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Drought detection in the Murray-Darling basin from space gravity and hydrologic observations

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GRACE geoid data were used to monitor and analyse the severe multi-year drought of Murray-Darling river basin in Australia for the recent period (08/2002-07/2007). The GRGS/CNES 10-day solutions up to degree 50 (i.e., spatial resolution of ˜400 km) were used to estimate time-series (and associated uncertainties) of water volume change over this ˜1 millions of km2 region and revealed a significant decrease of water mass versus time of ˜100 cubic km. Annual averages of GRACE-derived water storage were compared to in-situ observations of surface waters and showed a correlation of 98%. In this semi-arid region of Australia, groundwater represents the larger part of the total water loss (70%) during the drought, thus showing the capability of GRACE to detect and monitor variations of shallow groundwater.