Chinese National Report to Standing Committee on Antarctic Geographic Information (SC-AGI)

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Outline

- During 2013~2014, China has done some Antarctic geographic information projects.
  - Mapping blue-ice areas in Antarctica
  - Chinese Satellite Imagery over specific polar area
  - Some DEM over specific polar area
  - Larseman Hills aerophotography
  - Near real-time Polar ionospheric TEC release system at Chinese Station
  - Dome Argus surface Ice-flow velocities

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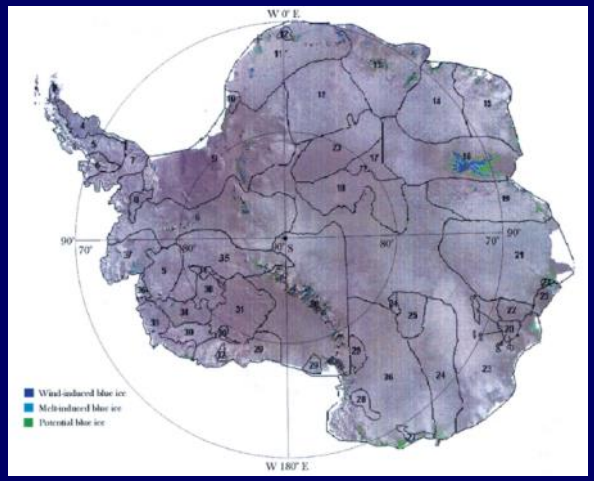
Mapping blue-ice areas in Antarctica

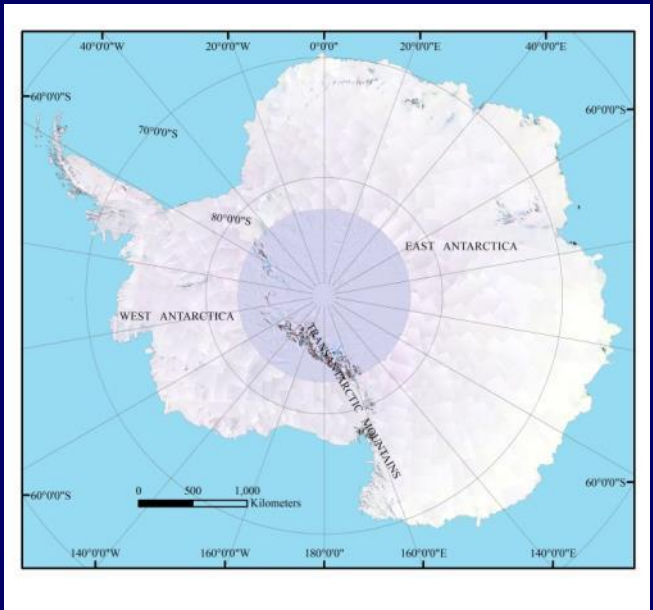
- only one previous mapping of BIAs over Antarctica has been implemented.

AVHRR data acquired in the astral summer of 1983-1994 with 1.01-kilometer spatial resolution.



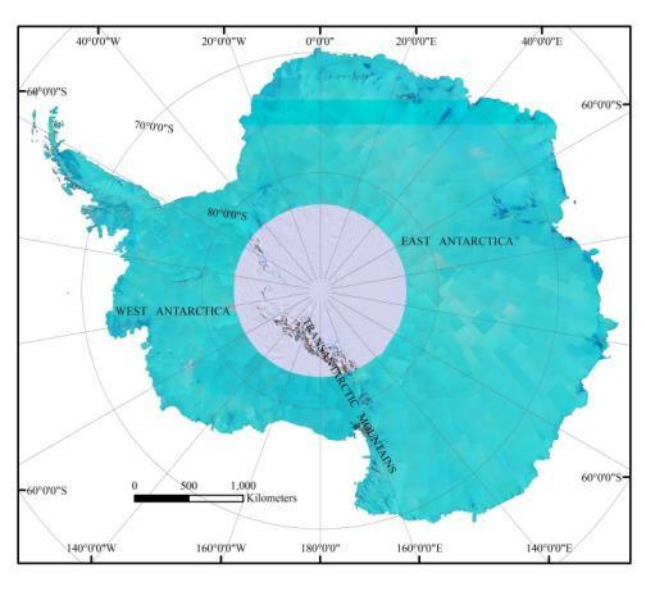
(Winther et al. 2001)

- In all other studies, BIAs were mapped only in sparse local areas.



improved LIMA with all multispectral bands (Band 1-5 and 7) at 15-meter spatial resolution over the portion of the Antarctic continent north of 82.5° S

supervised and unsupervised classification



MODIS mosaic data acquired during the 2003–2004 austral summer covering the area south of 82.5° S

(Hui, F.M., X. Cheng, et al., 2013.)

