Title: Numerical modeling and analysis of the effect of Greek complex topography on tornadogenesis
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RECOMMENDATION: MAJOR REVISIONS

This paper analyzes three different tornadoes affecting Greece in the last few years. After synoptic analysis, simulations are performed with the WRF model for each case. The sensitivity to the orography is considered by removing the mountains in the inner domain. Differences between the two sets of simulations are analyzed in terms of absolute vorticity, of vorticity budget (vorticity equation), and of some instability variables used to identify the presence of conditions favorable to tornadogenesis.

The paper deals with an important topic, is interesting, well written, thus I think it is worth of publication in NHESS. Anyway, some substantial revisions are necessary before publication.

MAJOR POINTS:

- The numerical setup of the experiments should be better justified. In particular, at Page 6 Line 6, it is not clear why you remove the orography only in the inner domain. In this way, you initialize the inner grid with fields that are calculated using the normal orography (and model levels whose height is modulated by the orography). A more appropriate and standard procedure removes the orography of the area of interest (domain 3) also in the other domains. I suggest to include, if possible, a reference to justify the way you followed.
  Also, you used ERA-Interim reanalysis with horizontal resolution 0.75° x 0.75° to initialize the model on the external grid with a resolution of 12 km. The jump in resolution is quite large (about 6 or 7:1), larger than what is normally used for limited area model simulations (3:1 or 5:1). Also this choice should be possibly supported with appropriate references.
- Section 6 “Results and Discussion” should be improved. It is not clear if the values of the four variables are larger, comparable or smaller than the values normally observed for tornado events: this point should be clarified. In this effort I suggest to show in Figure 8 the values for the two sets of simulations and not their differences. Also, I suggest you add a new Figure showing the spatial distribution of the four variables at the time of tornadogenesis for each case (12 panels in total). The discussion should be based on this new Figure; in the present version, the discussion from Page 12, Line 15 to Page 13, Line 11 is difficult to follow and interpret without a figure that represents the patterns of the instability variables.
- English is very poor and needs substantial revision, possibly by a native English speaker. It is not a task of the reviewer to identify each mistake, anyway some indications are provided below:

- “‘s” is often used improperly; it should be omitted at, e.g., Page 1 Line 16, Page 2 Line 30; Page 8 Line 14
- “ly” should be used for adverbs, not for adjectives: for example, at Page 2 Line 5 “Additional” should be changed into “Additionally”; at Page 5 Line 3: “brief” instead of “briefly”; Page 12 Line 7: “actual” instead of “actually”
- “analyses” is plural, “analysis” is singular (e.g., Page 5 Line 3)
- Page 3 Line 10-11: the correct structure of the sentence is: “Are these diagnostic variables sufficient …”
- wrong use of articles: Page 10 Line 26: “…**in nature**…”
- “tornadogenesis” is one word;
- page 12 Line 16: “expanded” instead of “was expanded”: it is past tense. Similarly, Page 12 Line 29: “propagated” instead of “were propagated”

- page 13 Line 8: was instead of were
- page 14 Line 3: affection? What do you mean?
- page 22 Line 8: sometimes is one word;

MINOR POINTS:
Page 2 Line 6: "… with analysis **of the** absolute vorticity budget …"
Page 2 Line 18: "… mankind; **they** were …"
Page 2 Line 21: Before the paragraph on the climatology of tornadoes in Greece, I suggest to add some references on the climatology of tornadoes in the Mediterranean area, extracted for example from Matsangouras et al., 2013.
Page 3 Line 21: "the importance **even of a relatively shallow** orography"
Page 3 Line 22: "sensitivity experiment**s** …"
Page 4 Line 18: "T4-T5 of Torro scale": it would be helpful to indicate what is the estimated intensity corresponding to scales T4-T5
End of page 6: I suggest to change in this way: "The model was initiali**z**ed at 00:00 UTC, on 17 November 2007 (~2**1** hours before the event) for 2007 tornado even**t**. For the tornado events of 2010 and 2011, the model was initialized at 00:00 UTC on 12 February 2010 (~1**7** hours before the event) and at 00:00 UTC on 20 September 2011 (~1**5** hours before the event), respectively. The time of initialization was selected in order to examine the **model forecast ability more** than 12 forecast hours ahead **to represent the value** of previous diagnostic variables **without spin up problems**."
Page 7 Line 3-4: rephrase the sentence, which is not clear at all.
Page 7 Line 7: change into "**a brief synoptic analysis**…"
Page 7 Lines 25-26: "… **trough** line is positioned from **southern Italy to northern Lybia**, accompanied by a thermal **trough** of …"
Page 7 Line 27: "a cold front activity **and an instability line** over …"
Page 8 Line 16: "…**southern Italy** …"
Page 9 Line 5: delete "ambient"
Page 10 Lines 16-20: it is not clear why the error considering METAR should be larger than using SYNOP. Also, the last sentence (Line 20) is obscure.
Page 11 Line 24: "despite their fine **(but not fine enough)** grid spacing …"
Page 12 Line 15: "EHI analysis **shows that** an area …"
Page 12 Line 16: Gulf of Korinthos; Page 13 Line 7: Gulf of Thermaikos: please show where they are in Figure 1
Page 12 Line 28: "recorde**d**"
Page 12 Line 30: "…compare**d** …"
Page 13 Line 6: "… was **generally** less …"
page 13 Line 10: the values 2200 and 1600 m^2/s^2 are not consistent with Fig. 8; it would be better to show the fields for the two simulations and not their difference
page 14 Lines 6-8: any explanation about the reason why MCAPE is larger in the case without orography only for T11 event?
page 14 Line 24: "**Initial and** …"
page 14 Line 26: please delete "with ECMWF gridded analyses"
page 15 Line 17: "a less important" instead of "the least"

TABLES:
- in Tab. 1, the formula for SRH is incomplete (it is not clear the meaning of k, x)
- in Tab. 2, is the comparison performed during the whole day? why not focusing on the period close to the occurrence of the event? Also, why not removing the spin up time (first 6-8 hours) from the comparison? Finally, it is not clear whether you interpolate the model output fields in the station location, or you use the grid point closest to the station.
FIGURES:
- the names in Fig. 1 are difficult to read, thus they should be written more clearly; also, all

geographic names you mention in the text should added in the Figure.
- in Figure 4, it is not clear whether the fulminations represent the total number cumulated in a previous period. The meaning of the colors is not explained. METAR (tactical??? reports) data are difficult to read.
- Figure 8: in which area are the variables evaluated? this piece of information is relevant and should be added.