

Response to Reviewer #1

Dear Editor and Reviewer,

we would like to thank you for the careful reading of the manuscript and the constructive comments that substantially helped to improve and clarify the paper. Answers to all your comments are detailed hereafter. Corrections to the English grammar were adopted in the revised version of the manuscript according to both the reviewer's and editor's recommendations but are not reported or discussed here. All authors agree with the modifications made to the manuscript. The comments by the referee are reported in italic font followed by our response. Again, thank you for your feedback. We appreciate the thorough and valuable comments on our manuscript. We will carefully address all the suggestions and make the necessary revisions.

Reviewer comments

- *In the abstract, SLP is mentioned in line 25, without being first defined at its first mention in line 16. Please make sure all abbreviations appear at first mention throughout the text.*

We thank the reviewer for pointing this out. This change will be incorporated to the manuscript.

- *Figure 1. Could it be possible to add labels to the SST contours or a colorbar if they are in the same color scale? Why is SST only for the EBUS regions? Would it be better a global map of SST with boxes defining each EBUS? I don't think the bathymetry is of any interest for this study, specially away from the regions of study. Figure 1 intention is to resalt the EBUS location global SST could be unnecessary for that purposes*

Thank you for your feedback. We will add labels or a colorbar to the SST contours for clarity and replace the bathymetry with a global map of SST.

- *Lines 60-65. Here you establish the relationship between SST and upwelling intensity and report a higher S2N ratio between SST and Ekman transport. Could you add any reference to support these statements?*

Thank you for your comment. These statements arise from the definition of upwelling center from Kämpf and Chapman, 2016. We will rephrase the text in line 56 to highlighted this

“Upwelling within the same EBUS is not usually evenly distributed due to irregular coastlines and seafloors, resulting in more pronounced upwelling in specific 'upwelling centers'. In these areas, the sea surface temperature (SST) drops significantly as cold subsurface water rises, leading to a stronger relationship between SST and upwelling intensity (Kämpf and Chapman, 2016). Consequently, these upwelling centers exhibit a stronger signal-to-noise ratio between SST and Ekman transport, making them ideal for studying long-term upwelling trends.”

- *Section 3.1. The descriptions the selection of each dynamical point for each EBUS is appreciated, but I think it would improve if, for each subsection, you specified which point is UP1 and UP2. For example, for CalUS, between Cape Mendocino and Point Conception, which one would be UP1 or UP2. As these geographical features don't appear in the maps, only being referred to as UP1 or 2, I think it would be useful to specified it in the text. (Editor – but I think UP1 and UP2 are labelled in the figure 2 panels in each case, although some of the dots are not very distinct. The text might refer to the respective panel in figure 2 in each case, especially as figure 2 is several pages later than section 3.1. For CalUS, HuUS and BeUS please say in the text which is UP1 or UP2).*

Thank you for your suggestions. The respective location for UP1 and 2 are now indicated in section 3.1, and readers are also referred to the respective panels in figure 2.

- *Line 171. Here appears the definition of SLP but has already been mentioned above (line 102).*

Thank for you comment. The text will be modified accordingly

- *Line 173. The authors mention Rykaczweski hypothesis, but there's no description of it or any reference in the text. It is explained below in the discussion section.*

We thank the reviewer for pointing this out. The text will be modified as follow:

“To corroborate more recent hypothesis that suggests an alternative mechanism, a poleward shift of the oceanic high-pressure system would stimulate latitude-dependent changes in the magnitude and timing of the upwelling winds (Rykaczewski et al., 2015).”

- *Line 200. I think the notation is wrong on my version of the file, with the average bar above the slash. In this case, I would also recommend removing the slash: within their respective uncertainty ranges for (U_p) and (O_c).*

Thank you for your comments. The notation was incorrect, and the text will be modified accordingly. Additionally, the average bar will be replaced with the appropriate vector notation to emphasize the vectorial nature of U_p and O_c (e.g. $\overrightarrow{U_p}$ and $\overrightarrow{O_c}$)

- *Figure 2. I would recommend the authors to select a different color for the land. It is in a very similar palette to the colorbar used for SST. Also, it is difficult to differentiate between the dynamical points (black dots) and the cruise data (also black dots). Please consider differentiating them. In the caption, please add the distinction between blue and red dots for subplots a and b.*

Thank you for your suggestions. We have also adjusted the land color in Figure 3 for consistency. The caption will be modified to clarify the distinction between the blue and red dots.

- *Tables 1 and 2. I think it would add value to the analysis if the statistically significant correlations were marked (either with an asterisk or in bold).*

Thank you for your suggestion. While we understand the value of highlighting statistically significant correlations, all correlations in Tables 1 and 2 are statistically significant. Therefore, marking them in the table could be redundant. A clarification will be added at line 300 as follow:

“...not comparable. Nonetheless, all the linear fits are statistically significant.”

- *Figure 3. In the caption, you mention ‘the color scale indicates the trend values and the right margin of each graph’. Should this be changed to the color scale indicates the trend values at the bottom of the figure? Also, correct ‘black-dots’: Shaded area with black dots or Black-dot shaded áreas*

Thank you for your suggestions. The caption will be modified accordingly.

- *Lines 359 and 363. Consider replacing La Niña y El Niño with the cool and warm phases of El Niño Southern Oscillation (ENSO). If so, remove the description of ENSO from line 524.*

Thank for you comment. The text will be modified accordingly.

- *Line 394. No need to describe again EBUS abbreviation.*

Thank for you comment. EBUS abbreviation will be suppress.

- *Lines 395-399. Please replace 'mb' to mbar for the pressure units and specify that the values within parenthesis represent the spatial SD. (Editor – do you need to repeat the table 3 values in the text?)*

We thank the reviewer for pointing this out. The units will be corrected. Also, we agree with the editor's comments, and the text will be simplified as follow:

“ERA5 data show positive and significant trends across all EBUS (see Table 3), while NCEP data indicate negative trends in the BeUS. Despite these differences, both datasets show good overall agreement. The strongest SLP gradient trends are found in the HuUS region, whereas the weakest trends occur in the BeUS. Given its coarser resolution (2°) compared to ERA5 (0.25°), NCEP data are considered less reliable. Despite this, the findings both datasets support an intensification of the pressure gradient.”

- *Table 3. Please replace 'mb' to mbar for the pressure units*

Thank you for your comment. We have corrected the units.

Editor comments

- *Line 568. “higher” -> “stronger”. Also “. . . and intensification is slightly stronger . . .”; does this apply in both oceans?*

Thank you for your comments. I have made the suggested change. As you noted, the statement does not apply to both oceans. To address this, I have removed the phrase from the text to avoid any confusion.

- Lines 574-575. Please see the OS data policy https://www.ocean-science.net/policies/data_policy.html where “The best way to provide access to data is by depositing them (as well as related metadata) in FAIR-aligned reliable public data repositories” and “In rare cases where the data cannot be deposited publicly (e.g., because of commercial constraints), a detailed explanation of why this is the case is required.”

Thank you for your comment and for pointing out the data policy guidelines. I apologize for the oversight regarding the RaProCan dataset. This dataset is indeed publicly available through the SeaDataNet portal, which is part of the PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT, at <https://www.seadatanet.org/>. I will update the manuscript accordingly to reflect this information