

Présence Belge en Antarctique



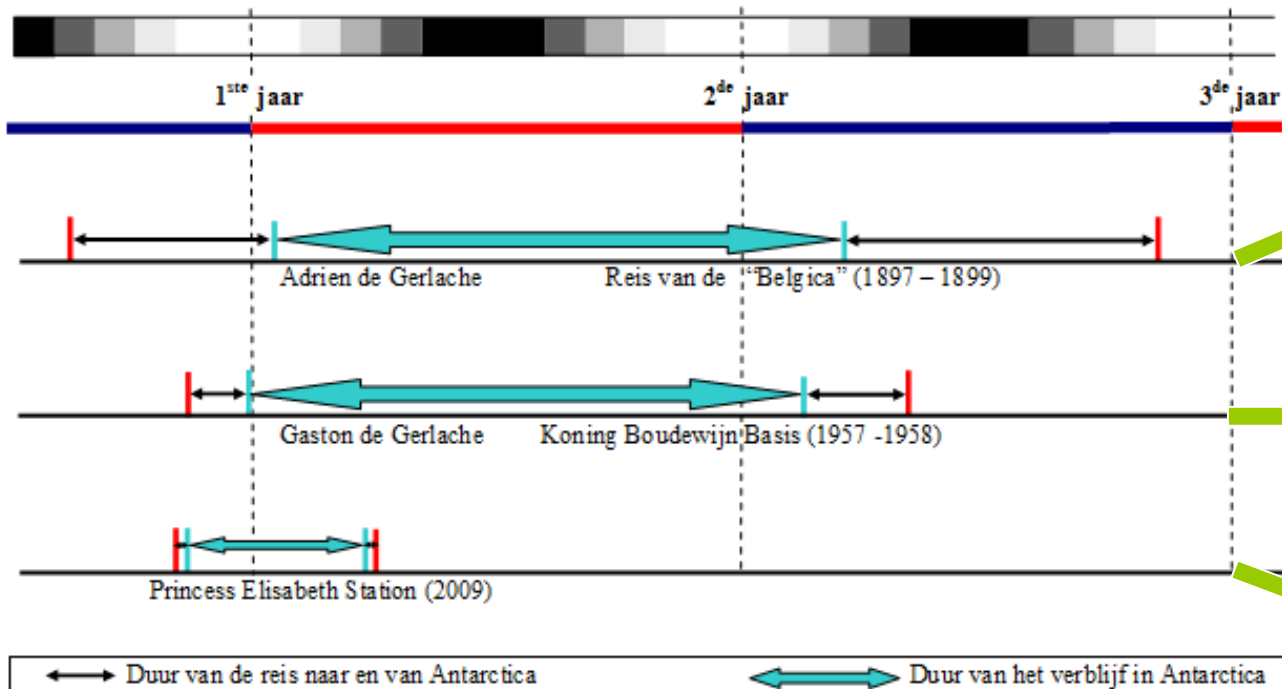
Contributions des Géodésiens et Cartographes

Société Géographique de Liège

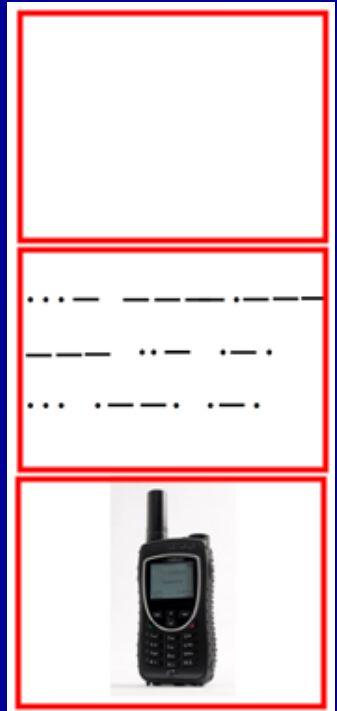
Trois périodes importantes

- **1897 - 1899** **Expédition de la « Belgica »**
 - Commandée par Adrien de Gerlache
- **1957 - 1958** **Construction de la Base Roi Baudouin**
 - Entre **1957** et **1968** 6 expéditions ont hiverné à la Base Roi Baudouin
 - La première fut commandée par Gaston de Gerlache
- **2004 - 2018** **Princess Elisabeth Station**
 - IPF - Réalisation Alain Hubert et Johan Berte
 - Politique Scientifique Fédérale (BELSPO)

Durées des expéditions 1897 2022



Communications



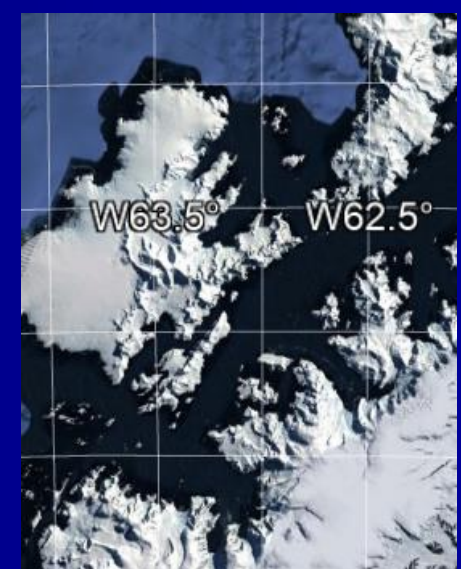
1897



1957

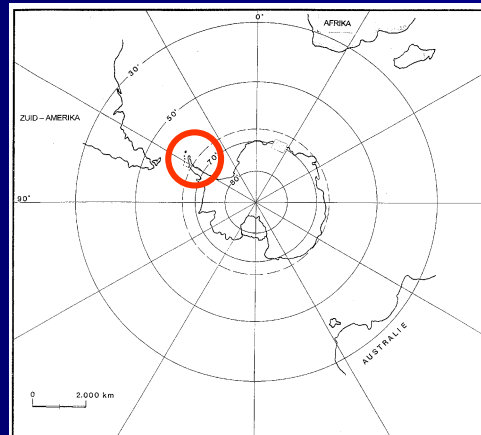


2022

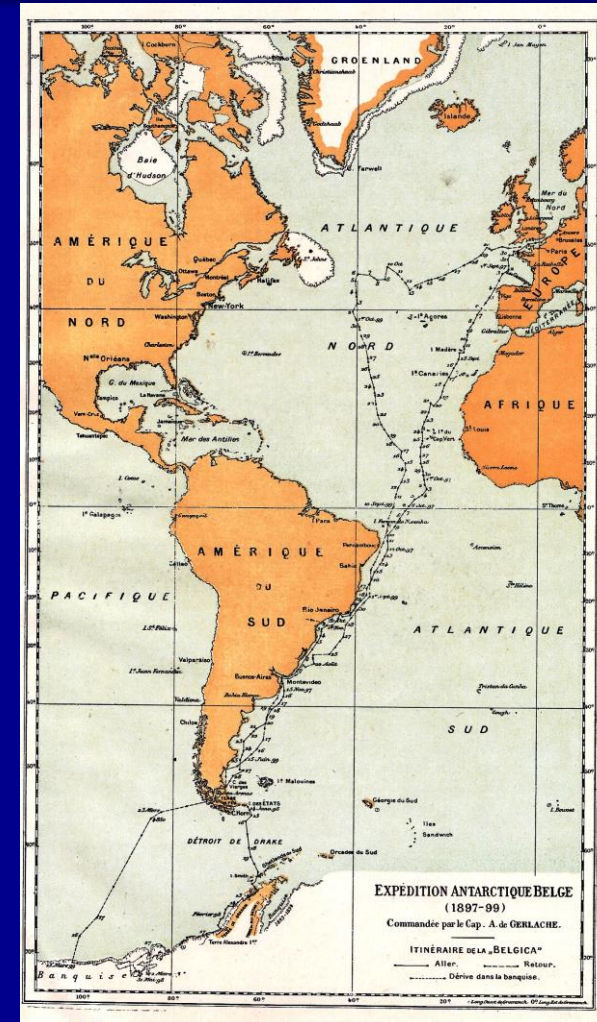


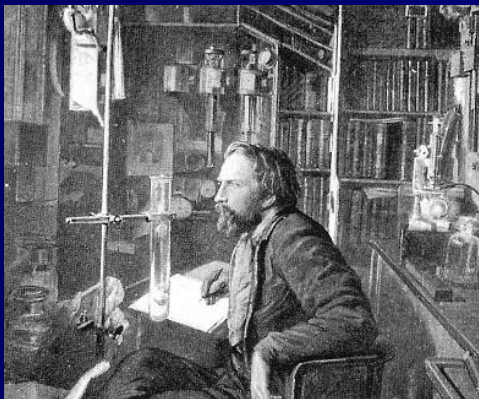
1897 – 1899

Expédition de la “BELGICA”



- Météorologie
- Océanographie
- Cartographie
- Géologie
- Biologie – Zoologie - Botanique
- Médecine
- Physique du globe

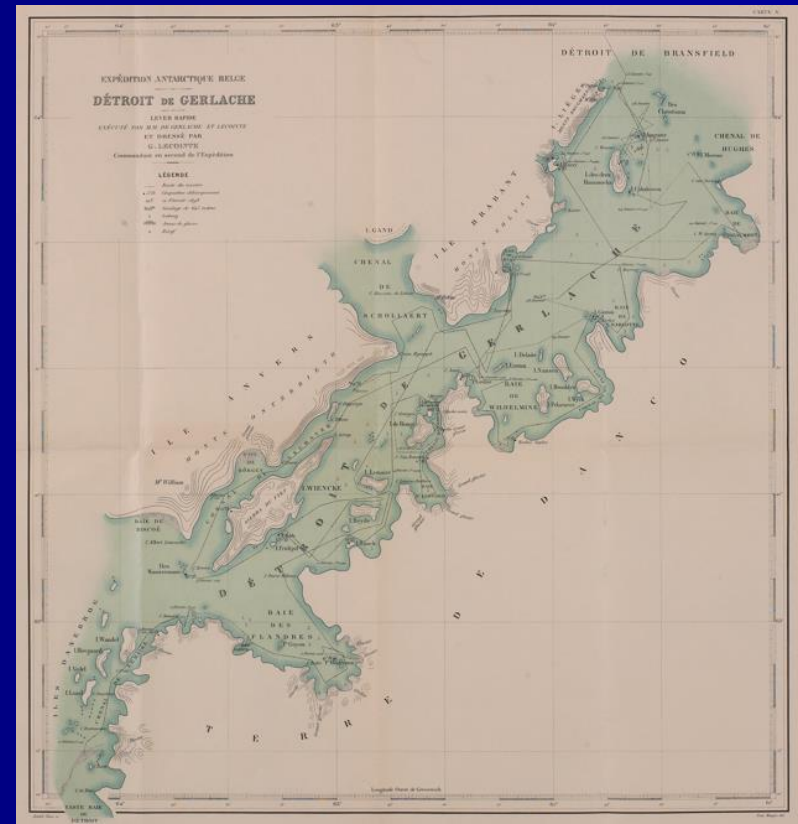
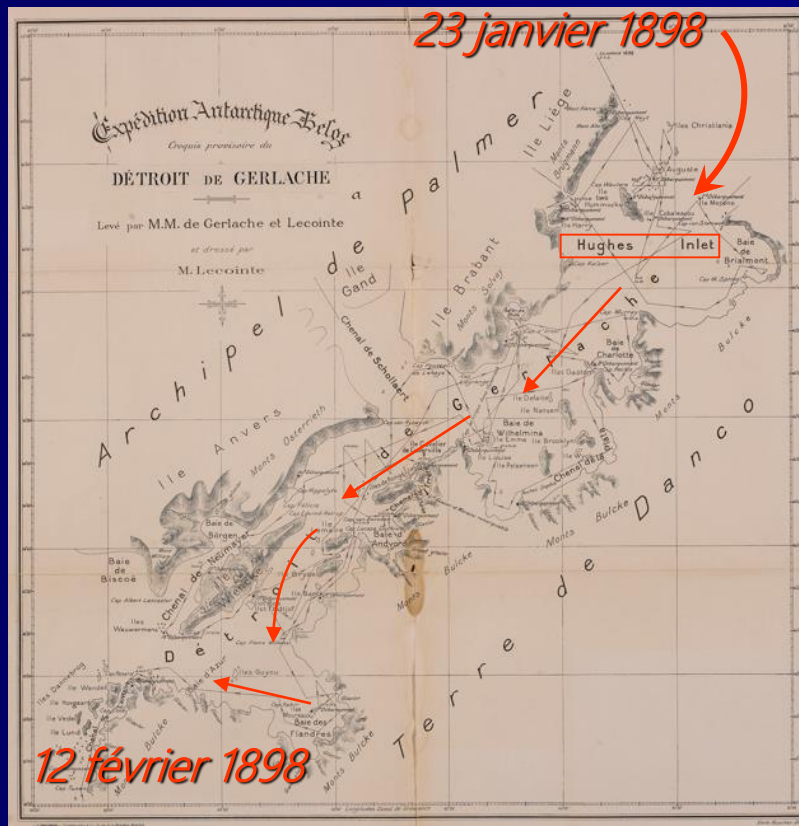




La carte du Détroit de Gerlache

Un levé cartographique effectué en 21 jours
du 23 janvier au 12 février 1898

« Ce détroit n'est pas figuré sur les cartes, aussi éprouvons nous, à nous y engager, cette joie et cette émotion spéciales qui s'emparent des navigateurs lorsque l'étrave de leur navire laboure des flots vierges » (A. de Gerlache).

