Recent applications of FEOM and TsunAWI: regional and global experiments

S. Harig, **D. Sidorenko**, **Q. Wang**, **R. Timmermann**,
C. Wekerle, **N. Rakowsky**, **S. Danilov** and **J. Schröter**

Alfred Wegener Institute for Polar and Marine Research
Am Handelshafen 12
Bremerhaven, Germany
sven.harig@awi.de

We present the recent status and applications of the unstructured mesh ocean models TsunAWI and FEOM (Finite Element Ocean Model) currently under development at AWI.

TsunAWI is a wave propagation model based on the nonlinear shallow water equations and employing the $P_1^{NC}-P_1$ element pair in triangular meshes of regional and global extent. The model is optimized and validated in academic test cases and realistic events with measured data as well. Recently TsunAWI was used to simulate the tsunami caused by the M_w 8.8 earthquake on 27 Feb 2010 offshore the coast of Chile. We present model results in a global mesh with high resolution in the source area and at tide gauge locations. The results compare well with buoy and tide gauge data as well as satellite altimetry data.

The 3D ocean general circulation model FEOM was recently applied in the setting of the Coordinated Ocean-Ice Reference Experiments (CORE I). The global mesh has horizontal resolution varying from 1/5 ° near the coast to 1 ° in the deep ocean, and 43 unevenly spaced z-levels in the vertical. The heat, fresh water and momentum forcing is computed using the atmospheric fields and bulk formulae provided by Large and Yeager (2004). The model was run for 500 perpetual years. It is shown that FEOM performs very well compared with the previous CORE I results.

Examples of regionally focused studies will be presented to show FEOM's advance in oceanographic applications.

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