

CFD IN WIND ENERGY – FROM WIND TURBINE AERODYNAMICS TO ATMOSPHERIC BOUNDARY LAYER FLOWS

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ABSTRACT

We are proposing a minisymposium on Computational Fluid Dynamics and associated optimization in wind energy. Topics will vary from small-scale phenomena e.g. wind turbine aerodynamics, to large-scale Atmospheric Boundary Layer (ABL) flows. Computational Fluid Dynamics (CFD) and Numerical Weather Prediction (NWP) are modern tools to analyse and optimize wind farms and wind turbine technology. When dealing with turbine design and related performance factors, it is close to traditional CFD for rotating machines, whereas analysing of wind conditions of large wind farms goes close to local weather predictions. In addition, boundary layer phenomena including “roughness” (i.e. buildings, forests, lakes, oceans) need to be taken in to account. Forests can be modelled as a rough surface in large-scale simulations, but in metre-scale it is a flow through a porous medium, or separate trees should be modelled. Therefore, different scales need different modelling approaches.

The minisymposium will cover both large-scale and small-scale computational approaches. It will attract academia, meteorological institutes, modelling enterprises, as well as wind energy industry.

We would like to propose one session with 6 presentations of 20 minutes each. The corresponding organizer is Prof. Jari Hämäläinen, and the co-organizers are Dr. Gabor Janiga and Prof. Dominique Thevenin.