

deltas, to mention only a few, will be under increased danger of short-term - and perhaps even permanent-coastal erosion and inundation in the foreseeable future due in part of river diversion and fluvial sediment reduction, as well as anthropogenically enhanced subsidence. To a large extent these conflicts in river utilization and delta survival may be intractable, as the growing need for water in industry and agriculture in many watersheds ultimately may supercede any ability to preserve the coastal environment. In some cases endangered delta urban centers already may be doomed (e.g. New Orleans); in others (e.g., Shanghai) the future is still unclear.

Flux and fate of Asian River-derived sediments in the Western Pacific marginal seas

Paul LIU

Dept. of Marine, Earth and Atmospheric Sciences,
North Carolina State University, USA
E-mail: jpliu@ncsu.edu

Rivers are the major carriers for delivering large amounts of land-derived freshwater, sediment, and natural elements to the global ocean. Collectively, the global rivers annually discharge about 35,000 km³ of fresh waters and 22-22 × 10⁹ tons of solid and dissolved sediment to the ocean. Among them, approximately 70% has been delivered from Asian large rivers (e.g. Yellow, Yangtze, Pearl, Red, Mekong, and Ganges-Brahmaputra, etc) and numerous small mountainous rivers (e.g. rivers in Taiwan, Indonesia, and Papua New Guinea, etc) into the Western Pacific marginal seas, e.g. Yellow Sea, East China Sea, and South China Sea. As a result, Asian rivers, especially those large rivers, play important roles in not only controlling the physical and biogeochemical features of the Asian estuaries and Western Pacific ocean margins, but also in impacting on the evolution and culture development of Asian society.

Field studies show nearly 50% of Asian large river-derived sediment has been deposited in the lower reach of the river mouth, forming many extensively distributed subaerial delta plain, and rest of them discharges into the adjacent ocean. Among those being discharging into the ocean, nearly half of them has been found to be longshore-transported several hundreds kilometers from the river mouth. There is very little or few percent of the total sediment discharge has been found to be across-shelf transported into the deep ocean.

In contrast, sediment from small rivers has a very

different fate. Some major small mountainous rivers in active margins (e.g. Kaoping, Choshui, Lanyang, etc), usually do not form deltas and are mainly controlled by episodic events, contribute more than 50% of global terrigenous sediments to the sea. However, more than 80% of their sediment discharges are transported directly to the shelves or deep canyons mainly via gravity/turbidity or hyperpycnal flows, which are distinctly different from the above large rivers that discharge to passive margins or shallow marginal seas.

Holocene evolution of Yangtze delta: Retrospective and Perspective

Zhanghua Wang, Zhongyuan Chen

State key laboratory for estuarine and coastal research,
ECNU, Shanghai 200062, China

The present study is to review the numerous previous efforts on the geomorphological and sedimentary environmental evolution of the Yangtze delta since LGM. Many studies were carried out in the 1980s, primarily focusing on the morphologic change by the means of traditional methods, including development of the modern delta, Holocene sea transgression and storm depositions on the delta coast. In 1990s, more intensive studies were given to sedimentary facies change and stratigraphy by using conventional radiocarbon measurement, which had helped examine in the paleo-incised valley of the Yangtze estuary. Progress has been made after later 1990s, since AMS ¹⁴C becomes available to help establish more detailed sediment stratigraphy and sedimentary facies distribution in time and space. This further support sea level establishment and morphological identification on the delta plain and in the river mouth. Also, numerous surveys using combined coring and seismic profiling in cooperation with AMS ¹⁴C have further promoted the study of the Holocene delta evolution, including high-resolution chrono-stratigraphic formation, sea-level rise model, coastline shift and delta plain morphological change, etc. Of note, geoarchaeological study of the Yangtze delta has highlighted the interaction between nature and the nearly Neolithic activities.

Presently, we are paying more attention to the future delta studies, primarily involving estuarine sedimentary processes in response to east Asia monsoon and human activities in geological and human dimensions.

Key words: geomorphology; sedimentary environment; sea level; east Asia monsoon

Modern mangrove pollen representation and a 9,000-year record ecological changes from the northwestern coast area of the South China Sea

Zhen LI^{1*}, Jie LI¹, Lejun LIU² & Guangzhao LI³

¹State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai 200062, China

*E-mail: zli@sklec.ecnu.edu.cn

E-mail: imlizhen@hotmail.com

²School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai 200240, China;

³First Institute of Oceanography, SOA, Qingdao 266061, China

³Guangxi Mangrove Research Center, Beihai, 536000, China

The relationships between vegetation and modern pollen are examined along a coast to inland gradient of plant communities in the Yingluo Bay area, Guangxi, in China. Communities of *Rhizophora stylosa*, *Kandelia candel*, *Bruguiera gymnorrhiza*, *Kandelia candel* and *Excoecaria agallocha* that develop on tidal flat were sampled for pollen analysis. The distribution of these communities can be related to both specific plant individual and environmental parameters such as plant cover, tree breast diameter and topography, water table depth, substrate type and salinity. High percentages of mangrove types can reflect the mangrove vegetation in general, although some terrestrial pollen occur. After drawing the scatter diagram and using correlation analysis, cluster analysis and detrended correspondence analysis, we summarized two groups impacting on pollen abundance. One includes the parameters of plant, in which plant cover is significant associated with pollen percentages for *Rhizophora stylosa* and *Kandelia candel*, plant percentage play an important role on pollen abundance for *Bruguiera gymnorrhiza* and *Excoecaria agallocha*, and tree breast diameter is for *Avicennia marina* by controlling plant percentage. The other group mainly focuses on the environment conditions, of which soil types and salinity factors are displayed by the first axis of DCA, altitude or water table depth shown by the second axis and tidal hydrodynamics

indicated by the third axis according to the separated samples associated with the communities in each sampling squares. Subsequently, fossil data from four cores in a mangrove system from the northwestern coast area of the South China Sea were compared to the modern data set in search of similarities between fossil and modern pollen spectra. Both of regression correlation and composite DCA revealed that the fossil pollen assemblages have modern counterparts, permitting to interpret the vegetation changes of various areas and the coastal line migration in greater details during the last 9000 years.

Neotectonics of the Jadukata fan, Bangladesh

A. K. M. Khorshed ALAM¹ & Md. Badrul ISLAM²

¹Geological Survey of Bangladesh, Segunbagicha, Dhaka 1000, Bangladesh

E-mail: khorshed_alam@bdonline.com

²Department of Geology & Mining, University of Rajshahi, Rajshahi 6205, Bangladesh

Jadukata fan is one of the fans developed at the base of the southern foothill region of the Shillong Plateau in Bangladesh. With the objectives of characterizing a tropical and humid alluvial fan and examining the influence of tectonics in the formation and development of a fan, geomorphology of the fan has been studied. This study has been carried out with help of different remote sensing data and subsequent field checking. Natural levee, bars and crevasse splay are the common geomorphic features on the fan. The area lies in a tectonically complex region of the world, evidenced by the high seismicity. Important neotectonic signatures identified on the fan are preferred flow direction of the streams, bends in several streams along a N-S directed line, sudden widening of consecutive small streams along a E-W directed line and multi-level of bars on the Jadukata River. Results of the study show that the alluvial fan building processes is controlled by the neotectonic activities. The whole area is affected by natural hazards like flood, river bank erosion and siltation. Data show that low magnitude earthquake occurred in the area during the last two decades. Occurrence of these and several large earthquake in the surrounding areas in the past indicate the possibility of future earthquake occurrence.