

Ocean Sci. Discuss., author comment AC4
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Reply on RC3

Gandy Maria Rosales Quintana et al.

Author comment on "Interannual variability in contributions of the Equatorial Undercurrent (EUC) to Peruvian upwelling source water" by Gandy Maria Rosales Quintana et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-13-AC4>, 2021

Referee #3 : Anonymous

Major points:

This is an interesting paper addressing the relationship between the equatorial undercurrent to the upwelling off the coast of Peru. The objectives of the paper are reasonably clear, in particular, the Lagrangian particle tracking as applied to 20 years of regional data from a high resolution global model to investigate the above relationship. The focus of the paper is on interannual variability. Though I do realize the interannual variability is large in this region, I did think a more logical approach would be to discuss the mean annual cycle (20 year average of each month) first to establish particle tracking and its interpretation. Though this may have been covered in previous published studies your results are based on a very high resolution model and this is new. Therefore, it would be better to introduce these results first before the interannual results. The proposed section would lead the reader to an understanding of the particle tracking method and its interpretation. The results as presented in the text are more like results from a notebook and are difficult to digest. It should be more thoughtfully and more clearly written.

Response: Thank you for your valuable comment. We will improve the results section in a more systematic manner.

The second major point is that section 3.5 comes too early in the paper. The main focus of the paper is the relationship of the EUC to the Peruvian upwelling. This needs to be discussed very thoroughly before going on to the impacts on the fishery. Though the fishery is important as far as the ecosystem is concerned the science has to be dictated by the physics first, before jumping ahead to the biology of the system. The biology is a consequence of the physical oceanography as presented in this paper.

Response: Thank you for your valuable comment. We will re-organize these sections as suggested.

I would therefore suggest you consider a major revision of the structure of the paper. Eg. Mean annual cycle, interannual variability, Discussion and Summary of your results regarding the EUC and upwelling. I am not sure the ecosystem discussion section 3.5 is necessary, but it could be added in the final conclusion on the impact of the upwelling on

the fishery.

Response: Thank you for your valuable comment. We will re-structure the paper accordingly.

Minor points

Page 1 Line 9 Should 8 deg S.?

Response: Corrected.

Page 2 Line 35 Replace "in" by "on "

Response: Corrected.

Page 2 Line 56 remove first occurrence of "in"

Response: Corrected.

Page 2-3 Line 53-60 Will need revising in light of my suggestions above.

Response: We will modify it accordingly.

Page 3 Line 80-81 The number of particles used to initialize the trajectories is remarkably variable. Need to explain carefully why this is the case and how this will affect your results.

Response: The number of particles is proportional to the strength of upwelling (see response to Comment 2 of Reviewer 1).

P5 Line 119 The clear seasonal variability is mentioned here and that is why I suggest you should discuss the mean annual cycle first before discussion of interannual variations. Eg. Mean Annual Cycle only in section 3.2, 3.3 and 3.4 As it stands the results in particular in 3.4 are presented in a confusing manner.

Response: Thank you for comment. We will enhance and re-organize the results accordingly.

Page 8 Section 3.5 As stated above this is the application of the EUC to upwelling and should be placed after Section 3.6

Response: Thank you for comment. We will re-organize these sections accordingly.

Page 8 line 276-277 This is more than an inference. It is your main hypothesis and therefore should be stated clearly. Secondly it is stated the EUC is highly variable without stating the mean transport and its variability and interannual or seasonal?

Response: We will state our hypothesis more clearly in the conclusions. We presented the mean transport values, interannual variability and seasonal variability in Figure 1, Figure 9, Table 1 and Table A3. However, we will improve the clarity and presentation of these results.