

**Structure and evolution of the Arctic in the light of new geophysical compilation and regional kinematics**

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New Circum-Arctic maps of magnetic and gravity anomaly have been produced by merging regional gridded data. Satellite magnetic and gravity data were used for quality control on the long wavelengths of the new compilations. The new Circum-Arctic digital compilations of magnetic, gravity and some of their derivatives have been analyzed together with other freely available regional and global data and models in order to provide a consistent view of the tectonically complex Arctic basins and surrounding continents. In particular, available tomographic models have been also scrutinised and evaluated for their potential to reveal the deeper structure of the Arctic. Tectonic boundaries (including continent-ocean boundaries and sutures) have been mapped mainly based on potential field data and their derivatives. In areas where the crustal age remains speculative we compare the crustal thickness derived from gravity inversion with other geophysical constrains. Based on our data analysis, we present a kinematic scenario as part of a larger tectonic framework, where subduction of the Pacific and South Anyui oceans led to the opening of the Amerasia Basin, motion between the North American plate relative to a fixed Eurasian/Lomonosov plate led to opening of small basins between the Lomonosov Ridge and Alpha Ridge area, and a mantle thermal anomaly (precursor of Iceland hotspot?) weakened the crust along the north/northeast part of the American craton facilitating the opening of the Canada Basin, rifting in the Baffin Bay and creating a zone of weakness in the area of future Eurekan orogeny.