



Evaluation of ERA-Interim for tropospheric delay and water vapour estimation in different climate zones using ground-based GNSS observations

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Tropospheric delay and integrated water vapour (IWV) derived from climate reanalysis models, such as that of the European Centre for Medium-range Weather Forecasts (ECMWF) namely the ECMWF ReAnalysis-Interim (ERA-Interim), are widely used in many geodetic and atmospheric applications. Therefore, it is of interest to assess the quality of these reanalysis products using available observations. Observations from Global Navigation Satellite Systems (GNSS) are, as of now, available for a period of over 2 decades and their global availability make it possible to validate the zenith total delay (ZTD) and IWV obtained from climate reanalysis models in different geographical and climatic regions. In this study, a 5-year long homogeneously reprocessed GNSS data set based on double differenced positioning strategy and containing over 400 globally distributed ground-based GNSS stations has been used as a reference to validate the ZTD estimates obtained from the ERA-Interim climate reanalysis model in 25 different climate zones. It has been studied how the difference between the ERA-Interim ZTD and the GNSS-derived ZTD varies with respect to the different climate zones as well as the topographic variations in a particular climate zone. Periodicity in the ZTD residuals in different climate zones has been analyzed. Furthermore, the variation of the ZTD differences with respect to latitude has been presented. Finally, for one GNSS station in each of the 25 climate zones, IWV derived from ERA-Interim has been compared to the IWV derived using GNSS observations.