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Crustal structure and post-collisional exhumation of the Øygarden Complex, SW Norway Caledonides

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The Øygarden Complex (ØC) represents the southwestern-most basement window in the Norwegian Caledonides. It is interpreted as a part of the Baltican continental margin that was subducted and metamorphosed during Scandian continent collision, yet, the crustal structure and the exhumation mechanism of this metamorphic complex are poorly constrained.
Continuous coastal exposures provide an excellent opportunity to study the internal structure of the basement window. We present a newly compiled geologic map of the ØC, a 3D network of detailed structural cross sections, U-Pb zircon geochronology of migmatites and preliminary Ar-Ar mica ages from ductile-to-brittle shear zones. The crustal structure of the ØC is characterized by distinct structural levels, which appear to be decoupled by weak décollements. These shear zones developed preferentially in phyllonitic amphibolites. Upper structural levels show rather localized ductile deformation with top-to-E kinematics. In contrast, lower structural levels reveal distributed ductile flow with top-to-W kinematics and high-strain zones, which show progressive strain-localization during retrograde deformation. Foliation trajectories of migmatitic gneisses define strongly elongated domal structures, which are oriented parallel to linear ductile fabrics and correlate with pronounced magnetic anomalies. Based on field-based observations and new geo-/thermochronological data we discuss the post-collisional exhumation history of the ØC. We evaluate exhumation as a metamorphic core complex and suggest possible implications for early Devonian post-orogenic exhumation of deep crustal levels in the Scandinavian Caledonides.