Home
Online Library ACP
- Recent Final Revised Papers
- Volumes and Issues
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD
Alerts & RSS Feeds
General Information
Submission
Review
Production
Subscription
Comment on a Paper

Volumes and Issues Contents of Issue 12

Atmos. Chem. Phys., 7, 3143-3151, 2007
www.atmos-chem-phys.net/7/3143/2007/

Asymmetricity of ground-based GPS slant delay data

R. Eresmaa, H. Järvinen, S. Niemelä, and K. Salonen
Finnish Meteorological Institute, Erik Palménin aukio 1, 00100 Helsinki, Finland

Abstract. The ground-based measurements of the Global Positioning System (GPS) allow estimation of the tropospheric delay along the slanted signal paths through the atmosphere. The meteorological exploitation of such slant delay (SD) observations relies on the hypothesis of azimuthal asymmetry of the information content. This article addresses the validity of the hypothesis.

A new concept of asymmetricity is introduced for studying the SD observations and their model counterparts. The asymmetricity is defined as the ratio of the absolute asymmetric delay component to total SD. The model counterparts are determined from 3-h forecasts of a numerical weather prediction (NWP) model, run with four different horizontal resolutions. The SD observations are compared with their model counterparts with emphasis on cases of high asymmetricity in order to see whether the observed asymmetry is a real atmospheric signature.

The asymmetricity is found to be of the order of a few parts per thousand. Thus, the asymmetric delay component barely exceeds the assumed standard deviation of the SD observation error. However, the observed asymmetric delay components show a statistically significant meteorological signal. Benefit of the asymmetric SD observations is therefore expected to be taken in future, when NWP systems will explicitly represent the small-scale atmospheric features revealed by the SD observations.

Final Revised Paper (PDF, 336 KB) Discussion Paper (ACPD)

Citation: Eresmaa, R., Järvinen, H., Niemelä, S., and Salonen, K.: Asymmetricity of ground-based GPS slant delay data, Atmos. Chem. Phys., 7, 3143-3151, 2007. Bibtex EndNote Reference Manager