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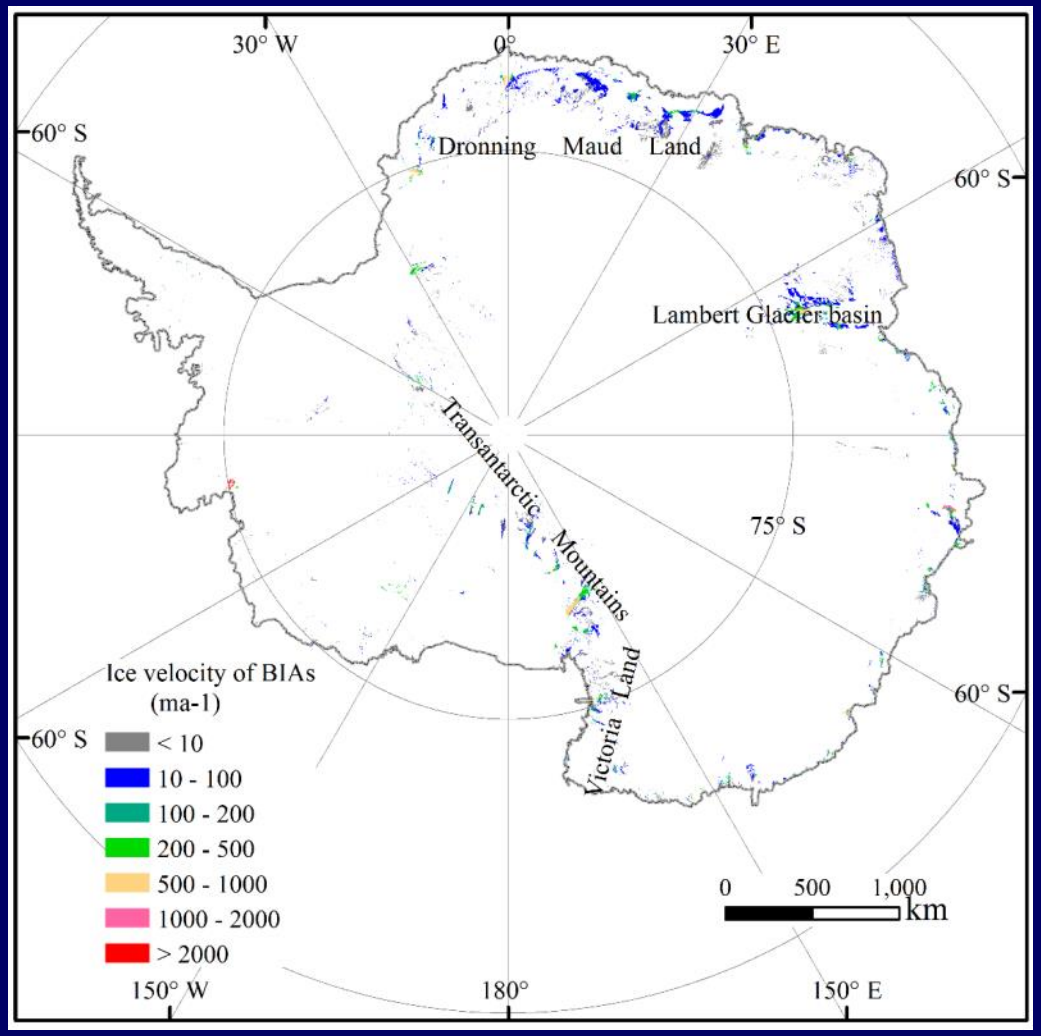

1. We observe a total BIAs area of 234,549km^2 across Antarctica, which account for approximately 1.65% of the area of Antarctica.

2. BIAs were usually located along coastlines or near areas of exposed, ice-free rock, but BIAs were concentrated in four regions: Victoria Land, the Transantarctic Mountains, Dronning Maud Land, and the Lambert Glacier basin.

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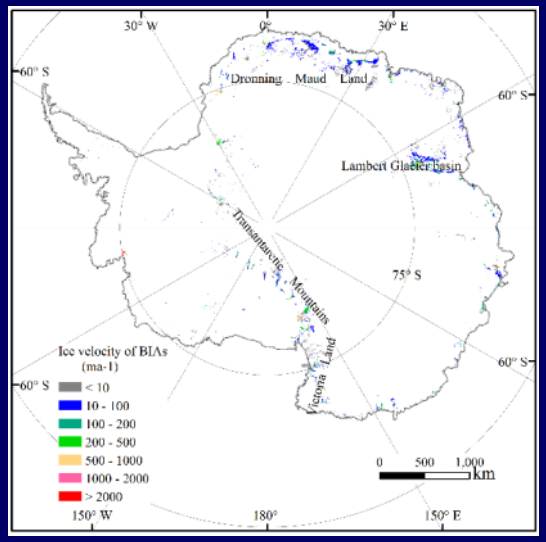
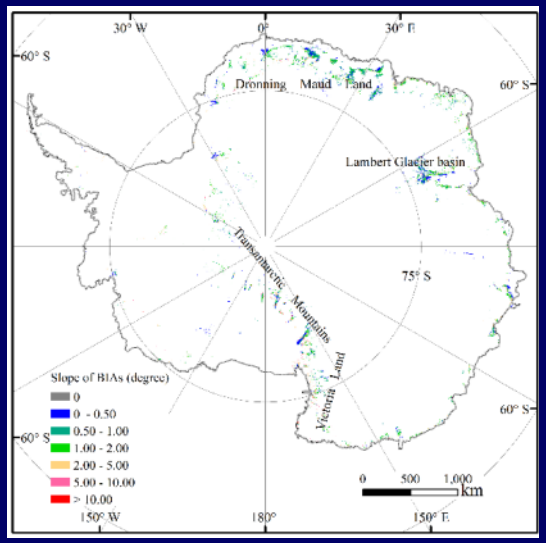
Spatial distribution

Maps and Areas of BIAs for different classes of ice velocity and surface slope.

