# Coupled Intraseasonal Variability between the North Pacific Storm Track and Tropical Convection in Boreal Winter

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## Northern Hemisphere midlatitude storm tracks in boreal winter

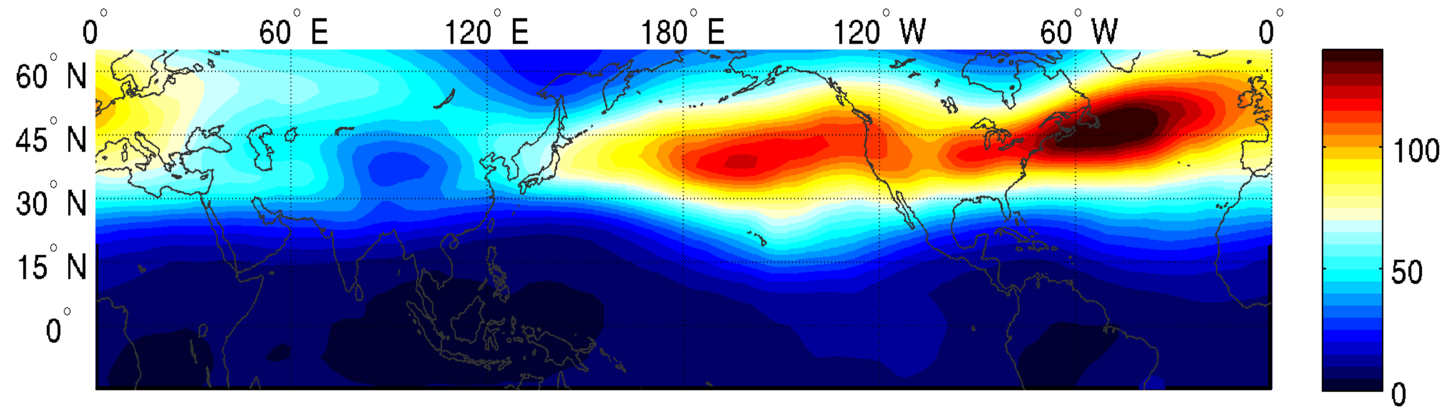


Fig. 1 Climatological winter (DJFM,1979/80-2008/09) storm tracks in terms of synoptic eddy kinetic energy(EKE) at 250mb. Unit: $m^2/s^2$.

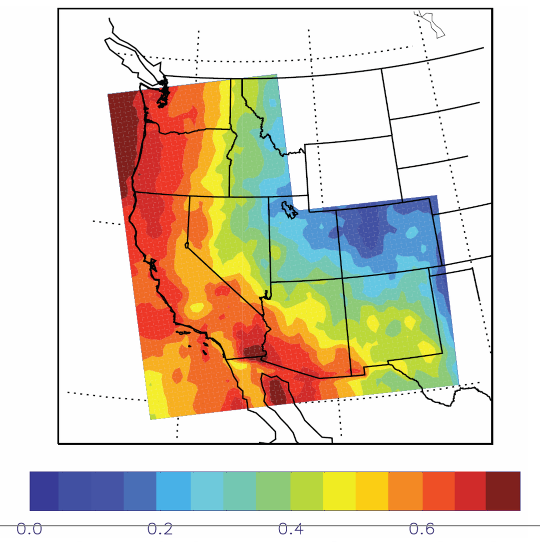

Fig. 2 Ratio of the cyclone-induced precipitation amount to the total winter precipitation in the western U.S.

