Sediment transport and deposition off the Huanghe (Yellow River) Delta and in the adjacent Bohai Sea and seasonal comparison

Zuosheng YANG [1,2], Naishuang BI [1,2], Youjun JI [1,2], Houjie WANG [1,2], Yoshiki SAITO [3]

1 College of Marine Geosciences, Ocean University of China, 238 Songling Rd., Qingdao 266100, China (zshyang@ouc.edu.cn)
2 Key Laboratory of Submarine Science and Prospecting Techniques, Ocean University of China, Qingdao 266100, China
3 AIST, Geological Survey of Japan, IGG, Central 7, Higashi 1-1-1, Tsukuba 305-8567, Japan

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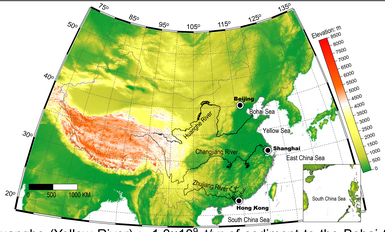
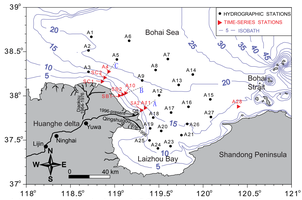
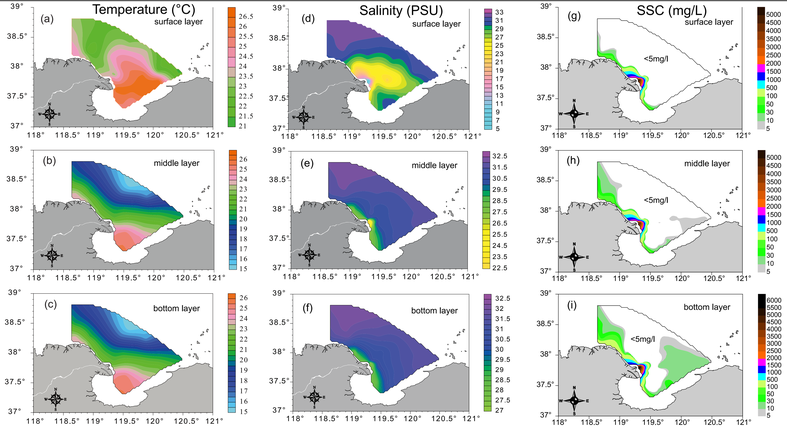


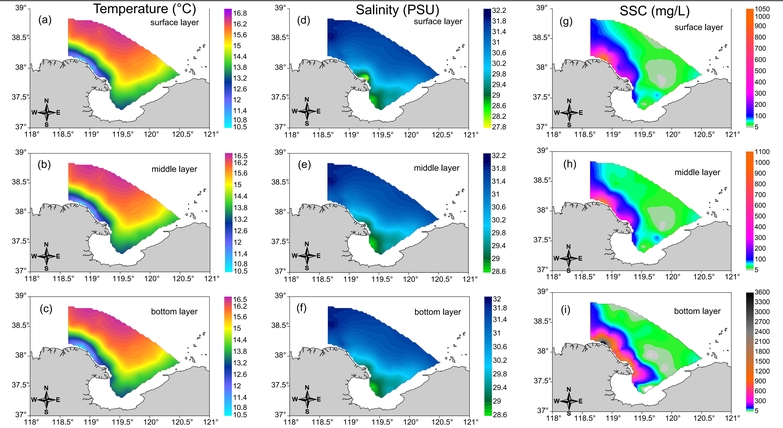
Huanghe (Yellow River) : 1.0×10^9 t/yr of sediment to the Bohai Sea. Few measurement-based studies on the sediment transport in the Bohai Sea.



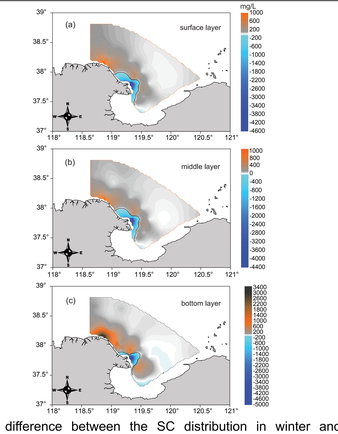
Hydrographic survey in (winter) 2006 and (summer-flood season) in 2007



