

Metals in Magmas: Across Arc Variations in Volcanic Metals

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Arc volcanoes play an important but poorly understood role in supplying metals to the ocean and atmosphere^{1,2}. Quantifying the contribution of arc volcanism to the global metal cycle will address important questions regarding the role of volcanoes as suppliers of both environmental and economically-relevant metals to the bio- and geosphere. Basaltic scoria was sampled from 10-12 volcanoes in East Java Indonesia in order to carry out a study of metal partitioning during fractionation, sulfide, and aqueous fluid saturation. We present bulk major, trace and volatile metal compositions, and trace metal and volatile variations in glass



Figure 1: Map of sampling locations, with slab contours, depth to slab, and nearby porphyry deposits noted.

and zoned minerals. We assess hypotheses concerning primary arc-magma metal enrichment involving the transfer of metals from the downgoing slab, degassing of metals from magma, and sequestration of metals in sulphur-rich minerals at depth. We provide a foundation to building a more complete understanding of volcanic controls on metal cycling.

[1] Edmonds, M., Mather, T. A. & Liu, E. J. *Nat. Geosci.* 1–6 (2018) [2] Mather, T. A. et al. *Geochim. Cosmochim. Acta* (2012) [3] Williams, H. M. et al. *Geochim. Cosmochim. Acta* 226, 224–243 (2018).