## Linear coupling between the North Pacific storm track and tropical convection on intraseasonal timescales

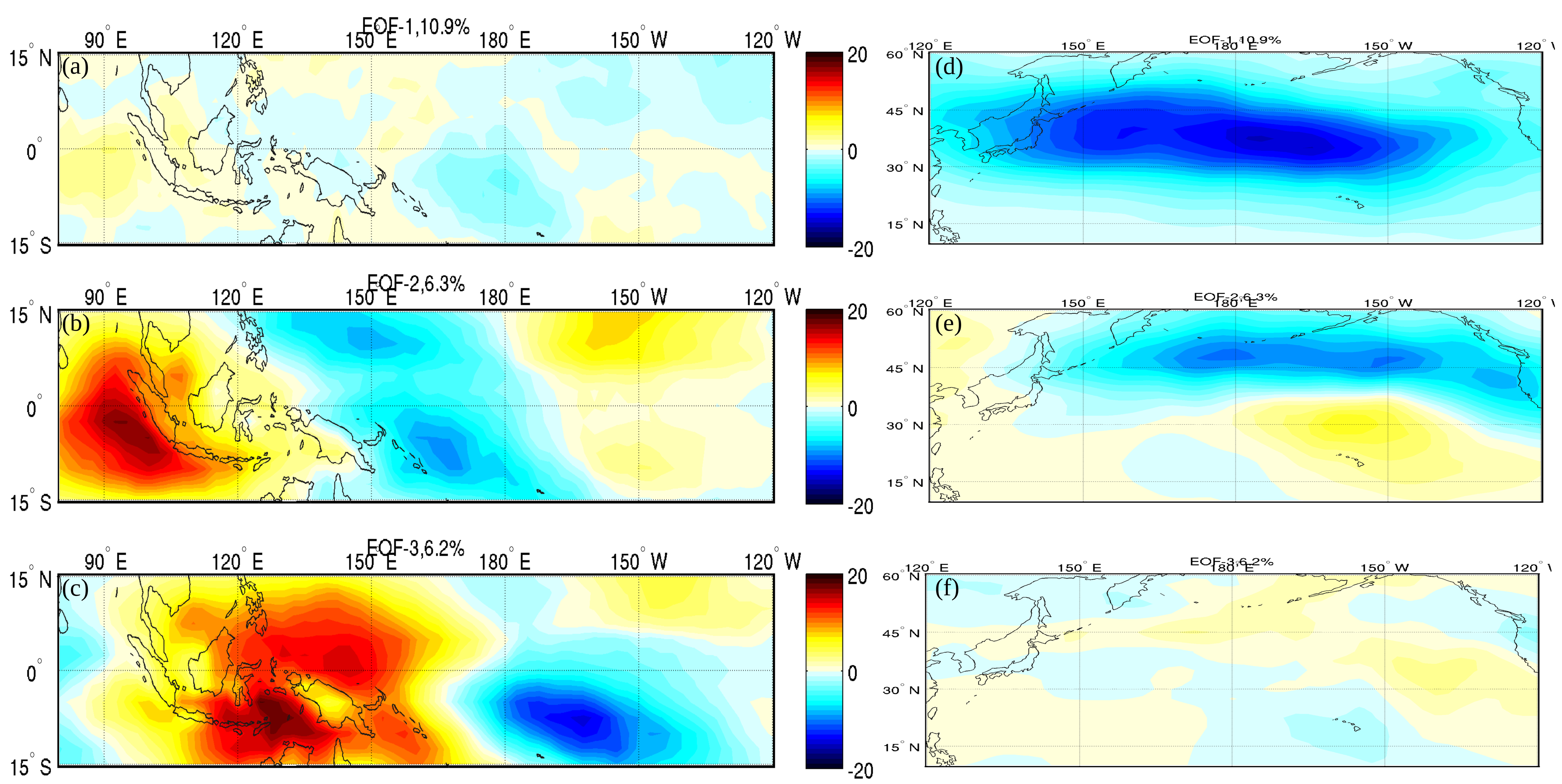


Fig. 3 Coupled intraseasonal mode of tropical convection (left column) and the North Pacific storm track (right column) obtained through a combined EOF analysis of the low-pass filtered (15-90 day) tropical OLR and vertically (925mb-200mb) averaged EKE (VEKE). First three EOF modes are listed from top to bottom.

