Session title: G03g - Time-Variable Gravity Field
Session type: IAG (Geodesy)
Symposium: G03
Presentation number: IUGG19-3379

Abstract title:

Seamount growth to be observed in future satellite gravity missions

C. Braitenberg[1], D.F. Barbolla[2], F. Brandolin[1], T. Pivetta[1].
[1]University of Trieste, Department of Mathematics and Geosciences, Trieste, Italy.
[2]University of Salento, Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, Lecce, Italy.

Growing seamounts bear a hazard to navigation, especially if their summit reaches shallow depths and they reach the ocean surface. A seamount that expands up to the surface and creates an island, is detectable by remote sensing images, but not if the island retracts below the surface. Real time gravity observations detect the mass change independently of the optical detection, the limiting factor being only the noise level of the data acquisition in relation to the signal generated by the mass change. Starting from realistic size-frequency distributions of seamounts, we estimate the expected signals of seamount growth. We develop a method to compare the signal to the spectral noise characteristics of a GRACE-type mission, expandable to a possible mission with improved noise curve. We evaluate the expected gravity changes of seamounts and find that a noise curve of GRACE improved by a factor 10 would be sufficient to detect a realistic sea mount growth with a latency of 1 year. The detection threshold though has a tradeoff with the time resolution, since resolution improves for increased time periods over which the satellite observation can be averaged.