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REMOTELY-SENSED INVESTIGATION OF THE IMPACT OF YANGTZE RIVER'S DISCHARGE TO THE EAST CHINA SEA

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The Yangtze River (Chang Jiang) is the longest river in China and Asia, and the third-longest in the world, after the Nile in Africa and the Amazon in South America. The river is about 6,380 km long and with 1,800,000 km² of catchment area. According to the hydrological records from 1950 to 2000, The river has a mean annual runoff of 905 billion m^3, with variation from 676 billion m^3 to 1360 billion m^3, and averagely carries about 0.433 billion tons of sediment with variation from 0.239 billion tons to 0.678 billion tons, and about 0.15 billion tons of dissolved matters to the East China Sea each year. The terrestrial materials provide rich substrates for biological activities and alluvial processes. The Yangtze River delta, one of the most developed regions in China, becomes an important center for industry, transportation and economy in China. The biggest port, Shanghai Port, is located at the estuary of Yangtze River. In order to utilize the water resources of Yangtze River, the Three Gorges Dam, the biggest hydrological project in the world, was built at the middle reaches of the river near Yichang city, Hubei Province in late 2002, The dam was designed to have feasibility for normal storage level of 175 m. On 1 st June 2003, the reservoir began its storage, the water reached at 135 m on 10 June and at 139 m on 5 November, 2003. It is widely concerned that the impact of the Three Gorges Dam to the environment of the river and the East China Sea. One of the main effects of the dam on the ocean is that the dam would change of the river's discharge which is the main terrestrial input to the East China Sea. It is important to know how the discharge of Yangtze River affects on the East China Sea. The river's discharge is typically rich of suspended sediments, which could be taken as an indicator of terrestrial matters and the discharged freshwater. On the other hand, the suspended sediments is the main contributor of the water-leaving radiance of coastal waters. The higher the

suspended sediments concentration is in waters, the higher water-leaving radiance.

In this study, the monthly average discharge data of the Yangtze River were collected, and the monthly average water-leaving radiance data in the area of the East China Sea were processed and calculated from SeaWiFS data acquired from 1997 to 2002. The correlation between the monthly average discharge and the monthly average water-leaving radiance was analysed, and a correlation coefficient image map was achieved. The results show that a narrow zone with low positive correlation (correlative coefficient R varies from 0.3 to 0.6) occurs along the coast, and then a big zone with high negative correlation (R varies from 0.6 to 0.9) occurs in offshore. The negative correlation zone expands eastward to the south of Cheju Island about 500 km away from the river mouth, and expands southward to the Taiwan straits. Considering the delay of discharge's effect to the ocean, the correlation between monthly average discharge and the monthlu average water-leaving radiance corresponding one month, two months and three months later was analysed respectively. The one-month delayed and two-month delayed correlation coefficient have similar distribution pattern as the non-delayed correlation coefficient, while the three-month delayed correlation coefficient is week and the negative correlation area is much less. It possibly means that the discharge of Yangtze River has direct impact on the East China Sea for about three months. The correlation coefficient image map could be further applied for water mass identification in the East China Sea. It is needed to find the reasons of the negative correlation coefficient.