

Monitoring delta changes using SAR intensity data of the Yellow River

Akiko Tanaka^{1*}, Aritoshi Mio¹, Yoshiki Saito¹, Houjie Wang²

¹Geological Survey of Japan, AIST, ²Ocean University of China

The Yellow River, Huang He, Delta in China is one of the fastest changing coasts on the Earth's surface. These drastic changes were caused by a number of factors, including heavy sediment loads, recent water demands, and frequent river course changes. JERS-1 (Japanese Earth Resource Satellite-1) SAR (Synthetic Aperture Radar) data acquired during 1992 and 1997 and ALOS (Advanced Land Observing Satellite) PALSAR (Phased Array type L-band Synthetic Aperture Radar) data acquired since 2007, 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.

A series of JERS-1 data demonstrates the ability to monitor tidal flat area quantitatively. Tidal flat area increased until 1995, and then eroded between 1995 and 1997. In May 1996, a new channel was cut near the tip of the delta, with the result that tidal flat area again increased. This area change is well correlated with annual water and sediment discharge at the Lijin Station, which is located about 100 km upstream from the entrance of the mouth channel and the lowest hydrological station on the river. A series of JERS-1 data also captures the seasonal changes in tidal flat area.

Interferometric SAR (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.

Keywords: SAR, Yellow River Delta, coastal changes, Interferometric SAR analysis