Comments on:

”Turbulence in a coastal environment: the case of Vindeby” :Rieska Mawarni Putri, Etienne Cheynet, Charlotte Obhrai and Jasna Bogunovic Jakobsen

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The very thorough review by the anonymous reviewer covered most of my comments also. I just want to add a few items:

- Data from additional instrumentation available
- Sonic anemometer flow distortion
- Tower flow distortion
- Spikes in data

Background

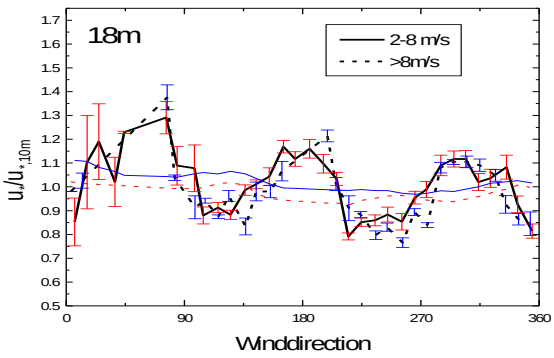
I was responsible for running the Vindeby measurements and I had a lengthy email correspondence with the primary author on the measurements and the corresponding databases of analysed data and timeseries in the spring of 2020.

Additional instrumentation

During two prolonged periods in 1994 additional instrumentation was added to the experiment called the RASEX measurements [1]. Instrumentation included wave wires for more accurate (and better special resolution) wave measurements and three additional sonic anemometers of which two were of a type with considerably less flow distortion.

Sonic anemometer flow distortion

In addition to the Solent omni-directional anemometers during the basic measurements, three more sonics were added, at 32m (omnidirectional Solent), 3m and 10m (asymmetric Solent with less flow distortion). The omnidirectional Solent shows considerable flow distortion, here illustrated with the ratios of measured u* at 18m (omnidirectional) to measured u* at 10m (asymmetric sonic), fig. taken from a presentation by me at Oregon State University, 7 May, 1998:



Tower flow distortion influence on phi_m

When calculating phi_m with measurements from a tower like the one used in Vindeby, you need to take into account the variation with height of the flow distortion caused by the tower (fig. 6 in [2]). There were anemometers on both sides of the mast which enabled modelling of the flow distortion and its influence on the wind profiles [2].

Furterhermore it was shown that phi_m varies with sea fetch [2], which was also not taken into account in the WES paper:

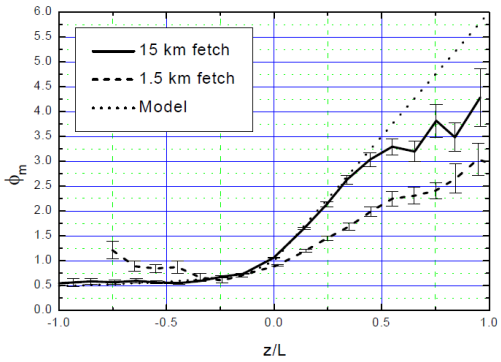


Figure 6 *Nondimensional wind profiles as a function of stability. The full line is long fetch data, whereas the dashed line is short fetch data. The model is shown as a dotted line.*

Spikes in data

On page 9 the authors refer to a fairly crude method for removing spikes. Checking for spikes using a much better method [3] was part of the QC routine and the data analysis – and of course filtering out data with strong precipitation left data with very small amount of spiking (precipitation sensor on mast LM).

[1] Højstrup, J., J. Edson, J. Hare, M. S. Courtney, and P. Sanderhoff, 1997: The RASEX 1994 experiments. Risø-R-788, Risø National Laboratory, Roskilde, Denmark.

[2] J. Højstrup: Vertical extrapolation of offshore wind profiles. In proceedings from EWEA conference in Nice, France, 1999.

[3] J. Højstrup: A statistical data screening procedure. Meas. Sci. Technol. 4 (1993) pp. 153-157