



Making better use of mesoscale and higher resolution models and analyses in wind resource assessment

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Mesoscale models are now widely used to downscale from global atmospheric reanalyses to produce wind maps and site-specific guidance on wind resources. Finer scale models have the potential of capturing greater detail of the flows and topographic and surface influences. We have attempted to quantify and compare the accuracy of the basic global datasets and the added value of mesoscale modelling, especially as horizontal grids approach 1-2km, the resolution of the Met Office's UK operational forecast model. Several global reanalyses datasets of long term atmospheric climate have been examined. Their horizontal resolution is relatively coarse with typically several kilometres grid size as they are expensive to produce. Reanalyses' quality is normally assessed in terms of larger-scale meteorology. Here the primary focus is the regional realism and their suitability for downscaling by mesoscale models. By comparing observations with both mesoscale and global model data we demonstrate the added value of the mesoscale model approach. In addition to winds we consider other parameters such as stability, gusts and turbulence. We use the mesoscale model versions of the Met Office seamless prediction system called the Unified Model (MetUM). This is used operationally for both global and limited area numerical weather prediction and for climate studies. With this system we evaluate the extra value in each step of the model chain from reanalyses, through regional and finer-scale mesoscale models to the final location specific site-adjustment. We use as many good quality site observations as possible to evaluate the final resource estimates. These are independent of the atmospheric data observations included in the global and mesoscale modelling process. We also make an assessment of the potential benefit from higher resolution regional reanalyses which are now under way or planned.