

Dear M.M. Miglietta,

thank you for your suggestions and comments that will improve the manuscript. Here are the answers to your comments and we will also include them in final manuscript.

1) Page 2122, Line 15-16: the way the horizontal diffusion parameters are tuned should be better explained.

For the better realization of extreme events such as medicanes, the horizontal diffusion parameters in the interior domain were set to zero to avoid smoothing effects. Therefore the factors to reduce the standard coefficient for numerical diffusion in case of humidity, cloud water, temperature and pressure smoothing are set to zero (along with the Runge-Kutta numerical scheme we did not have any instability problem in our simulations).

2) Page 2122, Line 26: some indications on how the spectral nudging technique is implemented.

The reviewer is right that the forecast is forced to reanalysis by applying spectral nudging (von Storch et al., 2000). The spectral nudging was applied on the wind field components above 850 hPa in the interior domain with the aim to keep the large-scale circulation close to the reanalysis data. The wind field components at the lower levels are free to interact with local orography (Cavicchia and von Storch, 2012). The spectral nudging was applied to the wind field components for scale larger than 4 ERA-Interim grid points.

3) Page 2123, Line 17-19: I suppose that uncoupled simulations without nudging can have some problems in following the real atmospheric evolution without any forcing (apart from the boundary conditions) in a period of one month.

The reviewer is right that simulations without spectral nudging are expected to have some problems in following the real atmosphere (esp. with lead times of three weeks). The reason of starting simulations three weeks before the medicane formation is to have a couple of weeks ocean spin-up in coupled simulations. To be consistent with the coupled simulations we also used same period of simulations in the atmosphere-only simulations (with ERA-Interim SST forcing).

The coupled and atmosphere-only simulations improved the precision in times and locations of the simulated medicanes by applying spectral nudging to CCLM (page 2127 line 18- 28). However, spectral nudging did not improve the intensity of medicanes, such as mean sea level pressure, warm-core and wind speed compared to the simulations without spectral nudging. It is not possible to achieve higher precision in times and locations of simulated medicanes without spectral nudging. But, we are not interested to obtain highest accuracy in the times and locations of the medicanes (page 2127 line 27-28). The important variables to investigate medicanes that is the warm-core, sea level pressure, and wind speed did not show any significant difference in simulations with and without spectral nudging.

4) Page 2125 Line 24: the criteria for Medicane are never mentioned. I suppose you do not apply the Hart (2003) diagram, but you just looked at the thermal structure at 700 hPa. This should be indicated explicitly.

In this study we simulated listed historical medicanes (Tous and Romero, 2013), to investigate the impact of air-sea interaction in the coupled model on the intensity of medicanes as compared to the atmosphere-only model and adequate atmospheric grid resolution essential to resolve medicane features (page 2121, line 8-11). We are not interested in the classification of these medicanes. Therefore, we did not follow the Hart (2003) diagram.

To simulate a medicane, one needs to find intense sea level pressure minima, a warm-core at mid-troposphere, and strong cyclonic winds (Tous et al., 2013) (page 2124 line 6-7). The “criteria” refers here to “intense sea level pressure minima, a warm-core at mid-troposphere, and strong cyclonic winds”, which we expect to simulate a medicane. We will clarify this in final version of paper.

References

Cavicchia, L. and von Storch, H.: The simulation of medicanes in a high-resolution regional climate model, *Clim. Dynam.*, 39, 2273–2290, 2012.

Hart R.E.: A cyclone phase space derived from thermal wind and thermal asymmetry. *Mon Weather Rev* 131:585–616, 2013.

Tous, M., Romero, R., and Ramis, C.: Surface heat fluxes influence on medicane trajectories and intensification, *Atmos Res.*, 123, 400–411, 2013.

von Storch, H., Langenberg, H., and Feser, F.: A spectral nudging technique for dynamical down-scaling purposes, *Mon. Weather Rev.*, 128, 3664–3673, 2000.