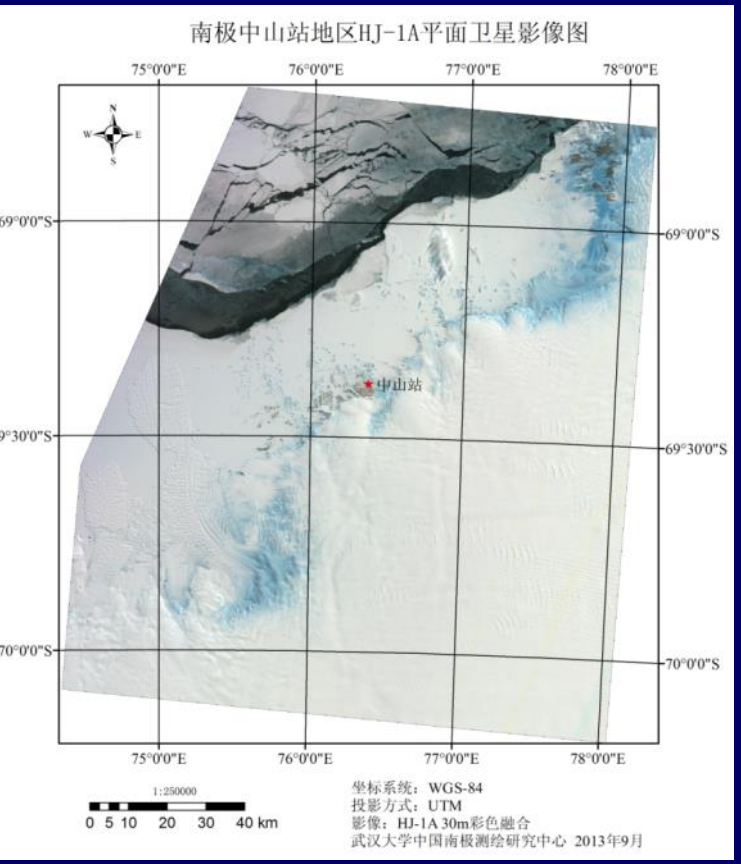




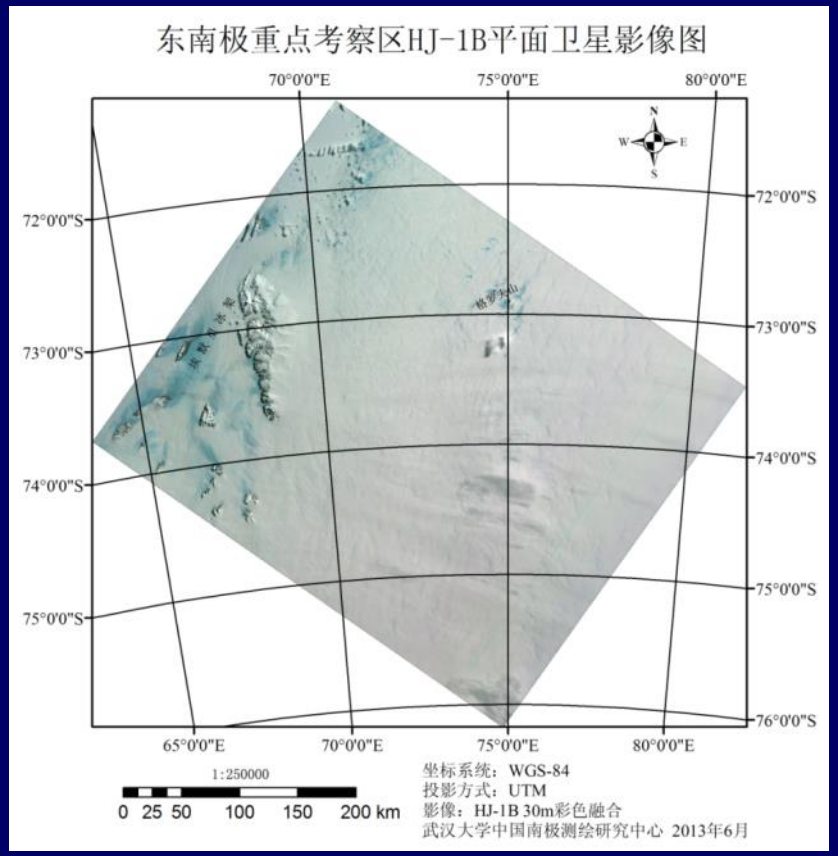
Ice velocity	Area		Slope	Area	
m a^{-1}	km^2	%	°	km^2	%
<10	81755	36.30	0	15138	6.90
10–100	85483	37.96	<0.5	40487	18.45
100–200	21844	9.70	0.5–1	63395	28.89
200–500	20186	8.96	1–2	51226	23.35
500–1000	12653	5.62	2–5	37082	16.90
1000–2000	2087	0.93	5–10	6433	2.93
>2000	1199	0.53	>10	5666	2.58

- Regions with an ice velocity over 200 meters per year were situated on the Ross, Shackleton, Amery, Riiserlarsen and Ronne Ice Shelves closely associated with glacier dynamics.
- Surface slopes of only 5.51% of the BIAs, at most, were greater than 5 degrees; these areas were primarily located in the Transantarctic Mountains and Victoria Land.

