

Sea Level Variability from ERS-1, ERS-2 and TOPEX/POSEIDON

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Abstract

Since the launch of TOPEX/POSEIDON (T/P) in August 1992, several altimetric satellites (T/P, ERS-1 and ERS-2) are flying simultaneously. While T/P with its unprecedented accuracy has provided a new picture of the ocean, it cannot observe the full spectrum of the sea level and oceanic circulation. At least another mission is needed to resolve the mesoscale oceanic circulation. The ERS satellites are thus an excellent complement of T/P sampling. Results of the merging of T/P and ERS-1/2 data will be presented. The methodology is based on a reduction of ERS orbit error using T/P as a reference. The ERS orbit error is thus reduced to a level comparable to T/P orbit error (i.e. 2 cm). High resolution maps of sea level anomaly are then obtained with an improved objective analysis method of multiple altimeter data sets. Analysis of maps obtained with T/P and ERS-1/2 alone and with the combination of the three satellites are performed to analyse the consistency of the data sets and the additional information provided by the combination of T/P and ERS-1/2. A global statistical description (frequency/wavenumber spectrum, Reynolds stresses) of the mesoscale variability based on these data sets is then performed. Finally, results on regional analysis in the Mediterranean sea and North Eastern Atlantic are given. They show that the merged data set provides a unique description of mesoscale circulation and that new features of the circulation (e.g. development and propagation of Algerian eddies in the Mediterranean sea) are revealed. *Keywords: altimetry, ocean circulation, sea level, merging, mesoscale (max. 6)*