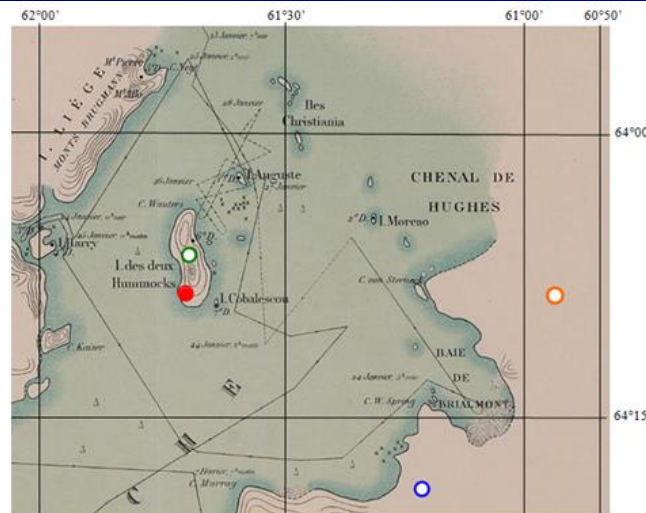
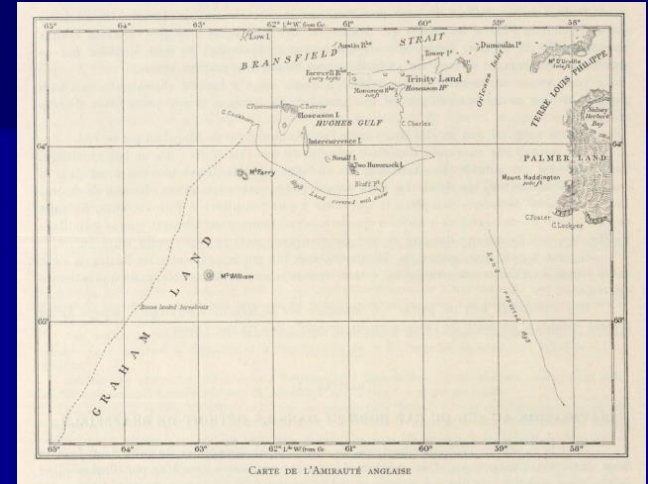
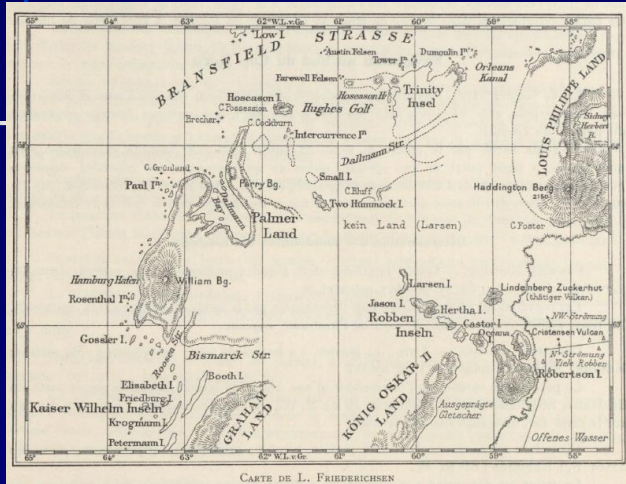


Cartes du **Détroit de la Belgica**

Détroit de Gerlache

- - ***Lever rapide*** — Exécuté par MM. de Gerlache et Lecointe et dressé par Lecointe Commandant en second de l'Expédition
- - ***Croquis provisoire*** du détroit de Gerlache - Levé par MM. de Gerlache et Lecointe et dressé par M. Lecointe
- - ***Croquis provisoire*** du détroit de la *Belgica* - Dressé par le Lieutenant de Vaisseau Lecointe, Commandant en second de l'Expédition
- - ***Sketch of*** Danco Land, the *Belgica* Strait and Palmer Archipelago Surveyed by Capt G. Lecointe — 1898.

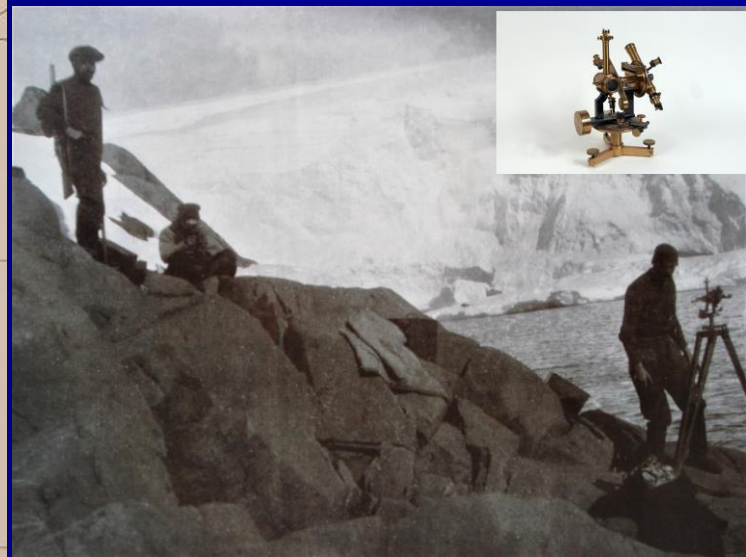
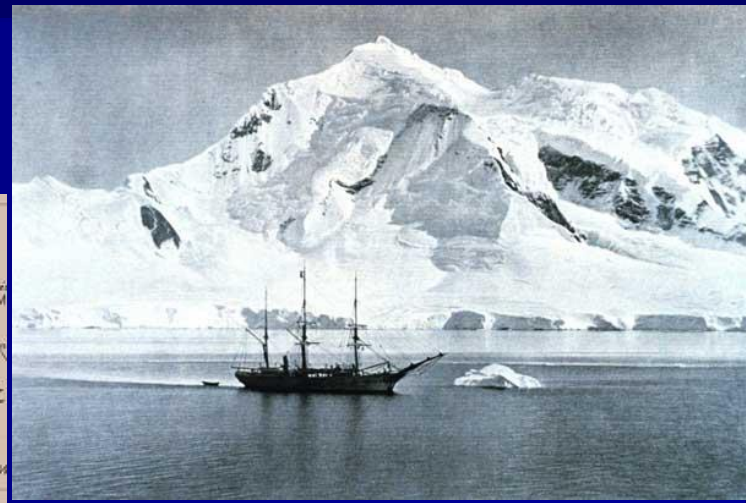
La Belgica quitte l'Amérique du Sud le 14 janvier 1898 et atteint la péninsule Antarctique le 23 janvier 1898



●	Carte British Antarctic Survey	2017	64°08'S - 61°42'W
●	Carte A. de Gerlache et G. Lecoq	1898	64°07'S - 61°41'W
●	Carte L. Friederichsen	1895	64°19'S - 61°14'W
●	Carte de l'Amirauté Anglaise		64°09'S - 60°56'W

20 Débarquements

- Sciences
- Tours d'horizon
- Photos
- Croquis





Coordonnées Géographiques

Station dans l'île Harry

2 droites de hauteur (coupant sous 25°)

64°07'19''S - 61°58'44''W

Station au Cap Neyt

1 droite de hauteur

63°57'06''S - 61°47'15''W

Près du Cap von Sterneck

1 méridienne

64°08'52''S

Station dans l'île Auguste

2 droites de hauteur

64°02'26''S - 61°35'03''W

Station près de l'île Cobalescou

1 méridienne

64°09'S

Station près de l'île Louise

1 droite de hauteur

64°31'S - 62°22'W

Coordonnées Géographiques

Station dans l'île d'Anvers

1 circumméridiennes

64°31'38"S – 62°56'

Station dans l'île Wiencke

1 droite de hauteur

64°47'S - 63°29'01"W

Station dans les îles Wauwermans

1 méridienne

64°54'22"S - 63°42'W

Station dans les îles Moureaux

2 droites de hauteur, dont 1 méridienne

65°04'24"S - 63°00'27"W

Station sur la Terre de Danco

2 droites de hauteur, dont 1 méridienne

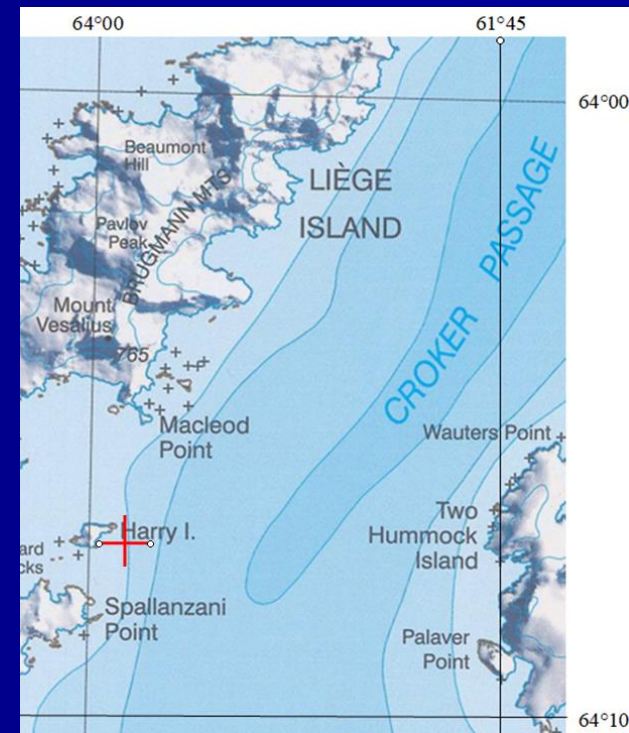
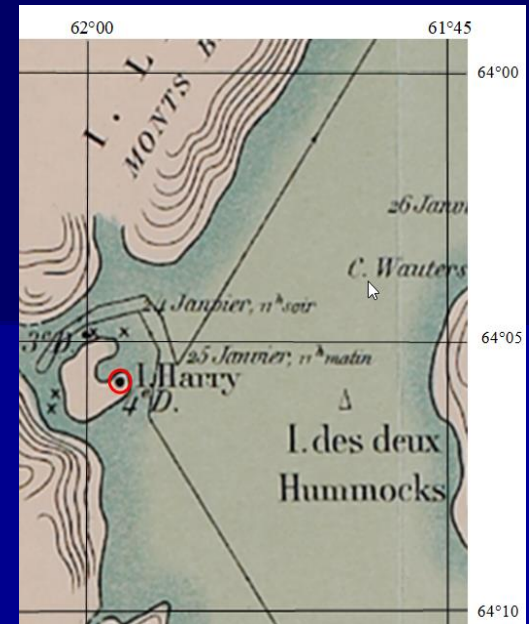
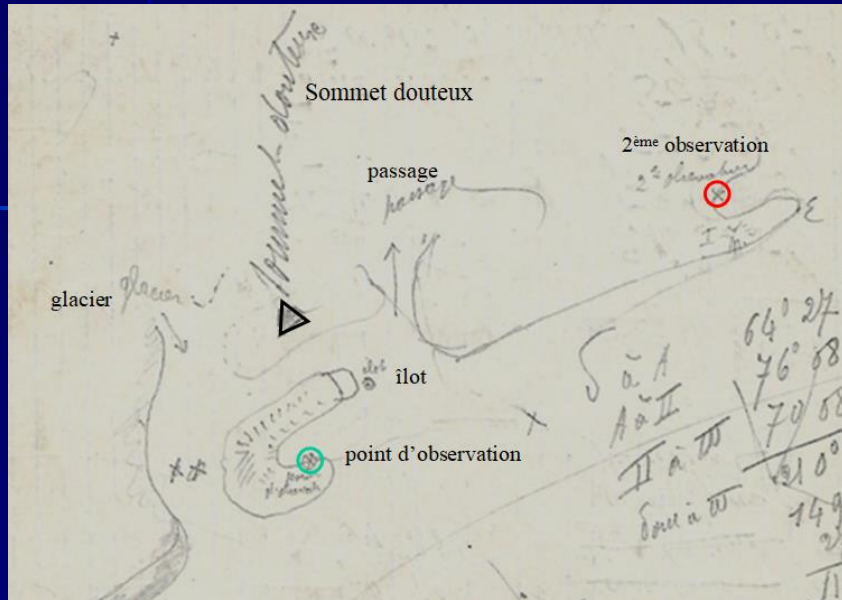
65°01'26"S - 63°48'46 W