Chinese Satellite Imagery over specific polar area



Zhongshan Station area in HJ-1A image



Amery Ice shelf and Grove Mountains in HJ-1B image

Location and extension of some ZY-3 data

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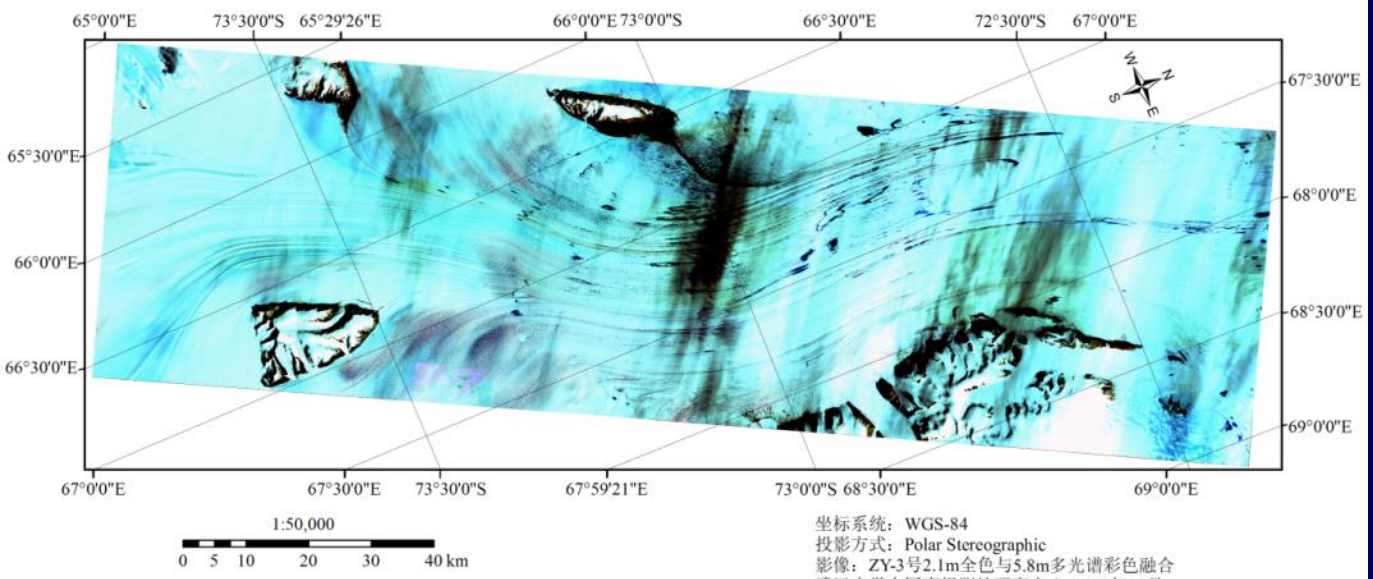
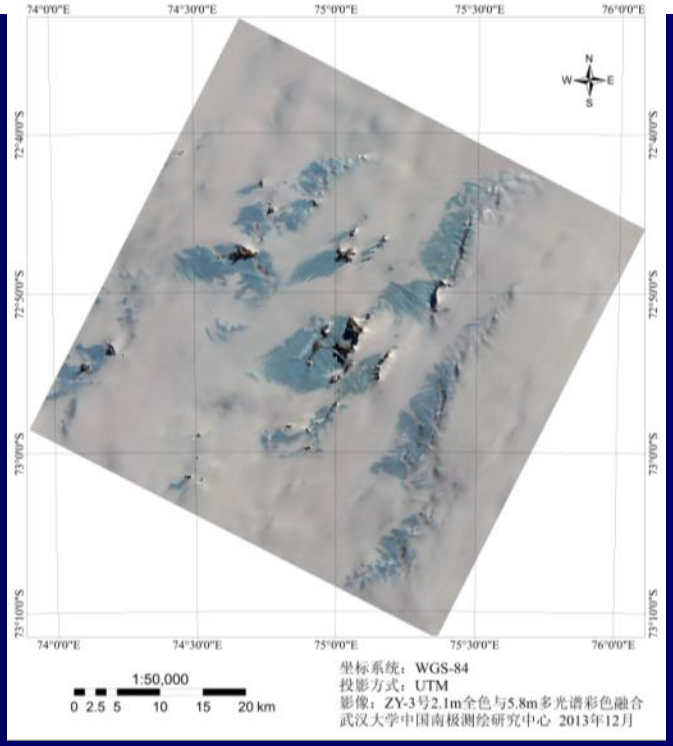
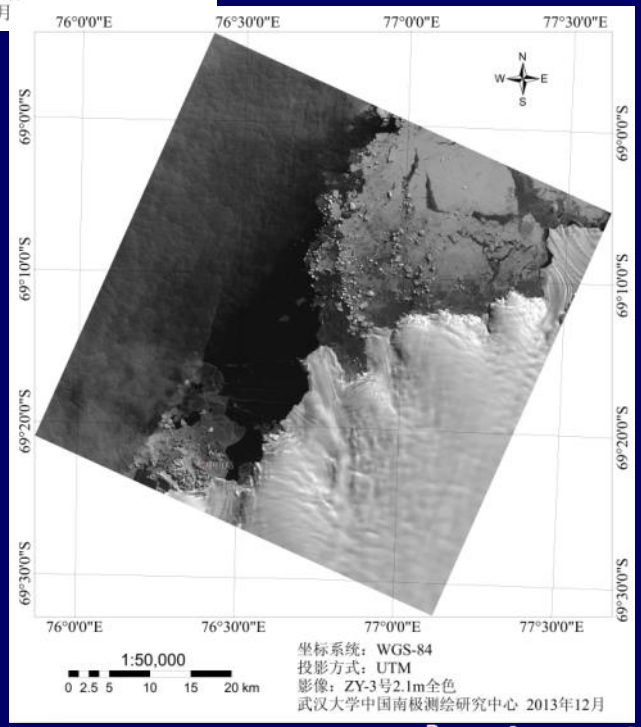


