

# High resolution wind hindcast over the Bohai and Yellow Sea in East Asia: evaluation and wind climatology analysis

## Abstract

A 34-year (1979-2012) high-resolution atmospheric hindcast over the Bohai and Yellow Sea (BYS) has been performed using COSMO-CLM 4.14 (CCLM) forced by the ERA-Interim reanalysis data (ERA-I). The skill of CCLM in surface wind reproduction and the added value from dynamical downscaling have been investigated by comparing with the co-located QuikSCAT grid data and the site observation. The results reveal that CCLM has reliable ability to reproduce the regional wind characteristics over the BYS. Added value has been detected in the coastal areas with complex orography; however, no obvious added value in the offshore areas. CCLM wind is revealed with strong seasonal variability, with more improvement in summer relative to ERA-I even in the offshore areas, which may benefit from the well-resolved tropical cyclones or mesoscale convective system (MCS) by CCLM in summer. CCLM shows better skill in representing light and moderate winds, but has more added values at strong winds relative to ERA-I, though not all the cases when compared with site observation. The spatial digital filter method was used to investigate the source of added value, and results show that CCLM adds value to ERA-I mainly in medium scale, which may due to the better resolved mesoscale processes by CCLM. Furthermore, the wind climatology has been investigated and increasing trend in south YS especially in winter and spring have been found at the 0.05 significant level.

**Keywords** QuikSCAT · Dynamical downscaling · Added value · Ocean surface wind · CCLM