



## **Climate change projections of medicanes with a large multi-model ensemble of regional climate models**

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Cyclones with tropical characteristics, usually called medicanes, occasionally develop over the Mediterranean Sea. Possible future changes of medicanes are a matter of concern due to their large damage potential. Here we analyse a large set of climate change projections with regional climate models (RCMs) from ENSEMBLES project. The aim is to increase our knowledge about the future evolution of medicanes, advancing previous studies along several important lines: use of a large ensemble of RCMs, nested in many different GCMs, and covering a long continuous time period (up to 150 years). The main overall results are a future reduction in the number of medicanes and an increase in the intensity of the strongest medicanes, in agreement with other studies. But the large size of the ensemble reveals some important model-related uncertainties. The increase in extreme intensity shows a clear dependence on the GCM driving the simulations. In contrast to the overall results, a few simulations also show changes in the monthly distribution of medicanes, with less winter cases and more autumn and late summer cases. Some environmental variables have been explored in an attempt to offer physical explanations for these results. A plausible reason for the overall decrease of medicane frequency is the projected increase in vertical static stability of the atmosphere. A relevant result is that the general and clear increase in average static stability is unable to avoid that several simulations project higher maximum winds in the future. This could indicate that the increased SST and latent heat fluxes may overcome the limitation of a higher overall static stability, if favourable conditions for medicane genesis indeed occur. This is a worrying possibility, as the strongest damages are associated to the most intense cyclones.