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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Detection and thermal description of medicanes from numerical simulation" *by* M. A. Picornell et al.

Anonymous Referee #1

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This paper describes an interesting numerical analysis of four different tropical-like cyclones in the Mediterranean. The paper is well written and provides a useful contribution in the field. Thus I think it is appropriate for publication in NHESS after some relatively minor revisions.

MAJOR POINTS:

- P7425L1 (Page 7425 Line 1): compared to Hart (2003), you use slightly shallower layers. Anyway, the motivations for such a change are not clear. Is this change suggested "a posteriori" by the results of your analysis? This is an interesting point to discuss more in the detail.

- P7429L14: ". . . the cyclone is not well simulated and therefore not classified as med-

icane.": In Rasmussen and Zick (1987) it is shown the presence of a upper-level warm core, which is confined in your simulations in the lower layer. Maybe your simulations reflect better the real vertical profile of temperature in the cyclone ? Alternatively, what do you think could be the reasons of the simulation failure? Please, discuss about these points.

- Section 4: it would be interesting in the discussion to include some considerations about the duration and radius of the medicanes you find, e.g. comparing your results with Table I in Tous and Romero (2013) and Table 1 in Miglietta et al. (2013).

MINOR POINTS:

P7418L4: change into "are of small size" OR "are small sized"

P7419L19: ". . . as a new key mechanism . . .": Really, a role of jet in the development of these cyclones was already identified in Reale and Atlas (2001) [their Subsection 5.b]

Reale, O., and R. Atlas (2001), Tropical cyclone-like vortices in the extratropics: Observational evidence and synoptic analysis, Wea. Forecasting, 16, 7–34.

P7420L11: change into ". . . have been established . . ."

P7421L17: I think that a paper to cite, though not exactly pertinent to the construction of methods to detect medicanes from numerical models systematically, is Romero and Emanuel (2013):

Romero, R., and K. Emanuel (2013), Medicane risk in a changing climate, J. Geophys. Res. Atmos., 118, 5992–6001, doi:10.1002/jgrd.50475.

P7424L17: change into ". . . by Chaboreau et al. (2012), who used a radius of 200 km, and Miglietta et al. (2011), who chose a radius of 100 km (but verifying the results were consistent in a range of values), obtaining . . ."

Miglietta, M. M., A. Moscatello, D. Conte, G. Mannarini, G. Lacorata, and R. Rotunno

(2011), Numerical analysis of a Mediterranean ”hurricane” over south-eastern Italy: Sensitivity experiments to sea surface temperature, Atmos. Res., 101, 412–426.

P7424L20: change into " . . . as suggested in Hart . . ."

P7424L22: you define the mean radius of the warm core anomaly but do not define the radius of the cyclone (shown in Figs. 2,4,6,9). If you use the extension of the most external closed isobar, I think that the task of identifying this line would be pretty complex in some cases. Discuss about that.

P7425L16: change into ". . . in the Western Mediterranean in early Fall and two . . ."

P7425L25: why do you use ERA-40 and not the higher resolution ERA-INTERIM?

P7426L18: change into "... moved north-eastward."

P7427L13: change into ". . . very close each other (see . . ."

P7427L14: change into ". . . disagreeing with the pressure . . ."

P7431L24: change into "off-shore Spain,"

P7435L11: change into ". . . different future scenarios as well as . . ."

FIGURE 1: ALGERIA -> ARGELIA; Peloponnesus is much more to the south!

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 7417, 2013.