428.3669	26.03263	3.67737	0.22817
G149	0.6	NaN	1.8736	0.86266	0.02503	484.4587	30.82638	4.07491	0.26447
G150	0.6	NaN	1.7592	0.81336	0.02288	461.3147	28.14244	4.11541	0.25538

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
10304.6	274.2	6234.8	59.2	5010.8	24.1	65.3	105.6		
NaN	-671.5	6329.5	83.8	NaN	NaN	NaN	NaN		
9843.3	260.3	6178.4	57.6	5060.4	24.1	59.3	94.5		
10176.7	286.4	6221.2	62.1	5027.2	25.3	63.6	102.4		
10154.6	282.1	6178.6	61.3	4973.7	25.1	64.3	104.2		
10295.7	267.4	6230	57.8	5006.6	23.7	65.3	105.6		
10553.2	301.5	6302.4	64.2	5037.3	25.5	67.4	109.5		
11954.2	327.3	6337.8	66.4	4711.1	26	88.6	153.7		
9796.7	266.6	6157.6	59.1	5044.3	24.7	59.1	94.2		
10632.5	291.9	6297.1	61.9	5008.3	24.6	68.8	112.3		
10236	276.2	6208.6	59.8	4993.1	24.4	64.9	105		
9845.6	260.9	6182.3	57.7	5065	24.1	59.3	94.4		
9995.7	273.4	6199.6	59.9	5047.3	24.7	61.2	98		
9892.6	275.1	6145	60.7	4999.8	25.2	61	97.9		
10323.2	284.5	6245.4	61.2	5020.6	24.6	65.3	105.6		
9887	269.6	6081.3	59.6	4911.9	25	62.6	101.3		
10013.3	281.3	6188.6	61.5	5027	25.2	61.8	99.2		
10439.7	292	5410.1	70.9	3780.4	41.3	93	176.2		
10167.6	275.6	6227.2	59.9	5038.1	24.5	63.3	101.8		
10426.1	288.4	6214.2	61.9	4948.5	25	67.8	110.7		
10452.3	299.4	6301.7	64	5063.9	25.5	65.9	106.4		
10457.3	298.9	6280.7	63.9	5033.2	25.4	66.5	107.8		
10152	285.7	6173.7	62.1	4967.4	25.4	64.4	104.4		
10519.9	285.4	6207.9	61	4913.9	24.7	69.5	114.1		
10322.2	275.3	6208.7	59.4	4969.4	24.1	66.3	107.7		
10066.9	288.7	6179.3	63	4999.1	25.9	62.9	101.4		
10192.2	277.9	6179.3	60.4	4964.2	24.8	64.9	105.3		
303.1	4	339.2	6.4	595.3	7.8	-10.6	-49.1	303.1	4
9852.8	287.4	6140.8	63.4	5005	26.3	60.4	96.9		
10561.3	298.3	6272.5	63.5	4993.2	25.3	68.4	111.5		
10352.8	298.1	6260.7	64.1	5033.9	25.7	65.4	105.7		
10557.5	303.1	6264.3	64.5	4982.8	25.7	68.5	111.9		
9952.8	273.1	6125.1	60.2	4954.9	25.3	62.5	100.9		
10706.9	297.7	6299	63	4990.6	24.9	70	114.5		
10752.4	302.6	6318.7	63.8	5005.9	25.1	70.2	114.8		
-112.8	2.6	NaN	69.3	4996	25.7	NaN	-102.3		
11325.5	328.5	6400.8	67.5	4966.9	25.6	76.9	128		
11348.3	318.8	6390.6	65.5	4946.5	24.9	77.6	129.4		
9799.1	311.2	6142.7	68.7	5022.8	28.2	59.5	95.1		
10972.4	303.6	6352	63.5	4993.1	24.7	72.7	119.8		
336.8	4.3	338.1	6	347.5	4.8	-0.4	-3.1	336.8	4.3
10918.8	331	6277.5	69.3	4903	26.9	73.9	122.7		
10190	293.8	6224.8	63.7	5028.6	25.8	63.7	102.6		
10261.5	308.3	6170.6	66.6	4932.7	27	66.3	108		
10437.5	316.5	6256.6	67.7	5004.9	27	66.8	108.5		
2201.5	24.4	2328.6	16.5	2442.6	11.6	-5.5	-9.9	2442.6	11.6
10059.2	278.3	6176.5	60.9	4997.3	25.2	62.9	101.3		
10563.3	316.6	6303	67.3	5035.3	26.5	67.6	109.8		

10486.5	333.7	6248	71.2	4979.3	28.2	67.8	110.6		
10749.4	310.2	6276.9	65.4	4948.1	25.7	71.3	117.2		
10876.5	314.7	6317.7	65.9	4970.8	25.6	72.2	118.8		
10149.5	302.8	6164.6	65.8	4955.5	26.8	64.6	104.8		
11556.5	330.4	6427.8	67.2	4943.5	25	79.8	133.8		
10635.2	302.2	6260.5	64.2	4956.1	25.5	69.9	114.6		
411.3	5.9	655.6	12	1622.6	16.2	-37.3	-74.7		
9956.7	288.4	6172.6	63.4	5020.5	26.2	61.3	98.3		
10585.3	325.8	6227.1	69.3	4922.9	27.5	70	115		
10991.8	303.6	6332.8	63.4	4960.9	24.8	73.6	121.6		
10279.6	290.8	6250.3	62.8	5039.5	25.4	64.5	104		
9849.4	280	6127.6	62	4987.5	26	60.7	97.5		
10587.6	309	6265.7	65.7	4976.5	26.1	69	112.8		
10392.3	319.9	6218.2	68.6	4963.4	27.5	67.1	109.4		
10353.2	309.6	6245	66.6	5011.8	26.8	65.8	106.6		
10406.4	320.8	6257.8	68.8	5015.1	27.5	66.3	107.5		
10450.8	311.3	6218.5	66.7	4947.7	26.8	68.1	111.2		
-46.4	1.1	-2368.1	-341	5109.8	27.4	-98	-100.9		
10594.4	322.9	6275.3	68.6	4988.1	27.2	68.8	112.4		
10780.3	319.8	6321.2	67.4	5001.8	26.4	70.5	115.5		
10390.5	316.9	6238	68	4991.7	27.3	66.6	108.2		
10277.1	319.2	6267.2	68.8	5063.8	27.5	64	103		
10710.5	325.9	6277.5	68.9	4959.5	27.2	70.6	116		
10740.4	307.5	6295.3	65	4976.4	25.7	70.6	115.8		
10205.7	317.2	6186.4	68.7	4970.4	27.9	65	105.3		
10002.4	314.9	6177.5	68.9	5014.5	28.3	61.9	99.5		
11508	351.5	6439.6	71.7	4972.8	26.8	78.7	131.4		
4183.9	72.8	4633.8	30.4	4837	19	-9.7	-13.5		
10278.8	304.1	6242.5	65.7	5028.8	26.7	64.7	104.4		
11265.7	353.5	6454.2	72.7	5057.6	27.3	74.5	122.7		
232	3.7	403.2	10.3	1557.7	21	-42.5	-85.1		
9827.2	303.9	6098.2	67.3	4952.6	28.2	61.1	98.4		
9739.4	298.5	6146.6	66.4	5045.1	27.8	58.5	93		
NaN	-1492.1	NA	84	5042.7	45.4	NaN	NaN		
10614.5	327.2	6321.2	69.4	5046.8	27.4	67.9	110.3		
10370.4	328.6	6254.4	70.5	5020.3	28.2	65.8	106.6		
947.4	11.4	943.5	11.5	935.4	8.4	0.4	1.3	947.4	11.4
11342.1	344.2	6418.6	70.7	4987.4	26.8	76.7	127.4		
10590.2	309.8	6288.6	65.9	5007.9	26.4	68.4	111.5		
3617	430.2	4338.6	209.9	4693	141.5	-16.6	-22.9		
9817.4	314.9	6136.5	69.6	5009	28.9	60	96		
10407.3	322.3	6256.2	69.1	5012.6	27.8	66.4	107.6		
396.8	5	413.2	6.7	506.9	5.9	-4	-21.7	396.8	5
10065.3	325.3	6147.8	71	4955.3	29.2	63.7	103.1		
2497.4	27.6	2674.6	17.8	2812.1	12.7	-6.6	-11.2	2812.1	12.7
9913.8	308.9	6100.7	68.3	4931.6	28.8	62.5	101		
10404	330.8	6299.4	70.9	5074	28.3	65.2	105		
10468.6	334.2	6243.1	71.4	4977.4	28.3	67.7	110.3		
10400.9	326.8	6301.9	70.1	5078.2	28	65	104.8		
425.7	6.1	492.5	10.7	817.4	13	-13.6	-47.9	425.7	6.1
10418.5	318.4	6242.1	68.3	4989.8	27.5	66.9	108.8		
267.2	3.6	293.9	6.2	512.7	8	-9.1	-47.9	267.2	3.6
10057.1	315.8	6197.2	69	5026.9	28.4	62.3	100.1		
10775.8	335.3	6341.1	70.6	5030.9	27.7	69.9	114.2		
10654.7	323.3	6308.7	68.6	5018.5	27.3	68.9	112.3		

9824.4	318	6131.2	70.4	4999.7	29.3	60.2	96.5
10404.9	307.3	6240.6	66	4991.5	26.7	66.7	108.5
10569.8	312.4	6242.4	66.7	4948.7	26.9	69.3	113.6
10090.2	336.9	6245.1	73.3	5084.6	29.8	61.6	98.4
10254.6	298	6172	64.6	4936.6	26.5	66.1	107.7
10353.9	302.8	6243.5	65.3	5009.6	26.6	65.8	106.7
10611.2	312.9	6288.2	66.6	5001.6	26.7	68.7	112.2
288.3	4.1	347.4	7.7	764.9	11.7	-17	-62.3
3275.4	242.1	4632.1	124	5290.5	80.4	-29.3	-38.1
9887.1	298.7	6135	66	4987.4	27.8	61.2	98.2
10182.6	306.4	6211	66.6	5011.3	27.4	63.9	103.2
10352.9	325.3	6211.4	70.1	4964.9	28.4	66.7	108.5
8329.1	237.2	5855.1	58.2	5049	27.2	42.3	65
10300	327.5	6233.5	70.7	5010.5	28.7	65.2	105.6
220.3	2.8	296.2	4.9	948.5	8.6	-25.6	-76.8
10083.7	302.8	6134.3	66.3	4931.2	27.8	64.4	104.5
10379.5	316	6209.8	68.1	4955.3	27.8	67.1	109.5
9921.5	303.9	6118.9	67.1	4955	28.3	62.1	100.2
9897.1	320.1	6174	70.6	5039.2	29.4	60.3	96.4
9740.4	313.9	6166.7	69.8	5072.9	29.4	58	92
10550.3	329.4	6309.6	70.3	5048.2	28.2	67.2	109
10827.5	327.8	6346.1	69	5024	27.3	70.6	115.5
9707	308.1	6141.1	68.7	5046.6	29	58.1	92.3
9884.6	318.5	6161.5	70.3	5025.1	29.3	60.4	96.7
10372	327.1	6216.9	70.4	4967.3	28.6	66.8	108.8
10839.4	347.4	6340.6	73.1	5013	28.8	71	116.2
10231.5	302.3	6189.6	65.7	4967.9	27.2	65.3	106
10524.2	356.9	6259.6	76.1	4985.3	30.4	68.1	111.1
10068.1	339.1	6246.4	74	5092.6	30.3	61.2	97.7
11029.9	343.9	6360.3	71.8	4989.4	28	73.4	121.1
11122.2	336.5	6395.2	70	5013.4	27.4	73.9	121.8
10518.3	325.3	6324.2	69.5	5077.3	28.1	66.3	107.2
9151.2	297.5	6062.3	68.6	5095.3	30	51	79.6
10601.1	330.9	6231.8	70.6	4925.3	28.6	70.1	115.2
10414.8	326.6	6223.9	70.1	4965.3	28.3	67.3	109.8
10888.2	353.6	6391.3	74.1	5070.9	28.8	70.4	114.7
10218.6	317.4	6130.6	69.1	4888.5	28.8	66.7	109
10021.6	319.6	6182.3	70.1	5016	29.3	62.1	99.8
11310.9	369.4	6383.7	76.2	4946.9	29.3	77.2	128.6
10248.8	317.9	6175.3	69.1	4943	28.8	66	107.3
10232.3	334.4	6348.1	72.4	5188.9	29.4	61.2	97.2
10548	348.5	6282.6	74.4	5011.2	29.9	67.9	110.5
10282.4	321.5	6225.9	69.7	5004.7	28.8	65.2	105.5
10328.5	313.7	6250.2	67.8	5026	27.9	65.3	105.5
9945.1	314.5	6155.6	69.3	4999.9	29.1	61.6	98.9
10471	335.9	6280.2	72	5028.9	29.3	66.7	108.2
10522.2	321.8	6230.6	69	4945.3	28.3	68.9	112.8

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input: 69-72.csv
n samples: 152
concordant to +5/-15%: 121 (79.6%)
cut-off at 1100 Ma (89 younger | 32 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/(	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	0.4	NaN	2.3295	0.86323	0.02613	384.2123	23.86211	3.22915	0.2071
G002	453.2	24.3	0.9477	0.05233	0.00095	0.31971	0.00601	0.04432	0.00059
G003	204.4	11.6	1.1241	0.05127	0.00126	0.31879	0.00782	0.04511	0.00065
G004	267.1	12	0.7567	0.04892	0.00113	0.26331	0.00615	0.03905	0.00055
G005	692.4	37.6	0.5259	0.05307	0.00082	0.36851	0.00611	0.05038	0.00065
G006	193.5	15.3	1.1179	0.05486	0.00117	0.47483	0.01026	0.06279	0.00088
G007	42.7	15.5	0.838	0.11088	0.00191	4.65096	0.08429	0.30431	0.00441
G008	238.8	17.5	0.98	0.05443	0.00109	0.45153	0.00921	0.06019	0.00083
G009	60.6	21.7	0.5883	0.11173	0.00175	4.89162	0.08203	0.31762	0.00442
G010	142	77.3	0.6697	0.1653	0.00206	10.48032	0.14824	0.45998	0.00595
G011	250.1	62	0.3171	0.09938	0.0013	3.26348	0.04753	0.23824	0.00306
G012	91.9	7	1.0003	0.05281	0.0016	0.45679	0.01363	0.06276	0.00099
G013	565.1	82.6	0.6641	0.07079	0.00093	1.26607	0.01849	0.12976	0.00165
G014	235.3	11.6	0.8366	0.05381	0.00125	0.31119	0.00724	0.04196	6.00E-04
G015	703.7	30.3	0.7278	0.05139	0.00088	0.26635	0.00477	0.03761	0.00049
G016	519	91.9	0.0934	0.10853	0.00135	2.7834	0.039	0.18606	0.00235
G017	304.1	40.3	0.2248	0.07429	0.00107	1.3658	0.02135	0.13337	0.00173
G018	466.7	67.4	0.1456	0.06785	0.00092	1.39172	0.02079	0.14881	0.0019
G019	316.3	116.4	0.6516	0.10777	0.00133	4.76592	0.06679	0.32083	0.00407
G020	481	76.5	0.3283	0.07053	0.00093	1.50236	0.02203	0.15455	0.00197
G021	687.6	42.7	0.0727	0.05598	0.00082	0.51258	0.00814	0.06643	0.00085
G022	71.5	5.9	1.3386	0.05343	0.0018	0.45616	0.01503	0.06194	0.00102
G023	292.4	59.7	0.6583	0.08105	0.00118	1.9885	0.03128	0.17799	0.00233
G024	1634	393.9	0.0787	0.11236	0.00133	3.89194	0.0527	0.25131	0.00314
G025	1875.4	70.2	0.3785	0.05042	7.00E-04	0.25253	0.00385	0.03634	0.00046
G026	926.8	68.6	0.8225	0.07291	0.00101	0.6338	0.00961	0.06306	0.00081
G027	344.7	120.9	0.3608	0.11536	0.00142	5.23307	0.07311	0.32912	0.00417
G028	31.8	11.6	0.9704	0.10997	0.00213	4.46189	0.0892	0.29436	0.00449
G029	455.8	20.2	0.306	0.04876	0.00092	0.29572	0.00574	0.044	0.00059
G030	546.4	66.4	1.281	0.06063	0.00087	0.77418	0.01206	0.09264	0.00119
G031	189.5	24.4	0.5721	0.06495	0.0011	1.04511	0.01857	0.11674	0.00156
G032	202.6	67.7	0.4806	0.11031	0.00145	4.61945	0.06759	0.30381	0.00392
G033	724.6	58.8	0.698	0.05496	8.00E-04	0.54064	0.00856	0.07136	0.00091
G034	649.7	109.5	0.9798	0.0832	0.00117	1.6164	0.02477	0.14096	0.00182
G035	219.2	72.4	0.1853	0.12162	0.00157	5.48485	0.07914	0.32718	0.00421
G036	950.8	NaN	0.2848	0.74938	0.01043	59.64879	0.93216	0.57749	0.00883
G037	365.1	93.5	0.299	0.09075	0.00117	3.10245	0.04477	0.24804	0.00316
G038	949.9	96.1	1.2934	0.05684	0.00078	0.60075	0.00906	0.07668	0.00097
G039	69.3	20.2	1.0208	0.14226	0.00236	4.56425	0.07645	0.23277	0.00344
G040	61	39.7	1.6058	0.16267	0.0023	10.10343	0.15752	0.45062	0.00618
G041	210.9	66.2	0.8234	0.09949	0.00134	3.68448	0.05481	0.26868	0.00347
G042	2611.7	215.4	0.6211	0.05606	0.00071	0.57373	0.00813	0.07424	0.00093
G043	198.3	10.4	0.7015	0.05307	0.0013	0.33727	0.00822	0.04611	0.00067
G044	131.6	8.4	0.6036	0.05381	0.00143	0.43127	0.01139	0.05815	0.00087
G045	0.4	NaN	2.2661	0.816	0.02569	390.843	26.18688	3.47503	0.23922
G046	0.4	NaN	2.1186	0.87086	0.02693	401.8929	25.93935	3.34816	0.22266
G047	1131.6	75.8	0.8299	0.11368	0.0015	0.91061	0.01324	0.05812	0.00074
G048	287.6	21.4	0.8141	0.05672	0.00107	0.49781	0.0097	0.06368	0.00086

G049	2881	199	0.7937	0.06425	0.00083	0.52344	0.00752	0.05911	0.00074
G050	1421.8	215.3	0.1877	0.0697	0.00087	1.47877	0.02085	0.15393	0.00193
G051	160.8	53	0.4127	0.10747	0.00148	4.53972	0.0686	0.30646	0.00399
G052	765.6	277.9	0.4596	0.15418	0.00189	7.1767	0.09962	0.33771	0.00424
G053	253.2	11.2	0.4102	0.0797	0.00287	0.44433	0.01521	0.04045	0.00076
G054	316.3	47.5	0.3468	0.07076	0.00104	1.41493	0.02238	0.14507	0.00188
G055	801.7	29.8	0.8649	0.05316	0.00092	0.22857	0.00413	0.03119	0.00041
G056	317.6	14.9	0.3871	0.05733	0.00116	0.35701	0.00735	0.04518	0.00062
G057	577.8	45	0.762	0.05659	0.00088	0.52644	0.00873	0.0675	0.00087
G058	715	36	0.7613	0.07402	0.00115	0.43838	0.00719	0.04297	0.00056
G059	328.1	32.3	0.8357	0.06159	0.00101	0.71116	0.01234	0.08377	0.0011
G060	265.8	23	1.0505	0.05761	0.00108	0.55426	0.01068	0.0698	0.00094
G061	577.8	311.9	0.7466	0.15971	0.00198	9.87528	0.13832	0.44861	0.00564
G062	382.6	28.9	0.5501	0.05857	0.00099	0.55852	0.00987	0.06918	0.00091
G063	729	33.1	0.5616	0.03713	0.00084	0.2119	0.00495	0.0414	0.00054
G064	359	32.5	0.922	0.0642	0.00105	0.66054	0.0114	0.07465	0.00098
G065	166	16.4	0.932	0.05954	0.00121	0.66942	0.01389	0.08158	0.00113
G066	598.7	48.6	0.8069	0.06079	0.00092	0.58407	0.00947	0.06971	9.00E-04
G067	1190.4	63.1	0.5221	0.05435	8.00E-04	0.36724	0.00581	0.04902	0.00063
G068	199.1	10.3	0.8273	0.05634	0.00137	0.3416	0.00826	0.04399	0.00064
G069	236.2	85.1	0.5945	0.11334	0.00151	4.9722	0.07343	0.31829	0.00408
G070	78	22.4	0.985	0.08937	0.00152	2.85701	0.05102	0.23193	0.0032
G071	40.1	9.7	0.8329	0.08305	0.00181	2.33381	0.05147	0.20387	0.00309
G072	694.5	23.7	0.3882	0.05682	0.00101	0.25686	0.00473	0.0328	0.00043
G073	464	89.5	0.4108	0.07799	0.00107	1.96349	0.02948	0.18266	0.00233
G074	73.2	12.2	0.6578	0.07062	0.00148	1.43005	0.03046	0.14692	0.00212
G075	1534.2	482.2	0.7203	0.10636	0.00136	4.07129	0.05806	0.27773	0.00349
G076	126.8	56.4	0.5042	0.177	0.00241	9.8032	0.14707	0.40183	0.00526
G077	449.7	18.2	0.3155	0.04925	0.00098	0.27151	0.00555	0.03999	0.00054
G078	111.5	5.2	0.9349	0.06011	0.00194	0.32283	0.01012	0.03897	0.00064
G079	7.8	NaN	0.6999	0.8432	0.03993			44.5437	15.84579
G080	-440.1	NaN	-0.1708	0.63822	0.1028	91.76171	12.95648	1.04313	0.15126
G081	138.1	6.5	1.1453	0.05996	0.00175	0.30358	0.00866	0.03674	0.00057
G082	1883.2	102.7	0.2027	0.06951	0.00096	0.52287	0.00787	0.05457	0.00069
G083	319.4	112.7	0.7715	0.14059	0.00188	5.89252	0.08699	0.30409	0.00388
G084	864.9	39.6	0.6814	0.05326	0.00087	0.29751	0.00512	0.04053	0.00053
G085	935.9	277	0.9209	0.08872	0.00117	2.97354	0.04345	0.24317	0.00307
G086	38.8	13	0.86	0.10113	0.00197	3.88005	0.07763	0.27835	0.00414
G087	8.3	12.1	6.5687	0.18666	0.00426	12.96733	0.308	0.50401	0.00978
G088	525.9	45.5	0.7862	0.05814	0.00093	0.59254	0.01	0.07395	0.00096
G089	111.5	70	1.2363	0.15962	0.00224	10.21538	0.15728	0.46433	0.00611
G090	87.6	4.8	0.5261	0.06026	0.0019	0.41605	0.01278	0.05009	0.00081
G091	0	NaN	0.7391	0.62599	0.15538	204.7675	89.63047	2.37324	1.06149
G092	161.2	13.4	0.9132	0.05874	0.00129	0.55909	0.01233	0.06905	0.00098
G093	172.5	32	0.6486	0.07196	0.00118	1.63348	0.02823	0.1647	0.00219
G094	262.3	19.8	0.8609	0.06744	0.00128	0.59187	0.01149	0.06367	0.00087
G095	463.6	283.4	1.0541	0.16028	0.00213	10.38668	0.15283	0.47017	0.00595
G096	1437.5	584.5	0.114	0.15516	0.00205	8.66975	0.12654	0.4054	0.0051
G097	1451.8	92.9	0.1416	0.05779	0.00083	0.53797	0.00838	0.06754	0.00086
G098	79.7	6.2	0.721	0.05874	0.00173	0.55093	0.01598	0.06804	0.00107
G099	387.8	66.8	0.7563	0.0757	0.00112	1.56302	0.02488	0.14981	0.00193
G100	630.9	83.1	0.3601	0.0646	0.00095	1.12585	0.01782	0.12644	0.00162
G101	0	NaN	3.2049	1.00645	0.53796	685.3976	898.9735	4.9409	6.74615
G102	108.5	9	0.8149	0.05731	0.00146	0.56452	0.01427	0.07147	0.00106
G103	96.7	5.8	0.5272	0.05764	0.00172	0.44169	0.01291	0.0556	0.00088

G104	794.8	38	1.0238	0.06291	0.00105	0.34354	0.006	0.03962	0.00052
G105	446.2	22.1	0.9873	0.0568	0.00109	0.32048	0.00632	0.04093	0.00055
G106	441.8	101.1	0.6139	0.08708	0.00125	2.46993	0.03837	0.20579	0.00264
G107	0	NaN	0.7633	1.03782	0.2903	400.4132	190.1603	2.79924	1.40772
G108	330.3	78.1	0.4169	0.15023	0.00227	4.60437	0.0742	0.22236	0.00295
G109	275.4	102.4	1.0785	0.10629	0.00155	4.29711	0.06763	0.29332	0.0038
G110	142	6.9	0.6437	0.05651	0.00159	0.33771	0.00935	0.04336	0.00066
G111	406.5	21.2	0.9662	0.06234	0.00122	0.36667	0.00729	0.04267	0.00058
G112	676.7	45.5	0.5936	0.05541	0.00092	0.47078	0.00821	0.06165	8.00E-04
G113	464.9	33.4	0.5741	0.06124	0.00105	0.5552	0.00996	0.06577	0.00087
G114	150.8	7.7	1.0418	0.05965	0.00163	0.34089	0.00917	0.04146	0.00063
G115	109.4	57.2	1.0521	0.16083	0.00238	9.22786	0.1475	0.41628	0.00551
G116	472.3	38.3	0.762	0.05619	0.00096	0.54529	0.00972	0.07041	0.00092
G117	595.6	45.6	0.697	0.05759	0.00096	0.53878	0.00943	0.06788	0.00089
G118	1.3	NaN	6.3472	1.13469	0.85775	582.4039	596.174	3.72396	4.59692
G119	1346.4	98.5	0.0188	0.23602	0.02261	2.25009	0.1838	0.06917	0.00412
G120	262.3	22	0.7317	0.05545	0.0011	0.55984	0.01133	0.07326	0.001
G121	515	33.5	0.4391	0.057	0.001	0.4812	0.00877	0.06125	0.00081
G122	541.2	38	0.4917	0.05667	0.00098	0.51236	0.0092	0.0656	0.00086
G123	121.1	6.9	1.2934	0.05189	0.00163	0.31135	0.00958	0.04353	0.00069
G124	230.9	89.5	0.9307	0.11058	0.00166	4.83518	0.07768	0.31723	0.00412
G125	74.5	6.5	0.8185	0.0603	0.00179	0.61487	0.01791	0.07398	0.00118
G126	360.8	9.9	0.6851	0.07263	0.0017	0.23818	0.0055	0.02379	0.00035
G127	214.4	43.5	0.3841	0.08053	0.00131	2.14462	0.03672	0.19322	0.00255
G128	334.6	16	0.7615	0.05236	0.00115	0.30041	0.00663	0.04163	0.00058
G129	308.1	36.2	1.3631	0.06529	0.00155	0.80432	0.01908	0.08938	0.00132
G130	582.1	45	0.761	0.05889	0.001	0.5429	0.00964	0.06688	0.00088
G131	184.7	21.9	0.4895	0.06839	0.00128	1.04095	0.01999	0.11043	0.0015
G132	101.1	30.2	1.0154	0.08802	0.00152	2.90841	0.0525	0.23975	0.00326
G133	276.3	95.4	0.1242	0.11704	0.00176	5.53951	0.08919	0.34339	0.00444
G134	413.9	20.8	0.488	0.05445	0.00109	0.35421	0.00722	0.04719	0.00064
G135	210	34.9	2.8155	0.12504	0.00608	1.65874	0.07445	0.09625	0.0026
G136	382.6	35.8	0.9913	0.0648	0.00115	0.70499	0.01299	0.07893	0.00105
G137	157.7	9.2	1.2789	0.05203	0.00148	0.31885	0.00891	0.04446	0.00068
G138	210.9	18.3	1.1156	0.05542	0.0012	0.52432	0.01147	0.06864	0.00096
G139	507.2	18.7	0.351	0.05705	0.00115	0.28292	0.00581	0.03598	0.00049
G140	662.3	21.9	0.395	0.05152	0.00104	0.2266	0.00466	0.03191	0.00043
G141	410	68.8	0.4947	0.07231	0.00118	1.5511	0.02655	0.15564	0.00203
G142	-3001.7	-278.7	0.5174	0.05991	0.00096	0.71141	0.01206	0.08615	0.00112
G143	353.4	26.6	0.6197	0.05646	0.0011	0.52687	0.01045	0.06771	0.00092
G144	244.9	14.7	0.8498	0.05403	0.00123	0.37934	0.00866	0.05094	0.00072
G145	205.7	16.5	0.7504	0.06069	0.00128	0.5837	0.01247	0.06978	0.00097
G146	645.7	59.3	0.1438	0.06783	0.00113	0.889	0.01554	0.09509	0.00125
G147	674.1	48	0.5882	0.05618	0.00098	0.50142	0.00909	0.06476	0.00085
G148	950.3	312.9	0.1488	0.11387	0.00173	5.1418	0.0833	0.32763	0.0042
G149	398.3	28.5	0.4869	0.05622	0.00108	0.52225	0.01024	0.0674	0.00091
G150	66.7	4.9	1.092	0.08017	0.00246	0.6543	0.01937	0.05922	0.001
G151	155.1	11.3	1.038	0.05733	0.00144	0.46542	0.01162	0.0589	0.00087
G152	493.7	24.3	0.9556	0.05256	0.00109	0.29474	0.00619	0.04069	0.00056

