

# The Contribution of Global Geodetic Observations to Understanding Dynamic Earth Processes

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The Earth is a dynamic system—it has a fluid, mobile atmosphere and oceans, a continually changing global distribution of ice, snow, and water, a fluid core that is undergoing some type of hydromagnetic motion, a mantle both thermally convecting and rebounding from the glacial loading of the last ice age, and mobile tectonic plates. In addition, external forces due to the gravitational attraction of the Sun, Moon, and planets also act upon the Earth. These internal dynamical processes and external gravitational forces exert torques on the solid Earth, or displace its mass, thereby causing the Earth's figure, rotation, and gravitational field to change. Geodetic observing systems, both space-based and ground-based, provide the measurements of the Earth's figure, rotation, and gravitational field that are used to study these dynamical processes and the response of the Earth to them. Geodetic observations also provide the metrological foundation for Earth observations and provide the means to determine mass transport in the Earth system. Geodetic observations are therefore a cornerstone of the Earth observing systems needed for scientific research and societal applications. In this presentation, selected examples of the contribution of geodetic observations to understanding the dynamic Earth system will be presented.

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