

Long-term observations of plant phenology, and land cover and land use change by satellite remote-sensing in Asia

*Shin Nagai¹, Taku M Saitoh²

1. Earth Surface System Research Center, Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology, 2. River Basin Research Center, Gifu University

Accurate monitoring of spatio-temporal variability of plant phenology, and land cover and land use change (LCLUC) is one of important tasks to evaluate ecosystem functions (photosynthesis and evapotranspiration) and services, and biodiversity under global change (climate change and anthropogenic activities). Towards this aim, despite coarse spatial resolution (250-1000 m), analysis of Terra and Aqua/MODIS satellites-observed vegetation index data at a daily time step is useful. We evaluated the year-to-year variability of the conventional start (SGS: the timing of leaf flush) and end of growing season (EGS; the timing of leaf fall) in Japan and LCLUC (deforestation) in insular Southeast Asia by analysing time-series in daily Terra and Aqua/MODIS satellites-observed green-red vegetation index (GRVI) for a decadal scale. SGS was defined as the first day when GRVI was greater than or equal to 0 in spring and EGS was defined as the first day when GRVI was less than zero in autumn. We calculated the ratio of number of days of minus GRVI values with clear sky conditions to those of all GRVI values with clear sky conditions for each pixel at a yearly time step. Then deforestation was defined as the ratio was greater than 0.8. SGS and EGS showed the year-to-year variability along the horizontal and elevational gradients. Deforestation for palm oil and acacia plantation was shown in Sumatra, near-coast region of Sarawak, and Central Kalimantan. In this presentation, we show the latest result and discuss the characteristics of spatio-temporal variability of SGS and EGS in Japan, and deforestation in insular Southeast Asia.

Keywords: remote-sensing, plant phenology, land cover and land use change