Precipitable water vapor change obtained from GPS in the north Thailand

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We have been performed GPS measurements to investigate the water vapor change at KogMa stations and Chiang Mai meteorological station in the north Thailand. We processed their data to obtain the precipitable water vapor since March 2003.

The GAMIT/GLOBK ver.10.31 software was used in the processing, and data of 7 IGS stations, Usuda, Wuhan, Lhasa, Guam, Darwin, Cocos Island, and Singapore were used as fiducial stations.

Precipitable water vapor (PWV) obtained at KogMa between 2003 and 2007 is 5 - 15 mm in the dry season and about 40 mm in the wet season. That at Chiang Mai is 15 - 30 mm in the dry season and about 60 mm in the wet season. It has similar change every year, but it is larger in October and December 2005 than that in other years. This period was pointed out that La Nina occurred by Japan Meteorological Agency. Though we compared the PWV change with the sea surface temperature of the western Pacific Ocean and South China Sea, we cannot find the significant relation between them.

The elevation at KogMa is 1364 m and that at Chiang Mai is 314 m and their elevation change is more than 1000 m, but the horizontal distance is only 8.4 km. Therefore we thought that the PWV difference of the two stations shows the water vapor of the layer between 314 m and 1364 m (lower layer) and that that at KogMa shows the water vapor above 1364 m (Upper layer). PWV is 5 - 15 mm both in upper and lower layer in the dry season, and it is about 40 mm in the upper layer and 20 mm in the lower layer.

We also obtained the relative humidity in the lower layer and compared them to that at Chiang Mai. These are almost the same value in the wet season but that at Chiang Mai is larger than that in the lower layer in the dry season. It shows that the surface atmosphere has more moisture then the mean of the lower layer.