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# Satellite gravity : a probe on Earth's system dynamics

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## Abstract

Since 2002, the GRACE satellite mission has been measuring the time variations of Earth's gravity field from space, revealing the mass displacements associated to a wide range physical processes within the Earth's system, from the depth of the core to the top of the atmosphere. From 2009 to 2013, the GOCE satellite mission allowed us to map globally, for the first time, the tiny variations of Earth's gravity vector : the gravity gradients. In contrast with classical scalar observations on the gravity intensity, the vectorial nature of gravity is taken into account with GOCE, bringing a lot more information on the geometry of the masses. Here, we discuss how GRACE and GOCE have advanced knowledge on the dynamics of our planet and its surrounding fluid layers, and questions raised in the context of the Microscope mission.

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