



Favorable conditions for Seasonal Footprinting Mechanism on ENSO

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Previous studies have suggested that the wintertime sea surface temperature (SST) anomalies in the North Pacific, which is generated by the concurrent North Pacific Oscillation (NPO), are able to force the El Niño and Southern Oscillation (ENSO) in the following winter via the so-called ‘seasonal footprinting mechanism’ (SFM). We examine how the mid-latitude atmospheric forcing, which is represented by the NPO, effectively generates the ENSO in the following winter via the SFM in the observations. It is found that there exists a favorable condition in which the spatial structure of NPO as well as associated wind speed and net heat flux in the northeast Pacific is important. Using a linear baroclinic model experiment, it is found that the La Niña-like SST anomalies centered in the eastern tropical Pacific tend to make the NPO structure which is favorable or unfavorable for the SFM. We emphasize that the position of La Niña-like SST forcing in the previous winter is able to modify the structure of NPO, which provides a favorable condition of the El Niño event in the following winter via the SFM.