



Regional Sea level change in the Arctic Ocean from a combination of radar and laser altimetry, tide gauges and ocean models

Ole Baltazar Andersen, Yongcun Cheng, and Tina Hvid
DTU Space, Geodesy, Copenhagen, Denmark (oa@space.dtu.dk)

Lack of adequate spatial and temporal sea level observations in the Arctic Ocean is one of the most challenging problems in the study of changes in sea level and ocean circulation in the Arctic Ocean today. Especially as sea level variation in the Arctic Ocean plays an important role in the global climate system.

Only a few tide gauges with long time series exists (1933-> present). Preliminarily investigations show that several of these are not indicative of sea level changes but rather of changes in river flows due to their position so a careful editing is required.

The use of satellite altimetry (1992->present) is hampered due to a suite of problems. The error on sea level recovery increases, standard retracking removes most data in areas of sea ice and furthermore most of the Arctic is not covered due to the inclination of the satellites. Only the radar altimeters on board ERS and ENVISAT and the laser altimeter on board ICESAT have so far provided (sparse) information about Arctic sea level change.

However the presence of seasonal ice coverage makes studies of sea level variations difficult. Initially a new global model for the annual sea level variation (DTU10ANN) have been developed by merging hydrodynamic modeling and satellite altimetry. This model is then applied to the satellite altimetry from ENVISAT and ICESAT for the subsequent studies of sea level variations in the Arctic region. This significantly improves both the determination of the tides but also the determination of long term sea level variations. The presentation is a contribution to the EU supported projects MONARCH and MyOcean.