Challenges and Insights from the New European Wind Atlas Project

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Objectives of the NEWA Project

- Development of a high-value data base of high-fidelity experiments
- Development of methodologies for wind resource assessment and wind turbine site suitability based on a mesoscale to micromodel mode-chain
- Publication of a European Wind Atlas database accessible through a web interface
- Definition of a verification and validation framework for the model-chain based on the experimental campaigns and means to quantify the uncertainties of the wind atlas

Challenges

Mapping wind resources and associated uncertainties across Europe using supercomputing for seamless high-resolution spatial planning

Conducting experimental campaigns of unprecedented size to characterize complex flow conditions across a wide range of wind climates and topography

Bridging meteorological models and wind engineering tools to improve physical insight of flow models leading to more reliable wind assessment

Tapping the potential of open data science to foster collaborative research and transfer of knowledge to industry

Insights

Meso-micro coupling to change the paradigm of design tools traditionally based on idealized inflow conditions

Uncovering flow complexity in complex terrain with scanning lidar technology and high-fidelity simulations

Building a hierarchy of benchmarks for verification and validation of meso-micro models and wind assessment methodologies

Improving wind resource assessment using the best available input data from ERA5 reanalysis to airborne laser scanning of canopy

Open-Access Resources

- NEWA open-source model chain based on WRF and OpenFOAM (beta release in Jan’18)
- Database of experiments, released throughout 2018 from the NEWA data server
- V&V benchmarks released through Windbench.net, open to external participation within the IEA Task 31 Wakebench

References


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