Observation of Water Vapor Base on GPS and Radiosonde During the occurrence of El Niño and La Niña, on the Sulawesi island - Indonesia

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The influence of El Niño on the island of Sulawesi, in general, is to make the sea surface temperature around Indonesia decreased which resulted in reduced cloud formation that makes rainfall decreased. While the impact of La Niña is the increase in rainfall in the Western Equatorial Pacific region, where Indonesia is in the area. La Niña makes the weather tend to be warmer and more humid.

To measure the El Niño and La Niña events directly and comprehensively comprehend physics mechanisms for the benefit of environmental forecasting is not an easy thing. Therefore, a precipitation water vapor (PWV) monitoring obtained from the radiosonde, and the GPS receiver ground is proposed to detect the El Niño and La Niña events.

GPS data processed to generate PWV value is data by 2015. That is at two INACORS stations on the island of Sulawesi, i.e., CMAK in Makassar and CBIT in Bitung / Manado. To validate the PWV GPS data is done a comparison with Radiosonde PWV data. Radiosonde PWV data source is from the web *http://weather.uwyo.edu/upperair/sounding.html*, i.e., WAAA station at Makassar and WAAM station in Manado. Radiosonde PWV data from 2010 to 2016. Radiosonde PWV data in addition to validating PWV GPS also analyzed the El Niño and La Niña phenomena.

Validation results indicate a good agreement between GPS PWV and Radiosonde PWV, with correlation coefficients ranging from 0.622 to 0.837, significant at the 99% confidence level. The results of Radiosonde PWV data analysis 2010 to 2016 at 2 WAAA and WAAM stations show a distinctly different pattern at the time of El Niño and La Niña. The first pattern, which is an indication of the occurrence of La Niña from July 2010 to April 2011, the value of PWV at WAAA station in the range 37.55 - 82.21 mm, averaging 57.17 mm and PWV value at WAAM 32.15 - 73.43 mm, averaging 57.77 mm. The second pattern is the occurrence of El Niño in April 2015 to April 2016, the value of PWV at WAAA station in the range of 14.96 - 73.59 mm, 48.19 mm average and PWV in WAAM range of 15.59 - 68.68 mm on average 48.28 mm.
So with validation results between PWV GPS and Radiosonde PWV, and Radiosonde PWV analysis of El Niño and La Niña, INACORS data is highly likely to be used to detect El Niño and La Nina events.

Keywords: El Niño, La Niña, Water Vapor, GPS, Radiosonde

