**Ocean Science
Discussions**

Interactive comment on "Statistical trend analysis and extreme distribution of significant wave height from 1958 to 1999 – an application to the Italian Seas" *by* G. Martucci et al.

Anonymous Referee #2

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I have some serious concern about the statistical analysis. I think the authors draw too far reaching conclusions from some of their findings.

First the trend analysis of means. The general trend analysis i reasonable but I have some doubts about the significance of the break in Figure 5.

I have more serious objections on thh extreme value analysis. The authors make separate fits by the least squares method to each of the three classical extreme value families. Doing so they keep the shape parameter gamma fixed to one of four values (following Goda), and then selects "the best fitting distribution". The danger in this is seen in Figure 9, which suggests confidence intervals for the return values, which seem

to be very narrow. This does not take into account the fact that also the shape parameter is estimated from data, and hence uncertain. I my experience, confidence intervals for extreme return values are much wider. (Also the use of an extrapolation from linear regression is dangerous.) So, I suggest that the authors use some technique of parameter estimation in the Generalized Extreme Value distribution (and Pareto in the POT case), available for example in the R-package (see reference in the book by Coles). These techniques also provide confidence bands for extreme return values (admitted, these are depressingly wide!)

Some details:

At the end of Section 2: The description of how data in Figure 2 are selected is not at all clear. What correlation should be less than 0.1?

page 2011, top: "..., only the distribution showing the highest correlation coefficient is selected". My question: correlation with what?

page 2017, line 2: "The best fitting distribution, ..." How do you messure the fit?

page 2017, line 8: You could use for example mean exceedance plot to investigate what threshold to use.

page 2018, line 8-9: I don't understand the meaning of "Nevertheless, ..., 1/122640"

Interactive comment on Ocean Sci. Discuss., 6, 2005, 2009.