

Contributions to contemporary sea-level and geoid changes about Greenland

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Kevin Fleming

GeoForschungsZentrum - Potsdam, Telegrafenberg, Potsdam, Germany

kevin@gfz-potsdam.de

Contributions to sea-level and geoid change about Greenland arising from glacial-isostatic adjustment (GIA) have been assessed. Those assessed are divided between the effects of changes in ice loading occurring outside of Greenland, particularly North America, following the Last Glacial Maximum (LGM, *ca.* 21 ka) and those arising from changes in the Greenland Ice Sheet (GIS). The GIS's contribution may be further divided into past and current changes in the ice sheet.

It is found that the ongoing GIA from past ice-load changes outside of Greenland is sufficient to contribute a change of several mm yr^{-1} over the entire island, particularly in the west. GIA from changes in the GIS following the LGM override this signal, although this is strongly modified by the neoglaciation. The resulting predictions, which also accommodate current changes in the GIS, were compared with results from tide-gauge data. However, large discrepancies are apparent, not least due to problems with resolving secular trends from the observations owing to the availability of usually only very short time spans (<10 years).

The present-day changes in the GIS and their influence on the contemporary geoid were examined using two different mass-balance descriptions: 1) a full ice-sheet model obtained from air-borne laser altimetry surveys and 2) a model describing changes above *ca.* 2000 m found from GPS surveys. Change in the geoid are dominated by ice-mass losses below 2000 m, and in fact, considering an estimated accuracy for the geoid temporal-change signal from the GRACE gravity space mission, regional variability in the present-day mass balance of the GIS may be resolved.