EGU21-9931, updated on 05 Aug 2021
https://doi.org/10.5194/egusphere-egu21-9931
EGU General Assembly 2021

Predictability of large-scale atmospheric flow patterns connected to extreme precipitation events in the Mediterranean

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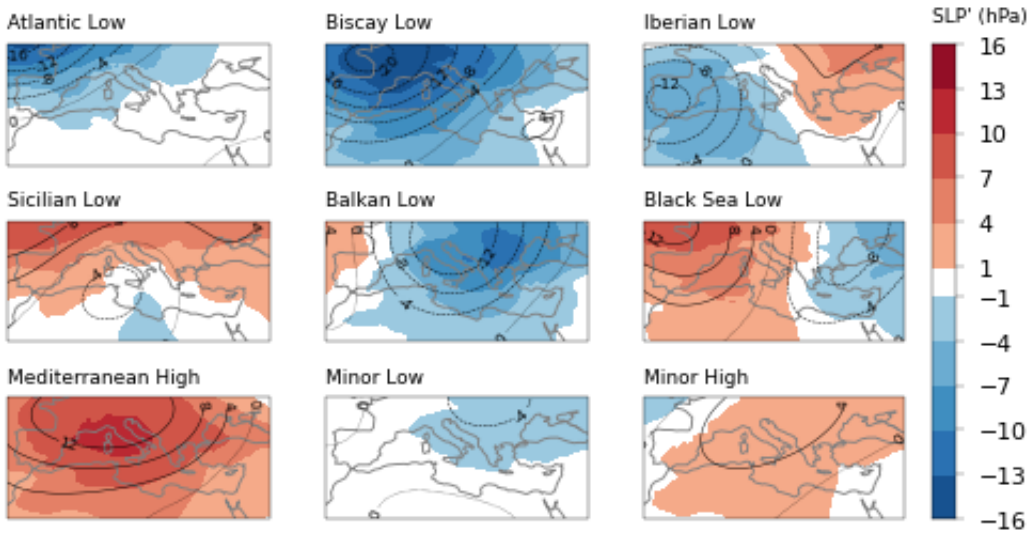
The Mediterranean region frequently experiences extreme precipitation events with devastating consequences for the affected societies, economies, and environment. Being able to provide reliable and skillful predictions of such events is crucial for mitigating their adverse impacts and related risks. One important part of the risk mitigation chain is the sub-seasonal predictability of such extremes, with information provided at such timescales supporting a range of actions, as for example warn decision-makers, and preposition materials and equipment.

This work focuses on the predictability of large-scale atmospheric flow patterns connected to extreme precipitation events in the Mediterranean. Previous research has identified strong connections between localized extremes and large-scale patterns. This is promising to provide useful information at sub-seasonal timescales. For such lead times, the Numerical Weather Prediction models are more skillful in predicting large-scale patterns than localized extremes. Here, we analyze the usefulness of these connections at sub-seasonal timescales by using the ECMWF extended-range forecasts. We aim at quantifying related benefits for the different areas in the Mediterranean region and providing insights that are of interest to the operational community.

Initial results suggest that the ECMWF forecasts provide skillful information in the predictability of large-scale patterns up to about 15 days lead time.



Large-scale patterns over the Mediterranean based on anomalies of sea level pressure (color shades) and geopotential at 500 hPa (contours) (Figure adapted from Mastrantonas et al, 2020)