



Normal modes of the Australia-Antarctic basin

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It is well known that the circulation in the Southern Ocean is strongly controlled by bathymetry. In particular, studies of altimeter data and numerical models have uncovered areas of exceptionally high sea-surface height variability associated with abyssal plains. It has been suggested that this variability is related to the excitation of barotropic normal modes, trapped by almost-closed contours of f/H .

A notable example, and focus of this study, is the Australia-Antarctic Basin. We will present results from a normal mode analysis that show that the Australia-Antarctic Basin indeed houses several non-oscillatory barotropic normal modes. The projection time series of these normal modes onto altimeter-based sea-level anomalies are significantly coherent with wind stress curl, suggesting excitation due to Ekman pumping. The coherence analysis suggests a very rapid decay time scale on the order of a few days, in agreement with earlier results from the OCCAM model. Such rapid decay is consistent only with values of bottom friction or lateral viscosity that are on the high side of published estimates.