



## **Comparisons of observed and modeled elastic responses to hydrological loading in the Amazon Basin and application to the levelling of water level gauges.**

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In various regions on the Earth, vertical crustal displacements derived from hydrological loading effects (VCD-HL) cannot be neglected and should be included in the list of corrections to be applied to time series. Yet, no standard global model exists to take this effect into account. In the Amazon basin, neglecting this effect in the vertical component of GPS series may significantly impact the precision of geodetic experiments like network surveying, tide gauge leveling, or satellite altimeter calibration. VCD-HL are derived from rheological models coupled with either time variable gravity field (TVGF) measurements or hydrological data. In the present study we compare the monthly vertical component of 18 GPS sites located in the Amazon basin, with the deflection models derived from Gravity Recovery and Climate Experiment (GRACE) observations with data produced by different analysis centers on the one hand and derived from different types of hydrological model, on the other hand. The GPS data set includes the largest deflections by hydrological loading ever recorded at two stations located in the center of the basin. We show that the GRACE solutions produced by GRGS best explain the hydrological loading effects observed in the GPS series over Amazon basin. We also present applications of this result in terms of time varying levelling of gauges.