Eastward Shift of the Pacific/North American (PNA) Pattern on a Interdecadal Time Scale and an Associated Synoptic Eddy Feedback

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In this study, we investigate the interdecadal changes in the Pacific/North American (PNA) pattern during the winter season (November-February) that accompanies the global-scale climate shift in the late 1970s. In the Empirical Orthogonal Function (EOF) analysis, the PNA pattern shows three distinctive features during the period of 1983-2002 in contrast with that of the previous decades (1959-1977): the extension of the central North Pacific cell into the Gulf of Alaska, the eastward shift of the action center of the Canadian cell, and weakening of the North America cell. Pacific/North American structural changes are closely related to the southeastward shift of the storm track that causes the vigorous synoptic eddy feedback region to move farther east. Eddy activity feeds the cyclonic flow at the eastern part of conventional central North Pacific cell, following the storm track. And we found that the eastward shift of the ENSO teleconnection is not obvious over the mid-latitudes, unlike the zonal shift in wind stress anomalies over the Tropics. The action center of the anomalous low does not move eastward, but is rather displaced slightly westward. From the above analyses, we conclude that the PNA pattern shift may have been caused by extratropical internal dynamics rather than by tropical forcing. The shift of storm track from the high latitude northwestern Pacific to the subtropical eastern Pacific may be affected by PDO phase shift.