



Observations of the boundary-layer height and the wind profile in the marine boundary layer

Rogier Floors, Sven-Erik Gryning, and Alfredo Peña

Department of Wind Energy, DTU, Roskilde, Denmark (rofl@dtu.dk)

Because of the large number of wind turbines that is planned to be installed offshore in the North Sea, there is an increasing interest in the representation of the wind profile in the marine boundary layer. We present an evaluation of the WRF model using a combination of mast measurements and remote sensing techniques. The wind, temperature and humidity and wave parameters are measured at the FINO 3 platform in the North Sea. The boundary layer height is estimated using a CL51 ceilometer from Väisälä and the wind profile up to the PBL height is measured using a wind lidar from Leosphere from August 2013 onwards.

The backscatter coefficient was generally high and therefore the ceilometer was able to estimate the PBL height well. The PBL height showed a pronounced seasonal cycle: unstable conditions availed during autumn, while stable conditions were more common during spring. This caused a distinct behaviour of the wind profile, with relatively large wind shears during spring. The differences between the WRF model and the observations at FINO 3 will be discussed.