

Iodine Budget in the Manus Back-Arc Basin: Implication for the Iodine Cycle in the Earth's mantle

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Halogens such as iodine fall into the category of conservative elements that have potential to trace degassing and recycling at subduction zones. This stems from the large halogen concentration contrast between sediments at the surface and Earth's mantle [1]. To date, progress has been impeded by the difficulty of measuring ppb levels of I (and Br) in basaltic glasses. Here, we demonstrate the potential of I in tracking slab volatile release using samples from the Manus Back-Arc Basin (MBAB) where basalts are erupted at different distances from the New Britain Trench, where current subduction is taking place.

Iodine analyses using the neutron irradiation noble gas mass spectrometric (NI-NGMS) technique [2, 3] have been performed on basaltic samples from MBAB [4]. With this new dataset, we revisit previously published data by [5] to quantify the contribution of the I-, Ba-enriched component from the slab into the pristine mantle source. Iodine content decrease when distance from the trench increase (from 135.8 ppb to 1.9 ppb). Using a mixing diagram I/Nb and Ba/Nb, we calculate that I slab contribution is about 2% in East Manus (150 Km from the trench) and dropped to 0.2‰ in MSC/ETZ region (300 Km from the trench).

[1] Muramatsu et al. (1998), *Chem. Geol.* **147**, 201-216.

[2] Kendrick (2012), *Chem. Geol.* **292-293**, 116-126.

[3] Ruzié-Hamilton et al. (submitted), *Chem. Geol.*

[4] Sinton et al. (2003), *J. Pet.* **44**, 159-195.

[5] Kendrick et al. (2014), *EPSL* **400**, 165-176.