
A Study on Thermal Indices for the Outdoor Environment

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Abstract

This paper aims at obtaining predictive indices of human thermal sensation for the outdoor environment. Two indices are newly suggested : one is named temperature load TL that is derived from the skin and core temperatures estimated from two-nodes model of Gagge et al. (1971), and the other one is temperature sensation index or TSI, which is a regressional function of wind velocity and operative temperature. The applicability of suggested indices, i. e. TL and TSI were tested along with other existing indices such as SET*, the temperature humidity index THI and the wind chill index WCI. The dataset on temperature sensation collected for several cities in Japan were used to see the correlation with thermal indices. For the summer condition, TL and TSI have better correspondence with answered thermal sensation. It was also shown that TSI can be practical measure to estimate temperature sensation for winter as well. Finally, the sensitivity of air temperature, humidity and wind velocity to thermal sensation was investigated using TL-based temperature sensation.



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