Silicon isotope systematics of zircon from various granite types

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Zircon is a mineral extensively used in Earth Sciences as a geochronometer, source tracer for magmatic systems, and witness to continental growth in the detrital record [1,2]. Silicon isotopes in bulk-rocks have been shown to discriminate some granite types from others [3,4] and their application to zircon seems promising [5], especially in a perspective of probing the detrital zircon record. Silicon isotope signatures can be controlled by the source, mineralogy, and crystallization history of granitic magmas [6]. Therefore, it is relevant to assess if zircons from distinct granite types exhibit differences such as those visible in bulk-rock data. Moreover, post-crystallization processes that commonly affect zircon (e.g., radiation-damage, metamorphic recrystallization, alteration) are likely to modify its Si isotope composition, and it is, therefore, also relevant to address this issue.

The present contribution reports new Si isotope data in zircon measured by LA-MC-ICP-MS and solution MC-ICP-MS. Our results show that zircons have δ^{30}Si values ranging from -0.05 ± 0.15 and -0.64 ± 0.12 (2SE) for A-type granitoids, from -0.29 ± 0.10 and -0.83 ± 0.12 for Archean TTGs, from -0.24 ± 0.12 and -0.88 ± 0.12 for I-type granitoids, and from -0.54 ± 0.14 and -0.94 ± 0.13 for S-type granitoids. Data for the various granite types investigated here almost entirely overlap and, hence, indicate that Si isotopes in zircon are not a simple discriminant between granite types. The δ^{30}Si variations existing within each type could be a key to constrain the differentiation history of their parent melts and identify source compositions. We will present our conclusions at the conference.

[1] Iizuka et al. (2005) *Geology* **33**, 485-488. [2] Guitreau et al. (2012) *EPSL* **337-338**, 211-223. [3] Savage et al. (2012) *GCA* **92**, 184-202. [4] Deng et al. (2019) *Nat. Geosci.* **12**, 774-778. [5] Trail et al. (2018) *PNAS* **115**, 10287-10292. [6] Poitrasson (2019) *RIMG* **82**, 289-344.