



ESA - MOST Dragon 2 Programme

2011 DRAGON 2 SYMPOSIUM

中国科技部-欧洲空间局合作“龙计划”二期

“龙计划”二期2011年学术研讨会

Project Summary

ID 5290 Sea Ice SAR Detection

June 24, 2011

Main Results

- We investigated the sea ice condition in Bohai Sea in the winter of 2010-2011 by using multi-sensor data. It was shown that sea ice condition is relative heavy this winter, but the ice condition in Laizhou Bay was more serious than last year.
- In 2001, a sea ice observation experiment was carried out by using established microwave scattering measurement. Sea ice scattering data of five radar bands (C, X, S, L and Ku) were acquired and analyzed.
- Some research was conducted on SAR sea ice classification, and object-oriented SAR sea ice classification method developed. ENVISAT ASAR APS Data and polarimetric characteristic were also used to classify sea ice in Bohai Sea.
- Based on the sea ice classification result, sea ice thickness level can be given by combining PolSAR binary-tree classification method with proposed thickness-related ice classification schemes. SAR polarization decomposition was also studied to retrieve sea ice thickness.

- We investigated the sea ice in Polar region by using multi-source microwave remote sensing to detect ice edge, ice thickness, ice concentration.
- European partners studied thin ice classification and backscattering in the Kara Sea and the Fram Strait.
- Backscattering statistics were investigated using ENVISAT WSM images. As validation data was used MODIS based ice thickness charts. It was shown that the C-band radar response from thin ice is very sensitive to the type and development stage of sea ice.
- Using airborne SAR equipped with C- and L-band polarimetric SAR with very high resolution (2 m) it was investigated the separability of different thin ice classes for several radar configurations. It turned out that for different ice types different frequency and polarization combinations gave the best results. Some of the combinations require that the SAR sensor has a very low noise-equivalent σ^0 .

List of Publications

- ① ZHANG Xi, ZHANG Jie, JI yonggang. Sea Ice Detection From SAR Images of the Liaodong Bay Based on Texture Analysis. Advances in Marine Science, 2008,26(3):386-393
- ② ZHANG Xi, ZHANG Jie, MENG Junmin, JI Yonggang. SEA ICE CLASSIFICATION IN BOHAI SEA WITH ENVISAT ASAR APS DATA. Proceedings of the 2010 Dragon Symposium. China, Guangxi.
- ③ WANG Hong-xia, ZHANG Xi, MENG Jun-min, SU Teng-fei. Analysis of Sea Ice Backscattering Characteristic in Bohai Sea. Proceedings of the 2010 Dragon Symposium. China, Guangxi.
- ④ JI Yonggang, ZHANG Jie, ZHANG Xi, MENG Junmin, LU Tongzhen, LIU Zhenyu. APPLICATION OF REMOTE SENSING IMAGERY TO SEA ICE MONITORING IN BOHAI SEA. Proceedings of the 2010 Dragon Symposium. China, Guangxi.
- ⑤ ZHANG Xi, ZHANG Jie, MENG Junmin. Sea ice edge detection by polarization basis transformation using full-polarization SAR. The 16th annual youth academic symposium held by Chinese Institute of Electronics, China, Yantai.
- ⑥ LIU Meijie, ZHANG Jie, MENG Junmin. Analysis sea ice condition of Bohai sea based on multi-source remote sensing data in the winter of 2009-2010. The 16th annual youth academic symposium held by Chinese Institute of Electronics, China, Yantai.

Project Planning – 2011 and 2012

- Carry out Sea ice experiments to obtain calibrated backscattering coefficient, sea ice physical characters of different ice types and to master sea ice electromagnetic scattering mechanism for different ice types and radar parameters.
- Continue to study SAR sea ice detecting methods, including sea ice classification, sea ice thickness detection.
- Develop sea ice SAR remote sensing monitoring software.