

Coastal Zone Remote Sensing Monitoring in Yellow River, Yangtze River and Pearl River Delta

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The study area of the project is the three largest river deltas: the Yellow River deltas, Changjiang (Yangtze River) deltas and Zhujiang (Pearl River) deltas. The main contents include the following 5 parts: (1) land use/cover remote sensing monitoring and drive factors analysis; (2) wetland remote sensing monitoring and evaluation; (3) shoreline remote sensing monitoring and annual change analysis; (4) water quality monitoring and integrated evaluation; (5) cross-calibration of COCTS and CZI with MERIS.

Land use/cover remote sensing monitoring: A 10-day field work in the Yellow River Delta was performed in June 2008. Information of ground control points by differential global positioning system was collected for the geometrical correction of satellite data. Besides, field photos were taken for the interpretation of remote sensing images. Lots of classification experiments were carried out for ENVISAT MERIS and HY-1B CZI images. In January 2011, a new field work for the validation of classification results was conducted.

Coastal line remote sensing monitoring: The relationship between satellite (MERIS and CZI) images features and the field coastal line was established. A new method to automatically extract coastal line was developed using the instantaneous water lines from the long time series satellite images. Compared with the results from the i⁹⁰⁸ project± of china, the new method was proved to work well.

Wetland remote sensing monitoring: Texture characteristics of 4 types of typical coastal wetland (culture zone, salt field, tidal flat and reservoir) in ENVISAT ASAR image was analyzed by the method of gray level co-occurrence matrices. The supervised classification was performed, the result of which indicates that SAR imagery has the response capability of the different kinds of wetland.

Water quality monitoring: The statistical retrieval models for the concentration of suspended particulate matter (SPM) in Bohai Sea of China by ENVISAT MERIS, FY-3 MERSI, HY-1B CZI and CEBRS-02 CCD data were developed. Spatio-temporal distribution of SPM in the Bohai Sea was analyzed in terms of its spatial pattern, disturbance by sustaining strong wind and seasonal variability. QAA (Quasi-Analytical-Algorithm) was modified and validated by field data in the Bohai Sea, Yellow Sea and East China Sea to retrieve inherent optical properties (IOPs). Two new models for retrieving surface slinity and particle size of SPM in the Yellow River estuary were developed and validated.

Calibration and validation: Extensive in situ data in the Bohai Sea of China were collected to assess MERIS radiometric properties and concentrations of ocean color constituents, including spectral normalized water leaving radiance, concentrations of SPM and chlorophyll a. During the analysis, a relatively strict spatio-temporal match-up method was adopted regarding the complexity of marine environment and its variation in the turbid coastal area.