

Environment Monitoring

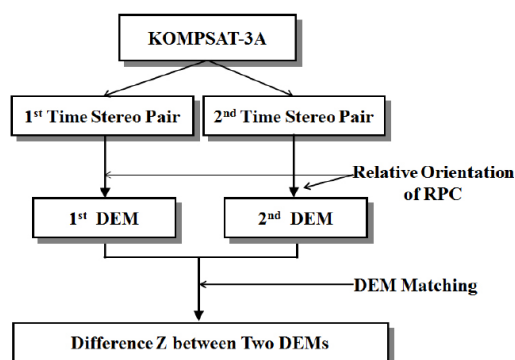
REFERENCE

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<http://www.ndsl.kr/ndsl/search/detail/article/articleSearchResultDetail.do?cn=JAKO201720636499905>

Antarctic DEMs Generation Using KOMPSAT-3A Stereo Images and Comparison by DEM Matching

Antarctica, where ice sheet has been declined rapidly, should be monitored periodically. However, there are difficult to access for local survey or aircraft observation due to the vast and extreme environments of the polar regions. In order to overcome this problem, there have been a lot of studies by acquiring radar or laser data by satellite. It is also difficult to accurately measure the changes of the surface where is composed of snow or ice layer, and it is also difficult to product a high-resolution DEM. This study therefore aims to product DEMs of two periods using high-resolution KOMPSAT-3A stereo images, and DEM matching is implemented by the LZD(Least-squares Z-Differences) method to detect DEM changes in both periods. As a result, the proposed method could be suggested as comparing height differences of the two DEMs within 1m precision.

Keywords : Antarctic, DEM, KOMPSAT-3A, DEM Matching, LZD



Schematic Diagram of Antarctic DEM(Digital Elevation Model)

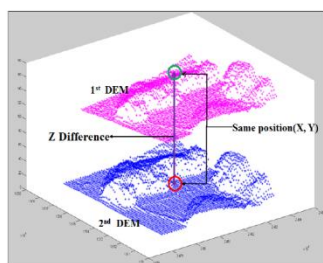


Fig. 1. Progress to compare two DEMs of the Antarctic test area from KOMPSAT-3A stereo satellite imagery(top) and schematic view of LZD DEM matching(bottom)

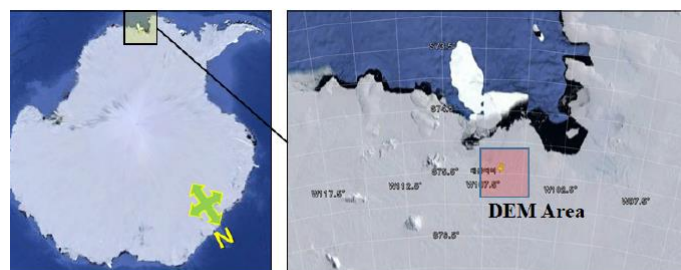


Fig. 2. Analysis target area in Thwaites glacier

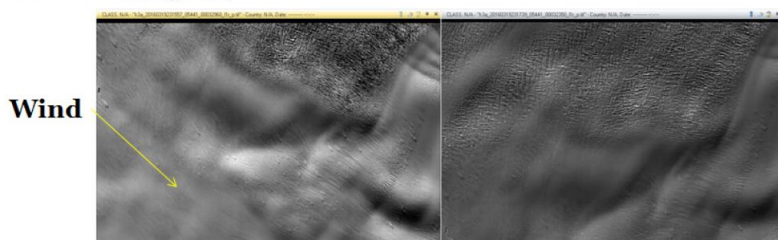


Fig. 3. 1st time stereo pair of KOMPSAT-3A

PRODUCTS USED

- KOMPSAT-3A
- 0.55M resolution
- EO satellite

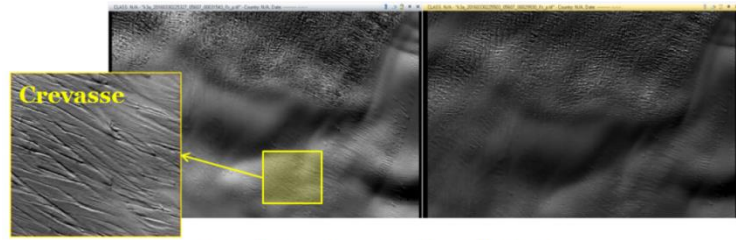


Fig. 4. 2nd time stereo pair of KOMPSAT-3A

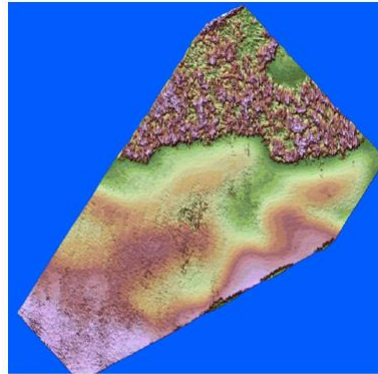


Fig. 5. 1st DEM by the provided RPC (grid space: 1m)

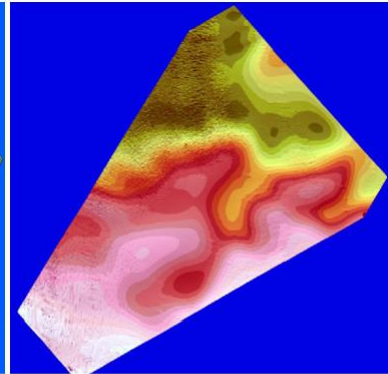


Fig. 6. 1st DEM by the relative oriented RPC (grid space: 1m)

