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ENSO teleconnections over the Euro-Mediterranean region: the role of extratropical PDO modulation

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At the interannual time scale ENSO (El Nino Southern Oscillation) represents the major driver of climate variability at the global scale. However, the detection of the ENSO influences over the Euro-Mediterranean domain is made difficult by the large variability of the atmospheric circulation on the North Atlantic-European sector.

In this work, we investigate the role of low frequency sea surface temperature (SST) variability in shaping the ENSO fingerprint over the Euro-Mediterranean region. Indeed, the different processes involved in the spread of ENSO signal remotely, as the propagation of planetary waves, may be affected by the background sea surface temperature state. In the detail, we focus our attention on how the North Pacific low frequency SST variability, due to the different phases of the Pacific Decadal Oscillation (PDO), may interact with the teleconnection of the different phases of ENSO.

In the framework of the MEDSCOPE project, we propose a set of idealized numerical experiments where different combinations of ENSO and extratropical PDO SST forcing are taken into account. The analysis of this new ensemble makes the atmospheric response to ENSO over the Euro-Mediterranean sector emerge, and allows to evaluate the effects of the extratropical PDO modulation. Moreover, some dynamical mechanism is suggested in order to explain the sensitivity patterns obtained over the target region under different SST mean states.

This process-oriented approach permits to advance the understanding on the connection between mid-latitude climate variability and tropical forcing, and to enhance a deeper insight on the key mechanisms driving the atmospheric circulation over the Mediterranean sector on a number of different time-scales. Furthermore, it will contribute to improve our understanding of possible sources of predictability for the Euro-Mediterranean region.