

ANSWER TO REVIEWER'S COMMENTS

"On the wind stress formulation over shallow waters in atmospheric models" Pedro A. Jiménez and Jimmy Dudhia.

Reviewer 3

GENERAL COMMENT

Suggestion: Minor revision.

The manuscript depicts an exploration for the parameterisation of surface wind stress over shallow waters by a method of combining numerical modelling and observational data. The study adds our knowledge of the parameterisation in such condition and the result has potential to improve numerical climatic and NWP modelling especially for coastal regions. The manuscript is well organised and well written. I have a concern listed as item (1) which needs to be clearly addressed before the manuscript is accepted for publication.

ANSWER

We appreciate the overall positive perspective that this reviewer has of the manuscript and we would like to thank her/him for the time she/he devoted to review the manuscript. The two specific comments are reproduced below with a detailed answer on how we will modify the manuscript to address them.

SPECIFIC COMMENTS:

COMMENT 1

The authors ignore the stability correction in the relation of surface stress, surface wind and momentum roughness length in introducing Eqns (2) and (3). Although over waters such correction is minor given the large thermal capacity of the underlying water, the influence should either be included in formulae or adequately justified such ignorance. A robust way would be a data regression to derive Eqn (2) as

$$\text{Log}_{10}(z_0) = a * U_{15N} - b$$

where subscript N denotes to neutral condition. Thus a transformation from Eqn (2) to (3) would be faultless.

ANSWER

Note that in empirically fitting Eq. 2 all stability conditions were used. We will clarify that assuming a neutral logarithmic wind profile to transform from Eq. 2 to Eq. 3 is an assumption. The main motivation for this approximation is to derive a simple expression (Eq. 3). Assuming neutral atmosphere is a reasonable assumption given the relative low impact of the new formulation for low-moderate winds (Fig. 1); the largest impact is found for high winds where assuming neutral atmosphere is a good approximation. We will add the following phrase on page 9068, line 22: “... *in the new WRF experiment. Assuming neutral atmosphere is a good approximation given the larger (smaller) impact of the new formulation for moderate-high (weak) winds when the atmosphere is nearly neutral.*”

COMMENT 2

2). *In P9068, L13, I would suggest to explicitly list the formula of Edson et al. (2013) in here as it has been used quite often in the following figures.*

ANSWER

We will introduce the formula of Edson et al. (2013) in the way suggested.