

The authors have produced species distribution models for a little studied region off the coast of South America. Their intent is to use such models to assist in the designation of areas that may contain highly suitable habitats for key benthic taxa in the form of demosponge, glass sponges and stony corals. The authors have followed appropriate methodologies for the modeling work, and the manuscript is clear and well produced. The ensemble approach used is essentially the standard one being used in most modern deep-sea species distribution studies, and the range of model types is appropriate. The quality of writing is high, and I have no major comments pertaining to the writing.

I thank the authors for taking such an approach that is well grounded in the literature. I have only a few minor comments (items 1-3) and one moderate (item 4) methodological comment that I believe the authors should at least respond to.

### 1. Sampling bias approach

It is great to see consideration of sampling bias in this study, and it is becoming increasingly used, so any case studies that incorporate this, over say, random background selection is valuable. I do have some questions on this, which are likely more discussion points outside of the manuscript. Basically, when I explored the supplementary figures, there were some spurious placements of pseudo-absences in some regions (see example below) and I wasn't clear exactly how the probability grid was created, and how points were placed based upon it. Can you clarify in the methods the exact approach used, i.e. how were the 10,000 points distributed throughout the grid. As it stands, I wasn't able to fully visualize the approach.

Figure 8 - Two labelled areas have pseudo-absences, but are way outside of any presences. I wonder if the settings of the kernel density are not quite right.

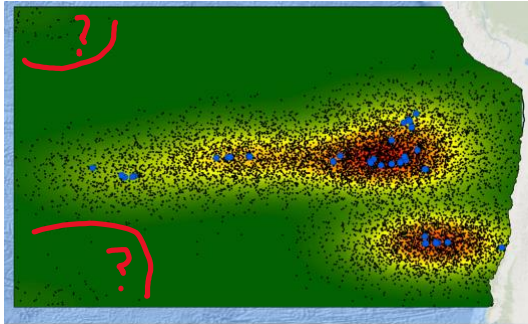
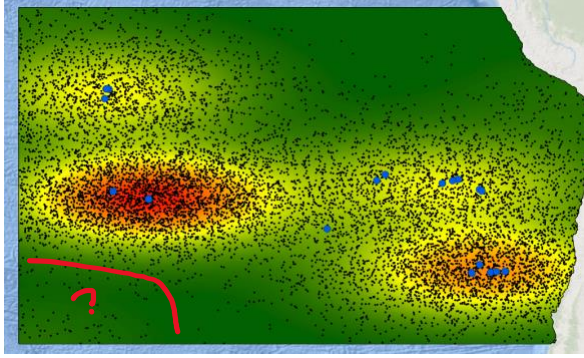


Figure 6, same comment as above



## 2. Who created the environmental data?

I was not 100% clear if some of the environmental layers (not the topographic layers, and surface derived remote sensing layers) were created specifically in this study or were obtained from Davies and Guinotte (2011), which are freely available on Zenodo. Clearly the use of WOA13 supersedes several environmental layers created by then. It is not a critical point in terms of using the data, but the use of *sensu* in the attribution, to me, states that you replicated the approach and generated all the layers independently, if you used the data from the Zenodo repository where the Davies and Guinotte layers are stored or obtained it directly from Davies and Guinotte, then you should attribute them more appropriately.

## 3. Old environmental and bathymetric data?

One of the central requirements for species distribution modeling is to use the best available data. For the presence dataset I have no doubt that it represents the most recent data available. However, the bathymetry and the World Ocean Atlas data used in this manuscript are clearly older. These two products have moved on significantly since SRTM30 was released by Becker et al in 2009 and World Ocean Atlas 2013. There are newer products, what I do not know is how different these products are for the modeled region. It is entirely possible that in GEBCO 2020 or SRTM15, that there are new areas of high resolution multibeam incorporated. Likewise, given World Ocean Atlas is now at version 2018, but I do not know if there are new data from this region. I encourage the authors to explore these data to ensure they are using the most up to date environmental datasets.

## 4. Validation of environmental layers

This point is valid in either situation outlined in item 2 above. I firmly believe that validation of the environmental data is as important as the validation of the species distribution models themselves. In Davies and Guinotte 2011, extensive calibration of the environmental data extrapolation was undertaken, but this was for the global ocean. When moving down to a regional area, we cannot rely upon a global calibration exercise to show the approach is appropriate. Validation must be undertaken, and it is a fairly simple process. It does not strictly need to be independent, as all we are asking, is how well does the environmental data used fit “reality”. Reality in this case, is our best-known understanding of the main oceanographic conditions. I would really like to see this analysis done, as it is needed to provide full confidence in the models that are created.