



## **Observing the shoreline change of Taiwan western coast by SAR images from 1996 to 2005**

H.R. Liao (1), H.W. Wang (1), C.T. Wang (1) and K.S. Chen (1)

(1) Center for Space and Remote Sensing Research, National Central University, Taoyuan, Taiwan , ( Contact Email: liaohr@csrnr.ncu.edu.tw )

The length of coast around the island of Taiwan is about 1250 km long and with very varied coastal types. The eastern collision coast is about 300 km and composite by rock, the western trailing-edge coast is about 430 km and sandy. Orogenic sediments are progressively transported westward and deposited on the coastal zone. These sediments make the topography and shape of western coast flatter and winding. There are a lot of offshore sandbanks parallel to the shore off Yulin, Chiayi and Tainan county coast. Especially the Waishandin sandbanks is the biggest one of Taiwan. Recently, economy and environment have been changed, especially geographical features and global climate. Those factors make the western coastal topography been changing rapidly. The weather of Taiwan affects the observation quality by optical satellite images like SPOT. We collect 44 synthetic aperture radar (SAR) images of ERS-2 acquired the years of 1996, 1999, 2003 and 2005 to extract the waterlines (shorelines) of Taiwan western coast. The radar image signal of the gray-level boundary is distinct difference between water and land. Thus we extract waterline by multi-scale edge detection method. Those extracted waterlines are in different tide level. We address the highest and lowest shoreline by all of the different shorelines. Accuracy is checked by comparing with topographic survey data from sidescan sonar and real time location data of waterline from GPS. About 95% of regional different is within 0-3 pixels. Analysis was subsequently carried out by integrating with the tidal data and relevant geological information at the same tide datum. By SAR image observation, follow equal of tidal datum, northern and southern coastal trend does not change, sandbanks off central-southern coast were drift southward. Comparing the waterlines in the same

tide level, we find the sandbars location and size was variation at Yulin and Chiayi coast in the period. The Haifongdong sandbar, located near the Choushui River mouth, ceaselessly moved southward by about 200 m/year. But there was not stable trend in the area variation. The Waishandin sandbar, the largest one of Taiwan, the position of northern part was not variation but southern part moved eastern-southward about 70m/year during the years. The area of Waishandin sandbar was ceaselessly diminished. In the future, it can be expected for coastal change trend from images that will become available from high-resolution of TerraSAR-X and Radarsat-2.