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# Uranium-series evidence for variations in subduction components along the Izu volcanic arc

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Uranium-series isotopes can provide information about the time-scales of processes in subduction zones such as fluid transfer from the subducted slab to the mantle wedge, melt generation within the mantle wedge and ascent of the melts to the surface. Yet, critical aspects of these isotopic systems are not well understood. Traditionally, 238U excesses over 230Th in arc magmas has been interpreted to reflect the relative affinity of U for an aqueous fluids that transports it into the subarc mantle while Th remains immobile but recent U-Series models for the Mariana arc (Avanzinelli et al., 2012) indicate that some Th is transferred to the arc in the fluid which will affect conclusions on the time-scales of subduction zone processes. The Izu arc is highly depleted in most incompatible elements which allows components derived from the subducting slab to be more clearly identified. Samples from several islands of the Izu arc have large 238U excesses over 230Th which suggests that the compositions of magmas from this part of the Izu-Bonin-Mariana (IBM) arc are dominated by fluids derived from the subducting slab.

Trends in U-series isotopes in other arcs worldwide and in particular in the Mariana arc in the southern segment of the IBM arc have been interpreted as mixtures between fluids derived from the subducted slab and a sediment melt. Variations in U-Series isotopes within the more depleted Izu arc indicate a negligible influence of sediment melts. Instead, samples from different islands are mixtures between a fluid that is compositionally similar to the fluid end-member in the Mariana arc and the depleted sub-arc mantle. The U-series data for the Izu arc as well as differences in the enrichment in fluid-mobile elements show that the magnitude of the fluid-flux is highly variable within the Izu arc. Trends in the U-series data indicate that Th is mobilized in the fluid. Furthermore, the unusual trends in the U-series data for the Izu arc allow us to gain information about the compositions of both the fluids derived from the subducted slab as well as the sub-arc mantle.

REFERENCES:
Avanzinelli, R., Prytulak, J., Skora, S., Heumann, A., Koetsier, G., Elliott, T. (2012) Geochimica et Cosmochimica Acta 92, 308-328

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