

Estuarine Shoreline Mapping Using Satellite SAR Data in Yellow Sea Delta

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The increasing developments in coastal zones drive coastal modifications include building structures that regulate water and sediments (dams and seawalls) and ground water extraction leading to subsidence. The Yellow River Delta is one of the fastest changing coasts on the Earth's surface and it used to be thought of as second in the world in terms of sediment load [e.g., Millikan and Syvitski, 1992]. Two factors contribute to the changes: 1) the river carries a heavy sediment load, leading to clogged channels and frequent river course changes; 2) the river is heavily engineered and water is oversubscribed, resulting in little flow to the coast in recent years [Evans, 2002]. For example, between 1989 and 2000, astronauts on the Space Shuttle documented dramatic changes in the tip of the Yellow River delta (http://earthobservatory.nasa.gov/Features/AstronautPhotography/astronaut_photography2.php).

JERS-1/SAR data during 1992 and 1997 and ALOS/PALSAR data in 2007 and 2008 are used for dynamic monitoring of land cover changes in the Yellow River delta. Raw SAR data are processed, coregistered and geocoded, to make SAR backscatter intensity images. Multitemporal SAR intensity images are used to examine the changing pattern of accretion and erosion of the Yellow River delta. It provides valuable information about the historical evolution of the delta area and water-course changes. Colour assignment images may also be useful to clarify these changes. The smooth surface area has been measured on geocoded SAR images using NIH ImageJ 1.42q software (<http://rsbweb.nih.gov/ij/>), and changes in the area correlate well with water and sediment discharges. This area grew until 1995, and then began eroding back between 1995 and 1997 due to a gradual decrease in sediment supply. In 1997, a new channel was cut near the tip of the delta, and the smooth surface area again grew. InSAR analysis of PALSAR reveals no notable ground deformation during July 2007 and June 2008. Further investigation using several pairs (as well as longer time intervals) should be done in order to verify the above results.