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50-year Nordic and Arctic Sea Level reconstruction based on a reprocessed two Decade Altimetric Sea Level Record and Tide Gauges.

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For ocean and climate research it is essential to get as accurate long-term altimetric sea level data as possible. Whereas the accuracy of the altimetric time series is nearly un-interrupted and of high quality in the Nordic Seas, the accuracy is frequently degraded in the interior of the Arctic Ocean due to the presence of seasonal or permanent sea ice.
We have reprocessed ERS-1/2/Envisat satellite altimetry to develop an improved 20-year sea level dataset for the Nordic Seas and Arctic Ocean adding in recent retracked Cryosat-2 to bring the record up to 2014.
Nordic and Arctic sea level reconstructions present a substantially different set of challenges from global sea level reconstructions. In particular, tide gauge records are scarce and often short, and in many cases located in rivers, necessitating a number of modifications to existing reconstruction techniques. By using the 20 years reprocessed altimetry records we attempt to establish the preconditions for a stable reconstruction of Arctic sea level from 1950 to today. This includes quality criteria for the tide gauge records -such as allowable trends - and regularization details of the fit.