

Standardized Assessment of Marine Meteorological Data from Offshore Platforms

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Abstract:

In order to investigate conditions for offshore wind power generation in the German coastal areas, three research platforms were constructed in the North Sea (FINO1 and 3) and the Baltic Sea (FINO2). The observations from these masts are shown to be a valuable source of multi-level and sub-hourly maritime atmospheric data in an otherwise data-sparse region. The research project 'FINO-Wind' focusses on defining standards for the quality control, analysis and interpretation of the data which is necessary to make the results of the different platforms comparable and more useful for users in the renewable energy sector. Standards for wind turbines given in the IEC norm (International Electrotechnical Commission) can only be partly applied as some requirements are not applicable to offshore masts. Therefore, a standardization method for the data quality check is developed by introducing an automatic multi-level checking scheme. The quality criteria are either derived from existing meteorological standards or carefully chosen from several years of experience. The question, how to correct the wind speed measurements for flow distortions resulting from the mast structure, were investigated for each mast individually using five different methods: comparison to a vertical LiDAR (Light detection and ranging), Computational Fluid Dynamics (CFD) calculations, Uniform Ambient Mast flow (UAM) method, comparison of multiple sensors at the same height, and wind tunnel measurements. A thorough evaluation of these analyses yielded an optimized correction method for the wind speed measurements. The authors acknowledge funding for this project on atmospheric conditions for renewable energy generation through the 'Wind Energy Initiative' of the German Federal Ministry for Economic Affairs and Energy for the period 2013 to 2016. DWD implements this project as a federal government-business enterprise in collaboration with the Federal Maritime and Hydrographic Agency, UL International GmbH, Fraunhofer IWES, DNV GL, and Wind-consult GmbH. www.dwd.de/fino-wind.