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Mediterranean Thermohaline Response to Large-Scale Winter Atmospheric Forcing in a MedMIT12 Ocean Model Simulation

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Modes of large–scale atmospheric variability of Atlantic and of Eurasian origin, such as the North Atlantic Oscillation (NAO), the East Atlantic pattern (EA), the East Atlantic Western Russian pattern (EAWR) and the Mediterranean Oscillation Index (MOI) are known to impact on air-sea heat and freshwater fluxes in the Mediterranean Sea. However, the propagation of these atmospheric forcing signals from the surface toward the interior and the abyss of the Mediterranean Sea remains unexplored.
In this contribution, we illustrate the spatial patterns and time scales of the Mediterranean thermohaline response to winter forcing from NAO, EA, EAWR and MOI simulated by the high-resolution ocean model MedMIT12. We present results from a composite analysis around strong positive and negative phases of these modes to track the propagation of the associated signals from the sea surface towards the abyssal layers, focusing on key regions such as the Gulf of Lions, the Adriatic Sea, the Levantine basin and the Aegean and Cretan Seas. We discuss how the considered atmospheric modes imprint differently on the thermohaline properties in these key areas for oceanic convection in the Mediterranean Sea.