Heat Risk Mapping of Vulnerable Population using Multi-temporal Satellite Observations in Nakhon Ratchasima Province, Thailand

Lhapawong K. [1*], Kaewmesri P.[1], Pleebut M.[1], Chaikampa A.[1], Kitratporn N.[1] and Sukawattanavijit C.[1]

[1]Geo-Informatics and Space Technology Development Agency (Public Organization)

*Kulapach@gistda.or.th   (*Corresponding author's email only)

ABSTRACT

The average global temperature is continuously rising which increases the impact from heat-related public health. Thailand regularly faces with the problem of unprecedented heat waves year after year. Nakhon Ratchasima province is one of the provinces severely affected by heatwaves and is classified by Thailand Department of Health as having a dangerous heat level. The aim of this study is to develop a heat risk map for vulnerable population in Nakhon Ratchasima province. The heat hazard dataset was based on night-time and day-time land surface temperature (LST) from MODIS onboard Terra/Aqua satellite, while the vulnerability dataset were obtained using the distribution of populations aged 60 and above as well as satellite-derived greenspace. The risk indices were normalized and computed with equal weighting. The developed monthly heat risk map covers the period during 2019 to 2023. The initial results found the number of elderly individuals aged 60 and above increased in all the 32 districts of Nakhon Ratchasima during the study period. The overall highest daytime LST is detected in Nong Bun Mak District at 36.96 Celsius, while the overall highest nighttime LST is measured in Muang Nakhon Ratchasima District at 23.02 Celsius. The Muang Nakhon Ratchasima showed the highest LST during the nighttime for 2019, 2020, 2021 and 2023. The developed heat risk map showed the highest risk level in Muang Nakhon Ratchasima due to large urban areas and high number of elderly population.

Keywords: Land surface temperature, Vulnerability, Time-series analysis, Public health, MODIS