

**Mass flux measurements from the GRACE Mission**

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The mass transport between the earth's atmosphere, oceans and solid earth is a critical component of global climate change processes and is an important component of the signals associated with global sea level and polar ice mass change, depletion and recharge of continental aquifers, and change in the deep ocean currents. This mass exchange has a gravitational signal, which can be monitored as an indication of the process. The Gravity Recovery and Climate Experiment (GRACE) is a joint NASA and DLR mission whose purpose is to improve our understanding of the Earth's dynamical system by making pioneering measurements of the gravity signals associated with mass exchange between its components. The primary objectives are to measure: 1) the Earth's time-averaged gravity field over the mission life and 2) the monthly variations in the gravity field at wave lengths between 400 and 4000 km. The major cause of the time varying mass is water motion and the GRACE mission is providing a continuous, multi-year record characterizing the seasonal cycle of mass transport between the oceans, land, cryosphere and atmosphere; its inter-annual variability; and the long period components of the mass transport. Measurements of continental aquifer mass change, polar ice mass change and ocean bottom currents are examples of new remote sensing capabilities enabled by the GRACE satellite measurements. This presentation will briefly review the overall measurement concept and discuss examples of recent results, which are related to climate studies. Finally, the presentation will describe the improvement expected with the planned RL05 data release and the potential contribution to contemporary climate science studies.