The Djougou (Benin, West Africa) permanent superconducting gravity station: 2010 – 2016

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In July 2010, a permanent superconducting gravimeter (OSG-60) was installed in the frame of the GHYRAF (Gravity and Hydrology in Africa) Project, in sub-Humid West Africa at the Djougou station (northern Benin). This meter is also part of the IGETS project, since its location is very interesting in terms of network coverage due to the poor presence of stations around the equator. This station is as well part of the AMMA-CATCH long term hydrological observing system, so we have a wide variety of hydrological information available on the long term.

We present the main results obtained after almost 6 years of continuous SG measurements in terms of instrumental drift, noise level, estimate of the SG transfer function, calibration results using parallel FG5 absolute gravimeter measurements, influence of the instrument shelter and gravity response to atmospheric pressure changes.

The main goal of 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. The gravimeter is also sensible to precipitation amounts, but the retrieval of the local evapotranspiration signal is limited by 1. The building size, 2. The lack of knowledge of lateral transfers and 3. The strong S1 and S2 pressure signal in this subtropical zone. More generally the WSC will be compared to the ones observed in West Africa by GRACE satellites.