

INTRODUCTION

With changes in the ecosystem caused by the on-going climate change, biodiversity in the respective regions of the ecosystem have also been subject to change. In particular, as vegetation in the Arctic region has shown extra sensitivity to the effects of climate change, it must be continually monitored as indicators of climate change. However, there are lots of obstacles to conduct continuous vegetation monitoring in detail through field work in the Arctic region. For this reason, satellite data was developed to allow research in the regions inaccessible to field work. The objective of this study is to construct the vegetation map of the Midtre Lovénbreen, in Svalbard, Norway and to observe long-term variation of vegetation using remote sensing images.

MATERIALS & METHODS

❖ Satellite image

We will use Formosat-2 and Pleiades 1A satellite image.

Satellite	Formosat-2	Pleiades 1A
Launch date	2004.05.21	2011.12.16
Spatial Resolution	Pan(B&W) : 2m MS : 8m	pan(B&W) : 50cm MS : 50cm
No. of band	4 (B, G, R, NIR)	4 (B, G, R, NIR)
Revisit interval	Daily	Daily
Swath width	24km	20km
Mission life	5 years	5 years

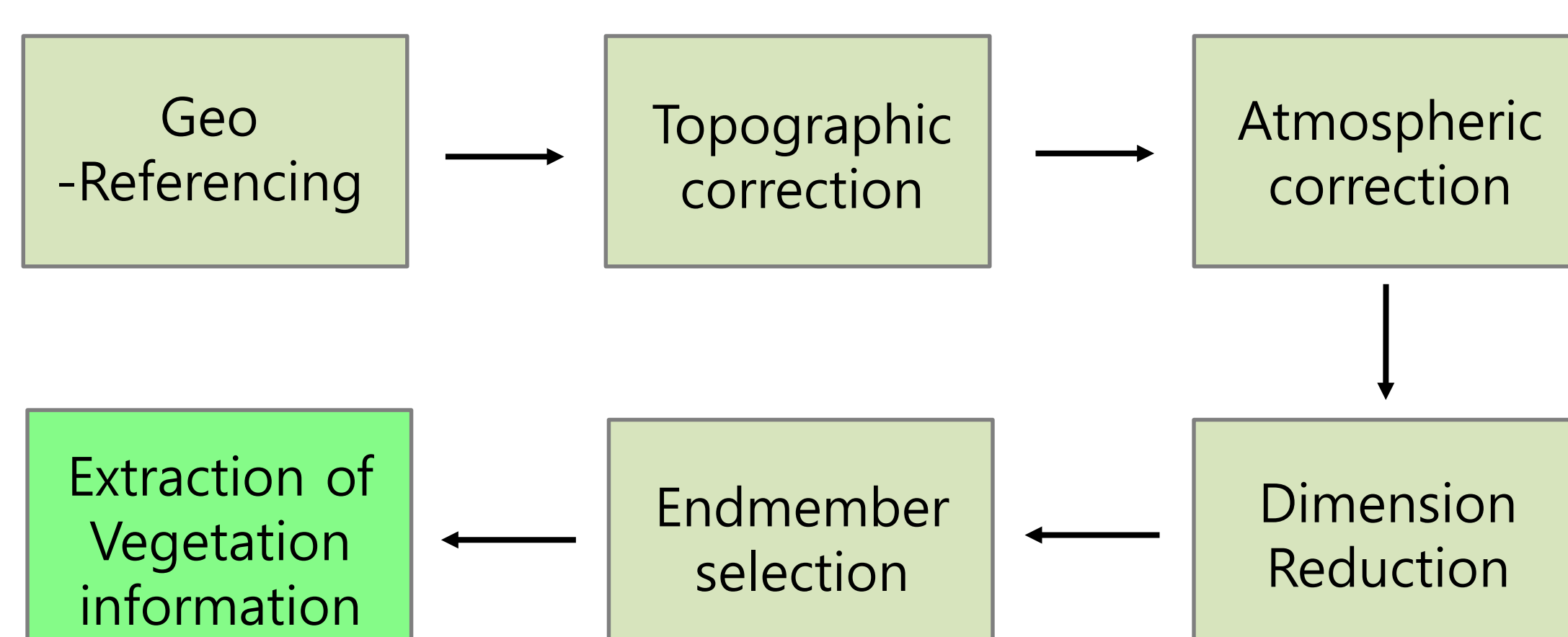
Both of these satellite images are high-resolution and as both carry NIR band, are well-suited to make observations of vegetation states.

