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Editorial Type: [Article](#)Article Type: [Research Article](#)**Modulation of the Occurrence of Heatwaves over the Euro-Mediterranean Region by the Intensity of the Atlantic Multidecadal Variability**Saïd Qasmi<sup>1, 2</sup>, Emilia Sanchez-Gomez<sup>2</sup>, Yohan Ruprich-Robert<sup>3</sup>, Julien Boé<sup>2</sup>, and Christophe Ca...[View More +](#)Published-online: [08 Jan 2021](#)Print Publication: [01 Feb 2021](#)DOI: <https://doi.org/10.1175/JCLI-D-19-0982.1>Page(s): [1099–1114](#)[Article History](#)[© Get Permissions](#)

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[Abstract/Excerpt](#)[Full Text](#)[Supplementary Materials](#)**Abstract**

The influence of the Atlantic multidecadal variability (AMV) and its amplitude on the Euro-Mediterranean summer climate is studied in two climate models, namely CNRM-CM5 and EC-Earth3P. Large ensembles of idealized experiments have been conducted in which North Atlantic sea surface temperatures are relaxed toward different amplitudes of the observed AMV anomalies. In agreement with observations, during a positive phase of the AMV both models simulate an increase (decrease) in temperature of 0.2–0.8°C and a decrease (increase) in precipitation over the Mediterranean basin of 0.1–0.2 mm day<sup>-1</sup> (northern half of Europe) compared to a negative phase. Heatwave durations over the Mediterranean land regions are 40% (up to 85% over the eastern regions) longer for a moderate amplitude of the AMV. Lower and higher amplitudes lead to longer durations of ~30% and ~100%, respectively. A comparison with observed heatwaves indicates that the AMV can considerably modulate the current anthropogenically forced response on heatwaves durations depending on the area and on the AMV amplitude. The related anticyclonic anomalies over the Mediterranean basin are associated with drier soils and a reduction of cloud cover, which concomitantly induce a decrease (increase) of the latent (sensible) heat flux, and an enhancement of the downward radiative fluxes over lands. It is found that both tropical and extratropical forcings from the AMV are needed to trigger mechanisms, which modulate the atmospheric circulation over the Euro-Atlantic region. The amplitude of the local climate response over the Mediterranean basin evolves linearly with the amplitude of the AMV. However, the strength of this relationship differs between the models, and depends on their intrinsic biases.

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