

PREFACE

Cities around the world are experiencing the detrimental effects of urbanization and climate change, with one of the most concerning issues being the phenomenon known as the urban heat island effect. In this context, the city of Hyderabad and its surrounding areas have been the subject of a comprehensive study aiming to analyse and understand the surface urban heat island effect. This study delves into the intricate relationship between land cover, land surface temperature, and the emergence of heat islands in urban environments.

Over the years, the rapid growth of Hyderabad has resulted in significant changes in land cover and land use patterns. To comprehensively assess the surface urban heat island effect, the study extensively examines the temporal dynamics from 2008 to 2022, capturing changes in land cover and their corresponding impact on land surface temperature. Moreover, the study focuses on both daytime and night-time temperature variations, recognizing their distinct characteristics and implications.

Through meticulous land cover analysis, the study uncovers the strong presence of the surface urban heat island effect in the urban areas of Hyderabad. Notably, the effect is more pronounced during night-time, emphasizing the need for effective mitigation strategies to counteract the heat build-up in densely populated urban regions. The research findings also shed light on the alarming trend of increasing bare land in rural areas, accompanied by a decline in vegetation cover. This trend suggests potential challenges such as gradual migration and desertification, underscoring the interplay between social, economic, political, and environmental factors that contribute to such phenomena.

Examining the relationship between land cover types and land surface temperature, the study reveals that built-up areas exhibit the highest land surface temperatures, followed by bare land. On the other hand, vegetation and water bodies offer a cooling effect due to their lower land surface temperatures. The analysis further demonstrates an upward trend in land surface temperatures for built-up areas during both day and night, while bare lands experience increased temperatures primarily during the daytime. This highlights the critical role that land cover plays in determining land surface temperature and the subsequent formation of heat islands in Hyderabad.