WRF-NMM Mesoscale Weather Forecast Model and CALMET Meteorological Preprocessor Wind Simulations over the Mountaneous Region

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An advanced mesoscale WRF- NMM (Weather Research and Forecasting - Nonhydrostatic Mesoscale Model), was used in this application. The model was performed on a fine scale resolution (3 by 3 km) over large modelling domain $\sim$ 300 by 300 km for one year of data (2004). Based on this resolution the areas with elevated wind speeds are determined. Each area identified with high wind speeds is processed with the U.S. EPA's meteorological preprocessor CALMET (part of the CALMET/CALPUFF long range regulatory system) with a fine resolution of 100 by 100 m to capture dynamic effects over the mountain region. Some limited data were available for validation. The application of the CALMET preprocessor demonstrated kinematic effects that result in increaed wind speeds above the mountains. This effect was confirmed by the measeurments with the sonic anemometers mounted on a TV tower in the study area. In addition, it was concluded that in the ridged terrain, the standard power low profile is not applicable.

In addition, the WRF-NMM was tested in the same application on the resolution of 100 by 100m. The model simulation was limited for one month, because of the computer time requirement. Although of limited duration, this test suggests that WRF-NMM can be applied directly, without re-processing the data through the CALMET.