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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Medicanes in an ocean–atmosphere coupled regional climate model" *by* N. Akhtar et al.

M. A. Gaertner

miguel.gaertner@uclm.es

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The paper is really interesting. The design of the experiments is well explained and the reasons for using a 1-D ocean model are convincing.

There are several aspects of the paper that I find remarkable:

- The fact that the medicanes are captured and are generally close in timing and track to the observed lows, in the simulations without spectral nudging. This is not obvious, as the simulations start with a relatively high previous period (3 weeks) and the domain is large.

- The improvements in the coupled runs in comparison to the atmosphere-only runs.

The fact that in many cases the coupling generates a positive feedback (more intense winds and warm cores) goes in the opposite direction of the most frequent negative feedback, as the strong winds associated to tropical cyclones tipically mix up colder subsurface waters and reduce the intensity of the cyclone. There are some observed cases of positive feedbacks for tropical cyclones, when the ocean mixed layer is deep enough. It would be very interesting to analyse what happens with the temperature of the near surface water in your coupled simulations.

- There are some indications that the increases in wind intensity are linked to more intense warm cores. This would be an interesting line for further studies.

- The fact that the spectral nudging does not show clear improvements, and even show worse results in some cases (e.g., CCL08sn shows clearly less lifetime, with a much higher error, than without sn).

Apart from this, I have a comment regarding the minimum SST for development of tropical cyclone (commented in the introduction): the value of 26°C is widely cited, but this is not an absolute threshold. There are cases where hurricanes have developed over lower SSTs, like hurricane Vince in 2005 over the Atlantic, which developed over 24°C waters. It seems that the critical factor is the difference of temperature between the surface and the upper levels, not the absolute SST value. This can explain why tropical-like cyclones can develop over relatively cold Mediterranean waters.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 2117, 2014.