

Interactive comment on “Global dataset of thermohaline staircases obtained from Argo floats and Ice Tethered Profilers” by Carine G. van der Boog et al.

Anonymous Referee #2

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This paper tackles the worthwhile problem of identifying and characterizing double-diffusive staircase structures in ocean temperature and salinity profiles. Unfortunately there are fundamental shortcomings of the work.

Without seeing representative profiles (from different regions), it is impossible to determine the extent to which the algorithm works. Figure 6b provides clues that it may be appropriate sometimes for the identification of salt-finger layers, although there are profile regions that appear to indicate steps which are not colored red (and it is unclear why). It would be helpful to be given some information about where the profiles are, and shown the detailed T-S structure. Figure 6a is clearly showing that the algorithm

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is not working. The algorithm appears to have picked up the thermohaline intrusions underlying the double-diffusive staircase. One can see this immediately because of the regions that are deeper than the temperature maximum are marked blue. I would encourage the reviewers to examine some papers on the Arctic staircase and compare and validate their results against those. Similarly, the reader needs to see detailed profiles and validation. (As an aside, potential temperature should be used when examining step structures in deep water and the authors ought to compare profiles of potential temperature and temperature through deep staircases.)

The authors state that they only analyze profiles "with an average resolution finer than 5 dbar", and then that "all profiles are linearly interpolated to a vertical resolution of 1 dbar". First, it's unclear how interpolating to 1 dbar influences the results for a profile with a vertical resolution of ~ 5 dbar, and second (as the authors note) there are regions where gradient layer thicknesses are an order of magnitude smaller than the vertical resolution of their profiles. If this is not an issue, it will become clear when the authors show details of representative profiles as per my comment above.

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