❖ Methods

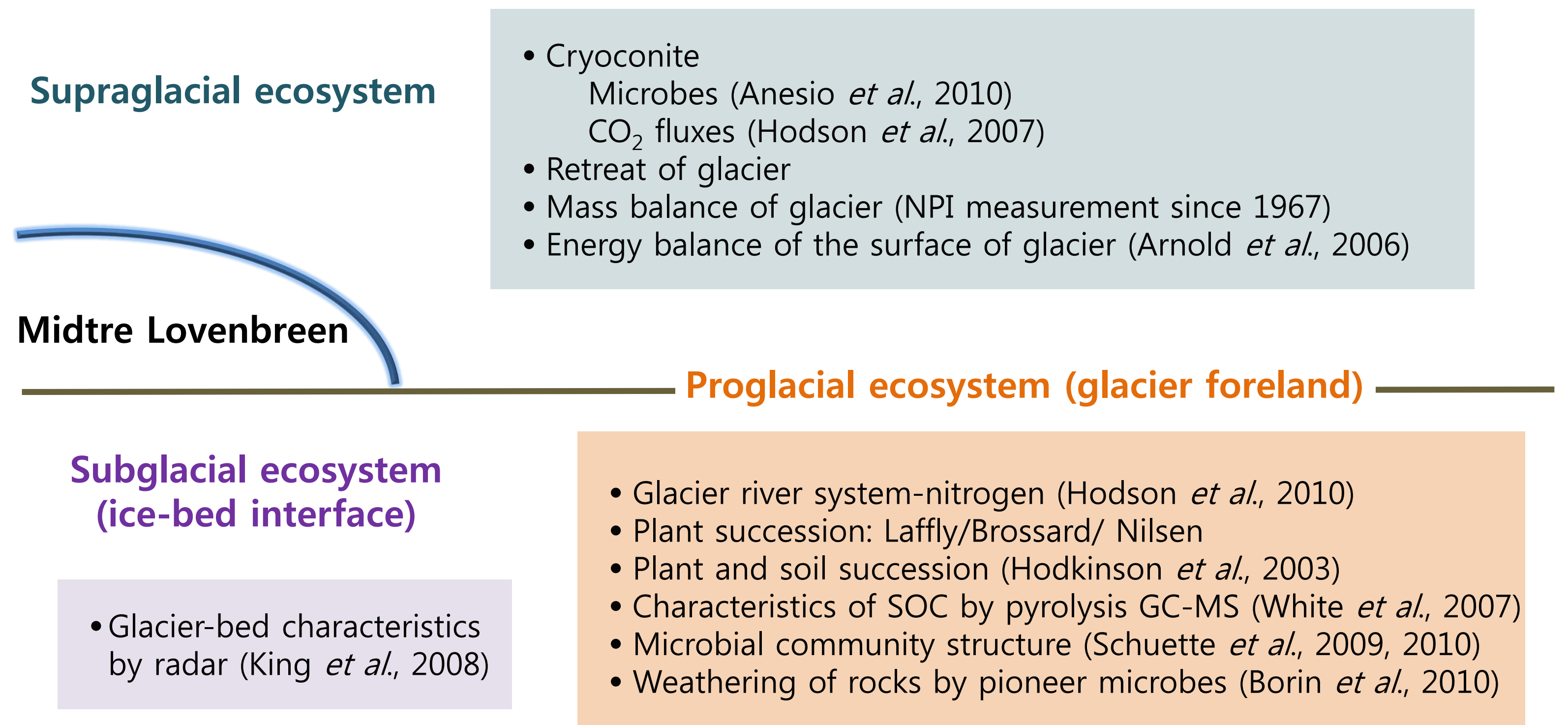
While moss and lichen are dominant in the Arctic region, observation and analysis using satellite imaging is difficult due to their small and sparse distribution.

To improve limits in spatial resolution, several methods will be used.

