Natural Hazards and Earth System Sciences Discussions

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Comment on nhess-2022-103

Anonymous Referee #1

Referee comment on "Wind-wave characteristics and extremes along the Emilia-Romagna coast" by Umesh Pranavam Ayyappan Pillai et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-103-RC1, 2022

General comments

The manuscript (MS) examine an in-depth analysis of wind-wave characteristics along Emilia-Romagna (ER) coasts (northern Adriatic Sea, Italy) for 10 years starting from 2010 after fine tuning the numerical model-Wave Watch III at a buoy location. I appreciate the author's efforts to include multidimensional analysis for better understanding of the seasonal and extreme wave impacts along the selected coast. The flow of the MS and specially discussion of research gap gives a clear idea for a reader about this work. There is no doubt about the quality of work. But these are some suggestions for authors which can even elevate the clarity of this research.

- There is a great discussion on wind speed in the MS. The wind speed values (section 4.1.1) seems like a low range for me. I strongly recommend the authors to check those values with in-situ measurements if you have any.
- Authors could discuss a bit more literatures on research conducted in similar way along global study regions than Adriatic Sea
- Could 10 years include the climatological impacts of wind-wave characteristics? The MS analyse more of seasonal aspects than climatological/long-term variation.

Some specific comments are mentioned below

Specific comments

Kindly go through the below mentioned comments and alter the MS wherever is necessary:

- It will be greatly appreciated to mark the names mentioned in text to be on the figures. For eg. Line 74 mentions about Po delta, it will be easier for the readers to understand the work more if it's marked in the figure too for visualization.
- Line 26: Than IPCC,2007, now IPCC report citations could be included.
- What is restricted/controlled fetch? It will be good to get more clarity on MS too.
- Line 85: Indicating the dominance of swell or sea in the selected study domain can enhance the knowledge beforehand.
- Figure 1: This can be more legible and well distributed. The mesh and bathymetry info can be in one figure. The figure is not indicating anything like region, the Sea etc. Including that can be a good idea. Figure 1. (a) can be an inset image and other information are important could be enlarged. A legible north arrow with map scales, coordinates lat & long N, E degree etc are also recommended (this comment is applicable for all maps).
- Give the legend names (eg. Figure 7, wave height (m) than mentioning meter in legend ranges), x- and y-axis variables in each plots, etc
- Line 199: Mention which ECMWF wind: ERA5, ERA interim etc.
- Appreciate explaining why the zones or control points are assigned? Or on what basis?
- Line 156: Why there is no ST6+ JONSWAP (EXP4)?
- Line 157: Apt to mention why the representative months are February and September?
- Section 3.3: Why the validation was done for each year separately? What is the significance of that?
- Figure 3 (f-j): It might be suitable to use 45-degree line than best fit line to best understand the underestimation and bias in validation. Check for wave characteristic notations in graph axis too.
- Sub-section 4.1.1 is the only subsection under 4.1, which can be merged with section 4.1 itself.
- Section 4.1.1: The wind speed values seems to be lower than a desired value. And SD is more than the annual mean wind speed which is not right. Check those values for wind speed everywhere. The mean value can come around 5 m/s to 20 m/s to produce the wave characteristics indicated in the MS. Make changes in text and figures accordingly. I recommend comparing these values with in-situ measurement if you have any for authors clarity.
- Figure 4 &6, mark degree N, E on Latitude and Longitude coordinate axis
- Revise Figure 5 according to new wind speed data and try to correlate Figure 5 and Figure 7 for any influence of predominant wind direction on wave characteristics.
- Line 285: Sticking to one notation of position can help the reader understand better. Either 'control points' or 'stations. Indicating 'point' can sometimes make confusions.
- What is the significance of analysis of 25^{th} day of month and monthly mean seasonal spectra for each year? What are the concluding remarks of these analysis could be mentioned?
- Line 315: 'As seen from the Fig.???' to be filled
- Line 425: 'the comparison of Tm and Tp…… 10 years' needs clarity. Please reframe by adding adequate information.
- A discussion on limitations/uncertainties of this study could be added. Such as limitations of Weibull distribution

Technical /minor corrections

Some of the minor technical/typos noticed are mentioned here:

- Line 13: 'direction' to 'wave direction'
- Significant wave height could be H subscript s. This applies with every wave characteristic. Using the global notations can be beneficial for a wider audience in understanding this research more.
- Expand acronym at first appearance will be appreciated. Few eg: are line 26 IPCC, WW3 is not expanded anywhere in MS, Line 101: 'JONSWAP parameterization (Joint North Sea Wave Project)', this can be 'Joint North Sea Wave Project (JONSWAP) parameterization', Explain ST4, ST6, CFL etc. Could use the acronyms after defining. PDF is expanded twice and is using the same.
- Line 121: check '~4.5 km hourly'
- After defining Significant wave height (H_S) use the same in everywhere.
- I recommend the authors to make the decimal places consistent in entire MS. Eg. Line 126 location coordinates has 4 decimal places. Most research work would go for 2 decimal numbers.
- Line 180: 'measurement's' to 'measurements'
- Line 188: 'Fig. 3' to 'Figure 3'
- Line 190: 'relatively a good' to 'relatively good'
- Line 250: 'and northern' to 'and the northern'
- Line 327: 'upon blowing of the wind' to 'wind characteristics'
- Line 348: 'costal' to 'coastal'
- Line 423: 'A Hs' to 'An'
- Line 435: 'waves' to 'wave'

[The same comments are attached in a pdf file too]

Please also note the supplement to this comment:
https://nhess.copernicus.org/preprints/nhess-2022-103/nhess-2022-103-RC1-supplement.pdf