

Interactive comment on “On the wind stress formulation over shallow waters in atmospheric models” by P. A. Jiménez and J. Dudhia

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There is no doubt that this very interesting and well written paper is of high relevance for modelling the wind flow in the marine boundary layer. But especially the used FINO1 observations require a very critical examination.

I agree with all of the comments from the reviewers and discussion participants. My special concern is to caution against an all too trustful use of the FINO1 data. Many people have been analysing this data for 10 years, and from the beginning until now, new problems, measurement errors and inconsistencies have been occurring again and again. Many reviewers have rejected submitted papers due to the use of FINO1 data. Unfortunately, this has not stopped others to publish studies using this defective data without caution.

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Just a few of the problems: - There are no anemometers below 30 m height, and the one at 30 m is affected by the helicopter platform and the containers at 23 m height. - The wind speed measurements are not only affected by the mast shadow, but also by strong flow distortion (dynamic pressure as well as speed-ups) around the quite massive lattice mast, with relatively short boom lengths. - All single temperature measurements have biases and uncertainties of around 0.5 Kelvin, which is too much to calculate a reliable Richardson number. The temperatures from the three sonic anemometers exhibit deviations of up to 6 Kelvin, rendering the covariance $w'T'$ relatively useless.

As Gerald Steinfeld has pointed out in his comment, since 2009, a further restriction is added due to the construction and trial operation of the offshore wind farm alpha ventus directly next to FINO1: twelve 5MW-turbines with hub heights of about 90 m and rotor diameters between 116 m and 126 m. This means that for all (easterly) wind directions between 0° and 180° , the FINO1 data cannot be used for the purpose of the present article.

In short: An independent, scientific examination and approval of the whole technical measurement system of FINO1 has never been done. The technical documentation of the whole campaign is very poor. There is not enough evidence to trust in this data for micro-meteorological studies.

At last a minor question: Have the authors compared hourly averages of the standard 10-minutes-wind speed observations to the hourly WRF output, or have they used just one 10-min-average every hour on the hour?

Interactive comment on Geosci. Model Dev. Discuss., 7, 9063, 2014.

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