Amery Ice Shelf



Grove Mountains



Zhongshan Station area

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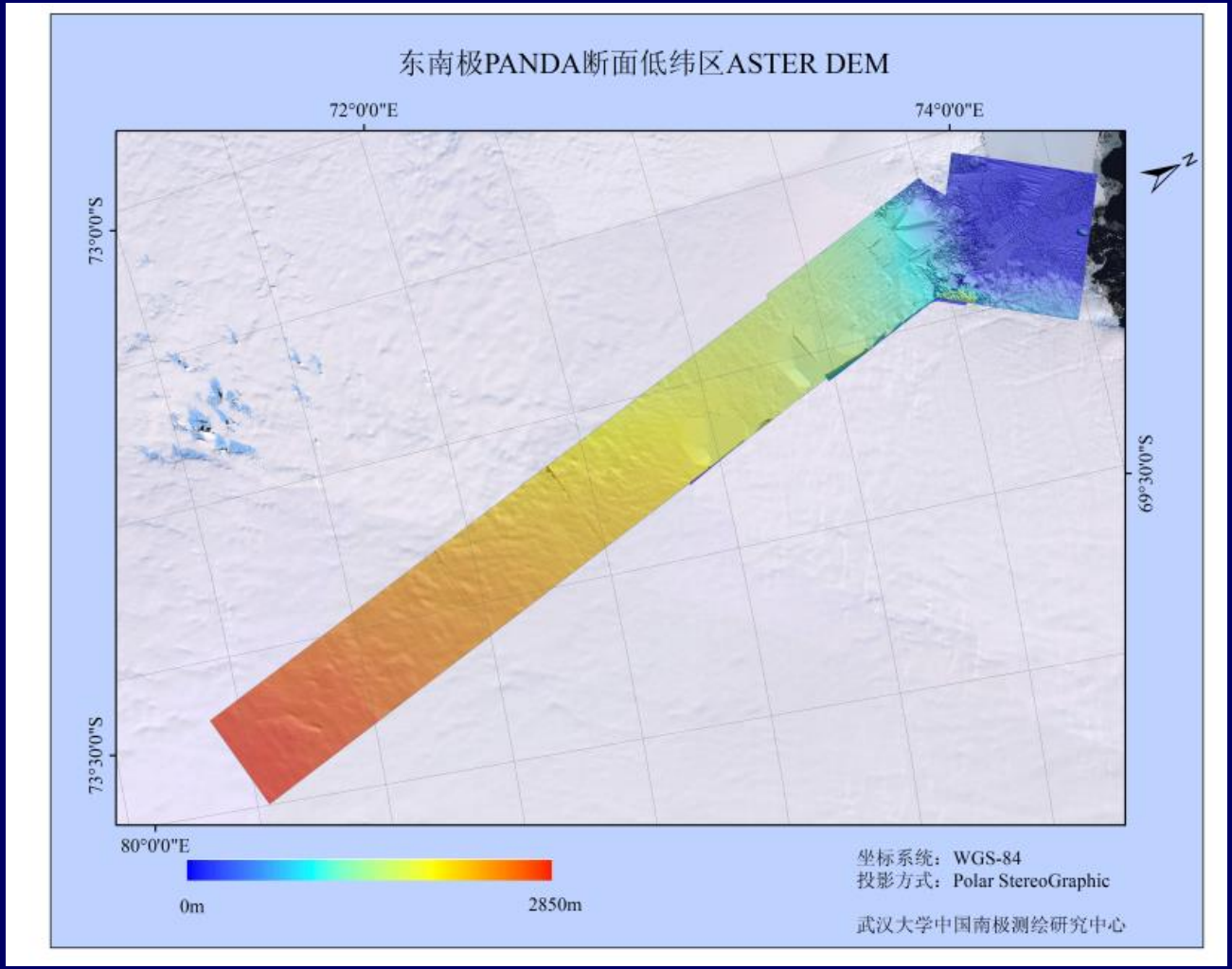
Some DEMs over specific polar area



ASTER DEM (resolution: 15m)

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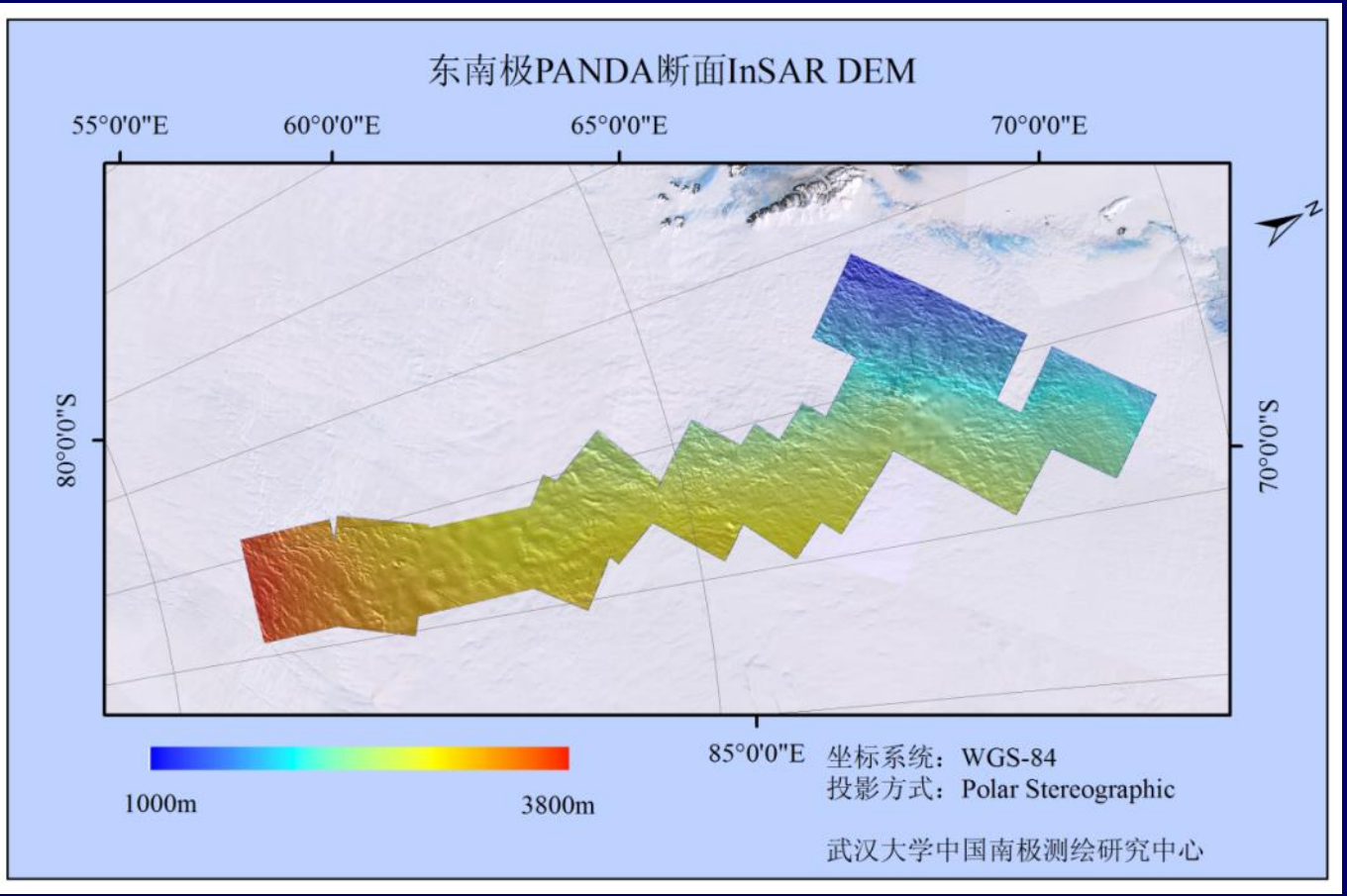

