D124-P018 **Room: Poster Session Hall** **Time: May 16**

Comparison between GPS PWV and PWV derived from Meso-scale objective analysis data in Izu-Oshima island

Marie Hirata[1]; # Shigeru Nakao[1]; Yuichi Morita[2]

[1] Kagoshima Univ.; [2] E.R.I. Univ. of Tokyo

Morita et al.(2004) reported that baseline lengths elongate in summer and shorten in winter in the Izu-Oshima GPS dense network. These episodic changes in baseline lengths correlate to seismic activities in 8 years. However, these episodic deformations are artificial if an estimation of zenith troposphere delay (ZTD) does not succeed in the GPS analysis. We try to compare the meteorological data to estimated ZTD due to confirm the status of these estimations. ZTD is able to separate two parts: zenith hydrostatic delay (ZHD) and zenith wet delay (ZWD). ZHD is mainly due to dry air and can be calculated using surface pressure measurement. ZWD is caused by water vapor. We can obtain ZWD by subtracting ZHD from ZTD. Precipitable Water Vapor (PWV) is proportional to ZWD. If the amount of PWV from GPS analysis (GPSPWV) is the same as that of PWV derived from Meteorological data, the estimation of ZTD succeed in the GPS analysis. Then, these episodic changes are true crustal deformation. As there is no meteorological data in height direction in Izu-oshima, GPS PWV is compared with PWV derived from Meso scale objective analysis data by JMA (MesoPWV). These data are provided on the grid points whose interval is 10 km horizontally every 6 hours.

GPS data of the dense GPS network in Izu-Oshima are analyzed by BERNESE GPS Software Ver. 5.0 BPE together with selected GEONET in Kanto and Tokai district and TSKB IGS sites. IGS precise ephemeredes are used. ZTD is estimated with the Niel mapping function every hour. We analyzed the GPS data in January 21 and 22, February 14, 15, 22 and 23, July 10 and 11, and August 24 and 25, 2005.

GPS PWV is calculated by following Iwabuchi et al. (2000). Temperature at GPS sites in Izu-Oshima is extrapolated from temperature at Izu-Oshima weather station by temperature lapse rate, 0.5 degrees Celsius per 100 meters. Then, atmospheric pressure at GPS sites in Izu-Oshima is estimated by extrapolated temperature at GPS site, atmospheric pressure at the weather station and height difference between a GPS site and the weather station. On the other hand, MesoPWV at grid points estimated as follows; an amount of water vapor in every layer is estimated relative humidity and saturated water vapor density. MesoPWV is calculated from the amount of water vapor by integration for vertical direction. We selected the nearest grid to GPS sites and height correction to MesoPWV is carried out. MesoPWV is extrapolated down to the actual surface when a model surface of Meso scale objective analysis data is higher than the height at a GPS site. On the contrary the model water vapor below the actual surface is subtracted from MesoPWV.

Time series of MesoPWV and GPSPWV indicate good agreement except for rapid change in GPSPWV. This disagreement causes difference of time resolution. Mean value of difference between MesoPWV and GPSPWV is 0.22 mm and its RMS is 5.70mm. Averages of the difference in summer (July and August) and winter (January and February) are 1.40 mm and -1.21 mm, respectively. It seems that there is no difference between in summer and in winter. GPS analysis can estimate troposphere parameters well. We can conclude that changes in baseline length are not artificial phenomena but true crust deformation.