ABSTRACT

ANALYSIS OF TRENDS AND VARIABILITY OF PHILIPPINE SOIL MOISTURE FROM 2002 – 2014 USING PASSIVE MICROWAVE SATELLITE DATA

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Lack of soil moisture data has been addressed by advancements in satellite-borne sensors that provide sound estimates of soil moisture from regional up to global scale. In this study, soil moisture data from passive microwave satellites were analyzed to investigate the trends and variability of soil moisture in the Philippines and to introduce a practical approach to constantly monitor soil moisture in the country. Through time series plots and maps of soil moisture derived from the Advanced Microwave Scanning Radiometer – Earth Observing System (AMSR-E), historical trends and variability of soil moisture across the country from June 19, 2002 to October 3, 2011 were explained by difference in land cover type, soil texture, climate type and season. Coefficient of Variation (CoV, in %) was lowest during March, April and May or MAM (2.27%), in open areas (4.39%), in areas with silt loam soil (3.60%), and under Type IV climate (5.03%). Soil moisture was also correlated with *in situ* precipitation from the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) Synoptic Stations and with satellite-derived precipitation from the Tropical Rainfall Measuring Mission (TRMM). Sinait Station in Sinait, Ilocos Sur showed highest seasonal soil moisture correlation at R = 0.85 and R = 0.82 for in situ and TRMM-derived rainfall, respectively. Areas that show negative correlation with rainfall suggest complex interaction between soil moisture, climatology, land cover and soil properties, and demands further investigation. Validation of satellite derived soil moisture was done with the launch of AMSR2, AMSR-E's follow-up mission. Comparison with in situ measurements demonstrated the capability of AMSR2 to provide reliable soil moisture estimates (R2=0.80) in areas with minimal vegetation cover and during MAM when average rainfall is at minimum. However, further investigation on other factors affecting soil moisture variability, such as soil properties, land use-land cover, vegetation, etc. must be carried out alongside with field validation needed to recommend the use of satellite data over ground measurements.