Geophysical Research Abstracts
Vol. 13, EGU2011-9264, 2011
EGU General Assembly 2011

Contributions of bottom pressure and steric signals to regional sea level variability: Extracting the physics from numerical models.

Christopher W. Hughes (1), Joanne Williams (1), Rory Bingham (2), Chris Wilson (1), and Vladimir Stepanov (3)
(1) National Oceanography Centre, Liverpool, United Kingdom (cwh@pol.ac.uk), (2) University of Newcastle, (3) University of Reading

Using data from an ocean model at 1/12 degree resolution, a similar model at 1/4 degree resolution, and a barotropic model at 1/4 degree resolution, in comparison with satellite altimetry, we investigate the causes of sea level variability and the regional variability of those causes. We find that barotropic processes explain a large fraction of the variability in bottom pressure even on interannual time scales, and that these barotropic processes have a characteristic frequency spectrum quite different from the spatially variable spectrum of the steric signal. This raises the quesion of whether coastal sea level is better thought of as either bottom pressure or total sea level. At first glance, the data seem consistent with coastal sea level being dominated by barotropic processes, with the steep continental slope acting as a barrier to most of the steric signal associated with mesoscale variability. However, a small difference in the slopes of coastal sea level spectra in barotropic and full baroclinic models points to a more subtle indirect influence of baroclinic processes which comes to dominate at the longest time scales. We also present preliminary investigations into how deterministic modelled sea levels are, for a given wind stress forcing.