

Tracking Calderas of the Yellowstone-Snake River Plain Volcanics: Paleomagnetic and $^{40}\text{Ar}/^{39}\text{Ar}$ Dating Results From the Picabo Volcanic Field

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The age-progressive Snake River Plain-Yellowstone Volcanics are often considered to be derived from a deep-seated mantle plume (e.g., Anders et al., 2014, GRL). Alternative explanations include a shallow mantle plume or shallow convection driven by the descending Juan de Fuca slab (REF). In order to differentiate between models, an accurate determination of the progression of volcanic centers through time is needed. However, calderas of the eastern Snake River Plain (eSRP) are overlain by up to 3 km of younger basalts, so estimates for the locations of calderas are largely based on exposures of silicic volcanic units along the margins of the eSRP.

As part of an ongoing project to date and correlate volcanic units of the eSRP, here we report paleomagnetic results from 4 volcanic units of the Picabo Volcanic Field including the Tuff of American Falls (TAF), the older Idavada Volcanics (Tivo), the Tuff of Little Chokecherry Canyon (LCC), and a tuff sampled north of Cedar Knolls (C10 & C10A). The LCC and Tivo sampling sites are on the northwestern margin of the eSRP while the TAF and C10/C10A sites are on the southeastern margin of the plain. Measurements of magnetization and alternating field demagnetization were performed in the paleomagnetism lab at Lamont-Doherty Earth Observatory. Low stability overprints were removed yielding linear single-magnetic-component decay trajectories in almost all samples. Additional samples were taken for $^{40}\text{Ar}/^{39}\text{Ar}$ dating of sanidine crystals from the Cedar Knolls (C10) sampling site and from the upper and lower Picabo Volcanic Tuff near the town of Picabo on the northwestern margin of the plain.

Paleomagnetic analysis of the TAF (previously dated at 7.58 ± 0.01 Ma, Ar/Ar; 7.91 ± 0.16 Ma, U/Pb) and Tivo (ca. 9.25 Ma) sites yield reverse-polarity magnetization. The LCC (9.46 ± 0.03 , Ar/Ar; 9.7 ± 0.12 Ma, U/Pb) site yields normal magnetization consistent with previous results from sites in the Little Chokecherry Canyon tuff. The C10/C10A sites yield normal magnetization and the upper flow unit (C10) gives a magnetization direction similar to that reported by Anders et al. (2014) for the upper unit of the Arbon Valley Tuff (Tuff A, 10.22 ± 0.01 Ma, Ar/Ar).