Observations Astronomiques

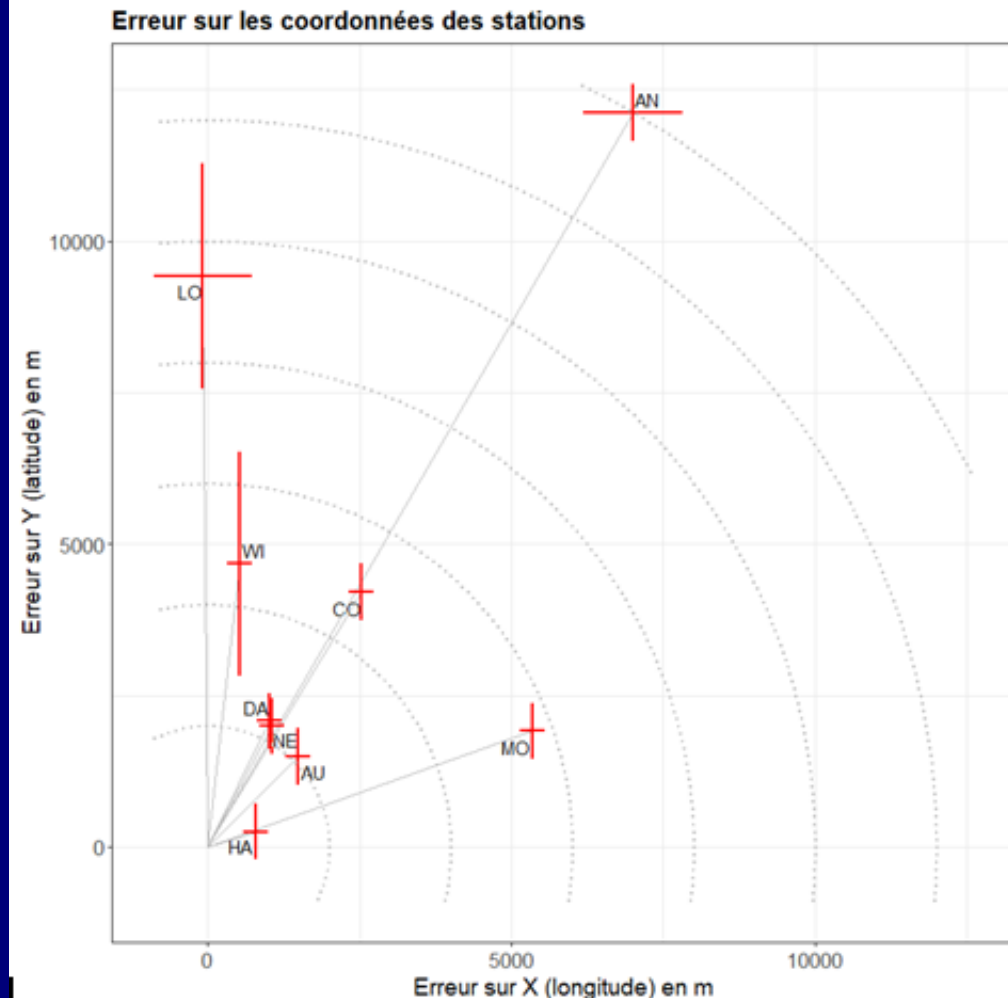
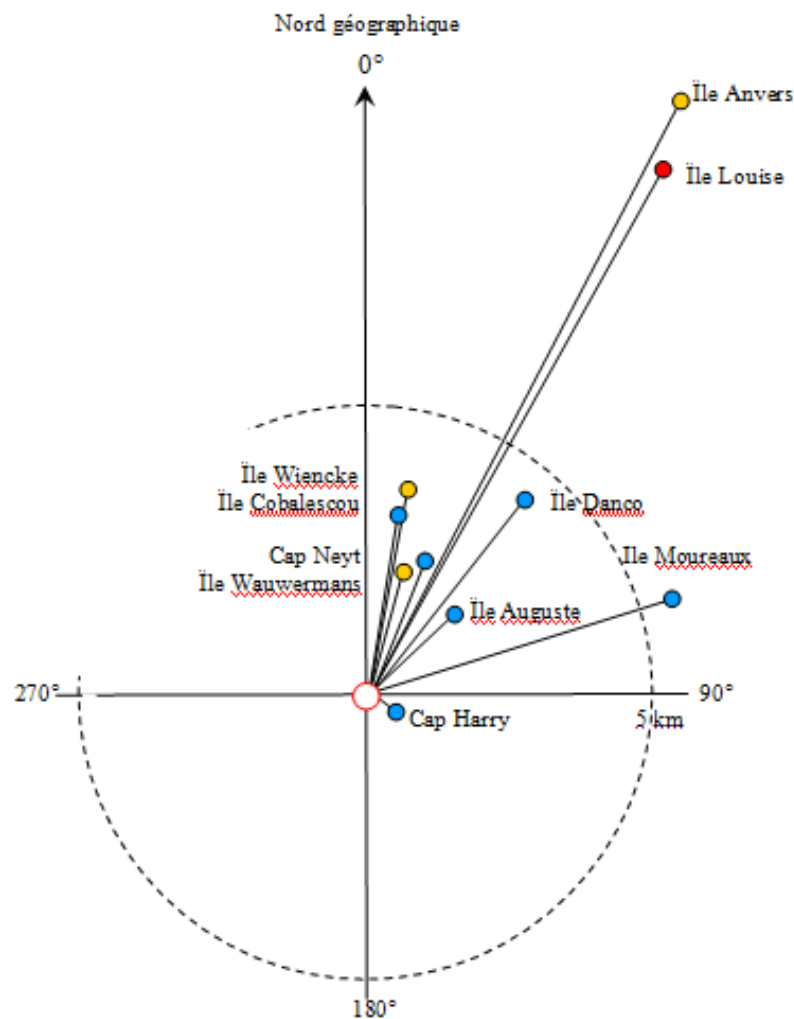
Base du lever



Ile Harry



Erreurs sur les coordonnées des stations



Comparaisons

Lecoinge 1898

BAS 2022

2022 GE

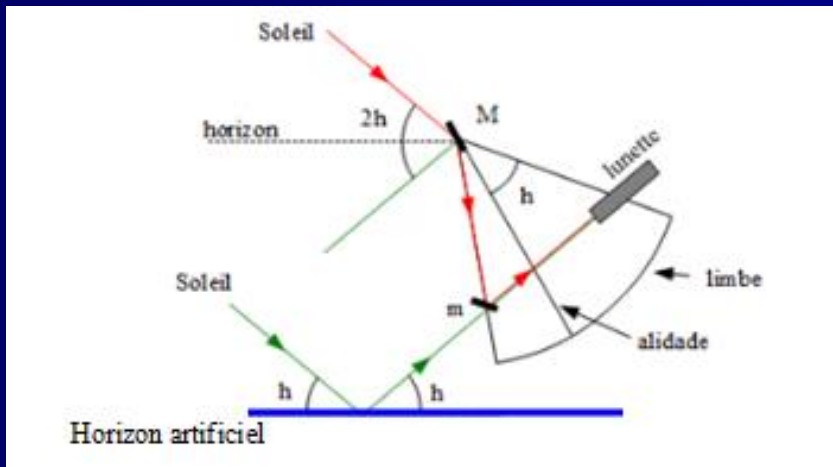
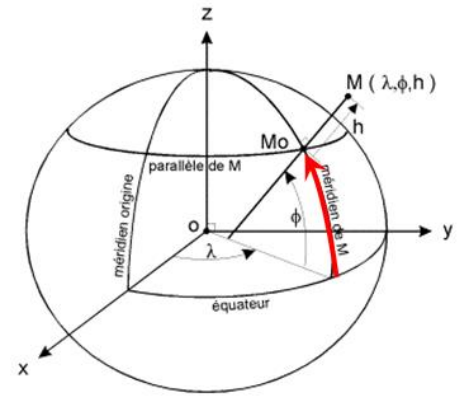
Nom	Lecoinge 1898		Auteur 2 (BAS1)		Auteur 1 (GE, LIMA, BAS2)	
	Long	Lat	Long	Lat	Long	Lat
Cap Neyt	61°47'15"W	63°57'06"S	61°48'29"W	63°58'24"S	61°49'32"W	63°58'11"S
Ile Auguste	61°35'03"W	64°02'26"S	61°37'56"W	64°03'12"S	61°37'52"W	64°03'14"S
Ile Harry	61°58'45"W	64°07'19"S	61°59'15"W	64°07'09"S	61°60'43"W	64°07'27"S
Récifs près de l'Ile Louise	62°22"W	64°31'S	62°29'34"W	64°36'04"S	62°23'34"W	64°36'15"S
Ile Anvers	62°56"W	64°31'38"S	62°03'54"W	64°37'20"S	61°05'49"W	64°38'10"S
Ile Wiencke	63°29'01"W	64°77'S	63°30'00"W	64°49'00"S	63°25'28"W	64°47'25"S
Terre de Danco Cap Renard	63°49'46"W	65°01'26"S	63°52'21"W	65°01'16"S	63°51'04"W	65°03'33"S
Une des Iles Moureaux	63°00'27"W	65°04'24"S	63°07'16"W	65°05'20"S	63°07'17"W	65°05'26"S
Iles Wauwermans	63°42"W	64°54'22"S	63°43'42"W	64°56'36"S		
Ile Cobalescu	61°36'00"W	64°08'30"S	61°39'06"W	64°11'42"S	61°39'07"W	64°11'46"S

