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Magnetic Fabrics in the Bjerkreim Sokndal Layered Intrusion

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The Bjerkreim Sokndal (BKSK) layered intrusion in Southern Norway covers 230 km2 and was emplaced 930 Ma ago by several pulses of jotunitic magma. It forms a syncline with strong foliation on the limbs. The rocks consist of plagioclase-pyroxene cumulates, and contain two magnetic minerals, magnetite and hemo-ilmenite. Earlier studies suggest that the remanent magnetization in the rocks is carried by lamellar hemo-ilmenite. Hemo-ilmenite displays a strong anisotropy of magnetic susceptibility and therefore we are interested in the magnetic fabrics of the rocks from the BKSK intrusion. Magnetic fabrics have been characterized for 60 sites, with a main focus on the so-called MCU IVe' unit, which generates a strong negative aeromagnetic anomaly. In order to define the carriers of the magnetic fabrics, anisotropy of anhysteretic remanent magnetization (AARM), anisotropy of isothermal remanent magnetization (AIRM) and anisotropy of thermal remanent magnetization (ATRM) were measured in addition to low-field anisotropy of magnetic susceptibility (LF-AMS). AIRM and ATRM were partially demagnetized in an attempt to isolate the magnetic fabrics due to high-coercivity hemo-ilmenite. Initial results show a strong AARM which is coaxial to the LF-AMS. Partially demagnetized AIRM and ATRM are not significant. This indicates a strong contribution of a low-coercivity phase such as magnetite. The high-coercivity hemo-ilmenite anisotropy could not be isolated in samples that contain both magnetite and hemo-ilmenite. Samples that are free of magnetite show a strong LF-AMS, but anisotropy of remanent magnetization is in general not significant. This suggests that higher fields would be needed to isolate the hemo-ilmenite fabric. Mineral fabric data will be used to determine whether the magnetite anisotropy is influenced by the orientation of hemo-ilmenite lamellae.