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
9295.7	315.7	6045.4	71.8	5029.8	30.5	53.8	84.8		
279.6	3.6	281.7	5.5	299.9	4.7	-0.8	-6.8	279.6	3.6
284.4	4	281	7	253	5.5	1.2	12.4	284.4	4
246.9	3.4	237.3	5.7	144	3.1	4	71.5	246.9	3.4
316.9	4	318.5	5.5	331.8	4.4	-0.5	-4.5	316.9	4
392.6	5.3	394.5	8.3	406.5	7.1	-0.5	-3.4	392.6	5.3
1712.6	21.8	1758.5	18.8	1813.9	14.6	-2.6	-5.6	1813.9	14.6
376.8	5	378.4	7.7	388.9	6.5	-0.4	-3.1	376.8	5
1778.1	21.6	1800.8	17.7	1827.7	13.3	-1.3	-2.7	1827.7	13.3
2439.5	26.3	2478.2	16.7	2510.6	11.6	-1.6	-2.8	2510.6	11.6
1377.5	15.9	1472.4	14.2	1612.5	10.6	-6.4	-14.6	1612.5	10.6
392.4	6	382	10.9	320.6	8.3	2.7	22.4	392.4	6
786.5	9.4	830.6	10.4	951.4	8.1	-5.3	-17.3	786.5	9.4
265	3.7	275.1	6.6	363.1	7.1	-3.7	-27	265	3.7
238	3	239.8	4.6	258.4	3.9	-0.7	-7.9	238	3
1100	12.8	1351.1	13.2	1774.9	10.4	-18.6	-38		
807.1	9.8	874.4	11.4	1049.4	9.4	-7.7	-23.1	807.1	9.8
894.3	10.7	885.4	11	864	7.9	1	3.5	894.3	10.7
1793.8	19.9	1778.9	14.9	1762.1	10.3	0.8	1.8	1762.1	10.3
926.4	11	931.3	11.2	943.8	8.1	-0.5	-1.8	926.4	11
414.6	5.1	420.2	6.7	451.6	5.3	-1.3	-8.2	414.6	5.1
387.4	6.2	381.6	11.9	347.1	9.9	1.5	11.6	387.4	6.2
1056	12.8	1111.6	13.2	1222.7	10.3	-5	-13.6	1056	12.8
1445.2	16.2	1612	13.9	1837.9	10.1	-10.3	-21.4		
230.1	2.9	228.6	3.8	214.4	2.7	0.6	7.3	230.1	2.9
394.2	4.9	498.5	7.4	1011.5	8.9	-20.9	-61		
1834.1	20.2	1858	15.1	1885.5	10.5	-1.3	-2.7	1885.5	10.5
1663.3	22.4	1723.9	20.5	1798.9	16.3	-3.5	-7.5	1798.9	16.3
277.6	3.6	263.1	5.4	136.3	2.4	5.5	103.6		
571.1	7	582.2	8.5	626.1	6.7	-1.9	-8.8	571.1	7
711.8	9	726.5	11.2	772.7	9.2	-2	-7.9	711.8	9
1710.2	19.4	1752.8	15.4	1804.5	11.1	-2.4	-5.2	1804.5	11.1
444.3	5.5	438.8	6.9	410.6	4.9	1.3	8.2	444.3	5.5
850.1	10.3	976.6	12	1273.9	10.2	-13	-33.3	850.1	10.3
1824.7	20.4	1898.2	15.7	1980.1	11.2	-3.9	-7.8	1980.1	11.2
2938.5	36.1	4168.2	20.6	4828.4	14	-29.5	-39.1		
1428.4	16.3	1433.3	13.9	1441.4	9.9	-0.3	-0.9	1441.4	9.9
476.3	5.8	477.7	7.1	485.3	5.3	-0.3	-1.9	476.3	5.8
1349	18	1742.8	18.5	2254.9	15	-22.6	-40.2		
2398	27.5	2444.3	18.2	2483.6	13.1	-1.9	-3.4	2483.6	13.1
1534.1	17.6	1568	14.9	1614.6	10.9	-2.2	-5	1614.6	10.9
461.6	5.6	460.4	6.6	454.7	4.6	0.3	1.5	461.6	5.6
290.6	4.1	295.1	7.3	331.8	6.9	-1.5	-12.4	290.6	4.1
364.4	5.3	364.1	9.3	363.1	8.1	0.1	0.3	364.4	5.3
9660	344.6	6062.7	76.7	4949.9	31.7	59.3	95.2		
9474.6	330.1	6090.9	74.3	5042.3	31.2	55.6	87.9		
364.2	4.5	657.4	8.9	1859.1	11.3	-44.6	-80.4		
398	5.2	410.2	7.8	480.7	7.2	-3	-17.2	398	5.2

370.2	4.5	427.4	6.3	749.9	6.8	-13.4	-50.6	370.2	4.5
923	10.8	921.7	10.7	919.5	7.5	0.1	0.4	923	10.8
1723.3	19.7	1738.3	15.8	1757	11.5	-0.9	-1.9	1757	11.5
1875.6	20.4	2133.6	15.6	2392.8	11.3	-12.1	-21.6		
255.6	4.7	373.3	12.7	1189.6	25.2	-31.5	-78.5		
873.3	10.6	895.2	11.7	950.5	9.1	-2.5	-8.1	873.3	10.6
198	2.6	209	4.1	335.6	4.9	-5.3	-41	198	2.6
284.9	3.8	310	6.5	504.3	8	-8.1	-43.5	284.9	3.8
421.1	5.3	429.4	7.1	475.6	5.9	-1.9	-11.5	421.1	5.3
271.2	3.5	369.1	6.3	1042	10.1	-26.5	-74		
518.6	6.5	545.4	8.9	659.9	8	-4.9	-21.4	518.6	6.5
435	5.7	447.8	8.4	515	7.6	-2.9	-15.5	435	5.7
2389.1	25.1	2423.2	16.3	2452.6	11.5	-1.4	-2.6	2452.6	11.5
431.2	5.5	450.6	7.8	551.1	7.2	-4.3	-21.8	431.2	5.5
261.5	3.3	195.1	4.6	-547.1	-16.4	34	-147.8		
464.1	5.9	514.9	8.5	748.2	8.7	-9.9	-38	464.1	5.9
505.5	6.7	520.4	10	586.9	9.1	-2.8	-13.9	505.5	6.7
434.4	5.4	467.1	7.4	631.8	7.1	-7	-31.2	434.4	5.4
308.5	3.9	317.6	5.3	385.6	4.7	-2.9	-20	308.5	3.9
277.5	4	298.4	7.3	465.8	9.1	-7	-40.4	277.5	4
1781.4	20	1814.6	15.6	1853.6	11.3	-1.8	-3.9	1853.6	11.3
1344.6	16.7	1370.7	16.5	1412.1	13	-1.9	-4.8	1412.1	13
1196.1	16.5	1222.6	18.9	1270.4	15.8	-2.2	-5.8	1270.4	15.8
208	2.7	232.1	4.6	484.6	6.8	-10.4	-57.1	208	2.7
1081.5	12.7	1103.1	12.6	1146.6	9.4	-2	-5.7	1081.5	12.7
883.7	11.9	901.6	15.2	946.4	12.9	-2	-6.6	883.7	11.9
1579.9	17.6	1648.6	14.6	1737.9	10.6	-4.2	-9.1	1737.9	10.6
2177.5	24.2	2416.5	17.4	2625	12.8	-9.9	-17		
252.8	3.3	243.9	5.2	159.7	2.9	3.6	58.2	252.8	3.3
246.4	4	284.1	9	607.5	14.8	-13.2	-59.4	246.4	4
24616.7	2242.9	NA	364.3	4996.5	47.7	NA	392.7		
4605.9	477.3	4599.7	217.7	4597.5	161.8	0.1	0.2		
232.6	3.5	269.2	7.8	602.1	13.3	-13.6	-61.4	232.6	3.5
342.5	4.2	427.1	6.5	913.9	8.3	-19.8	-62.5		
1711.6	19.2	1960.1	16	2234.5	12.1	-12.7	-23.4		
256.1	3.3	264.5	4.9	339.9	4.7	-3.2	-24.6	256.1	3.3
1403.2	15.9	1400.9	13.9	1398.1	10	0.2	0.4	1398.1	10
1583	20.9	1609.5	19.8	1645	15.9	-1.6	-3.8	1645	15.9
2631	41.9	2677.3	28.2	2713	21.6	-1.7	-3	2713	21.6
459.9	5.8	472.5	7.8	535	6.7	-2.7	-14	459.9	5.8
2458.6	26.9	2454.5	17.8	2451.6	13	0.2	0.3	2451.6	13
315.1	5	353.2	10.6	612.9	14.5	-10.8	-48.6	315.1	5
7838	2028.6	5408.7	516.9	4569.5	249.2	44.9	71.5		
430.4	5.9	450.9	9.5	557.5	9.4	-4.5	-22.8	430.4	5.9
982.8	12.1	983.2	13.3	984.8	10.3	0	-0.2	982.8	12.1
397.9	5.3	472.1	8.8	851.4	10.9	-15.7	-53.3		
2484.3	26.1	2469.9	17	2458.6	12.3	0.6	1	2458.6	12.3
2193.9	23.4	2303.9	16.6	2403.6	12.2	-4.8	-8.7	2403.6	12.2
421.3	5.2	437.1	6.8	521.8	5.9	-3.6	-19.3	421.3	5.2
424.3	6.5	445.6	12	557.5	12.6	-4.8	-23.9	424.3	6.5
899.9	10.8	955.7	12.1	1087.1	9.9	-5.8	-17.2	899.9	10.8
767.5	9.3	765.8	10.5	761.3	7.9	0.2	0.8	767.5	9.3
11486.6	7320.2	6631.9	1486.7	5246.4	539.6	73.2	118.9		
445	6.4	454.5	10.8	503.5	10.1	-2.1	-11.6	445	6.4
348.8	5.4	371.4	10.5	516.1	12.1	-6.1	-32.4	348.8	5.4

250.5	3.2	299.9	5.5	705.2	8.5	-16.5	-64.5		
258.6	3.4	282.3	5.8	483.8	7.4	-8.4	-46.5	258.6	3.4
1206.3	14.1	1263.3	13.9	1362.3	10.8	-4.5	-11.4	1362.3	10.8
8604.7	2388.6	6087.2	582.8	5289.5	282.5	41.4	62.7		
1294.3	15.6	1750.1	16.8	2348.5	13.8	-26	-44.9		
1658.1	18.9	1692.8	16.1	1736.7	12.1	-2.1	-4.5	1736.7	12.1
273.6	4.1	295.4	8.2	472.5	10.6	-7.4	-42.1	273.6	4.1
269.4	3.6	317.2	6.5	685.8	9.8	-15.1	-60.7		
385.7	4.9	391.7	6.9	428.8	5.8	-1.6	-10.1	385.7	4.9
410.6	5.3	448.4	7.9	647.7	8.2	-8.4	-36.6	410.6	5.3
261.9	3.9	297.8	8.1	590.9	12.2	-12.1	-55.7	261.9	3.9
2243.6	25.1	2360.9	18.2	2464.4	13.7	-5	-9	2464.4	13.7
438.6	5.5	441.9	7.7	459.9	6.3	-0.7	-4.6	438.6	5.5
423.4	5.4	437.6	7.5	514.2	6.7	-3.3	-17.7	423.4	5.4
10009	6273.1	6466.9	1467.2	5414.3	763.9	54.8	84.9		
431.2	24.8	1196.8	79.3	3093.3	92.6	-64	-86.1		
455.8	6	451.4	8.8	430.4	7	1	5.9	455.8	6
383.2	4.9	398.9	7.2	491.5	6.8	-3.9	-22	383.2	4.9
409.6	5.2	420	7.5	478.7	6.6	-2.5	-14.4	409.6	5.2
274.7	4.3	275.2	8.5	280.6	7.7	-0.2	-2.1	274.7	4.3
1776.2	20.2	1791	16.7	1809	12.7	-0.8	-1.8	1809	12.7
460.1	7.1	486.6	13	614.4	13.7	-5.5	-25.1	460.1	7.1
151.6	2.2	216.9	5.4	1003.6	14.9	-30.1	-84.9		
1138.8	13.8	1163.3	14.5	1210	11.5	-2.1	-5.9	1210	11.5
262.9	3.6	266.7	6.1	301.2	5.7	-1.4	-12.7	262.9	3.6
551.9	7.8	599.3	12.7	783.7	13	-7.9	-29.6	551.9	7.8
417.3	5.3	440.3	7.7	563	7.3	-5.2	-25.9	417.3	5.3
675.2	8.7	724.4	12	880.4	11	-6.8	-23.3	675.2	8.7
1385.4	17	1384.1	16.6	1382.9	13	0.1	0.2	1382.9	13
1903	21.3	1906.7	17.1	1911.5	12.9	-0.2	-0.4	1911.5	12.9
297.2	3.9	307.9	6.4	389.7	6.5	-3.5	-23.7	297.2	3.9
592.4	15.3	992.9	35.2	2029.4	42.7	-40.3	-70.8		
489.7	6.3	541.8	9.3	767.8	9.6	-9.6	-36.2	489.7	6.3
280.4	4.2	281	7.9	286.7	7.1	-0.2	-2.2	280.4	4.2
428	5.8	428	9	429.2	7.6	0	-0.3	428	5.8
227.9	3	253	5.4	493.5	7.9	-9.9	-53.8	227.9	3
202.5	2.7	207.4	4.6	264.2	4.7	-2.4	-23.3	202.5	2.7
932.5	11.3	950.9	12.9	994.7	10.3	-1.9	-6.3	932.5	11.3
532.7	6.6	545.6	8.7	600.3	7.3	-2.4	-11.3	532.7	6.6
422.3	5.6	429.7	8.3	470.5	7.3	-1.7	-10.2	422.3	5.6
320.3	4.4	326.6	7.5	372.3	7.1	-1.9	-14	320.3	4.4
434.8	5.8	466.8	9.5	628.3	9.9	-6.9	-30.8	434.8	5.8
585.6	7.4	645.8	10.1	863.4	9.7	-9.3	-32.2	585.6	7.4
404.5	5.1	412.7	7.4	459.5	6.4	-2	-12	404.5	5.1
1826.9	20.4	1843	16.9	1862.1	13	-0.9	-1.9	1862.1	13
420.5	5.5	426.7	8.2	461.1	7.1	-1.4	-8.8	420.5	5.5
370.9	6.1	511.1	14.1	1201.2	21.6	-27.4	-69.1		
368.9	5.3	388	9.4	504.3	10	-4.9	-26.8	368.9	5.3
257.1	3.5	262.3	5.8	309.8	5.5	-2	-17	257.1	3.5

e

input: 73-76.csv
n samples: 150
concordant to +5/-15%: 102 (68.0%)
cut-off at 1100 Ma (80 younger | 22 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/(	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	42.2	10.9	15.399	0.70664	0.05173	82.88825	9.5192	0.85181	0.10312
G002	60.4	NaN	0.8678	1.7351	0.5697	165.3296	48.19533	0.69193	0.28433
G003	7	NaN	1.4648	1.36628	0.05589	170.6716	9.09353	0.90708	0.05498
G004	167.6	14.9	0.2467	0.07693	0.00139	0.92176	0.01665	0.087	0.00115
G005	183.4	17.7	1.0478	0.06151	0.00118	0.6748	0.01295	0.07966	0.00106
G006	0.6	NaN	0.3144	0.80969	0.01993	548.0079	33.49219	4.91428	0.30614
G007	0	NaN	0.7883	0.88745	0.06212		289.2125	8.92175	2.3964
G008	890.7	47.5	0.6021	0.07098	0.00105	0.47494	0.0072	0.04858	6.00E-04
G009	0	NaN	-4.4956	0.91031	0.22461			-30.6853	135.7423
G010	0	NaN	2.6222	0.87759	0.04187	367.7156	38.56387	3.0421	0.33026
G011	2495.7	139.9	0.3733	0.05831	0.00074	0.43372	0.00584	0.054	0.00065
G012	537.3	24.5	0.3594	0.05496	0.00094	0.33831	0.00587	0.04469	0.00057
G013	627	30.5	0.8339	0.05323	0.00091	0.30991	0.00538	0.04227	0.00054
G014	162.3	8.9	1.0924	0.06869	0.00173	0.41932	0.01024	0.04432	0.00065
G015	705.5	72.9	0.6237	0.05979	0.00083	0.77733	0.01133	0.09438	0.00115
G016	21.1	NaN	3.6675	0.81116	0.01151	108.4779	1.80133	0.97081	0.01629
G017	709.6	52.1	0.8078	0.05939	0.00087	0.52064	0.00794	0.06364	0.00079
G018	11.1	0.8	0.8049	0.57551	0.01887	8.85776	0.22853	0.11172	0.00323
G019	501	38.1	0.7326	0.05892	0.00093	0.54876	0.00887	0.06761	0.00085
G020	307.1	109	1.325	0.09687	0.00124	3.64288	0.04981	0.27298	0.00335
G021	910.6	72.8	0.0541	0.07038	0.00106	0.82273	0.01281	0.08485	0.00107
G022	937.6	316.1	0.1765	0.11358	0.00135	5.21642	0.0672	0.33335	0.004
G023	190.4	71.8	1.0139	0.11435	0.00149	4.91937	0.06843	0.31225	0.00389
G024	131.8	9.3	0.5273	0.05868	0.00205	0.53071	0.0178	0.06565	0.00114
G025	1220.6	332.5	0.1561	0.14692	0.00178	5.68758	0.07454	0.28097	0.00341
G026	645.2	59.2	0.7663	0.0592	0.00086	0.6583	0.00993	0.08071	0.001
G027	307.1	39.9	10.3101	0.75245	0.01246	43.25963	0.73714	0.41726	0.00742
G028	4587	305.1	0.4465	0.21237	0.00342	1.72807	0.02714	0.05905	0.00082
G029	102	50.3	1.1581	0.13084	0.0018	6.93659	0.10128	0.38478	0.00497
G030	120.7	NaN	8.0536	0.82525	0.00999		55.20972	21.36362	0.47847
G031	278.9	24.4	0.4449	0.05696	0.001	0.65661	0.01171	0.08366	0.00109
G032	387.9	47.7	0.5858	0.09293	0.0013	1.46478	0.02141	0.11439	0.00143
G033	1201.3	104.2	1.077	0.0614	0.00082	0.60061	0.00852	0.07099	0.00087
G034	209.2	22.3	0.4271	0.06133	0.0011	0.85822	0.01556	0.10154	0.00134
G035	254.9	151.8	0.7808	0.17873	0.00218	12.1908	0.16162	0.49496	0.00609
G036	1380	137.3	1.591	0.05507	0.00073	0.55135	0.0078	0.07266	0.00089
G037	628.8	28.5	0.6864	0.0795	0.00128	0.44037	0.00719	0.0402	0.00052
G038	801.6	138.7	1.0689	0.08849	0.00128	1.72434	0.0259	0.14141	0.00179
G039	881.9	62.8	0.53	0.05446	0.00079	0.49878	0.00753	0.06646	0.00082
G040	0	NaN	12.9596	10.41754	1.36628			16.49996	11.86015
G041	1876.3	124	0.0003	0.1441	0.00853	1.29227	0.07245	0.06507	0.00167
G042	148.8	6.2	0.4992	0.00701	0.00412	0.03752	0.02205	0.03882	0.00115
G043	641.1	54.4	1.0499	0.05484	0.00084	0.52706	0.00834	0.06974	0.00088
G044	722.5	30.5	0.5327	0.05351	0.00091	0.29209	0.00507	0.03961	0.00051
G045	745.4	51.9	0.5396	0.05458	0.00091	0.49107	0.0084	0.06528	0.00084
G046	1105.7	166.7	0.9974	0.12842	0.00168	2.29094	0.03186	0.12944	0.00161
G047	485.2	40.1	0.7142	0.05615	9.00E-04	0.57158	0.00944	0.07386	0.00094
G048	305.3	21.9	0.48	0.05854	0.00154	0.54861	0.01404	0.06799	0.00103

G049	185.2	34.8	1.1682	0.06798	0.00113	1.40235	0.02385	0.14966	0.00196
G050	94.9	50.9	0.4964	0.16569	0.00327	10.81692	0.22125	0.47364	0.00815
G051	78.5	14.3	0.9203	0.07038	0.00147	1.5001	0.03129	0.15464	0.00222
G052	62.7	21.8	0.8824	0.10397	0.00173	4.19554	0.0719	0.29278	0.00406
G053	129.5	69.9	0.4934	0.16558	0.00216	10.8557	0.15293	0.47565	0.00609
G054	97.9	30.7	1.0345	0.12385	0.00201	4.44092	0.07396	0.26014	0.0036
G055	411.9	19.4	0.8914	0.04941	0.00102	0.2734	0.00563	0.04015	0.00054
G056	2803.3	621.1	0.4881	0.16677	0.00201	5.08375	0.06696	0.22116	0.00269
G057	826.2	63.8	1.1948	0.0562	0.001	0.47707	0.00861	0.06158	0.00081
G058	924.1	66.1	0.451	0.05978	0.00088	0.56237	0.00864	0.06825	0.00086
G059	116	9	0.9937	0.054	0.00146	0.48052	0.01272	0.06456	0.00097
G060	1064.1	69.9	0.5421	0.06261	0.00089	0.53222	0.00793	0.06166	0.00077
G061	282.4	76	1.6098	0.07628	0.00109	2.05007	0.03097	0.19497	0.00248
G062	1.2	NaN	1.401	0.80633	0.0464	42.18569	2.2267	0.37954	0.0237
G063	263.1	11.9	0.72	0.05259	0.00131	0.29473	0.0072	0.04066	0.00059
G064	188.7	16.4	1.1534	0.0548	0.00125	0.52235	0.01183	0.06914	0.00098
G065	487.5	56	0.1405	0.07121	0.00103	1.17663	0.01783	0.11987	0.00152
G066	462.9	69.6	0.3504	0.09054	0.00143	1.90185	0.031	0.15239	0.00202
G067	139.5	42.6	0.7808	0.10182	0.00152	3.69793	0.058	0.26346	0.00348
G068	2190.4	214.6	0.1991	0.07637	0.00098	1.05987	0.01464	0.10068	0.00124
G069	298.8	22.4	0.7049	0.0548	0.0013	0.50544	0.01179	0.06691	0.00096
G070	90.2	21.3	0.7529	0.1081	0.00226	3.03984	0.06311	0.204	0.00316
G071	279.5	23.7	0.8887	0.05422	0.00111	0.53848	0.01104	0.07204	0.00099
G072	157	26.2	0.2715	0.06917	0.00122	1.58001	0.02841	0.1657	0.00224
G073	1264	53.3	0.8999	0.09741	0.00191	0.49415	0.0095	0.0368	0.00052
G074	983.9	213.5	0.0465	0.11804	0.00149	3.68401	0.05062	0.22641	0.00281
G075	375	82.4	0.9915	0.07396	0.00104	1.85004	0.02763	0.18145	0.00231
G076	31.1	NaN	1.2721	0.29884	0.00817	3.61111	0.08603	0.08765	0.00187
G077	1038.4	261.8	0.2379	0.10862	0.00138	3.73478	0.05147	0.24942	0.0031
G078	378	23.5	0.3579	0.11933	0.0023	0.93993	0.01776	0.05714	0.00083
G079	1013.7	79.6	0.5694	0.05449	0.00079	0.54706	0.00836	0.07282	0.00092
G080	435.4	31.1	0.7513	0.05273	0.00094	0.45925	0.00837	0.06318	0.00083
G081	65	3.8	0.8793	0.05366	0.0022	0.37714	0.01497	0.05098	0.00095
G082	1692.3	481.3	0.1136	0.10806	0.00137	4.37583	0.06044	0.29376	0.00365
G083	517.4	32.7	0.7188	0.05931	0.00101	0.46714	0.00814	0.05714	0.00075
G084	569	55.9	1.8648	0.06156	0.00098	0.57451	0.00947	0.06769	0.00088
G085	103.1	16.1	0.6054	0.10204	0.00182	2.065	0.03731	0.14681	0.00206
G086	545	156.1	0.4847	0.10242	0.00137	3.77311	0.05453	0.26723	0.00339
G087	192.2	144.2	2.1431	0.15677	0.00209	10.00464	0.14423	0.46292	0.00594
G088	494	18.7	0.3875	0.06494	0.0012	0.33479	0.00627	0.0374	0.00051
G089	609.4	34.4	0.6766	0.0514	0.00087	0.36264	0.00632	0.05117	0.00067
G090	219.7	15.5	0.9236	0.05253	0.00117	0.43078	0.00954	0.05949	0.00084
G091	298.8	127.6	0.959	0.11771	0.00159	5.67137	0.08253	0.34952	0.00447
G092	571.3	35.9	0.8639	0.05179	9.00E-04	0.38719	0.00689	0.05423	0.00071
G093	437.1	40.6	0.7289	0.05744	0.00094	0.66103	0.0112	0.08348	0.00109
G094	396.1	32.6	0.8403	0.05613	0.00103	0.55338	0.01033	0.07152	0.00096
G095	589.5	66.3	0.2217	0.06957	0.00103	1.08842	0.01703	0.11349	0.00147
G096	7.6	1.4	0.126	0.41088	0.08903	9.72885	1.75809	0.17177	0.02826
G097	111.3	54.8	1.9322	0.1181	0.00177	5.26137	0.08351	0.32316	0.00434
G098	512.7	66.8	0.1821	0.06472	0.00096	1.1931	0.01874	0.13373	0.00173
G099	573.7	241.3	1.1916	0.1148	0.00154	5.2458	0.07606	0.33149	0.00422
G100	202.7	34.9	0.9884	0.07496	0.00124	1.47321	0.02524	0.14257	0.00191
G101	0	NaN	1.2398	0.80273	0.1059	161.7204	28.34081	1.46147	0.28067
G102	57.4	10.3	1.2762	0.08085	0.0019	1.57039	0.03647	0.1409	0.00219
G103	264.9	54.8	0.2866	0.07851	0.00117	2.20533	0.03492	0.20377	0.00267

