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# Remote Sensing Based Investigation of Vegetation Response to the El-Nino Caused Drought Conditions over Indonesia

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**Abstract**

El-Nino Southern Oscillation (ENSO) is a widely acknowledged global climatic phenomenon caused by a rapid increase of sea surface temperature in the tropical Pacific. The ENSO phenomenon mainly affects the coastal areas of tropical and subtropical climate zones. One of these effects is the redistribution of rainfall from Indonesia, New Guinea and Australia into the Pacific and to the pacific coast of South America. This redistribution leads to drought conditions in wide areas of South-East Asia and as a consequence of drought to agricultural yield decreases and food shortage. The goal of this study was to investigate and to quantify the relationship between variability of ENSO and drought events over Indonesian archipelago. This relationship was investigated by the examination of month-to-month correlations between standardised anomalies of the Normalized Difference Vegetation Index (NDVI) and two ENSO indices, Sea Surface Temperature Anomalies (SSTA) and Southern Oscillation Index (SOI). The results demonstrated that the total dimension of the territory affected by anomalous weather conditions caused by ENSO depends on the duration of a certain ENSO event. On the contrary, the magnitude of the NDVI anomalies is predicted by the intensity of the El-Nino event. Thus, the total affected area for the 1997–98 ENSO was two times larger than that for the 1982–83 ENSO episode. However, the 1982–83 ENSO episode was shorter but more intense. The ENSO in 1997–98 was the longest event throughout the period of 1982–2003 but demonstrated a lower intensity that is characterised by lower correlation coefficients. The results of this study serve to a better understanding of the origin and driving forces of droughts in Indonesia and emphasises the importance of taking into account the El-Nino duration and intensity when trying to evaluate the ENSO damage grade on the vegetation cover.

**Keywords:** ENSO, Indonesia, NDVI, remote sensing, vegetation response

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