

LA-ICP-MS U-Pb dating of Oki Dozen volcano using non-polished zircons

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LA-ICP-MS U-Pb dating using zircon is now widely used with great success. The normal dating process includes polishing zircons. This process is good in terms of avoiding surface contamination of common Pb and/or Pb loss and is essential for SHRIMP, in which only small fraction (drilling depth of 1-2 μm) is used for dating. Compared to SHRIMP, LA-ICP-MS ablates a much larger volume (drilling depth of $>10 \mu\text{m}$) of zircon. This means that it is easy to date zircons from the surface to the inner core of the crystal and examine the existence of inherited cores and potentially investigate the timespan of crystallization. Here we dated non-polished zircons for some reference samples (Fish Canyon Tuff and OD-3) and samples from Oki Dozen volcano. Zircons were ablated for 30 seconds using 213 nm Nd-YAG laser with 10 Hz repetition rate and 4-5 J/cm^2 energy density. Final drilling depth for 5 J/cm^2 was 27 μm and the $^{206}\text{Pb}/^{238}\text{U}$ ratio from 9-18 μm depth were used to determine ages. It was found that non-polished zircons yield reliable ages because of agreement with reference ages. The Oki Dozen samples yielded 6-7 Ma ages, in agreement with or slightly older than K-Ar ages of 5.4-7.4 Ma.

Keywords: U-Pb dating, zircon, LA-ICP-MS, Oki Dozen volcano