



## **Multidecadal oscillations of the thermohaline circulation: bottom topography damping vs. atmospheric forcing stochastic excitation**

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Flat-bottom idealized-geometry ocean models forced by fixed surface buoyancy fluxes show generic bifurcations towards multidecadal oscillations when the overturning circulation is large enough or the eddy-dissipation reduced. These oscillations are prevented in the presence of large-scale bottom topography like a Mid-Atlantic Ridge. Here we address this issue through a multimodel approach, using both z-coordinates (MOM), terrain-following (ROMS) and isopycnal (HYCOM) models.

First we verify the ubiquity of these generic oscillations, including source and damping processes. We distinguish two main damping processes and quantify their relative influence:

- (1) the damping of Rossby basin modes through bottom-topography interactions;
- (2) the changes in the mean circulation with bottom topography that no longer supports unstable linear modes.

On the contrary, stochastic NAO-like atmospheric forcing maintains these oscillations against bottom topography damping. The opposite influence of these processes on the multidecadal variability is investigated for actual North-Atlantic Ocean conditions.