Variations in the characteristics of Changjiang sediment discharging into the sea due to human activities

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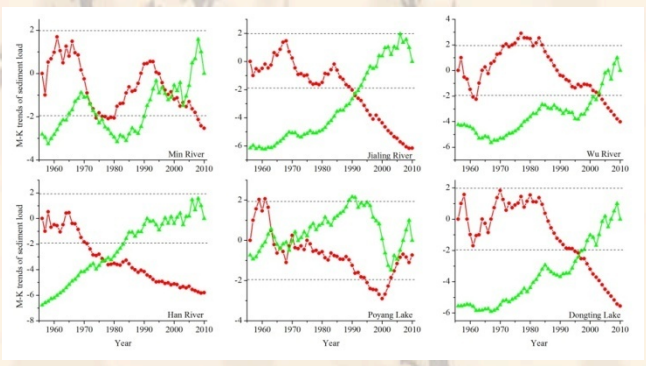
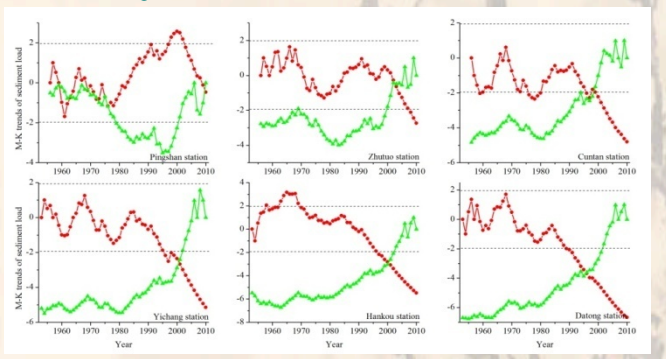
Sketch of the Changjiang catchment and location



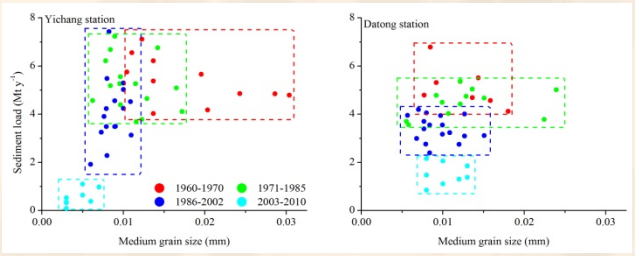
M-K trends of the sediment load for the Jinsha, Min, Jialing, Wu, and Han Rivers and the Poyang and Dongting Lake system. The temporal-spatial variation trends of the sediment loads of the seven tributaries indicated that the sediment load began to decrease later at upstream locations compared to downstream locations.



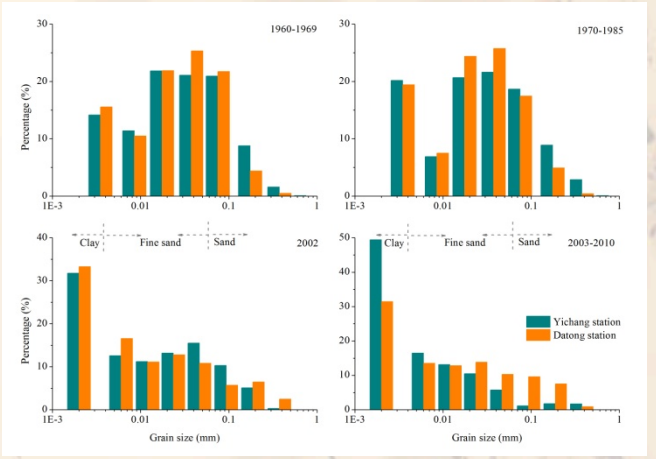
M-K trends of the sediment load for different gauging stations of the Changjiang main river. There were significant temporal-spatial differences in the sediment load variations of the Changjiang main river: the sediment load began to decrease later in upstream locations than in downstream locations, and four stepwise reduction stage periods were observed: 1956-1969, 1970-1985, 1986-2002, and 2003-2010.

Before 2003, the clay, silt, and sand sediment fractions entering the sea mainly originated from the upstream Changjiang. After 2003, about 27.1% of the clay component of the sediment entering the sea mainly originated from the upstream of the Changjiang, and more than 55.8% of silt and 74.1% of sand components were supplied by the erosive sediment of the main river channel.

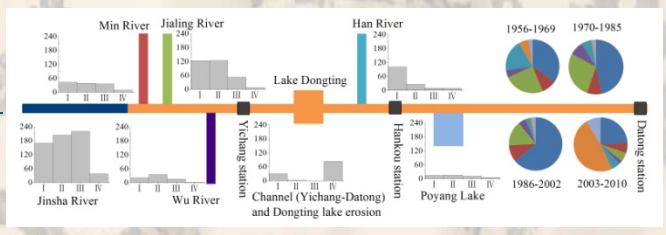
Before 2003, the various sub-catchments as the sources of the sediment entering the sea may be evaluated by analyzing the sediment components in the deposition area; after 2003, the sediment source of the estuarine-coastal deposits associated with the Changjiang could not be represented by the upstream sources alone.



Relationship between the medium grain size of suspended sediments and the sediment load during different periods at the Yichang and Datong stations. the sediment grain size from the upstream Changjiang exhibited a continuous decreasing trend. In contrast, the decreasing trend of D50 from the Datong station was not as significant as that from the Yichang station during the four stages.



Distribution of the suspended sediment grain size of the Yichang and Datong stations in 1960-1969, 1970-1985, 2002, and 2003-2010.



Contribution of different sub-catchments to the sediment load from the Changjiang entering the sea during different periods. Before 2003, the variations in the sediment composition entering the sea were mainly determined by the changes in the sediment contribution proportion of the Jinsha, Jialing, and Han Rivers. After 2003, channel erosion of the main river of the Changjiang supplied 63.0% of the sediment load entering the sea.

Annual quantities of clay, silt, and sand at the Yichang and Datong stations during different periods.

Time Period	Clay (Mt y^{-1})		Fine sand (Mt y^{-1})		Sand (Mt y^{-1})	
	Yichang	Datong	Yichang	Datong	Yichang	Datong
1960-1969	78	78	297	291	172	134
1970-1985	105	86	257	257	159	102
1986-2002	128	113	212	174	63	50
2003-2010	27	48	25	77	3	27