Coupling NMM Mesoscale Weather Forecast Model with CALMET for Wind Energy Applications

Z. Radonjic (1), Dr. D. Chambers (1), B. Telenta (1), S. Music (1), and Dr. Z. Janjic (2)

(1) SENES Consultants Ltd., Canada, (2) National Weather Service (NWS) / National Centers for Environmental Prediction (NCEP)

ABSTRACT

A new and advanced mesoscale NMM (Nonhydrostatic Mesoscale Model)embeded in the framework - Forecast Refinement System Host (FReSH), was used in this application on the fine scale resolution (2 by 2 km). CALMET the U.S. EPA meteorological preprocessor (part of the CALMET/CALPUFF long range regulatory system) then applied on the resolutions of 100 by 100 m and 250 by 250 m. This study investigates the validation of FReSH3/CALMET against two data sets obtained from the meteorological towers at heights 58 and 62 m above the ground. Data set 1 was for a site at the elevation of 581 m above sea level (asl). Data set 2 was for a site at the elevation of 694 m – asl. The system is validated through a comparison of 10 minutes wind data measured and predicted by FReSH and the CALMET models. Case studies are used to investigate the capability of the models to predict the winds at the potential wind energy sites as well to demonstrate that the both models can be used to generate realistic forecasts for the wind energy sites often located at the hilly terrain.