**INFLUENCE OF WRF RADIATION SCHEME ON PRECISION OF IRRADIANCE FORECASTING**

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In the case of day-ahead forecasting of solar irradiance, the simulation using the numerical weather prediction (NWP) model and the post-processing to correct the simulated value are generally used. Weather Research and Forecasting (WRF) is one of NWP models widely used in various fields. WRF is a numerical hydrodynamics model and employs various physics schemes for physical processes related to meteorological phenomena. In terms of irradiance forecasting, several short-wave radiation schemes are available. This study compared the irradiance forecasting accuracy at Nagoya meteorological observatory by changing short-wave radiation scheme.

This study investigated the effect of short-wave radiation scheme on irradiance forecasting. Two short-wave radiation schemes, i.e. Dudhia scheme and RRTMG scheme were compared. The Dudhia scheme is a simple scheme to calculate by subtracting light scattering and absorption due to clouds and atmosphere from extra-terrestrial solar irradiance. The RRTMG scheme is a more realistic scheme to calculate by integrating bands in the wavelength region using the k-distribution method and obtaining a transmission function.

This study forecasted the solar irradiance at Nagoya meteorological observatory (35°10.0’ N, 136°57.9’ E) on February 1st to 28th, 2015. In order to simulate clouds in a smaller spatial scale and improve forecasting accuracy, three calculation domains with different spatial resolutions (domain 1: resolution 27 km, range 2160 km × 2160 km, domain 2: resolution 9 km, range 1062 km × 1062 km, domain 3: resolution 3 km, range 543 km × 462 km) were defined for 2-way nesting, in which calculation result of each domain was reflected in others. Domain 1 completely includes domain 2, and domain 2 completely includes domain 3. Domain 3 was set to include the Japan Sea and the Nagoya meteorological observatory located near the center of the domain. For the initial value and the boundary value to be inputted every 3 hours, the GFS forecasted data distributed by National Centers for Environmental Prediction was used.

Figure 1 shows the forecasted irradiance during February 19th to 25th of the grid where Nagoya meteorological observatory is located. The %MAE from 8:00 to 16:00 during the forecasted period was 30.4% and 34.2% in Dudhia scheme and RRTMG scheme, respectively. Although forecast accuracy of Dudhia scheme is higher than RRTMG scheme for the period simulated in this study, further comparison is needed by changing the forecasting period, physical scheme, input data, etc. By properly combining various schemes or various NWP models, this study will be conducted to improve the irradiance forecasting accuracy.

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**Area:** PV system integration including Smart Grid.