

Extreme heat vulnerability assessment in tropical region: a case study in Malaysia

ABSTRACT

In the past decade, the inevitable increase in temperature has caused Malaysia to experience more extreme heat events, and yet very little research has been dedicated in exploring the heat-related vulnerability of exposed population. In this study, the extreme heat vulnerability index (EHVI) has been evaluated to identify the most vulnerable districts to extreme heat events. We evaluated exposure, population sensitivity and adaptive capacity from sociodemographic and remote sensing data. We have applied multivariate analysis on 13 indicators for every 87 districts to elucidate the extreme heat vulnerability in Peninsular Malaysia. The EHVI was generated by summing up the normalized extreme heat exposure scores and factor scores from the multivariate analysis. Our findings clarify that the most vulnerable populations are confined in the urban and northern region of Peninsular Malaysia. The source of vulnerability varied between both regions, with urbanization and population density increase the vulnerability in urban areas, high heat exposure and sensitive population are the dominant factors of vulnerability in the northern region. These findings are valuable in identifying districts vulnerable to extreme heat and help regulatory body; in designing effective adaptation and preparedness strategies to increase the population resilience towards extreme heat.

Keyword: Heatwave; Land surface temperature; Heat vulnerability indices; Urban heat Island; El-Nino