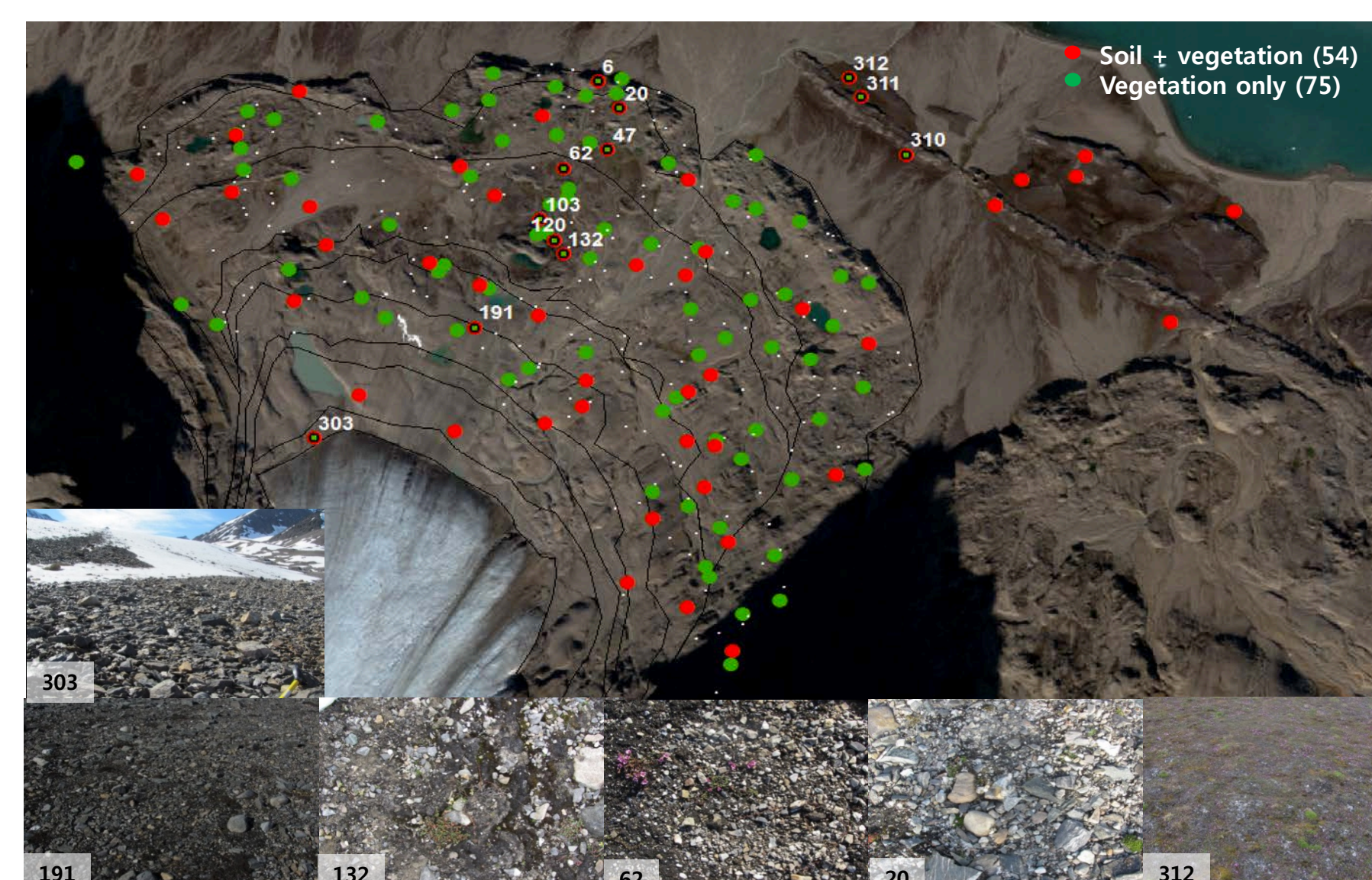
1. Minimum Noise Fraction (MNF): to minimize the dimensionality and noise;
2. Pixel Purity Index (PPI): to collect the endmember
3. Spectral Mixture Analysis (SMA): to confirm the abundance of vegetation.



