Interactive comment on "Assessment of reliability of extreme wave height prediction models" *by* Satish Samayam et al.

Satish Samayam et al.

sasraj@iitm.ac.in

Comment: The authors speculate that the under-prediction of the buoy data is because the ECMWF data do not capture cyclone events. Is there any way they could test (or even suggest a test) of this hypothesis? For example, could one window the buoy data to eliminate time windows known to contain cyclones, and repeat the analysis? If their hypothesis is correct, such artificial windowing would lead to an improved comparison. C1 Of course, in practice one wants to correctly model all extremes including cyclones, but it may be possible to quantify the effect of the cyclones.

Discussion for reply: Figure shows the comparison of time series of the significant wave heights at Alghero from buoy measurements (red curve), from ERA-Interim wave hindcast measurements (green curve) during the cyclonic month of December 1999.

This comprehensive comparison has been carried out by extracting the ERA-Interim data of resolution 0.125ox0.125o nearest to the selected buoy locations. From the figure we can see that the maximum Hs observed for ERA-interim data is 7.51m which is lower than 9.88m, maximum Hs that is measured by the buoy. For this location, the maximum wave height obtained from ERA-interim and that with buoy measurements show considerable variation. From this comparison of time series it can be observed that simulated ERA-Interim data under predicts the high wave events especially during cyclones. Eventually comparing the buoy return value estimates with the respective ERA-Interim estimates at the same location, we see that the ERA-Interim estimates are lower than those of the buoy estimates. It is possible to develop a linear association between the ERA-Interim and buoy estimates to overcome this underestimation in the future studies. This can be done by comparing the buoy return value estimates with the respective ERA-Interim estimates at several locations to maximize the number of data points used to estimate the linear association.

Minor Comment: p11, line 296: Please provide a reference for "It has been experimentally prove [d->n] that ..."

Reply: Two references (Boccotti, 2000; Arena and Pavone, 2006; Laface and Arena,2016) will be added in the text.

Minor clarifications: p6 line 183: Is it clearer to write "should not be correlated with one another and should be identically distributed"?

Reply: Yes we can rewrite the sentence like the reviewer mentioned above.

p9 line 240: Presumably this should read "If X is distributed according to the GPD"

Reply: Yes

p10 line 287: It is not clear what is meant by "P-" approximation; "P" it is not defined as "polymonial" until section 4.3.

Reply: This correction will be incorporated in the revised version of the manuscript.

p17, line 497 and p19, line 542: do the authors mean "shortcome", not "shortage"?
Reply: 'shortcome', This corrections will be incorporated in the revised version of the manuscript.

Minor presentation notes: p1 line 24: "The Indian Ocean with ..." p2 line 60: "these models consist of" p3 line 67: "give a closed form" p3 line 94: "extrapolation of a polynomial " p3 line 108: "for the Indian" p4 line 122: the acronym RON is only defined (Rete Ondametrica Nazionale) on the next page; please define when first used. p7 line 201: [missed space] "respectively and" p7 line 211: "the GPD" p8 line 213: "to amount to" p9 line 248: "does not" p10 line 268: "... of degree n; it is considered that the value of n may vary." p10 line 278: "Another principal feature of the ... is the standard deviation ..." p10 line 281: "Obviously, the lesser delta, the higher" p10 line 288: "statistical equivalence" p11, line 297: "aspects, it emerges" p11, line 302: "to the equivalent" p12, line 330: "despite being very simple" p12, line 336: "This means that the calculation"; line 337 "this means that" p12, line 343: "a three-parameter Weibull" p13, line 360: "and resulting parameters"; line 362 "a Frechn'et" p13, line 374: "The lower the value of RMSE, i.e. near to zero, the better the fit" p14, line 385: "result in a less" p15, line 429: "the standard deviation" Equations: Presumably the journal will understand that the functions ln and log should be typeset in normal (Roman) font not mathematical font, but it is worth changing now to ensure there is no typesetting error. Equation (13) is already correct, but the earlier equations need this adjustment. p15, lines 431-2: "The lower the value of delta, i.e., the nearer to zero, indicates a better fit between the actual tail of the provisional function and the Polynomial approximation with tail fitted. p15, lines 431-2: "resulting standard deviation" [not standard error, presumably] p16, line 466: "at a certain location in the Arabian Sea" p17, line 492: "The GEV and GPD methods show" p17, line 505: "recommended always applying" p19, line 538: "the ETS method"; line 539 "the provision function" p19, line 550: "these vary"

Reply: Thank you for your comments. These corrections will be incorporated in the

revised version of the manuscript.
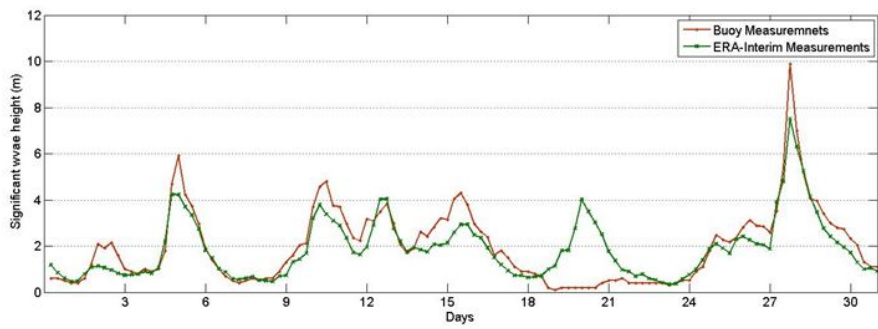
Figure: Comparison of ERA-Interim data with buoy data for a cyclonic month at Alghero

Fig. 1.