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**The Issue of Stochastic Constraints Used for Zwd Estimation from GPS Observations: The Case of Tropical Regions**

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**Abstract Text:**

A better understanding of tropical weather processes is necessary to improve numerical weather models, which are not fully satisfactory in tropical regions. Water vapor has a key role in these atmospheric processes and precipitable water vapor (PWV) is a widely employed quantity to study these processes and compute water budgets. PWV can be retrieved with an accuracy of about  $1 \text{ kg.m}^{-2}$  from the zenithal wet delays (ZWD) estimated during GPS data processing. In that perspective, six permanent GPS stations have for instance been deployed in West Africa within the framework of the African Monsoon Multidisciplinary Analysis (AMMA) project.

The current quality level of PWV could be reached thanks to successive improvements of the mapping functions used (NMF  $\rightarrow$  GMF  $\rightarrow$  VMF1) and of the a priori ZHD retrieved from meteorological models. However, standard GPS data processing does still not optimally take into account the climatic variability across stations and time: the stochastic constraints used for ZWD estimation are generally the same regardless of the station and of its local weather. This non-optimal modelling of GPS data affects the accuracy of GPS-derived PWV and is therefore one limiting factor for weather and climate studies. The purpose of this study is to quantify the influence the stochastic ZWD constraints on PWV, especially at tropical GPS stations and suggest possible improvements.

**Session Selection:** Climate and Meteorological Studies Employing Ground-based GNSS/GPS Techniques

**Title:** The Issue of Stochastic Constraints Used for Zwd Estimation from GPS Observations: The Case of Tropical Regions

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**Preferred Presentation Format:** Poster Requested

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