Climate and Heritage, Towards Urban Heat Island Mitigation

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Abstract

Revaluing the urban heart of the city involves multiple actions that affect the physical infrastructure as well as the democratic exercise of use and recognition of Open Public Space (OPS) to promote sustainability and climate resilience. The objective of this research is to analyze the environmental performance of urban greenery as a strategy to mitigate the negative effect of Urban Heat Island (UHI) at a microclimatic scale in the historic site of the city of Tarija, located in the monumental heritage area. The study is based on integrated scalar analysis according to the classification of the fields of perception: large structure, sector/site, place and building, applying geoprocessing and computational simulation. The methodological process comprises three procedures: 1) Temporal analysis of ICU (2001-2021) with the Land Surface Temperature (LST) indicator, and Normalized Difference Vegetation Index (NDVI) by remote sensing and space syntax with the Integration (Inthh) indicator at the scale of large structure, 2) Elaboration of the Bioclimatic Heritage Sheet (BHS) for the inventory and cataloguing of the EPA, 3) Comparison of scenarios with vegetation: Base scenario (current) and Deep green scenario (proposal) that includes tree planting in roads, courtyards and green corridors that articulate three squares in the center, through climatic variables and thermal comfort indicators PET and PMV with ENVI-met V5.5.1 simulation at site/building scale. The results corroborate the hypothesis, the performance of urban greenery increases if existing central green areas are articulated, preserving heritage elements to integrate the cultural landscape. The implementation of this micro-climate strategy in neighborhoods/districts is recommended to promote a policy of climate change adaptation and urban warming mitigation, so necessary nowadays.

Keywords

Heritage, Bioclimatism, Microclimate, Greening, ENVI-Met Simulation