

New $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology of Primary Hydrous Minerals from the Karoo LIP magmas: Evidence for a Hydrated Source?

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The Karoo continental flood basalt (CFB) province is primarily located in South Africa but also contains minor exposures in Antarctica. This ~ 180 Ma province is composed of tholeiitic lava flows and sills as well as a large radiating dyke swarms. The origin of the Karoo CFB is still a highly debated topic with many different and often times conflicting models proposed. The polarity in these models often can be traced down to the degree of influence a plume and/or the sub-continental lithospheric mantle (SCLM) had during the genesis of this magmatic province [e.g., 1].

Five low-Ti sills intruded into the Western Cape Province of the Karoo basin were investigated using $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology. This portion of the Karoo CFB province is geochronologically underrepresented. These selected sills will not only continue to test the synchronicity of emplacement but are peculiar as they contain hydrated minerals (biotite and hornblende), an unusual feature for Karoo low-Ti basalts. For each sample, biotite and/or hornblende separates yielded statistically indistinguishable $^{40}\text{Ar}/^{39}\text{Ar}$ (plateau) ages as plagioclase separates. These data indicate that the biotite and hornblende found within these samples are primary features and imply that water must have been present in the magma during the crystallization of those sills.

Where does this water come from? Major and trace elements and Sr, Nd, Pb, and O isotopic data will also be presented on these rocks in order to test if the water present in the system at the time of formation came from assimilation of sediments from the surrounding basin, the upper crust, or directly from one of the mantle sources (eg, lithospheric/asthenospheric mantle metasomatized by paleo-subduction fluids) inferred in the genesis of the Karoo CFB province.

[1] Jourdan, Bertrand, Schärer, Blichert-Toft, Féraud, and Kampunzu (2007), *Journal of Petrology* **48**, 1043-1077.