



Multi-year GNSS monitoring of atmospheric IWV over Central and South America for climate studies

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Atmospheric water vapour has been acknowledged as an essential climate variable. Weather prediction and hazard assessment systems benefit from real-time observations, whereas long-term records contribute to climate studies. Nowadays, ground-based GNSS products have become widely employed, complementing satellite observations over the oceans. Although the past decade has seen a significant development of the GNSS infrastructure in Central and South America, its potential for atmospheric water vapour monitoring has not been fully exploited.

With this in mind, we have performed a regional, seven-year long and homogeneous analysis, comprising 136 GNSS tracking stations, obtaining high-rate and continuous observations of column integrated water vapour and troposphere zenith total delay (Bianchi et al. 2016). As preliminary application for this data set, we have estimated local water vapour trends, their significance, and their relation with specific climate regimes.

We have found evidence of drying at temperate regions in South America, at a rate of about 2% per decade, while a slow moistening of the troposphere over tropical regions is also weakly suggested by our results. Furthermore, we have assessed the regional performance of the empirical model GPT2w to blindly estimate troposphere delays. The model fairly reproduces the observed mean delays, including their annual and semi-annual variations. Nevertheless, a long-term evaluation has shown systematical biases, up to 20 mm, probably inherited from the underlying atmospheric reanalysis.

Additionally, the complete data set has been made openly available at a scientific repository (doi:10.1594/PANGAEA.858234).

References:

C. Bianchi, L. Mendoza, L. Fernandez, M. P. Natali, A. Meza, J. F. Moirano, Multi-year GNSS monitoring of atmospheric IWV over Central and South America for climate studies, *Ann. Geophys.*, ISSN 0992-7689, eISSN 1432-0576, 34 (7), 623–639 (doi:10.5194/angeo-34-623-2016).