



Medicanes in an ocean-atmosphere coupled regional climate model

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So-called medicanes (Mediterranean hurricanes) are meso-scale, marine and warm core Mediterranean cyclones which exhibit some similarities with tropical cyclones. The strong cyclonic winds associated with them are a potential threat for highly populated coastal areas around the Mediterranean basin. In this study we employ an atmospheric limited-area model (COSMO-CLM) coupled with a one-dimensional ocean model (NEMO-1d) to simulate medicanes. The goal of this study is to assess the robustness of the coupled model to simulate these extreme events. For this purpose 11 historical medicane events are simulated by the atmosphere-only and the coupled models using different set-ups (horizontal grid-spacings: 0.44° , 0.22° , 0.088° ; with/with-out spectral nudging). The results show that at high resolution the coupled model is not only able to simulate all medicane events but also improves the simulated track length, warm core, and wind speed of simulated medicanes compared to atmosphere-only simulations. In most of the cases the medicanes trajectories and structures are better represented in coupled simulations compared to atmosphere-only simulations. We conclude that the coupled model is a suitable tool for systemic and detailed study of historical medicane events and also for future projections.