



## Mass Transports, Space Geodesy and the Ocean

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In this review we present results from the impact of the space geodetic missions GRACE and GOCE on oceanography. In combination with satellite altimetry GOCE provide a dynamic ocean topography (DOT) which is used for assimilation in ocean models. Their accuracy and high resolution is sufficient to identify large scale differences between ocean modelling and measured DOT. This will require new efforts in ocean modelling. GRACE measures mass redistribution on the Earth which is mostly useful for hydrology, glaciology and solid Earth studies. For oceanography mass change can be converted to bottom pressure change which influences the circulation field. Further it allows us to close the mass budget of the ocean and separate density and mass contributions to sea level change. Finally, we have now reached a level of understanding that allows the joint estimation of geodetic and oceanographic state variables.