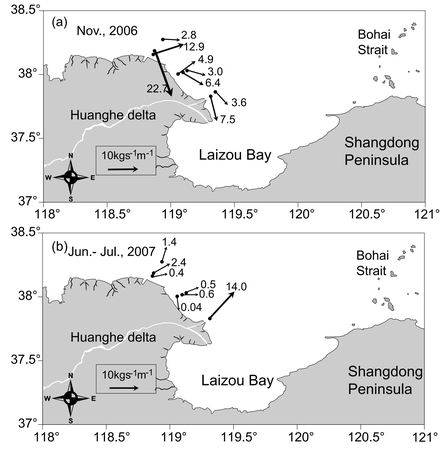
Summer survey. Highly strafiticated water body. Sediment >10 mg/L limited within 10-20 km form the coast. Two centers of high SSC from 500-7000 mg/l around abandoned mouth and river mouth



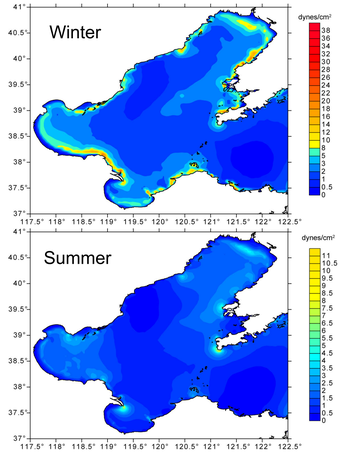
Winter survey. Well-mixed water body. Zone of high SSC ＞100 mg/Lof 35 km along coast. Three centers of highest SSC from 1000-3500 mg/L around abandoned river mouths and present river mouth.



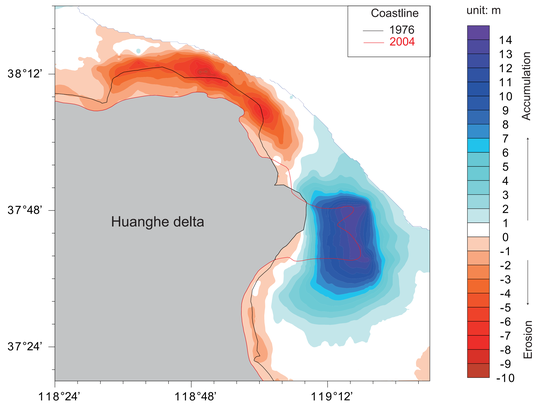
The difference between the SC distribution in winter and summer illustrated that the SSC in winter was generally 200-3000 mg/L higher than in summer, except for a small area around the present river mouth, where it was lower by 200-5000 mg/L due to the input of the river during the summer flood period.



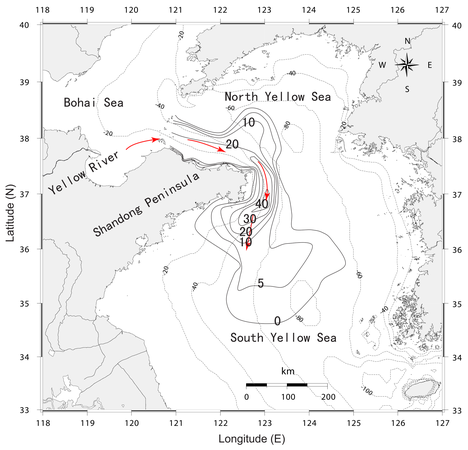
Suspended sediment concentration and sediment fluxes higher in winter than summer by 1.7-27.1 and 2-122.5 times,respectively. Sediment fluxes show the sediment transports northeastward in summer, but mostly southward in winter.



Modelling result based on joint effect of wave and current. High bottom shear stress zone and the protuberant topography of the river mouths indicate that seasonal variation of suspended sediment distribution off the Huanghe delta are mostly resulted from seasonal variation of waves.



Water-drop shape of erosion-accumulation pattern off the delta in 1976-2004 based on records fo 32 longshore bathymetric survey lines. Sediment accumulated in the southern part of the subaqueous delta as result of the southward sediment dispersion basically in winter season.



Isopath map of the large distal subaqueous delta in the Northern Yellow Sea (Yang and Liu, 2007). This mud body is considered as the major distal sink of the Huanghe sediment which is mainly transported from the Bohai Sea to the Yellow Sea in winter season.

Conclusions:

In summer huge sediment to the sea accumulated mostly in nearshore area due to tidal shear fronts and stratified water body. In winter massive sediment in nearshore area is resuspended and transported offshoreward by strong winter sea dynamics.

Coastal area off the Huanghe delta acts as a sediment sink in summer and converted to be a sediment source in winter in response to the seasonal variation of the East Asian monsoon in this region.