



## **A numerical study of temperature inversions in the Yellow Sea in winter**

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The Yellow Sea (YS) is semi-enclosed marginal sea located between the China and the Korean Peninsula. The mouth of the YS is open to the East China Sea (ECS). The Changjiang River, which is one of the largest rivers in the world, influences the southern YS. The Yellow Sea Warm Current (YSWC), which flows into the YS, is strong in winter. Previous observation studies have shown that temperature inversion occurs widely in the YS. However, there has been many limitation in understanding fully the temporal-spatial structure of temperature inversion and its cause due to sparse observation data.

This study investigates the structure of temperature inversion and its causes in the YS, based on numerical model experiment. The temperature inversion occurs actively in the areas near the southeastern of the Changjiang River estuary, west and south of the Korean Peninsula, and north and east of the Shandong Peninsula during wintertime. The model with realistic forcing was used to study the temperature inversion from 1993 to 2011. The ocean circulation model with a grid of a  $0.1^\circ \times 0.1^\circ$  horizontal resolution and 40 vertical levels was used. Atmospheric forcing data from ECMWF reanalysis was used in the ocean model. Temperature inversion calculated using observed data by the National Fisheries Research and Development Institute (NFRDI) during the last 19 years (1993–2011) was compared with model result. Although the seasonal temperature inversion amplitude of the model in the center of YS was larger than that of the observation data, the overall changes in seasonal temperature inversion were effectively captured. It is though that the main causes of temperature inversion in winter are wind driven current and surface heat flux in the YS