

Strategies towards interpretation of *in-situ* detrital apatite U-Pb data

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Apatite U-Pb dating requires a robust characterisation of the common Pb composition, which is commonly achieved by measuring ²⁰⁴Pb or by applying a ²⁰⁷Pb correction (e.g. Chew et al., 2014). The latter can easily be carried out on conventional quadrupole LA-ICP-MS systems, enabling fast measurements and big datasets. In addition, the measurement of Pb isotopes simultaneously to ²³⁸U makes it possible to determine both fission track and U-Pb ages for individual grains. Apatite U-Pb ages commonly compliment zircon U-Pb ages, but have the advantage that they can date mafic rocks as well as felsic rocks (e.g. Pochon et al., 2016). This opens new avenues for detrital thermo- and geochronology.

Detrital apatite U-Pb geochronology requires a common Pb characterisation for each individual grain, as they can come from different source terranes. In the absence of an instrument capable of directly measuring the ²⁰⁴Pb for each apatite grain, this is not a straight-forward process. Here we present strategies for extracting useful information from complex detrital apatite U-Pb data using examples from various locations on the margins of the Siberian Craton. The Siberian cratonic margin is a suitable study location for this exercise as it has well-defined source regions and corresponding age populations in detrital zircon spectra. The utility of fission track data for interpreting U-Pb age populations is shown through key examples. U, Th or other trace elements are often useful source-terrene discriminators. In addition, multiple analyses in different zones of single grains with different common Pb compositions aid in defining individual age- populations. We also discuss different filters that should be used before calculating statistically robust weighted mean ²⁰⁷Pb-corrected U-Pb ages and detrital apatite age-spectra.

Chew, D.M., Petrus, J.A., Kamber, B.S (2014) U-Pb LA-ICPMS dating using accessory mineral standards with variable common Pb. *Chemical Geology*, 363C, 185-199.

Pochon et al., 2016. U-Pb LA-ICP-MS dating of apatite in mafic rocks. *American Mineralogist*, 101(11), 2430-2442.