



4D Arctic: Structure and evolution of Arctic crust and mantle based on multi-scale geophysical studies

Carmen Gaina (1), Ivan Koulakov (2), Jan Inge Faleide (1), and Johannes Schweitzer (3)

(1) University of Oslo, Center for Earth Evolution and Dynamics CoE, Department of Geosciences, Oslo, Norway
(carmen.gaina@geo.uio.no), (2) Institute of Petroleum Geology and Geophysics, Novosibirsk, Russia, (3) NORSAR, Norway

Arctic geological history contains many grey zones. In particular, the structure of the lithosphere and the spatial and temporal interaction between the crust and upper mantle has been meagerly explored, yet it may hold some of the answers for the formation of passive margins, sedimentary basins, oceanic bathymetric features and volcanic provinces. As part of an interdisciplinary collaborative project between Norway and Russia, we aim to build multi-scale models that will unravel the structure and evolution of Arctic's crust and mantle and their interaction through time. In this contribution we will review the present status of knowledge regarding the present structure of the Arctic crust and mantle, and the tectonic evolution of this region since the Late Jurassic.

To infer first order outlines of major tectonic blocks, boundaries between continental and oceanic areas, crustal heterogeneities and ages of oceanic crust, we have used the magnetic and gravity anomaly maps of the Arctic region (Gaina et al., 2011 and Saltus et al., 2011) and other available geological and geophysical data. A much more detailed upper mantle structure could be deciphered from the recently published three dimensional model of P velocity based on tomographic inversion of ISC global data (Jakolev et al., 2012). These datasets and models are jointly interpreted and a preliminary scenario for the Arctic region evolution since the Late Jurassic is presented.

References

Gaina, C. et al. (2011) Geol. Soc. London, Memoirs 35; 39-48.
Jakolev et al. (2012) Russian Geology and Geophysics, 53; 963-971
Saltus et al. (2011) Geol. Soc. London, Memoirs 35; 49-60.