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Assessment of Urban Heat Islands in an Eastern Amazonian city

PROBLEM

The increase in Urban Heat Islands (UHI) in tropical cities, especially in the Amazon region, represents a significant public health issue. In Belém (Brazil), the rise in Land Surface Temperature (LST) has primarily affected central neighborhoods, where uncontrolled urbanization and deforestation have exacerbated the UHI phenomenon, creating thermal stress conditions for the population. This phenomenon is linked to higher energy demand, greenhouse gas emissions, and a decline in the quality of life in cities.

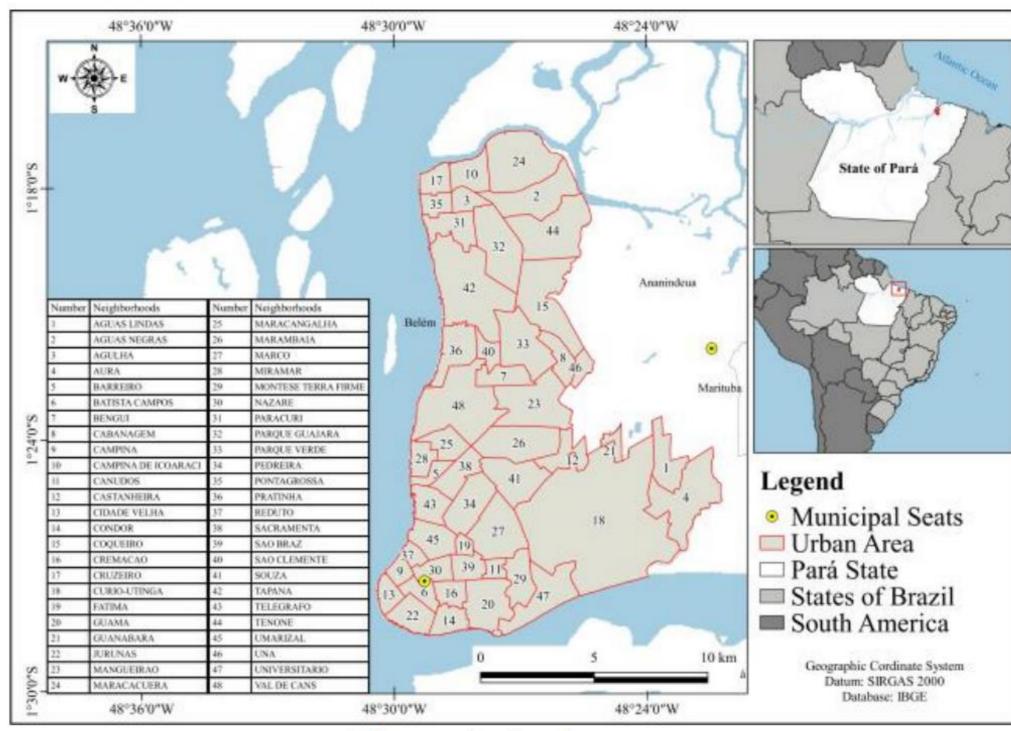


Figure 1. Study area.

GENERAL OBJECTIVE

The goal of this research was to analyze changes in Land Surface Temperature (LST) and Urban Heat Islands (UHI) in Belém, Brazil, between 1986 and 2023 using Landsat satellite imagery. The study aimed to identify the most affected areas by the phenomenon and provide data to support urban planning decisions and the implementation of mitigation strategies.

