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Validation of AROME wind speed forecasts against mast observations in the Finnish wind power resource mapping project

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The upgrade of the Finnish wind power resource mapping is going on. The previous mapping was published 1991 and it was mainly based on observations. The climatology for the present mapping is made with meso-scale NWP mode and down scaling to detailed topography using WAsP-model. One of the tasks in the mapping is to validate/verify the model wind speed against mast observation. There is a group of masts with measurement heights around 100 meters available for this purpose. Most of the masts are in the Helsinki Testbed area while some of the masts are at existing wind farms.

From a larger data set (ERA INTERIM) a representative sample of months has been chosen and also two extra 12 month sets representing extreme wind conditions. The total sample consists of 72 separate months.

The lateral boundaries and first guess is from ERA INTERIM data. HIRLAM model (with 7.5 km resolution) is used to make initial analyses for 2.5 km AROME model with 6 hourly data assimilation cycle. Finally AROME model is used to simulate the wind climate. The output is with 3 hour interval. The WAsP-model is used to downscale the wind in coastal areas and hills in Northern Finland with 250 meter resolution and corresponding roughness.

For validation the operative AROME is used. Only 00 UTC initial analyses are used to make forecasts up to +24 hours with 3 hourly outputs to cover the diurnal cycle. The validation period began from June 2008 and it will last to the end of the project in October 2009.

The number of masts is around 20 and the height of measurements is typically between 60 and 100 meters.

The validation is made with traditional verification methods. A special attention is also made to the quality control of observations. A part of the wind speed measurement instruments are not typical cup anemometers but acoustic instruments (Vaisala VXT520).

The detailed results of validation will be presented. The preliminary results for the year 2008 indicate that there is a slight positive bias in wind speed climatology of AROME model.