

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

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We would like to thank the anonymous reviewer for his valuable comments and suggestions.

Specific comment Despite their name, medicanes are not necessarily characterized by 10-m wind speed overcoming the 32 m/s threshold, i.e. the hurricane-level intensity. Most of them are pseudo-tropical storms with wind speed reaching 17 m/s or more. This point should be clarified in the introduction. Furthermore, the time evolution of the maximum wind speed associated with medicanes should be shown as it is classically done for tropical storms.

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Actually the text can give the false impression that medicanes are necessarily characterized by wind speed overcoming the 32 ms^{-1} threshold. To clarify this point some changes will be introduced in the paper.

First, the following text will be added in the introduction:

P7418L24 (Page 7418 Line 24): "... as strong winds, that sometimes overcome the threshold wind of tropical storm (17 ms^{-1}) and exceptionally up the threshold of hurricane (32 ms^{-1}), and heavy precipitations, ..."

Secondly, following text in "Methodology" section:

P7423L23: "... in at least six of the eight directions, which roughly corresponds to a wind speed of about 32 ms^{-1} (hurricane-level intensity) "

will be replaced by:

" ... in at least six of the eight directions. This threshold roughly corresponds to a mean geostrophic wind speed of about 32 ms^{-1} , which itself is equivalent to a gradient wind of $15 - 17 \text{ ms}^{-1}$ for cyclone radii between 150 and 200 km."

Certainly to illustrate the evolution of the 10-m maximum wind associated with

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medicanes would be very interesting, as indicated by the reviewer, but unfortunately it is not available from our simulations. As an alternative, we can calculate the gradient wind (to include not only the pressure gradient but also the cyclone radius) to report when the wind is more or less intense throughout medicane life. This will imply the following changes in the paper:

The time evolution of the gradient wind associated with medicanes will be added to figures 2, 4, 6 and 9, figure captions will be modified and text will be added in "Result" and "Summary and discussion" sections:

P7439: Fig. 2. Evolution over time of **(a)** Gradient Wind (ms^{-1}) in green (top) and Central Pressure (hPa) in violet + Mean Pressure Gradient (hPa $100 km^{-1}$) in orange (bottom) **(b)** Mean Radius (km) in blue + Mean Warm Core Radius (km) in orange + Geostrophic Vorticity ($10^{-4} s^{-1}$); for 1982 event.

P7441: Fig. 4. Evolution over time of **(a)** Gradient Wind (ms^{-1}) in green (top) and Central Pressure (hPa) in violet + Mean Pressure Gradient (hPa $100 km^{-1}$) in orange (bottom) **(b)** Mean Radius (km) in blue + Mean Warm Core Radius (km) in orange + Geostrophic Vorticity ($10^{-4} s^{-1}$); for 1983 event.

P7443: Fig. 6. Evolution over time of **(a)** Gradient Wind (ms^{-1}) in green (top) and Central Pressure (hPa) in violet + Mean Pressure Gradient (hPa $100 km^{-1}$) in orange (bottom) **(b)** Mean Radius (km) in blue + Mean Warm Core Radius (km) in orange + Geostrophic Vorticity ($10^{-4} s^{-1}$); for 1995 event.

P7446: Fig. 9. Evolution over time of **(a)** Gradient Wind (ms^{-1}) in green (top) and Central Pressure (hPa) in violet + Mean Pressure Gradient (hPa $100 km^{-1}$) in

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orange (bottom) **(b)** Mean Radius (km) in blue + Mean Warm Core Radius (km) in orange + Geostrophic Vorticity ($10^{-4} s^{-1}$); for 1996 event.

P7427L12: "... while the gradient wind and the vorticity reach a relative maximum (see Fig. 2a and Fig. 2b)..."

P7427L17 "...meanwhile the gradient wind and the vorticity achieve the highest values (see Fig. 2a and Fig.2b)..."

P7429L7: "... but the pressure gradient does not overcome the threshold value and the gradient wind is lower than $13 ms^{-1}$ (see Fig. 4a)..."

P7430L21: "... as a medicane until 16 January, with a life-time of 24 h. During this period, the gradient wind is larger than $17 ms^{-1}$ (see Fig. 6a). Along the entire simulation ..."

P7431L28: "... the minimum central pressure value is reached although far from the observed value, gradient wind reaches $17 ms^{-1}$ (see Fig. 9a) and a deep warm-core begins to form, but ..."

P7432L4: "... it is classified as a medicane. The gradient wind increased to $18 ms^{-1}$, its maximum value (see Fig. 9a). At 18:00 ..."

