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Medicanes: tropical-like-cyclones in the Mediterranean Sea and their uncertain fate with climate change

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Windstorms, extreme precipitations and instant floods seems to strike the Mediterranean area with increasing frequency. These events occur simultaneously (compound extreme events) during powerful tropical-like Mediterranean cyclones, also called medicanes. Medicanes are mesoscale cyclones with a diameter usually smaller than 300 km, with a rounded structure and a cloudless area at the center. The mesoscale cyclones are frequently associated with wind, heavy precipitation and changes in temperature, generating high risk situations such as flash floods and large-scale floods with significant impacts on human life and built environment. In the month of October 2016, a strong mesoscale cyclone passed over Sicily and Malta causing flash-floods and numerous damages on Malta. In October 2015 another mesoscale cyclone has passed over Corsica with flash-floods and wind gusts of 150km/h to finally vanish over the south of France where the intense precipitations caused important damages and several life losses. The first challenge we face in the study of medicanes is their detection in historical observations: false positives can be detected from extratropical cyclones that have no tropical structures.
In the second part of the study we assessed whether the large-scale atmospheric circulation could change the frequency of occurrence. Preliminary results show a decrease of the large-scale circulation patterns favoring medicanes in all the seasons except summer. Is this enough to state that we are likely to observe a decrease of these events in the future? No, indeed the warming expected of the Mediterranean Sea could favor convective storms that can organize into tropical cyclones without the need of large-scale circulation drivers.