

We will complete the program in fiscal year 2008, resting on the results of an experimental experience study association held several times, and on the discussion at the study committee. At the same time, it is scheduled to publish "Guidance book" and "Picture book of Living thing" to enlighten the public.

A couple ocean-atmosphere model for ocean currents energy estimation

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Nature endowed Indonesia with all forms of renewable energy resources, such as ocean current and wind. Intensive research, exploration and exploitation of the resources are necessary to contribute in a sustainable manner to meet increasing energy demand that has been experienced in Indonesia. In this study, a couple ocean-atmosphere model was utilized and we estimated the potential energy of ocean currents in Indonesian Waters. Ten years satellite wind data provided by NCEP was also used for validating the model. Further, we also evaluated ocean currents, as components of tidal and wind induced currents, obtained from the 3D validated hydrodynamic-atmospheric model to estimate marine current potential energy in Indonesian Waters. From the study that we have carried out, it shows that Indonesia has a great energy resources of wind and ocean currents. The result of wind data processing shows that in southern part Indonesian area such as southern Java, Bali, Lombok, NTB, NTT, and Arafura Sea have larger energy potential which reach maximum peak during west monsoon (from Desember to February). We estimates the available wind power density in those potential area reach 1.325 - 3.66 kW/m². From the analysis that we have done, it indicates that Makasar, Lombok, Bali and Selayar Straits have strong current velocity therefore they have far larger energy than other Indonesian waters which contains power density 1.038 - 2.685 kW/m².

Sediment characteristics of the different intertidal flats along the Yellow River Delta

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The sediment distribution of intertidal flats is controlled by sediment supply and marine dynamics. The research on the distribution of sediment grain size helps to reveal the trend of sediment transportation and coastal morphodynamics. In this study, 167 intertidal surficial sediment samples were collected at cross-shore sections along the intertidal flats of the Yellow River Delta in 2004. Based upon statistics of sediment parameters and sediment moving modes from probability cumulative distribution curves, and combined with topography and hydrodynamics, the intertidal flats along the Yellow River Delta was discussed in present study. The objective is to obtain the characteristics and spatial distribution of intertidal flat sediments, and to better understand the sedimentary environment and the hydrodynamic factors. The results are shown as follows:

- (1) The intertidal flats along the Yellow River Delta could be broadly divided into three geomorphic zones: abandoned area at the north of the delta (AAN), current river mouth (RMA) and Laizhou Bay (LZB). The surficial sediments of the different intertidal flats showed various characteristics, which was in accord with their hydrodynamic conditions.
- (2) For AAN, in general, it showed complicated sediment types and poorly-sorted trend. The flats suffered from serious erosion, resulting in the developing of some shell ridges and eroded ridges. Cumulative grain-size distribution curves indicated that most of the sediment samples of AAN had a large bed load which was directly related to the strong wave activity.
- (3) For RMA, the intertidal flats were relatively smooth and the tidal currents played more important role. In addition, groins cross the shoreline had great effects on the distribution of surficial sediments of the intertidal flats by changing partial tidal currents field along nearshore zone.
- (4) For LZB, intertidal flats were very broad and had no obvious changes of sediment types. Sediment grain became coarser and better sorted from high intertidal flats to low intertidal flats.

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.

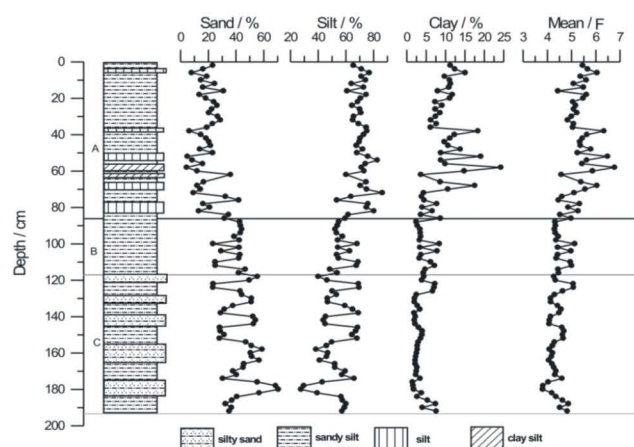


Fig. 1 Grain size variations in the sediment core at Yuantuojiao Point, Changjiang Estuary

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