



The influence of wintertime NAO on springtime precipitation over the Europe

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The impact of wintertime North Atlantic Oscillation (NAO) on the precipitation over the North Atlantic/European region during the subsequent spring is investigated. Motivated by observed seasonally-lagged connection between the NAO and precipitation, targeted numerical integrations are carried out by the International Centre for Theoretical Physics (ICTP) atmospheric general circulation model (AGCM). The wintertime NAO – spring climate connection is presented using composite and correlation maps constructed upon winter (December-February, DJF) NAO index categorization. Considerable spatial similarity between DJF and spring (March-May, MAM) precipitation maps is found as well as for mean-sea level pressure and surface air temperature maps. Moreover, it is demonstrated that observed MAM sea-surface temperature (SST) pattern in the North Atlantic is significantly correlated with the DJF NAO index of the preceding winter season implying its possible role as a link between the DJF NAO and the subsequent spring climate over the Europe. Therefore, an experiment using ICTP AGCM coupled with a slab ocean layer in the North Atlantic is performed. It is found that both DJF and MAM responses are adequately simulated, and the SST pattern is reproduced consistently with the observations. According to the observational and modeled evidence, the wintertime midlatitude SST pattern persists for several months allowing thermal coupling between the ocean and atmosphere resulting in a springtime atmospheric response similar to the wintertime NAO pattern. Thus, the mixed-layer SSTs in the North Atlantic act as a contributing factor in temporal teleconnectivity of wintertime NAO and spring precipitation over the Europe.