

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2021-441

Anonymous Referee #1

Referee comment on "Formulation of a new explicit tidal scheme in revised LICOM2.0" by
Jiangbo Jin et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2021-441-RC1>, 2022

Comments to the Author

Tides play an important role in the ocean, which plays crucial role in energy transfer and maintaining the thermohaline circulation. Thus, the introduction of tidal processes in global ocean models is necessary. The new aspect in this study is the inclusion of tides in a global model via the explicit calculation of the tide generating force based on the positions of the sun and moon, rather than the traditional method of including about eight tidal constituents with empirical amplitudes and frequencies. Excellent results are demonstrated for the effect on improving simulations of the ocean circulation. This paper has a clear logic and concise structure, which can provide guidance for further improvement of ocean models related to tidal forcing. So, I recommend to accept the MS after the following minor editing.

L107-109: why convert the tidal force into the tidal potential in equation (5) after getting the tidal force?

L132-135: The parameterized topographic wave drag has an important impact on the results, Are the two wave drag terms applied in your two tidal experiments exactly the same, including the parameterized formulation and coefficients?

L118-120: As you said, both and are functions of universal time, what is those function?

L187: What's does "large non-closed circular bands" mean?

L211: total errors => total error

L212: I don't think phrasing "phase error" is specific enough, especially when it first appears. Instead, "amplitude-weighted phase error (phase error)".

L225: a similar distribution => similar distributions

L311-312: "This is because Exp2, in applying the new formulation of the tidal scheme, can better represent the projection positions of both the Sun and Moon relative to Exp1.",
Why?

L325-326: modes => constituents

Figures:

Fig.9: dynamic sea level => DSL