G104	524.4	39.8	0.5426	0.05565	0.00093	0.54278	0.00941	0.07076	0.00093
G105	275.4	18.9	0.6335	0.05322	0.00108	0.46146	0.00948	0.0629	0.00087
G106	2.9	0.3	0.3089	0.58335	0.03088	13.64755	0.57796	0.16972	0.00803
G107	175.2	9.3	1.1286	0.05346	0.0015	0.31312	0.00858	0.04249	0.00066
G108	388.5	158.6	1.3331	0.10729	0.00153	4.60117	0.0703	0.31112	0.00406
G109	731.3	173.6	0.1021	0.11515	0.00162	3.92536	0.05938	0.2473	0.00321
G110	85	4.6	1.4146	0.06185	0.00228	0.35188	0.01245	0.04127	0.00075
G111	387.9	26	0.097	0.05566	0.00103	0.54502	0.01028	0.07103	0.00096
G112	3694	234.5	0.4611	0.07835	0.00108	0.639	0.00951	0.05917	0.00076
G113	1670	175.7	0.1602	0.08159	0.00119	1.22543	0.019	0.10896	0.00141
G114	98.4	32	0.9957	0.09499	0.00222	3.49779	0.08175	0.26715	0.00443
G115	196.3	74	0.6898	0.10927	0.0017	4.9417	0.08134	0.32811	0.00447
G116	276	109.2	0.9333	0.1084	0.00161	4.88154	0.07745	0.32671	0.00435
G117	271.9	12.1	0.5323	0.05408	0.00128	0.31116	0.00728	0.04175	0.00061
G118	807.5	29.3	0.1882	0.05441	0.00102	0.28259	0.00541	0.03768	0.00051
G119	427.2	68.2	0.8612	0.07584	0.00118	1.42287	0.02326	0.13612	0.0018
G120	167.6	12.2	0.3978	0.05694	0.00134	0.55008	0.01283	0.0701	0.00103
G121	481.1	38.9	0.5318	0.05454	0.00096	0.5672	0.0103	0.07545	0.00102
G122	559	35.9	0.1269	0.05361	0.00093	0.49892	0.00899	0.06753	0.00091
G123	271.3	14.5	0.7662	0.0509	0.00118	0.33142	0.00767	0.04725	0.00068
G124	93.2	6.3	1.0064	0.05116	0.00164	0.39802	0.01243	0.05646	0.00093
G125	457.1	31.9	0.2643	0.05362	0.00094	0.52084	0.00946	0.07048	0.00095
G126	144.2	7.4	1.3042	0.08249	0.00297	0.44704	0.01518	0.03932	0.00076
G127	443.6	25.4	0.5669	0.07816	0.00144	0.58272	0.0109	0.0541	0.00075
G128	151.8	7.5	0.9417	0.0524	0.00157	0.30212	0.00884	0.04184	0.00067
G129	631.7	101	0.5282	0.07245	0.0011	1.49628	0.02422	0.14986	0.00198
G130	461.7	26.2	0.8648	0.05298	0.00103	0.35694	0.00705	0.04889	0.00068
G131	163.5	55.3	1.3003	0.08946	0.00142	3.22262	0.05417	0.2614	0.00355
G132	340.5	3	1.2907	0.04695	0.00292	0.04428	0.00264	0.00685	0.00016
G133	268.4	18.6	0.4099	0.05558	0.00111	0.51346	0.01045	0.06704	0.00094
G134	1351.8	228.3	0.4383	0.0679	0.00099	1.50813	0.02365	0.16118	0.00211
G135	4.1	1.3	0.4218	0.38577	0.01367	16.64321	0.55192	0.31309	0.01003
G136	492.8	22.7	0.5388	0.05022	0.00105	0.3001	0.00634	0.04337	0.00061
G137	466.4	82.7	0.3736	0.07366	0.00113	1.73116	0.0284	0.17057	0.00227
G138	731.9	178.8	0.2741	0.16876	0.00244	5.5724	0.08705	0.23964	0.00315
G139	135.9	53.5	0.5572	0.1475	0.0023	7.27517	0.12073	0.35797	0.00493
G140	441.8	66.7	0.0297	0.06758	0.00105	1.49958	0.02491	0.16106	0.00215
G141	454.7	29.4	0.5257	0.06055	0.00111	0.50833	0.00962	0.06094	0.00084
G142	261.9	18.6	0.5701	0.05257	0.00114	0.47743	0.01042	0.06591	0.00095
G143	203.9	16.4	0.4169	0.05429	0.00115	0.58314	0.01249	0.07797	0.00112
G144	69.1	3.6	1.4654	0.05149	0.00232	0.27599	0.01203	0.03891	0.00075
G145	581.3	94.6	0.2184	0.06848	0.00106	1.54916	0.02568	0.1642	0.00219
G146	429.5	55.8	0.3511	0.06886	0.00113	1.17696	0.02033	0.12407	0.00168
G147	677.4	29.5	0.6906	0.05499	0.00103	0.29526	0.00572	0.03897	0.00054
G148	436	30.2	0.6696	0.05865	0.0011	0.51122	0.00984	0.06328	0.00088
G149	717.2	45.3	0.4013	0.08224	0.00136	0.68165	0.01186	0.06017	0.00082
G150	361.5	26.6	0.5139	0.06167	0.00116	0.60143	0.01166	0.0708	0.00099

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
3972	359	4497.6	141.9	4744.3	73.6	-11.7	-16.3		
3390	1083.3	5192.6	530.9	6000.7	332.5	-34.7	-43.5		
4161.6	185.8	5224.7	73.8	5672.2	41.4	-20.3	-26.6		
537.8	6.8	663.3	10.9	1119.4	12.3	-18.9	-52		
494.1	6.3	523.6	9.6	657.1	9.3	-5.6	-24.8	494.1	6.3
11457.7	333.7	6405.2	67.9	4938.9	24.8	78.9	132		
14792.8	1557	NA	281.6	5069	70.6	NA	191.8		
305.8	3.7	394.6	6.3	956.8	9.2	-22.5	-68		
NaN	-29477.6	NA	4499.9	5105	248.9	NaN	NaN		
9004.1	526.7	6000.9	120.1	5053.2	48.1	50	78.2		
339	4	365.8	5.4	541.4	5.3	-7.3	-37.4	339	4
281.8	3.5	295.9	5.5	410.6	5.8	-4.7	-31.4	281.8	3.5
266.9	3.3	274.1	5.1	338.6	4.9	-2.6	-21.2	266.9	3.3
279.6	4	355.6	8.7	889.4	14.9	-21.4	-68.6		
581.4	6.8	584	8.2	596	6.3	-0.4	-2.4	581.4	6.8
4373.5	53.3	4768	22.1	4941.5	14.3	-8.3	-11.5		
397.7	4.8	425.6	6.7	581.4	6.5	-6.5	-31.6	397.7	4.8
682.7	18.7	2323.5	39.9	4447.4	32.9	-70.6	-84.6		
421.7	5.1	444.2	7.3	564.1	6.8	-5.1	-25.2	421.7	5.1
1555.9	17	1559	14.1	1564.7	10.2	-0.2	-0.6	1564.7	10.2
525	6.4	609.6	9	939.5	9.2	-13.9	-44.1	525	6.4
1854.6	19.3	1855.3	14.4	1857.5	10.1	0	-0.2	1857.5	10.1
1751.8	19.1	1805.6	15.2	1869.7	11.1	-3	-6.3	1869.7	11.1
409.9	6.9	432.3	13.7	555.2	14.9	-5.2	-26.2	409.9	6.9
1596.2	17.2	1929.5	14.8	2310.4	11	-17.3	-30.9		
500.4	6	513.6	7.7	574.5	6.4	-2.6	-12.9	500.4	6
2248	33.7	3848.4	24.1	4834.3	16.7	-41.6	-53.5		
369.8	5	1019	13.7	2923.7	15.4	-63.7	-87.4		
2098.6	23.1	2103.3	16.7	2109.3	12.2	-0.2	-0.5	2109.3	12.2
20031.8	137.9	NA	25.8	4966	12.2	NA	303.4		
517.9	6.5	512.5	8.8	490	6.8	1.1	5.7	517.9	6.5
698.2	8.3	916	11.3	1486.5	10.9	-23.8	-53		
442.1	5.2	477.6	6.9	653.3	6.4	-7.4	-32.3	442.1	5.2
623.4	7.8	629.2	10.4	650.8	8.6	-0.9	-4.2	623.4	7.8
2592.1	26.3	2619.2	16.3	2641.1	11.5	-1	-1.9	2641.1	11.5
452.2	5.3	445.9	6.5	415.1	4.5	1.4	8.9	452.2	5.3
254.1	3.2	370.5	6.4	1184.6	11.3	-31.4	-78.6		
852.6	10.1	1017.6	12.4	1393.1	11	-16.2	-38.8		
414.8	5	410.9	6.4	390.1	4.7	1	6.3	414.8	5
18450.9	4368.9	NA	741.9	NaN	NaN	NA	NaN		
406.4	10.1	842.3	36.9	2277.1	53.7	-51.8	-82.2		
245.5	7.1	37.4	21.6	NaN	NaN	556.5	NaN		
434.6	5.3	429.9	7	405.7	5.1	1.1	7.1	434.6	5.3
250.4	3.2	260.2	4.9	350.5	5	-3.8	-28.6	250.4	3.2
407.7	5.1	405.6	7	395.1	5.5	0.5	3.2	407.7	5.1
784.7	9.2	1209.5	12.8	2076.5	11.6	-35.1	-62.2		
459.4	5.6	459	7.6	458.3	5.9	0.1	0.2	459.4	5.6
424	6.2	444.1	10.9	550	11.2	-4.5	-22.9	424	6.2

899.1	11	889.9	12.5	867.9	9.7	1	3.6	899.1	11
2499.5	35.7	2507.5	24.3	2514.6	18.4	-0.3	-0.6	2514.6	18.4
926.9	12.4	930.4	15.4	939.5	12.8	-0.4	-1.3	926.9	12.4
1655.4	20.2	1673.1	17.8	1696.2	13.7	-1.1	-2.4	1696.2	13.7
2508.3	26.6	2510.8	17	2513.5	12.1	-0.1	-0.2	2513.5	12.1
1490.6	18.4	1720	17.7	2012.4	14.2	-13.3	-25.9		
253.8	3.3	245.4	5.4	167.3	3.2	3.4	51.7	253.8	3.3
1288	14.2	1833.4	14.5	2525.5	11.2	-29.7	-49		
385.2	4.9	396.1	7.3	460.3	6.6	-2.7	-16.3	385.2	4.9
425.6	5.2	453.1	7.1	595.6	6.6	-6.1	-28.5	425.6	5.2
403.3	5.9	398.4	10.2	371	8.4	1.2	8.7	403.3	5.9
385.7	4.7	433.3	6.7	695	7.2	-11	-44.5	385.7	4.7
1148.2	13.4	1132.3	13.1	1102.4	9.6	1.4	4.2	1102.4	9.6
2074.1	110.7	3823.4	84.2	4933	58	-45.8	-58		
256.9	3.7	262.3	6.7	311.1	6.7	-2	-17.4	256.9	3.7
431	5.9	426.7	9.4	404.1	7.6	1	6.7	431	5.9
729.8	8.7	789.7	10.6	963.4	9	-7.6	-24.2	729.8	8.7
914.3	11.3	1081.7	13.7	1436.9	12.1	-15.5	-36.4		
1507.5	17.8	1570.9	15.9	1657.6	12.2	-4	-9.1	1657.6	12.2
618.4	7.3	733.8	9.3	1104.8	8.6	-15.7	-44		
417.5	5.8	415.4	9.5	404.1	7.9	0.5	3.3	417.5	5.8
1196.8	16.9	1417.7	19.9	1767.6	17.5	-15.6	-32.3		
448.4	6	437.4	8.8	380.2	6.5	2.5	17.9	448.4	6
988.4	12.4	962.4	13.8	903.8	10.6	2.7	9.4	988.4	12.4
233	3.2	407.7	8.1	1575.1	15.7	-42.9	-85.2		
1315.7	14.8	1567.9	14.1	1926.8	10.9	-16.1	-31.7		
1074.9	12.6	1063.4	12.5	1040.4	9.2	1.1	3.3	1074.9	12.6
541.6	11.1	1552	27.6	3464.2	26.8	-65.1	-84.4		
1435.5	16	1578.9	14.2	1776.4	10.7	-9.1	-19.2		
358.2	5.1	672.8	11.9	1946.2	16.7	-46.8	-81.6		
453.1	5.5	443.1	6.9	391.4	4.7	2.3	15.8	453.1	5.5
394.9	5	383.7	7.1	317.2	4.9	2.9	24.5	394.9	5
320.5	5.8	324.9	12.5	356.8	12.3	-1.4	-10.2	320.5	5.8
1660.3	18.2	1707.8	14.7	1767	10.6	-2.8	-6	1767	10.6
358.2	4.6	389.2	7	578.5	7.5	-8	-38.1	358.2	4.6
422.2	5.3	460.9	7.6	658.9	7.7	-8.4	-35.9	422.2	5.3
883.1	11.6	1137.3	15.5	1661.6	14.6	-22.4	-46.9		
1526.7	17.2	1587	14.8	1668.4	11	-3.8	-8.5	1668.4	11
2452.4	26.2	2435.2	17.1	2421.1	12.3	0.7	1.3	2421.1	12.3
236.7	3.2	293.2	5.8	772.4	10	-19.3	-69.4		
321.7	4.1	314.2	5.8	258.8	3.9	2.4	24.3	321.7	4.1
372.5	5.1	363.7	8.1	308.5	5.9	2.4	20.7	372.5	5.1
1932.3	21.4	1927	16.1	1921.7	11.6	0.3	0.5	1921.7	11.6
340.4	4.3	332.3	6.2	276.1	4.2	2.4	23.3	340.4	4.3
516.9	6.5	515.2	8.5	508.5	6.5	0.3	1.7	516.9	6.5
445.3	5.8	447.2	8.2	457.5	6.8	-0.4	-2.7	445.3	5.8
693	8.5	747.7	10.4	915.7	8.9	-7.3	-24.3	693	8.5
1021.9	155.5	2409.4	250.5	3949.4	215.5	-57.6	-74.1		
1805.1	21.1	1862.6	17.2	1927.7	12.9	-3.1	-6.4	1927.7	12.9
809.1	9.8	797.4	10.9	765.2	8	1.5	5.7	809.1	9.8
1845.6	20.4	1860.1	15.8	1876.7	11.5	-0.8	-1.7	1876.7	11.5
859.2	10.8	919.4	12.9	1067.4	10.9	-6.6	-19.5	859.2	10.8
5806.7	735.1	5170.4	235.1	4926.6	132.9	12.3	17.9		
849.7	12.4	958.6	17.5	1217.8	16.7	-11.4	-30.2	849.7	12.4
1195.5	14.3	1182.7	13.9	1159.8	10.3	1.1	3.1	1159.8	10.3

440.7	5.6	440.3	7.6	438.4	6	0.1	0.5	440.7	5.6
393.2	5.3	385.3	7.9	338.2	5.8	2.1	16.3	393.2	5.3
1010.6	44.3	2725.6	67.2	4467.1	53.1	-62.9	-77.4		
268.2	4.1	276.6	7.8	348.4	8.3	-3	-23	268.2	4.1
1746.2	20	1749.5	16.1	1753.9	11.9	-0.2	-0.4	1753.9	11.9
1424.5	16.6	1618.9	15.5	1882.2	12	-12	-24.3		
260.7	4.6	306.1	10.9	668.9	18.1	-14.8	-61	260.7	4.6
442.4	5.8	441.7	8.2	438.8	6.6	0.1	0.8	442.4	5.8
370.6	4.6	501.7	7.5	1155.8	9.5	-26.1	-67.9		
666.7	8.2	812.3	10.9	1235.7	10.4	-17.9	-46		
1526.3	22.5	1526.7	22.6	1527.9	18.5	0	-0.1	1527.9	18.5
1829.2	21.7	1809.4	17.5	1787.3	13.1	1.1	2.3	1787.3	13.1
1822.4	21.1	1799.1	16.8	1772.7	12.4	1.3	2.8	1772.7	12.4
263.7	3.8	275.1	6.7	374.4	7.4	-4.1	-29.6	263.7	3.8
238.4	3.2	252.7	5.2	388.1	6	-5.6	-38.6	238.4	3.2
822.7	10.2	898.6	12.2	1090.9	10.4	-8.4	-24.6	822.7	10.2
436.8	6.2	445	10	489.2	9.1	-1.9	-10.7	436.8	6.2
468.9	6.1	456.2	8.2	393.4	5.7	2.8	19.2	468.9	6.1
421.3	5.5	411	7.4	354.7	5.2	2.5	18.8	421.3	5.5
297.6	4.2	290.6	6.9	236.3	4.9	2.4	25.9	297.6	4.2
354.1	5.7	340.2	10.4	248	7.1	4.1	42.7	354.1	5.7
439	5.7	425.7	7.7	355.1	5.3	3.1	23.6	439	5.7
248.6	4.7	375.2	12.8	1257.2	26	-33.7	-80.2		
339.6	4.6	466.2	8.6	1150.9	12.7	-27.1	-70.5		
264.2	4.1	268.1	8	302.9	7.8	-1.4	-12.8	264.2	4.1
900.2	11.1	928.9	12.3	998.6	9.7	-3.1	-9.9	900.2	11.1
307.7	4.2	309.9	6.4	327.9	5.4	-0.7	-6.2	307.7	4.2
1497	18.1	1462.6	16.2	1414	12.1	2.4	5.9		
44	1	44	2.9	46.7	2.8	0	-5.7	44	1
418.3	5.7	420.8	8.4	435.6	7.1	-0.6	-4	418.3	5.7
963.3	11.7	933.7	12	865.5	8.5	3.2	11.3	963.3	11.7
1755.9	49.2	2914.5	45.8	3854.5	35.2	-39.8	-54.4		
273.7	3.8	266.5	5.9	205.2	3.9	2.7	33.4	273.7	3.8
1015.3	12.5	1020.2	13.1	1032.2	9.9	-0.5	-1.6	1015.3	12.5
1384.8	16.4	1911.8	16.8	2545.4	13.5	-27.6	-45.6		
1972.5	23.4	2145.8	18.6	2317.1	14.2	-8.1	-14.9	2317.1	14.2
962.7	11.9	930.2	12.5	855.7	9	3.5	12.5	962.7	11.9
381.3	5.1	417.3	7.9	623.3	8.5	-8.6	-38.8	381.3	5.1
411.5	5.7	396.3	8.5	310.3	5.8	3.8	32.6	411.5	5.7
484	6.7	466.5	9.6	383.1	6.8	3.8	26.3	484	6.7
246.1	4.7	247.5	10.8	262.8	10.4	-0.6	-6.4	246.1	4.7
980.1	12.1	950.2	12.6	883.1	9.1	3.1	11	980.1	12.1
753.9	9.6	789.9	11.7	894.5	9.8	-4.6	-15.7	753.9	9.6
246.4	3.4	262.7	5.4	411.8	6.3	-6.2	-40.2	246.4	3.4
395.5	5.3	419.3	8	554.1	8	-5.7	-28.6	395.5	5.3
376.7	5	527.8	8.8	1251.2	11.9	-28.6	-69.9		
441	6	478.1	8.9	662.7	9.2	-7.8	-33.5	441	6

e

input: 77-80.csv
n samples: 150
concordant to +5/-15%: 76 (50.7%)
cut-off at 1100 Ma (59 younger | 17 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/U	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	0.7	NaN	0.1588	0.81882	0.03333	84.21302	4.0207	0.74628	0.03935
G002	-1.4	1.2	0.0928	5.30285	1.95562	-57.5619	3.05339	-0.07877	0.029
G003	55.1	17.1	0.474	0.10987	0.00158	4.36436	0.06625	0.28823	0.00373
G004	195.1	43.9	0.3697	0.08907	0.00112	2.67135	0.03638	0.21764	0.00264
G005	135.3	34.1	0.8306	0.08442	0.00111	2.51265	0.03532	0.21597	0.00265
G006	-8.2	-1.8	-0.1798	1.67383	0.24789	-14.6684	0.73027	-0.06359	0.00915
G007	223	19.5	0.6109	0.06856	0.00102	0.74991	0.01164	0.07937	0.00098
G008	61.9	3.2	0.5764	0.05738	0.00219	0.38116	0.01399	0.0482	0.00084
G009	65.3	28.2	1.6915	0.1076	0.00147	4.5461	0.06608	0.30657	0.00389
G010	4.8	NaN	0.6946	0.8708	0.07292	114.1957	12.19029	0.95156	0.11251
G011	0	NaN	3.6209	1.11089	0.14181	472.5397	145.1023	3.08655	0.99091
G012	133.2	40	0.4161	0.10261	0.00124	3.99301	0.05264	0.28237	0.00341
G013	329.7	172.6	0.8962	0.16169	0.00176	9.74307	0.11907	0.43723	0.00515
G014	530.2	31.4	0.5027	0.07443	0.00096	0.5722	0.00791	0.05578	0.00067
G015	375.9	25.2	0.2398	0.05616	0.00079	0.52688	0.00783	0.06807	0.00083
G016	336.5	24.1	0.6099	0.05459	8.00E-04	0.49438	0.00757	0.06571	8.00E-04
G017	515.9	168.2	0.4394	0.15371	0.0017	6.56282	0.08096	0.30981	0.00367
G018	249.5	21.9	0.9594	0.15151	0.00195	1.50495	0.02047	0.07208	0.00089
G019	78.2	54	3.2317	0.37462	0.00806	21.8737	0.47885	0.42367	0.00904
G020	653.2	104.8	0.4373	0.11762	0.00135	2.42653	0.03067	0.14969	0.00178
G021	6.1	0.2	0.0484	0.77095	0.03159	12.05082	0.36854	0.11342	0.00425
G022	14.3	2.7	0.5059	0.0828	0.00234	2.04293	0.05636	0.17904	0.00303
G023	8.8	NaN	1.29	0.49249	0.01611	8.11709	0.21769	0.11959	0.00334
G024	373.9	22.1	1.1087	0.05459	0.00085	0.35869	0.00577	0.04767	0.00059
G025	535	23.2	0.5812	0.05461	0.00084	0.30191	0.00482	0.04012	0.00049
G026	872.8	117.2	0.0934	0.10002	0.00124	1.95446	0.02615	0.14178	0.00171
G027	19.7	NaN	1.5896	0.66561	0.00961	48.43228	0.76185	0.52797	0.00854
G028	978.1	46.5	0.3243	0.05245	0.00068	0.34179	0.00473	0.04728	0.00056
G029	29.2	NaN	2.2357	0.47168	0.00781	9.67198	0.15195	0.14879	0.00235
G030	253.5	23.5	1.5028	0.05799	0.00091	0.54723	0.00889	0.06847	0.00085
G031	159.7	15.3	0.4161	0.06285	0.00102	0.7943	0.01326	0.09171	0.00116
G032	0	NaN	5.8836	1.06957	0.11646			32.07404	39.39255
G033	162.5	22.9	0.5846	0.0755	0.00108	1.33434	0.02	0.12824	0.00159
G034	9.5	NaN	0.8249	0.76278	0.07829	13.62098	0.98251	0.12957	0.01236
G035	269.2	19.6	0.4337	0.06014	0.00093	0.57752	0.00922	0.06968	0.00086
G036	917.6	158	0.4018	0.07761	0.00087	1.76609	0.02202	0.16512	0.00194
G037	699.4	43.5	0.7282	0.06174	8.00E-04	0.47551	0.0066	0.05588	0.00067
G038	383.4	26.2	0.3919	0.05682	0.00094	0.5172	0.0088	0.06604	0.00083
G039	547.9	5	0.5121	0.06335	0.00154	0.07417	0.00176	0.0085	0.00012
G040	259.7	12.5	0.3678	0.05967	0.00107	0.38589	0.00701	0.04693	6.00E-04
G041	574.4	38.2	0.1015	0.06055	8.00E-04	0.58606	0.00826	0.07022	0.00085
G042	871.4	92.1	0.2951	0.06747	0.00083	0.96217	0.01284	0.10347	0.00124
G043	596.8	30.8	0.932	0.05793	0.00088	0.34647	0.00546	0.04339	0.00053
G044	698.1	42.2	0.2649	0.06264	0.00083	0.52424	0.00742	0.06073	0.00073
G045	597.5	25.2	0.556	0.06481	0.00095	0.34673	0.00528	0.03882	0.00048
G046	116.2	7.1	1.2104	0.0712	0.00167	0.47149	0.01078	0.04805	0.00069
G047	295.7	14.2	0.5404	0.05518	0.001	0.33948	0.00622	0.04464	0.00057
G048	2	NaN	0.5786	0.68347	0.02635	29.48631	1.03042	0.31303	0.01233

