Geophysical Research Abstracts, Vol. 9, 07529, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07529

On the consideration of ocean tides in a baroclinic OGCM

M. Thomas (1) and H. Dobslaw (1)

(1) Institute for Planetary Geodesy, Dresden University of Technology

Generally, oceanic mass redistributions are attributed to contributions from gravitational tides and those from the general, i.e., thermohaline, wind-, and pressure driven circulation. Analogously, numerical global ocean models are still divided into ocean general circulation and tidal models. However, it is unclear if disregarding non-linear interactions by a linear superposition of both dynamical components is accurate, especially with respect to frequencies that are typical for both circulation and tides.

Here, a model approach is described allowing a simultaneous calculation of the ocean's general circulation and tides. In contrast to partial tide models, tidal dynamics are deduced from the complete luni-solar tidal potential derived from the positions of moon and sun without decomposition into fourier components. The application of the complete astronomical forcing and the non-linear model equations implicitly allow for interactions between partial tides and, consequently, the generation of shallow water tides in a baroclinic ocean. The importance of non-linear interactions between circulation induced and tidal dynamics with respect to short-term mass redistributions as well as the impact of sea-ice on ocean tides will be estimated.