

How to identify oceanographic variations undetectable in the satellite gravity missions.

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By precise measurements of variations of the gravity field, the satellite gravity missions are expected to detect mass movement of the solid earth, the atmosphere, the ocean, snow and ice. Among them, the ocean, that has more mass than the atmosphere, and that is more variable than the solid earth, is expected to be one of the most detectable source of the gravity variations.

Most of variations in the ocean is, however, confined in the upper layer, so the pressure variations (namely, variations of the mass above) in the deep ocean is much smaller due to baroclinic density structure of the ocean. The pressure gradient in the deep ocean is related to the barotropic current and deep-ocean current. Considering spatio-temporal scales of these phenomena, known oceanographic variations are sorted whether detectable or not in the satellite gravity missions.

In addition, possibility of the satellite gravity to detect some new oceanic variations is to be considered.