G049	152.9	9.7	1.303	0.07733	0.00171	0.51941	0.01123	0.04874	0.00069
G050	554	24.7	0.3996	0.05187	0.00092	0.31077	0.0056	0.04347	0.00055
G051	1337	746.6	0.5744	0.17995	0.00197	12.09455	0.14842	0.48768	0.00573
G052	512.5	28.7	0.685	0.08917	0.00122	0.61471	0.00886	0.05002	0.00061
G053	786.5	101.2	0.4626	0.06432	0.00076	1.08212	0.0141	0.12207	0.00145
G054	613.1	47	0.0977	0.0568	0.00074	0.63546	0.00889	0.08117	0.00098
G055	0	NaN	15.0718	0.7859	0.13654			-45.6244	210.9653
G056	55.1	5.9	1.0202	0.13932	0.00423	1.60165	0.04637	0.08341	0.00145
G057	605.6	49.1	0.768	0.06147	0.00084	0.60082	0.00867	0.07092	0.00086
G058	294.3	18.2	0.5946	0.06033	0.00111	0.47133	0.00874	0.05669	0.00074
G059	411.2	18.9	0.6172	0.06635	0.00109	0.38908	0.00656	0.04255	0.00054
G060	795.3	42.2	0.1808	0.07352	0.00103	0.54675	0.00803	0.05396	0.00066
G061	307.9	7.2	0.5593	0.05354	0.00121	0.16052	0.0036	0.02175	3.00E-04
G062	959.1	75	0.289	0.05955	0.00073	0.63902	0.00851	0.07787	0.00093
G063	-3.4	NaN	0.4095	0.80534	0.07934	50.59953	3.91986	0.45588	0.04365
G064	806.2	63.6	0.3907	0.08779	0.00107	0.91434	0.01208	0.07557	9.00E-04
G065	227	84.6	0.6169	0.11866	0.0014	5.41231	0.0704	0.33095	0.00398
G066	526.8	41.1	0.5475	0.06344	0.00085	0.63276	0.00907	0.07236	0.00088
G067	240.6	14.3	0.1903	0.05706	0.00096	0.48395	0.00838	0.06154	0.00078
G068	271.9	17	0.6213	0.10533	0.00158	0.80833	0.01244	0.05568	0.00071
G069	630.8	29.7	0.7954	0.0819	0.00157	0.44509	0.00847	0.03943	0.00053
G070	337.1	11.8	0.4985	0.07666	0.00135	0.34289	0.00609	0.03246	0.00042
G072	0.7	NaN	1.0803	1.01905	0.10247	671.8784	159.5784	4.78376	1.181
G071	68	8.7	1.7707	0.06084	0.00139	0.75228	0.01709	0.08971	0.00126
G073	251.5	NaN	1.2781	0.74722	0.02523	360.2526	39.66624	3.49809	0.3892
G074	677.7	16	0.2151	0.07382	0.00117	0.24207	0.00394	0.02379	3.00E-04
G075	363.7	132.4	0.5428	0.1635	0.0019	7.5489	0.0972	0.33499	0.00402
G076	120.3	1.6	1.3986	0.0636	0.00406	0.08513	0.00514	0.00971	0.00024
G077	-0.7	4.5	-13.2947	0.95069	0.07775	805.9052	270.6944	6.15059	2.0935
G078	645.1	47	0.6356	0.07321	0.00096	0.66067	0.00928	0.06547	0.00079
G079	723.2	51.8	0.2015	0.06048	0.00087	0.61117	0.00921	0.07332	9.00E-04
G080	360.9	77.4	0.6117	0.09976	0.00132	2.6215	0.03711	0.19065	0.00235
G081	532.9	39.5	0.4106	0.04912	0.00078	0.48251	0.00799	0.07127	0.00087
G082	407.8	67.4	0.8003	0.07796	0.00101	1.54293	0.02145	0.14359	0.00174
G083	812.3	130.2	0.5929	0.07435	0.00093	1.50647	0.02045	0.14701	0.00177
G084	764	37.9	1.1427	0.11761	0.00168	0.65062	0.00963	0.04014	5.00E-04
G085	1012.8	70.6	0.0896	0.05904	0.00075	0.60299	0.00828	0.0741	0.00089
G086	139.3	11.5	0.5526	0.06864	0.00125	0.71872	0.01324	0.07597	0.001
G087	129.1	56.3	0.8198	0.1266	0.00158	6.38786	0.08699	0.36609	0.0045
G088	216.8	67.3	0.605	0.11711	0.00152	4.53435	0.06353	0.28091	0.00348
G089	758.6	129.7	0.8208	0.07997	0.00096	1.62304	0.02141	0.14726	0.00176
G090	138	2.6	0.9081	0.23425	0.0064	0.50732	0.01204	0.01571	3.00E-04
G091	980.9	222.6	0.0432	0.11788	0.0014	3.8961	0.05081	0.23981	0.00287
G092	150.9	8	0.6569	0.06075	0.00182	0.39904	0.01155	0.04766	0.00075
G093	124.4	9.9	1.1327	0.05387	0.00118	0.46854	0.01019	0.0631	0.00085
G094	244	43.4	0.6068	0.07193	0.00097	1.64399	0.02367	0.16582	0.00203
G095	438.4	29.3	0.4163	0.07167	0.00102	0.62792	0.00941	0.06356	0.00078
G096	428.9	60.8	0.7019	0.07474	0.00097	1.29977	0.01819	0.12617	0.00153
G097	812.3	36.5	0.4175	0.05281	0.00076	0.31583	0.00479	0.04339	0.00053
G098	156.3	12.3	0.5645	0.05756	0.00111	0.57629	0.01117	0.07264	0.00096
G099	3.4	NaN	1.2974	0.51711	0.02179	10.93469	0.37823	0.15342	0.00557
G100	201.9	15.7	0.2239	0.08256	0.00132	0.88543	0.01457	0.07781	0.001
G101	551.9	23.2	0.5482	0.05855	0.00101	0.31362	0.00553	0.03886	0.00049
G102	239.9	52.8	0.3372	0.08381	0.00116	2.46236	0.03628	0.21315	0.00265
G103	176.7	65.9	0.703	0.11529	0.00146	5.16656	0.07094	0.32514	0.00398

G104	505	41.6	0.0529	0.07057	0.00095	0.85606	0.01232	0.08801	0.00107
G105	157.7	52.4	0.4682	0.10848	0.0014	4.58484	0.06395	0.30663	0.00377
G106	231.8	11.4	0.4618	0.06494	0.00121	0.41786	0.00783	0.04669	0.00061
G107	479.9	53.2	0.1416	0.08172	0.00109	1.28512	0.01835	0.11409	0.00139
G108	659.3	28.4	0.3669	0.05917	9.00E-04	0.34289	0.00542	0.04204	0.00052
G109	219.6	100.7	0.0974	0.14247	0.0018	8.71962	0.1202	0.44405	0.00548
G110	93.8	51.7	0.715	0.16223	0.00206	10.33493	0.14332	0.46221	0.00576
G111	117.6	8.2	0.4234	0.08948	0.00179	0.80753	0.01598	0.06548	0.00091
G112	1625.2	268.3	1.8411	0.11348	0.00137	1.83004	0.02423	0.117	0.0014
G113	-2	-0.7	-0.2867	0.43999	0.1416	21.09584	5.99733	0.34786	0.07782
G114	316.1	14.8	0.8921	0.08355	0.00147	0.45641	0.00808	0.03963	0.00052
G115	331.7	20.7	1.079	0.05251	0.00092	0.36562	0.00657	0.05051	0.00064
G116	261	16.7	1.1913	0.05305	0.001	0.36963	0.00708	0.05055	0.00066
G117	293.6	103.8	0.3039	0.14295	0.00181	6.6904	0.09203	0.33955	0.00417
G118	362.3	147	0.357	0.17798	0.00216	9.64798	0.12855	0.39329	0.00475
G119	407.8	22.4	0.8507	0.07725	0.00125	0.50035	0.00832	0.04699	6.00E-04
G120	549.2	244	0.504	0.15019	0.00182	8.3299	0.11068	0.4024	0.00483
G121	99.9	NaN	0.2751	0.83743	0.01562	300.7405	9.58234	2.60548	0.08465
G122	918.3	39.1	1.1064	0.12536	0.0018	0.60095	0.00898	0.03478	0.00044
G123	397.6	49.1	0.3867	0.0945	0.00127	1.53091	0.02199	0.11753	0.00144
G124	228.4	21.5	1.1663	0.0638	0.00109	0.65801	0.01151	0.07483	0.00096
G125	331.7	10.1	0.4812	0.06419	0.0022	0.25129	0.00825	0.0284	0.00048
G126	354.8	26.2	0.3723	0.09169	0.00136	0.89869	0.01385	0.07111	0.00089
G127	480.6	37.6	0.8155	0.06234	0.00092	0.58399	0.00905	0.06797	0.00084
G128	256.3	26	0.293	0.07399	0.00113	1.01382	0.01616	0.09941	0.00125
G129	161.1	11.6	0.3104	0.1006	0.00172	0.95908	0.01657	0.06917	0.00092
G130	717.8	32	0.5485	0.06041	0.00099	0.34463	0.0058	0.04139	0.00052
G131	1728.6	66.4	0.4699	0.05726	0.00078	0.28715	0.00418	0.03638	0.00044
G132	229.7	NaN	1.1382	0.83038	0.01011	116.6155	1.56613	1.01888	0.01234
G133	348.7	17.1	0.4433	0.07131	0.00132	0.45837	0.00855	0.04663	0.00062
G134	414.6	144	0.3575	0.12808	0.00161	5.87718	0.08054	0.3329	0.00403
G135	297	47.9	0.6504	0.07543	0.00119	1.50897	0.0247	0.14514	0.00185
G136	0	NaN	NaN	0.06854	0.63954	#NAME?	NaN	#NAME?	NaN
G137	396.3	56.1	0.4534	0.06527	0.00091	1.19925	0.01781	0.1333	0.00164
G138	649.1	27.4	0.2057	0.05555	0.00087	0.33054	0.00541	0.04317	0.00054
G139	425.5	22	1.4037	0.05878	0.00105	0.31556	0.00572	0.03895	5.00E-04
G140	728	52.9	0.3431	0.05966	0.00084	0.58652	0.00877	0.07132	0.00087
G141	547.2	33.3	0.7229	0.06633	0.00101	0.48644	0.00775	0.0532	0.00066
G142	0	NaN	NaN	0.5231	0.32101	Inf	NaN	Inf	NaN
G143	808.2	52	0.2229	0.08108	0.00112	0.71494	0.01051	0.06397	0.00079
G144	766.7	246.4	0.3657	0.1165	0.00147	4.91206	0.0675	0.3059	0.00369
G145	2295.5	211.2	0.0051	0.35411	0.0191	4.41038	0.19304	0.09036	0.00367
G146	378.6	26.9	0.4144	0.0574	0.00094	0.53923	0.00911	0.06815	0.00086
G147	87	5.4	0.8539	0.09075	0.00323	0.65758	0.02173	0.05257	0.00104
G148	1258.9	59	0.408	0.06802	0.00095	0.41942	0.00622	0.04473	0.00055
G149	223.6	10.5	0.6558	0.07685	0.00153	0.44151	0.00877	0.04168	0.00057
G150	723.9	51.6	0.4477	0.06992	0.00101	0.64948	0.00988	0.06739	0.00083

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
3593.8	145.3	4513.5	66.8	4954.8	41	-20.4	-27.5		
-528.9	202.9	NaN	538.5	7497	374.2	NaN	-107.1		
1632.7	18.7	1705.6	16	1797.3	12.1	-4.3	-9.2	1797.3	12.1
1269.4	14	1320.6	12.9	1405.7	9.6	-3.9	-9.7	1405.7	9.6
1260.5	14	1275.7	13.1	1302.2	9.6	-1.2	-3.2	1302.2	9.6
-423.5	63	NaN	225	5951.5	149.9	NaN	-107.1		
492.4	5.9	568.2	8.4	885.5	8.8	-13.3	-44.4	492.4	5.9
303.5	5.2	327.9	11.8	506.2	15.2	-7.5	-40	303.5	5.2
1723.8	19.2	1739.4	15.5	1759.2	11.4	-0.9	-2	1759.2	11.4
4310.3	371.6	4819.7	145.8	5042.2	84.4	-10.6	-14.5		
9074.6	1563.1	6255	350.1	5384.7	129	45.1	68.5		
1603.3	17.1	1632.8	13.9	1671.9	9.9	-1.8	-4.1	1671.9	9.9
2338.2	23.1	2410.8	14.8	2473.4	10.1	-3	-5.5	2473.4	10.1
349.9	4.1	459.4	6.5	1053.2	8.5	-23.8	-66.8		
424.5	5	429.7	6.5	458.7	5.2	-1.2	-7.5	424.5	5
410.3	4.8	407.9	6.4	395.5	4.8	0.6	3.7	410.3	4.8
1739.8	18.1	2054.4	14.3	2387.6	10.2	-15.3	-27.1		
448.7	5.4	932.4	10.9	2363	11.8	-51.9	-81		
2277.1	40.9	3178.1	29.4	3810.2	21.3	-28.4	-40.2		
899.2	10	1250.5	11.9	1920.4	9.9	-28.1	-53.2		
692.6	24.6	2608.4	52.1	4869	41.3	-73.4	-85.8		
1061.7	16.6	1129.9	22.5	1264.5	20.4	-6	-16	1061.7	16.6
728.2	19.2	2244.1	38.9	4218.9	32.7	-67.6	-82.7		
300.2	3.6	311.2	5.3	395.5	5.1	-3.5	-24.1	300.2	3.6
253.6	3	267.9	4.6	396.3	5	-5.3	-36	253.6	3
854.7	9.7	1100	11.6	1624.5	10	-22.3	-47.4		
2732.9	36	3960.6	21.6	4658.2	14.5	-31	-41.3		
297.8	3.4	298.5	4.5	305.1	3.4	-0.2	-2.4	297.8	3.4
894.2	13.2	2404	21.1	4155.1	16.5	-62.8	-78.5		
426.9	5.1	443.2	7.2	529.4	6.5	-3.7	-19.4	426.9	5.1
565.6	6.8	593.6	9.3	703.2	8.2	-4.7	-19.6	565.6	6.8
22554.4	7677.9	NA	1251.7	5331.7	110	NA	323		
777.8	9.1	860.8	11	1081.8	9.5	-9.6	-28.1	777.8	9.1
785.4	70.5	2723.7	132.6	4853.8	103.3	-71.2	-83.8		
434.2	5.2	462.9	7.4	608.6	7.1	-6.2	-28.7	434.2	5.2
985.2	10.7	1033.1	10.5	1136.9	7.7	-4.6	-13.3	985.2	10.7
350.5	4.1	395	5.8	665.1	6.3	-11.3	-47.3	350.5	4.1
412.3	5	423.3	7.2	484.6	6.4	-2.6	-14.9	412.3	5
54.6	0.8	72.6	2	720	12.5	-24.9	-92.4		
295.6	3.7	331.4	6.2	591.6	8	-10.8	-50	295.6	3.7
437.5	5.1	468.3	6.7	623.3	6.2	-6.6	-29.8	437.5	5.1
634.7	7.2	684.4	8.6	852.3	7.1	-7.3	-25.5	634.7	7.2
273.8	3.3	302.1	5.1	527.1	6.2	-9.4	-48.1	273.8	3.3
380.1	4.4	428	6.2	696	6.7	-11.2	-45.4	380.1	4.4
245.5	3	302.3	5	768.2	7.9	-18.8	-68		
302.5	4.2	392.2	9	963.2	14.6	-22.9	-68.6		
281.5	3.5	296.8	5.7	419.5	6.2	-5.1	-32.9	281.5	3.5
1755.6	60.5	3469.8	54.1	4696.4	38.8	-49.4	-62.6		

306.8	4.2	424.8	9.1	1129.7	15.1	-27.8	-72.8		
274.3	3.4	274.8	5.2	279.7	4.3	-0.2	-1.9	274.3	3.4
2560.6	24.8	2611.8	15.1	2652.4	10.3	-2	-3.5	2652.4	10.3
314.6	3.7	486.5	7.1	1407.8	10.4	-35.3	-77.7		
742.5	8.3	744.7	8.8	752.2	6.3	-0.3	-1.3	742.5	8.3
503.1	5.8	499.5	7	483.8	5	0.7	4	503.1	5.8
NaN	-30475.9	NA	4699.4	4896.4	175	NaN	NaN		
516.4	8.6	970.9	21.9	2218.8	27.4	-46.8	-76.7		
441.7	5.2	477.8	7	655.7	6.6	-7.5	-32.6	441.7	5.2
355.5	4.5	392.1	7.3	615.4	8.5	-9.3	-42.2	355.5	4.5
268.6	3.3	333.7	5.9	817.4	9.2	-19.5	-67.1		
338.8	4	442.9	6.7	1028.3	9.1	-23.5	-67.1		
138.7	1.9	151.2	3.7	351.8	6.7	-8.2	-60.6	138.7	1.9
483.4	5.6	501.7	6.8	587.3	5.5	-3.6	-17.7	483.4	5.6
2421.3	193.3	4004.2	136.8	4931.2	99.3	-39.5	-50.9		
469.6	5.4	659.4	8.3	1377.9	9.2	-28.8	-65.9		
1843	19.3	1886.8	14.4	1936.1	10.2	-2.3	-4.8	1936.1	10.2
450.4	5.3	497.8	7.1	723	6.9	-9.5	-37.7	450.4	5.3
385	4.7	400.8	7	493.9	6.6	-3.9	-22	385	4.7
349.3	4.3	601.5	8.9	1720.1	12.4	-41.9	-79.7		
249.3	3.3	373.8	7.3	1243.1	13.7	-33.3	-79.9		
205.9	2.6	299.4	5.7	1112.4	11.9	-31.2	-81.5		
11313.8	1316.3	6611.7	270.3	5263.9	101.5	71.1	114.9		
553.8	7.5	569.5	11.7	633.6	10.8	-2.8	-12.6	553.8	7.5
9693.2	557.8	5980.2	117.7	4824.3	34	62.1	100.9		
151.6	1.9	220.1	4	1036.6	10.3	-31.1	-85.4		
1862.5	19.4	2178.8	15	2492.2	10.8	-14.5	-25.3		
62.3	1.5	83	5.5	728.4	33.2	-24.9	-91.4		
12681.4	1887.3	6796.2	355	5166.2	82.5	86.6	145.5		
408.8	4.8	515	7.2	1019.8	8.4	-20.6	-59.9		
456.1	5.4	484.3	7.3	620.8	6.7	-5.8	-26.5	456.1	5.4
1124.9	12.7	1306.7	13.3	1619.6	10.7	-13.9	-30.5		
443.8	5.2	399.8	6.6	153.6	2.3	11	189		
864.9	9.8	947.7	10.9	1145.9	8.9	-8.7	-24.5	864.9	9.8
884.2	9.9	933	10.6	1051	8.2	-5.2	-15.9	884.2	9.9
253.7	3.1	508.9	7.6	1920.2	12.3	-50.1	-86.8		
460.8	5.3	479.1	6.7	568.6	5.5	-3.8	-19	460.8	5.3
472	6	549.9	9.5	887.9	10.8	-14.2	-46.8	472	6
2011	21.2	2030.6	15.4	2051.3	11	-1	-2	2051.3	11
1595.9	17.5	1737.3	14.9	1912.6	11.2	-8.1	-16.6		
885.6	9.9	979.2	10.6	1196.2	8.4	-9.6	-26	885.6	9.9
100.5	1.9	416.6	11.4	3081.3	26.4	-75.9	-96.7		
1385.7	14.9	1612.9	13.6	1924.3	10.2	-14.1	-28		
300.1	4.6	341	9.8	630.4	14.1	-12	-52.4	300.1	4.6
394.5	5.2	390.2	8.3	365.6	6.7	1.1	7.9	394.5	5.2
989	11.2	987.2	11.5	984	8.5	0.2	0.5	989	11.2
397.2	4.7	494.8	7.4	976.6	8.9	-19.7	-59.3		
766	8.8	845.6	10.2	1061.5	8.5	-9.4	-27.8	766	8.8
273.8	3.3	278.7	4.6	320.6	4	-1.8	-14.6	273.8	3.3
452	5.8	462.1	8.7	513.1	7.8	-2.2	-11.9	452	5.8
920.1	31.1	2517.6	51.7	4290.7	42.2	-63.5	-78.6		
483	6	643.9	9.8	1258.8	11.5	-25	-61.6		
245.8	3	277	5.2	550.4	7.3	-11.3	-55.3	245.8	3
1245.6	14.1	1261.1	13.4	1288.1	10.1	-1.2	-3.3	1288.1	10.1
1814.8	19.4	1847.1	15	1884.4	10.8	-1.8	-3.7	1884.4	10.8

543.8	6.3	628	8.5	945	8.3	-13.4	-42.5	543.8	6.3
1724.1	18.6	1746.5	14.9	1774	10.8	-1.3	-2.8	1774	10.8
294.2	3.8	354.5	6.8	772.4	10.1	-17	-61.9		
696.5	8	839.1	10.3	1238.8	9.5	-17	-43.8		
265.5	3.2	299.4	5.1	573.4	6.7	-11.3	-53.7	265.5	3.2
2368.7	24.5	2309.1	16.1	2257.4	11.4	2.6	4.9	2257.4	11.4
2449.3	25.4	2465.2	16.5	2479	11.8	-0.6	-1.2	2479	11.8
408.9	5.5	601.1	11.1	1414.5	15.3	-32	-71.1		
713.3	8.1	1056.3	11.2	1855.9	10.3	-32.5	-61.6		
1924.4	372.2	3143	380	4051.7	320.7	-38.8	-52.5		
250.5	3.2	381.8	7	1282.1	12.8	-34.4	-80.5		
317.7	3.9	316.4	5.9	307.7	4.7	0.4	3.2	317.7	3.9
317.9	4	319.4	6.3	330.9	5.3	-0.5	-3.9	317.9	4
1884.5	20.1	2071.4	15.6	2263.2	11.5	-9	-16.7		
2138.1	22	2401.8	15.8	2634.1	11.4	-11	-18.8		
296	3.7	411.9	7	1127.7	11	-28.1	-73.7		
2180.1	22.2	2267.6	15.5	2348.1	11.1	-3.9	-7.2	2348.1	11.1
8267.2	151.3	5797.4	37.9	4986.8	18.8	42.6	65.8		
220.4	2.7	477.8	7.3	2033.9	12.6	-53.9	-89.2		
716.3	8.3	942.9	11.2	1518.1	10.6	-24	-52.8		
465.2	5.8	513.4	8.6	735	8.9	-9.4	-36.7	465.2	5.8
180.5	3	227.6	7.8	747.9	18.1	-20.7	-75.9		
442.8	5.4	651	9.3	1461	11.5	-32	-69.7		
423.9	5.1	467	7.2	685.8	7.4	-9.2	-38.2	423.9	5.1
611	7.3	710.8	10.1	1041.2	9.9	-14	-41.3	611	7.3
431.2	5.5	682.8	10.8	1635.2	13.9	-36.9	-73.6		
261.4	3.2	300.7	5.4	618.3	7.6	-13	-57.7	261.4	3.2
230.4	2.7	256.3	4.1	501.6	5.4	-10.1	-54.1	230.4	2.7
4528.9	39.4	4840.8	17.3	4974.8	12.3	-6.4	-9		
293.8	3.8	383.1	7.3	966.3	11.5	-23.3	-69.6		
1852.4	19.5	1957.9	15.1	2071.8	11.1	-5.4	-10.6	2071.8	11.1
873.7	10.4	934	12.4	1080	10.5	-6.5	-19.1	873.7	10.4
NaN	NaN	NaN	NaN	884.9	5511.1	NaN	NaN		
806.7	9.3	800.2	10.3	783.1	7.6	0.8	3	806.7	9.3
272.5	3.3	290	5.1	434.4	5.5	-6	-37.3	272.5	3.3
246.3	3.1	278.5	5.4	559	7.7	-11.5	-55.9	246.3	3.1
444.1	5.2	468.6	7	591.3	6.3	-5.2	-24.9	444.1	5.2
334.1	4	402.5	6.5	816.8	8.5	-17	-59.1		
Inf	NaN	Inf	NaN	4307.7	614.2	NaN	Inf		
399.7	4.8	547.7	7.8	1223.4	9.8	-27	-67.3		
1720.5	18.2	1804.3	14.7	1903.2	10.8	-4.6	-9.6	1903.2	10.8
557.7	21.7	1714.3	55.9	3724.8	53.4	-67.5	-85		
425	5.2	437.9	7.4	506.9	6.5	-2.9	-16.2	425	5.2
330.3	6.4	513.1	16.4	1441.4	27.4	-35.6	-77.1		
282.1	3.4	355.6	5.6	869.2	8.2	-20.7	-67.5		
263.2	3.5	371.3	7.5	1117.3	13.5	-29.1	-76.4		
420.4	5	508.2	7.6	926	8.8	-17.3	-54.6		

e

input: 81-84.csv
n samples: 153
concordant to +5/-15%: 118 (77.1%)
cut-off at 1100 Ma (91 younger | 27 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/U	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	107	5.8	1.145	0.05768	0.00132	0.33345	0.00745	0.04194	0.00055
G002	463.2	22	0.9626	0.05402	0.00079	0.29024	0.00433	0.03898	0.00045
G003	221.5	20.6	0.9426	0.05652	0.00083	0.59788	0.0089	0.07675	0.00089
G004	4136.3	16.9	0.53	0.04751	0.00074	0.02477	0.00039	0.00378	4.00E-05
G005	415.4	25.4	0.1127	0.05452	0.00073	0.48303	0.00669	0.06428	0.00073
G006	178.7	14.1	0.5091	0.07565	0.00114	0.7538	0.01143	0.07229	0.00086
G007	508.5	40.4	1.0781	0.05537	0.00071	0.48281	0.00646	0.06326	0.00072
G008	368.2	27.2	1.8604	0.05325	0.00079	0.36189	0.00545	0.04931	0.00057
G009	338	43.4	0.3581	0.06676	0.00082	1.14363	0.01467	0.12429	0.00141
G010	163	72.3	1.16	0.11548	0.00134	5.42028	0.06659	0.34054	0.00387
G011	382	26.1	0.4647	0.05543	0.00079	0.49673	0.00721	0.06501	0.00075
G012	1379	572.4	0.199	0.15646	0.0017	8.73209	0.10143	0.40491	0.00448
G013	732	78.2	0.2231	0.06467	0.00075	0.955	0.01169	0.10714	0.0012
G014	0.6	-1.4	-4.2341	0.87158	0.03767	272.9294	22.20588	2.27191	0.19332
G015	331.1	40.4	0.3192	0.06596	0.00082	1.08942	0.01407	0.11983	0.00136
G016	777.9	159.2	0.7395	0.0945	0.00108	2.45541	0.02972	0.18852	0.00211
G017	874.2	NaN	1.6462	0.05296	0.00066	0.35954	0.00467	0.04926	0.00055
G018	177.5	30.3	0.8157	0.07034	0.00091	1.40661	0.01895	0.14509	0.00167
G019	1225.4	151.5	0.4746	0.06492	0.00073	1.03586	0.0124	0.11577	0.00129
G020	70.5	41	0.4016	0.18231	0.00211	12.89606	0.15942	0.51321	0.00593
G021	139.7	8.9	0.4388	0.05815	0.00131	0.48684	0.01071	0.06074	8.00E-04
G022	264.3	12.2	0.6246	0.05341	0.00094	0.30782	0.0054	0.04181	5.00E-04
G023	100.1	5.8	0.952	0.05387	0.00137	0.35542	0.00878	0.04787	0.00065
G024	574	45.5	0.7978	0.06127	0.00079	0.57669	0.00767	0.06829	0.00078
G025	34	6.8	1.4916	0.08644	0.00191	1.76847	0.03832	0.14843	0.00211
G026	1020.9	68.9	0.2593	0.05554	0.00067	0.52084	0.00655	0.06804	0.00076
G027	394.6	183.5	0.6467	0.15857	0.00176	8.87241	0.10486	0.40595	0.00453
G028	268.1	23.9	1.0148	0.0613	0.00088	0.60972	0.00888	0.07217	0.00084
G029	379.5	80.1	0.3925	0.08959	0.00104	2.44939	0.02998	0.19836	0.00223
G030	424.2	32.7	0.5362	0.05719	0.00076	0.56253	0.00771	0.07137	0.00081
G031	423.6	35.8	0.7961	0.05631	0.00075	0.56178	0.00773	0.07238	0.00083
G032	422.3	22.4	0.6797	0.05248	0.00077	0.34159	0.00512	0.04722	0.00055
G033	956.7	119	0.5029	0.07644	0.00089	1.24581	0.01524	0.11824	0.00132
G034	71.7	28.7	0.9392	0.12047	0.0015	5.34464	0.06979	0.32188	0.00376
G035	343.6	13.3	0.8105	0.0508	9.00E-04	0.2322	0.00409	0.03316	4.00E-04
G036	630.6	25.4	0.2233	0.05199	0.00072	0.2934	0.00417	0.04094	0.00047
G037	467	40.4	0.6148	0.05797	0.00075	0.62366	0.00839	0.07805	0.00089
G038	84.3	31	1.1043	0.10824	0.00138	4.30293	0.05717	0.28841	0.00337
G039	410.4	20.9	1.2064	0.06054	0.00093	0.33213	0.00514	0.0398	0.00047
G040	33.4	7.5	0.0233	0.0926	0.00156	3.00298	0.05085	0.23527	0.00304
G041	512.9	161.2	0.1206	0.13478	0.00151	5.89742	0.07026	0.31745	0.00354
G042	321.6	72	0.5457	0.08288	0.00098	2.33352	0.02913	0.20427	0.0023
G043	90	28.7	0.5663	0.11176	0.00142	4.39815	0.0584	0.2855	0.00334
G044	196.4	16.4	0.8063	0.05676	0.00091	0.55699	0.00899	0.07119	0.00084
G045	118.3	7.2	1.3192	0.05278	0.0012	0.33667	0.00752	0.04628	6.00E-04
G046	511.7	252.8	0.3195	0.16082	0.00179	10.09303	0.11992	0.45534	0.00507
G047	518.6	30.2	1.2526	0.05684	0.00082	0.34967	0.00512	0.04463	0.00052
G048	1837.2	132.5	0.3259	0.07797	9.00E-04	0.74514	0.00908	0.06934	0.00077