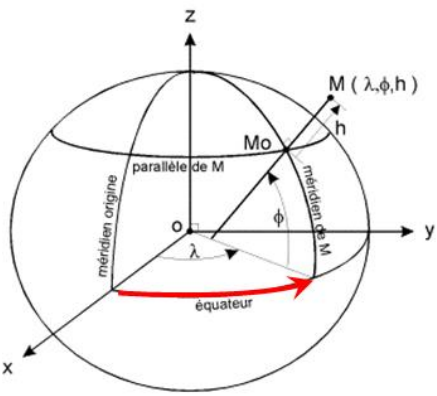
- Longitude λ $\sigma = 5 \text{ sec}$ $1 \text{ sec} = 200 \text{ m}$
- Latitude φ $\sigma = 15''$ $1'' = 31 \text{ m}$

SEXTANT

« Toutes nos observations astronomiques relatives aux coordonnées géographiques ont été faites au sextant ... »

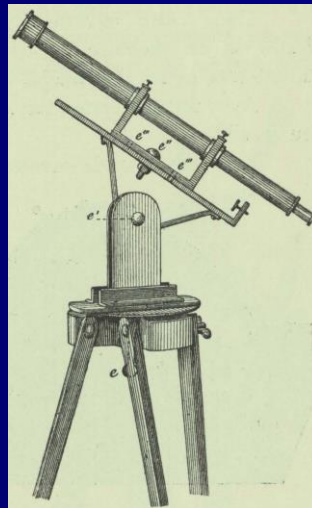
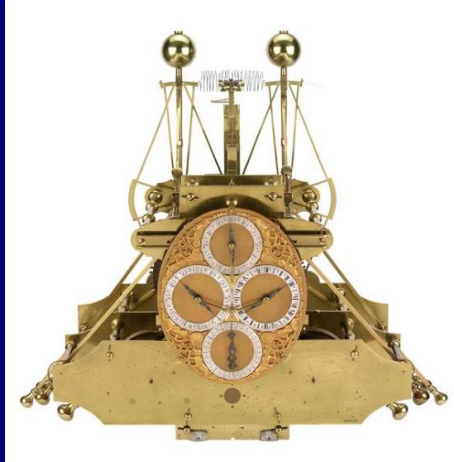
Latitude => **Angle** => **Sextant**





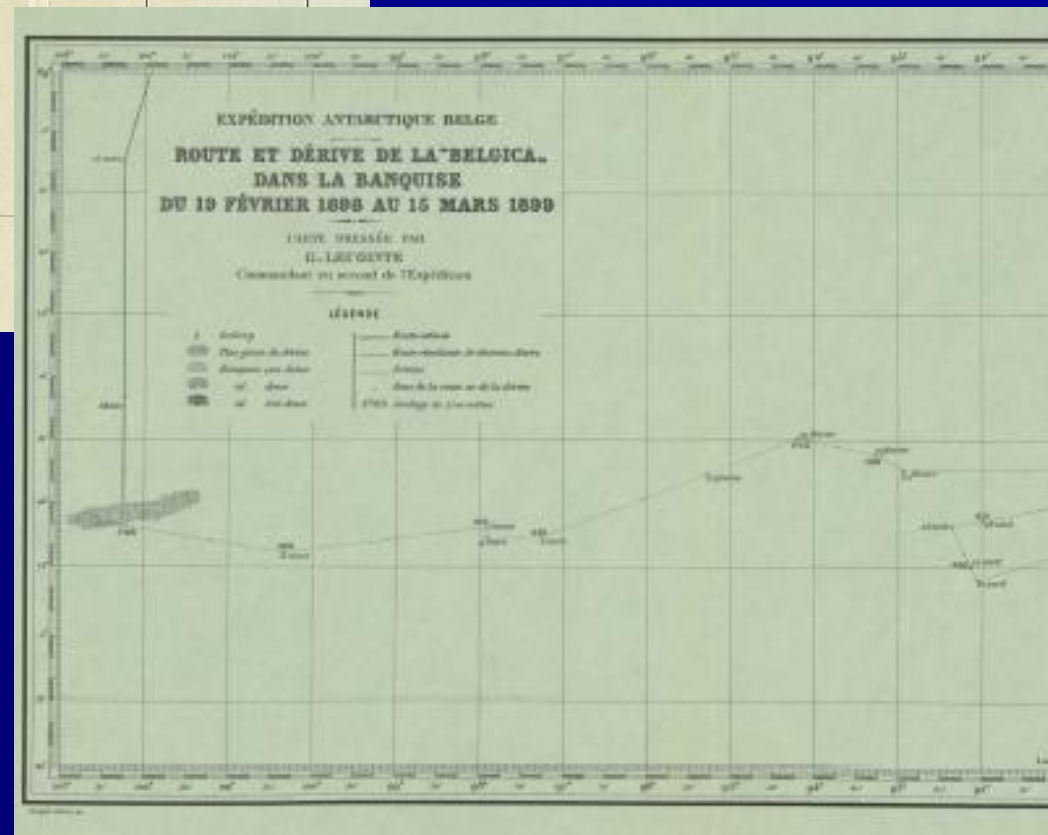
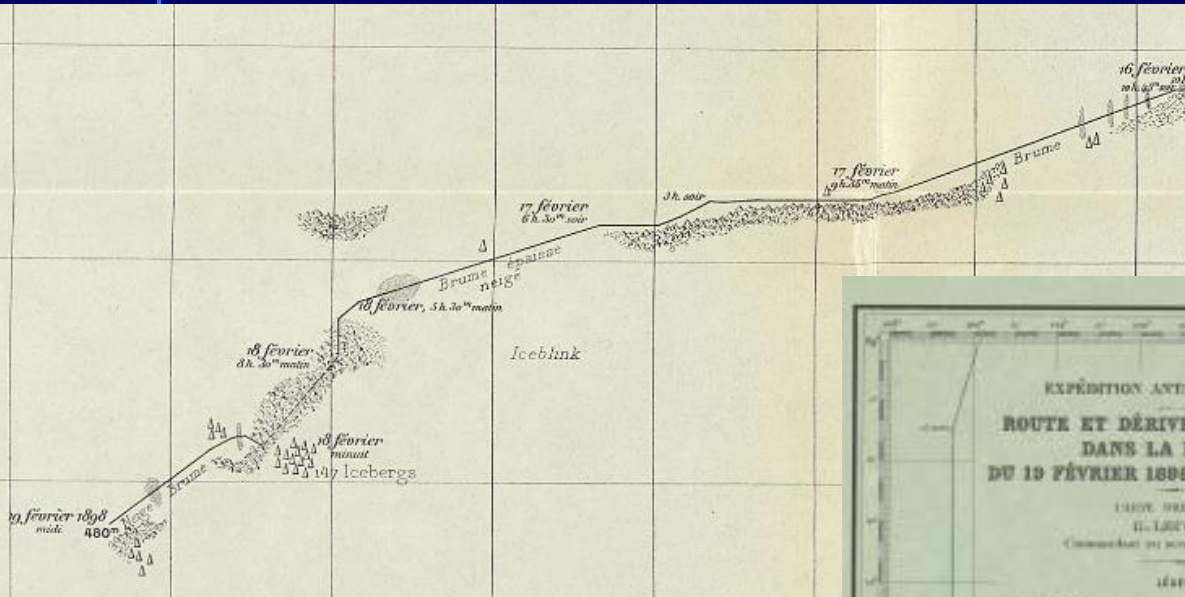
CHRONOMETRE

Longitude => Heure => Chronomètre

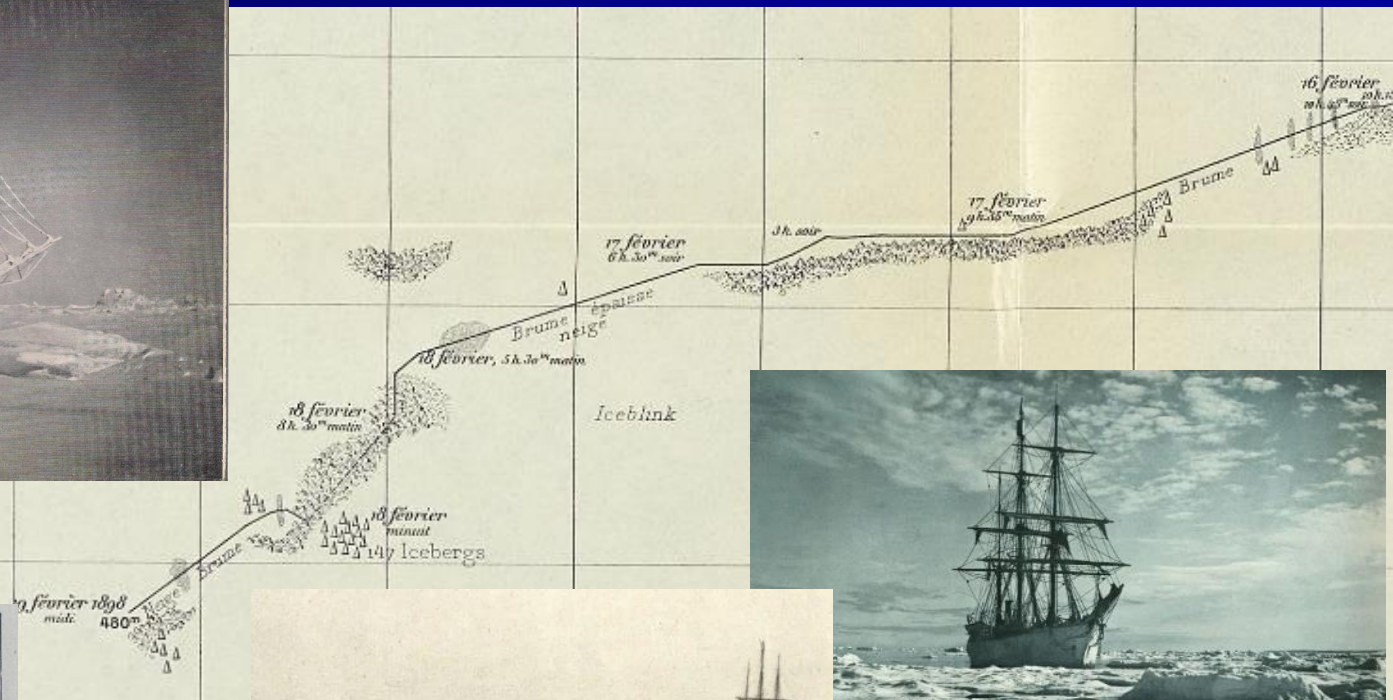


Route et Dérive de la «Belgica» dans la Banquise – du 13 au 19 février

Route et Dérive de la «Belgica» dans la Banquise – du 19 février 1898 au 13 mars 1899



