

## What have the magmas of Indian Heaven and Mounts St. Helens, Cascades Arc, in common?

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Recent geophysical studies of the subsurface of the Cascade Range near Mount St. Helens (MSH) have indicated the possibility of a zone with distributed melt in the lower crust east of MSH directly below the Indian Heaven (IH) volcanic field [1]. It also indicates the presence of serpentized (cold) mantle lithosphere directly beneath MSH, which would be a potential barrier for magma transport and argues for eastward origin of MSH magmas and co-location of IH and MSH magmas [2].

We present new trace element and high precision isotope data on MSH (Castle Creek period) and the Quaternary IH. Trace element compositions of all IH lavas show typical arc-like signatures and are similar to MSH lavas. Few IH basalts have Sr, Ba and LREE enrichments that exceed the enrichments of the MSH lavas, but the trace element patterns of the two volcanic fields are similar. MSH and IH overlap in radiogenic isotopic (Sr, Nd, Pb and Hf) composition and are distinct from nearby Cascades magmas. Preliminary  $\delta^{18}\text{O}$  data for IH olivines range from 5.0-5.7‰, which are lower than MSH lavas which range down to 5.7‰. The trace element and radiogenic isotopes indicate that some of the IH and MSH magmas can have similar mafic parents, that the more evolved magmas at MSH have a significant crustal influence of as of yet unknown origin, and that the two volcanic fields have separate crustal plumbing systems.

[1] Hansen, S. M., et al (2016). *Nature Comm.* DOI: 10.1038/ncomms13242

[2] Kiser, E., et al (2016). *Geology* 44(6): 411-414.

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