

Algorithm for Modelling Land Surface Temperature and Land Cover Classification and Their Interaction

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Abstract : The rampant and unintended spread of urban areas resulted in increasing artificial component features in the land cover types of the countryside and bringing forth the urban heat island (UHI). This paved the way to wide range of negative influences on the human health and environment which commonly relates to air pollution, drought, higher energy demand, and water shortage. Land cover type also plays a relevant role in the process of understanding the interaction between ground surfaces with the local temperature. At the moment, the depiction of the land surface temperature (LST) at city/municipality scale particularly in certain areas of Misamis Oriental, Philippines is inadequate as support to efficient mitigations and adaptations of the surface urban heat island (SUHI). Thus, this study purposely attempts to provide application on the Landsat 8 satellite data and low density Light Detection and Ranging (LiDAR) products in mapping out quality automated LST model and crop-level land cover classification in a local scale, through theoretical and algorithm based approach utilizing the principle of data analysis subjected to multi-dimensional image object model. The paper also aims to explore the relationship between the derived LST and land cover classification. The results of the presented model showed the ability of comprehensive data analysis and GIS functionalities with the integration of object-based image analysis (OBIA) approach on automating complex maps production processes with considerable efficiency and high accuracy. The findings may potentially lead to expanded investigation of temporal dynamics of land surface UHI. It is worthwhile to note that the environmental significance of these interactions through combined application of remote sensing, geographic information tools, mathematical morphology and data analysis can provide microclimate perception, awareness and improved decision-making for land use planning and characterization at local and neighborhood scale. As a result, it can aid in facilitating problem identification, support mitigations and adaptations more efficiently.

Keywords : LiDAR, OBIA, remote sensing, local scale

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