



Validation of CryoSat-2 derived lake levels

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The SIRAL altimeter on-board the ESA satellite CryoSat-2 is the first radar altimeter that is capable of operating in synthetic aperture radar (SAR) mode. The SAR technology provides a much higher along-track resolution compared to conventional altimetry. The higher resolution makes it possible to accurately monitor much smaller water bodies than previously.

In this study, which is part of the FP7 project Land and Ocean take up from Sentinel-3 (LOTUS), we examine and validate Cryosat-2 derived lake levels and as a reference we compare our results with lake levels based on Envisat data. As a test case we consider 5 lakes; Vänern (Sweden), Okeechobee (Florida, US), Arresø, Mossø, and Skanderborgsø (Denmark), which are ranging from approximately 9 km² to 5655 km². We estimate the along-track precision and the accuracy by validating the estimated lake levels with gauge data from Okeechobee and Vänern. We find that the precision based on CryoSat-2 increase significantly for small lakes compared to Envisat. Despite the spatially varying lake crossings, Cryosat-2 is able to provide lake level time series of a quality that is comparable to or better than Envisat. Hence, these results demonstrate the promising possibilities of the upcoming mission Sentinel-3, which potentially will be able to provide accurate time series for small lakes.