Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10844, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10844
EGU General Assembly 2008

Barotropic Modes of the Mascarene Basin

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The Indian Ocean displays a large variety of bathymetric features, with ridges, oceanic plateaus and continental islands outlining a considerable number of abyssal plains. Consequently, barotropic variability in the Indian Ocean is strongly controlled by bathymetry, and is in many cases organized in spatially coherent modes.

Case in point is the Mascarene Basin, where current meter observations have shown the presence of strong bi-monthly oscillations. In this presentation we will test the hypothesis that this oscillation is caused by resonant excitation of a barotropic Rossby basin mode of the Mascarene Basin.

Normal mode analysis in a barotropic shallow-water model, configured to represent the Mascarene Basin, turns up several modes with bi-monthly time scale. We will show that one of those matches the observations particularly well. This mode can be described as the fundamental basin mode of a basin tilted with respect to due north.