

Role of atmospheric heat and moisture transport for Mediterranean hot extremes.

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Heat waves severely impact human health, agricultural productivity, and infrastructure. The Mediterranean is a recognized climate hotspot, with both observations and climate model projections indicating amplification of hot extremes and prolonged dry spells. Previous work has quantified the roles of advection, adiabatic, and diabatic processes in building extreme temperatures. A few recent studies links the temperature extremes to anomalous atmospheric transport, but are limited to few case studies, and none has focused specifically on the Mediterranean?

In this study the Mediterranean hot extremes are identified from 1979 to 2023 using ERA5 temperature fields. We then use the pre-computed Lagrangian Reanalysis (LARA) climatology, where 6 million air parcels are tracked globally from 1940 to 2023 to compute anomalous heat and moisture transport during these hot extremes.. Our method of identifying anomalous flow processes that drive Mediterranean heatwaves, offers a new approach in understanding hot extremes.