Diurnal changes of the sediment plume at the Yellow River mouth during Water-Sediment Regulation

*Yonggui Yu[1], Xuefa Shi[1], Houjie Wang[2], Zifeng Hu[3]

1. FIO, SOA, 2. Ocean Univ. of China, 3. Hohai Univ.

Since the operation of Water Sediment Regulation (WSR) regime in 2002, most of the Huanghe (Yellow River) sediment was deposited in a confined near-shore zone through hypopycnal plume. On the basis of GOCI satellite images collected in 2011, 2012 and 2013 WSRs, we analyzed hourly changes of sediment plume at the Huanghe river mouth through suspended matter concentration retrieval. Results show that the diurnal changes of the sediment plume can be classified as the following 4 types: 1) minor changes—the sediment plume stayed relatively stable within the 8 hours' observation, with only minor changes that could not be easily detected; 2) one-orientation changes—the sediment plume moved gradually towards a certain direction (landwards or seawards), and its main-axis could shifted even by 90° within 8 hours; 3) back-and-force movement--the sediment plume shifted landwards or seawards in the first few hours and then moved backwards; 4) mixed changes—the sediment plume moved to a certain direction in the first a few hours and then changes its pathway to another orientation. In addition, total suspended mater (TSM) at the Huanghe river mouth varies both spatially and temporally, reflecting an intensive interaction between different hydrodynamic processes. For a certain site, the hourly changes in TSM can exceed 100 mg/l, whereas the hourly changes of TSM for its nearby site exhibit 1-3 hours lag. Tidal currents with opposite directions for the ebb tide and flood tide, along with the shear front at the river mouth is believed to be responsible for the diurnal changes of sediment plume. Wind, however, seems to exert a minor control on the changes of plume morphology.

Keywords: Yellow River mouth, sediment plume, diurnal changes , Water-Sediment Regulation

