



Recovery of regional water mass variations over Africa using GRACE satellite gravimetry

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Time series of regional $2^\circ \times 2^\circ$ Gravity Recovery and Climate Experiment (GRACE) solutions of surface water mass change have been computed over Africa (30°W 60°E 40°S 40°N) from 2003 to 2011 with a 10-day resolution by using a new regional approach. The advantages of using such solutions are a significant reduction of aliasing errors that produce North-South striping, as well as more accurate spatial localizations of hydrological structures. We propose a validation of our regional solutions over the African continent in order to demonstrate their ability to describe water storage change as a response of climate forcings. Principal Component Analysis (PCA) of these regional water mass maps is applied to separate different climatic modes of variability, and each spatial and/or temporal mode remains consistent to other independent datasets. We also study the possibility to detect the multi-years signals from deep water layers, in particular in the northern desert regions, and confront them to groundwater model outputs. Finally, the contribution of the terrestrial water storage to sea level are estimated at different spatial scales: from the largest watersheds (Congo, Nile, Niger, Okavango, ...) to the continental scales.