

Magma emplacement mechanisms and syn-magmatic deformation – a new approach to the Knaben area in Vest Agder, Norway

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The Knaben area, known for its molybdenite mining, defines a N-S striking (~30° dip towards the east) belt, consisting of porphyry granite with a varying density of amphibolite and varieties of deformed granite, lying within the Sirdal Magmatic Belt, is important for understanding the emplacement- and deformation mechanisms of the batholith. Detailed geological mapping combined with geochronology, geochemistry, and structural geology will be the focus areas. Last autumn's fieldwork indicated that several of the formerly mapped enclaves of amphibolite and deformed granite are more coherent than previously indicated, and some have been followed for a few kilometres. Several varieties of granite make up the area, mainly a dominating red porphyry granite, and a grey molybdenite-bearing finer grained granite. Structural investigations revealed consistent “top to the west” compressional kinematics on mappable shear zone networks often displaying west-directed duplex geometries. The Knaben area could possibly comprise a boundary between two individual plutons in the Sirdal Magmatic Belt, or a zone with remaining host rock. Geochronology of the eastern and western plutons will be done. Currently, largely different paleomagnetic vectors of the eastern and western porphyry granites indicate that they are separate plutons. Exploring how the emplacement- and deformation mechanisms have acted and are related, will be one of the main objectives. If the deformed granite is host rock, or syn- to post-magmatic deformed porphyry granite has been one of the major questions. A better understanding of the formation of the Knaben area, also regarding the emplacement of molybdenite, will prove useful for understanding the regional batholith, and possibly the possibility for molybdenite to occur elsewhere. The Sirdal Magmatic Belt, and also Knaben, seem to be of great value for studying magmatic processes.