



Increasing Strength of Compound Hot-Wet Dynamical Extremes Over the Mediterranean

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The Mediterranean (MED) basin is a hot-spot for climate change impacts. We present recently developed techniques derived from Dynamical System Theory to investigate long-term changes in compound hot-wet extremes over the MED. We use three reanalysis products, spanning a 40-year period from 1979 to 2018: ERA5, ERA-Interim and ERA5 10-member ensemble. From these datasets, we extract daily maximum temperature (degC) and total precipitation (mm), which we then use in the dynamical systems analysis.

Results show that the strength of the dynamical coupling between hot and wet extremes increased significantly at both annual and summer (June-August) timescales during the reanalysis period. This means that, regardless of changes in the occurrence of individual hot or wet extremes, joint occurrences may be becoming more frequent.

Compound hot-wet extremes mostly occur during July and August, and correspond to a low-pressure core over the Aegean Sea and the eastern MED. The increasing trends in compound extremes may be associated with surface MED warming. Such enhanced warming can therefore drive compound hot-wet extremes especially during the summer, when localised convection or mesoscale systems such as medicanes are responsible for extreme precipitation events.