

The semidiurnal variation in GPS-derived zenith neutral delay

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Zenith neutral delay (ZND) estimates derived from ground-based GPS receivers exhibit variations at harmonics of the solar day. The aim of this work is to characterize the semidiurnal (S2) variation and determine its probable origin.

Data from 100 GPS sites are compared with surface pressure measurements to reveal close agreement between the estimated ZND S2 variation and the S2 surface pressure tide. Error analysis suggests that the S2 variation in ZND estimates is not due primarily to orbit, solid earth, or Earth orientation modelling errors. Atmospheric loading and mapping function errors are each expected to contribute less than 11% to the estimated ZND S2 amplitude. Local incongruities reflect the influence of water vapour or site dependent errors.