



Medicane risk in a changing climate: Results of two methods

R. Romero, M. Tous, and C. Ramis

Universitat de les Illes Balears, Departament de Física, Palma de Mallorca, Spain (romu.romero@uib.es)

Medicanes or "mediterranean hurricanes" are extreme cyclonic windstorms morphologically and physically similar to tropical cyclones. With an average frequency of only 1-2 events per year and given the lack of systematic, multidecadal databases, an objective evaluation of the long-term risk of medicane-induced winds in the current climate is impractical with standard methods. Also, there is increasing concern on the way these extreme phenomena could change in frequency or intensity as a result of human influences on climate.

First attempts to evaluate the medicane risk and its possible changes have been undertaken recently by our group based on two different perspectives. The first method consists of detecting and tracking symmetric warm-core cyclonic disturbances generated in nested climatic simulations. Owing to the high computational cost, this technique is limited by the horizontal resolutions used, which do not usually allow the RCMs to resolve the vast majority of medicanes as we know them today (i.e. small-scale vortices with very detailed inner region dynamics), and by the production of too few climate realizations as to permit an adequate and complete sampling of the probability distribution function of storms.

Our second risk assessment method takes advantage of a statistical-deterministic approach developed in the context of the long-term wind risk associated with tropical cyclones. This approach generates thousands of synthetic storms with low computational cost, thus enabling a statistically robust assessment of the spatial-temporal risk function, in the form, for instance, of geographical distributions of return periods for extreme winds.

With these techniques, fewer medicanes but a higher number of violent storms are projected at the end of the century compared to present, suggesting an increased probability of major economic and social impacts as the century progresses.