InSAR DEM derived from ERS tandem data

(resolution: 20m)

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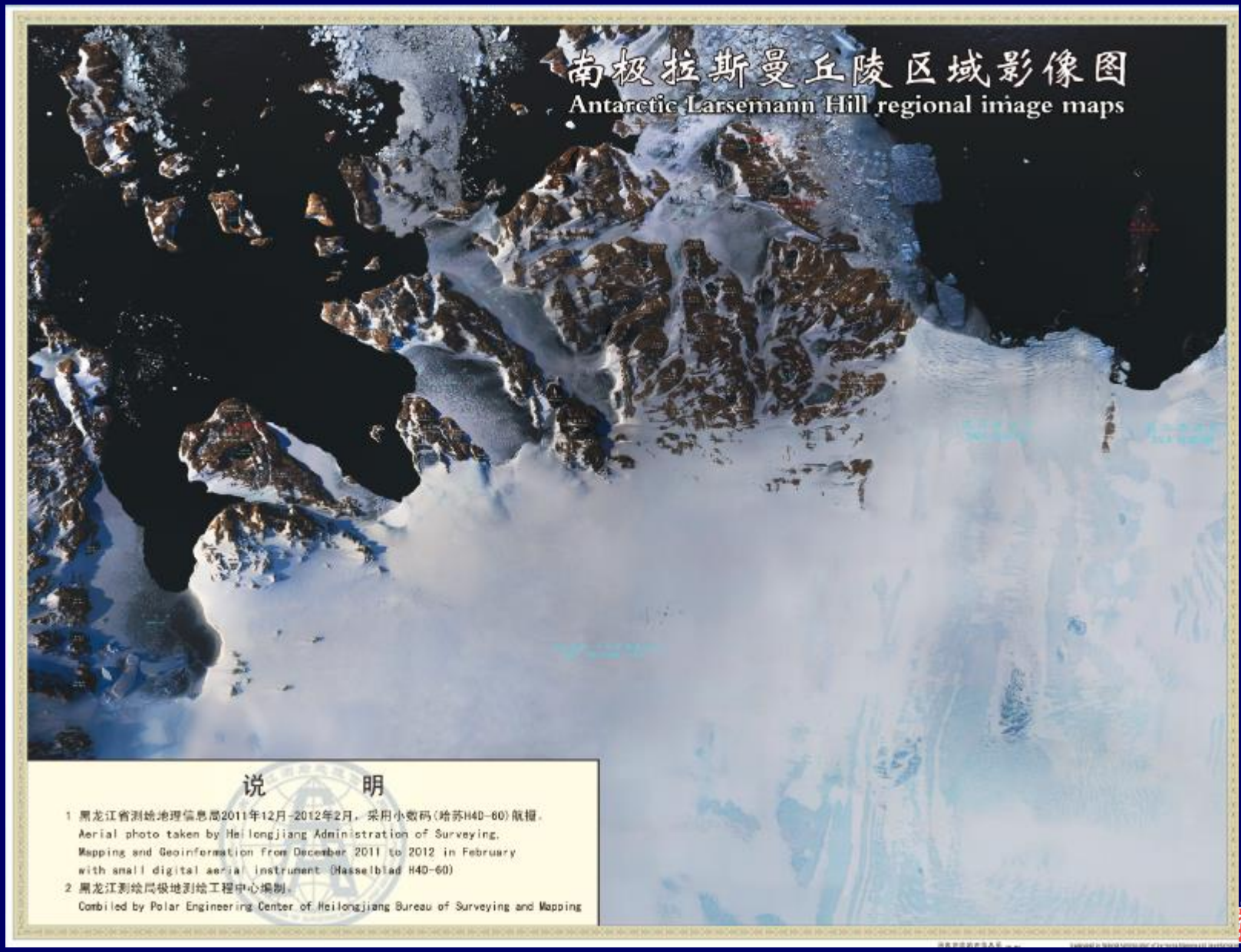
Larseman Hills aerophotography

- Larsemann Hills was proposed to be a protected area by China.
- In order to supply its high resolution image map. We used aerial photogrammetry to get a new map of 20cm resolution.


南极拉斯曼丘陵区域影像图
Antarctic Larsemann Hill regional image maps
说　明
1 黑龙江省测绘地理信息局2011年12月-2012年2月，采用小数码(哈苏H4D-60)航摄。
Aerial photo taken by Heilongjiang Administration of Surveying, Mapping and Geoinformation from December 2011 to 2012 in February with small digital aerial instrument (Hasselblad H4D-60)
2 黑龙江测绘局极地测绘工程中心编制。
Combiled by Polar Engineering Center of Heilongjiang Bureau of Surveying and Mapping

Polar ionospheric TEC real-time release system

- System function

  Polar ionospheric TEC real-time release system, which contains data collection, processing and distribution automatically.

❖ **Data from Chinese Polar GPS tracking stations**

Zhongshan GPS tracking station, built in 1998, East Antarctica.

Great Wall GPS tracking station, built in 2008, West Antarctica,

Yellow River GPS tracking station, built in 2005, Arctic.

