



Validation of CryoSat-2 derived lake and fjord levels in Denmark

Karina Nielsen, Lars Stenseng, Heidi Villadsen, Ole B. Andersen, and Per Knudsen
National Space Institute, DTU, Kgs. Lyngby, Denmark (karni@space.dtu.dk)

The ESA satellite Cryosat-2, launched in 2010, is the first mission that carries a radar altimeter, which is able to operate in Synthetic aperture radar (SAR) mode. Compared to conventional altimetry, the SAR mode provides a much higher resolution in the along-track direction, which for Cryosat-2 is approximately 300 m. This higher resolution opens new possibilities with respect to monitoring and modeling of inland water bodies, since much smaller bodies can be observed than previously.

Retracking of the SAR waveform is essential to obtain accurate water levels used in hydrological modeling. It is therefore important to evaluate and validate the accuracy of the retrackers. In this study, which is part of the FP7 project Land and Ocean take up from Sentinel-3 (LOTUS), we process the ESA SAR L1b Baseline B data product, using various retrackers, to derive water levels in Danish lakes and fjords. Denmark is an excellent test area, since there are a large amount of lakes and fjord systems ranging from a few km² to 100 km², which enable us to test our retrackers on different water conditions. Based on a statistical analysis we evaluate the performance and stability of the different retrackers. To validate our results, we compare the retracked water levels with the SRTM digital elevation model (DEM) and a high resolution Danish DEM, with a grid size of 1.6 m.