



Structural and Density Configuration of the Lithosphere of the greater Barents Sea/Kara Sea Region

Peter Klitzke (1), Jan Inge Faleide (2), Judith Sippel (1), and Magdalena Scheck-Wenderoth (1)

(1) Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Potsdam, Germany (klitzke@gfz-potsdam.de),

(2) Department of Geosciences, University of Oslo, Oslo, Norway

The Barents Sea and Kara Sea continental shelves situated in the European Arctic, are characterised by a complex tectonic history. Three major overlapping orogenies (Timanian, Caledonian, Uralian) in late Precambrian to Paleozoic times and recurring phases of rifting and subsidence contributed to a complicated crustal structure and the formation of deep sedimentary basins differing fundamentally in their geometry between the western and the eastern Barents Sea.

This study presents new information on the large-scale structural setting as well as to the density composition of the lithosphere in the greater Barents Sea and Kara Sea region. Therefore, a consistent 3D-structural model has been developed which resolves five sedimentary megasequences, the crystalline crust and the lithospheric mantle. The structural model has been assigned with physical properties in order to refine it via 3D gravity modelling. The final 3D model indicates the presence of high-density bodies at the base of the crust beneath the following regions: the southwestern and eastern Barents Sea basins, the South Kara Sea basin, Svalbard and the thick Cenozoic depocentres (trough mouth fans) along the continent-ocean boundary of the western Barents shelf. Additionally, the lithospheric mantle exhibits elevated densities in the East Barents Sea and the South Kara Sea. The distribution of the mantle mass surpluses coincides strikingly with areas that experienced less erosion in the late Cenozoic. This indicates a connection between the deeper lithospheric density configuration and surficial processes.