<u>Comment</u>

The authors present a methodology for determining the land-sea transitional area based on the empirical distribution of anisotropy in meteorological and ocean processes. This is an interesting article, however it will be beneficial for the audience if the authors could provide some feedback on the following matters:

1 Definition of anisotropy

In [Chorti et.al., 2008] a non-parametric estimator of statistical anisotropy was proposed, for which an approximate estimate of the anisotropy statistics distribution was provided in [Petrakis et.al., 2017]. While the authors cite [Chorti et.al., 2008], from the rest of the references it is not clear if anisotropy is defined as in geostatistics (statistical anisotropy: directional dependence of correlation functions) or as in (geo)physics (directional variation of a physical property, e.g., elasticity, permittivity). Also it is not clear how anisotropy is estimated. The authors should clarify, by providing the definition of anisotropy and the estimator they use.

It is very true that we should specify that it is a geo-statistic anisotropy (geometric). Therefore, we have specified at the aim of the paper: “The aim of this paper is to analyse the geo-statistical anisotropy of nearshore wind and waves, in wave-driven coasts. From that, what follows is to propose a new quantitative and objective definition for the land-sea border that benefits from these high-resolution (spatial and temporal) fields and from the underlying process-based knowledge.”

2. Spatial resolution of wind and wave fields

For both fields there are sub-domains with anisotropy ratio estimates of R≈100 or more. Therefore, the largest correlation length within such sub-domains is larger by two orders of magnitude compared to the smallest correlation length over the perpendicular principal axis. Assuming stationarity, for an accurate estimation of anisotropy a field should be sampled at a sufficiently large domain, to satisfy ergodicity, and at a high resolution, in order to capture the spatial variability at length scales below the smallest correlation length. The authors estimate anisotropy over circular sub-domains of 5km radius. Some representative field maps would be useful to justify that the sub-domains are sufficiently large and contain an adequate number of measurement samples for the fulfillment of the aforementioned requirements.

We have modified the flow-chart to clarify that we have interpolated the wind and the wave fields in order to have enough resolution to obtain the anisotropy.

(pp. 7, lines 1-2) Also, we have reorganized the text so these lines say: “The geo-statistical Anisotropy needs to be computed on a regular grid and therefore, both wind velocity (V_w) and significant wave height (H_s) have been interpolated on a rectangular mesh, first on a grid of 1 km then to a finer mesh of 10m.”

References

Chorti, A., Hristopulos, D. T. (2008). Nonparametric identification of anisotropic (elliptic) correlations in spatially distributed data sets. IEEE Transactions on Signal Processing, 56(10 I), 4738-4751. doi:10.1109/TSP.2008.924144

Petrakis, M.P., Hristopulos, D. T. (2017). Non-parametric approximations for anisotropy estimation in two-dimensional differentiable gaussian random fields. Stochastic Environmental Research and Risk Assessment, 31(7), 1853-1870. doi:10.1007/s00477-016-1361-0