
S1-05 Hydrogravimetry to investigate water storage changes: the case of the AMMA-CATCH Djougou site in northern Benin

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Résumé

In July 2010, a permanent superconducting gravimeter (OSG-60) was installed in the frame of the GHYRAF (Gravity and Hydrology in Africa) Project in West Africa at the Djougou station (northern Benin). This meter is part of IGETS (International Geodynamics and Earth Tide Service) since its geographical location of primary importance for the worldwide network coverage due to lack of stations in the equatorial zone. This station is also part of the AMMA-CATCH long-term hydrological observing system providing a wide variety of hydrological information available for seasonal and long-term studies.

We present the main results obtained after 8 years of continuous SG measurements in terms of instrumental drift, noise level, calibration using parallel FG5 absolute gravimeter measurements, and gravity response to tides, atmospheric pressure and Earth rotation changes.

One of the goals in installing this SG was to monitor integrated water storage changes (WSC) in the sensitivity zone around the gravimeter by observing temporal gravity changes and compare them with point-scale hydrological measurements, such as water table depth or neutron probe monitoring.

We will report on hydrological results obtained by applying a hybrid gravimetric approach to the investigation of WSC in the Ara catchment, near Nalohou. This means that, in addition to the permanent SG observations and episodic absolute gravity measurements, we also rely on the repetition of micro-gravity observations with a portable spring meter on a local network of 14 stations.

Finally, our ground gravity results will be compared to space gravity observations from GRACE using mass concentration (mascon) solutions.

Mots-Clés: gravity, water storage changes, Ara catchment

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