



Processes leading to disturbance of the U/Pb system of metamorphic zircons - evidence from SHRIMP analyses

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The in situ U/Pb dating method SHRIMP was used to analyze zircons from metamorphic rocks that were formerly dated with either scattering or different ages (by different authors), using zircon evaporation and conventional U/Pb analyses. Our application of U, Th, and Pb concentrations as well as CL images of zircon grains, and information on mineral inclusions, leads to different conclusions.

The usual pattern – where younger U/Pb zircon ages were accompanied by lowering of their Th/U ratio – was only found in one sample resulting only in a slight decrease of the age information by the evaporation method. In another sample, the common Pb, included in K-feldspar mineral inclusions, caused scattering and exceedingly young evaporation ages, even if the evaporation age was calculated from an inverse isochron. A different process was observed from a third sample. Here, the decrease of U/Pb ages was accompanied by an increase of common Pb, and with U and Th concentrations. We attribute this to an interaction with a fluid system, although SEM and CL images of the zircons show only weak indications for this process. The age interpretation of the fourth sample remains speculative because we did not find unambiguous changes of concentrations or in the CL images, indicative for reset processes.

These unusual observations lead to the preliminary conclusion that U/Pb reset of zircon ages due to metamorphic processes cannot in every case be identified by their low Th/U ratios.