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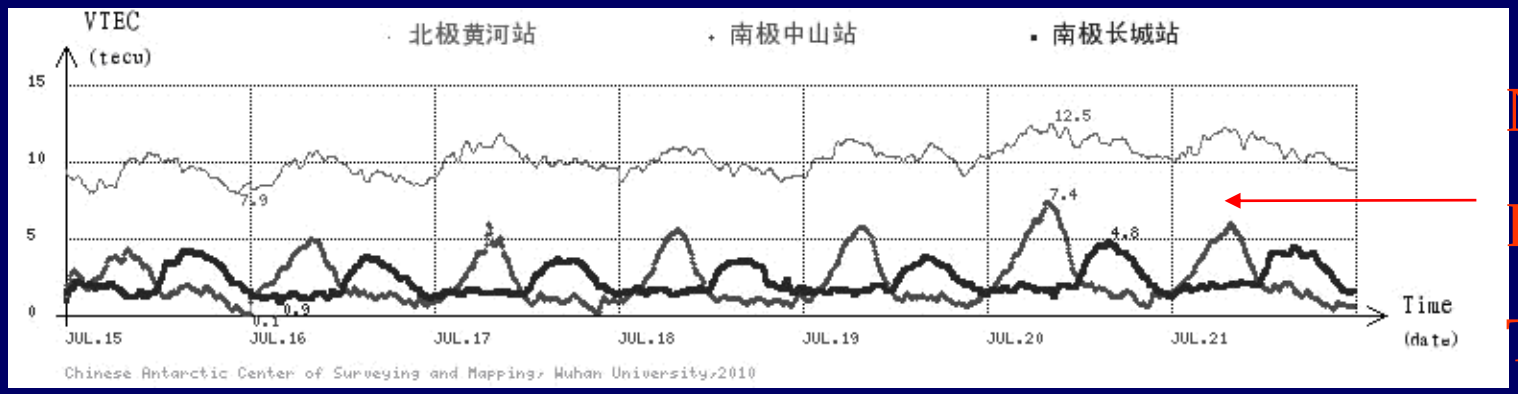
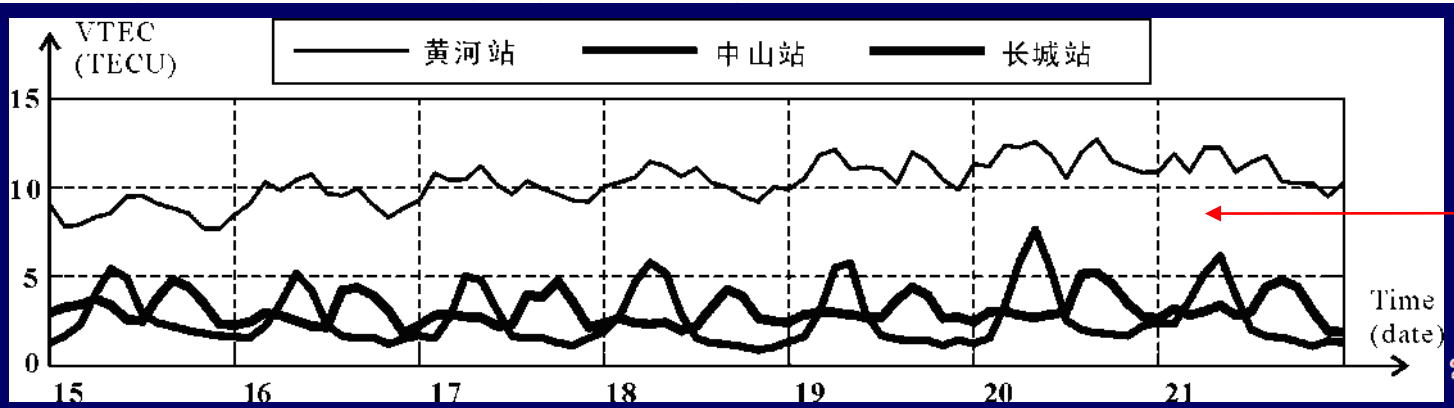
❖ **Online view:**

