

Reply to Referee #2

We thank Anonymous Referee #2 for his/her useful comments, which improved our paper.

The changes referred to in our replies can be found in the attached file “Reviewed_paper.pdf” uploaded as a supplemental material.

The whole paper has been improved in terms of language, grammar and syntax.

Specific comments:

1. Title

Referee: *Title - It can be considered appropriate. However, it is my opinion that to describe the contents of the paper for the potential reader and for indexing, abstracting, etc, it could be something as: Sea waves modeling with X-band COSMO-SkyMed© SAR derived wind field forcing and applications in coastal vulnerability assessment.*

Authors’ Reply: The title has been modified according to the referee’s suggestions (see the title in p. 1 of attached file).

2. Abstract

Referee: *Abstract - The abstract does not accurately reflect the content of the contribution. It is very long and no concise. It must state directly and informatively what has been found, including a general statement of the used methodology.*

Authors’ Reply: The abstract has been improved in terms contents, length and language (grammar and syntax), see the abstract in p.1 of the attached file.

3. Introduction

Referee: *The introduction should state why the explored issue is of interest, what is known about it and what we do to improve the knowledge about the subject.*

Authors’ Reply: The introduction has been improved according to the referee’s suggestions (see Section 1 of the attached file).

Referee: *The initial part of the introduction, concerning the role of the atmosphere-ocean coupled interaction is a well-known fact and it can be reduced to a few sentences indicating the importance of the air-sea interactions on different time and spatial scales, in particular for the generation of wind waves.*

Authors’ Reply: The initial part of the introduction has been properly reduced (see p. 2 in Section 1 of the attached file).

Referee: *The expression wind-wave interaction modeling is not correct in this context (lines 3 and 5, page 3284). The authors are using wind-wave models (wind-wave numerical models or just wave models).*

Authors’ Reply: This expression has been modified and correctly used into the whole manuscript (see the attached file).

Referee: *The authors dedicate a large part of the introduction to explain various aspects of the most widely used third generation wave models, WAM and WAVEWATCH III. This part should be reduced and the interested reader should be lead to specialized literature cited in the paper.*

Authors' Reply: See the modified text at p. 2-3 in Section 1 of the attached file.

Referee: *Introduction is not the place to describe data sets or methods used in the paper. Lines (8-24 of page 3286) concerning SAR data and WAM model should be eliminated or combined with contents in the data sets and methodology contents.*

Authors' Reply: The introduction has been improved according to the referee's suggestions (See the modified text in the Section 1 of the attached file).

Referee: *What is the meaning of: tidal events?. (lines 22-23).*

Authors' Reply: The sentence "tidal events" was incorrectly used, so it has been replaced with "wave storms" or "wave storm events" (See the modified text in the attached file).

Referee: *The purpose of the article is not explicitly and clearly stated. In fact, it is hidden in the introduction among data set and methodological aspects description. Even, at the beginning of the experimental results section.*

Authors' Reply: The purpose of the paper has been explicitly and clearly stated (See the modified text in the attached file).

4. Data set

Referee: *Contents of data set section should be combined with those included in the introduction and improved.*

Authors' Reply: See the modified text in Section 2 of the attached file.

Referee: *It is a well-known fact that results from wave numerical models simulations depend critically on the quality of the driving wind fields. It has been shown by various authors that uncertainties in the wind field have a large impact on estimated wave conditions. In example:*

Teixeira, J., Abreu, M., Soares, C., 1995. Uncertainty of ocean wave hindcasts due to wind modelling. J. Offshore Mech. Arct. Eng. 117, 294–297.

Holthuijsen, L., Booji, N., Bertotti, L., 1996. The propagation of wind errors through ocean wave hindcasts. J. Offshore Mech. Arct. Eng. 118, 184– 189.

Among others.

However, uncertainty of wind fields derived from SAR images is not discussed.

Authors' Reply: The uncertainty of wind fields derived from SAR images has been discussed into the manuscript (see p. 3 in Section 1 and p. 15 in Section 4.1 of the attached file).

5. Methodology

Referee: *3.2 - SWAN model - The term S in equation (2) is not the difference between the inner and the outer energy for the spectrum. It is the source function representing the sum of wave energy input from wind, energy dissipation by wave breaking and the energy redistribution of energy via non-linear interaction between frequency components.*

Authors' Reply: See the modified text at p. 9 in Section 3.2 of the attached file.

6. Experimental results

Referee: *Why including the objectives of the paper at the beginning of this section?.*

Authors' Reply: See the modified text at p. 13 in Section 4 of the attached file.

Referee: *The term wind-wave oceanographic modeling is redundant. Please, use wind-wave modeling.*

Authors' Reply: Done (see the modified text in the attached file).

Referee: *SAR wind field retrival - Text from line 5 to 21 (page 3297) concern methodology. These are no results of the research.*

Authors' Reply: The content of Section 4.1 has been improved. See the modified text at p. 13-15 in Section 4.1 of the attached file.

7. Conclusions

Referee: *The conclusions of the research are not accurately stated. The contents of this section are not exactly conclusions. There is a mixture of conclusions and many other aspects, such as comments on the used data set which should be removed. Also points from line 11 to 23 should be removed*

Authors' Reply: The conclusions have been improved (see p. 23-24 in Section 5 of the attached file).

GENERAL COMMENTS

Referee: *The paper includes enough new content of broad interest in the ocean sciences field and is suitable for the journal. So, my recommendation is that the paper can be accepted with moderate revisions, including restructuring and/or reviewing some parts of the text, but can be achieved without new information, except the comments concerning the uncertainty of wind fields derived from SAR images.*

Authors' Reply: The whole paper has been improved according to the referee's suggestions. In detail, the uncertainty of wind fields derived from SAR images has been discussed into the manuscript (see p. 3 in Section 1 and p. 15 in Section 4.1 of the attached file).

In the following, it is provided a list of other major changes, which have been made into the text:

- All the sections have been corrected and improved (language, grammar and syntax) for a better comprehension of the whole paper.
- The reference list has been correctly updated.
- The tables 1, 2 and 3 has been updated and correctly described into the manuscript.
- A Table 4 has been inserted to better describe the experimental results in Section 4.3.
- Figure 2 has been updated according to the experimental results in Section 4.1.
- Figures 5, 6, 7 have been improved to better describe the experimental results in Section 4.2.
- Figures from 10 to 15 have been substituted with new Figures 10, 11 and 12 to better describe the experimental results in Section 4.3.