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Separating GRACE-based ocean bottom pressure estimates into wind-driven circulation signatures and spatially variable mass-induced sea-level changes

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The melting of the continental ice caps and mountain glaciers or the unsustainable pumping of groundwater resources and its subsequent discharge into the ocean through rivers causes the barystatic part of the global mean sea-level to vary slowly in time. In addition, the mass-induced sea-level does not change uniformly, but varies spatially due to self-attraction of masses at the continents and in the atmosphere, and due to deformations of the sea-floor in response to surface mass loads. The consequences of removing mass from a single location is usually called the sea-level fingerprint of that region, and the physical model conventionally applied to calculate the spatially variable effect is known as the sea-level equation.

The Gravity Recovery and Climate Experiment (GRACE) has collected more than 15 years of sensor data that allow for the quantification of large-scale mass re-distributions on the globe, and the GRACE-Follow On (GRACE-FO) mission launched in May 2018 is currently continuing that record. Based on the latest RL06 of monthly-mean gravity fields processed at GFZ, residual wind-driven bottom pressure signatures and the mass-induced spatially variable sea-level changes are unambiguously separated from each other. Contemporary spatially-variable barystatic sea-level trends will be discussed separately for various densely populated coastal regions in both Europe and Asia. Results will be available for download via gravis.gfz-potsdam.de.