Ocean Science
Discussions

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Interactive comment on "Extreme waves and climatic patterns of variability in the Eastern North Atlantic and Mediterranean basins" *by* Verónica Morales-Márquez et al.

Anonymous Referee #1

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The manuscript "Extreme waves and climatic patterns of variability in the Eastern North Atlantic and Mediterranean basins" by Morales-Márquez et al. describes an analysis of the 99percentile of significant wave height focused during winter months over NE Atlantic and Mediterranean Sea. The study is interesting and some outcomes show novel information and wave climate variability patterns (eg. the contribution of seasonality into variability, historical trends over the 30-year period used, correlation with climate indices). From my point of view, however, the manuscript requires an improvement in the wording to better describe some technical steps. One of the main weaknesses of the work is that it seems that the SWH has not been validated against observations, neither the SHW99 magnitude nor its variations.

Specific comments: i. English grammar needs to be checked

ii. Lines 11-12 "Besides, extreme waves influence the upper ocean by enhancing vertical mixing through the Stokes layer". A reference of the statement would be desirable.

iii. Line 13. I do not completely understand the message about the role of the extreme waves in coastal flooding at 'intra-annual' scale. Please, consider rewriting.

iv. References of the journal articles are odd worded at the end of the manuscript, making difficult find the referenced information sources.

v. I suggest removing 'methods' of the title of section 2 since EOFs, correlation significance estimation, composites, etc. methods are not described in this section

vi. Section 2.1 "Waves and Atmospheric Data" requires organisation and adding relevant details for the analysis of extreme wave climate. I am confused by some aspects that are ambiguously mentioned. Some examples: a) What is the time resolution of the used winds to generate the waves by forcing WaveWatch model? £winds fields at 0.5deg are used over the Mediterranean Sea? £is this spatial resolution enough to simulate wave extremes? b) What is the time resolution of SWH from the database? Averaged 3hourly values? One hourly value each 3 hours? c) £has the used wave data source been validated in the study area? A comparison against buoy records in the analyzed domains shown in figure 1 is crucial to validate the further analysis of extreme waves

vii. I wonder how robust figure 2c and 2d are, as they are calculated from the maximum 99percentile value of a month and year. Are the monthly spatial patterns preserved for the averaged month of highest 99percentile value?

viii. Is semi-annual cycle statistically significant in the regression model? (eq.1). Panels of figure 3 do not show clear semiannual cycles for points 1 & 2. Maybe the variance reduction is only due to annual cycle

ix. Lines 90-93. Please, review the grammar. I do not completely understand the

insights in the sentences. How 'generation wave areas' have been estimated/detected? What does development wave area mean?

x. I do not see the relationship (alignment) of the historical estimated SWH99 trends (1979-2009) with future projections of surface wind (referenced from Gallagher et al. 2016). Please, clarify this statement

xi. Line 116. Please, provide details about how the 5yr-periodicity is estimated. I cannot see clearly in Fig.5-1

xii. White color of colorbar in figures 7 & 9 must be centered on zero

xiii. Line 186-87. Please, clarify the step 2 to build the composite. I do not understand what the authors refer as 'time steps' and why only 2 values per month are obtained

xiv. Lines 189-91. As far as I understand how the composite is built, the composite maps only represent spatial patterns for a target location with a high correlation between winter SHW99 and a climate index. They are not synoptic maps (a map for a given moment of time)

xv. Figures 9 & 10. The magnitude of the wind vector and SLP would help the reader to better understand the resulting maps

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