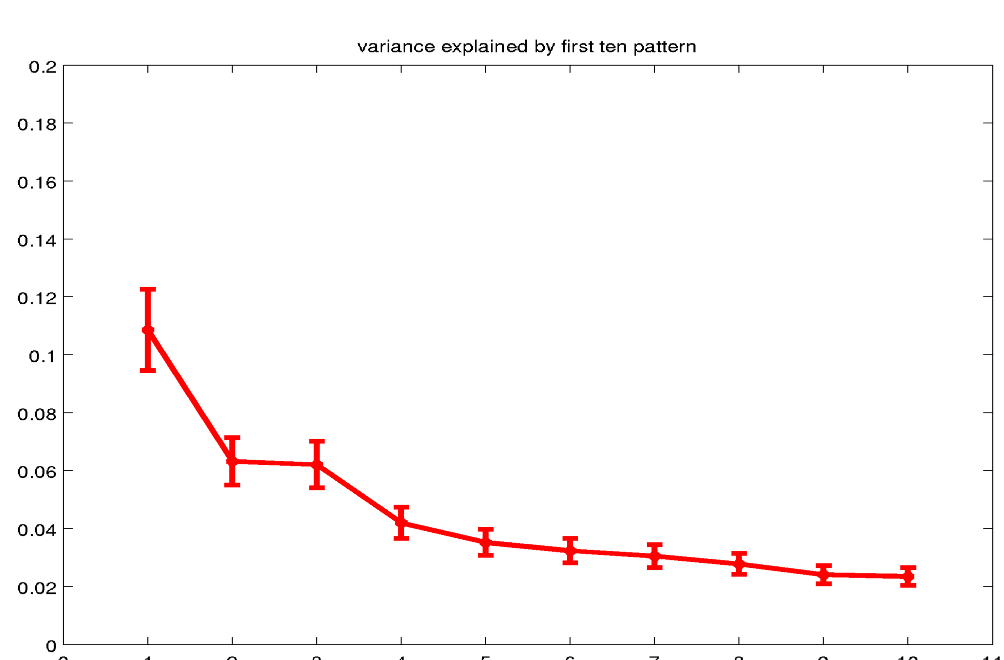


Fig. 4 Fractions of the Intraseasonal variance explained by the first ten EOF modes.

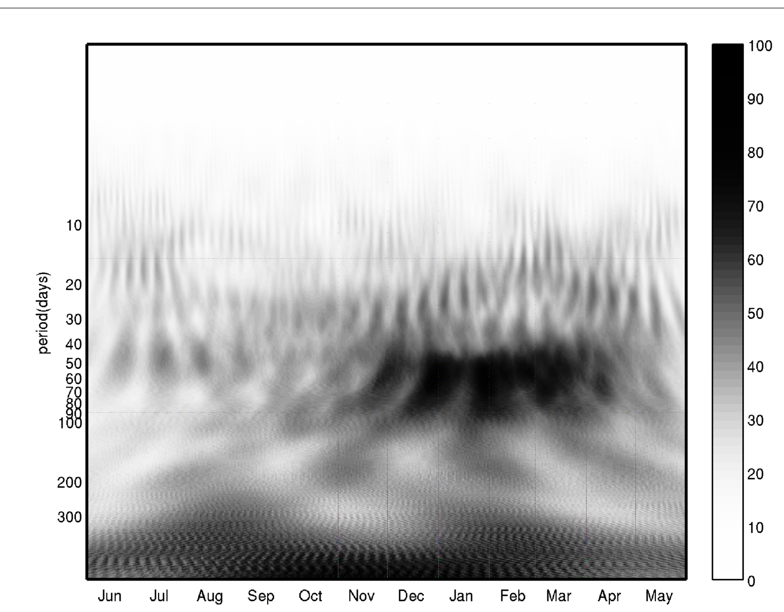

Fig. 5 Climatological frequency-time spectrum of the tropical OLR averaged over a 10° X 10° box centered at 165°E, 5°S. The most pronounced intraseasonal signal is found in December-March period.

