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Regional Differences in the Seasonal Variation of the upper-tropospheric Jet

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It is known that upper-tropospheric jet stream (UTJS) is the very important weather system. It is always accompanied with server wind shear and strong atmospheric baroclinicity. The seasonal variation of the UTJS is asymmetric, which is not only reflected in spatial distribution but also in temporal-evolution. To make up the deficiency of using wind speed to describe the UTJS, the jet occurrence percentage is calculated for comparing the seasonal variation differences between PJS and SJS, between eastern and western Hemisphere to reveal the asymmetric variation characteristics of the UTJS. The results indicate that the jet occurrence climatology in winter is spiral-like but annular in summer. The jet occurrence percentage in Eastern Hemisphere is relatively larger and southward location in comparison with that in Western Hemisphere. PJS and SJS can be separately observed over North Africa and Asia regions, whereas only one jet stream observed over Western Pacific and Atlantic Ocean. Based on comparison of the jet occurrence percentage and air temperature gradient, the relationship between the UTJS and the air temperature gradient depend on different regions, different seasons and different types of jet stream. Overall, SJS is primarily determined by the latter. The relationship between SJS and air temperature gradient is better in Eastern Hemisphere than Western Hemisphere, better in other seasons than summer. The local diabatic heating in mid-high latitudes play important role in determining the zonal position of the UTJS center, but it does not throw obvious impact on the meridional shift of the UJTS. The transport of the eddy heat plays very important role in the variation of the UTJS from 140E to 70W, while it throws little impact on the SJS along 30E and 90E. The PJS along 30E and 90E may be influenced by the momentum transport and eddy transport to large extent.