PREVIOUS STUDIES IN MIDTRE LOVÉNBREEN



STUDY AREA



• **Study area:** Glacier foreland of Midtre Lovénbreen, Brøgger Peninsula, Svalbard, Norway (79°N, 12°W)

- **Vegetation survey sites:**
- All dots for the sites that Moreau *et al.* (2005) covered
- Green and red dots for the sites in 2014

❖ Verification of results acquired from satellite images

These results using remote sensed images will be confirmed by comparing the field data acquired in July 2014 and a vegetation map from Moreau *et al.* (2005).

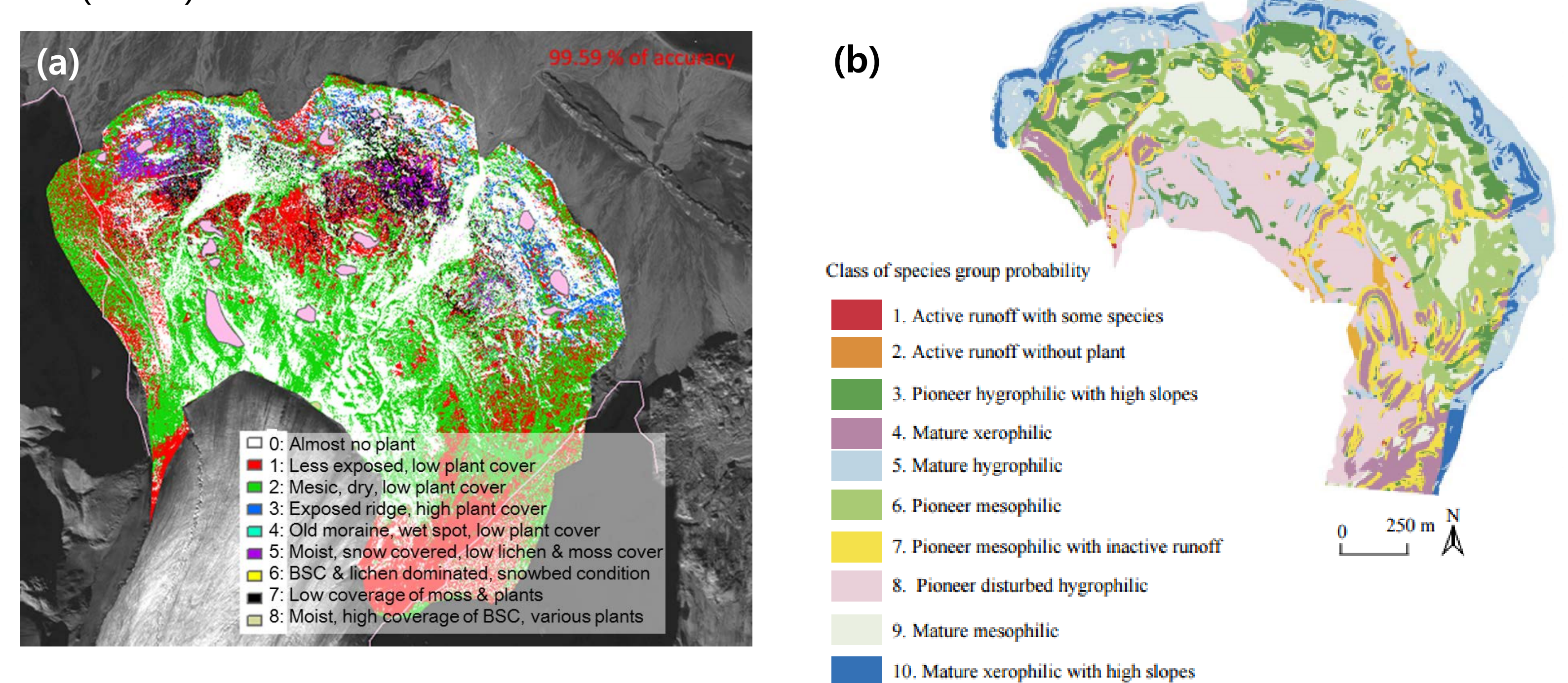


Fig 1. (a) Vegetation map in 2014 and (b) that in 2005 (Moreau *et al.*, 2005)

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