Title: Understanding the effect of bottom topography on the dynamics of the Southern Ocean and Chandler wobble using an eddy-resolved ocean dynamics model

The aim of this project was investigating the effect of bottom topography on the dynamics of the zonal flows in the Southern Ocean and determining the influence of the resulting oceanic currents on the Earth's Chandler wobble. The project was a collaboration of Dr. Karabasov's group in Queen Mary University of London and Prof. Kamenkovich's group in Rosenstiel School of Marine and Atmospheric Science, University of Miami. The fellow, Dr. Elnaz Naghibi, had a presentation on "The effect of bottom topography on the dynamics of the Southern Ocean and its role in the Chandler wobble excitation" in AGU Fall Meeting, New Orleans, December 2017. She also visited Rosenstiel School of Marine and Atmospheric Sciences, University of Miami in December 2017-January 2018 to start a collaboration and gave a talk there on "Mesoscale ocean modelling using high-resolution computational methods: oceanic turbulence effect on the Chandler wobble dynamics". Both the conference participation and the visit were supported by InterRidge/ISA Endowment Fellowship.

The Southern Ocean embraces the most powerful current on the Earth, the Antarctic Circumpolar Current, and is reported to play a dominant role in polar motion excitations [1, 2, 3]. The meso-scale dynamics of the Southern Ocean is highly dependent on its bottom topography [4, 5]. Following the Ph.D. project on the interactions of the Chandler wobble and North Atlantic, Dr. Naghibi has been studying the Southern Ocean dynamics and its effect on Earth rotation under the partial support of InterRidge Fellowship. She has been using high-resolution as well as reduced-order models to compute the forcing terms of Chandler wobble for the Southern Ocean region. For high-resolution modelling of the Southern Ocean, she has been using both inhouse quasigeostrophic package in Queen Mary University and the more advanced ocean model, HYCOM (HYbrid Coordinate Ocean Model), with realistic continent boundaries and bottom topography by the specialized help and support of Prof. Kamenkovich. Based on her preliminary analysis, the Southern Ocean contributes dominantly in the motion term of the Chandler wobble excitation. The results are now being compared with geodetic observations of the Chandler wobble excitation and will be reported in journal articles.

Reference:

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