G049	4.4	0.4	0.0503	0.62874	0.0183	17.47264	0.43706	0.20162	0.0055
G050	1218.5	55.1	0.5619	0.06713	0.00089	0.38229	0.00521	0.04131	0.00047
G051	397.1	26.1	0.5645	0.07751	0.00104	0.64324	0.00884	0.06021	0.00069
G052	535	25.6	1.1833	0.05005	0.00075	0.2575	0.00392	0.03733	0.00043
G053	292.7	15.3	1.0955	0.07092	0.00112	0.40699	0.00643	0.04163	5.00E-04
G054	240.4	18.8	0.6684	0.05782	0.00088	0.55647	0.00853	0.06983	0.00082
G055	312.8	27.2	0.9476	0.06042	0.00087	0.60047	0.00876	0.0721	0.00084
G056	1250.6	234.7	0.4439	0.08212	0.00094	2.01749	0.0245	0.17824	0.00199
G057	125.2	23.9	0.6362	0.07629	0.00106	1.79194	0.02559	0.17042	0.002
G058	295.2	21.8	0.3841	0.07874	0.0011	0.7584	0.0108	0.06988	0.00081
G059	1124.1	165.5	0.3054	0.07709	0.00089	1.59715	0.01943	0.1503	0.00167
G060	691.1	54.4	0.5357	0.0573	0.00073	0.57574	0.00765	0.07289	0.00082
G061	397.8	94.6	1.3121	0.07548	0.00092	1.86145	0.02366	0.17891	0.00202
G062	368.2	156.3	0.466	0.14038	0.0016	7.42225	0.08991	0.38358	0.00429
G063	310.9	92.3	0.6575	0.10009	0.00118	3.59681	0.04473	0.26072	0.00294
G064	212.7	10.4	0.8379	0.05234	0.00097	0.29863	0.00552	0.04139	5.00E-04
G065	750.9	216.3	0.0599	0.1111	0.00127	4.56639	0.05517	0.2982	0.00332
G066	1737.7	671.4	0.3551	0.12518	0.00141	6.23793	0.07455	0.36151	0.00401
G067	462.6	21.7	0.7067	0.05079	8.00E-04	0.28927	0.00458	0.04132	0.00048
G068	470.1	22.8	0.7066	0.05271	0.00078	0.30942	0.00465	0.04259	0.00049
G069	187.6	18.6	0.9141	0.08389	0.00122	0.93398	0.0137	0.08077	0.00095
G070	595.4	50.3	0.8943	0.0602	0.00077	0.58592	0.0078	0.07061	8.00E-04
G071	655.8	129.2	0.7521	0.07767	0.00092	1.86733	0.02323	0.17443	0.00195
G072	678.5	50.2	0.5572	0.0579	0.00077	0.54409	0.00743	0.06818	0.00078
G073	1025.3	140.7	0.1098	0.07044	0.00083	1.3909	0.01729	0.14326	0.0016
G074	1055.5	165.2	0.227	0.08998	0.00109	1.95805	0.02472	0.15787	0.00178
G075	720.6	367.8	1.5408	0.12679	0.00145	6.35616	0.07705	0.36371	0.00405
G076	219.7	16.3	0.6317	0.06145	0.00102	0.56531	0.00937	0.06674	8.00E-04
G077	334.2	132.5	0.5813	0.14205	0.00166	6.94712	0.08579	0.35481	0.00399
G078	246.7	95.7	1.0811	0.11244	0.00136	4.75566	0.06026	0.30684	0.00348
G079	119.6	10	0.5255	0.06115	0.00115	0.65406	0.01221	0.07759	0.00097
G080	842.1	302	0.0461	0.12381	0.00142	6.21068	0.0755	0.36393	0.00405
G081	433	144.2	0.3429	0.11117	0.00131	4.82013	0.05971	0.31456	0.00353
G082	670.9	47.2	0.5309	0.05879	0.00079	0.52781	0.00728	0.06513	0.00074
G083	456.9	21.4	0.8843	0.06306	0.00105	0.3427	0.00567	0.03943	0.00047
G084	1295.9	63.6	0.5136	0.07602	0.00095	0.47395	0.00614	0.04523	0.00051
G085	290.1	149.3	0.8008	0.16297	0.00192	9.65324	0.11996	0.42973	0.00484
G086	849	35	0.1308	0.06355	0.00086	0.37425	0.0052	0.04272	0.00049
G087	164.9	13.9	0.7902	0.05658	0.00097	0.56397	0.0097	0.07232	0.00087
G088	290.8	163.5	0.7515	0.16614	0.00196	10.66663	0.13241	0.46577	0.00524
G089	544.4	26.7	1.0513	0.06738	0.00099	0.37136	0.00553	0.03998	0.00047
G090	765.3	235.9	0.0301	0.11482	0.00135	5.0385	0.06232	0.31837	0.00356
G091	1693.7	NaN	1.6976	0.06067	0.00074	0.6345	0.0081	0.07587	0.00085
G092	126.5	8.9	0.6549	0.07006	0.00134	0.58838	0.01105	0.06093	0.00077
G093	561.4	43.6	0.841	0.05634	8.00E-04	0.51293	0.00743	0.06606	0.00076
G094	0	NaN	1.7906	0.94125	0.07661	385.8247	66.73186	2.97381	0.53448
G095	806.9	29.1	0.4705	0.06651	0.00102	0.31089	0.00477	0.03391	4.00E-04
G096	884.3	86.1	0.3115	0.08705	0.00109	1.12073	0.01451	0.09341	0.00105
G097	424.8	28.2	0.5624	0.05613	0.00086	0.4697	0.00725	0.06071	0.00071
G098	1756	168.2	1.4348	0.05651	7.00E-04	0.54924	0.00709	0.07051	0.00079
G099	0	NaN	NaN	-0.93093	0.53954	#NAME?	NaN	Inf	NaN
G100	508.5	99.2	0.7306	0.07825	0.00097	1.81109	0.02342	0.16791	0.00189
G101	327.9	16.2	0.5166	0.05375	0.00089	0.33994	0.00565	0.04589	0.00054
G102	161.8	29.9	0.4407	0.27527	0.03626	5.85657	0.66485	0.15435	0.01475
G103	680.4	67.8	1.1186	0.05875	0.00078	0.64168	0.00875	0.07924	9.00E-04

G104	805	58.4	1.1403	0.05434	0.00074	0.42892	0.00602	0.05727	0.00065
G105	1149.9	44.4	0.4272	0.05305	0.00074	0.27138	0.00387	0.03711	0.00042
G106	793	57.4	1.1795	0.0548	0.00076	0.42945	0.00608	0.05685	0.00065
G107	691.7	342.3	0.299	0.16636	0.00199	10.54561	0.13226	0.45988	0.00515
G108	484	21.4	0.8323	0.05702	0.00094	0.29948	0.00493	0.0381	0.00045
G109	361.3	54.2	0.8586	0.06383	0.00086	1.11833	0.01543	0.12712	0.00145
G110	304	14.9	0.7369	0.05891	0.00118	0.34919	0.00686	0.043	0.00054
G111	382.7	63.2	0.5563	0.07282	0.00095	1.5088	0.02036	0.15031	0.00171
G112	490.9	24.4	0.8279	0.06166	0.00094	0.35952	0.0055	0.0423	0.00049
G113	467	65.4	0.705	0.06645	0.00088	1.13177	0.0154	0.12357	0.00141
G114	648.9	47	0.8326	0.0571	8.00E-04	0.48934	0.00696	0.06217	0.00071
G115	299.6	174.7	1.0892	0.16848	0.00206	10.56295	0.13475	0.45485	0.00513
G116	439.9	23	0.9546	0.05774	9.00E-04	0.34501	0.0054	0.04335	0.00051
G117	268.1	12.7	0.7394	0.05497	0.00099	0.31433	0.00561	0.04148	5.00E-04
G118	178.1	40.1	1.0523	0.07586	0.00105	1.89592	0.02677	0.18133	0.0021
G119	0.6	NaN	1.7699	0.85301	0.02016	404.5658	20.13694	3.44081	0.17494
G120	424.2	20.9	0.8351	0.05484	9.00E-04	0.31938	0.00523	0.04225	5.00E-04
G121	222.8	13.7	0.7918	0.05476	0.00102	0.40185	0.00745	0.05324	0.00065
G122	344.3	16.7	0.3042	0.05568	0.00095	0.36746	0.00624	0.04788	0.00057
G123	645.1	212.9	0.339	0.13016	0.00161	5.67568	0.07309	0.31634	0.00356
G124	319.7	11.6	0.2146	0.06337	0.00119	0.32197	0.00593	0.03686	0.00045
G125	70.5	28.7	0.3626	0.12866	0.00187	6.69421	0.10002	0.37747	0.00466
G126	399.7	28.8	0.2225	0.05985	0.00089	0.60552	0.0091	0.0734	0.00085
G127	611.1	56	0.5036	0.06212	0.00087	0.70842	0.01011	0.08274	0.00095
G128	422.9	183.4	0.2539	0.16159	0.00202	9.2989	0.12075	0.41749	0.00472
G129	401.5	29.3	0.6116	0.08839	0.00129	0.79034	0.01164	0.06487	0.00076
G130	1385.3	80.1	0.7544	0.06057	0.00081	0.44015	0.00604	0.05272	6.00E-04
G131	344.3	28.2	0.586	0.05678	0.00088	0.58451	0.00909	0.07468	0.00087
G132	88.7	6.2	1.4535	0.1024	0.00219	0.73358	0.01502	0.05197	0.00072
G133	713.1	38.5	0.9098	0.05417	0.00081	0.33761	0.00513	0.04521	0.00052
G134	106.4	18.2	0.8998	0.07168	0.0012	1.41775	0.02372	0.1435	0.00175
G135	1146.1	169.7	0.3414	0.07706	0.00098	1.55802	0.02054	0.14669	0.00165
G136	827.6	92.5	0.4865	0.06827	9.00E-04	0.99068	0.01346	0.10527	0.00119
G137	402.8	20.9	1.7591	0.08186	0.00131	0.46642	0.00745	0.04134	0.00049
G138	163.6	10.7	0.0744	0.07861	0.00165	0.74429	0.01513	0.06869	0.00091
G139	157.3	85.5	0.6108	0.17165	0.00222	11.0643	0.14808	0.46762	0.00537
G140	779.2	28.4	0.27	0.06329	0.00095	0.31573	0.00476	0.03619	0.00042
G141	0.6	NaN	1.8167	0.8596	0.01614	538.6026	21.68885	4.5457	0.18439
G142	1846	126.1	0.2396	0.06134	0.00082	0.58085	0.00799	0.06869	0.00078
G143	109.5	8.1	0.9162	0.05681	0.00132	0.48584	0.01103	0.06204	0.00082
G144	190.7	10.3	1.3812	0.06165	0.00152	0.34633	0.00824	0.04076	0.00055
G145	148.5	11.4	0.7146	0.05877	0.00117	0.54371	0.01066	0.06712	0.00084
G146	547.6	33.1	2.4665	0.05655	0.00123	0.28443	0.00604	0.03649	0.00047
G147	1591.7	125.1	0.8599	0.06968	0.00093	0.69747	0.00952	0.07262	0.00082
G148	1116.5	151.5	0.1243	0.07067	0.00093	1.37584	0.01855	0.14124	0.00159
G149	1252.5	84	0.3247	0.06093	0.00083	0.55507	0.00773	0.0661	0.00075
G150	0.6	NaN	1.9449	0.8404	0.0173	490.5444	21.87914	4.2347	0.1908
G151	141.6	7.3	0.8299	0.05986	0.0014	0.36308	0.00824	0.04401	0.00058
G152	210.2	19.2	0.8783	0.07037	0.0012	0.74945	0.01272	0.07727	0.00094
G153	227.2	9.3	0.4544	0.06932	0.00139	0.36645	0.00718	0.03835	0.00049

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
264.8	3.4	292.2	6.7	517.6	9.3	-9.4	-48.8	264.8	3.4
246.5	2.8	258.7	4.3	371.9	4.6	-4.7	-33.7	246.5	2.8
476.7	5.3	475.9	7.1	472.9	5.6	0.2	0.8	476.7	5.3
24.3	0.3	24.8	0.5	74.9	1.1	-2.1	-67.5	24.3	0.3
401.6	4.4	400.1	5.8	392.6	4.4	0.4	2.3	401.6	4.4
449.9	5.2	570.4	8.4	1085.8	10	-21.1	-58.6		
395.4	4.4	400	5.7	427.2	4.5	-1.1	-7.4	395.4	4.4
310.3	3.5	313.6	5.1	339.5	4.3	-1.1	-8.6	310.3	3.5
755.2	8.1	774.2	9.1	830.3	7	-2.5	-9	755.2	8.1
1889.3	18.6	1888.1	13.9	1887.4	9.9	0.1	0.1	1887.4	9.9
406	4.5	409.5	6.2	429.6	5	-0.8	-5.5	406	4.5
2191.6	20.6	2310.4	14.1	2417.8	10	-5.1	-9.4	2417.8	10
656.1	7	680.7	8	763.6	6.2	-3.6	-14.1	656.1	7
7641.4	380.9	5699.2	96.6	5043.5	43.6	34.1	51.5		
729.6	7.8	748.2	8.9	805.1	6.9	-2.5	-9.4	729.6	7.8
1113.4	11.4	1259	11.5	1518.1	9	-11.6	-26.7		
310	3.4	311.9	4.5	327.1	3.5	-0.6	-5.2	310	3.4
873.4	9.4	891.7	10.3	938.3	7.9	-2.1	-6.9	873.4	9.4
706.2	7.5	721.9	8.2	771.7	6.1	-2.2	-8.5	706.2	7.5
2670.3	25.3	2672.1	15.4	2674	10.9	-0.1	-0.1	2674	10.9
380.1	4.9	402.8	8.7	535.4	9.4	-5.6	-29	380.1	4.9
264	3.1	272.5	5.1	346.3	5.2	-3.1	-23.7	264	3.1
301.4	4	308.8	7.7	365.6	7.8	-2.4	-17.6	301.4	4
425.8	4.7	462.3	6.4	648.7	6.2	-7.9	-34.4	425.8	4.7
892.2	11.8	1034	17	1348	16.5	-13.7	-33.8	892.2	11.8
424.3	4.6	425.7	5.7	434	4.3	-0.3	-2.2	424.3	4.6
2196.4	20.8	2325	14.4	2440.5	10.3	-5.5	-10	2440.5	10.3
449.2	5.1	483.4	7.1	649.8	6.9	-7.1	-30.9	449.2	5.1
1166.5	12	1257.2	11.7	1416.8	8.9	-7.2	-17.7		
444.4	4.9	453.2	6.4	498.9	5.2	-1.9	-10.9	444.4	4.9
450.5	5	452.7	6.4	464.6	5	-0.5	-3	450.5	5
297.4	3.4	298.4	4.8	306.4	3.9	-0.3	-2.9	297.4	3.4
720.4	7.6	821.5	9.1	1106.6	7.8	-12.3	-34.9	720.4	7.6
1798.9	18.3	1876	14.6	1963.2	10.8	-4.1	-8.4	1963.2	10.8
210.3	2.5	212	4.1	231.8	3.7	-0.8	-9.3	210.3	2.5
258.7	2.9	261.2	4.1	285	3.4	-1	-9.2	258.7	2.9
484.5	5.3	492.1	6.7	528.6	5.3	-1.6	-8.4	484.5	5.3
1633.6	16.9	1693.9	14.2	1770	10.7	-3.6	-7.7	1770	10.7
251.6	2.9	291.2	4.9	622.9	7.2	-13.6	-59.6	251.6	2.9
1362.1	15.9	1408.4	16.2	1479.7	13.1	-3.3	-8	1479.7	13.1
1777.3	17.3	1960.9	13.7	2161.2	10	-9.4	-17.8		
1198.2	12.3	1222.6	11.6	1266.4	8.6	-2	-5.4	1266.4	8.6
1619	16.7	1712	14.3	1828.2	10.8	-5.4	-11.4	1828.2	10.8
443.3	5.1	449.6	7.2	482.2	6.2	-1.4	-8.1	443.3	5.1
291.6	3.7	294.6	6.7	319.4	6.2	-1	-8.7	291.6	3.7
2418.9	22.5	2443.3	14.5	2464.3	10.3	-1	-1.8	2464.3	10.3
281.5	3.2	304.5	4.9	485.3	5.6	-7.6	-42	281.5	3.2
432.2	4.6	565.4	6.9	1146.1	7.9	-23.6	-62.3		

1184	29.5	2961.2	38.3	4575.9	29.2	-60	-74.1		
260.9	2.9	328.7	4.9	841.8	7.6	-20.6	-69		
376.9	4.2	504.3	7	1134.3	9.2	-25.3	-66.8		
236.3	2.7	232.7	3.9	197.3	2.7	1.6	19.7	236.3	2.7
262.9	3.1	346.7	5.8	955.1	9.8	-24.2	-72.5		
435.1	4.9	449.2	7	522.9	6.2	-3.1	-16.8	435.1	4.9
448.8	5.1	477.5	7.1	618.6	6.7	-6	-27.5	448.8	5.1
1057.4	10.9	1121.4	10.9	1248.4	8.2	-5.7	-15.3	1057.4	10.9
1014.4	11	1042.5	11.9	1102.7	9.3	-2.7	-8	1014.4	11
435.4	4.9	573.1	8	1165.6	9.7	-24	-62.6		
902.6	9.4	969.1	10	1123.5	7.8	-6.9	-19.7	902.6	9.4
453.5	4.9	461.7	6.3	503.1	5.1	-1.8	-9.8	453.5	4.9
1061	11	1067.5	11	1081.3	8.1	-0.6	-1.9	1061	11
2093	20	2163.7	14.3	2231.9	10.3	-3.3	-6.2	2231.9	10.3
1493.5	15	1548.8	13	1625.8	9.6	-3.6	-8.1	1625.8	9.6
261.4	3.1	265.3	5.2	300.3	4.8	-1.5	-12.9	261.4	3.1
1682.4	16.5	1743.2	13.3	1817.5	9.7	-3.5	-7.4	1817.5	9.7
1989.3	19	2009.8	13.8	2031.3	9.9	-1	-2.1	2031.3	9.9
261	3	258	4.5	231.3	3.3	1.2	12.8	261	3
268.9	3	273.7	4.5	316.3	4	-1.8	-15	268.9	3
500.7	5.7	669.7	9.2	1290	10.6	-25.2	-61.2		
439.8	4.8	468.3	6.4	610.8	5.9	-6.1	-28	439.8	4.8
1036.5	10.7	1069.6	10.8	1138.4	8.1	-3.1	-9	1036.5	10.7
425.2	4.7	441.1	6.3	526	5.5	-3.6	-19.2	425.2	4.7
863.1	9	885.1	9.6	941.2	7.2	-2.5	-8.3	863.1	9
944.9	9.9	1101.2	11.1	1425.1	9.3	-14.2	-33.7	944.9	9.9
1999.7	19.1	2026.2	14	2053.9	10.1	-1.3	-2.6	2053.9	10.1
416.5	4.8	455	7.5	655	8	-8.5	-36.4	416.5	4.8
1957.5	19	2104.7	14.4	2252.3	10.6	-7	-13.1	2252.3	10.6
1725.1	17.2	1777.1	13.9	1839.2	10.3	-2.9	-6.2	1839.2	10.3
481.7	5.8	511	9.1	644.5	9	-5.7	-25.3	481.7	5.8
2000.8	19.1	2006	14	2011.8	10	-0.3	-0.6	2011.8	10
1763.1	17.3	1788.4	13.7	1818.6	10	-1.4	-3.1	1818.6	10
406.7	4.5	430.4	6.2	559.3	5.8	-5.5	-27.3	406.7	4.5
249.3	2.9	299.2	5.3	710.3	8.5	-16.7	-64.9		
285.2	3.1	393.9	5.5	1095.6	8.4	-27.6	-74		
2304.5	21.8	2402.3	15	2486.7	10.9	-4.1	-7.3	2486.7	10.9
269.7	3	322.8	4.9	726.7	7	-16.5	-62.9		
450.1	5.2	454.1	7.7	475.2	6.5	-0.9	-5.3	450.1	5.2
2465	23	2494.5	15.1	2519.1	11	-1.2	-2.1	2519.1	11
252.7	2.9	320.7	5.2	849.5	8.5	-21.2	-70.3		
1781.8	17.4	1825.8	13.7	1877.1	10.1	-2.4	-5.1	1877.1	10.1
471.4	5.1	498.9	6.5	627.6	5.7	-5.5	-24.9	471.4	5.1
381.3	4.7	469.8	8.6	930.1	11.7	-18.8	-59		
412.4	4.6	420.4	6.3	465.8	5.3	-1.9	-11.5	412.4	4.6
8894.3	867	6049.6	199.8	5152.1	82.1	47	72.6		
215	2.5	274.9	4.7	822.5	8.6	-21.8	-73.9		
575.7	6.2	763.3	9	1361.6	9.4	-24.6	-57.7		
379.9	4.3	391	6.3	457.5	5.6	-2.8	-17	379.9	4.3
439.2	4.8	444.5	6	472.5	4.7	-1.2	-7	439.2	4.8
Inf	NaN	NaN	NaN	NaN	NaN	NaN	NaN		
1000.6	10.4	1049.5	11	1153.2	8.5	-4.7	-13.2	1000.6	10.4
289.2	3.3	297.1	5.2	360.6	5	-2.7	-19.8	289.2	3.3
925.3	82.4	1954.8	141.1	3336.3	128.7	-52.7	-72.3		
491.6	5.4	503.3	6.9	557.8	5.7	-2.3	-11.9	491.6	5.4

