

## Early-Middle Jurassic Mafic Dykes from the H.U. Sverdrupfjella, Antarctica

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The Early to Middle Jurassic break-up of Gondwana produced large-volume magmatic events, resulting in large igneous provinces (LIPs) such as the Karoo LIP in southern Africa and Ferrar LIP in East Antarctica. The Early-Middle Jurassic mafic dykes from Sverdrupfjella located in western Dronning Maud Land (WDML), Antarctica, are regarded as part of the Karoo LIP [1]. These dykes intrude both the Grunehogna Province (an Archean basement fragment in WDML thought to have been a pre-breakup constituent of the Kalahari Craton) and the Maud Province (broadly co-eval with the Mesoproterozoic Namaqua-Natal metamorphic province in southern Africa). The dykes intruding the Grunehogna Province are considered on-craton, whereas those intruding the Maud Province are considered off-craton. The geochemistry and geochronology of these dykes and basalts found in the Grunehogna Province and the Maud Province (Vestfjella, Heimefrontfjella and Kirwanveggen) have been studied by previous workers [e.g., 1] and have been categorized into two groups: low-Ti ( $\text{TiO}_2 < 2.5\%$ ) and high-Ti ( $\text{TiO} > 2.5\%$ ) groups. Based on  $^{40}\text{Ar}/^{39}\text{Ar}$  age of mafic dykes intruding the Grunehogna Province (on-craton), dyke emplacement occurred at  $\sim 178$  Ma and  $\sim 190$  Ma [1]. The Vestfjella basalts (off-craton) have K-Ar ages between 170-230 Ma, and plagioclase K-Ar ages at  $\sim 180$  Ma [2]. The Kirwanveggen basalts (off-craton) yielded a K-Ar age of  $172 \pm 10$  Ma [3]. Mafic dykes in Sverdrupfjella that intrude Early Jurassic alkaline intrusive bodies (Straumsvola, Tvora and Jutulröra) show two  $^{40}\text{Ar}/^{39}\text{Ar}$  age peaks: one at 178-175 Ma (Straumsvola) [4] and another at 206-204 Ma (Jutulröra) [5]. These dykes from the H.U. Sverdrupfjella are characterized by low  $\text{TiO}_2$  and Zr contents. The dykes from Sverdrupfjella (off-craton) strike dominantly NNE-SSW, with dip angles ranging from  $60^\circ$  to  $90^\circ$ . The strike trends are similar to equivalent dykes from the on-craton region of WDML (Grunehogna Province, Almannryggen area)

Samples collected from the Sverdrupfjella are fine to medium grained; the groundmass consists of plagioclase, augite and minor amounts of magnetite and ilmenite. Phenocrysts consist of plagioclase, olivine (with inclusions of Cr-spinel) and augite, and pseudomorphs of euhedral olivine and augite. Unaltered dyke samples will be used for age determination using  $^{40}\text{Ar}/^{39}\text{Ar}$  data. Rb-Sr and Sm-Nd isotopic systematics will be used to evaluate mantle sources and crustal contamination. Initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios and Nd epsilon values of unaltered samples will be used to test models of derivation and petrogenesis. Isotopic ratios of  $^{87}\text{Sr}/^{86}\text{Sr}$  ranging from 0.703361 to 0.711183, and  $^{143}\text{Nd}/^{144}\text{Nd}_{180}$  epsilon values from 1 to -13 [6] would support derivation from heterogeneous mantle sources with melts affected by crustal contamination. Geochemical and geochronological data for the Early-Middle Jurassic dykes from Sverdrupfjella will be used to determine whether there is any overlap with similar data from the Karoo and Ferrar LIPs.