



## **Effects on the Earth's shape due to ocean mass redistributions from GRACE observations in a warming climate**

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The Earth's ice cover is melting in more places and at higher rates than at any time since record keeping began. Recent satellite observations and results from around the world show that global ice melting accelerated during the 1990s-which was also the warmest decade on record. This enhanced melting is among the first observable signs of human-induced global warming, caused by the unprecedented release of carbon dioxide and other greenhouse gases over the last century. Loss of the ice would not only affect the global climate, but also would raise sea levels and influence the Earth rotation and possible Earth's shape. For example, the total ocean mass variations through the input of land water from glaciers cause the secular oceanic bottom pressure (OBP) anomalies and such OBP changes will possibly affect the Earth's shape. In this paper, the secular OBP data are obtained from GRACE measurements (2002-2008). It has been shown that regionally distinct patterns of bottom pressure anomalies emerge in the Southern and Northern Hemispheres due to spatially inhomogeneous warming and ocean circulation change and a net mass transfers from the Southern to the Northern Hemisphere. As the OBP anomalies are directly proportional to mass load anomalies, the secular OBP variations result an asymmetrical variation of the Earth's shape. Next step, we will further analyze its possible mechanism.

Key words: Earth shape; Oceanic mass redistribution; GRACE