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Identification of Hotspots for Heatwaves using Big Data

Sang-Wook Kim, Jongchul Park, Taehyun Kim, and Yeora Chae
Korea Environment Institute, Division for Climate and Energy, Sejong-si, Korea, Republic of (swkim@kei.re.kr)

Impact-based forecasts provide information about the risk of a hazard so that it can be prepared and responded appropriately. In order to mitigate and respond to disasters better, it is necessary to identify the most vulnerable areas, called hotspots. This study identifies hotspots for a heatwave, one of the fatal hazards in South Korea, using high-resolute data in four major cities (Seoul, Busan, Daegu, and Gwangju). High-resolution (100m×100m) income data and floating population data based on Long-Term Evolution (LTE) signals are used as a socio-economic factor of hotspots. The daily maximum temperature that downscaled from the short-range forecast system into 1km×1km is used as a meteorological factor. Each grid point is categorized on the relationship between temperature and floating population by the time. The categories are classified into four groups; points where population increases with temperature, points where population decrease with temperature, points that have low variability, and the others. The areas where the population density increases with temperatures are mainly avoidable to heat, such as parks, subway stations, and indoor shopping centers. The population decreased with temperature in universities, tourist sites, and residential areas. The third group, which is areas of low variability with a coefficient of variation of less than 20%, is areas that do not respond properly to heatwaves. Hotspots are defined as low-income old-age residential areas with low population variability. Those identified hotspots can be concerned as areas that need prior public care to disaster mitigation and response.