



A high quality reprocessed GPS integrated water vapour dataset for atmospheric process studies, model evaluation and assimilation into HYMEX SOP reanalysis

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Data from the 970 ground-based GPS receivers in France, Italy, Spain, Portugal and Morocco have been reprocessed in a consistent way using GIPSY-OASIS II software for the period from 1st September 2012 to 31 March 2013 which encompasses the Special Observation Periods (SOP 1 and 2) of the HYMEX project. The number of sites per country is: 544 (France), 147 (Italy), 231 (Spain), 43 (Portugal) and 5 (Morocco). The reprocessed GPS tropospheric delay data set is screened and validated, and used to evaluate the operational GPS data assimilated into numerical weather prediction models. The mean of delay differences between the operational and reprocessed solutions is about 0 +/- 3 mm (mean +/- standard deviation of bias over all stations) and the standard deviation of delay differences ranges between 4 and 8 mm. Significant bias reduction is thus expected from a reanalysis ingesting the reprocessed delay data. Various methods and auxiliary data (surface pressure and weighted mean temperature) are investigated for the conversion of delay data have been into integrated water vapour. The final integrated water vapour dataset is used to evaluate radiosonde humidity observations and mesoscale model simulations. The spatial and temporal distribution is studied with a focus on heavy precipitation events in the north-western Mediterranean area during the HYMEX SOP1 and 2.