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Examining the impact of extreme land surface temperature and land cover on heatwave occurrence: The case of MENA region

Mohammadsaeed asghariian¹, Parvin Azizi², **Milad Aminzadeh**³, and Nima Shokri³

¹Graduate Faculty of Environment, University of Tehran, Tehran, Iran

²Department of Civil Engineering, Isfahan University of Technology, Isfahan, Iran

³Institute of Geo-Hydroinformatics, Hamburg University of Technology, Hamburg, Germany

The increase in Land Surface Temperature (LST) in a changing climate is expected to alter the intensity and frequency of heatwaves by shifting the energy partitioning over the land surface. The relationship between LST and hot air temperatures, influenced by land cover and associated changes in surface properties is not fully understood, particularly in dry regions of the world experiencing prolonged droughts. Extremely high LSTs and their projected changes [1] may stress resilience and adaptive capacities of the growing population in the Middle East and North Africa (MENA). We thus investigate the evolution of extremely high LSTs in MENA over the past two decades to identify its coupling with hot air temperatures considering different land cover types. Our preliminary results highlight the difference in warming rates of LST and air temperature across different land covers thus enabling to identify the role of land temperature extremes in triggering heatwave events. We observed that variation of land temperature arising from land cover changes (affecting soil moisture dynamics and surface thermal and radiative properties) may significantly influence the occurrence and the intensity of heatwaves in this region. The study offers valuable insights into the complex interplay between land and air hot extremes that are particularly important in local climate investigations, agricultural practices, and ecosystem functions.

Reference

[1] Aminzadeh, M., Or, D., Stevens, B., AghaKouchak, A., & Shokri, N. (2023). Upper bounds of maximum land surface temperatures in a warming climate and limits to plant growth. *Earth's Future*, 11, e2023EF003755. <https://doi.org/10.1029/2023EF003755>