

Observational and dynamical analyses of the atmospheric response to different forcings in the midlatitude North Pacific

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Using 58-year NCEP atmospheric reanalysis daily data, the global seasonal mean atmospheric forcing terms is calculated, and the distribution features of their climatological means and decadal variabilities are investigated. Observational and dynamical analyses of the atmospheric response to different kind of forcings in the midlatitude North Pacific are also made. The main conclusions are as follows: 1) on seasonal mean timescale, the atmospheric PV source actually consists of three parts, the diabatic heat forcing, the transient eddy heat forcing and the transient eddy vorticity forcing. The diabatic heating dominates in the low latitude region and also in the lower level of atmosphere while the transient eddy heating dominates in the middle latitudes and in the upper atmosphere; 2) the atmospheric response to either diabatic or transient heat forcing depends on the basic flow structure and the heating profile, which is likely baroclinic in the midlatitude North Pacific, and that to the transient vorticity forcing is always barotropic; 3) The positive feedback process involving the SST anomalies, the atmospheric anomalous forcings, and the atmospheric heights response could be the reason why the configuration of interdecadal climate variability in the midlatitude North Pacific maintains.