Aeroacoustic calculations of a full scale Nordtank 500kW wind turbine - DTU Orbit
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The Actuator Line/Navier-stokes technique is used to compute the incompressible flow around a full scale Nordtank 500kW wind turbine under different complex flow conditions such as atmospheric turbulence and wind shear. The flow field is used as an input to aeroacoustic calculations based on; a semi empirical noise model; and a Navier-Stokes based computational aeroacoustic code (CAA). The Navier-Stokes based approach is solving acoustic perturbation equations and is capable of taking propagation and ground effects into account, but is limited to low frequency noise due to feasible mesh resolution, and due to the simplification in the actuator line method using body forces to represent the blade. Noise levels are compared to field measurements of a Nordtank 500kW wind turbine at different wind speeds and in flow profiles.

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