



Attribution of the destructive Mediterranean derecho in 2022 to anthropogenic warming

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An extremely intense and organized convective storm, classified as a “derecho”, developed over the western Mediterranean Sea on August 18, 2022. The system affected Corsica, northern Italy, and Austria, with wind gusts up to 62 m/s and giant hailstones (diameter of around 11 cm), being responsible for 12 fatalities and 106 injured people.

The derecho developed over an extreme and persisting marine heatwave over the western Mediterranean. Therefore, the hypothesis of a relationship between the atmospheric event and the marine heatwave rapidly arose, suggesting a possible link with anthropogenic climate change.

By performing model simulations with both the Model for Prediction Across Scales (MPAS) and the nonhydrostatic operational AROME model and using the pseudo-global warming approach, we find a relationship between the marine heatwave, the actual anthropogenic climate change conditions, and the development of this extremely rare and severe convective event. These results suggest the increase of probability of development of similar events with respect to the past associated to climate change, and illustrate how climate change effects can cascade through a chain of extreme weather and climate events.