POSITIONING PRECISION EVALUATION OF GPS- COMPARISON WITH GPS-PWV AND SONDE-PWV-

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Global positioning system (GPS) is a well-known method for precise geodesy of crustal movement. A receiver on ground measures microwaves emitted by GPS satellite. One can estimate the distance between satellites and the receiver from the propagation speeds of radio wave. Recently, from a quantity of delay of radio wave propagation by water vapor pinched GPS satellite and a receiver on ground, we are going to get information about water vapor distribution in atmosphere. In this way from GPS as fix, to the use as GPS at a point of view of meteorology thrives, too. Otani and Nito [1999] examined precipitable water vapor (PWV) in Japan using GPS observation data (GPS-PWV), and compared it with that from radiosonde observation (sonde-PWV). The difference is about 4.0mm with r.m.s on an average. In this study, we made a GPS campaign observation from 27 to 29 on June in 1999 at the station of Toyama University on the Jodo sumit of Tateyama Mountains and compared the GPS-PWD data with sonde-PWV data launched at Kurobe Dam during the same period. We carefully examined the meteorologic situations, water vapor contents observed with radiosonde at every hundred meters of altitude, and also the trajectory of the sonde.

The value that took away sonde-PWV from GPS-PWD is 4.4mm on an average this time, it is likely that two precipitable water vapor is harmonic. More the following results come out, when they compare it with trajectory of sonde. Average of bias at sonde flies in the 6000m sky, and leaving it more than 5km becomes than about 5mm. Against this, average of bias at it flies in the 6000m sky, and leaving it 5km as follows becomes 3.1mm. Bias has occurred with this. A cause of bias, GPS-PWD is originally average quantity for heterogeneity atmosphere, in particular, when GPS converts a quantity of atmosphere delay from being cross into a being vertical course, it regard atmosphere as stratified structure.