Natural Hazards
and Earth System
Sciences
Discussions

Interactive comment on "Time-clustering of wave storms in the Mediterranean Sea" *by* G. Besio et al.

G. Besio et al.

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First of all we would like to thank Dr Serinaldi for his detailed constructive comments on the paper and his subsequent correspondence with us. We are also grateful to Dr Serinaldi for providing a script to carry out the analysis of the AF curves and we acknowledged this in the dedicated section of the paper.

To understand if what we saw in the AF curves was a signature of a departure from a Poisson distribution or that of a non-homogeneous Poisson process we used the approach described in Serinaldi and Kilsby (2013). We compared the AF pattern of a time series (hindcast in this case) to the AF distribution of a population of point processes with the same cyclic characteristics and intensity of the reference one.

Following your suggestions we carried out the following steps:

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1- We carried out a Fourier analysis to determine the dominant cyclic components in the time series; this led to identify 5 dominant components corresponding to the yearly cycles and, with much smaller amplitudes to cycles with periods of six, three, one months and one week. Note that cyclic components associated to typical tidal cycles (i.e. 28, 14 days) do not show significant energy. This is expected as the Mediterranean is a microtidal sea. Also the time series analysed are in deep waters, which makes already small sea level oscillations negligible.

2- With the amplitudes and periods of these cycles we simulated a cyclic, hence non-homogeneous Poisson point process. This was done with the Integrate and Fire (IF) technique by Serinaldi and Kilsby (2013). Here we used the script that you kindly provided.

3- Subsequently, we compared the distribution of the AF of 1000 realisations of this process to the AF found in the time series under study. The results of this analysis are shown in Figure 7 of the revised version of the paper.

The results confirm that the AF corresponding to time scales longer than 50 days is associated to the cyclic components, while at time scales shorter than 50 days there is a significant departure from a Poissonian AF pattern. At the moment, however we are unable to draw conclusions on the oscillations that appear at some locations in the scale where departure is detected. We think that further analysis is needed and we will analyse other basins, possibly macro-tidal.

Again we would like to thank you for the very productive discussion during the revision of the manuscript.

A copy of the revised manuscript can be downloaded here https://www.dropbox.com/s/wodmffeg9iht60l/storm_cluster_rw_1.0RB.pdf?dl=0