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Estimation of Atmospheric Delay with the JMA-NHM and Its Application to InSAR

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The baseline solutions observed by global positioning system (GPS), electro-optical distance measurement (EDM) or interferometric synthetic aperture radar (InSAR) generally include an error due to atmospheric delay. The methods to correct this error with the grid-point values (GPVs) of various numerical weather models have been researched since Ichikawa *et al*. (1995), Shimada (1999), and recently applied to the volcanological monitoring GPS and EDM data with the mesoscale analysis (MANAL) of the Mesoscale Model (MSM) which is a Non-Hydrostatic Model (JMA-NHM) of the Japan Meteorological Agency (Takagi *et al*., 2010a, 2010b). In this presentation, we report the method to estimate the slant delay in troposphere and lower stratosphere at observation time with the time-interpolated GPVs derived from downscaling the JMA-NHM which is also used to make the MANAL (operational resolution is at 5 km grid size and total of 50 vertical levels). Using GPVs showing potential temperature, pressure and mixing ratios of water vapor, we calculated the refractive indices to transform the atmospheric delays. Then, we applied the method to the InSAR data before unwrapping for the purpose of monitoring the ground deformation in the volcanic area.

Under the estimation of atmospheric delay, the optimization of downscaling JMA-NHM, the direct use of the zenith total delay calculated in MANAL which has operationally assimilated GPS precipitable water vapors since October 2009 (Shoji *et al*., 2009) and others are future works.

References
Ichikawa, R., M. Kasahara, N. Mannoji and I. Naito, 1995: Estimations of atmospheric excess path delay based on three-dimensional, numerical prediction model data. *J. Geod. Soc. Japan*, **41**, 379-408.

Shimada, M., 1999: Correction of the satellite's state vector and the atmospheric excess path delay in the SAR interferometry -An application to surface deformation detection-. *J. Geod. Soc. Japan*, **45**, 327-346.

Shoji, Y., T. Iwabuchi, Y. Hatanaka, H. Seko, R. Ichikawa, R. Ohtani and N. Mannnoji, 2009: GPS meteorology: Research on the construction of GPS water vapor information system and application to meteorology, geodesy, and hydrology. *J. Geod. Soc. Japan*, **55**, 17-38.

Takagi, A., K. Fukui and Y. Shoji, 2010a: GPS baseline solutions with tropospheric correction by using the JMA numerical weather model for monitoring volcanoes. *Bull. Volcanol. Soc. Japan*, **55**, 1-12.

Takagi, A., K. Fukui, T. Shimbori and S. Iijima, 2010b: Atmospheric correction in EDM by using the JMA numerical weather model: Application to measurement at Asamayama volcano. *Bull. Volcanol. Soc. Japan*, **55**, 41-51.

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