



Tropical North Atlantic as a non-stationary switch-on for ENSO-European rainfall teleconnection

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El Niño-Southern Oscillation (ENSO) impact on the North Atlantic European sector (NAE) still rises many unanswered questions. Nowadays, there is a growing evidence advocating for a non-stationary feature affecting both, the tropospheric and the stratospheric pathways, of the ENSO-NAE teleconnection. In particular, a changing link between ENSO and the spring Euro-Mediterranean rainfall has been documented in response to different phases of the Atlantic Multidecadal Oscillation (AMO). Nevertheless, the underlying physical explanations are far to be completely understood. In this study a purely tropospheric mechanism, in which the Tropical North Atlantic (TNA) plays a major role, is presented. Our results rely on the distinct capacity of ENSO to generate a zonal thermocline depth gradient (and hence a related zonal SST gradient) over the TNA under different AMO phases. Consequently, a secondary atmospheric Rossby wave-train, related to ENSO, can be triggered from the TNA to the European sector. The occurrence of this ENSO-NAE teleconnection via TNA could be subject to inter-decadal changes of ENSO properties and Atlantic background conditions. The novel proposed mechanism gives a step forward in the understanding of the role of the Atlantic basin as modulator of the ENSO-NAE teleconnection.