

Paper Number: 2570

Geo-environment changes corresponding to global climate and anthropogenic injection in small river estuaries on China coast

Yin, P.¹, Yang, S.Y.², Duan, X.Y¹ and Kang, X.N.³

¹ Qingdao Institute of Marine Geology, China Geological Survey, South Fuzhou Road, Qingdao, China, pingyin@fio.org.cn

² Tongji University, Shanghai, China

³ Ocean University of China, Qingdao, China

The China coast is dominated by two fluvial sediment source-to-sink systems like most of the Asian continental margins, i.e. the large rivers vs. small mountainous rivers. The main three large rivers, the Yellow River, the Yangtze River and the Pearl Rivers, carry the majority discharges of water, sediments and dissolved solids to the coast and sea. However, 60% of the China coastlines are supplied by the small and medium scale rivers, even though they only bring 14% fresh water discharge and 4% sediments discharge to the coastal area. The small rivers plays a very important role in the China coastal geological evolution as well as the social development, most of the small river estuaries are linked to the coastal major cities or harbours. The small rivers are more sensitive to the natural driving and anthropogenic impacts, the human activities in the river drainage have strongly affected the river discharges to the coast, together with coast engineering activities have strongly reshaped the river estuary landscape in the past century.

A national project on the small river estuary geological survey was carried out along the China coast to understand the sedimentary environment temporal and spatial variation, and the impact of global climate changes and anthropogenic activities. Environmental risk assessment will be valued at the end of the project. Hereby introduce the primary research result of this project.

River discharges have changed dramatically in the last century due to the global climate changes, but mainly account for the anthropogenic impacts. Dramatic decrease of water and sediment discharges based on the long term records revealed that small rivers are more sensitive to the anthropogenic impacts. Spatial and temporal variation of water and sediments discharges along the China coast show that rivers from the north China are more affected due to the large scale water diversion and lower precipitation, water and sediment discharges of most small rivers from Hebei, Shandong and Jiangsu provinces have almost dropped into zero level, most estuary coastline are eroded subsequently

Environment changes in the small river estuaries are coherent with anthropogenic impacts, most of the estuary areas are surrounded by coastal defences, harbours, reclamation, water covering areas were decreased and hydrodynamic environment are weaken, this caused sediment accretion in the river mouth areas. Pollution has become a serious problem for most of small river estuaries under the

anthropogenic impact from the river catchments and the coastal areas. Samples from the lower catchment of rivers along the coast demonstrated that the pH values, electric conductivities and dissolved solids of major and trace elements in most rivers of northern China are much higher than those in rivers of southern China, which is consistent with climate change from north to south, the dissolved solids major elements in river water are associated with soil type and chemical composition. The trace element concentrations variation may be attributed to special geological and geochemical background of drainage areas, but the extremely anomaly should mostly be accounted to anthropogenic pollution.