359	4	362.4	5.4	385.2	4.4	-0.9	-6.8	359	4
234.9	2.6	243.8	3.9	330.9	3.9	-3.7	-29	234.9	2.6
356.4	4	362.8	5.5	404.1	4.6	-1.7	-11.8	356.4	4
2439	22.7	2483.9	15.2	2521.4	11.1	-1.8	-3.3	2521.4	11.1
241	2.8	266	4.7	492.3	6.4	-9.4	-51	241	2.8
771.4	8.3	762.2	9.5	736	7.1	1.2	4.8	771.4	8.3
271.4	3.3	304.1	6.2	563.8	8.7	-10.8	-51.9	271.4	3.3
902.7	9.6	934	10.6	1008.9	8.3	-3.3	-10.5	902.7	9.6
267.1	3	311.9	5.1	662.3	7.4	-14.4	-59.7	267.1	3
751.1	8.1	768.6	9.4	820.6	7.5	-2.3	-8.5	751.1	8.1
388.8	4.3	404.5	6	495.4	5.5	-3.9	-21.5	388.8	4.3
2416.8	22.7	2485.5	15.4	2542.6	11.4	-2.8	-4.9	2542.6	11.4
273.6	3.2	301	5.1	519.9	6.3	-9.1	-47.4	273.6	3.2
262	3.1	277.5	5.3	411	6.1	-5.6	-36.3	262	3.1
1074.2	11.5	1079.7	12	1091.4	9.3	-0.5	-1.6	1074.2	11.5
9610.6	253.9	6097.7	56.8	5012.9	23.8	57.6	91.7		
266.8	3.1	281.4	5	405.7	5.5	-5.2	-34.2	266.8	3.1
334.4	4	343	6.5	402.4	6.2	-2.5	-16.9	334.4	4
301.5	3.5	317.8	5.7	439.6	6.1	-5.1	-31.4	301.5	3.5
1771.8	17.4	1927.7	14.4	2100.1	11	-8.1	-15.6		
233.3	2.8	283.4	5.5	720.7	9.7	-17.7	-67.6		
2064.5	21.8	2071.9	16.8	2079.7	12.9	-0.4	-0.7	2079.7	12.9
456.6	5.1	480.7	7.2	598.2	6.7	-5	-23.7	456.6	5.1
512.5	5.7	543.8	7.6	678.2	6.9	-5.8	-24.4	512.5	5.7
2249.1	21.5	2367.9	15.5	2472.4	11.6	-5	-9	2472.4	11.6
405.2	4.6	591.4	8.4	1391	11.1	-31.5	-70.9		
331.2	3.7	370.4	5.5	624	6.2	-10.6	-46.9	331.2	3.7
464.3	5.2	467.4	7.3	483	6	-0.7	-3.9	464.3	5.2
326.6	4.4	558.7	11	1668.1	17.5	-41.5	-80.4		
285	3.2	295.4	4.8	378.1	4.7	-3.5	-24.6	285	3.2
864.4	9.9	896.4	12.3	976.9	10.5	-3.6	-11.5	864.4	9.9
882.4	9.3	953.7	10.5	1122.7	8.6	-7.5	-21.4	882.4	9.3
645.2	6.9	699.1	8.8	876.8	7.7	-7.7	-26.4	645.2	6.9
261.1	3	388.7	6.4	1242.2	11.5	-32.8	-79		
428.3	5.5	564.9	10.8	1162.3	14.5	-24.2	-63.2		
2473.1	23.6	2528.6	16.1	2573.8	12.1	-2.2	-3.9	2573.8	12.1
229.2	2.6	278.6	4.6	718	7.7	-17.7	-68.1		
11042.9	214.3	6387.6	45.3	5023.8	18.9	72.9	119.8		
428.3	4.7	465	6.5	651.2	6.4	-7.9	-34.2	428.3	4.7
388	5	402.1	8.9	484.2	8.9	-3.5	-19.9	388	5
257.5	3.4	302	7.3	662	12	-14.7	-61.1	257.5	3.4
418.8	5.1	440.9	8.4	558.6	8.6	-5	-25	418.8	5.1
231	2.9	254.2	5.7	474	8.2	-9.1	-51.3	231	2.9
451.9	4.9	537.3	7.3	918.9	8.1	-15.9	-50.8		
851.7	9	878.7	10.2	947.9	8.1	-3.1	-10.2	851.7	9
412.6	4.5	448.3	6.4	636.8	6.4	-8	-35.2	412.6	4.5
10670.8	235	6292.9	50.2	4991.8	20.7	69.6	113.8		
277.6	3.6	314.5	7.3	598.5	10.6	-11.7	-53.6	277.6	3.6
479.8	5.6	567.9	9.1	939.2	10.4	-15.5	-48.9		
242.6	3	317	6.5	908.3	12	-23.5	-73.3		

e

input: 85-88.csv
n samples: 150
concordant to +5/-15%: 42 (28.0%)
cut-off at 1100 Ma (31 younger | 11 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	0.5	NaN	0	0.88624	0.14358		728.7393	9.85363	6.04712
G002	74.9	7.4	0.6746	0.15513	0.00366	1.80029	0.04053	0.08425	0.00144
G003	0	NaN	49.7848	0.73089	0.13116			36.37837	36.75989
G004	0	NaN	Inf	0.79243	0.03398	Inf	NaN	Inf	NaN
G005	1343.7	NaN	0.1082	0.76538	0.02684	52.35778	1.87582	0.49666	0.01983
G006	0	NaN	5.1053	0.42589	0.1018	304.1436	146.7729	5.18492	2.45647
G007	175.8	17.7	0.9109	0.14297	0.00294	1.60161	0.0322	0.08134	0.00127
G008	159.1	24.5	2.4211	0.09544	0.00177	1.23468	0.02333	0.09392	0.00134
G009	0	NaN	NaN	0.77285	0.24904	Inf	NaN	Inf	NaN
G010	1073.8	94.8	1.1686	0.2957	0.02786	2.88339	0.22392	0.0708	0.00439
G011	19.7	6.4	0.3644	0.11905	0.00249	5.01926	0.10744	0.30613	0.005
G012	490.1	58.2	0.1764	0.06419	0.00086	1.07892	0.01595	0.12204	0.00156
G013	432.5	60.1	0.357	0.09285	0.00129	1.68056	0.02538	0.13143	0.00171
G014	0	NaN	-3.1237	0.67182	0.10477			-30.7138	15.80848
G015	0	NaN	NaN	0.29986	0.41643	Inf	NaN	Inf	NaN
G016	15.8	0.4	0.1971	0.70923	0.01625	18.46602	0.37576	0.18906	0.00424
G017	0	NaN	-Inf	0.68816	0.12284	Inf	NaN	Inf	NaN
G018	82.8	5.3	0.094	0.06216	0.00169	0.57585	0.0154	0.06727	0.00105
G019	3.4	17.2	13.4251	0.82298	0.01442	256.5526	7.18533	2.26373	0.06511
G020	108.9	NaN	0.1114	0.8908	0.01969	382.5991	16.48959	3.11891	0.13857
G021	157.1	22.9	0.5324	0.09129	0.00158	1.6557	0.02973	0.13171	0.00183
G022	1524.5	94.8	0.1507	0.09359	0.0012	0.79479	0.01134	0.06167	0.00078
G023	0	NaN	NaN	0.43173	0.32541	Inf	NaN	Inf	NaN
G024	0	NaN	3.3205	0.81309	0.03373			67.9991	25.80945
G025	689.1	2.6	1.0867	0.18653	0.00681	0.07626	0.00242	0.00297	7.00E-05
G026	827.5	45.9	1.0609	0.09934	0.00136	0.60358	0.00899	0.04413	0.00057
G027	511.8	67.1	1.7019	0.07318	0.00105	0.93559	0.01451	0.09285	0.0012
G028	81.3	10.7	0.4911	0.06342	0.00132	1.07975	0.02282	0.12364	0.00176
G029	0	NaN	1.1872	0.86745	0.01978			58.192	10.35585
G030	0	NaN	-Inf	4.34323	11.32664	Inf	NaN	Inf	NaN
G031	0	NaN	Inf	0.84035	0.11032	Inf	NaN	Inf	NaN
G032	-17.2	NaN	1.3904	0.93691	0.2358	995.7773	279.2651	7.71921	2.65406
G033	122.6	6.1	0.1277	0.28746	0.00578	1.81175	0.03368	0.04578	0.00076
G034	1173.3	88.6	1.0007	0.05892	0.00079	0.50235	0.00742	0.06193	0.00078
G035	90.6	29.3	0.6254	0.13819	0.00198	5.37313	0.08336	0.28241	0.00382
G036	2147.1	NaN	1.9503	0.55642	0.01408	14.9599	0.33664	0.19528	0.00463
G037	0	NaN	-2.757	2.32951	1.84822			3.79167	4.58846
G038	4669	385.5	3.2068	0.09047	0.00117	0.57742	0.00825	0.04636	0.00059
G039	1279.2	NaN	1.3425	0.55085	0.00652	4.83272	0.06451	0.06373	8.00E-04
G040	1.5	0.2	0.4635	0.18172	0.02805	2.56776	0.36077	0.10264	0.00796
G041	142.3	NaN	7.3043	0.86709	0.0403	215.6762	16.60341	1.80681	0.14714
G042	868.4	50.2	1.3116	0.06137	0.00093	0.37174	0.00598	0.044	0.00057
G043	2262.8	156.6	0.1934	0.10111	0.00123	0.946	0.01298	0.06796	0.00085
G044	349.2	143.7	1.1465	0.11254	0.00139	4.94324	0.06865	0.31909	0.00404
G045	477.3	NaN	1.7614	0.0924	0.00186	0.50313	0.01006	0.03956	0.00057
G046	95.6	6.1	0.3964	0.06353	0.00174	0.5422	0.01459	0.062	0.00096
G047	645.7	53.8	0.6324	0.07331	0.00102	0.79155	0.01197	0.07844	0.001
G048	221.2	16.6	0.5943	0.07361	0.00158	0.68036	0.01461	0.06714	0.00097

G049	172.9	6.6	0.7083	0.08856	0.00248	0.39878	0.01071	0.03271	0.00054
G050	571.4	NaN	0.7026	0.90219	0.04236	224.4793	16.93157	1.8076	0.14588
G051	124.1	7.7	2.7895	0.40699	0.00843	2.65268	0.04873	0.04735	0.00084
G052	45.8	18	0.5617	0.12137	0.00201	5.80898	0.10153	0.3477	0.005
G053	135.5	7	1.1758	0.07336	0.00202	0.40845	0.01092	0.04045	0.00064
G054	1169.3	192.8	0.2964	0.15265	0.00186	3.28602	0.04486	0.15639	0.00196
G055	136.9	9.7	0.4468	0.07536	0.00195	0.68743	0.01738	0.06627	0.00104
G056	483.7	32.2	0.2013	0.06829	0.00116	0.63163	0.01114	0.06719	9.00E-04
G057	702.9	33.7	0.6887	0.12404	0.00183	0.69889	0.01086	0.04094	0.00054
G058	409.3	32.6	0.6595	0.0782	0.00123	0.76031	0.01253	0.07064	0.00093
G059	181.8	11.2	0.8047	0.10219	0.0021	0.73087	0.01484	0.05196	0.00076
G060	0	NaN	Inf	0.83351	0.01745	Inf	NaN	Inf	NaN
G061	435.4	22.9	1.5487	0.05545	0.00111	0.29003	0.00587	0.038	0.00052
G062	634.9	45.7	0.8251	0.13948	0.00194	1.13286	0.01684	0.05901	0.00077
G063	1242.2	123.1	0.0988	0.07246	0.00103	1.02749	0.01569	0.10304	0.00132
G064	0	NaN	-Inf	0.87352	0.15109	Inf	NaN	Inf	NaN
G065	-5.4	NaN	0	-1.16551	1.5374	54.44883	47.16052	-0.33945	0.47884
G066	528.5	50.9	0.256	0.06463	0.00097	0.85926	0.0137	0.0966	0.00125
G067	0	NaN	Inf	-0.60267	0.10132	#NAME?	NaN	Inf	NaN
G068	469.9	23.8	0.8706	0.05355	0.00103	0.31364	0.00617	0.04256	0.00057
G069	57.1	6.3	1.1047	0.15638	0.00367	1.86516	0.04163	0.08667	0.00146
G070	124.6	6.3	0.7311	0.05731	0.0018	0.34806	0.01064	0.04413	0.00071
G071	2964.2	419.3	0.0061	0.61124	0.01011	25.22024	0.42187	0.29983	0.00498
G072	632.9	25.8	0.601	0.06054	0.00108	0.30606	0.00562	0.03674	0.00049
G073	414.7	NaN	1.6953	0.14065	0.00255	0.50347	0.00905	0.02601	0.00037
G074	1.5	NaN	0.2023	0.8341	0.01534	514.9486	19.54045	4.48638	0.17234
G075	0	NaN	-2.85	1.88033	1.69015		274.1621	-2.07381	1.94588
G076	577.3	124.5	1.3469	0.09038	0.0012	2.00383	0.02905	0.16112	0.00204
G077	550.2	44.8	0.3256	0.11012	0.00158	1.1513	0.0176	0.07598	0.00098
G078	226.1	86.1	0.2785	0.12115	0.0016	6.03632	0.08759	0.3621	0.00463
G079	5334.9	2802.6	0.1332	0.1752	0.01466	6.45201	0.53447	0.26763	0.00733
G080	695	14.3	0.8167	0.05016	0.00117	0.12247	0.00285	0.01774	0.00025
G081	484.7	36.9	0.2375	0.06937	0.00109	0.72444	0.01194	0.0759	0.00099
G082	449.2	35.7	1.408	0.05498	0.00097	0.44599	0.00811	0.05896	0.00078
G083	509.8	53.1	0.7576	0.14471	0.00202	1.70668	0.02541	0.08571	0.0011
G084	2	NaN	-7.7617	0.66172	0.0365			138.0987	61.95247
G085	245.8	77.3	1.079	0.11211	0.00154	3.9568	0.05896	0.25652	0.0033
G086	325.1	24.7	1.0968	0.11755	0.00231	0.96161	0.01868	0.05946	0.00086
G087	406.9	33.7	0.9041	0.06894	0.00114	0.65541	0.01129	0.06909	0.00091
G088	634.9	39.8	0.0429	0.05711	9.00E-04	0.53031	0.00882	0.06749	0.00087
G089	468.4	34.7	0.6537	0.05939	0.001	0.53984	0.00946	0.06607	0.00087
G090	666.4	88.3	0.6455	0.06723	0.00095	1.09568	0.01667	0.11846	0.0015
G091	264.5	131.9	0.5231	0.15915	0.00209	9.64095	0.1389	0.4403	0.0056
G092	731.9	6.6	0.587	0.10341	0.00436	0.1126	0.00435	0.00791	0.00017
G093	299	38.3	1.0162	0.06866	0.00113	0.99132	0.01703	0.10495	0.00138
G094	2184	94.9	0.4452	0.1273	0.00184	0.68198	0.01038	0.03894	5.00E-04
G095	246.8	23.4	0.6534	0.18675	0.0046	2.0562	0.04712	0.08003	0.00143
G096	95.1	NaN	1.3367	0.29709	0.00641	2.00474	0.03936	0.04905	0.00084
G097	853.1	NaN	0.2235	0.78543	0.02338	61.59912	1.94977	0.57009	0.01963
G098	108.4	63.8	3.0594	0.11897	0.00179	5.2563	0.08401	0.32116	0.00428
G099	466	96.7	1.1735	0.07954	0.00113	1.76091	0.02679	0.16094	0.00205
G100	1306.8	268.1	0.5682	0.13075	0.0017	3.43495	0.0489	0.19097	0.00238
G101	1024.5	76.2	0.4357	0.06634	0.00096	0.6421	0.00991	0.07036	0.00089
G102	-99.5	34232456	0.2607	0.98738	0.07458		47.75314	-1.95144	0.36597
G103	2.5	NaN	0.5042	0.85882	0.03717			42.31236	13.46781

G104	603.9	28.2	0.9274	0.07231	0.00129	0.38262	0.00695	0.03847	0.00051
G105	0	NaN	NaN	-1.54821	7.82713	Inf	NaN	#NAME?	NaN
G106	1312.2	NaN	0.9884	0.73655	0.02432	61.97376	2.21162	0.61168	0.02367
G107	356.1	43.8	0.1947	0.07104	0.00109	1.21229	0.01958	0.12407	0.0016
G108	144.3	62	1.0683	0.12294	0.00178	5.77298	0.08949	0.34138	0.00446
G109	107.9	53.8	0.6463	0.15195	0.00219	8.92774	0.13777	0.42715	0.00562
G110	735.4	54.4	0.3898	0.08434	0.00127	0.80596	0.01275	0.06947	0.00089
G111	211.8	18.6	0.8481	0.08268	0.0016	0.8484	0.0165	0.0746	0.00103
G112	668.4	51.1	0.7846	0.06631	0.00106	0.59851	0.00997	0.06562	0.00085
G113	285.7	21.5	1.0203	0.07913	0.0015	0.66091	0.01264	0.06073	0.00083
G114	287.2	93.3	0.7765	0.11315	0.00161	4.30564	0.06529	0.27666	0.00354
G115	917.6	90.4	0.6023	0.195	0.00271	2.25821	0.0334	0.0842	0.00107
G116	327.6	40.3	0.5513	0.0662	0.00109	1.02762	0.0175	0.11285	0.00147
G117	-1.5	NaN	0.4224	-0.56858	0.46885		839.4007	11.66624	8.25183
G118	156.1	7.9	0.7635	0.08914	0.00227	0.52994	0.01304	0.04323	0.00067
G119	1053.1	52.2	0.4237	0.08086	0.00126	0.52765	0.00858	0.04745	0.00061
G120	319.7	30.6	1.1555	0.09373	0.00178	0.9501	0.01807	0.0737	0.00102
G121	1.5	NaN	17.7792	0.88132	0.02788			906.8193	907.1454
G122	592.1	NaN	3.1661	0.55301	0.02841	24.17204	1.1289	0.31782	0.01589
G123	1627.9	137	0.3687	0.09799	0.0014	1.05686	0.01598	0.07843	0.00099
G124	0.5	NaN	2.5427	1.12852	0.20969			24.08607	17.47896
G125	1	NaN	-0.0245	-7.31963	4.20001	55.57022	35.69532	-0.0552	0.03564
G126	405.9	23.6	0.6632	0.20264	0.00429	1.37156	0.02738	0.04922	0.00078
G127	7.4	NaN	0.3282	0.49012	0.01014	78.85605	2.00777	1.16993	0.02894
G128	1263.4	400.1	0.3705	0.35619	0.0176	14.27364	0.65984	0.29139	0.01163
G129	40.9	NaN	0	0.3188	0.29721	96.92836	123.7059	2.21089	2.46242
G130	829.5	71.9	1.1569	0.08452	0.00131	0.78789	0.0127	0.06779	0.00087
G131	441.3	23	1.3046	0.05167	0.00107	0.2802	0.00584	0.03943	0.00053
G132	958.5	61.2	0.5759	0.06137	0.00097	0.50032	0.00824	0.05928	0.00076
G133	0	NaN	NaN	0.65336	0.21323	Inf	NaN	Inf	NaN
G134	478.8	46.3	0.7503	0.20147	0.00303	2.18102	0.034	0.07872	0.00102
G135	317.7	NaN	0.3301	0.6901	0.02633	121.8682	6.47631	1.28422	0.07136
G136	128.1	45.3	1.4929	0.09738	0.00169	3.42108	0.06097	0.25547	0.00349
G137	0	NaN	NaN	2.20558	1.02808	Inf	NaN	Inf	NaN
G138	395.5	30	0.488	0.05549	0.00102	0.54434	0.01018	0.07133	0.00094
G139	0	NaN	0	-0.30124	1.02665	33.07587	111.0793	-0.79851	1.53523
G140	0.5	NaN	1.8663	0.82496	0.02173	672.8579	45.14252	5.93157	0.40245
G141	984.1	50.3	0.0763	0.10168	0.00169	0.71476	0.01215	0.05112	0.00067
G142	1362.9	102.5	0.4825	0.06668	0.00103	0.6393	0.01027	0.06972	0.00089
G143	153.2	23	1.0663	0.06661	0.00134	1.1091	0.02244	0.12109	0.00167
G144	-5349.2	-562.9	0.0299	0.64144	0.02813	34.00086	1.4145	0.38551	0.01741
G145	0	NaN	NaN	0.27075	0.24722	Inf	NaN	Inf	NaN
G146	1	NaN	1.2818	0.19371	0.23108	454.6078	584.2694	17.06877	8.89321
G147	1123	97.2	0.315	0.21263	0.00362	2.25308	0.03827	0.07707	0.00106
G148	540.8	167.5	0.42	0.11118	0.00171	4.4241	0.07095	0.28941	0.00373
G149	1781.1	205.9	0.7203	0.08694	0.00129	1.28161	0.01994	0.10722	0.00135
G150	-3	NaN	0	1.11716	2.85341		428.6447	-1.90376	4.80683

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
15371.5	3591.6	NA	643.9	5067.1	163.4	NA	203.4		
521.4	8.6	1045.6	19	2403.3	21.7	-50.1	-78.3		
23343.1	6339.7	NA	1041.8	4792.7	180.6	NA	387.1		
Inf	NaN	Inf	NaN	4908.2	43.2	NaN	Inf		
2599.4	85.4	4038.2	52.9	4858.6	35.3	-35.6	-46.5		
11746.1	2560.3	5808.8	537.1	4003.1	238	102.2	193.4		
504.1	7.6	970.8	16.1	2263.5	18.6	-48.1	-77.7		
578.7	7.9	816.5	13.1	1536.8	14.7	-29.1	-62.3		
Inf	NaN	Inf	NaN	4872.5	324.5	NaN	Inf		
441	26.4	1377.6	85.1	3447.8	92.5	-68	-87.2		
1721.6	24.7	1822.6	22.5	1942	18.1	-5.5	-11.3	1942	18.1
742.3	9	743.1	9.8	747.9	7.1	-0.1	-0.7	742.3	9
796	9.7	1001.2	12.1	1484.8	10.8	-20.5	-46.4		
NaN	-3429.7	NA	546.3	4671.6	156.8	NaN	NaN		
Inf	NaN	Inf	NaN	3469.5	1363.8	NaN	Inf		
1116.3	23	3014.3	30.9	4749.5	23	-63	-76.5		
Inf	NaN	Inf	NaN	4706.2	179.5	NaN	Inf		
419.7	6.3	461.8	11.6	679.6	13.5	-9.1	-38.2	419.7	6.3
7625.3	128.6	5636.6	34.1	4962	17.7	35.3	53.7		
9125.5	216.9	6041.1	50.3	5074.3	22.3	51.1	79.8		
797.6	10.4	991.7	14.1	1452.7	13.4	-19.6	-45.1		
385.8	4.7	593.9	8.1	1499.9	10	-35	-74.3		
Inf	NaN	Inf	NaN	4023.4	750.8	NaN	Inf		
27294.7	2411.3	NA	387.6	4944.8	41.8	NA	452		
19.1	0.4	74.6	3.1	2711.8	34.5	-74.4	-99.3		
278.4	3.5	479.5	7.2	1611.8	11.1	-41.9	-82.7		
572.4	7.1	670.6	9.5	1018.9	9.2	-14.6	-43.8	572.4	7.1
751.5	10.1	743.5	13.3	722.3	10.8	1.1	4	751.5	10.1
26306.4	1127.8	NA	182.1	5036.7	23	NA	422.3		
Inf	NaN	Inf	NaN	7233.6	2645.9	NaN	Inf		
Inf	NaN	Inf	NaN	4991.7	132.3	NaN	Inf		
13959.9	1962.2	7010.7	432.2	5145.6	253.9	99.1	171.3		
288.6	4.7	1049.7	17.1	3403.9	19.7	-72.5	-91.5		
387.4	4.7	413.3	6.3	564.1	5.8	-6.3	-31.3	387.4	4.7
1603.5	19.2	1880.6	16.9	2204.6	12.9	-14.7	-27.3		
1149.9	25	2812.7	33	4398.1	25.4	-59.1	-73.9		
10100.8	6173	NA	1468.1	6401	804.1	NA	57.8		
292.1	3.6	462.8	6.8	1435.5	9.9	-36.9	-79.6		
398.3	4.8	1790.6	14.5	4383.4	11.9	-77.8	-90.9		
629.9	46.5	1291.5	126.3	2668.6	145.4	-51.2	-76.4		
6653	337.9	5461.1	94.8	5036.1	46.9	21.8	32.1		
277.6	3.5	320.9	5.5	652.2	7.3	-13.5	-57.4	277.6	3.5
423.9	5.1	676	8.6	1644.6	9.9	-37.3	-74.2		
1785.3	19.7	1809.7	14.9	1840.8	10.5	-1.3	-3	1840.8	10.5
250.1	3.5	413.8	8.4	1475.6	15.7	-39.6	-83.1		
387.8	5.8	439.9	11.2	726	14.2	-11.8	-46.6	387.8	5.8
486.8	6	592.1	8.5	1022.5	9	-17.8	-52.4		
418.9	5.9	527	10.6	1030.8	13.9	-20.5	-59.4		

207.5	3.4	340.8	9.4	1394.7	21.2	-39.1	-85.1		
6654.8	334.9	5501.6	94.4	5092.3	47.4	21	30.7		
298.2	5.2	1315.4	20.1	3935.1	20.6	-77.3	-92.4		
1923.6	23.9	1947.8	19	1976.5	14.4	-1.2	-2.7	1976.5	14.4
255.6	4	347.8	9.4	1023.9	17.8	-26.5	-75		
936.7	10.9	1477.7	13.6	2375.8	11.2	-36.6	-60.6		
413.6	6.3	531.3	12.5	1078.1	17.2	-22.1	-61.6		
419.2	5.4	497.1	8.5	877.4	10	-15.7	-52.2		
258.7	3.3	538.1	8.3	2015.1	12.9	-51.9	-87.2		
440	5.6	574.2	9	1152	10.8	-23.4	-61.8		
326.5	4.7	557.1	10.8	1664.3	16.8	-41.4	-80.4		
Inf	NaN	Inf	NaN	4980.1	21.1	NaN	Inf		
240.4	3.2	258.6	5.5	430.4	7	-7	-44.1	240.4	3.2
369.6	4.7	769.1	10.3	2220.8	12.5	-51.9	-83.4		
632.2	7.7	717.7	9.9	998.9	9	-11.9	-36.7	632.2	7.7
Inf	NaN	Inf	NaN	5046.6	174.4	NaN	Inf		
-2673.2	4673.1	4077.2	1925.7	NaN	NaN	-165.6	NaN		
594.5	7.3	629.7	9.3	762.3	8	-5.6	-22	594.5	7.3
Inf	NaN	NaN	NaN	NaN	NaN	NaN	NaN		
268.7	3.5	277	5.7	352.2	5.7	-3	-23.7	268.7	3.5
535.8	8.7	1068.8	19.1	2416.9	21.6	-49.9	-77.8		
278.4	4.4	303.3	9.3	503.5	12.5	-8.2	-44.7	278.4	4.4
1690.5	24.7	3316.8	22.9	4534.9	16.6	-49	-62.7		
232.6	3	271.1	5.3	622.9	8.3	-14.2	-62.7	232.6	3
165.5	2.3	414	7.8	2235.2	16.4	-60	-92.6		
10973.5	202.5	6342.1	43.2	4981.1	18.5	73	120.3		
NaN	-11681.7	NA	1321.8	6110.4	910.5	NaN	NaN		
963	11.3	1116.8	12.4	1433.6	10.2	-13.8	-32.8	963	11.3
472.1	5.9	777.9	10.5	1801.4	12.1	-39.3	-73.8		
1992.1	21.9	1981.1	16	1973.2	11.5	0.6	1	1973.2	11.5
1528.8	37.3	2039.4	77.4	2607.9	78.5	-25	-41.4		
113.4	1.6	117.3	3	202.4	4.3	-3.4	-44	113.4	1.6
471.6	5.9	553.3	8.7	909.8	9.4	-14.8	-48.2	471.6	5.9
369.3	4.7	374.5	6.9	411.4	6	-1.4	-10.2	369.3	4.7
530.1	6.5	1011	12.1	2284.3	12.7	-47.6	-76.8		
31814.2	2871.1	NA	458.9	4649.7	55.4	NA	584.2		
1472	16.9	1625.4	15.3	1833.9	11.7	-9.4	-19.7		
372.3	5.2	684.1	12.2	1919.3	16.9	-45.6	-80.6		
430.7	5.5	511.8	8.5	896.9	9.8	-15.9	-52		
421	5.3	432	7.2	495.8	6.2	-2.5	-15.1	421	5.3
412.4	5.3	438.3	7.6	581.4	7.5	-5.9	-29.1	412.4	5.3
721.7	8.6	751.3	10.1	844.9	8.1	-3.9	-14.6	721.7	8.6
2352	25.1	2401.1	16.8	2446.7	12.1	-2	-3.9	2446.7	12.1
50.8	1.1	108.3	4.9	1686.2	34.7	-53.1	-97		
643.4	8.1	699.4	10.7	888.5	9.7	-8	-27.6	643.4	8.1
246.3	3.1	528	8	2061	12.7	-53.4	-88.1		
496.3	8.5	1134.4	20.8	2713.7	23.3	-56.2	-81.7		
308.7	5.2	1117.1	18.7	3455.1	21.2	-72.4	-91.1		
2908.2	80.6	4200.4	45.5	4895.5	30	-30.8	-40.6		
1795.4	20.9	1861.8	17.2	1940.8	13	-3.6	-7.5	1940.8	13
962	11.4	1031.2	12.4	1185.6	9.9	-6.7	-18.9	962	11.4
1126.6	12.9	1512.4	14.2	2108.1	11.5	-25.5	-46.6		
438.3	5.4	503.6	7.6	817.1	8.1	-13	-46.4	438.3	5.4
NaN	-2479.6	NA	206.1	5219.5	76.2	NaN	NaN		
24292.9	2004.5	NA	326.1	5022.6	43.6	NA	383.7		