Polar spatial data center

（http://data.chinare.cn/）

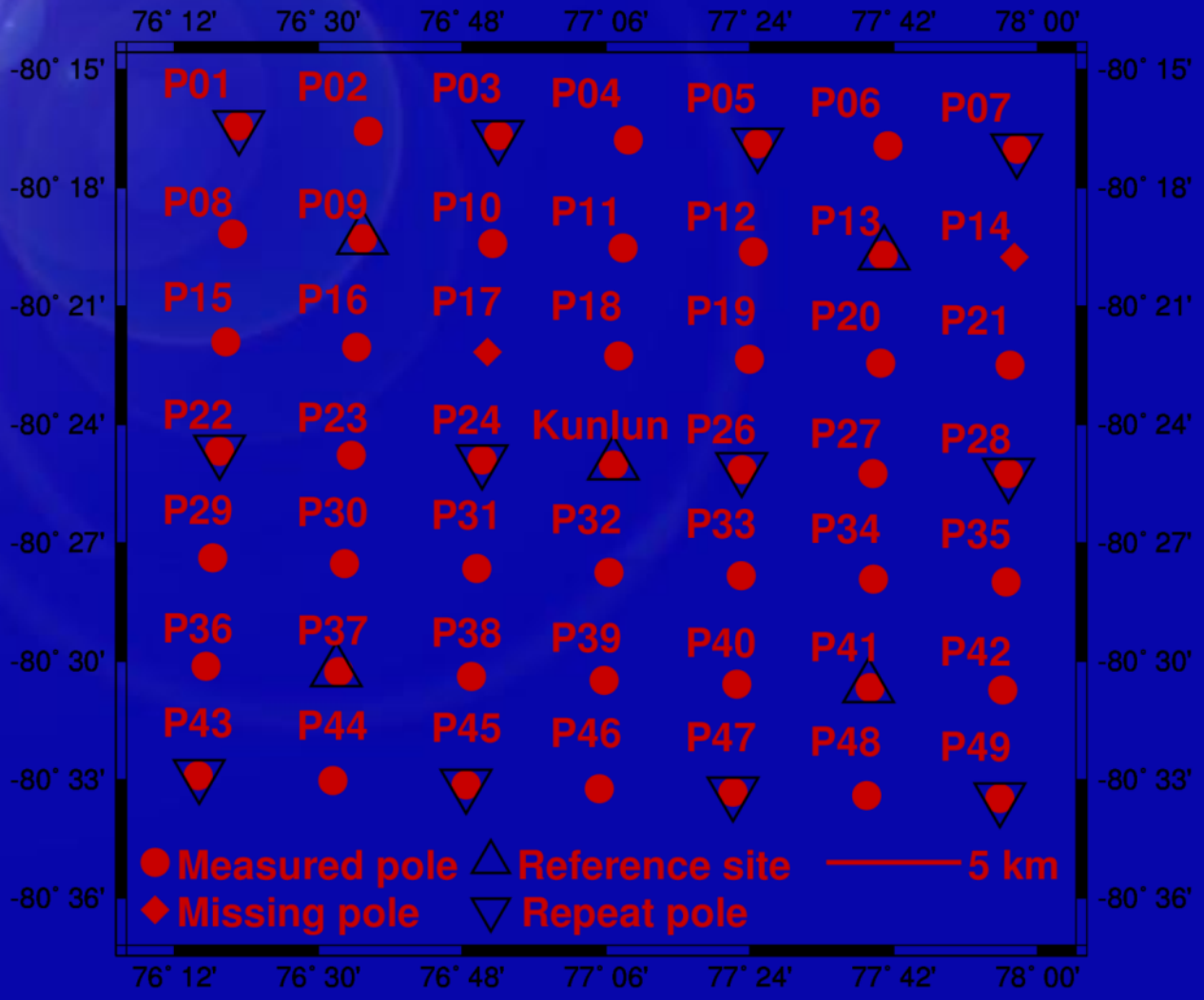


Near Real Time

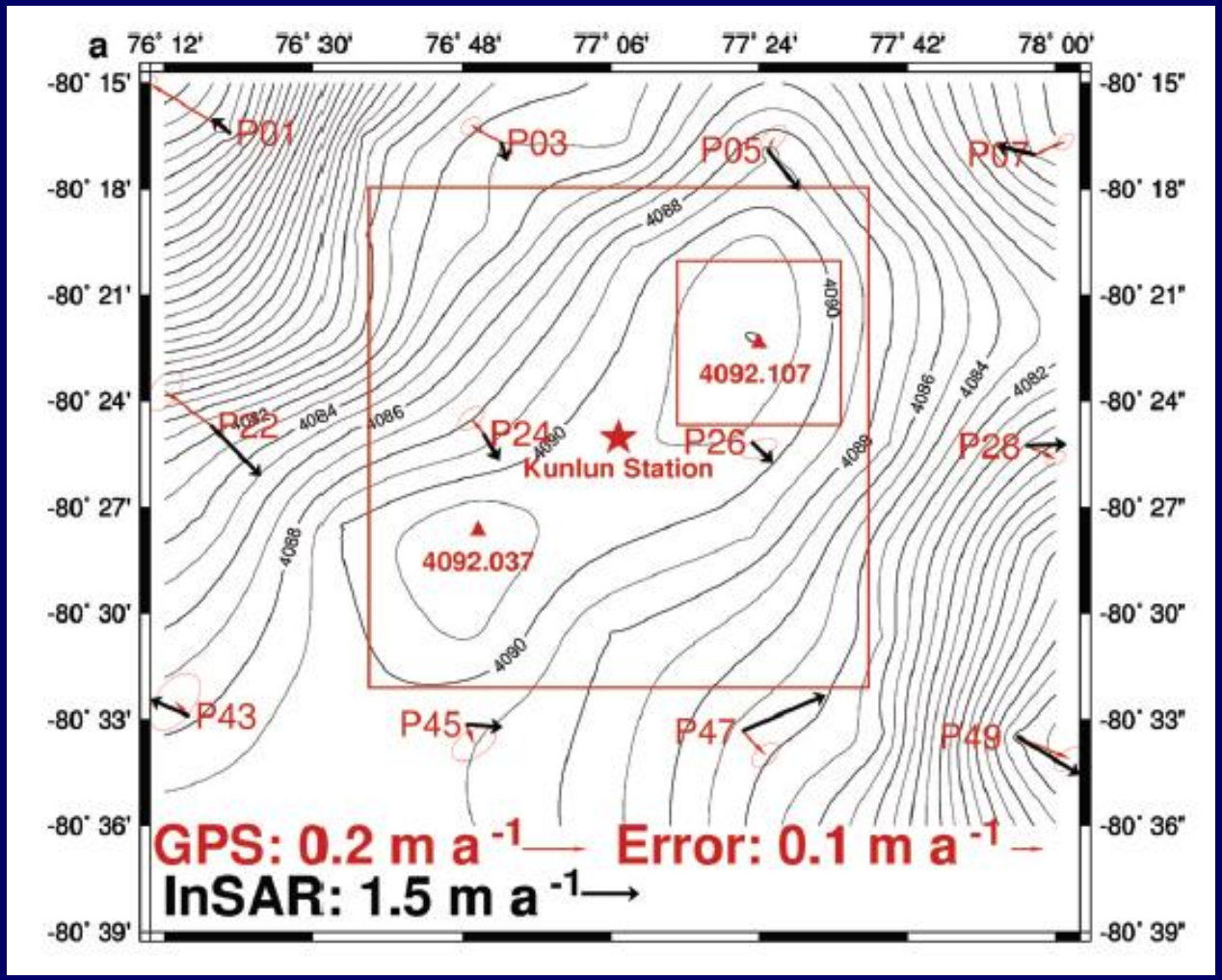


IGS GI

Surface ice flow velocities at Dome Argus



Location of poles for GPS measurements over Dome Argus in 2013



Surface topography and surface velocity field from GPS and InSAR

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Thanks