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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Analysis of synoptic conditions for tornadic days over Western Greece" *by* P. T. Nastos and I. T. Matsangouras

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Replies to Anonymous Reviewer #1

The authors would like to thank the Reviewer for providing insightful comments on the manuscript, allowing us to improve its scientific and presentation quality. Our replies to the reviewer's comments follow:

Comment: Introduction: The authors referenced in a number of recent and relevant studies related to the tornadoes historical records and their climatological patterns but they don't provide any element or evidence obtained from those studies. Thus, it is recommended to include the most important findings from those studies in the introduction in order to link their study with the recent state-of-the-art findings.

Reply: Following the reviewer's comment, in the revised paper we elaborated and enhanced the Introduction Section by including the most important findings from all relevant studies related to the tornadoes and their climatological patterns.

Comment: Page 2218, L.2-5: According to the previous recommendation add the key findings from the relevant studies in US, Finland and Greece.

Reply: In the revised paper we added the key findings from the above mentioned relevant studies.

Comment: Page 2219, L.11-27: This paragraph is mainly devoted in the mechanisms trigger the tornadoes and it is not related with the title of the section (Data and methodology). Therefore it is recommended to move it in the introduction.

Reply: Following the reviewer's suggestion, we moved this paragraph to Introduction Section.

Comment: Page 2219, L.7: It is mentioned that the analysis and discussion are also based on LI but there is not any relevant chart in the manuscript (there are only for GH and MSLP).

Reply: Charts of LI monthly analysis, calculated at the location of each tornadic event in west Greece, are illustrated in Fig.7 (lower graphs). In order to make our manuscript more coherent we added a new Figure that illustrates the LI seasonal spatial analysis, similarly to those Figures related with GH and MSLP seasonal analysis.

Comment: P.2220, L.9: Fig.1a obviously indicates that tornadoes maximum appearance is over western Greece. It is suggested to provide an explanation based on the geography of the area and the atmosphere-land synergies.

Reply: We introduced an explanation in order to explain this maximum over western Greece.

Comment: P.2220, L.25: Change the 0.09 events year-1 10-4 km-2 to the 0.09x10-4

events year-1 km-2. Do the same for the rest numbers. What is the difference between 9.42 events year-1 and the 1.16 TR year-1 ? Reply: Following the reviewer's comment we adopted his suggestion and replaced all relevant numbers. The 9.42 events per year refers to the annual mean of tornadic events (tornadoes, waterspouts and funnel clouds events) while the 1.16 TR per year refers only to the annual mean number of tornadoes (TR).

Comment: P. 2221, L.8-17: It will be clearer to add the mean annual tornadic events frequency in a diagram. Do the same for the seasonal variability.

Reply: Reviewer's comment was taken into account and a new Figure was added illustrating the mean and seasonal frequency of tornadic events.

Comment: Section 3.3: It is suggested to add a paragraph describing commons and differences of the prevailed synoptic patterns favored the tornadoes and waterspouts development.

Reply: A new paragraph was added describing commons and differences of the prevailed synoptic patterns favored for tornadoes and waterspouts development.

Comment: . 2228, L.23-25: The analysis concluded that tornadoes are more frequent in autumn over Western Greece and their development related with a trough existence across Italy and Adriatic Sea and lower than normal MSLP (-8 hPa). Taking into account that this is a rather typical synoptic circulation in the area during autumn nor all the troughs or extra-tropical cyclones produce tornadoes, which are the additional atmospheric conditions responsible for the development of a tornado?

Reply: In this paper we presented the favorable synoptic weather conditions that calculated from tornadic days and a composite anomaly of synoptic conditions was derived from NCEP reanalysis datasets. The composite anomalies depict the deviations from the normal synoptic pattern that appears in the specific season over west Greece. Thus, on one hand, the extracted anomalies indicate the particular synoptic weather

conditions associated with tornado days, but on the other hand, they could not be taken as the only factors for tornadogenesis, because we have to take into account that tornado development is also driven by other significant factors/mechanisms that are present in mesoscale and could not be depicted clearly at synoptic patterns. Besides, we have to consider topography and heat fluxes over shallow water bodies such as lagoons, which are scattered over west Greece.

Comment: Section 4: It is suggested to move the discussion based on the whiskers plots in a separate to the conclusions section. Moreover April and May are missing in the bottom panel of Fig.7.

Reply: Reviewer's comment was taken into account and the discussion based on whiskers plots in Conclusions section was moved to Results and Discussion section.

Technical corrections: â ÌĘ Substitute the "...west Greece" with the "...Western Greece. Enlarge the contour labels in the Figs. 2-5.

Reply: We took into consideration the suggestion.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 2215, 2014.