Session: C28 Poster: W49B

A mimetic discretization of the ocean primitive equations

Peter Korn[†]; Stephan Lorenz; Ralf Moller
[†] Max Planck Institute for Meteorology, Germany
Leading author: peter.korn@zmaw.de

The Max Planck Institute for Meteorology and the German Weather Service have been collaborating closely through the ICON project to develop new coupled atmosphere-ocean general circulation models for climate research and numerical weather forecasting (for a general overview see the poster by Giorgetta et al.). As a member of the ICON modeling system a new ocean model has been developed. This poster provides an overview of the ICON ocean model with an emphasis on the dynamical core. The three-dimensional, hydrostatic, Navier-Stokes equations on the rotating sphere and with a free surface are solved on a triangular z-coordinate grid. In order to obtain conservation of discrete dynamical invariants a new spatial discretization has been developed that is based on the method of mimetic finite differences. We describe the properties of the discretized equation and present a sequence of simulations. The numerical experiments range from unforced two-dimensional simulations to three-dimensional stratified flow simulations with wind forcing an realistic topography.