Explosive development of winter storm Xynthia over the Southeastern North Atlantic Ocean

by M. L. R. Liberato, J. G. Pinto, R. M. Trigo, P. Ludwig, P. Ordonez, D. Yuen, and I. F. Trigo

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Response to anonymous Referee #2

We thank the anonymous referee for the comments which have highlighted parts of our manuscript requiring further clarification. In our responses, all section, page and line numbers refer to the NHESSD document. The text in italics corresponds to the reviewer's comments.

The paper deals with the synoptic and thermodynamic evolution of a case of extreme cyclone with a destructive impact in southwestern Europe. It is an interesting paper, that analyses in details the mechanisms of the explosive deepening. Especially, I found especially attracting the approach to identify the moisture source region. I think that the paper could be accepted for publication in a journal of the standards of Natural Hazards, subject to some suggested changes.

- *I suggest that the structure of the paper could be changed:*

a) Section 3.1 describing the impacts should be removed to the introduction (before the objective of the study) or to separate section 2 that will describe the main characteristics of the case, explaining why this cyclone deserves further analysis. I suggest this because the results of the paper do not focus on the impacts but rather on the mechanisms.

b) Section 3.2 refers to model verification and should be removed to the section where the model is described

c) Section 3.3 should appear as a separate section 3, since this is an important part of the results.

d) Section 3.4 should appear as a separate section 4 since comprises the main core of the study

We understand the reviewer concern in regard to the overall structure of the results sections. Regarding comment a) please notice that it should not be included in the introduction as it corresponds to a large amount of analysis. In fact, the first 3 figures are described and analyzed in this sub-section and that is

hardly "typical" to be provided in the introduction. In any case we agree to include these aspects into a new section 3 just describing the main characteristics of the case.

Similarly we have kept the analysis performed in sections 3.2 and 3.3 together as they clear constitute a unit regarding the model results (new section 4). Finally, we agree with the reviewer that the last sub-section of the results (section 3.4) constitutes the main core of the analysis and have included in new section 5. These changes have contributed to a clearer structure of the manuscript and we thank the reviewer for this suggestion.

- *Although the authors characterize the cyclone explosive they do not mention if the pressure drop satisfies the criterion of explosive deepening. In the bibliography, many cases of cyclones are rapidly deepening but they cannot be characterized explosive, despite their serious impacts (see recent papers for explosive cyclones by Kouroutzoglou et al 2011, 2012). This point should be clarified.*

  We understand the reviewer's comment. The pressure drop may be evaluated from the figure/panel 4b but we agree that this information should be clearly provided to the reader. We have now included a sentence in the text with the definition of an explosive cyclone.

- *The term "southeastern North Atlantic" in the title is very confusing.*

  We suggest changing the title of the paper to: "EXPLOSIVE DEVELOPMENT OF WINTER STORM XYNTHIA OVER THE SUBTROPICAL NORTH ATLANTIC OCEAN"

- *In section 2.1, a map displaying the examined area and the station locations is required*

  The examined area and the stations location are already displayed on Figure 2. We have now included a sentence with a clear reference to Fig. 2 on (old) section 2.1.

- *In section 2.2, a map displaying the simulated area is required*

  The simulated area is already identified on figure/panel 4a. As stated on last comment we will include a sentence with this reference to Fig. 4 on (old) section 2.2.