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Title of proposed thesis study:

Characterizing the warm climate of the Philippines in the biothermal context

Abstract

The increasing global surface temperature due to human-induced climate change is causing an increase in cases of critical and fatal heat-related diseases among humans. The Philippines, having a tropical climate, is among the countries projected to be most affected by this scenario. It is therefore important to study and characterize the thermo-physiological effect of warm climate conditions in the Philippines to serve as reference information in current and future adaptation efforts on heat-related health risks.

Currently, the country relies on surface air (or ambient) temperature (T_a) and the Heat Index (HI) in describing the effect of atmospheric heat to the human body. This study hypothesizes that the operationally-computed Universal Thermal Climate Index (UTCI) could more significantly represent the local biothermal condition as it was derived from a state-of-the-art, multi-segmented and multi-layered human physiological model coupled with a model on thermal insulation. Furthermore, this model considers a comprehensive heat energy exchange between the human body and its immediate atmospheric environment, which is represented by air temperature, moisture, wind, and radiant temperature.

For this study, the three thermal indices (T_a, HI, and UTCI) will be compared based on or computed from sub-daily observation data available in DOST-PAGASA. These indices will first be subjected to statistical comparison in terms of their daily and annual patterns, and the frequency of their index categories. Then, all three will be subjected to a three-stage validation and analysis process, which would involve the validation of the applicability of these indices in the local setting from a monthly to sub-daily scale, and determine the degree of influence that each relevant meteorological parameter has on the derived indices. The index found to have the largest significance at representing the local biothermal condition will be used to establish the country's biothermal profile at a provincial scale (e.g., through spatiotemporal maps) to, hopefully, serve as reference for disaster risk reduction, climate change adaptation and mitigation, and future related research.