Evaluation of Korean wind map based on mesoscale model WRF

JaeYoung Byon, Young-Jean Choi, and Beom-Keun Seo

National Institute of Meteorological Research,Korea Meteorological Administration, Seoul, Korea(byonjy@kma.go.kr)

In order to encourage wind energy industry and assessment of wind resource in Korea, we establish wind resource map using numerical model over the Korean Peninsula. The model which is used in this study is Weather Research and Forecasting (WRF) that is developed in NCAR. A high resolution topography with a 100-m resolution and a land-use data which has a 30-m resolution are implemented over the Korean environment for the improvement of lower atmosphere forecast in WRF. WRF has conducted with a 1 km resolution which is forecasted using NCEP FNL data employed as initial and boundary condition.

The WRF model has run for one year for the wind map over the South Korea. The running periods that is named as typical meteorological year (TMY) is determined by statistical method. The TMY represents mean atmospheric characteristics from 1998 to 2008. Strong wind occurs in eastern, southern coastal region, and Jeju island of Korea. Wind in the Korean Peninsula blows from northwest during most of the season, but from southeast during summer. High occurrence rate of main wind direction is shown in mountainous region of inland and coastal region. The performance of the TMY results over the South Korea is validated with radiosonde observation at 80m above ground level which is wind turbine hub height. Root-mean-square-error (RMSE) shows about 3-6 m/s for wind speed and mean absolute error is about 30-50 degree for wind direction. Korean wind map will be improved continuously by data assimilation and high resolution simulation less than 1 km.