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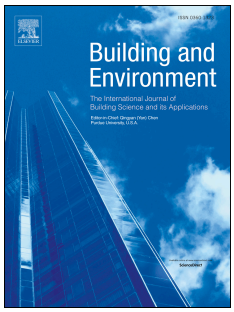

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Complying with the demand of standardization in outdoor thermal comfort: a first approach to the Global Outdoor Comfort Index (GOCI)

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Abstract: Over the past ten years the number of studies regarding outdoor thermal comfort has been progressively increasing. However, the existing works are characterized by a certain variety of instruments and methods. An example can be found in the indexes and evaluation scales used to estimate thermal perception. This is why this paper proposes the Global Outdoor Comfort Index (GOCI), which is obtained thanks to the combination of the empirical relations provided by the existing literature. Its independent variables are: air temperature (according to the reported F test value it is the most significant influencing parameter in the new proposed index), mean radiant temperature, relative humidity, wind velocity, latitude, mean annual temperature, mean temperatures of the hottest and coldest months. The index performances were compared to those of the Predicted Mean Vote (PMV), the Physiological Equivalent Temperature (PET), the Mediterranean Outdoor Comfort Index (MOCI) and the Universal Thermal Climate Index (UTCI) by means of an experimental field survey carried out in Rome (Italy). The GOCI reported a total percentage of correct predictions of 27.8%, higher than the PMV (27.7%), PET (25.4%) and UTCI (23.0%) but lower than the MOCI (32.2%). The higher predictive ability of this last index is due to the fact that it was specifically meant for the Mediterranean population. According to Spearman's rho measure of correlation and symmetrical measure of association Gamma calculations, the GOCI was the most sensitive index and it can be used to predict outdoor thermal comfort in areas devoid of studies about specific indexes.

Keywords: outdoor thermal comfort; Global Outdoor Comfort Index; Mediterranean Outdoor Comfort Index; Predicted Mean Vote; Physiological Equivalent Temperature; Universal Thermal Climate Index.