

SKY LUMINANCE DISTRIBUTION IN CENTRAL EUROPE AND THE MEDITERRANEAN DURING SUMMER PERIOD

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EXTENDED ABSTRACT

In this work the conditions of illuminance in Central Europe and the Mediterranean are studied and the prevailing sky luminance distributions are defined for the summer period. The data used are five-minute values of global and diffuse horizontal irradiance and illuminance along with zenith luminance from Bratislava and Athens for a period of five years. The study is based on the 15 theoretical sky types defined by Kittler et al., which are represented in diagrams of the ratio of zenith luminance to diffuse horizontal illuminance against solar altitude. Due to the fact that the theoretical curves converge and above 35° they are intersected, each observation is classified in one of the 15 sky types, only when the value of the ratio of zenith luminance to diffuse horizontal illuminance lies in a zone of $\pm 2.5\%$ around the theoretical curve, which describes the specific category. If any observation is classified in more than one sky types, the corresponding ratio of global horizontal illuminance to extraterrestrial horizontal illuminance is compared to the average ratios of the various sky types, for the same solar altitude and the observation is classified in the sky type with the nearest value. It is found that the most frequent sky types in Bratislava are: the white-blue sky with a distinct solar corona and the very clear sky with low illuminance turbidity, while in Athens the cloudless polluted sky with a broad solar corona prevails.

Key words: Sky luminance distribution; Zenith luminance; Diffuse illuminance; Daylight climate; Central Europe; Mediterranean