Prise dans les glaces entre le 20 mars 1898 et le 14 mars 1899 la Belgica dérive



LECOQ AU TRAVAIL PRÈS DE SON OBSERVATOIRE





Mount William and Neumayer Channel



1898
2008

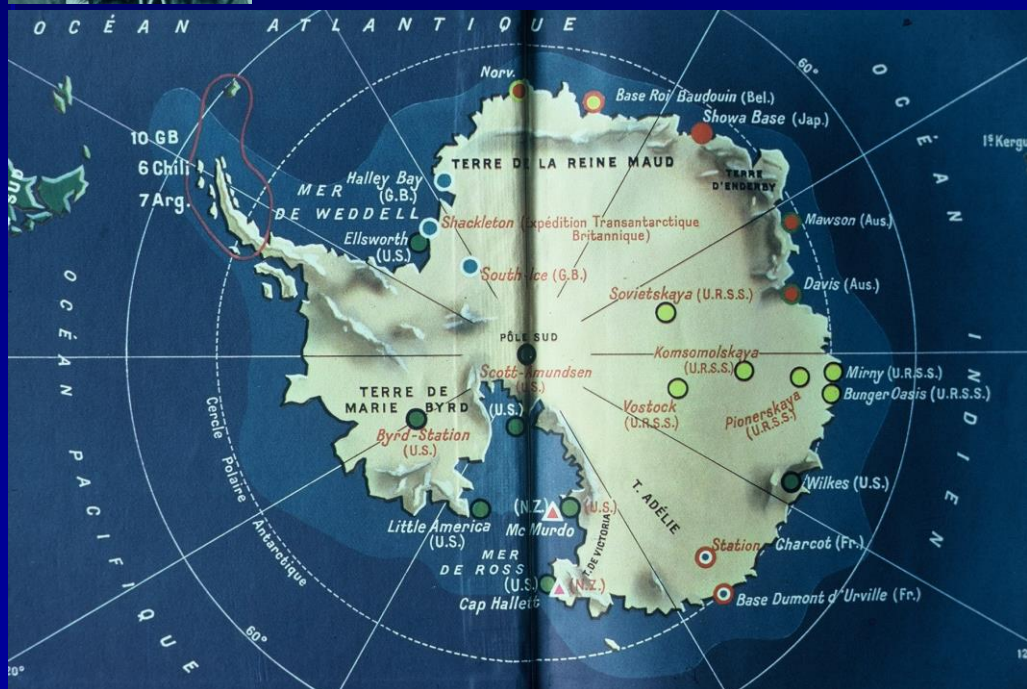


1957 -1958

Année Géophysique Internationale



Construction de la
Base Roi Baudouin



1957 - 1961 **3** Expéditions Belges

1964 – 1968 **3** Expéditions Belgo-Néerlandaises

- Météorologie
- Géomagnétisme
- Ionosphère
- Aurores
- Electricité atmosphérique
- Radioactivité
- Physiologie - Médecine
- Ozone
- Gravimétrie
- Géodésie – Photogrammétrie - Cartographie
- Géologie
- Glaciologie
- Océanographie
- Biologie – Zoologie - Botanique



Antwerpen – Cape Town



BRUXELLES
TRIPOLI
KANO
LUANDA



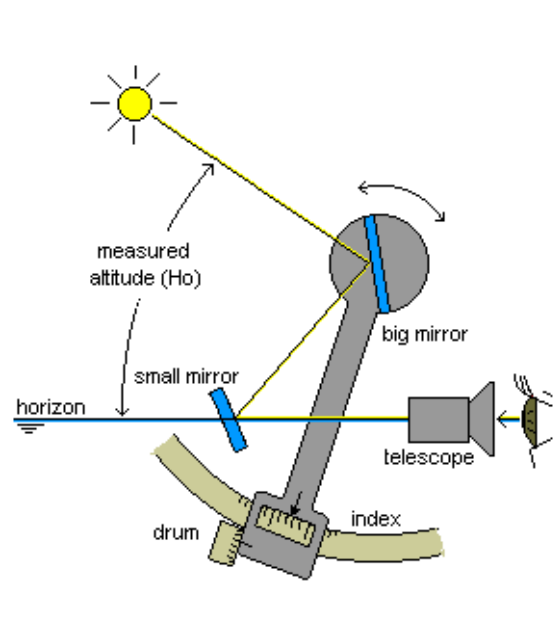
LUANDA
CAPE TOWN



CAPE TOWN
BASE ROI BAUDOUN

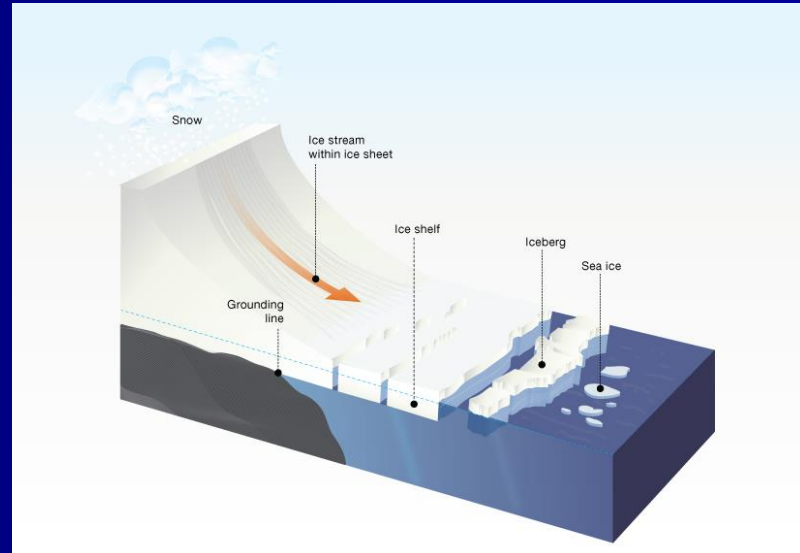
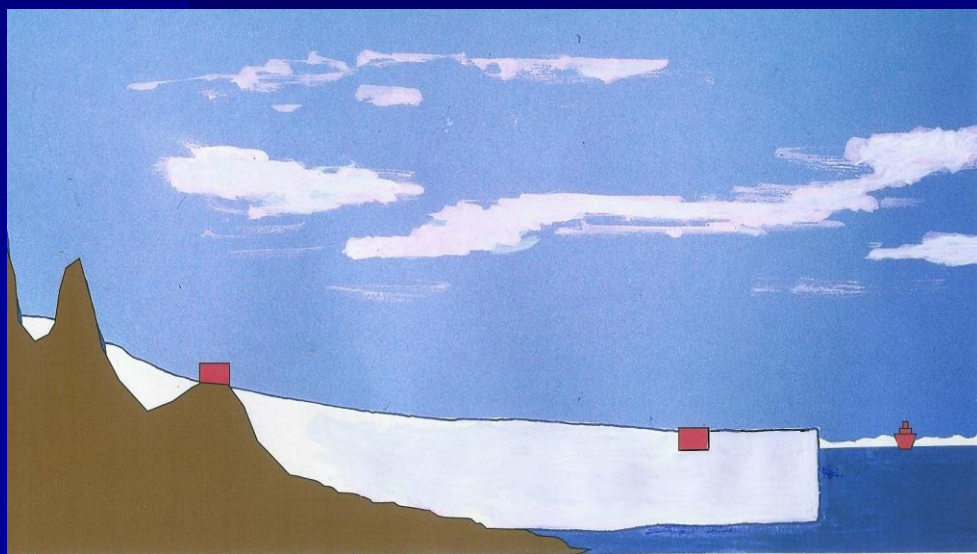
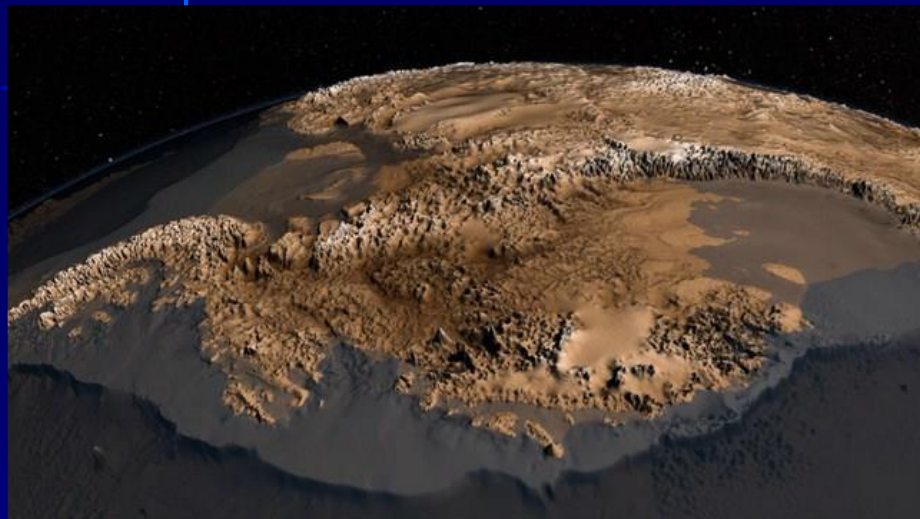








Le continent Antarctique

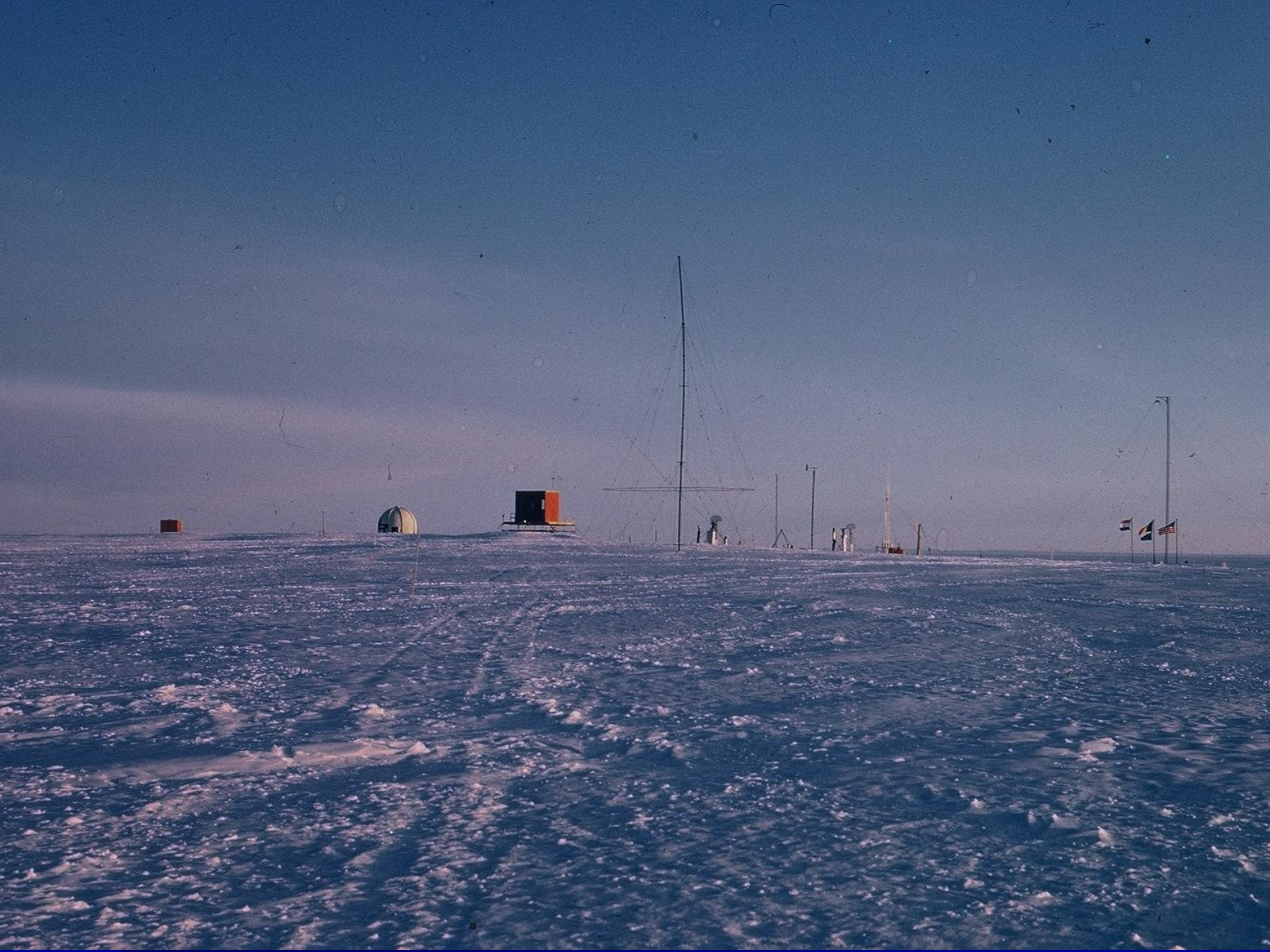












Discipline Géodésie



- Astronomie de position
- Mesure d'azimut
- Cartographie - Photogrammétrie
- Gravimétrie
- Triangulations
- Mesure de déplacement des glaciers
- Topographie