## Development of the storm track response to intraseasonal variation in tropical convection

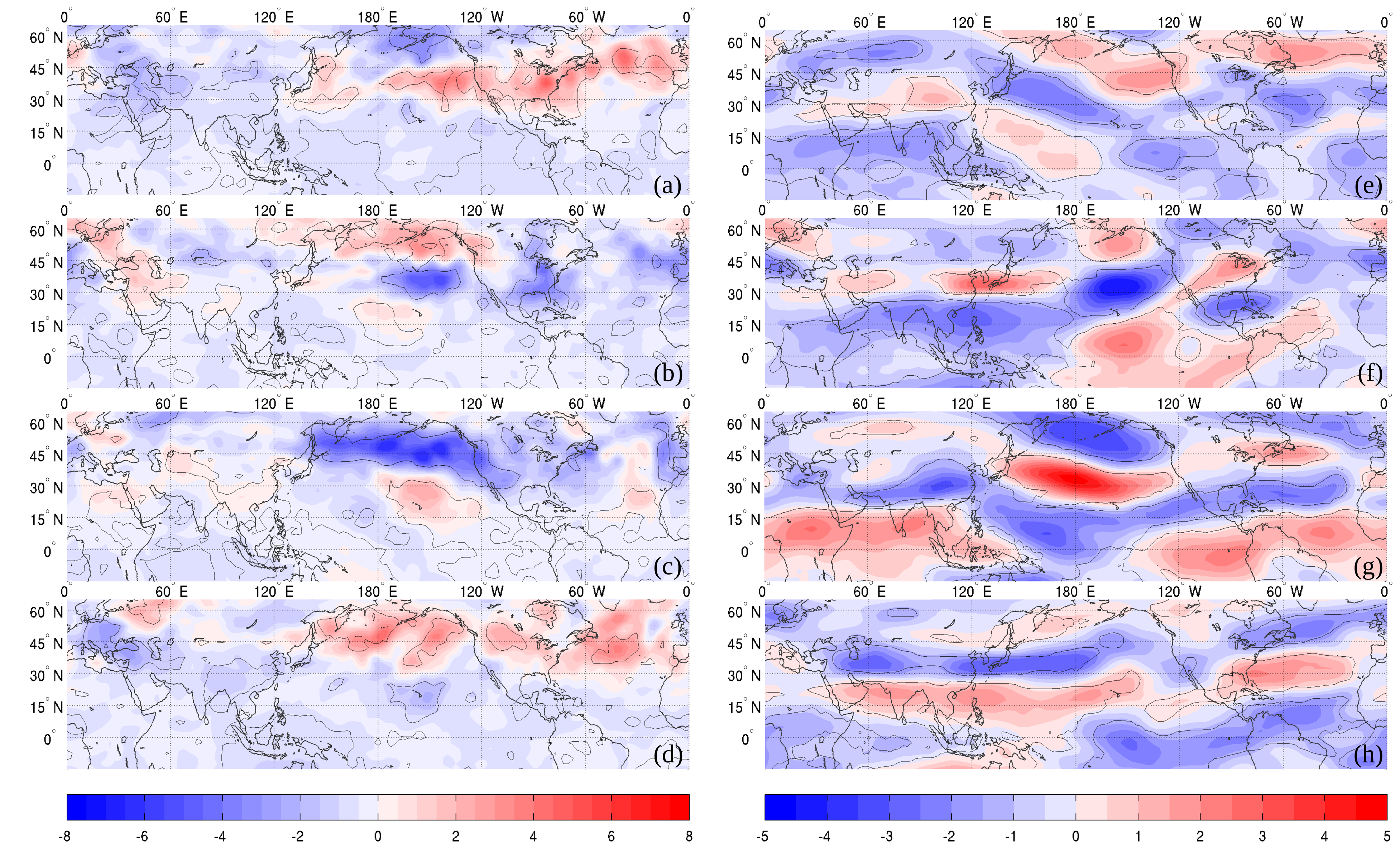

Fig. 6 Composite intraseasonal anomalies of VEKE (left column, unit: $m^2/s^2$) and 250mb zonal wind (right column, unit: m/s) based on the intraseasonal OLR index defined in Fig. 5. A Day 0 is defined as a day when the OLR index is at least one standard deviation below the normal. From top to bottom, day -25 to day -15 average; day -10 to day 0 average; day 0 to day 10 average; day 15 to day 25 average. Contours indicate 90% significance levels.

