Phenological Changes in Alaminos and Bani Watersheds Derived Using MODIS Data

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Abstract

Vegetation phenology reflects seasonality and the dynamics of climate and hydrologic regimes. This study aims to figure out the phenological change as affected by salt water intrusion and other factors in Alaminos and Bani watersheds in Pangasinan, Philippines. Remotely sensed data has provided means of studying patterns and dynamics in vegetation. Time series VI (Vegetation Index) curves can reflect a real trend of vegetation growth and therefore have been used to interpret the seasonal cycle and land cover classification. In this study, Moderate Resolution Imaging Spectroradiometer Normalized Difference Vegetation Index (MODIS NDVI) images from 2006 to 2012 were used to extract several phenological parameters including beginning date, ending date, and length of growing season by applying TIMESAT software developed by Jönsson and Eklundh (2004). This dataset (MOD13Q1) is a 16-day composite MODIS NDVI data with spatial resolution of 250 m. Samples for TIMESAT were taken across the watersheds and were mainly focused on vegetated and crop land areas. Based on TIMESAT phenological analysis results, natural vegetated areas (i.e., grassland, brushland) have similar profiles with cropland in terms of the beginning and the ending of growing season. For the cropland, mostly rice fields, which are near the sea, the length of growing season for both watersheds was found longer than those that are far from the sea. However, near the sea, cropland has early growing phase, while far from the sea, the growing phase is much later by about a month. The results also indicated that there is an interesting consistent difference in total vegetation growth (i.e., large seasonal integral) between croplands near and far from the sea. Croplands near the sea have less vegetation growth compared to the ones that are far from the sea due to the salt water intrusion. However, there are no consistent differences in the beginning, ending, length and large seasonal integral for natural vegetated areas in both watersheds. These findings can be used in mapping areas affected by seawater intrusions exacerbated by rising sea levels due to climate change

KEYWORDS: Phenology, Vegetation dynamics, MODIS NDVI, TIMESAT