Sea level in Thule measured with tide gauge, GNSS-IR and Satellite Altimetry

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Recent studies show that under the right conditions relative sea level can be measured using GNSS interferometric reflectometry (GNSS-IR). We test the possibility of using an existing GNET GPS station in Thule, Greenland, to measure interannual changes in sea level by comparing sea level measurements from GNSS-IR with tide gauge observations and satellite altimetry data. GNET is a network of 56 permanent GPS stations positioned on the bedrock around the edge of the Greenland ice sheet with the main purpose of monitoring ice mass changes. Currently, Thule is the only location in Greenland where we have both a tide gauge and a GPS station that is suitable for sea level measurement covering the same time period for more than a couple of years. If successful a number of other GPS stations are also expected to be suitable for GNSS-IR measurements of sea level. However, they lack the tide gauge station for testing.

We compare the measured sea level with uplift measured using the GPS and modeled from height changes of the Greenland ice sheet as well as sea surface temperatures and modeled sea level changes from gravimetry, in order to investigate the origin of sea level changes in the region.