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High resolution Global gravity field from retracked 2-Hz ERS-1 altimetry

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All present global marine gravity fields are based on the 1Hz (6km resolution) ERS-1 Geodetic Mission (GM) altimeter data along with other altimetric data. Close to the coast ($<$ 25 km) investigations by Trimmer (2004) have demonstrated that the altimetric gravity fields determination degrades due to a combination of several factors. By starting out from the original waveform data and retracking the entire ERS-1 GM mission using a highly advanced expert based system of multiple retrackers the return time from both the open sea surface and from all ice-covered regions within the coverage of the ERS-1 can be derived with higher accuracy that presently available.

This presentation describes the combined effort in improving the ERS-1 GM dataset through retracking and regression to 2 Hz (3 km) and its effect on gravity field modeling close to the coast.

The use of 2Hz data should enable a better determination of gravity field related signal both in the deep ocean but particularly in shallow water/coastal regions. Close to the coast the expert re-tracking system will result in considerable more data and at a higher resolution than present in the standard dataset.

Extensive comparisons carried out at the National Geospatial-Intelligence Agency is also presented to document the findings.