

## **Spatio-temporal variability of heat exposure in Peninsular Malaysia using land surface temperature**

### **ABSTRACT**

The increasing of extreme heat event across the world has become a new threat that was caused by the changing climate. It is important to understand the spatiotemporal dynamics of extreme heat and suggest feasible adaptation strategies to reduce the heat exposure. In this study, daytime land surface temperature (LST) has been retrieved from MODIS Aqua Earth observation satellite from NASA to characterize the latest spatio-temporal variability of heat exposure in Peninsular Malaysia with the reference of short-term mean calculated from year 2003 until 2012. It was found that the LST is increasing by  $0.0477^{\circ}\text{C}$  per year during the period. Trend analysis using Mann-Kendall test shows that the LST increases significantly during annually especially during southwest monsoon. Based on the z-score of mean LST for each district from year 2003 until 2018, heat exposure index (HEI) was obtained and exhibited the high HEI in mostly northern and urban areas. The HEI value will be one of the inputs for heat vulnerability assessment in the future research. Through cluster analysis, it was found that the northern part of Peninsular Malaysia is considered as the hot spot of extreme heat while cold spot is located in centre part of the region.

**Keyword:** Land surface temperature; MODIS; Peninsular Malaysia; Extreme heat; Exposure