

Interactive comment on “The “shallow-waterness” of the wave climate in European coastal regions” by Kai Håkon Christensen et al.

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In this paper authors identify the fraction of energy that is affected by interaction with the bottom. They found that it depends on the mean wavelength (I would say this is obvious), it can be large also far from the coast if the water is sufficiently shallow (which in practice is the case for the central areas of the North Sea). Even where water is deep (100m), shallow water effects can be occasionally present if waves are sufficiently long.

While the paper is well written, concise and methodologically clear (I mean that mathematical definition—see formulas 2 and 3—of r_n is clear, I have some difficulty to identify the real utility of this study. In my view authors should explain the practical relevance of a specific value of r_n . At a station where r_n has always values less than 5% can shallow water effects always be neglected? events with “high” (beyond which threshold?)

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values of r_n are poorly reproduced in the ERA-Interim reanalysis? these are examples of relevant questions, in my view.

Good points, which are also made by Ref. #2. Our choice of the ratio (2) is, as we now say explicitly, mainly motivated by our interest in radiation stress theory, in which the ratio between the group and phase velocity occurs naturally. We have added a short discussion at the end of Sec. 2.1 demonstrating the use of the ratios n and r_n (Eq. 4).

I suggest that the authors make more clear what are the practical implications of their results and whether they can offer guidelines for the interpretation of existing data and model simulations, e.g. in terms of accuracy of results, of the model setup and characteristics to be used in the different areas, on the necessity to account for wave-current interaction.

The practical implications depend on what aspects of the “shallow-waterness” that are of interest. With (4) we provide one example relevant to radiation stresses. As we also mention in our conclusions (lines 145-150), all the necessary information to assess the value of (4) can be taken from plots like those in Figs. 5 and 6, hence allowing for a quick assessment of the relevance of the shallow water effects.

The title does not really reflect the areas effectively included in the study. In depth analysis is concentrated in the North Sea and the Celtic Sea. Very little information is delivered for the rest of the European seas, including shallow parts of the Mediterranean (Rhone Delta and north Adriatic), the Bay of Biscay and Baltic and Barents seas.

The ERA-I data set is unfortunately not the best for studying the details in all regions in Europe and, as we now indicate in the conclusions (lines 140-145), this study should be regarded more as a “proof of concept”. The benefit of the stations chosen here is that they are distributed over a wide range of depths and that the verification statistics of ERA-I for these locations are good. These statistics have been added in Table 1.

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