



Estimation of crustal vertical displacements in Amazon basin due to hydrological loading effects analysed by GPS and GRACE observations

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The Amazon Basin is the world's greatest hydrological basin having a huge variation on hydrological cycle and therefore the greatest variation in hydrological loading on Earth. The Earth's crust respond elastically to this load variations, causing a vertical displacement of the crust in the order of several centimeters.

Permanent GPS stations installed in the Amazon basin have been used to measure the loading effects. The raw GPS data from this stations can be processing using several techniques, among which stands out the PPP (Precise-Point-Positioning). According to this method the daily coordinates of each station are estimated independently as they are not correlated . This is great alternative to using a network strategy, since it prevents error accumulation and contamination of the coordinates originating from other GPS stations in the network. For this reason PPP approach can be more appropriated to get the vertical displacement of stations in the Amazon basin.

In the present work we use the Gins-PC software developed at CNES / GRGS. We discuss the capability of the PPP strategy implemented in GINS-PC in catching the crustal displacements due to hydrological loading effects. We focused the analysis on the two extreme events (flood and drought) that occurred in the basin in july 2009 (flood) and October 2010 (drought).

These extreme hydrological events are also described by water level variation using altimetry data from the Jason-2 and ENVISAT missions and the GRACE data converted to hydrologic load and radial displacements. The overall consistency of these independent datasets is presented.