

Review from Referee #1

I thank the authors for taking into account in a very careful way the comments of both reviewers. Especially, they significantly improved the coupling between the ocean, wave and atmospheric models by including the effects of the surface currents into the wind (and not only turbulent fluxes) and by changing the parameterization of the drag coefficients. Also, the discussion comparing the present study with previous results is more complete and the diagnostics of the biases with respect to observations and their evolution with different configurations has been much improved. I am convinced that they added significance and visibility to their results by making the present version of the paper more complete and clearer. Still, the language could be improved and the paper deserves a very careful spell checking (the suggestions below are not comprehensive). I only have minor comments as follows.

Response: We sincerely appreciate the reviewer for her/his constructive comments on the manuscript. Our responses are listed as follows in blue. Text is revised accordingly.

Title: a noun is missing after CFSv2.0-WW3, I suggest “CFSv2.0-WW3 System” or “CFSv2.0-WW3 configuration”.

Response: As suggested, “System” is added.

l. 50: for Cch → for defining Cch

Response: As suggested, “defining” is added.

l. 139: please provide information here about the different coupling configuration tested and the details corresponding to 10_STEP_WW3.

Response: The corresponding information is added as below, “The three components are coupled every time step (180 s) in 1_STEP_ALL experiment, every 5 steps (900 s) in 5_STEP_ALL experiment and every 10 steps (1800 s) in 10_STEP_ALL experiment. In 10_STEP_WW3, only the WW3 is coupled every 10 time steps, whereas the GFS and the MOM4 remain the one time step (180 s) coupling frequency as the original settings in CFSv2.0”.

l. 145: Charnock parameter related estimation → estimation of the Charnock parameter

l. 146: offered → available

l. 154: Compared → Comparing

l. 164: The → Where

l. 178: supplementary → supplementary material or information

l. 180: varies in proportion to → depends on

l. 182: is the → the

l. 187: is an average value → is the average value of the density

l. 217: To account for the effects of Stokes drift velocity, the Eqn. 14 was applied → To account for the effects of the surface currents and of the Stokes drift, Eqn. 14 was used

l. 219: is also conducted → has been implemented

l. 221: with an angle → different

Response: Thanks. We have modified the manuscript according to all these comments.

l. 226: Eqs 11-13 do not show the link between the roughness length and the transfer coefficients, please rephrase.

Response: Text is revised to “The fluxes are in part determined by surface roughness length, which can be converted to surface exchange coefficients based on the Monin-Obukhov similarity theory (Monin and Obukhov, 1954)”.

l. 284: applied → used

Response: Done. Thanks.

l. 288: sentence is not clear; please rephrase.

Response: Text is revised to “The results in the first three days were excluded in the evaluation, since the wave influences were weak at the beginning”.

l. 303: This is different with → this contrasts with

Response: Done. Thanks.

l. 361: I don't understand the second part of the sentence; what is the meaning of perturbation here? In the “results” part, the authors should add a comment about the general increase of the biases (wrt ERA5 or observations) in all experiments, and the fact that it is likely a drift from the initial conditions (because no data are assimilated).

Response: We apologize for the confusion. The “with perturbations” is deleted. As suggested, a comment is added in Section 4 as below, “Compared with observations or ERA5, the general increase of the biases in all experiments is likely a drift from the initial conditions since no data are assimilated”.

References

Monin, A. S., and Obukhov, A. M.: Basic laws of turbulent mixing in the surface layer of the atmosphere, *Contrib. Geophys. Inst. Acad. Sci. USSR*, 151(163), e187, 1954.