

Extracting extra information from detrital zircon datasets using discordant data

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U-Pb ages from detrital zircons can provide valuable information regarding sedimentary processes that, in turn, influence tectonic reconstructions, basin analysis and mineral exploration studies. However, most detrital zircon datasets contain a component of analyses that are discordant in their U-Pb systematics and are typically discarded. Discordance can be caused by a number of factors but the predominant causes are Pb loss due to the alteration of zircon, or analysis of mixed age components. Interpreting such data can be difficult, however, discordant analyses may record geological events that are poorly represented in concordant data and therefore their significance missed or reduced.

In this study we use our recently published model [1] to determine the most likely discordia lines present within complex age populations. The model applies a discrete grid of discordia lines (which are definable by the user) to a detrital zircon population and then computes the probability densities along each of the lines based on their proximity to the data points. The more data that lies along a discordia line the higher the probability density for that line will be and the more likely that line is to have real age significance. The model then calculates the upper and lower intercepts of these possible discordia lines and displays the data in a 2D contour plot. We use examples from published data as well as our own U-Pb datasets to show how the model extracts geologically useful information that would otherwise be missed if discordant data is filtered out.

[1] Reimink et al. (2016) *J. Geol. Soc. Lon.* (in press).