Geophysical Research Abstracts
Vol. 15, EGU2013-4212, 2013
EGU General Assembly 2013

Robustness of the interdecadal variability of the overturning circulation in presence of eddy turbulence and bottom topography

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Intrinsic interdecadal variability arises spontaneously in idealized ocean circulation models when the overturning (dissipation) is large (low) enough, at low resolution. The existence of a critical threshold for the horizontal eddy diffusivity in the range of observational estimates legitimates some doubt on the relevance of such oscillations in the climate system. In addition, bottom topography may add some damping to the variability.
Previous idealized experiments are reproduced with adequate horizontal resolution to resolve mesoscale eddies using different numerical models (ROMS, HYCOM), and implementing various shapes of bottom topography. Interdecadal variability is ubiquitous in these simulations and appears even more robust to bottom topography when mesoscale eddies are resolved. Attempt is made to rationalize the changes in the variability period and structure through linear stability analysis. Simplified shallow-water models are used to quantify the role of the interactions with bottom topography.