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Precipitable water and water vapour transport over West Africa from GPS data and ECMWF analysis during the AMMA project

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The time evolution of precipitable water (PW) and water vapour transport (WVT) over West Africa is studied for year 2006. PW data are derived from the AMMA (African Monsoon Multidisciplinary Analysis) - GPS network. WVT is computed from ECMWF operational analysis. Humidity and wind fields from ECMWF analysis are first validated with the help of GPS PW data, and radiosonde humidity and wind profiles. Two time scales are more specifically investigated: the seasonal cycle and the diurnal cycle. The seasonal cycle is marked by a strong average PW during the Monsoon season and small PW during the dry season. The dry season exhibits strong modulations at timescales of 10-40 day, while the wet season shows weaker and shorter (3-15 day) modulations. These modulations are shown to be connected to large-scale atmospheric dynamics. A significant diurnal cycle in the tropospheric humidity over Sahel is also revealed from GPS PW observations. The spatio-temporal variability of these water vapour modulations, both over the region (between the Guinean coast and the near Sahara) and during year 2006, are discussed.