

Response to Reviewer 3

This paper proposes a concise and effective metric for identifying ocean fronts. The authors provide thorough background and reasonable discussion of certain considerations when using the metric.

Thank you for your comments and consideration. Below, please see our responses (in black) to the comments (in blue). We hope that you find our manuscript to be improved and suitable for publication.

Comments:

While the metric does appear to effectively highlight when water masses are not clearly assigned to a single cluster – the authors remain ambiguous on what is a ‘low’ metric and what is a ‘high’ metric. Toward the goal of removing ad hoc decision making, a more quantitative description of how the I-metric is classified would be helpful.

The difference between “low” and “high” is indeed somewhat arbitrary. In any particular application, one could use a histogram approach to find potential cut-off values. Here there is a sharp contrast between open ocean values and along-front values, which makes the separation a bit clearer.

Similarly, in figure 2b, low I-metric points are not shown – what was the threshold used and how was it chosen?

The threshold value was chosen at 0.05. This threshold is quite subjective but was chosen to improve the visibility of the plot. It also corresponds to standard values chosen for statistical significance.

Figure 3 caption should be rephrased to read as complete sentences.

This has been changed, and we hope that you now find it more readable.

Figure 5 legend should be fixed to be easily readable.

We changed the figure dimensions and the legend to be more readable. The lines in the figure legend from Kim and Orsi (2014) altimetric fronts are now much thicker, which should help a reader differentiate between them.

Figure 5 caption should be rephrased somehow, e.g. “Envelope indicates one standard deviation to either side.”

Thank you for that, we have changed that (last sentence in caption of Figure 5).

First sentence after equation 5 (line 277) should be rephrased more clearly.

Modified for clarity (line 296).