Review of “On the feasibility of the use of wind SAR to downscale waves on shallow water”
O.Q. Gutiérrez, F. Filipponi, A. Taramelli, E. Valentini, P. Camus, and F.J. Méndez”

Summary

This study presents a methodology to do wave downscaling to characterize the wave coastal climate, on high spatial resolution in the nearshore areas, using modelled and measured wind field, from a wind reanalysis and from the Synthetic Aperture Radar (SAR) respectively, to generate local waves and using a wave database (GOW Mediterranean) to force the model at the boundary and take into account the swell. For wave modelling the SWAN wave model was used. It is shown that the correlation between the waves force by wind from the reanalysis and the waves forced by wind derived from the SAR is good as well as the correlation between those downscaled waves compared to in situ measurements.

General comment

The authors present a methodology to downscale waves from deep waters, where usually there is more information, to shallow water, where typically there is a lack of wave information (modelled and measurements). They demonstrated that Earth Observations products can be used in oceanographic modelling as well as to reconstruct time series of wave parameters, as in this case, very close to the coast. For those reasons, I would recommend the publication of this manuscript, in principle. I do, however, have a number of minor comments (detailed below) that need to be addressed before the manuscript can be accepted.

Major comments

1. The authors claim that a good correlation was found on the downscaled waves forced by the wind from the reanalysis and the wind from the SAR, however the boundary conditions could play a mayor role here, if this is the case then using wind from the reanalysis or from SAR is irrelevant, at least for the scenarios chosen for this study. To show the importance of the wind used to force the wave model there should be a comparison of the wave field without boundary conditions. As it is stated by the authors (In the results and conclusions section, lines 11-13) “Although there are cases where wind sources show opposite direction, due to low resolution of the modeled winds, a good correlation was found on the downscaled waves”. This shows that the imposed boundary conditions are defining the wave fields inside the modelled domain and not the wind fields chosen.
Even in the case that boundary conditions are the main source of energy in that area, the methodology used to downscale the waves is valuable, and it is important show the strength and the weakness of the methodology used, this will add a value to the paper.

Minor comments

Language: Although the grammar and spelling are mostly good, I would recommend additional language editing. Some, but not all edits are listed below.

Page 1568
Line 5: .. or shallow water waves are .. add a comma . .or shallow water, waves are . .

Line 13: northern Adriatic sea -> Northern Adriatic Sea (look for this in the whole document)
Line 14: Global wave -> global wave
Line 23: Earth Observation (EO), -> Earth Observation (EO) products,
Line 24: can be adopted for providing -> can be adopted to provide

Page 1569
Line 9: or shallow water waves are -> or shallow water, waves are
Line 13: 800 long -> 800 km long
Line 14: Northern Adriatic Sea occupy the northern and shallower area -> Northern Adriatic Sea is a shallow area
Line 23: In Northern Adriatic Sea -> In the Northern Adriatic Sea
Line 26: favorable wind blowing from -> favorable wind which blows
, shows an evident -> , it shows an evident

Page 1570
Line 1: wave heights of 1 m, and period of 5 s -> wave heights up to 1 m and periods up to 5 s
Line 4: in order of 10 s in the NAS region -> in the order of 10 s in the Northern Adriatic Sea (I suppose NAS means Northern Adriatic Sea, as NAS has not been defined previously, and it is not used anymore)
Line 14: western Adriatic coast -> Western Adriatic Coast
Line 25: "1948 to march 2013" (as the month for 2013 is mentioned , add the month for 1948)

Page 1571
Line 1: the in situ buoys used in this process comes -> The in situ measurements from buoys used in this process come
Line 5: were used for the validations -> were used for validation
Lines 9-13: Change the sentence, difficult to understand, especially in the part "for NRCS developed by for VV-polarized"
Line 22: wind SAR fields to forcing -> wind SAR fields to force
Line 23: especially end of January -> especially at the end of january
Line 24: thanks to bora -> thanks to a Bora

Page 1572
Line 4: wave models a level -> wave models have a level
Line 5: Wavewatch -> WaveWatch
Line 11: and wind forcing, databases -> and wind forcing databases (delete the comma)
Lines 14-15: in Europe and Latin America (Fig. 3) -> in Europe (Fig.3) and Latin America
Line 19: in the Mediterranean is -> in the Mediterranean Sea is
Line 20: correlations upper to -> correlations larger than

Page 1573
Line 6: propagated using -> waves propagation was done using
Line 9: Lately, -> Finally,
Line 10: April 2012 and corresponding -> April 2012 corresponding
Line 13: "DOW" it was not defined previously.

Page 1574
Line 10: 116 x 110 (are this number of points or number of meshes?) 116 x 110 meshes or 116 x 110 points?

Line 18: the output boundary -> the input boundary
Line 24: The model can be shown on - > The model is shown in

Page 1575
Line 2: are the parameters dependent on -> are parameters that depend on
Line 5-6: The pairs of data -> The pairs of parameters
Line 13: on Camus -> in Camus
Line 15: grid points which define forcing of the numerical propagations. -> grid points where forcing is defined for the numerical propagation

Page 1576
Line 2: θm -> θ_m
Line 2: every N nodes (where N is ?)
Line 10: the first 15th PCs -> the first 15 principal components (it is better to write principal components, as PCs was not defined previously).
Line 23: $\theta m_{p,j}$ -> $\theta_{m_{p,j}}$

Page 1577
Line 4: on Camus -> in Camus
Line 6: Analysis of SAR -> The analysis of SAR
Line 23: the corresponding wave fields -> the corresponding wave boundary conditions

Page 1578
Line 19: Istran coast -> Istrian Coast

Page 1580
Line 17: as if by reconstructing -> as well as reconstructing (I'm not sure if the authors wants to say that)