243.3	3.2	329	6.3	994.7	11.3	-26	-75.5		
NaN	NaN	Inf	NaN	NaN	NaN	NaN	NaN		
3076.7	94.7	4206.4	50.8	4803.7	33.2	-26.9	-36		
753.9	9.2	806.2	11.2	958.6	9.5	-6.5	-21.3	753.9	9.2
1893.3	21.4	1942.4	16.9	1999.3	12.6	-2.5	-5.3	1999.3	12.6
2292.9	25.4	2330.6	17.8	2368	13.2	-1.6	-3.2	2368	13.2
433	5.4	600.2	9	1300.4	11	-27.9	-66.7		
463.8	6.2	623.8	11.1	1261.7	14	-25.6	-63.2		
409.7	5.1	476.3	7.8	816.2	9	-14	-49.8	409.7	5.1
380.1	5	515.2	9.5	1175.4	13.2	-26.2	-67.7		
1574.5	17.9	1694.4	15.8	1850.6	12.1	-7.1	-14.9	1850.6	12.1
521.1	6.4	1199.3	13.3	2784.8	13.2	-56.5	-81.3		
689.3	8.5	717.7	10.8	812.7	9.2	-4	-15.2	689.3	8.5
16367.1	4199.7	NA	1104.3	NaN	NaN	NA	NaN		
272.8	4.1	431.8	10.5	1407.2	19.4	-36.8	-80.6		
298.8	3.8	430.2	7.1	1218	11.1	-30.5	-75.5		
458.4	6.1	678.2	11.6	1502.7	14.9	-32.4	-69.5		
43906.8	6441.6	NA	1016.2	5059.2	31.9	NA	767.9		
1779.1	77.7	3275.4	69.9	4389.1	51.5	-45.7	-59.5		
486.7	5.9	732.3	10	1586.2	11.5	-33.5	-69.3		
20772.4	4491.6	NA	760.4	5406.7	187.7	NA	284.2		
-366	243.2	4097.6	861.6	NaN	NaN	-108.9	NaN		
309.7	4.8	876.8	15.5	2847.6	20.2	-64.7	-89.1		
4994	86	4447.6	32.3	4211.8	20.7	12.3	18.6		
1648.5	58.1	2768.1	60.3	3733.7	48.9	-40.4	-55.8		
7520.1	4943.7	4654.8	1459.8	3564.1	918.3	61.6	111		
422.8	5.3	590	9	1304.5	11.4	-28.3	-67.6		
249.3	3.3	250.8	5.5	270.8	4.9	-0.6	-8	249.3	3.3
371.2	4.6	411.9	6.9	652.2	7.6	-9.9	-43.1	371.2	4.6
Inf	NaN	Inf	NaN	4631.4	327.9	NaN	Inf		
488.5	6.1	1175	13.8	2838.1	14.3	-58.4	-82.8		
5324.9	201.4	4885.1	67.9	4710.2	38.4	9	13		
1466.6	17.9	1509.2	17.4	1574.5	13.9	-2.8	-6.9	1574.5	13.9
Inf	NaN	Inf	NaN	6327.1	472.4	NaN	Inf		
444.2	5.7	441.3	8.1	432	6.5	0.7	2.8	444.2	5.7
-10327.3	49117.7	3582.9	3856.9	NaN	NaN	-388.2	NaN		
12480.8	374.3	6613.2	73.8	4965.5	26.5	88.7	151.4		
321.4	4.1	547.6	9	1655	13.6	-41.3	-80.6		
434.5	5.4	501.9	7.9	827.8	8.7	-13.4	-47.5	434.5	5.4
736.8	9.6	757.7	13	825.6	11.4	-2.8	-10.8	736.8	9.6
2102	81	3610.1	62.1	4604.8	44.1	-41.8	-54.4		
Inf	NaN	Inf	NaN	3310.4	891.6	NaN	Inf		
18657.1	3172.8	6215.8	1318.9	2773.9	1132.4	200.2	572.6		
478.6	6.3	1197.7	15.4	2925.7	16.3	-60	-83.6		
1638.6	18.6	1716.9	16.6	1818.8	13	-4.6	-9.9	1818.8	13
656.6	7.9	837.6	11.1	1359.2	11.1	-21.6	-51.7		
NaN	-34286.6	NA	3659.2	5392.6	2580.6	NaN	NaN		

e

input: 89-92.csv
n samples: 150
concordant to +5/-15%: 70 (46.7%)
cut-off at 1100 Ma (60 younger | 10 older)

	concentrations:			ratios:					
sample	ppm U	ppm Pb	atomic Th/U	Pb207/Pb2	1 sigma 67	Pb207/U23	1 sigma 75	Pb206/U23	1 sigma 68
G001	113.5	6.2	0.9379	0.12705	0.00354	0.76247	0.0197	0.04354	0.00077
G002	1832.7	99.4	0.8905	0.07667	0.00097	0.48022	0.00654	0.04544	0.00055
G003	116.1	42.1	1.2699	0.11422	0.00157	4.30893	0.06297	0.27368	0.00349
G004	213.9	33.2	0.4041	0.07253	0.00107	1.48229	0.02283	0.14827	0.00187
G005	326.3	20.4	0.4972	0.09248	0.00149	0.72246	0.01184	0.05668	0.00074
G006	384.3	46.6	0.486	0.09794	0.00155	1.49451	0.02418	0.1107	0.00145
G007	243.1	28.3	0.3816	0.06642	0.00118	1.01672	0.01838	0.11106	0.00147
G008	487.8	18.4	0.6442	0.05245	0.00128	0.24453	0.00586	0.03382	0.00048
G009	364.4	25.4	0.6864	0.05544	0.00096	0.47353	0.00834	0.06196	8.00E-04
G010	2022.5	130.9	0.1944	0.07093	0.00087	0.64674	0.00865	0.06615	8.00E-04
G011	278.7	10	0.4584	0.05637	0.00132	0.26325	0.00607	0.03388	0.00047
G012	834	53.7	0.5493	0.08349	0.00113	0.6766	0.00967	0.05879	0.00073
G013	305.9	70.2	1.5605	0.07894	0.00112	1.78827	0.02674	0.16435	0.00206
G014	465.4	60.7	0.1384	0.08933	0.00116	1.65938	0.02307	0.13476	0.00166
G015	619.6	31.3	0.7378	0.07117	0.0012	0.43533	0.00747	0.04437	0.00058
G016	34	NaN	2.1792	0.42277	0.01429	2.60186	0.06915	0.04465	0.00119
G017	547.4	84.8	0.115	0.08433	0.00106	1.87041	0.02552	0.1609	0.00197
G018	50.7	2.9	0.3458	0.06886	0.00251	0.51375	0.01791	0.05413	0.00097
G019	933.8	119.4	1.0692	0.12602	0.0017	2.01581	0.02882	0.11604	0.00146
G020	1339.1	83.1	0.0115	0.09117	0.00148	0.80789	0.01333	0.06428	0.00084
G021	145.4	7.1	0.8985	0.07499	0.00245	0.4242	0.01316	0.04104	0.00071
G022	1390.3	64.7	0.5244	0.05276	0.00073	0.31589	0.00464	0.04343	0.00053
G023	32.4	1.2	0.296	0.29217	0.01254	1.38853	0.04843	0.03448	0.00104
G024	629.5	54	0.271	0.06014	0.00084	0.71604	0.01058	0.08638	0.00107
G025	181.4	NaN	0.7374	0.95806	0.10497	79.67462	9.54856	0.60331	0.08365
G026	1330.7	113.5	1.1082	0.06644	0.00085	0.6249	0.00866	0.06824	0.00083
G027	409.4	28.1	0.587	0.06493	0.00124	0.56178	0.01079	0.06276	0.00084
G028	880	97.6	0.0771	0.0808	0.00106	1.29994	0.01829	0.11672	0.00144
G029	362.9	26.4	0.7776	0.0636	0.00113	0.55082	0.00994	0.06283	0.00082
G030	909.8	45.8	0.1394	0.0533	0.00078	0.38726	0.00594	0.05271	0.00066
G031	12.5	0.4	0.2546	0.68781	0.01751	18.94789	0.42052	0.19985	0.00492
G032	401	20	0.752	0.07207	0.00127	0.42704	0.00761	0.04298	0.00057
G033	333.6	20.7	1.0584	0.14178	0.00219	0.95305	0.01493	0.04876	0.00064
G034	171	33.6	0.7803	0.11394	0.00208	2.54341	0.04658	0.16193	0.00231
G035	212.3	30.7	0.4076	0.07691	0.00131	1.45663	0.02543	0.13739	0.00183
G036	475.3	39.4	1.0603	0.09715	0.00141	0.89165	0.01354	0.06658	0.00085
G037	305.4	17.2	0.9214	0.05446	0.00107	0.35145	0.00694	0.04682	0.00062
G038	535.4	178.4	0.3109	0.13748	0.00166	6.12511	0.0814	0.32321	0.00395
G039	324.2	24.5	0.8434	0.05727	0.001	0.50331	0.00896	0.06376	0.00083
G040	189.3	30.9	0.6615	0.08815	0.0013	1.77224	0.0275	0.14586	0.00187
G041	201.8	14	1.1401	0.0547	0.0012	0.41049	0.00899	0.05445	0.00075
G042	263.5	28	2.2687	0.06407	0.00114	0.58968	0.0107	0.06677	0.00088
G043	575.2	36	0.502	0.05969	0.00093	0.47813	0.00773	0.05811	0.00074
G044	174.1	19.1	1.1323	0.22515	0.00347	2.63055	0.04082	0.08476	0.00116
G045	657.2	59.5	1.2824	0.06609	0.00103	0.63329	0.01025	0.06952	0.00089
G046	361.8	16.4	0.5534	0.07308	0.0014	0.41431	0.00795	0.04113	0.00056
G047	361.3	18.7	0.7545	0.07811	0.00136	0.47953	0.00848	0.04454	0.00059
G048	416.7	89.8	0.4592	0.09794	0.00127	2.67557	0.03767	0.19818	0.00247

G049	244.7	13.5	1.0063	0.0795	0.00158	0.48618	0.00957	0.04437	0.00062
G050	1032.7	40.9	0.5332	0.06467	0.00098	0.33125	0.00526	0.03716	0.00047
G051	442.3	21.6	0.4618	0.06474	0.00112	0.40867	0.00724	0.04579	6.00E-04
G052	744	53.6	0.6734	0.08346	0.00129	0.73162	0.01172	0.06359	0.00082
G053	1371.5	47.4	0.2137	0.07697	0.00108	0.36359	0.00542	0.03427	0.00043
G054	3.7	0.1	0.178	0.71552	0.04452	10.42365	0.46727	0.10568	0.0058
G055	477.9	132.8	0.4441	0.10659	0.00135	3.80202	0.0525	0.25876	0.0032
G056	540.6	NaN	2.5385	0.79634	0.01041	48.16291	0.68541	0.43876	0.00594
G057	171.5	39.3	0.7491	0.10635	0.00157	2.95486	0.04587	0.20157	0.00263
G058	0.5	NaN	2.1388	0.85657	0.0275	361.5007	23.81234	3.06164	0.20836
G059	224.8	11.7	0.9437	0.06218	0.00134	0.37073	0.00796	0.04325	6.00E-04
G060	243.1	42.3	0.6378	0.07072	0.00105	1.51482	0.02376	0.1554	0.00199
G061	13.6	3.6	2.5445	0.22008	0.00737	4.90959	0.14948	0.16183	0.00398
G062	374.4	30.8	0.7483	0.06279	0.00103	0.61941	0.01056	0.07157	0.00093
G063	291.2	14.6	0.7595	0.05356	0.00113	0.32194	0.00683	0.0436	6.00E-04
G064	705.9	124.1	0.3841	0.11221	0.00143	2.64753	0.03684	0.17116	0.00212
G065	0	NaN	-17.2031	0.9471	0.05342				
G066	272.4	117.3	0.849	0.12645	0.00163	6.23392	0.0878	0.35765	0.00448
G067	243.1	36.6	0.7901	0.06777	0.00106	1.20459	0.01972	0.12895	0.00167
G068	274	10.9	0.3463	0.05532	0.00124	0.29768	0.00663	0.03904	0.00054
G069	811	51.8	0.4713	0.07437	0.00107	0.60764	0.0093	0.05927	0.00075
G070	89.9	-1.5	0.0613	1.12562	0.49071	9.14963	0.94735	0.05897	0.02536
G071	562.6	45.1	0.6475	0.06592	0.001	0.64727	0.01035	0.07123	0.00091
G072	341.4	15.5	0.7708	0.07852	0.00204	0.42402	0.01062	0.03918	0.00061
G073	466.4	30.2	0.1126	0.06222	0.00101	0.5832	0.00981	0.068	0.00088
G074	272.9	14.4	1.1011	0.14649	0.00295	0.8386	0.0163	0.04153	0.00062
G075	148	12.6	0.7106	0.05915	0.00165	0.61032	0.01664	0.07485	0.00117
G076	478.4	182.7	1.1023	0.16714	0.00217	7.37435	0.10466	0.32007	0.00403
G077	328.9	28	1.2585	0.06159	0.0011	0.5581	0.01023	0.06574	0.00087
G078	165.8	15.3	1.1788	0.07044	0.00142	0.70261	0.01421	0.07236	0.00101
G079	423	68	0.9348	0.09289	0.0014	1.7083	0.02713	0.13342	0.00174
G080	358.2	8.5	0.5876	0.0726	0.00189	0.21389	0.0054	0.02137	0.00033
G081	436.6	61.2	0.2422	0.07941	0.00114	1.53935	0.02366	0.14062	0.0018
G082	-1027.4	64.5	0.3243	2.02544	0.12373	-84.9818	2.3424	-0.30438	0.01826
G083	263	25.7	0.7322	0.06304	0.0011	0.75041	0.01353	0.08635	0.00115
G084	139.1	11.8	2.4412	0.0891	0.00278	0.63587	0.01887	0.05177	0.00092
G085	528.1	32.5	0.1939	0.06953	0.00114	0.59546	0.01014	0.06213	0.00081
G086	302.7	23.1	0.4903	0.06462	0.00115	0.63215	0.0115	0.07097	0.00095
G087	283.9	25.7	1.7928	0.07575	0.00142	0.6709	0.01277	0.06425	0.00088
G088	329.4	14.2	0.4909	0.06186	0.00131	0.34195	0.00722	0.0401	0.00056
G089	448.6	35.4	0.9999	0.0632	0.00107	0.56496	0.00992	0.06485	0.00085
G090	774.9	150.7	0.2183	0.10547	0.00141	2.84557	0.04133	0.19572	0.00246
G091	241	63.7	0.9458	0.10722	0.00155	3.26728	0.05052	0.22107	0.00287
G092	1002.9	162.6	0.574	0.07548	0.00103	1.55446	0.02294	0.14941	0.00188
G093	255.2	96.8	0.4319	0.15242	0.00217	7.5146	0.1153	0.35768	0.0047
G094	240.5	1.8	0.4024	0.67145	0.01942	1.31892	0.02844	0.01425	0.00035
G095	660.4	97.9	0.4101	0.07483	0.00107	1.46058	0.02238	0.14161	0.0018
G096	384.3	40.5	0.4889	0.07253	0.00117	0.97875	0.01651	0.0979	0.00129
G097	93.6	53.4	0.0323	0.31586	0.005	26.23951	0.4503	0.60267	0.00927
G098	146.9	21.8	1.1184	0.19191	0.00326	3.08101	0.05283	0.11647	0.00166
G099	854.9	41.5	0.5519	0.31431	0.00488	1.8452	0.02907	0.04259	0.00059
G100	99.9	8.3	0.7728	0.06559	0.00193	0.64468	0.01849	0.0713	0.00116
G101	142.7	84.7	1.1741	0.16602	0.00233	10.39157	0.15846	0.45408	0.00594
G102	510.8	23.2	0.4011	0.05495	0.00121	0.33136	0.00729	0.04374	0.00061
G103	227.4	125.1	0.7659	0.16508	0.00228	10.44763	0.15687	0.45915	0.00592

G104	110.3	28.1	0.6105	0.08623	0.00146	2.70834	0.04795	0.22787	0.00311
G105	28.8	3.1	0.6695	0.39038	0.011	5.43609	0.13184	0.10102	0.00231
G106	2.1	NaN	-0.1615	0.72745	0.31583	186.3868	137.9605	1.85881	1.43259
G107	221.2	31.3	0.2722	0.09258	0.00151	1.74685	0.02975	0.13688	0.00183
G108	918.7	57.6	0.1408	0.07049	0.00106	0.62553	0.01003	0.06438	0.00083
G109	319	43.7	0.5609	0.07889	0.00134	1.37598	0.02422	0.12654	0.0017
G110	40.3	15.5	0.5122	0.1454	0.00302	6.93875	0.14704	0.34622	0.00572
G111	1855.7	121.1	0.283	0.06141	0.00088	0.55039	0.00851	0.06502	0.00083
G112	126.5	5.6	0.2981	0.24842	0.00679	1.34219	0.03246	0.0392	0.00078
G113	1684.2	44.8	0.4498	0.15795	0.00241	0.4983	0.00796	0.02289	3.00E-04
G114	338.8	46.9	0.513	0.07885	0.00131	1.44521	0.02504	0.13297	0.00178
G115	427.2	173.6	0.665	0.1666	0.00238	8.235	0.12718	0.35861	0.00467
G116	328.9	24.9	0.5356	0.0593	0.00108	0.56992	0.01066	0.06972	0.00094
G117	153.7	68.5	0.4166	0.13936	0.00203	7.77483	0.12222	0.40473	0.00531
G118	569.4	198.9	0.4961	0.16043	0.00223	7.46166	0.11299	0.33743	0.00431
G119	669.3	45.5	0.8454	0.05709	0.00097	0.46093	0.00816	0.05858	0.00077
G120	401	25.9	0.4918	0.05877	0.00108	0.48929	0.00924	0.0604	0.00081
G121	14.1	1.9	2.6758	0.27088	0.01233	3.178	0.12289	0.08512	0.00273
G122	82.1	4.9	0.7922	0.06164	0.00202	0.42877	0.01365	0.05046	0.00085
G123	727.8	42.9	0.4492	0.07548	0.00121	0.57297	0.00968	0.05507	0.00072
G124	456.5	21	0.363	0.06742	0.00148	0.41332	0.00908	0.04448	0.00064
G125	406.3	151.1	0.8061	0.14508	0.00219	6.48041	0.10478	0.32406	0.00431
G126	1308.2	100.9	0.6149	0.07216	0.00109	0.70034	0.01135	0.07041	0.00091
G127	894.1	51.2	0.2639	0.05664	0.00094	0.4496	0.00787	0.05758	0.00076
G128	5.2	0.6	0.0453	0.53199	0.0244	10.0104	0.36971	0.13652	0.00533
G129	1026.9	62	0.1567	0.07088	0.0011	0.60462	0.01001	0.06189	0.00081
G130	305.9	-2.6	0.3224	0.70193	0.09683	20.07453	2.20426	0.20749	0.02689
G131	290.7	107.3	0.5339	0.1082	0.00161	4.92476	0.07885	0.33023	0.00431
G132	349.3	26.1	0.4155	0.06187	0.00112	0.6086	0.01142	0.07137	0.00096
G133	0.5	NaN	4.0165	5.19302	16.19627		811.8195	1.54301	4.92489
G134	588.2	49	0.7206	0.06548	0.00108	0.65763	0.01143	0.07286	0.00096
G135	588.2	92.8	0.0875	0.07457	0.00114	1.71168	0.02808	0.16654	0.00217
G136	353.5	24.2	0.1489	0.06788	0.00132	0.65193	0.01293	0.06968	0.00097
G137	1068.2	70.9	0.2387	0.0709	0.00113	0.65155	0.01103	0.06668	0.00088
G138	144.3	11.8	1.2097	0.05876	0.00148	0.51692	0.01292	0.06383	0.00096
G139	165.8	61.2	0.7241	0.10707	0.00168	4.6829	0.07873	0.31732	0.00424
G140	83.1	17	0.7228	0.07656	0.00152	1.8839	0.03835	0.17852	0.00256
G141	213.3	16.7	0.6008	0.05875	0.00123	0.58299	0.01241	0.07199	0.00102
G142	562.6	84.3	0.3792	0.08471	0.00132	1.72532	0.0287	0.14778	0.00194
G143	534.9	203.8	0.5976	0.11265	0.00169	5.21115	0.08424	0.33562	0.00438
G144	0.5	NaN	2.4705	0.75619	0.04723	239.456	25.44078	2.29744	0.25454
G145	120.8	10.3	0.6419	0.05859	0.00143	0.62038	0.01509	0.07682	0.00114
G146	111.9	5.8	0.5514	0.05267	0.00162	0.34825	0.01051	0.04797	0.00076
G147	854.9	38.2	1.0614	0.05247	0.00095	0.25986	0.0049	0.03593	0.00048
G148	254.6	44.5	1.2821	0.06495	0.00113	1.207	0.02209	0.13482	0.00182
G149	1189.5	92.5	0.5902	0.07611	0.00123	0.77331	0.01328	0.07372	0.00098
G150	814.1	90.8	0.2958	0.06821	0.00108	1.02615	0.01737	0.10915	0.00144

ages:						discordance:		preferred ages:	
age 206/23	1s age68	age 207/23	1s age75	age 207/20	1s age76	%discord.6	%discord.6	preferred a	1 sigma ag
274.7	4.8	575.4	14.5	2057.5	24.6	-52.3	-86.6		
286.5	3.4	398.2	5.8	1112.6	8.6	-28.1	-74.3		
1559.5	17.7	1695.1	15.5	1867.6	11.7	-8	-16.5		
891.3	10.5	923.2	11.8	1000.8	9.4	-3.5	-10.9	891.3	10.5
355.4	4.5	552.1	8.8	1477.3	12.5	-35.6	-75.9		
676.8	8.4	928.2	12.5	1585.3	12.7	-27.1	-57.3		
678.9	8.5	712.3	11.3	819.6	10	-4.7	-17.2	678.9	8.5
214.4	3	222.1	5.6	305.1	6.4	-3.5	-29.7	214.4	3
387.5	4.9	393.6	7	430	6.1	-1.5	-9.9	387.5	4.9
412.9	4.8	506.5	6.9	955.4	7.6	-18.5	-56.8		
214.8	2.9	237.3	5.8	467	8.8	-9.5	-54	214.8	2.9
368.3	4.4	524.7	7.5	1280.7	9.8	-29.8	-71.2		
980.9	11.4	1041.2	12.3	1170.6	9.9	-5.8	-16.2	980.9	11.4
815	9.4	993.1	11.3	1411.2	9.9	-17.9	-42.3		
279.9	3.6	367	6.6	962.3	10.5	-23.7	-70.9		
281.6	7.3	1301.2	31.6	3992.1	33.6	-78.4	-92.9		
961.8	10.9	1070.7	11.6	1300.2	9.2	-10.2	-26	961.8	10.9
339.8	5.9	421	14	894.5	21.7	-19.3	-62		
707.7	8.4	1120.8	12.5	2043.2	11.9	-36.9	-65.4		
401.6	5.1	601.3	9.5	1450.2	12.5	-33.2	-72.3		
259.3	4.4	359	11.2	1068.2	21.6	-27.8	-75.7		
274.1	3.3	278.7	4.5	318.5	3.8	-1.7	-14	274.1	3.3
218.5	6.5	884.1	31	3429.2	42.1	-75.3	-93.6		
534.1	6.3	548.3	7.9	608.6	6.4	-2.6	-12.2	534.1	6.3
3043.2	336.3	4458	177.2	5177.1	110.6	-31.7	-41.2		
425.5	5	492.9	6.9	820.3	7.2	-13.7	-48.1	425.5	5
392.4	5.1	452.7	8.5	772.1	10.3	-13.3	-49.2	392.4	5.1
711.7	8.3	845.7	10.3	1216.6	9.3	-15.8	-41.5		
392.8	5	445.5	8	728.4	9.2	-11.8	-46.1	392.8	5
331.1	4	332.4	5.5	341.6	4.2	-0.4	-3.1	331.1	4
1174.5	26.4	3039.2	34.2	4705.5	25.6	-61.4	-75		
271.3	3.5	361.1	6.7	987.9	11.1	-24.9	-72.5		
306.9	3.9	679.7	10	2249.1	14	-54.8	-86.4		
967.5	12.8	1284.6	16.9	1863.2	15.6	-24.7	-48.1		
829.9	10.4	912.6	13	1118.9	11.5	-9.1	-25.8	829.9	10.4
415.5	5.1	647.3	9.3	1570.1	11.6	-35.8	-73.5		
295	3.8	305.8	6.3	390.1	6.4	-3.5	-24.4	295	3.8
1805.4	19.2	1993.8	15	2195.7	10.8	-9.5	-17.8		
398.5	5	413.9	7.4	501.9	6.9	-3.7	-20.6	398.5	5
877.7	10.5	1035.3	12.7	1385.8	11.1	-15.2	-36.7		
341.8	4.6	349.2	7.7	400	7.3	-2.1	-14.5	341.8	4.6
416.7	5.3	470.7	8.3	743.9	9.4	-11.5	-44	416.7	5.3
364.1	4.5	396.8	6.6	592.4	7	-8.2	-38.5	364.1	4.5
524.5	6.9	1309.2	15.2	3017.9	14.8	-59.9	-82.6		
433.3	5.4	498.1	7.9	809.2	8.7	-13	-46.5	433.3	5.4
259.8	3.5	352	7	1016.2	12.3	-26.2	-74.4		
280.9	3.6	397.8	7.2	1149.7	12	-29.4	-75.6		
1165.5	13.3	1321.7	13.3	1585.3	10.4	-11.8	-26.5		

279.9	3.8	402.3	8.1	1184.6	13.9	-30.4	-76.4		
235.2	2.9	290.5	5	763.6	8.1	-19	-69.2		
288.6	3.7	347.9	6.4	765.9	9.3	-17	-62.3		
397.4	5	557.5	8.6	1280	11.2	-28.7	-69		
217.2	2.7	314.9	5.1	1120.4	9.5	-31	-80.6		
647.6	33.8	2473.2	76.9	4762.2	62.6	-73.8	-86.4		
1483.5	16.4	1593.2	14.2	1741.9	10.5	-6.9	-14.8	1741.9	10.5
2345.1	26.6	3955.1	18.7	4915.2	13.2	-40.7	-52.3		
1183.7	14.1	1396.1	14.9	1737.8	12.3	-15.2	-31.9		
9035.2	330.7	5983.7	76.2	5018.8	32.4	51	80		
272.9	3.7	320.2	7	680.3	10.7	-14.8	-59.9	272.9	3.7
931.2	11.1	936.4	12	949.3	9.2	-0.6	-1.9	931.2	11.1
966.9	22.1	1803.9	35.1	2981.3	32.2	-46.4	-67.6		
445.6	5.6	489.5	8.1	701.1	8.3	-9	-36.4	445.6	5.6
275.1	3.7	283.4	6.2	352.6	6.3	-2.9	-22	275.1	3.7
1018.5	11.7	1314	13.1	1835.5	10.8	-22.5	-44.5		
NA	NA	NA	NA	5160.9	56.9	NA	NA		
1971	21.3	2009.2	15.7	2049.2	11.3	-1.9	-3.8	2049.2	11.3
781.9	9.5	802.7	11.3	861.5	9.1	-2.6	-9.2	781.9	9.5
246.9	3.4	264.6	6.1	425.2	7.8	-6.7	-41.9	246.9	3.4
371.2	4.6	482.1	7.4	1051.5	9.4	-23	-64.7		
369.4	154.4	2353.1	560.5	5403.1	440.5	-84.3	-93.2		
443.6	5.5	506.8	7.9	803.8	8.4	-12.5	-44.8	443.6	5.5
247.7	3.8	358.9	9.2	1160.1	18	-31	-78.6		
424.1	5.3	466.5	7.8	681.7	8.1	-9.1	-37.8	424.1	5.3
262.3	3.8	618.4	11.6	2305.4	18.3	-57.6	-88.6		
465.3	7	483.8	12.3	572.6	12.2	-3.8	-18.7	465.3	7
1790.1	19.7	2157.9	16.2	2529.2	12.1	-17	-29.2		
410.4	5.3	450.3	8.1	659.9	8.7	-8.8	-37.8	410.4	5.3
450.4	6.1	540.3	10.3	941.2	12.4	-16.7	-52.2		
807.3	9.9	1011.6	12.8	1485.6	11.8	-20.2	-45.7		
136.3	2.1	196.8	5.4	1002.8	16.6	-30.7	-86.4		
848.2	10.2	946.2	11.8	1182.4	10	-10.4	-28.3	848.2	10.2
-2339.7	169.2	NaN	88	6211.5	61.9	NaN	-137.7		
533.9	6.8	568.5	9.6	709.6	8.9	-6.1	-24.8	533.9	6.8
325.4	5.6	499.7	14.2	1406.3	23.8	-34.9	-76.9		
388.6	4.9	474.3	7.9	914.5	9.9	-18.1	-57.5		
442	5.7	497.4	8.8	762	9.5	-11.1	-42	442	5.7
401.4	5.3	521.3	9.5	1088.5	12.5	-23	-63.1		
253.5	3.5	298.6	6.6	669.3	10.4	-15.1	-62.1		
405.1	5.1	454.7	7.8	715	8.7	-10.9	-43.3	405.1	5.1
1152.3	13.3	1367.6	13.8	1722.5	11.1	-15.7	-33.1		
1287.5	15.2	1473.3	15.1	1752.7	12.1	-12.6	-26.5		
897.7	10.5	952.3	11.5	1081.3	9.1	-5.7	-17	897.7	10.5
1971.2	22.3	2174.7	17.4	2373.3	13.1	-9.4	-16.9		
91.2	2.2	854	21.9	4670.8	29.1	-89.3	-98		
853.8	10.2	914.2	11.5	1063.9	9.4	-6.6	-19.8	853.8	10.2
602.1	7.6	693	10.5	1000.8	10.3	-13.1	-39.8	602.1	7.6
3040.6	37.3	3355.5	21.6	3549.8	15.6	-9.4	-14.3	3549.8	15.6
710.2	9.6	1428	17	2758.6	16.1	-50.3	-74.3		
268.9	3.6	1061.7	13.7	3542.2	15.3	-74.7	-92.4		
444	7	505.2	13.4	793.3	16.2	-12.1	-44	444	7
2413.4	26.3	2470.3	17.8	2517.9	13.1	-2.3	-4.2	2517.9	13.1
276	3.8	290.6	6.6	410.2	7.4	-5	-32.7	276	3.8
2435.8	26.2	2475.3	17.5	2508.4	12.8	-1.6	-2.9	2508.4	12.8

