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Separation of gravitationally consistent sea-level and circulation-induced bottom pressure variations from GRACE

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The melting of the large ice caps or mountain glaciers, and the net-runoff and surface flux changes from other terrestrial storages causes the sea level to vary in time. However, sea level change is not globally uniform, but varies spatially due to self-attraction of masses at the continents, and deformations of the sea-floor in response to surface mass loads. The effects of removing mass from a single region as Greenland or Antarctica is usually called a sea-level fingerprint; and the physical model conventionally applied to calculate this effect is the sea-level equation.

The Gravity Recovery and Climate Experiment (GRACE) has delivered more than 15 years of data of time-variable gravity fields. In this presentation, we will demonstrate that spatially variable sea-level changes and circulation-induced bottom pressure variations can be unambiguously separated from the (properly post-processed) monthly gravity fields. Sea-level variations over the past 15 years will be reported individually for various regions of the world. The separated mass grids of sea-level change and circulation-induced bottom pressure variability are available from GFZ's newly launched GRACE Level-3 data portal