



A comparative analysis of the water budget changes from GLDAS hydrological model and satellite derived observations, Case Study: Lake Victoria Basin

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The aim of this study is to evaluate differences of the equivalent water variations of the Lake Victoria basin from 2003 to 2008 derived from Gravity Recovery and Climate Experiment (GRACE) along with the results of Jason1 altimetry mission with the Global Land Data Assimilation System (GLDAS).

In general, surface water of the lake, together with ground water, soil moisture and snow constitute stored water. Changes in the Lake Victoria level are related to the variations of the water stored in its basin, which contributes 20% of river discharge and 80% direct rainfall. In order to monitor the whole water changes, we assumed that changes in the local gravity variations of the basin are directly related to the changes in stored water. Analysis of monthly geoid model (realize 04 of the GRACE level-2 data) from 2003 to November 2006 also revealed a trend in the decline of the basin's stored water with a rate of 5.5 mm/month. However, because of the El Niño phenomenon in November 2006 this rate is computed around 2.5 mm/year from 2003 to 2008. Similarly, during the same period Jason1 mission altimeter data shows a descending mean height level with a rate of 29 cm/year from 2003 to November 2006. On the other hand, the amounts of water variation derived from analysis of GLDAS water budget data are much less than altimetry results and has some differences when compared to GRACE results. Consequently, it seems that the whole water volume from the lake is not wasted completely and might stay in the lake basin. However, it is necessary to improve the hydrological models with using satellite altimetry and terrestrial water storage data. The detailed outcomes will be presented in the full paper.