

O67. HYPOXIA IN THE SEMI-ENCLOSED BOHAI SEA

Hua Zhang¹

¹*Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences, China*

hzhang@yic.ac.cn

Formation of hypoxia zone in coast seas is a critical factor affecting the health of marine ecosystem and has becoming a focus of ocean science. Based on analysis of observation data from cruises conducted in the Bohai Sea in spring (May), summer (August), and autumn (November) of year 2014, this study investigated the spatial characteristics, formation mechanisms of bottom hypoxia zone in the semi-enclosed Bohai Sea and its relationship with the thermocline. The results showed that bottom dissolved oxygen (DO) was > 8 mg/L in Spring and Autumn of the Bohai Sea but a large zone with low bottom DO appeared in Summer, among which are hypoxia zones (DO<3 mg/L) with a total area approximately 4.2×10³ km². The hypoxia zone displayed a south-north “dual core” structure and the spatial characteristic is similar to that of the dual-core structure of cold bottom water in summer. The vertical profile of the cross section at the middle of Bohai Sea showed clear vertical stratification at the south and north depression basin alongside the ridge in the central Bohai Sea, which caused the decreasing DO and substantial acidification (pH<7.8) of bottom cold water. The relatively stable sedimentation environment in the bottom cold water zone has resulted in the substantial higher content of total organic carbon (TOC) and total organic nitrogen (TON) in the surface sediment than other areas. In conclusion, the seasonal stratification in central Bohai Sea and its retardation effect on exchange of DO is the critical physical mechanism for the formation of hypoxia zone. The mineralization of organic matter accumulated in surface sediment is an important driving force causing the low bottom DO and substantial acidification. Appearance of hypoxia zone is a result reflects the dramatic change of the ecosystem in the Bohai Sea and might closely linked with the frequent hazardous algae bloom (HAB) and degradation of fisheries.