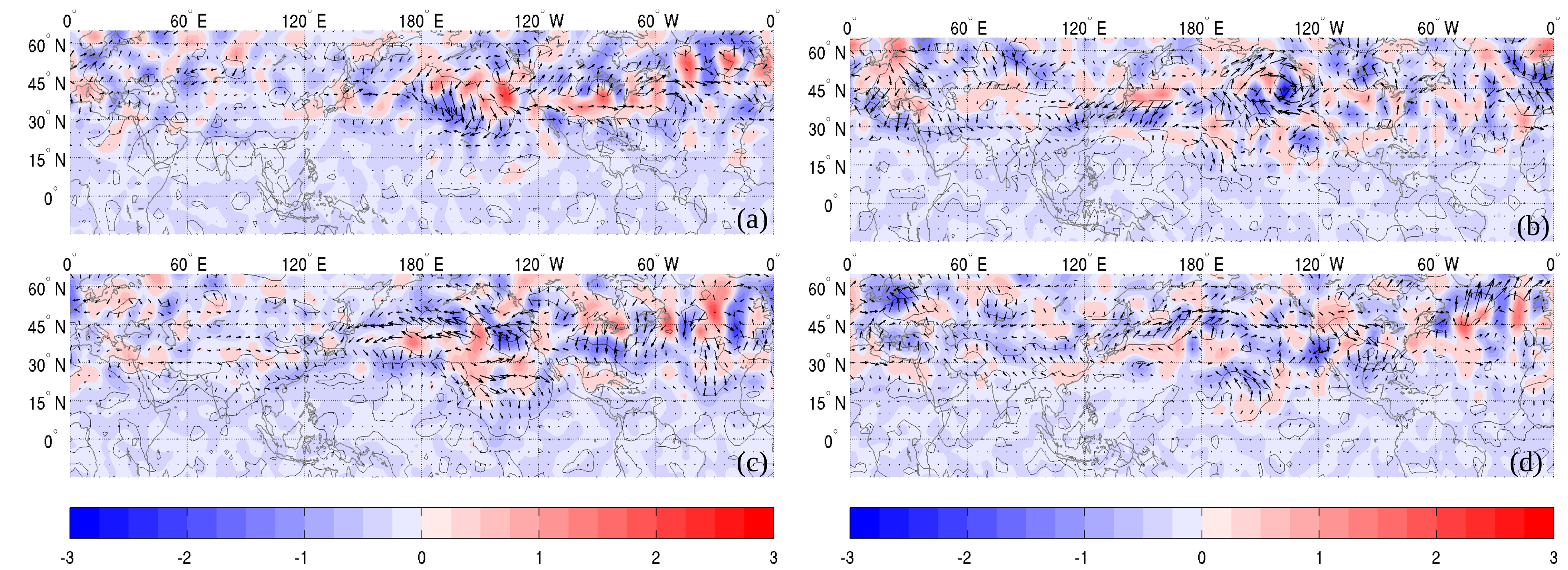

Fig. 7 Composite intraseasonal anomalies of the 250mb E-vector and its divergence (color shading, unit: $m/s^2$) based on the intraseasonal OLR index defined in Fig. 5. From (a)-(d): day -25 to day -15 average; day -10 to day 0 average; day 0 to day 10 average; day 15 to day 25 average.

## Intraseasonal modulations of the convection and western U.S. winter precipitation by the storm track anomalies

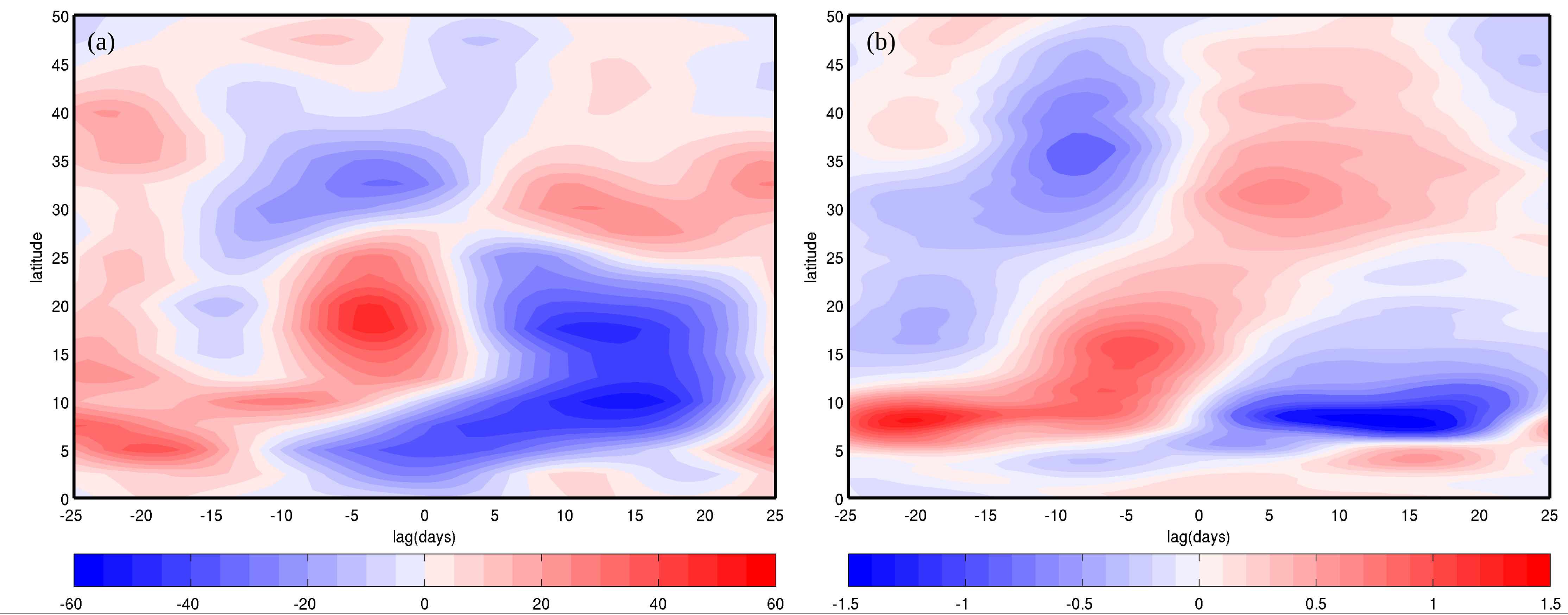


Fig. 8 Latitude-time map of the composite intraseasonal anomalies of the (a) OLR variance averaged over 180°E-120W° (unit: $w^2/m^4$) and (b) precipitation averaged over 125°W-115°W (unit: mm/day). Definition of Day 0 follows Fig. 6 and 7.

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