

The improvement of GPS-derived PWV accuracies using solid earth tide models based on local measurements

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We investigate the influence of contemporary solid earth tide models, in particular the IERS2003 model, on the integrated precipitable water vapour (PWV) obtained from the South African permanent networks of dual-frequency Global Positioning System (GPS) receivers. One of the International GNSS Service (IGS) stations analysed, SUTH (located at the South African Astronomical Observatory, Sutherland), is collocated with a superconducting gravimeter from which vertical earth tide displacement data are obtained for comparisons with the IERS2003 model and GPS measurements. It is illustrated that the global earth tide model over-estimates the crust's local vertical displacement. It is further shown that the model errors will contribute to significant errors in the consequently derived PWV. Finally, a number of strategies, including a novel method for measuring earth-tide with GPS, are presented to improve solid earth tide modelling during GPS processing.