

Climatology of coastal low level jets over the Bohai Sea and Yellow Sea and the relationship with regional atmospheric circulations

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The present study reveals a regional climatology and variability features of coastal low level jets (CLLJ) over the Bohai and Yellow Sea (BYS), based on a 35-year (1979–2013) high resolution (7 km) atmospheric hindcast product using the regional climate model COSMO-CLM driven by the ERA-Interim reanalysis dataset. By comparing with observations, the modeled data proves to be robust in reproducing the climatology, daily-cycle feature, variability of wind profiles and specific CLLJ cases. Results demonstrate that CLLJ over the BYS are featured with strong inter-annual, intra-annual and diurnal cycle variability, but weak decadal variability. They are more frequent in April, May and June (CLLJ-season) over the Bohai Sea and western coastal areas of Yellow Sea, and less frequent in winter. In CLLJ-season, the heights of jet cores are generally lower than 500 m above sea level. The wind speed maximum of CLLJ is mostly in the range 10 – 16 m/s, and prevailing wind directions are southerly and southwesterly. It is of nocturnal type, with highest occurrence frequency around 2300 at Local Time. Furthermore, a low-frequency linkage between anomalies of CLLJ occurrence frequency and regional atmospheric barotropic circulation has been identified with Canonical Correlation Analysis and Associated Correlation patterns. Pressure gradients over the East Asia-Northwest Pacific region are significantly correlated with the variations of CLLJ occurrence frequency over the BYS in terms of the annual cycle as well as interannual variability.