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Multidecadal Modulations of Tropical Atlantic impact on ENSO

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Observational studies have reported that tropical Atlantic interannual variability impacts on ENSO in different seasons and periods: Atlantic Niños (AN) in boreal summer during negative phases of the Atlantic Multidecadal Variability (AMV); and tropical north Atlantic (TNA) in boreal spring during positive AMV. Nevertheless, this relation is not clear for the whole observational record. This paper is a step forward towards understanding of tropical Atlantic impacts on ENSO: how and when do they occur? Using observations and a pool of preindustrial control simulations from the CMIP5 initiative we investigate the background ocean and atmospheric conditions promoting these tropical interbasin connections. Periods with a negative AN-ENSO connection appear characterized by a shallower thermocline over the western Pacific and deeper in the east, together with an increase in interannual SST variability over the tropics. Periods with a negative TNA-ENSO connection appear characterized by a steeper thermocline in the Pacific and positive interhemispheric SST gradient in the Atlantic. A decrease in tropical Pacific atmospheric and ocean variability characterizes these periods.