

DETECTION OF ICE SHELF VARIATION AT WESTERN SIDE OF LUTZOW HOLM BAY, ANTARCTICA

Tsutomu Yamanokuchi

Remote Sensing Technology Center of Japan
e-mail address : tsutomuy@restec.or.jp

Koichiro Doi, Kazuo Shibuya

National Institute of Polar Science

and Shigeru Aoki

Institute of Low Temperature Science, Hokkaido University

1. INTRODUCTION

Advance and / or retreat of ice shelf is one of the hot topic of polar science because it may have relationship with global climate change. In recent, salinity of Antarctic bottom water is getting lower and melting of ice shelf is considered as one of the source of pure water. Therefore, it is quite important to estimate temporal variation of ice shelf. The purpose of this study is to estimate the temporal change of ice shelf area from middle 1990s to 2008 using satellite data and to find the robust method to estimate ice shelf variation.

2. DATA AND ANALYSIS METHOD

Data used in this study is time series satellite data and grounding line data. It is necessary to know the position of grounding line for the precise decision of boundary between ice sheet and ice shelf. Antarctic Digital Database (ADD) is comprehensive digital database compiled every kinds of geographical information collected by all worlds' Antarctic expedition which edited by British Antarctic survey. However, the conventional grounding line data stored in the ADD is not able to use due to the lack of the accuracy of position and shapes. ERS-1/2 tandem mission is able to estimate grounding line information by InSAR analysis in recent [1] and these results are able to acquire through web site [2]. Therefore, we used this grounding line data for estimation of ice shelf - ice sheet boundary. Satellite data used for estimation of ice shelf in this study are JERS-1 SAR mosaic data observed in 1995, RAMP (Radarsat Antarctic Mapping Mission) [3] data for 1997 data and ALOS PALSAR / ScanSAR image for 2008 data. The analysis method is at first geometric correction of satellite image. Grounding line data and all satellite images are set to have WGS-84 reference system and WGS-84 datum with standard parallel 71degS. Then, ice shelf area are digitized manually.

3. PRESENT STATUS AND FUTURE PLAN

Our preliminary satellite image analysis result shows the large ice discharge is currently in progress at this area. Size of calving iceberg attains to 40km length. We will show more precise analysis results at our presentation and try to investigate recent oceanographic observation data around Syowa Station, which is Japanese Antarctic Station located at Lutzow Holm Bay. Also we will apply this analysis method to the other area.

4. REFERENCES

- [1]Yamanokuchi et. al, Validation of grounding line of the East Antarctic Ice sheet derived by ERS-1/2 interferometric SAR data, Polar Geoscience, Vol.18, pp1-14,2005
- [2]Yamanokuchi, T., K. Doi and K. Shibuya (2008): InSAR Grounding Line Database ver1.0 (http://www.restec.or.jp/research/InSAR-GL_main.html)
- [3]Jezek, K., and RAMP Product Team (2002): RAMP AMM-1 SAR Image Mosaic of Antarctica. Alaska Satellite Facility, Fairbanks, AK, in association with the National Snow and Ice Data Center, Boulder, CO. Digital media.