P7434L12: "... is shrunk. Gradient wind varies from 13 to $20 ms^{-1}$ and it reaches its maximum values, larger than $17 ms^{-1}$, when the system is classified as medicane. "

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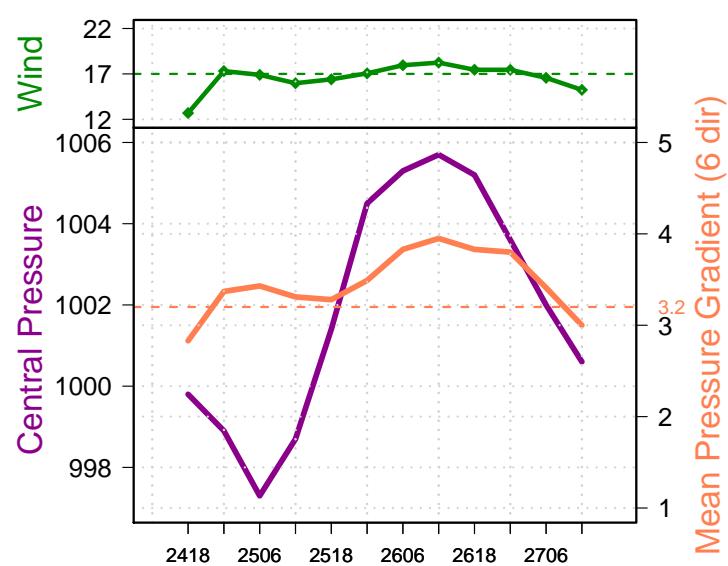


Fig. 1.

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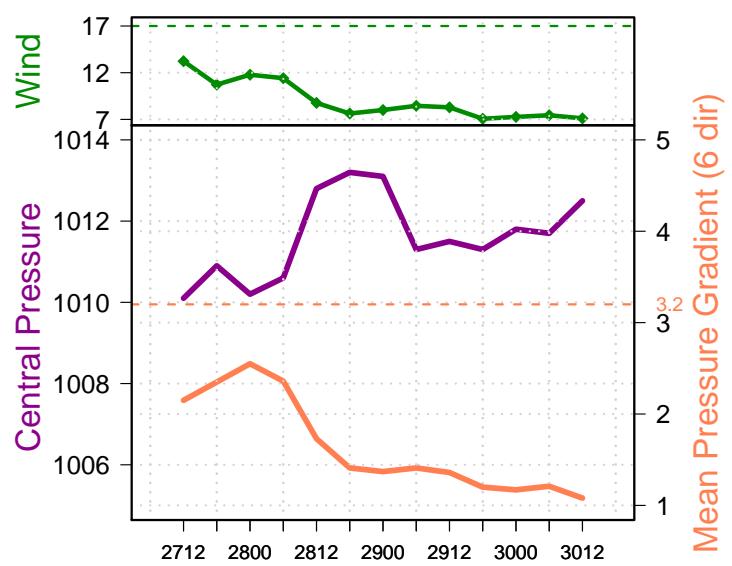


Fig. 2.

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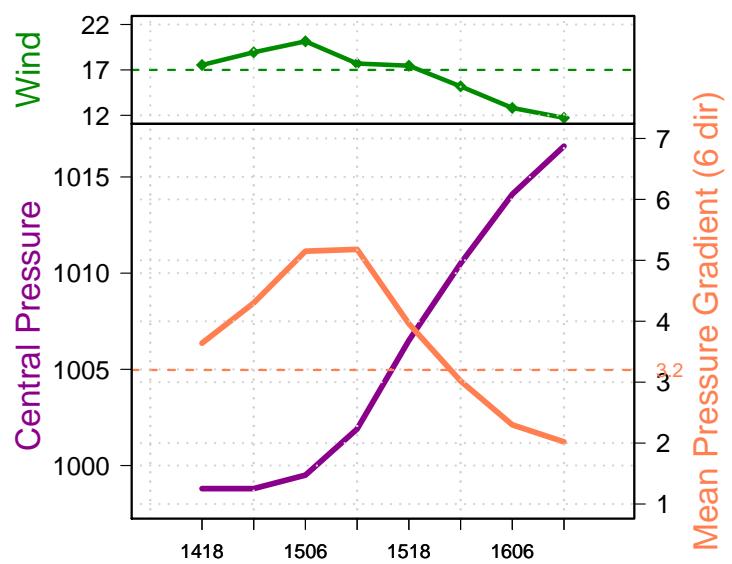


Fig. 3.

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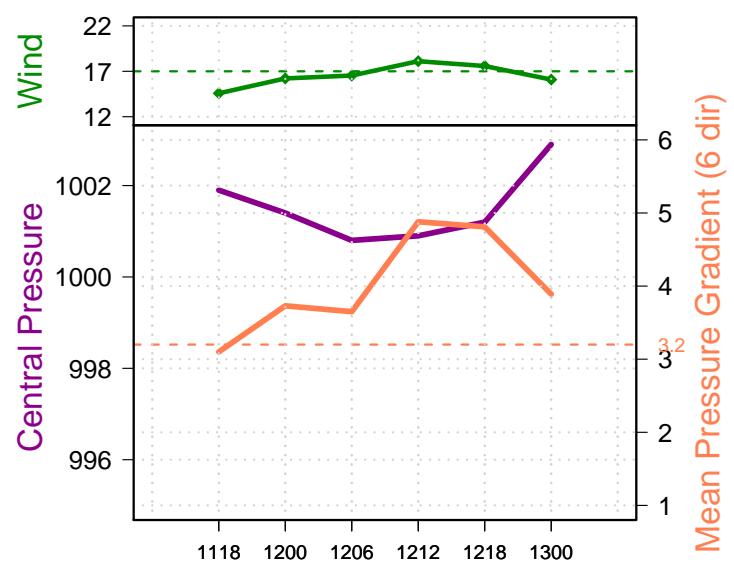


Fig. 4.

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