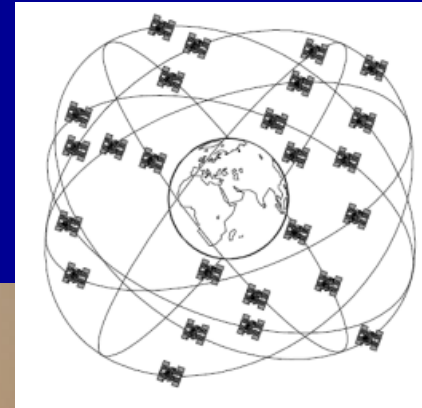
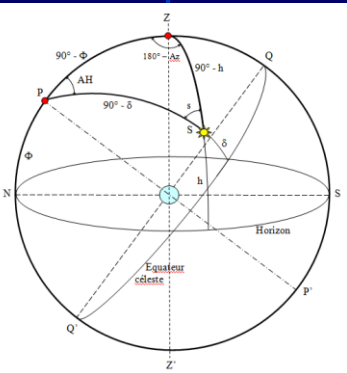
Coordonnées Géographiques

1965

2022

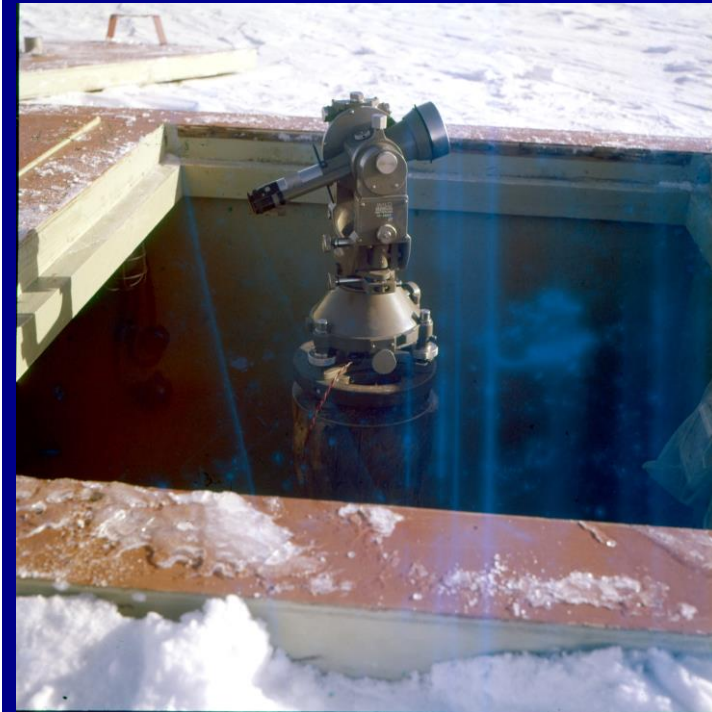
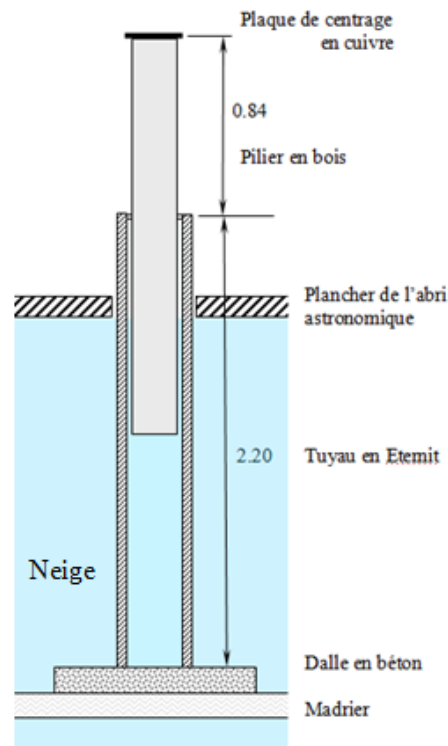
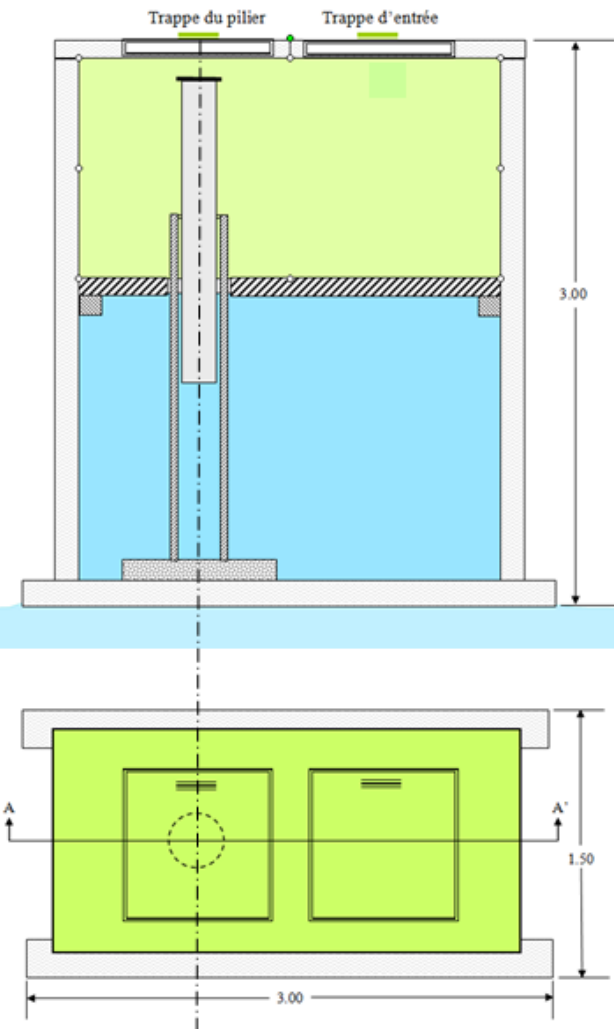
Astronomie de position

GNSS



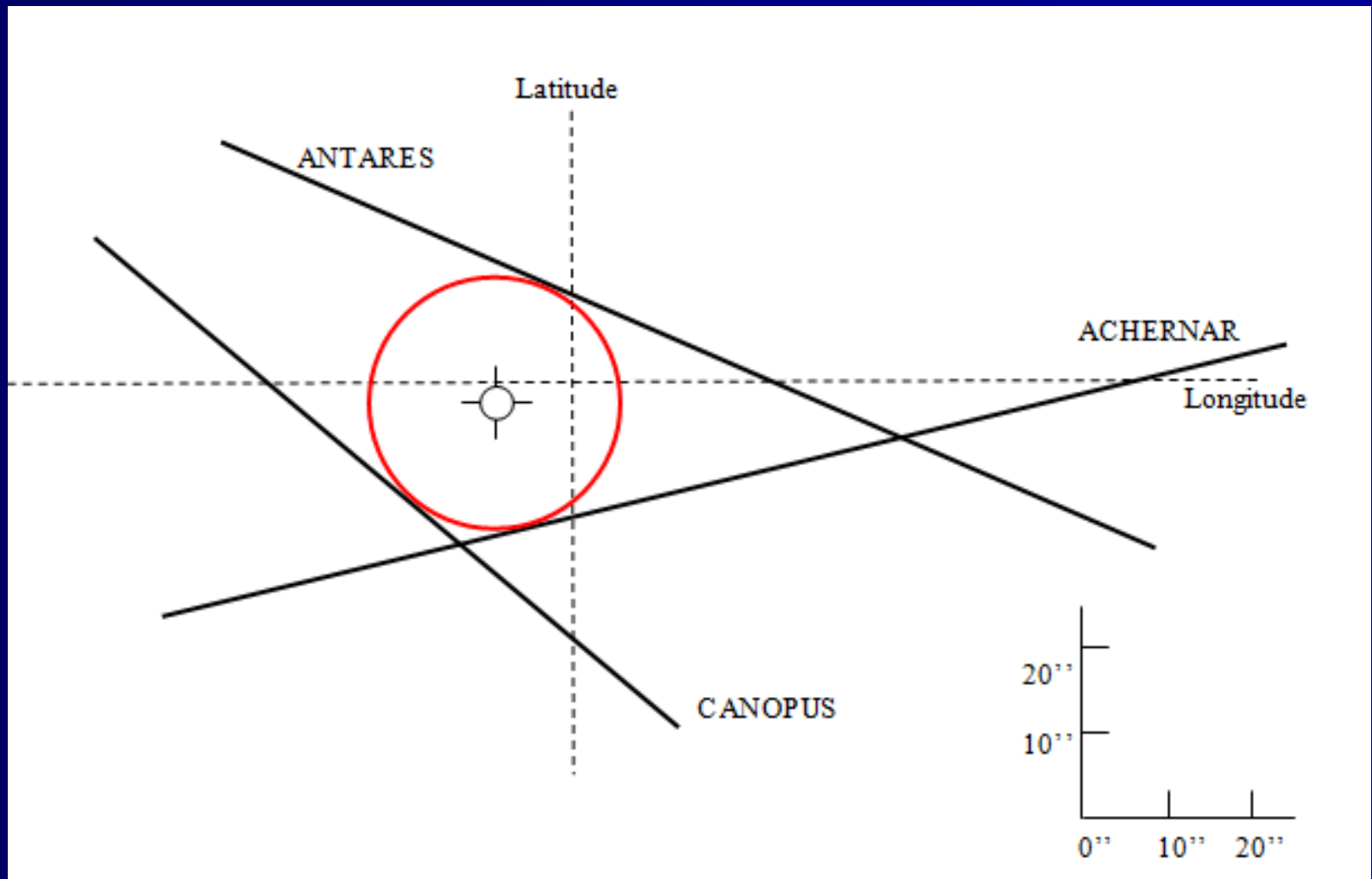
Abri Astronomique

Point “Astro BRB”



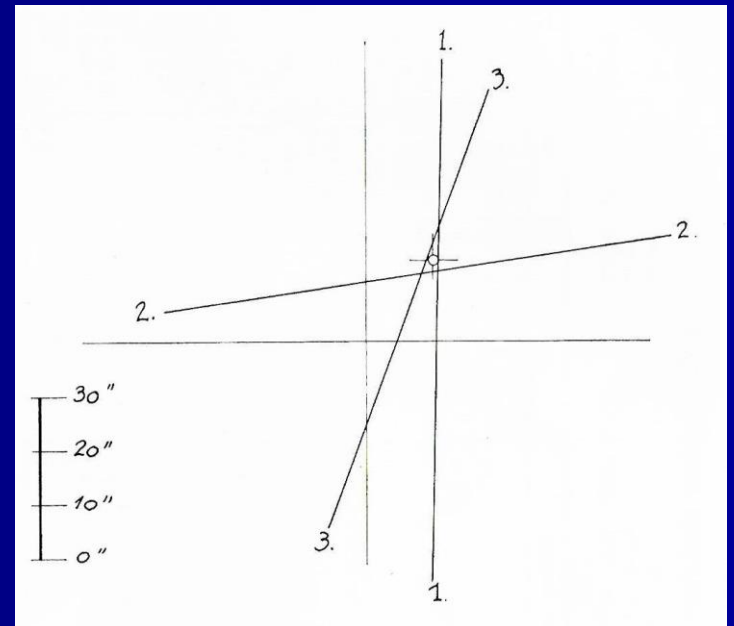
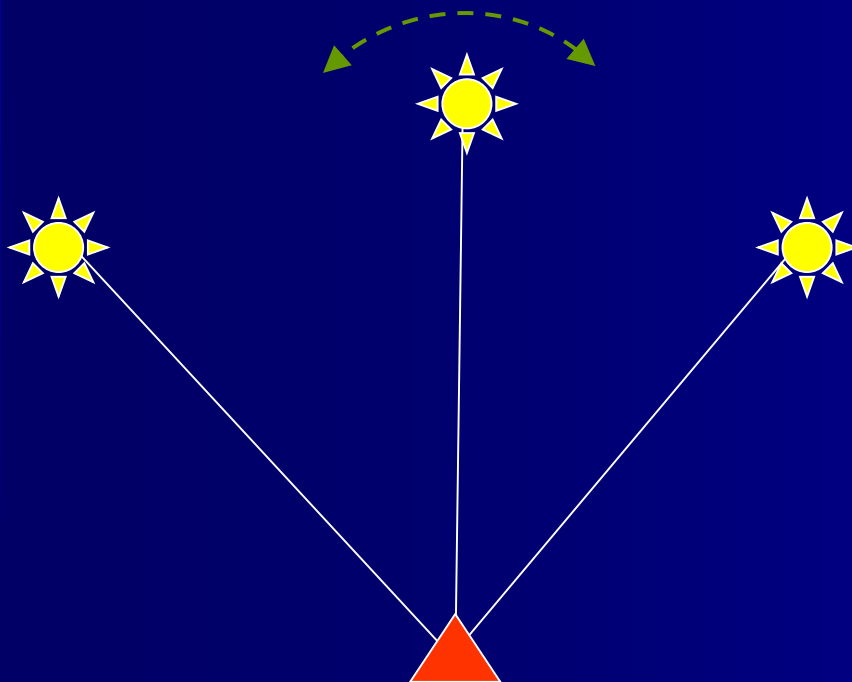
Point astronomique stellaire