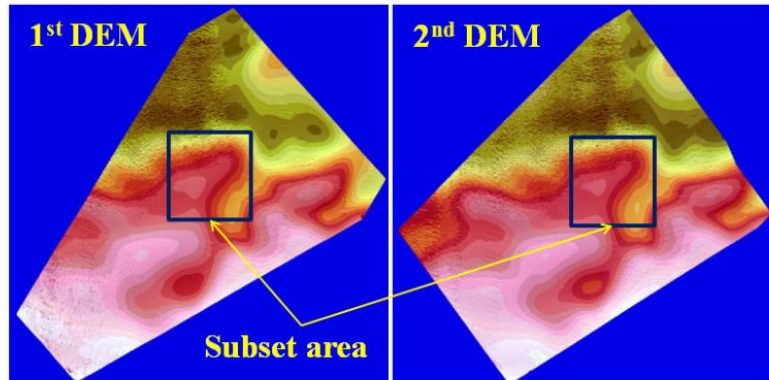


Fig. 7. 1st and 2nd DEM by the relative oriented RPCs, DEM matching area of the two DEMs

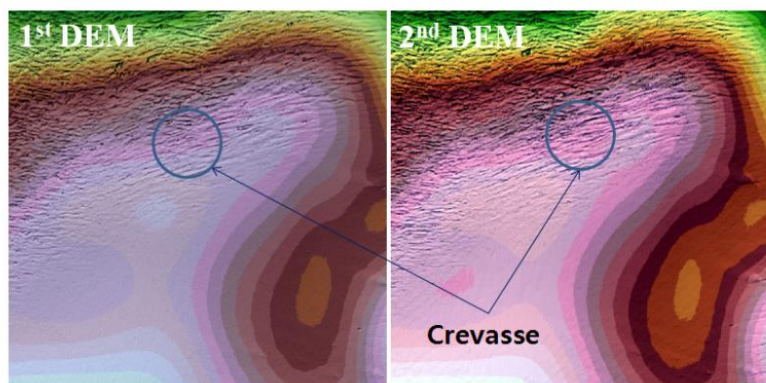


Fig. 8. Subset area (width: 5km x height: 5km) of 1st DEM (left) and 2nd DEM (right)

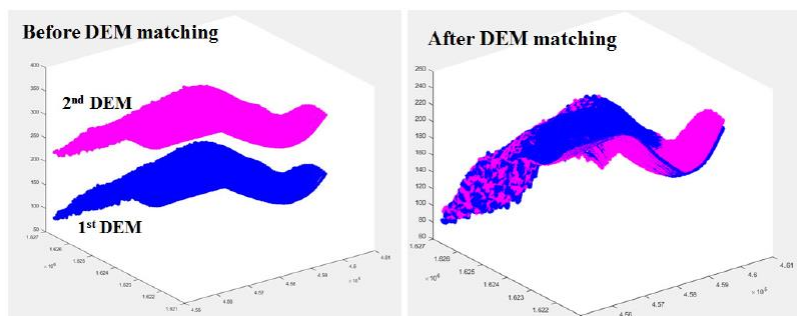
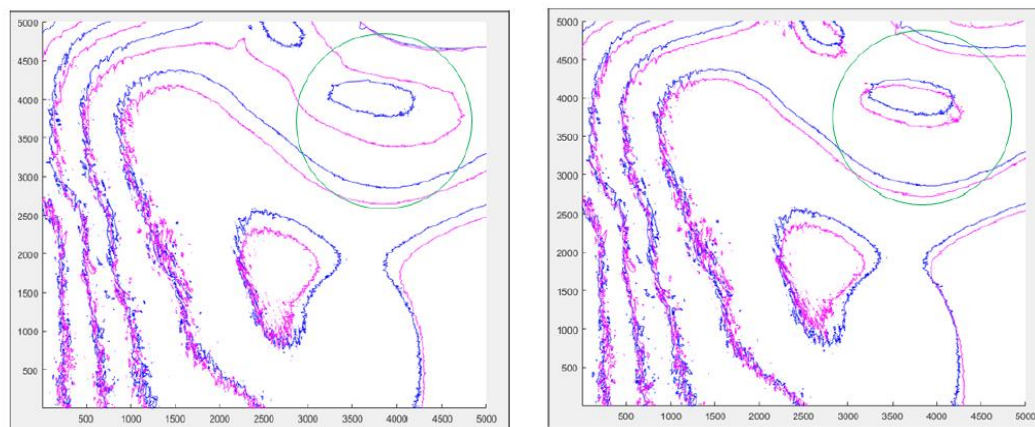


Fig. 9. Before (left) and after (right) LZD DEM matching of the two DEMs

PRODUCTS USED

- KOMPSAT-3A
- 0.55M resolution
- EO satellite



**Fig. 10. Contours of two DEMs before(top)
and after DEM matching(bottom)**

Conclusions

In this study, It demonstrated the applicability of the LZE DEM matching method for analyzing of change in Antarctic glaciers using KOMPSAT-3A data.

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