



Investigation of long-term trends in water vapour using the Swedish GPS network

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The Global Positioning System (GPS), as well as other Global Navigation Satellite Systems (GNSS), can be used as a tool to estimate the Integrate Precipitable Water Vapour (IPWV). This is done by estimating the delay of the GPS signals in the due to water vapour along with other unknown parts of the GPS phase observations in a GPS processing, then the delay can be related to the amount of water vapour. Mainly two processing strategies are used today. One is a network solution where data from several GPS receivers in a network are analysed together. The other is Precise Point Positioning (PPP) where every station is analysed individually, using the satellite orbits and clocks estimated e.g. from a network type of solution.

The Swedish geodetic reference network (SWEPOS) consists of 21 geodetic GPS stations which have been operational since 1993. These data are today an interesting source of information in order to assess long term trends in the IPWV. We have processed these data using both a network solution (with the GAMIT software) and PPP solution (using the GIPSY-OASIS II software). We present the obtained trends in water vapour from these solutions and estimate their uncertainty. By comparing the IPWV time-series from the two solutions, we investigate the different errors introduced by the two solutions. For example, how the two solutions react to a change of the protective radome. We also make comparisons with radiosonde data for the GPS stations close to radiosonde launch sites.