hauteur calculée – hauteur observée



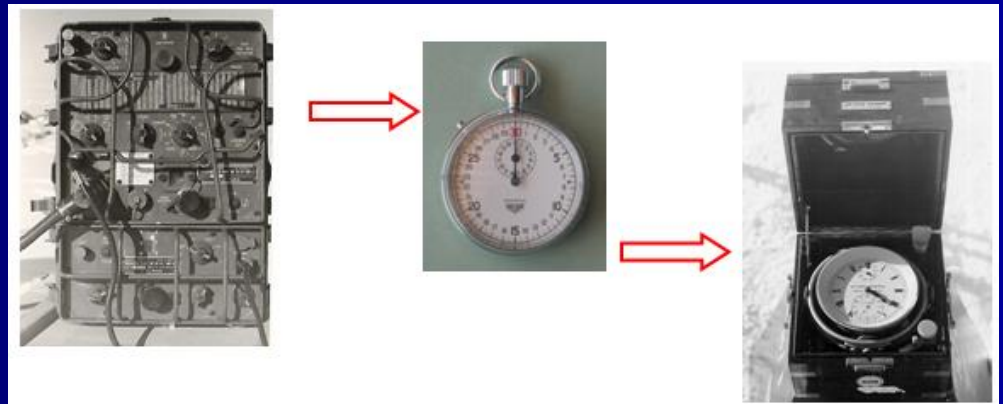
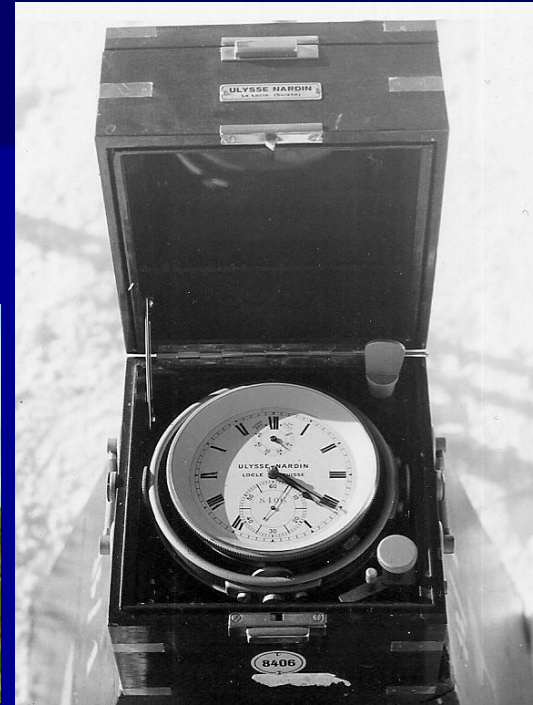
Point astronomique **solaire**

1 heure = 15°



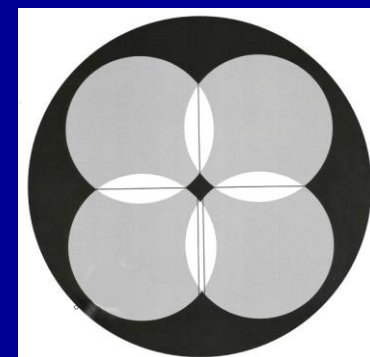
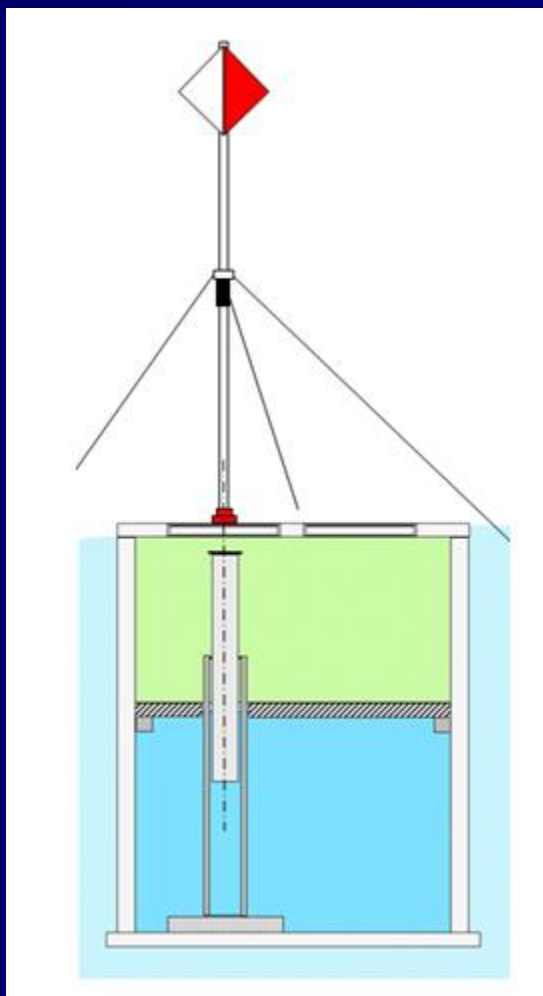
L'Heure

- Réglage du chronomètre
- Signaux horaires WWV



Visées sur le soleil

Théodolite T3 + prisme Roelofs



Base Roi Baudouin – Coordonnées Géographiques

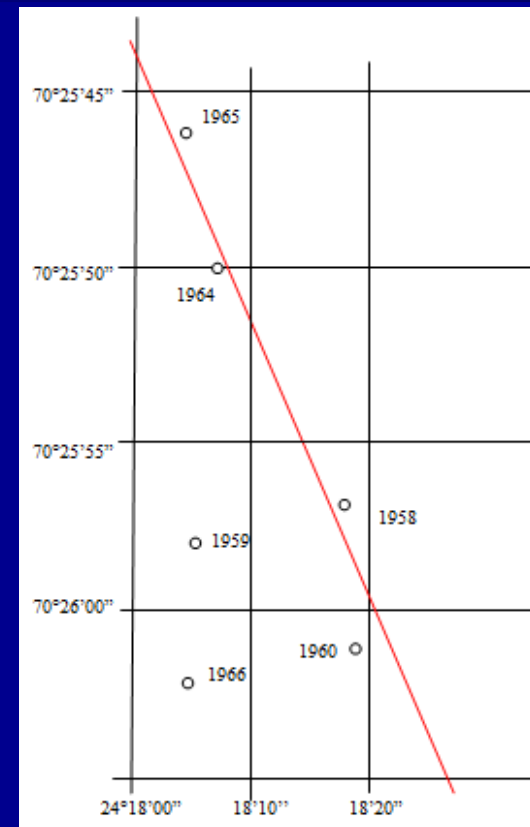
Pilier Astro BRB Mouvement

Observations 1958 - 1966

Année	Latitude Sud	σ	Longitude Est	σ	Date	Mesuré par	Rem.
1958	70° 25' 57"	4"	24° 18' 18"	5"	09.06.1958	J. Loodts	(1)
1959	70° 25' 58"	-	24° 18' 05"	-	---	K. Blaicklock	(2)
1960	70° 26' 01"	-	24° 18' 19"	-	---	K. Blaicklock	(3)
1964	70° 25' 50"	1"	24° 18' 07"	3"	27.10.1964	J. Loodts	(4)
1965	70° 25' 46"	5"	24° 18' 04"	1"	29.08.1965	J.-J. Derwael	(5)
1966	70° 26' 02"	-	24° 18' 04"	-	---	E. Lallemand	(6)

Observations 1965

Date	Nombre d'étoiles observées	Latitude ϕ	Longitude λ
06.07.'65	3	70° 25' 52''5	24° 18' 05''5
09.07.'65	4	51''3	04''1
10.07.'65	3	41''7	03''4
12.07.'65	4	41''2	05''8
01.09.'65	6	42''5	04''7
22.10.'65	4	47''7	03''3
Moyenne pondérée ¹⁵		70° 25' 46''8	24° 18' 04''5
Ecart type		5''05	1''05



Azimuth: 339,650 GON $\sigma = 4,067$ GON
 Distance : 119,47 m/an $\sigma = 2,381$ m/an

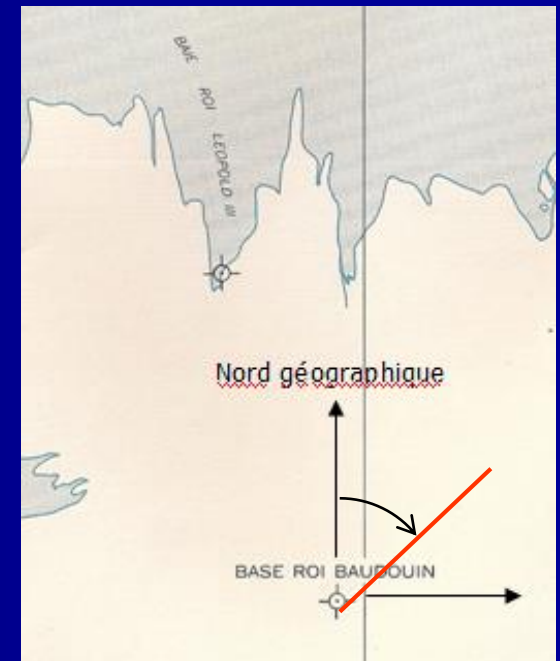
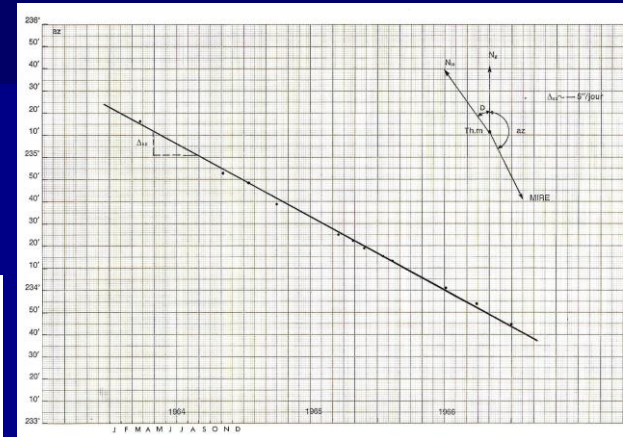
Mesures d'Azimuts

