



The importance of GPS-derived precipitable water for the validation of numerical weather prediction models in polar regions

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The advantages of GPS observations compared to other precipitable water (PW) measurement techniques are their high temporal resolution on the one hand and their independence of weather conditions on the other hand. PW from GPS has proven to be highly accurate. We computed precipitable water from one decade of GPS observations in combination with surface meteorological data.

Based on these time series a validation of the precipitable water in the global numerical weather prediction model of the National Center for Environmental Prediction (NCEP) was carried out. For Antarctica the agreement in PW between the model and the analysis was found to be poorer than in other regions. The seasonal signal in the precipitable water is underestimated in NCEP by 25% over Antarctica. The comparison also reveals that inter-annual variations are smaller in the analysis results than in the GPS PW. Additionally, subdaily variations observed in the GPS PW are not resolved from the model for most of the antarctic stations. GPS observations assimilated in numerical weather prediction models could help to improve the analysis in data sparse regions such as Antarctica.