

Satellite-Based Drought Monitoring in Korea: Methodologies and Merits

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Abstract : Satellite-based remote sensing technique has been widely used in the area of drought and environmental monitoring to overcome the weakness of in-situ based monitoring. There are many advantages of remote sensing for drought watch in terms of data accessibility, monitoring resolution and types of available hydro-meteorological data including environmental areas. This study was focused on the applicability of drought monitoring based on satellite imageries by applying to the historical drought events, which had a huge impact on meteorological, agricultural, and hydrological drought. Satellite-based drought indices, the Standardized Precipitation Index (SPI) using Tropical Rainfall Measuring Mission (TRMM) and Global Precipitation Mission (GPM); Vegetation Health Index (VHI) using MODIS based Land Surface Temperature (LST), and Normalized Difference Vegetation Index (NDVI); and Scaled Drought Condition Index (SDCI) were evaluated to assess its capability to analyze the complex topography of the Korean peninsula. While the VHI was accurate when capturing moderate drought conditions in agricultural drought-damaged areas, the SDCI was relatively well monitored in hydrological drought-damaged areas. In addition, this study found correlations among various drought indices and applicability using Receiver Operating Characteristic (ROC) method, which will expand our understanding of the relationships between hydro-meteorological variables and drought events at global scale. The results of this research are expected to assist decision makers in taking timely and appropriate action in order to save millions of lives in drought-damaged areas.

Keywords : drought monitoring, moderate resolution imaging spectroradiometer (MODIS), remote sensing, receiver operating characteristic (ROC)

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