



The Tall Wind project – exploring the wind profile and boundary-layer height in the atmosphere’s first kilometer over flat terrain.

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Predicting the wind at typical heights of present and future wind turbines is a considerable scientific challenge. Presently applied models are accurate within the surface layer. New measurements and instrument synergies are necessary as basis for developing new wind models and understanding the physical processes that form the wind profile in order to describe the wind profile above it.

Analysis of the wind and turbulence profiles from a meteorological mast at heights up to 160 meters and wind lidars up to 300 meters at the National test station at Høvsøre, Denmark, shows deviations of the wind profile above 80 meters from the profile used so far near the surface. It also reveals the importance of the boundary-layer height as a physical parameter for the description of the wind profile.

In the Tall Wind project, mast and lidar measurements of wind and fluxes will be combined with monitoring of the boundary-layer height by use of an aerosol lidar. At the main project monitoring sites (Høvsøre in Denmark and Hamburg in Germany) long term monitoring programmes on tall masts (160 and 300 meters) already exists and will be intensified. As part of the project the wind profile will be measured up to 1000 meters by a wind lidar (windcube) and the boundary-layer height by an aerosol lidar. The new data sets can be used for theoretical developments and evaluation of meso-scale meteorological models.

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In the paper the set-up of the Tall Wind project will be described and some first results and experience will be presented.