

## ***Interactive comment on “Self-Organizing Maps approaches to analyze extremes of multivariate wave climate” by F. Barbariol et al.***

**Anonymous Referee #2**

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The paper ‘Self-Organizing Maps approaches to analyze extremes of multivariate wave climate’ by Barbariol, Falcieri, Scotton, Benetazzo, Carniel and Sclavo, deals with a SOM mapping technique, to assess and describe the multivariate sea climate. The analysis is performed on a long wave time series of data, collected off shore Venice at the Acqua Alta oceanographic tower.

The multivariate sea state presentation is a key topic in the OS, the technique here proposed (SOM) is well supported by the literature and is well presented. The analysis is performed on the entire data set and on several sub set of data, and the differences are discussed. The paper is suitable for publication on Ocean Sciences after several small discussion and correction on the actual version of the paper.

Some other methodologies and techniques are used in the description and estimation

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of joint probability dependence among variables. Of particular interest is the use of copulas. Several application on this application on sea state variables can be found in literature, i.e. De Michele et al., 2007, (De Michele, G. Salvadori, G. Passoni, R. Vezzoli. A multivariate model of sea storms using copulas. Coastal Engineering, 54, (10), 2007, 734-751) and more recently in Masina et al., 2015 (Masina M., Lamberti A., and Archetti R. Coastal flooding: A copula based approach for estimating the joint probability of water levels and waves. Coastal Engineering, 97, 2015, 37-52). A comment is welcome.

More in detail, the authors select and discuss the results on several storms, for example considering the first data set and SOM application (page 1981-1982), the authors discuss the storm with  $H_s = 4.46$  m,  $6.7$  s,  $275^\circ$  N; and results are presented in Fig.5 (and later in Fig. 8 and Fig. 11). Can the authors give more information on the date of the events? Why this event is here discussed and how was selected? What #118 BMU refers to?

In Fig. 10 and Fig. 13 the right panels present the map for the highest values, so for the extreme events. I suggest to create new color palettes for the right panels, both for  $H_s$  and %, in order to better present the results for the extremes.

Line 9 page 1981: 0.36 s, seems to be a mistake, and the correct value is 3.6 s, please review this value.

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Interactive comment on Ocean Sci. Discuss., 12, 1971, 2015.