Geoscientific Instrumentation Methods and Data Systems Discussions

Geosci. Instrum. Method. Data Syst. Discuss., referee comment RC2
https://doi.org/10.5194/gi-2021-27-RC2, 2022

Comment on gi-2021-27

Anonymous Referee #2

Referee comment on "Glider observations of thermohaline staircases in the tropical North Atlantic using an automated classifier" by Callum Rollo et al., Geosci. Instrum. Method. Data Syst. Discuss., https://doi.org/10.5194/gi-2021-27-RC2, 2022

General Comments

The manuscript describes the improving of an existent algorithm capable to detect thermohaline staircases. The major achievements of the authors are the ability of their classifier to operate on dataset at any regular vertical spacing, which they provide some example, and therefore the possibility to be used on different kind of dataset.

They apply the classifier to glider data in North Atlantic, showing characterization of a thousand of staircases profiles with a very high reliability. Based on their case study, they hypothesise a relation between background vertical gradients and staircases formation in favourable regime.

Double diffusion and consequent formation of thermohaline staircases play a particular role in the diapycnal mixing, depending on staircase characteristics, therefore a useful, free and more complete tool like this classifier is a high valuable boost in this research field. Despite that some improvement could be made in order to achieve the publication.

Specific comments

- If I have understood correctly you are not using salinity data in the classifier, except than for a double check and parameters calculation. If I am right, you shouldn't use the claim about the applicability of your classifier on data with weak salinity reliability, this would be true if you include salinity using some kind of enhancement on the data. Despiking is a necessary data processing step always, so if you still have so very bad salinity data and you do not trust them, you should just not use them and base your

algorithm only on temperature (if you can). Actually, in a process like double diffusion, that is double indeed, salinity should be taken into account in a classifier algorithm, maybe with some warnings. I agree with Rev1 on the necessity of more wide clarification on this part.

- You are using North Atlantic data, but you also show Mediterranean data and cite Arctic data. This is a bit confusing, because it seems that you want to compare different kind of staircases, which is a good point (also because one of the strongest point of your classifier is its flexibility on different dataset), but if so the comparison need to be more structured in the text (maybe with specific paragraph or table?).
- The manuscript has different writing styles and this affects its fluency. In particular, introduction and some part of the result paragraphs are very broken up. It should be very much better if you balance and harmonize the whole manuscript.
- Line by line comments on the manuscript file with some (I hope) useful suggestions can be found attached.

Please also note the supplement to this comment:
https://gi.copernicus.org/preprints/gi-2021-27/gi-2021-27-RC2-supplement.pdf