1323.3	16.3	1330.7	16.1	1343.3	12.6	-0.6	-1.5	1343.3	12.6
620.4	13.5	1890.6	31.1	3872.4	28	-67.2	-84		
6771.3	3230.4	5313.7	893.4	4785.9	436.9	27.4	41.5		
827	10.4	1026	13.6	1479.3	12.7	-19.4	-44.1		
402.2	5	493.3	7.7	942.7	9.2	-18.5	-57.3		
768.1	9.7	878.7	12.7	1169.4	11.8	-12.6	-34.3	768.1	9.7
1916.5	27.4	2103.6	23.6	2292.5	18.9	-8.9	-16.4		
406.1	5	445.3	6.9	653.6	6.9	-8.8	-37.9	406.1	5
247.9	4.8	864.2	19.7	3174.7	26.5	-71.3	-92.2		
145.9	1.9	410.6	6.8	2433.8	14.1	-64.5	-94		
804.8	10.1	907.9	12.8	1168.4	11.5	-11.4	-31.1	804.8	10.1
1975.6	22.2	2257.2	17.5	2523.8	13.3	-12.5	-21.7		
434.5	5.7	458	8.4	578.1	8	-5.1	-24.8	434.5	5.7
2190.8	24.4	2205.3	17.6	2219.3	13.1	-0.7	-1.3	2219.3	13.1
1874.3	20.8	2168.4	16.9	2460.2	12.9	-13.6	-23.8		
367	4.7	384.9	6.9	495	6.7	-4.7	-25.9	367	4.7
378.1	4.9	404.4	7.6	558.6	7.9	-6.5	-32.3	378.1	4.9
526.6	16.2	1451.8	43	3311.1	44.4	-63.7	-84.1		
317.3	5.2	362.3	11.2	661.6	15.9	-12.4	-52	317.3	5.2
345.6	4.4	459.9	7.7	1081.3	10.7	-24.9	-68		
280.5	4	351.3	7.8	850.8	12.6	-20.1	-67		
1809.5	21	2043.2	17.7	2288.7	13.7	-11.4	-20.9		
438.6	5.5	539	8.3	990.5	9.6	-18.6	-55.7		
360.9	4.6	377	6.7	477.5	6.3	-4.3	-24.4	360.9	4.6
825	30.2	2435.7	55.6	4332.4	45.9	-66.1	-81		
387.1	4.9	480.2	7.8	954	9.6	-19.4	-59.4		
1215.4	143.6	3095	183.1	4734.7	138.7	-60.7	-74.3		
1839.5	20.9	1806.5	16.7	1769.3	12.5	1.8	4	1769.3	12.5
444.4	5.8	482.7	8.7	669.6	8.9	-7.9	-33.6	444.4	5.8
6016.8	12484.4	NA	4527.1	7469.5	3164.8	NA	-19.4		
453.4	5.8	513.2	8.5	789.8	9.1	-11.7	-42.6	453.4	5.8
993	12	1012.9	12.9	1056.9	10	-2	-6	993	12
434.2	5.8	509.7	9.6	864.9	11.3	-14.8	-49.8	434.2	5.8
416.1	5.3	509.4	8.3	954.5	9.9	-18.3	-56.4		
398.9	5.8	423.1	10.2	558.2	10.8	-5.7	-28.5	398.9	5.8
1776.6	20.7	1764.2	17.2	1750.1	13.1	0.7	1.5	1750.1	13.1
1058.9	14	1075.4	16.2	1109.8	13.4	-1.5	-4.6	1058.9	14
448.1	6.1	466.4	9.5	557.8	9	-3.9	-19.7	448.1	6.1
888.5	10.9	1018	13.1	1308.9	11.5	-12.7	-32.1	888.5	10.9
1865.6	21.1	1854.4	16.9	1842.6	12.8	0.6	1.2	1842.6	12.8
7691.5	497.6	5566.9	128.6	4841.4	62.9	38.2	58.9		
477.1	6.8	490.1	11.1	551.9	10.4	-2.6	-13.5	477.1	6.8
302	4.7	303.4	9.1	314.6	8.3	-0.4	-4	302	4.7
227.6	3	234.6	4.7	305.9	4.8	-3	-25.6	227.6	3
815.3	10.3	803.8	12.2	772.7	9.4	1.4	5.5	815.3	10.3
458.5	5.9	581.7	9.3	1098	10.8	-21.2	-58.2		
667.8	8.4	717	10.6	874.9	9.3	-6.9	-23.7	667.8	8.4

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All data is presented as a persentage proportion of garnet end-member in a single grain.

n° garnet	%almandine	%pyrope	%spessartine	%andradite	%grossular	Miscibility check
1	76	16	4	4	0	Y
2	14	1	1	36	50	Y
3	14	12	74	0	0	Y
4	26	8	66	0	0	Y
5	92	4	1	2	2	Y
6	no Grt					Y
7	1	4	96			Y
8	8	34	58			Y
9	84	12	1	2	2	Y
10	78	12	1	1	10	Y
11	68	18	1	1	14	Y
12	62	36	1	2	1	Y
13	1	16	84	1	1	Y
14	74	24	0	2	0	Y
15	26	16	58			Y
16	no Grt					Y
17	70	20	1	1	10	Y
18	no Grt					Y
19						
20	12	4	84			Y
21	1	1	4	34	62	Y
22	78	18	1	1	4	Y
23	88	12	1	1	1	Y
24	86	8	1	1	6	Y
25	64	28	1	1	8	Y
26	18	6	72	4	0	Y
27	1	2	1	24	74	Y
28	4	1	1	24	72	Y
29	10	1	1	8	82	Y
30	1	1	6	20	74	Y
31	4	1	8	20	68	Y
32	0	0	0	12	88	Y
33	6	1	1	18	76	Y
34	1	1	4	2	94	Y
35	10	1	1	16	74	Y
36	2	1	2	10	86	Y
37	1	12	1	22	66	Y
38	10	1	1	20	70	Y
39	1	1	6	6	88	Y
40	1	2	4	14	80	Y
41	1	4	4	4	88	Y
42	2	1	1	8	90	Y
43	1	2	1	1	98	Y
44	1	1	1	8	92	Y
45	1	1	1	2	98	Y
46	8	2	4	4	82	Y
47	1	1	4	14	82	Y
48	6	1	1	36	58	Y
49	1	1	2	16	82	Y
50	1	1	1	8	92	Y

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
64.0	36.0	<1	<1	<1
<1	<1	<1	70.0	30.0
84.0	14.0	<1	2.0	<1
58.0	42.0	<1	<1	<1
16.0	22.0	62.0	<1	<1
<1	<1	2.0	16.0	82.0
<1	4.0	<1	74.0	22.0
<1	<1	2.0	86.0	12.0
60.0	40.0	<1	<1	<1
<1	12.0	88.0	<1	<1
24.0	6.0	70.0	<1	<1
42.0	54.0	2.0	2.0	<1
6.0	36.0	58.0	<1	<1
12.0	22.0	66.0	<1	<1
42.0	48.0	4.0	6.0	<1
72.0	26.0	<1	2.0	<1
<1	14.0	86.0	<1	<1
62.0	36.0	<1	2.0	<1
74.0	20.0	2.0	4.0	<1
74.0	22.0	2.0	2.0	<1
10.0	22.0	40.0	6.0	22.0
14.0	18.0	68.0	<1	<1
16.0	14.0	70.0	<1	<1
<1	<1	2.0	12.0	86.0
36.0	50.0	10.0	2.0	2.0
<1	2.0	<1	82.0	16.0
<1	6.0	<1	4.0	90.0
2.0	34.0	64.0	<1	<1
62.0	36.0	<1	2.0	<1
48.0	52.0	<1	<1	<1
<1	<1	<1	64.0	36.0
2.0	14.0	84.0	<1	<1
48.0	22.0	30.0	<1	<1
<1	28.0	72.0	<1	<1
72.0	26.0	2.0	<1	<1
<1	12.0	88.0	<1	<1
<1	<1	<1	20.0	80.0
6.0	10.0	64.0	<1	20.0
<1	6.0	94.0	<1	<1
<1	4.0	<1	<1	96.0
26.0	24.0	50.0	<1	<1
14.0	8.0	78.0	<1	<1
20.0	22.0	58.0	<1	<1
<1	38.0	62.0	<1	<1
<1	12.0	88.0	<1	<1
<1	12.0	88.0	<1	<1

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
12.0	22.0	64.0	2.0	<1
<1	4.0	96.0	0.0	0.0
<1	10.0	90.0	0.0	0.0
<1	6.0	<1	6.0	88.0
58.0	40.0	<1	2.0	<1
<1	14.0	86.0	0.0	0.0
28.0	8.0	64.0	0.0	0.0
72.0	28.0	<1	<1	<1
12.0	16.0	72.0	0.0	0.0
36.0	20.0	44.0	0.0	0.0
<1	2.0	98.0	0.0	0.0
<1	6.0	94.0	0.0	0.0
74.0	22.0	<1	4.0	<1
74.0	22.0	<1	4.0	<1
<1	14.0	86.0	0.0	0.0
<1	4.0	<1	2.0	94.0
<1	14.0	86.0	0.0	0.0
74.0	20.0	4.0	2.0	<1
<1	40.0	54.0	4.0	2.0
50.0	44.0	2.0	4.0	<1
18.0	12.0	50.0	4.0	16.0
64.0	36.0	<1	<1	<1
<1	<1	2.0	4.0	94.0
<1	<1	<1	<1	100.0
<1	2.0	<1	<1	98.0
<1	<1	<1	14.0	86.0
<1	2.0	<1	2.0	96.0
<1	<1	<1	14.0	86.0
<1	<1	4.0	4.0	92.0
<1	<1	2.0	<1	98.0
<1	<1	<1	<1	100.0
<1	2.0	<1	<1	98.0
<1	2.0	<1	<1	98.0
<1	<1	2.0	14.0	84.0
<1	<1	2.0	4.0	94.0
<1	<1	<1	6.0	94.0
<1	<1	<1	<1	100.0
<1	4.0	<1	<1	96.0
<1	2.0	2.0	<1	96.0
<1	2.0	<1	<1	98.0
<1	2.0	<1	4.0	94.0
<1	<1	<1	4.0	96.0
<1	2.0	<1	<1	98.0
<1	<1	<1	2.0	98.0
<1	2.0	<1	8.0	90.0
<1	<1	<1	10.0	90.0

<1	<1	<1	6.0	94.0

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
22.0	14.0	64.0	0.0	0.0
62.0	18.0	20.0	<1	<1
<1	2.0	<1	26.0	72.0
<1	<1	<1	38.0	62.0
70.0	22.0	2.0	<1	6.0
8.0	10.0	82.0	0.0	0.0
84.0	14.0	<1	2.0	<1
<1	<1	<1	22.0	78.0
24.0	8.0	68.0	0.0	0.0
76.0	18.0	4.0	2.0	<1
42.0	30.0	20.0	<1	8.0
<1	4.0	<1	56.0	40.0
64.0	30.0	2.0	4.0	<1
70.0	24.0	4.0	<1	2.0
86.0	14.0	<1	<1	<1
34.0	14.0	52.0	0.0	0.0
76.0	18.0	2.0	4.0	<1
42.0	10.0	48.0	0.0	0.0
8.0	12.0	80.0	0.0	0.0
64.0	18.0	10.0	4.0	4.0
42.0	8.0	50.0	0.0	0.0
<1	<1	<1	82.0	18.0
86.0	10.0	<1	4.0	<1
<1	<1	<1	4.0	96.0

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
2.0	12.0	86.0	0.0	0.0
8.0	4.0	88.0	0.0	0.0
52.0	16.0	28.0	<1	4.0
76.0	16.0	<1	8.0	<1
72.0	12.0	12.0	4.0	<1
<1	<1	100.0	0.0	0.0
<1	<1	100.0	0.0	0.0
<1	18.0	82.0	0.0	0.0
84.0	10.0	2.0	4.0	<1
26.0	4.0	70.0	0.0	0.0
20.0	18.0	62.0	0.0	0.0
<1	12.0	88.0	0.0	0.0
74.0	24.0	<1	2.0	<1
<1	<1	100.0	0.0	0.0
<1	<1	100.0	0.0	0.0
16.0	12.0	72.0	0.0	0.0
8.0	2.0	90.0	0.0	0.0
4.0	14.0	82.0	0.0	0.0
84.0	12.0	<1	4.0	<1
60.0	14.0	26.0	<1	<1
58.0	28.0	10.0	4.0	<1
50.0	48.0	<1	2.0	<1
10.0	16.0	74.0	0.0	<1
<1	<1	<1	20.0	80.0
<1	<1	<1	12.0	88.0
<1	<1	<1	26.0	74.0
<1	<1	<1	10.0	90.0
<1	<1	<1	20.0	80.0
<1	<1	<1	<1	100.0
<1	<1	<1	2.0	98.0
<1	<1	2.0	22.0	76.0
<1	<1	<1	<1	100.0
<1	2.0	<1	20.0	78.0
<1	<1	<1	4.0	96.0
<1	<1	<1	4.0	96.0
<1	<1	2.0	10.0	88.0
<1	<1	<1	<1	100.0
<1	<1	2.0	12.0	86.0
<1	<1	<1	<1	100.0
<1	<1	<1	8.0	92.0
<1	<1	2.0	6.0	92.0
<1	<1	<1	<1	100.0
<1	2.0	<1	6.0	92.0
2.0	<1	8.0	8.0	82.0
<1	<1	<1	8.0	92.0
<1	<1	2.0	12.0	86.0

<1	<1	4.0	6.0	90.0
<1	<1	2.0	<1	98.0

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
6.0	10.0	84.0	0.0	0.0
62.0	36.0	2.0	<1	<1
12.0	6.0	82.0	0.0	0.0
60.0	38.0	<1	2.0	<1
62.0	26.0	8.0	4.0	<1
16.0	4.0	80.0	0.0	0.0
76.0	18.0	<1	6.0	<1
72.0	10.0	18.0	<1	<1
<1	<1	<1	54.0	46.0
26.0	4.0	70.0	0.0	0.0
36.0	6.0	58.0	0.0	0.0
12.0	8.0	80.0	0.0	0.0
64.0	36.0	<1	<1	<1
12.0	6.0	82.0	0.0	0.0
36.0	36.0	28.0	<1	<1
64.0	30.0	<1	6.0	<1
<1	16.0	84.0	0.0	0.0
<1	10.0	90.0	0.0	0.0
10.0	8.0	82.0	0.0	0.0
74.0	20.0	4.0	2.0	<1
58.0	<1	42.0	0.0	0.0
84.0	16.0	<1	<1	<1
36.0	6.0	58.0	0.0	0.0
28.0	10.0	62.0	0.0	0.0
96.0	2.0	<1	2.0	<1
<1	<1	<1	2.0	98.0
<1	<1	<1	20.0	80.0
<1	<1	2.0	<1	98.0
<1	<1	<1	18.0	82.0
40.0	16.0	44.0	0.0	0.0
<1	4.0	2.0	<1	94.0
<1	<1	<1	2.0	98.0
<1	<1	<1	14.0	86.0
30.0	6.0	64.0	0.0	0.0
76.0	18.0	4.0	2.0	<1
<1	<1	<1	12.0	88.0
12.0	<1	<1	18.0	70.0
<1	2.0	<1	<1	98.0
<1	4.0	<1	<1	96.0
64.0	36.0	<1	<1	<1
<1	<1	<1	<1	100.0
<1	<1	<1	10.0	90.0
<1	<1	<1	14.0	86.0
<1	<1	<1	10.0	90.0
<1	<1	<1	18.0	82.0
<1	<1	2.0	14.0	84.0

62.0	36.0	<1	2.0	<1
<1	<1	<1	12.0	88.0
<1	<1	<1	2.0	98.0
<1	<1	<1	2.0	98.0

almandine	pyrope	spessartine	andradite	grossular
12.0	10.0	52.0	2.0	24.0
30.0	10.0	60.0	0.0	0.0
84.0	14.0	<1	2.0	<1
72.0	28.0	<1	<1	<1
38.0	2.0	60.0	0.0	0.0
86.0	10.0	<1	4.0	<1
48.0	14.0	38.0	<1	<1
52.0	36.0	6.0	6.0	<1
<1	<1	<1	22.0	78.0
20.0	18.0	62.0	0.0	0.0
20.0	18.0	62.0	0.0	0.0
56.0	8.0	36.0	0.0	0.0
<1	<1	100.0	0.0	0.0
84.0	10.0	<1	6.0	<1
20.0	<1	80.0	0.0	0.0
84.0	10.0	2.0	4.0	<1
2.0	8.0	90.0	0.0	0.0
50.0	36.0	12.0	2.0	<1
72.0	16.0	8.0	4.0	<1
36.0	10.0	54.0	0.0	0.0
62.0	32.0	4.0	2.0	<1
52.0	42.0	4.0	2.0	<1
<1	16.0	84.0	0.0	0.0
10.0	10.0	80.0	0.0	0.0
<1	<1	2.0	12.0	86.0
42.0	4.0	54.0	0.0	0.0
76.0	14.0	4.0	6.0	<1
<1	<1	<1	22.0	78.0
36.0	14.0	50.0	0.0	0.0
<1	<1	<1	10.0	90.0
<1	<1	<1	<1	100.0
<1	<1	<1	<1	100.0
<1	12.0	88.0	0.0	0.0
<1	14.0	86.0	0.0	0.0
<1	<1	18.0	14.0	68.0
<1	<1	<1	<1	100.0
64.0	30.0	2.0	4.0	<1
<1	<1	<1	12.0	88.0
<1	<1	<1	4.0	96.0
10.0	6.0	84.0	0.0	0.0
4.0	20.0	76.0	0.0	0.0
54.0	4.0	42.0	0.0	0.0
74.0	22.0	<1	4.0	<1
<1	<1	<1	32.0	68.0
<1	<1	6.0	70.0	24.0
<1	<1	<1	16.0	84.0
<1	<1	<1	6.0	94.0
<1	<1	<1	8.0	92.0

almandine	***pyrope***	***spessartine***	***andradite***	***grossular***
<1	<1	<1	<1	100.0
<1	<1	6.0	6.0	88.0
<1	<1	<1	10.0	90.0
<1	<1	<1	6.0	94.0
<1	<1	4.0	10.0	86.0
<1	4.0	<1	2.0	94.0
<1	2.0	<1	<1	98.0
<1	2.0	<1	<1	98.0
<1	<1	<1	16.0	84.0
<1	<1	<1	10.0	90.0
<1	2.0	8.0	<1	90.0
<1	<1	<1	2.0	98.0
<1	4.0	<1	<1	96.0
<1	6.0	<1	<1	94.0
<1	<1	<1	14.0	86.0
<1	2.0	<1	<1	98.0
<1	<1	<1	<1	100.0
<1	<1	<1	<1	100.0
<1	<1	<1	24.0	76.0
<1	<1	2.0	16.0	82.0
<1	2.0	<1	<1	98.0
44.0	16.0	40.0	0.0	0.0
<1	<1	<1	16.0	84.0
66.0	22.0	2.0	2.0	8.0
<1	16.0	84.0	0.0	0.0
<1	<1	<1	16.0	84.0
72.0	26.0	2.0	<1	<1
76.0	16.0	2.0	6.0	<1
28.0	4.0	68.0	0.0	0.0
78.0	12.0	4.0	6.0	<1
58.0	26.0	14.0	2.0	<1
<1	<1	<1	<1	100.0
<1	2.0	2.0	<1	96.0
<1	<1	<1	32.0	68.0
72.0	26.0	<1	2.0	<1
<1	14.0	86.0	0.0	0.0
<1	<1	2.0	20.0	78.0
44.0	52.0	<1	4.0	<1
64.0	10.0	26.0	<1	<1
<1	14.0	86.0	0.0	0.0
22.0	4.0	74.0	0.0	0.0
<1	6.0	94.0	0.0	0.0
18.0	30.0	48.0	4.0	<1
<1	6.0	94.0	0.0	0.0
<1	4.0	<1	58.0	38.0

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
<1	4.0	2.0	<1	94.0
32.0	12.0	56.0	0.0	0.0
<1	<1	<1	6.0	94.0
<1	<1	2.0	10.0	88.0
<1	2.0	<1	14.0	84.0
<1	<1	<1	<1	100.0
<1	<1	<1	6.0	94.0
42.0	20.0	34.0	4.0	<1
4.0	18.0	78.0	0.0	0.0
16.0	16.0	68.0	0.0	0.0
58.0	36.0	<1	4.0	2.0
42.0	36.0	16.0	4.0	2.0
2.0	<1	<1	76.0	22.0
<1	30.0	70.0	0.0	0.0
32.0	20.0	48.0	0.0	0.0
62.0	36.0	<1	2.0	<1
2.0	8.0	90.0	0.0	0.0
62.0	38.0	<1	<1	<1
<1	2.0	<1	60.0	38.0
74.0	26.0	<1	<1	<1
<1	<1	<1	32.0	68.0
<1	18.0	82.0	0.0	0.0
84.0	14.0	<1	2.0	<1
60.0	38.0	2.0	<1	<1
2.0	<1	<1	76.0	22.0
54.0	20.0	26.0	0.0	0.0
8.0	8.0	84.0	0.0	0.0
4.0	4.0	92.0	0.0	0.0
62.0	36.0	<1	2.0	<1
60.0	40.0	<1	<1	<1
4.0	2.0	94.0	0.0	0.0

almandine	pyrope	spessartine	andradite	grossular
<1	<1	<1	<1	100.0
<1	<1	<1	2.0	98.0
<1	<1	<1	<1	100.0
64.0	26.0	<1	6.0	4.0
<1	<1	<1	4.0	96.0
<1	<1	<1	6.0	94.0
76.0	18.0	<1	6.0	<1
<1	<1	<1	<1	100.0
<1	<1	<1	26.0	74.0
<1	<1	<1	8.0	92.0
44.0	18.0	32.0	<1	6.0
<1	2.0	<1	60.0	38.0
72.0	28.0	<1	<1	<1
72.0	28.0	<1	<1	<1
76.0	24.0	<1	<1	<1
60.0	20.0	18.0	2.0	<1
62.0	38.0	<1	<1	<1
30.0	16.0	54.0	0.0	0.0
4.0	18.0	78.0	0.0	0.0
64.0	36.0	<1	<1	<1
82.0	14.0	<1	2.0	2.0
52.0	8.0	40.0	0.0	0.0
86.0	10.0	<1	4.0	<1
84.0	12.0	<1	4.0	<1
50.0	10.0	40.0	0.0	0.0
84.0	10.0	4.0	2.0	<1
62.0	38.0	<1	<1	<1
66.0	30.0	<1	2.0	2.0
76.0	18.0	<1	6.0	<1
60.0	14.0	26.0	0.0	0.0
52.0	48.0	<1	<1	<1
86.0	10.0	2.0	2.0	<1
22.0	12.0	66.0	0.0	0.0
72.0	28.0	<1	<1	<1
80.0	14.0	<1	4.0	2.0

almandine	*pyrope*	*spessartine*	*andradite*	*grossular*
<1	<1	<1	4.0	96.0
<1	<1	2.0	4.0	94.0
<1	<1	<1	24.0	76.0
<1	2.0	<1	<1	98.0
<1	<1	<1	<1	100.0
<1	4.0	<1	<1	96.0
<1	<1	2.0	16.0	82.0
<1	2.0	<1	<1	98.0
<1	<1	<1	12.0	88.0
<1	4.0	<1	<1	96.0
<1	<1	<1	16.0	84.0
<1	<1	<1	32.0	68.0
<1	<1	<1	8.0	92.0
<1	<1	2.0	22.0	76.0
1.0	2.0	4.0	1.0	92.0
<1	<1	<1	14.0	86.0
2.0	<1	2.0	4.0	92.0
<1	<1	4.0	14.0	82.0
2.0	<1	2.0	4.0	92.0
2.0	<1	2.0	14.0	82.0
<1	<1	<1	2.0	98.0
<1	2.0	<1	<1	98.0
<1	<1	<1	14.0	86.0
<1	<1	2.0	6.0	92.0
<1	26.0	74.0	0.0	0.0
64.0	24.0	4.0	6.0	2.0
12.0	14.0	74.0	0.0	0.0
50.0	2.0	48.0	0.0	0.0
<1	<1	6.0	84.0	10.0
88.0	8.0	2.0	2.0	<1
86.0	14.0	<1	<1	<1
70.0	16.0	10.0	2.0	2.0
<1	14.0	86.0	0.0	0.0
14.0	4.0	82.0	0.0	0.0
62.0	36.0	<1	2.0	<1
<1	6.0	<1	64.0	30.0
84.0	12.0	<1	4.0	<1
72.0	26.0	<1	2.0	<1
62.0	28.0	<1	4.0	6.0
84.0	14.0	<1	2.0	<1
74.0	26.0	<1	<1	<1
<1	4.0	<1	<1	96.0
68.0	26.0	1.0	4.0	1.0
64.0	36.0	<1	<1	<1
4.0	18.0	78.0	0.0	0.0
32.0	16.0	52.0	0.0	0.0
48.0	10.0	42.0	<1	<1
18.0	20.0	62.0	0.0	0.0