The manuscript reports on a method that allows to map the global mode-1 N_2 internal tides from sea surface height (SSH) measured by satellite altimetry. Results are presented and discussed in light of a similar product for the well-described mode-1 M_2 internal tides. The model's predictive skill is tested vis-à-vis of an independent global time series of SSH, and it proves to be good. The manuscript is clearly written and well presented, and the science looks robust to me. The scientific interest of mapping internal tides is emphasized in the context of the new SWOT satellite mission. I recommend this manuscript for publication after some minor revisions that I hope can help to clarify some points.

Thank you very much for your time and suggestions.

Minor comments:

- Line 6 and elsewhere: "1993 through 2019" replace "through" with "to"?

Changed as suggested.

- Line 10: "Both features mimic their barotropic counterparts" is unclear to me. This could be rephrased and developed a bit, including considerations on the energy conversion etc.

This expression is removed.

- Line 20: the acronym should be expanded first and put into parentheses afterward, i.e., "Surface Water and Ocean Topography (SWOT)"

Changed as suggested.

- Line 20: The SWOT mission has not been designed to strictly study the submesoscale only I think, but to have a wider picture of entangled motions and waves that have a signature in SSH.

Changed.

- Line 27: remove "(Section 2)" and stick it to where the plan is announced?

Removed as suggested.

- Line 31: I think it would be useful for the reader to be introduced to the semidiurnal tide components in general, before getting into the details of N2 and L2.

Thank you. But we do not how much the reader knows about tide.

- Line 37: insert "see their Figure 4" within the previous parentheses?

Changed as suggested.

- Line 39: “can better parameterize” is not very clear. I think you mean more than just parameterize, i.e., increase our understanding?

“parameterize” is replaced with “describe”

- Line 70: why is the fitting window size not varying geographically? I thought it would take into account mode-1 wavelength.

Good point. But it does not change much. See my recent paper (Zhao 2022 JPO).

- Line 75: add “horizontal” before “wavenumber”

Changed. ‘Horizontal’ is added in several places.

- Line 98 (and perhaps before): It would be good to stress out that only the coherent internal tides are mapped.

One sentence is added to admit this limitation.

- Line 112: rephrase “they have same generations over rough topography” to be more specific (amplitude, phase, etc.)

Dropped in revision.

- Line 114: add “energy” before “conversion”

Changed as suggested.

- Line 115: “in the causative chain” is unclear. If I understood correctly, you mean that the similar M2 and N2 barotropic tides generate similar baroclinic tides and that the ratio between barotropic tides is also observed in baroclinic tides.

“In the causative chain” is removed.

- Line 120: I assume 0 degree is East? It should be mentioned.

Yes. We follow standard polar coordinates.

- Line 137: typo? “prone to” be?

Fixed.

- Line 146: remove “percentage”

Removed as suggested.

- Line 157: I do not understand the sentence “Thus, …”

This sentence is dropped.

- Figure 4 and line 173: I think it would be good to give globally integrated numbers for all terms, and perhaps the integrated contribution of all negative and positive terms to make sure that the variance is indeed reduced.

Figure 4 (now Figure 6) is improved. I feel a global integration is not necessary.

- Line 198: add “mode-1”

Changed.

- Line 201: I do not understand how one can do “parameterizing the temporal variation” with the elements provided. It could be developed.

Changed to ‘better description of the temporal variation’

- Line 208: typo (sub and not sum). And perhaps rephrase into something that reminds the reader on the fast (waves) and slow (balanced motions) manifolds?

Fixed.