Geophysical Research Abstracts
Vol. 13, EGU2011-2004-2, 2011
EGU General Assembly 2011

Mantle gravity anomalies in Greenland

Andrew N. Grushinsky (1) and Evgeny D. Koryakin (2)

(1) Institute of Physics of Earth, Russian Academy of Sciences, Moscow, Russian Federation (a.grushinsky@mail.ru), (2) Sternberg Astronomical Institute, MSU, Moscow, Russian Federation

We calculated mantle gravity anomalies in Greenland based on the density model of the Earth crust that has been derived by us earlier. It consists of 5 layers: ice/water, sediments, upper crust, middle crust and lower crust. We processed each layer separately. This allows estimating the gravity effect of each layer individually, and finding out to which extent contributions from each layer partly compensate each other.
It was found, that the main features of mantle anomalies appear in more or less all sets of anomalies.
The most important features are as follows:
1. Anomalies are positive over land nearly everywhere and negative offshore.
2. Exceptions from this rule are also very characteristic: The continuation of the negative anomaly zone on the sea in the fracture zone at the north-eastern part of the Labrador Sea and the east of the Davis Strait.
3. High positive anomalies occur in the paleorift zone in the Baffin Bay and Labrador Sea.
4. A belt of the negative marine mantle anomalies continues clearly along the line from the Elsmore Island to the Makarov Basin.
Furthermore, we should note the deep negative anomaly in the north of the central part of Greenland's eastern shore. This anomaly takes place in all kinds of gravity anomalies, i.e. Bouguer, Glenny and topographic reductions. It also appears clearly in the isostatic residuals indicating, firstly, overcompensation, and, secondly, that it is of mantle and, most likely, dynamical origin.
As result of our analysis, we assume that Greenland exhibits a deep root, the density of which is less than normal mantle density.