Derivation of time series of the sky-cloud ratio from omnidirectional camera images for predicting sky conditions

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Prediction of photovoltaic output is necessary to efficiently control photovoltaic systems. In order to make a prediction about the output, it is necessary to predict the variations of the sky conditions. Therefore, the purpose of this study is to prepare a system that can always continue to take sky images using an omnidirectional camera, and to develop algorithms for calculating the time series of the sky ratio. First, we take sky images once every minute by the camera and store them as JPEG images. Next, we train a classifier using R and B of some images. Finally, we calculate the sky ratio of images, which we did not use for the training, using the classifier. F-measure in the cases of cloudy day is >0.9 and that in the cases of clear day is approximately 0.9 at daytime. Although F-measure tends to decrease drastically in the images with dark sky at dawn and evening, we are able to extract variations in sky ratio over the observation period, especially accurately in cloudy and mostly sunny days.

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