

We acknowledge the comments of the reviewers, which will contribute to significantly improve the paper. Please find enclosed below our response ([indented in blue](#)) to the reviewer comments, clarifying some issues.

The topic is very important since the Iberian nearshore, in general, and the Catalan coastal environment, in special, are subjected to high navigation traffic and also to other important human activities. At the same time, the impact of the climate changes in the coastal environment appears to be more visible in the last years and from this perspective the Iberian nearshore represents indeed a very representative environment. Thus, the work should be both useful and of general interest.

On the other hand, there are indeed some ambiguities in the work that should be better clarified. Even the title seems to be a little too long and somehow confusing.

[We agree that the title is a little long and it could be shortened: “Impact on wave-driven harbour agitation due to climate change in the Catalan ports”. Perhaps the referee refers to the term “wave-driven” as confusing, but we want to stress that we only analyze effects of climate change due to future modifications of wave patterns and that other effects as sea level rise are not considered.](#)

More details related to the modelling process, especially as regards the physical processes activated and on the reliability of the wave predictions are required. Moreover, although it might be considered only a minor aspect, it has to be noticed that there is no equation in the paper and this thing appears to be somehow odd. Equations might be useful and more illustrative in the proposed work.

[We did not include the equations since we made reference to previous works. It is true that there are a number of Boussinesq-type \(BT\) equations with different performances. The one employed here is based on the equations of Abbott et al. \(1978\). The processes activated include shoaling, refraction, diffraction, reflection \(which is essential when dealing with propagation within harbours\), bottom friction and non-linear interactions. In a recent study, Filippini et al. \(2015\) \(“On the linear behavior of BT models: amplitude-velocity vs amplitude-flux forms”, Coastal Engineering, <http://dx.doi.org/10.1016/j.coastaleng.2015.02.003>\) make an analysis of nonlinear wave transformation using different types of BT models. Models based on Abbott equations perform well for \$kd\$ up to 1 and for greater values they start to slightly underpredict the phase velocity and also underpredict the shoaling coefficient \(i.e. the wave height\).](#)

[In our study almost all the ports are located at limited depths \(between 6 and 12 m in the outer limit\), so most of the times the model performs the simulation within the best range of applicability \(\$kd = 1\$ \). In the case of three ports \(Barcelona, Tarragona and Port de la Selva\) the range of water depths is greater \(up to 20 to 25 m\), so for short periods the model is applied out of its best range of applicability and, as a consequence, the results are less reliable. However, the aim of the paper](#)

is focused in analyzing the difference between future and present conditions rather than in the obtaining of very accurate values of significant wave heights. In addition the simulations with the BT model are performed in similar conditions for present and future conditions, so even though the model is applied outside of its range of applicability, this does not introduce any bias in the results. Therefore, for comparative purposes as carried out in the paper, we consider that the obtained results are acceptable.

Since the reviewer considers it important, we will include all the information described in the previous paragraphs in the revised version of the paper.

The conclusions should be better structured and more concise.

We will rewrite the conclusions trying that they are better structured and more concise.

Finally, I should also underline that I suspect that most ambiguities are generated more by the structure and by some inconsistencies in the presentation of the work, while my impression is that the work itself is solid enough. Moreover, the Figures are in general well designed and present the information in a comprehensive way.

We agree that the presentation of the results can be a bit hard to follow sometimes due to the large inter-model variability. We will consider review and rewrite this part of the manuscript to improve the writing.