

Correspondingly, the saltation load on cumulative grain-size distribution curves became much larger, which indicated stronger hydrodynamic conditions towards low intertidal flats.

The sedimentation rate and grain size changes of the sediment core in the tidal flat at Yuantuojiao Point, Changjiang Estuary

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The Yuantuojiao Point located at the transition part of northern bank of the Changjiang River and the Yellow Sea. Tidal flat was well developed at Yuantuojiao Point. Tides, river discharge, sea waves and coastal reclamation were the main factors affecting the sedimentation on the tidal flat. The coast development has gone the accumulation trends and sensitivity to the coastal environmental changes. In this study a 192 cm core was collected and sampled at 2 cm intervals. The grain size was analyzed by Mastersizer2000. The vertical grain size changes were shown in the figure 1. There are three units in the core named A, B and C. In the unit A, there were frequently changes between silty sand and sandy silt. Unit B is the transition part of Unit A and C. From the bottom to the top the fine grains increased. This trend was coincided with the seaward migration of the coastline changes controlled by the human reclamation. The unit A and unit B are the natural sedimentary sequences of the tidal flat development at the northern bank of the Changjiang estuary. The boundary of unit A and unit B indicates the reclamation in the late time of 1950's. Because of the reclamation the coastline moved seawards and caused more fine sediments accumulating at the Yuantuojiao Point. The 137Cs vertical profile of the same core found the first peak of 137Cs fallout was at 52 cm, indicating the year of 1963. The another peak of 137Cs was at 18 cm, indicating the year of 1986 because of the Chernobyl event. The average sedimentation rate was 1.6 cm/a from 1986 to present, and from 1963 to 1986 the average sedimentation rate was 2.9 cm/a. The variation of the average sedimentation rates indicated that sedimentation rate has declined since 1960's corresponding with the sedimentation process of the tidal flat at Yuantuojiao Point because of the seaward reclamation. The average sedimentation rate at Yuantuojiao point was similar to the silt-muddy

tidal flat in southern Jiangsu coast, but lower than the sedimentation rate off the estuary of the Changjiang River. The seaward reclamation in the past decades at the Yuantuojiao Point caused the high sedimentation area moving to the eastern part and formed the spit and large muddy tidal flat at the northern part of the north branch of the Changjiang River. The main sediments source at Yuantuojiao Point was from the Jiangsu coastal tidal current from north to the south direction, which brought much fine sediments.

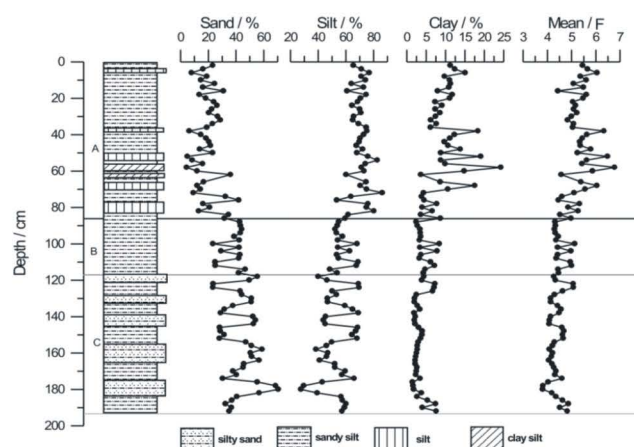


Fig. 1 Grain size variations in the sediment core at Yuantuojiao Point, Changjiang Estuary

The tidal flat utilization and related ecological problems in China

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The amount of arable land has continually declined since 1990s due to soil erosion, desertification, salinization, seawater intrusion, and occupation of arable land for non-agriculture use, and the effect of natural calamity in the coastal zone. Especially, with the increase of population and economy development, the conflict between man-land becomes acute. As a potential land resource, the tidal flat utilization and development has received great concern from governments at all levels in the coastal zone. However, because eco-environment of the tidal flat is fragile and sensitive, some principles should be followed. Based on the analysis of the discussion of distribution, formation factors, classification, and the existing problems in the