LAICPMS Analytical parameters and specifications

Detrital zircon geochronology resolves the crystallization age of the analyzed grains in order to associate them to their source rocks and tectonic setting (*e.g.* Cawood *et al*., 2012; Beltrán-Triviño *et al*., 2013; 2016). Zircon U–Pb geochronology was performed through laser ablation inductively coupled mass spectrometry (LA-ICP-MS) at the Institute of Geochemistry and Petrology at ETH Zurich.

In situ U-Pb LA-ICP-MS geochronology were conducted by using a 193 nm Resolution (S155) ArF excimer laser coupled to a Element SF ICPMS (Guillong *et al*., 2014; von Quadt *et al*., 2016). The output energy was typically ca. 2 J/cm^2 and a 5 Hz pulse repetition rate was used. The ablation was under helium flow of 0.7 L/min. Argon was admixed to the aerosol within the funnel of the ablation cell to transport the ablated material to the ICP for ionization. Dwell times range from 5 – 30 ms and peak hopping was employed. Oxide generation was optimized at ThO+/Th+=<0.3%. For each analysis a baseline was measured for 30 seconds followed by 30 seconds of ablation. Elemental concentrations were calculated using the IGOR based Iolite software (Paton *et al*., 2011). The stoichiometric Si concentration of 15.2 wt.% for zircon was used as an internal standard. SRM NIST 612 glass (Hinton, 1999) was used as the primary external trace element standard and was measured four times each 25 zircon analyses.

The masses 202, 204, 206, 207, 208, 232, 235 and 238 were measured. Total ablation time was set to 30 seconds with a gas blank/background measurement of 10s. Age data were collected in runs of 20 samples bracketed before and after by two analyses of the primary reference material GJ-1 (ca 609 Ma, Jackson *et al*., 2004) and each one of secondary reference zircons 91500 (ca. 1065 Ma, Wiedenbeck *et al*., 1995), Temora 1 (ca. 417 Ma, Black *et al*., 2003), Plesovice (ca. 337 Ma, Sláma *et al*., 2008) and Aus_Z7_5 (ca. 2.4 Ma, ETH Zurich in-house secondary standard, von Quadt *et al*., 2016).

Data reduction was performed with the IGOR based Iolite v2.5 (Paton *et al*., 2011) and Vizual Age (Petrus and Kamber, 2012) software. Obtained isotope ratios and dates were corrected for mass bias, instrumental drift and downhole fractionation using primary reference material. Dates and trace elements of spots with elevated Al, P, Ca, Mn or Fe were discarded because they are indicative of the presence of mineral (*e.g.* apatite, feldspar) or melt inclusions.

Statistical analyses of zircon data were performed using Isoplot 3.75 and 4.15 (Ludwig, 2012), and ISOPLOT R (Vermeesch, 2018). All discordant analyses of magmatic zircons were discarded. Only zircons with concordance greater than 90% were accepted and plotted.

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