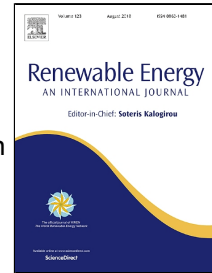


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Review of solar irradiance and daylight illuminance modeling and sky classification

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1 **Review of solar irradiance and daylight illuminance modeling and** 2 **sky classification**

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9 **Abstract**

10 In many parts of the world, the solar radiation and daylight illuminance data taken from
11 surfaces of interest are not always readily available. Without direct measurement, the data can
12 be predicted from empirical models based on geographical variations and meteorological
13 parameters. Recently, the International Commission on Illumination (CIE) has adopted a list
14 of 15 standard skies. Each standard sky represents a unique, well-defined sky radiance and
15 luminance pattern expressed by mathematical equations that can use to compute solar
16 irradiance and daylight illuminance on inclined surfaces and variously oriented vertical
17 planes. An issue is whether the sky conditions can be correctly categorized. This paper
18 reviews the solar radiation and daylight illuminance model developments and sky
19 classification methods. The findings indicated that Machine Learning techniques have been
20 effectively used for predicting solar radiation and daylight illuminance and classifying the
21 standard skies. Such approaches could be globally adopted and useful to compute the required
22 climatic data for renewable and sustainable developments and energy-efficient building
23 designs.

24

25 **Keywords:** Solar radiation; Daylight illuminance; Typical weather databases; Sky

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