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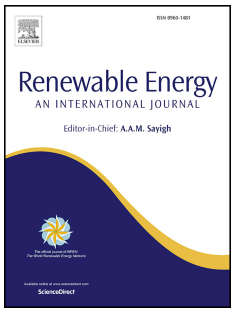

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Development of a PV performance model for power output simulation at minutely resolution

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Abstract

Because of the transient and non-linear characteristics of solar irradiance, simulation at sub-hourly resolution, e.g., at the order of 10 minutes or less, becomes more essential. In this paper, a PV performance model at sub-hourly resolution based on global horizontal irradiance is developed and validated by the minutely on-site measurements under different weather conditions. Then, a simulation at minutely resolution is carried out for the year 2015 in Zhuhai, China. The results are compared with the simulation results at hourly resolution. It is found that simulation at minutely resolution can reflect the real characteristics of power output fluctuations. The differences of daily energy output between hourly and minutely resolution are in the range of -2%~10%, and it seems that the higher values of daily clearness index will lead to higher values of daily differences. The differences of monthly and yearly energy output are -1~7.5% and 2.46%, respectively. The differences for different time scales indicate that for a longer time period (e.g., one year), the simulated energy output at hourly resolution will go closer with that at

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