



Intraseasonal Phase Transition of the NAO-Like Response to El Nino and Its Alteration by the Tropical North Atlantic SST

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The intra-seasonal change in the wintertime atmospheric circulations associated with El Nino over the North Atlantic region was examined. The atmospheric response to El Nino over the North Atlantic exhibits distinct contrast between early and late winter periods, namely positive NAO (North Atlantic Oscillation)-like response during early winter (November to December) and negative NAO-like response during late winter (January to February). This intra-seasonal phase transition of the NAO is mainly attributed to the seasonal-dependent atmospheric teleconnection of the El Nino. The NAO-like response as well as its seasonal dependency is further enhanced by the mid-latitude eddy forcing. Furthermore, we found that the tropical North Atlantic (TNAL) sea surface temperature anomaly (SSTA) also alters the North Atlantic atmospheric response. In general, the TNAL tends to get warm during late El Nino winter, and warm TNAL condition intensifies the negative NAO-like response. The relation between the TNAL and El Nino infers conspicuous climate impact of the El Nino during late winter, because warm TNAL acts to reinforce the El Nino teleconnection pattern. On the other hand, during early winter when it is too early for TNAL to respond to El Nino, the TNAL independently influences North Atlantic circulation regardless of El Nino's impact. Therefore, climate impact of the El Nino over the North Atlantic region seems weak and vague. This study suggests a possible reasoning on why the arguments on the remote impact of the El Nino over the North Atlantic region are so controversial.