

## **3D Modeling and Change Analysis of A large Rift in Filchner Ice Shelf by Combination Use of Satellite Stereo Images and Altimetric Data**

Shijie Liu, Haifeng Xiao, Xiaohua Tong, and Rongxing Li

Center for Spatial Information Science and Sustainable Development Applications, College of Surveying and Geo-Informatics, Tongji University, Shanghai, China

Remote sensing observation of the Antarctic ice sheets, compared to traditional in situ measurements, provides an efficient method to acquire the spatial information of the ice sheet topography as well as its changes. Filchner Ice Shelf (FIS), as part of the Filchner-Ronnie Ice Shelf (FRIS) system, has experienced calving cycles that resulted in immense calving areas. Two large rifts, Rifts 1 and 2, which are potentially comparable to the Grand Chasm that caused a major calving event in 1986, were monitored. In order to investigate the development of Rift 1, satellite stereo images acquired by ZY-3 and WV-2 satellites as well as laser altimetric data obtained by ICESat (Ice, Cloud and land Elevation Satellite) were used in our study. Three DEMs were reconstructed from the satellite stereo images, one from ZY-3 in 2014, and two from WV-2 in 2012 and 2016, respectively. Moreover, two ICESat tracks crossing the rift (dating from 2003 to 2009) were used for comparison in addition to the DEMs based on profile analysis.