



RESOURCE

Agricultural drought conditions over mainland Southeast Asia: Spatiotemporal characteristics revealed from MODIS-based vegetation time-series

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Description / Abstract

Drought is a reoccurring slow-onset hazard event and has a tremendous impact on agricultural production and ecosystem health. Mainland Southeast Asia is a major rainfed crop-producing area of the world, and this region is increasingly vulnerable to drought hazards. However, the monitoring and characterization of agricultural and vegetative droughts in this region remains understudied. This paper presented the first comprehensive analysis of spatiotemporal characteristics and trends of agricultural and vegetative droughts across the region using the Vegetation Condition Index (VCI) based on the reconstructed MODIS-based vegetation time-series data between 2000 and 2021. This study also developed an approach for identifying severe drought years using annual extreme pixels. Results showed that vegetation-based drought characteristics and trends varied in space and time across the region. Central Myanmar suffered from the most frequent droughts (nearly 60%), but prolonged events were less common. By contrast, the Lower Mekong area suffered from frequent and prolonged drought conditions. Most of the recent severe droughts were observed in Cambodia, and this area is characterized by a drying trend. Regionally, the severe drought years were detected in 2000, 2004, 2005, 2010, 2016, 2019, and 2020, and they were commonly found in Central Myanmar, Thailand, and Cambodia. The analysis of drought years indicated that the temporal change pattern of drought has shifted from the northern regions (e.g., Central Myanmar) in 2010 to the Lower Mekong region in recent years. The findings of this study provide valuable information for drought early warning management and agricultural planning across mainland Southeast Asia.

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