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Standardization of Meteorological Data from FINO Offshore Platforms

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In order to investigate conditions for offshore wind power generation in the German coastal waters, three research platforms were constructed in the North Sea (FINO1 and 3) and the Baltic Sea ($FINO_2$). Measurement masts at each offshore platform are equipped with a range of meteorological sensors at heights of 30 to 100 m above sea level.
Standardized analysis and interpretation of the data is necessary to compare the results of the different platforms and will improve the knowledge of the marine ambient conditions at the three locations.
International Electrotechnical Commission Standards (IEC) cannot always be applied as some requirements are not applicable to offshore masts e.g. due to the wake of the structure.
In the FINO-Wind project, therefore, a standardization method is developed. Recorded measurement data are checked automatically on the basis of a comprehensive quality control. The routine starts with a formal check, followed by climatological, temporal, repetition, and consistency checks. After successful completion of each sequence, the data are assigned standardized quality flags. By default, 10-minute data are processed.
A special focus is on mast effects on the wind data of the three masts due to the different shapes of the construction (square or triangular shapes and different boom structures). These effects are investigated in comparison with wind tunnel measurements, LiDAR, Computational Fluid Dynamics calculations, and a ‘uniform ambient flow mast correction’ method. An adjustment for such effects will be applied to all wind data.
The comparison of sensor equipment, its installation and orientation as well as of the mast constructions will lead to suggestions on how wind measurements at offshore platforms mast can be improved.
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