PROPOSAL

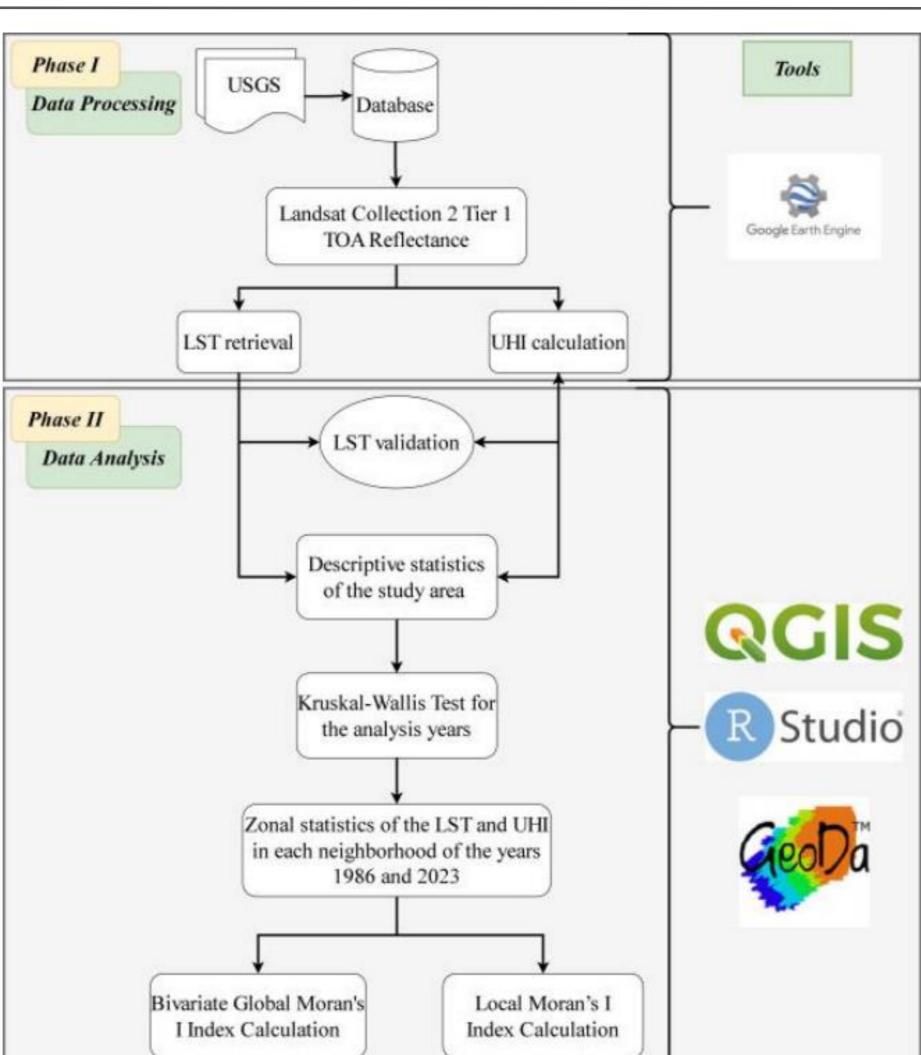


Figure 2. Methodology flowchart.

RESULTS

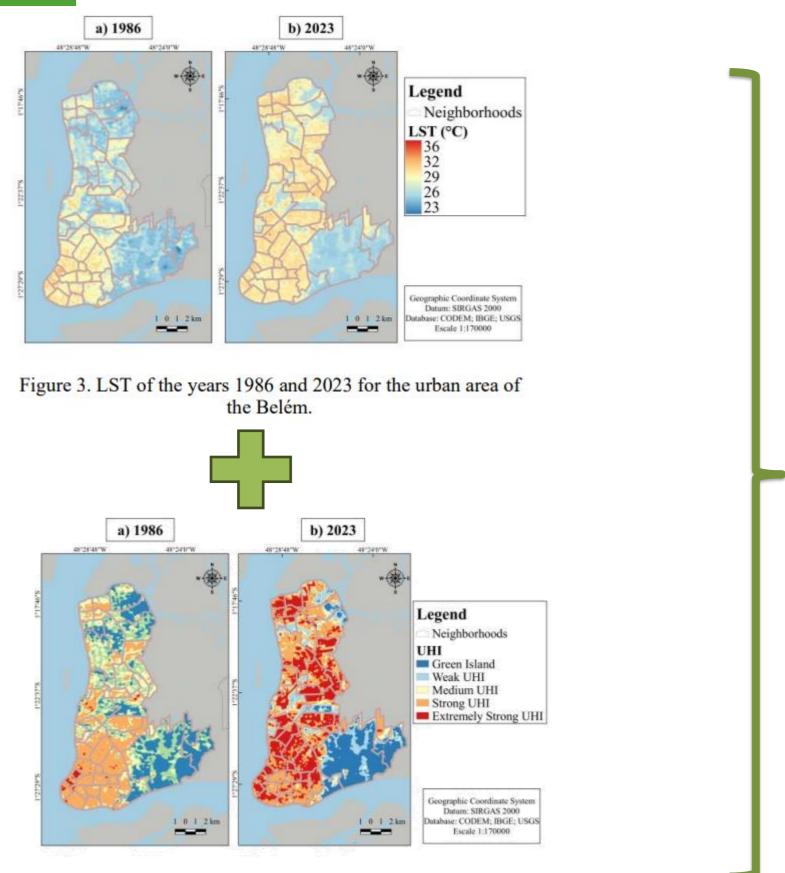


Figure 5. UHI of the years 1986 and 2023 for the urban area of the Belém.

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Figure 7. Cluster Map for LST and UHI.

CONCLUSIONS

- Significant Temperature Increase: The 1.5°C rise in LST is significant and correlates with urban expansion and the reduction of green areas in central neighborhoods of Belém.
- Higher UHI Concentration in Urbanized Areas: Areas near the city center show the highest UHI intensification due to urbanization and low vegetation cover.
- Implications for Urban Planning: The results highlight the urgent need to implement mitigation strategies, such as increasing green spaces, promoting nature-based solutions, and urban re-greening, especially in the areas most affected by extreme heat.

Recommendations: Urban planners should focus on neighborhoods with higher temperatures to implement measures that reduce the negative impacts of UHI, thereby improving quality of life and reducing heat-related health risks.





Link DOI