

MEDICANE RISK IN A CHANGING CLIMATE

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Medicanes or “Mediterranean hurricanes” are extreme cyclonic windstorms morphologically and physically similar to tropical cyclones. Although medicanes are rare phenomena and their size and intensity are clearly lower than for hurricanes, expected changes in frequency and intensity as a consequence of global warming are a cause for regional concern. Consequently, this study aims to investigate the long-term risk of medicane-induced winds.

First attempts to assess the medicane risk have been undertaken by our group based on two different perspectives. The first approach consists on detecting and tracking symmetric warm-core cyclonic disturbances generated in nested climatic simulations. As an alternative, the second method takes advantage of the statistical-deterministic approach developed by Emanuel and his team in the context of hurricane risk assessment in the tropical regions. This approach generates thousands of synthetic storms with a low computational cost, thus enabling a statistically robust assessment of the spatial-temporal risk function.

Here we present unprecedented medicane risk maps based on both techniques, using ERA40 reanalysis and GCM outputs as input data. Results derived from ERA-40 are compared, on the one hand, against the satellite-based climatology and, on the other hand, against the GCM-derived results for the baseline period. These comparisons allow us to calibrate the methods and to better assess the future effects of climate change on medicane frequency and intensity.

Both methods generally agree with regard to the medicane-prone geographical areas and seasonal incidence, pointing out the central-western Mediterranean basins and the cold season as the most favorable. Regarding the effects of climate change, fewer storms but an increased probability of violent cases at the end of the century compared to present are projected.

Keywords: Medicane, Climate change, Risk assessment