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## ***Interactive comment on “Intercomparison of the Charnock and CORE bulk wind stress formulations for coastal ocean modelling” by J. M. Brown et al.***

**J. M. Brown et al.**

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Thank you for the review. Below is our initial response to your comments which we will address in greater details when revising the manuscript.

Your major concern about lack of winds from NW-N is valid for local fetches within the Bay. However, the fetches to Liverpool Bay are greatest from the west. In the northwest the Isle of Man is present as shown in Figure 1. The wind roses at Hilbre (mouth of the Dee estuary) and at an offshore wind farm in Liverpool Bay (Gwynt Y Mor) are attached for data from 2005 - 2008. This clearly shows that the dominant wind direction at Hilbre is SE, influenced by the orientation of the Dee Estuary, and the secondary wind

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direction is westerly. The offshore wind rose at Gwynt Y Mor shows the SW then W wind directions to be dominant. The period we study does contain NW-W winds, mainly between 550 and 650 hours. However, the dominant direction over our study period is consistent with the wind climate in Liverpool bay showing W-SW dominance. We focus on these wind directions because SW-W veering winds are associated with extreme storms within Liverpool Bay. By analysing the time-varying contribution Figures 2&3 do show that the Charnock method is performing better during the NW-N periods. We agree that the overall mean values are biased towards SW-W wind direction, but this is consistent with the wind climate at this location. We agree that a more in depth discussion about the time-varying results focusing on the comparison of short periods of SW-W and NW-N winds during this study is required.

The reference to the CORE formulation is unfortunately a typo. It should indeed be COARE as it is in the reference. This will be corrected throughout the manuscript so that the correct information is referred to.

The inconsistency with the dates needs to be corrected. The full study period is 6th Feb-9th Mar. Both model simulations and observations at the offshore (Sites A and B) are available for this full period. However, observations in the Dee Estuary were only available from a limited period 12th Feb - 9th Mar, and the data we have used in the Hilbre Channel are only available from the 14th Feb due to a 48 hr period of instrument deployment. The figures are correct, but the text needs to be improved to clearly state the study period and the period of limited estuarine observations.

The limited period of data is 1 month, the 2 months of data (P524I20) is a typo. This needs to be corrected.

To be of similar accuracy (large or small), equation 1 must be near to zero. For surge at Site B the time-variation of this equation (Fig. 2b) is small and close to zero, which is why we refer to the models as having “similar accuracy”. At Hilbre (Fig. 4), the time-varying current speed and direction differential accuracy values do spend noticeable

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periods of time close to zero, while at other times the metric takes larger value. We agree that a comment about the frequent “similar accuracy” in the currents occurring at Hilbre needs to be made.

As suggested, for ease of comparison we will combine tables 1 and 2. Attention will also be paid to the figures to improve the clarity. In particular figure 1 will be changed to have Liverpool Bay only in the right panel, showing its location on the left panel. A better way to show the depth contours will be used and the estuary names included. The wind vectors will be split into two subplots of winds speed and direction to improve the clarity. The text and numbers will be enlarged and dates used on the x-axis.

Following the revisions stated above we will thoroughly read through the manuscript to remove any other mistakes in the text.

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Interactive comment on Ocean Sci. Discuss., 10, 519, 2013.

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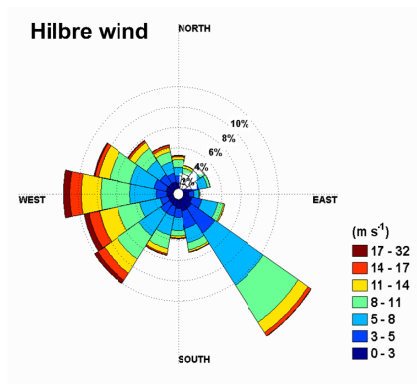
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Gwynt Y Mor: cup anemometer at 64 m: Sept 05 - Apr 08

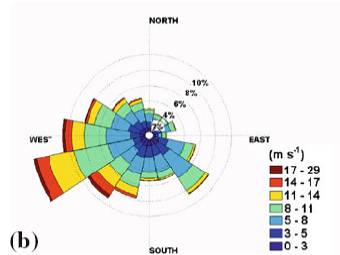


Fig. 1.

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