Smart information system based on RS and GIS as an adaptation strategy for reducing mortality from heat waves

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Multiple factors influence the risk of heat stroke and that, collectively, define the vulnerability of the population. This vulnerability can be physiologically differentiated by older adults and children, by gender, or due to the level of exposure to sporting activities or labor, among others. During the last two decades, hot extreme events are drastically increasing related to climate change and other climate phenomena such as El Niño event. The World Health Organization estimates that more than 70,000 heat-related deaths occurred in Europe during the last two weeks of August 2003 and almost 62,000 deaths during summer 2022. In Mexico, the record of heat-related deaths was set during the summer of 2023 when the Health Secretariat reported 373 deaths due to extreme heat events. The five ranking states were Nuevo León (27% of the cases), Sonora (20%), Baja California (14%), Tamaulipas and Veracruz (8% respectively), and 80% of them are located between the 25 to 31°Latitude North. To understand which the most influential factors for heat-related deaths are, this study analyzes the interaction between land surface temperature, spatial population dynamics, and the exposure-response relationship to urban form and the concentration of air pollution in the Monterrey Metropolitan Area. The paper will present the operational structure of a smart information system based on RS and GIS for planning a better and safer city life in San Nicolás de los Garza, the municipality that ranked first on heat-related deaths. In summary, results indicate the next highlights: (1) extreme heat waves are increasing every year in the metropolitan area, (2) urban heat islands are spatially and temporally located, therefore, (3) risk reduction and civil protection actions must include a holistic approach including warning early systems, social, labor and health care actions, (4) preventive policies must be implemented such as sustainable urban planning for population climate justice, (5) and adopting nature-based solutions.