

Prediction of atmospheric icing with AROME

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Keywords: NWP, Icing

Accurate prediction of atmospheric icing on wind mills is of great importance, both during the planning phase and during operation. The goal of the Swedish project "Wind power in cold climate" is to gain knowledge necessary to make detailed and site specific estimates on how the icing affects wind power production.

The cloud resolving numerical weather prediction model AROME has been used to forecast atmospheric icing for specific sites in northern part of Sweden for the winter 2009/2010. The effort will continue during 2010/2011 with more sites. Each site is equipped with instruments for ice indication and ice load measurements as well as measurements of other atmospheric parameters important for icing.

AROME is a non-hydrostatic model with an advanced scheme for cloud microphysics, explicitly predicting the different water phases in a cloud. The ability to correctly predict icing is highly dependent on a correct distribution of these different phases. The model has been applied with a horizontal resolution of 1 - 2.5km with 65 levels in the vertical.

The model results will be compared with the measurements from the different sites. The importance of a correct surface description, a proper initialization of the model and the sensitivity of the distribution of cloud species will be discussed. Results show that models and measurements shows a relatively good agreement on the onset of icing and melting whereas the levels of icing shows much larger differences.