

## Review OS-2021-13

### 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 realise 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 note book and are difficult to digest. It should be more thoughtfully and more clearly written.

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.

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.

### Minor points:

Page 1 Line 9 Should 8 deg S. ?

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

Page 2 Line 56 remove first occurrence of "in"

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

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

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 sections 3.2, 3.3 and 3.4 As it stands the results in particular in 3.4 are presented in a confusing manner.

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

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?