

Review of “Surface processes in the 7 November 2014 medicane from air-sea coupled high-resolution numerical modelling” by Marie-Noëlle Bouin and Cindy Lebeaupin Brossier.

This paper aims at assessing the main role of the physical processes on the ocean surface and their interactions with the atmosphere for the Qendresa medicane event, which took place on 7 November southern Sicily. In order to understand the impact of the air-sea interactions, the authors have used a high-resolution (1.33 km) coupled model. Using this model, they also have assessed the role of different parameters affecting the air-sea heat exchanges. However, for this case study, main results shows that the features of this medicane (e.g., track, intensity or lifecycle) are not significant modified by the fact of using a couple-model.

I found this study very interesting and I think that these results will be useful for the community. The authors provide a detailed and extensive explanation of the physical processes (interaction between ocean surface and atmosphere) involved in the genesis, amplification and finally the decay phase of this medicane. Taking into consideration these results and how they can be useful for the community, I would like to see this paper published. However, I have some major concerns that should be addressed before it can be accepted for publication in the “Atmospheric Chemistry and Physics” Journal.

Major Comment:

I strongly recommend that the Authors resubmit this paper by including some or all of the following suggestions:

- 1) Drastic English Improvement. I think it is very important to improve significantly the English of this manuscript (sentences directly translated from the language of the authors to English, sentences too long and confusing, swap sentences, etc.). The fact the manuscript is not well-written distracts the reader from the content of the paper and also makes sometimes very difficult to understand what the authors are trying to communicate. The reader should not try to figure out what the authors are trying to explain. I understand that the Authors could not be native English speaker (as myself), so maybe a little help would be beneficial.
- 2) The second critical aspect I am concern about is the fact that the control simulation the authors are using does not verify accurately the observations (e.g., Fig.3 and Fig. 4), from the tracking and intensity point of view of the medicane. Is this simulation the best simulation they can produce with this couple model? How many simulations the authors have performed in order to obtain the ‘best’ simulation that resemble the observations? Sometimes, this process can carry out more than 30 simulations changing different parameters of the model setup... Following this, if our control simulation cannot describe

properly the observations, what is the point of using this simulation to describe the physical processes involved, in this case, in the medicane? In this case, the results and conclusions obtained do not properly describe the phenome we observe, they describe something else...

- 3) Also, I found this manuscript too long, taking into account that this case study has been studied and examined by other authors before and most of the information described in this paper confirm previous results, conclusions or explanations. I think that in some sections, the information provided is not relevant, so they could resume significantly some of these sections.
- 4) Finally, in the conclusion section, the authors include new discussion about different categories where medicanes could be sorted. I think that this information should be introduced in one of the first sections of the manuscript and not at the conclusions. Again, in this last section, authors should try to overview the content and not repeat excessively content explained before.

Minor comments:

The following are some suggestions that could help to improve the quality of the manuscript:

Introduction Section:

- 1) Page 1 (L1): I suggest to add some more references on Medicanes. This section is focussed on the description of the characteristics of Medicanes, but I feel that relevant references related with the definition of MEDICANES (acronym from Mediterranean Hurricane) are missing. Also, in the text the word medicane is related with mediterranean cyclones, and although the idea is clear, is not the definition used in the literature.
- 2) Page 1 (L27): “their radius ranges typically” -> “their radius typically ranges”
- 3) Page 1 (L28): “due to the enclosed **character** of the Mediterranean”. What do you mean by character? I realized that the way of explaining the differences between Medicanes and TC (L25-34) is not very clear because of the use of long sentences separated by semicolons. I suggest to rephrase these ideas in a clearer way to facilitate the reader its comprehension.
- 4) Page 1 (L35-37) state that several studies documented different characteristics from medicanes, but only 1 reference is listed for each of these characteristics. I suggest to add more references.

- 5) Page 2 (L41): “impact of the coastal reliefs in triggering deep convection...” -> Add references
- 6) Page 2 (L44-45): “It is nevertheless inadequate to ...” -> This sentence it seems completely disconnected from the last sentence, which talks about the adapted version of the Hart Diagram. What do the authors mean stating that is inadequate to describe roles of upper-level and low-level processes? Do they mean that upper-level dynamics do not play a key role in the genesis of medicanes? I suggest to add some additional clarification of the meaning of this sentence.
- 7) Page 2 (L59-61): Add more references.
- 8) Page 2 (L65): “turning off selected processes in sensitivity experiments”-> In fact, the factor separation technique is a method of performing sensitivity experiments turning on/off different factors considered.
- 9) Page 3 (L84): “latent heat release **fed** at low level” -> It is not clear for me that this term can be used in this context.

Case study and simulations Section:

- 1) Page 4 (L125-126): “with high horizontal (1-2 km)” -> “with high **grid** horizontal and ... resolutions”
- 2) Page 4 (L126): “present” -> “current”?
- 3) Page 4 (L127): “platforms” -> “centers”?
- 4) Page 5 (L162): “radiative transfers” -> “radiative transfer models”
- 5) Page 5 (L172): “ECMWF operational analyses” -> Please, provide more information about these fields.
- 6) Page 5 (L177): “with resolution 1.33 km” -> “with **grid** resolution 1.33 km”
- 7) Page 6 (L199): “configurations described previously” -> “configurations previously described”

Medicane lifecycle and coupling impact Section:

- 1) Page 7 (L266): “until its landfall” -> “until it makes landfall”?
- 2) Page 7 (L271): “collocated” -> “located”?, “placed”?

Role of surface fluxes and mechanisms Section:

- 1) Page 9 (L325-328): Too long sentence.

Figures:

Most of the figures are poor quality. I suggest to create .pdf or .eps format figures to increase quality of the manuscript.

Fig. 7: missing x and y labels.

Fig. 8-9-10. Misleading x-label. It should be replace with something such as: Time (hours UTC)

Fig. 11: Dashed line representing cross section region and the grey star should be highlighted. In addition, in the capture, the last line should be corrected to "Grey stars indicate the position..." instead of "**The** grey stars indicate the position..."

Fig. 12,14: missing x-label

Fig. 13, 16, 18: Coast lines are too width and difficult the visualization of the fields depicted. Please, improve this feature. Also, enlarge grey stars.

Fig. 17: Enlarge grey star.