

Process-oriented gravity modelling of the Northern Scandes

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The Northern Scandes are associated with a prominent isostatic gravity low located westward of the main topography. Different origins have been proposed as a connection to the Transscandinavian Igneous Belt or a deep crustal origin. A shallow origin is often preferred from gravity and magnetic data. Earlier studies along the Blue Road profiles showed only a moderate increase of crustal thickness from the coast beneath the mountains. The profile is, however, located at the southern end of the isostatic gravity anomaly.

New crustal thickness estimates based on the receiver experiments Scanlips -2 and Scanlips-3D show that the isostatic anomaly is underlain by a very thick crust, which explains most of the gravity anomaly. The area is however not in isostatic equilibrium with respect to simple local isostasy.

An additional factor is the flexural rigidity of the lithosphere, which might have prevented local isostatic equilibrium and kept parts of the Northern Scandes geometry unaffected by later tectonic events, as for example the collapse of the Caledonides. We discuss the consequences and implications and illustrate the evolution of the crustal geometry by process-oriented gravity modelling.