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04–07 November2014, Bali-Indonesia DEVELOPMENT OF METHOD FOR EXTRACTING LOW-LEVEL TROPOSPHERIC MOISTURE CONTENT FROM GROUND BASED GPS DERIVED PRECIPITABLE WATER VAPOR (PWV) Aries Kristianto1,*), Tri Wahyu Hadi 1), and Dudy Darmawan Wijaya2) 1)Graduate Program of Earth Sciences, Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia 2)Graduate Program of Geodesy and Geomatics Engineering, Faculty of Earth Sciences and Technology, Bandung Institute of Technology, Indonesia *)E-mail: ariesmed@yahoo.com ABSTRACT Water vapor in the lower troposphere (low-level moisture) plays an important role in the development of deepconvection over tropical region.The vertical profile of atmospheric moisture has been conventionally observed using radiosonde but the temporal and spatial resolutions are very low. On the other hand, recent development Global Positioning System (GPS) satellite data processing makes it possible to estimate the total moisture content in an atmospheric column as Precipitable Water Vapor (PWV) with far better temporal and horizontal resolution.However, for tropical meteorological studies, close monitoring of the changes in low-level moisture ismore important.We developed a simple but effective technique to extract low-level (from surface up to 700 mb level) tropospheric moisture content from ground based GPS derived PWV.In this method, the upper-level PWV is estimated from global data and then subtracted from the total PWV. First, we analyze GPS data observed on July 27 – August 2, 2010 at GPS-BAKO station (6.4910 S - 106.8490 E) during which radiosondes were also lauched at 6-hour interval. Upper-level PWV was calculated from three global datai.e. gridded GPS Radio Occultation (RO), NCEPand ECMWF data and compared with those estimated from radiosonde.The results show that ECMWF data provide best estimate of upper-level PWV for extracting lower-lever moisture from GPS derived PWV.We applied the method to analyze GPS data observed during January through December 2009. It is of interest to note that the composite diurnal variation of low-level PWV at GPS-BAKO station is quite consistent with the characteristics of sea-breeze intrusion over Jakarta area as revealed by previous study.Moreover,it is also found that an increase in low-level moisture tends to be followed by convective activity. These results demonstrate that, combined with the use of global model data, ground based GPS observations are quite effective for monitoring low-level moisture variations in tropical region.

Keywords : PWV, troposphere, low level moisture, GPS, GPS-RO, NCEP, ECMWF

1. INTRODUCTION becomes important to know its role in determining regional weatherand climate The deep convection will only occur if the patterns.The characteristics of atmospheric rising air parcels originating near the surface dynamics over tropical region specially in of the layer (Holton,2004). Hadi et al. (2002) Indonesian maritime continent had a strong showed that an inversion layer can isolate the diurnal convective activity (Johnsonet humidity in the planetary boundary layeral.,1987; Nuryanto, 2011).Thus, below an altitude of 3 km. The horizontal observations of low level moisture is needed movement of water vapor in the lower layer 549