Geomagnetisme

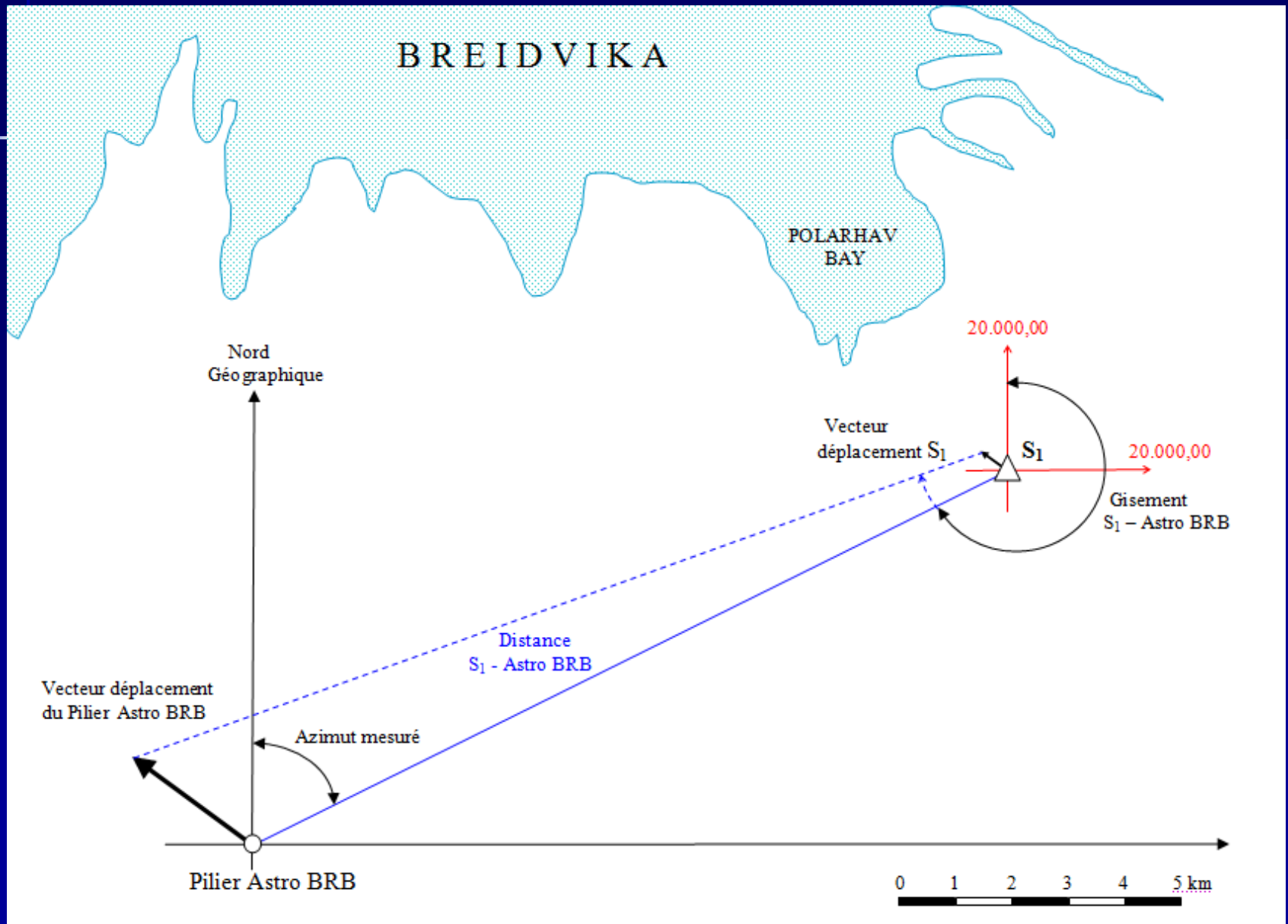
Base Roi Baudouin

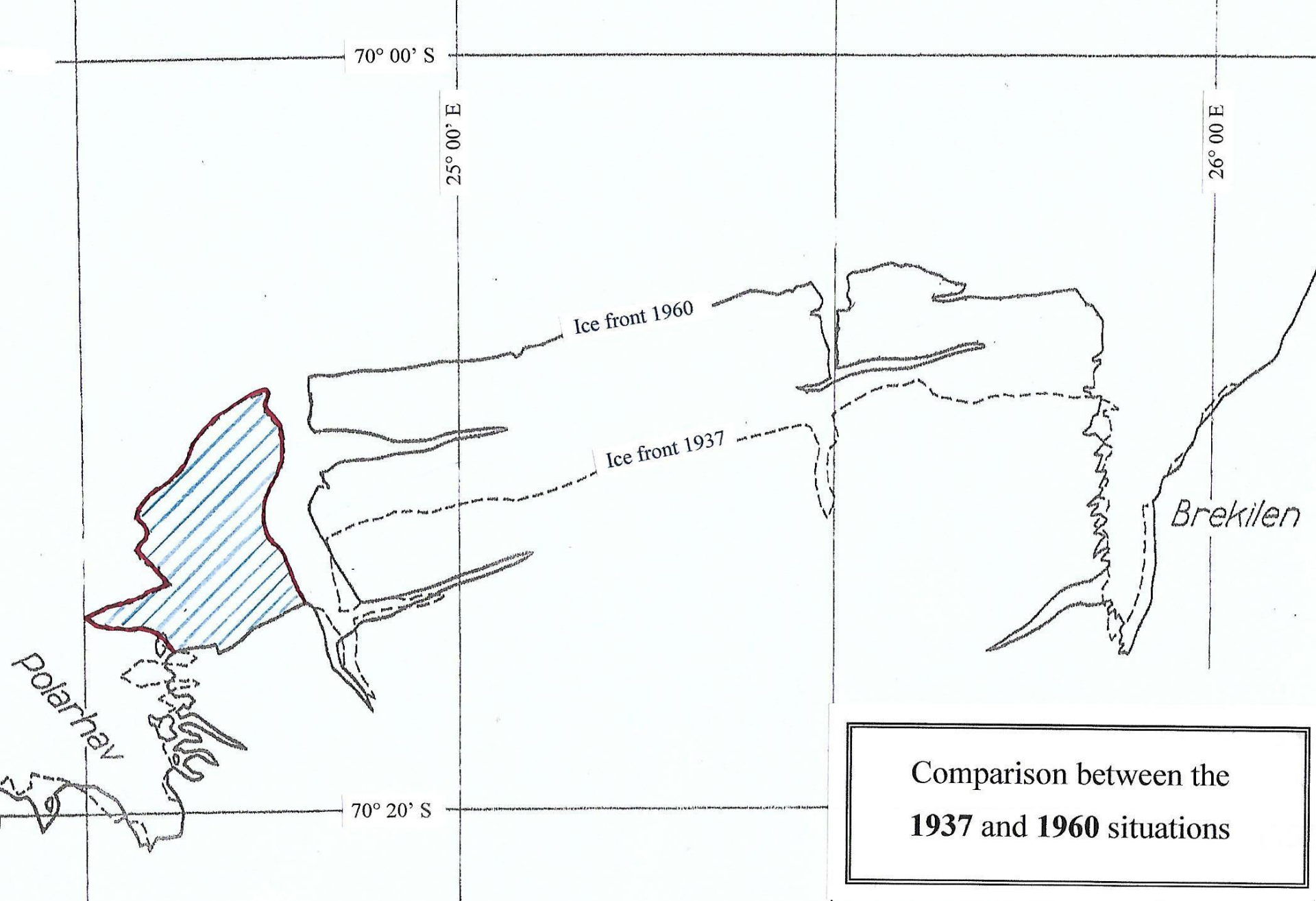
Année	Azimut	σ	Date	Mesuré par
1964	235° 10' 34"	-	23.03.1964	J. Loodts
	234° 51' 36"	3''1	08.11.1964	J. Loodts
1965	234° 48' 06"	-	13.01.1965	J. Loodts
	234° 37' 57"	5''7	31.03.1965	J.-J. Derwael
	234° 24' 39"	5''5	15.09.1965	J.-J. Derwael
	234° 21' 29"	5''7	21.10.1965	J.-J. Derwael
	234° 18' 39"	6''3	24.11.1965	J.-J. Derwael
1966	234° 14' 22"	6''1	13.01.1966	J.-J. Derwael
	234° 12' 42"	-	08.02.1966	E. Lallemand
	234° 00' 04"	-	02.07.1966	E. Lallemand
	233° 53' 10"	-	22.09.1966	E. Lallemand
	233° 43' 59"	-	31.12.1966	H. Declair

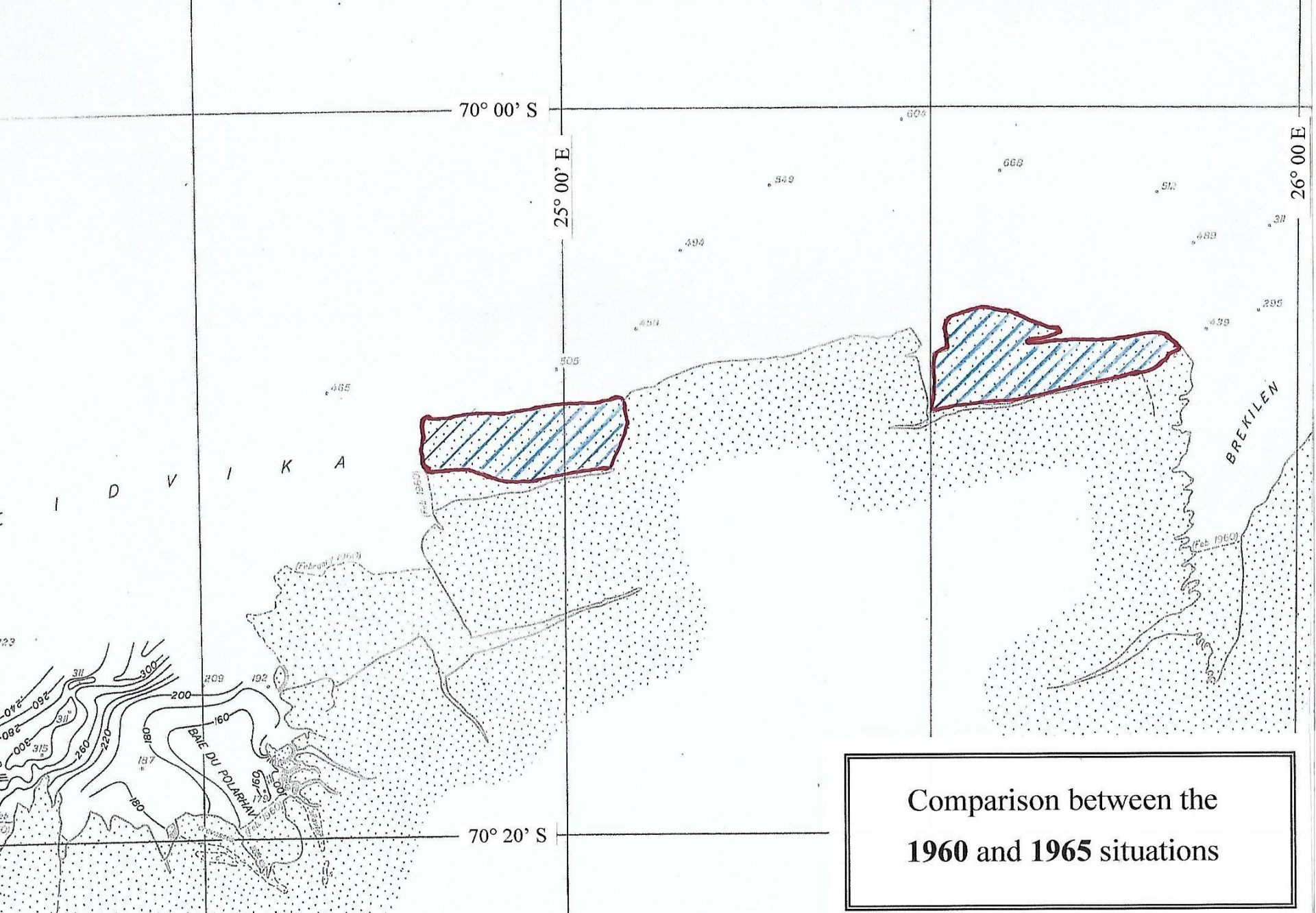
Orientation du réseau géodésique



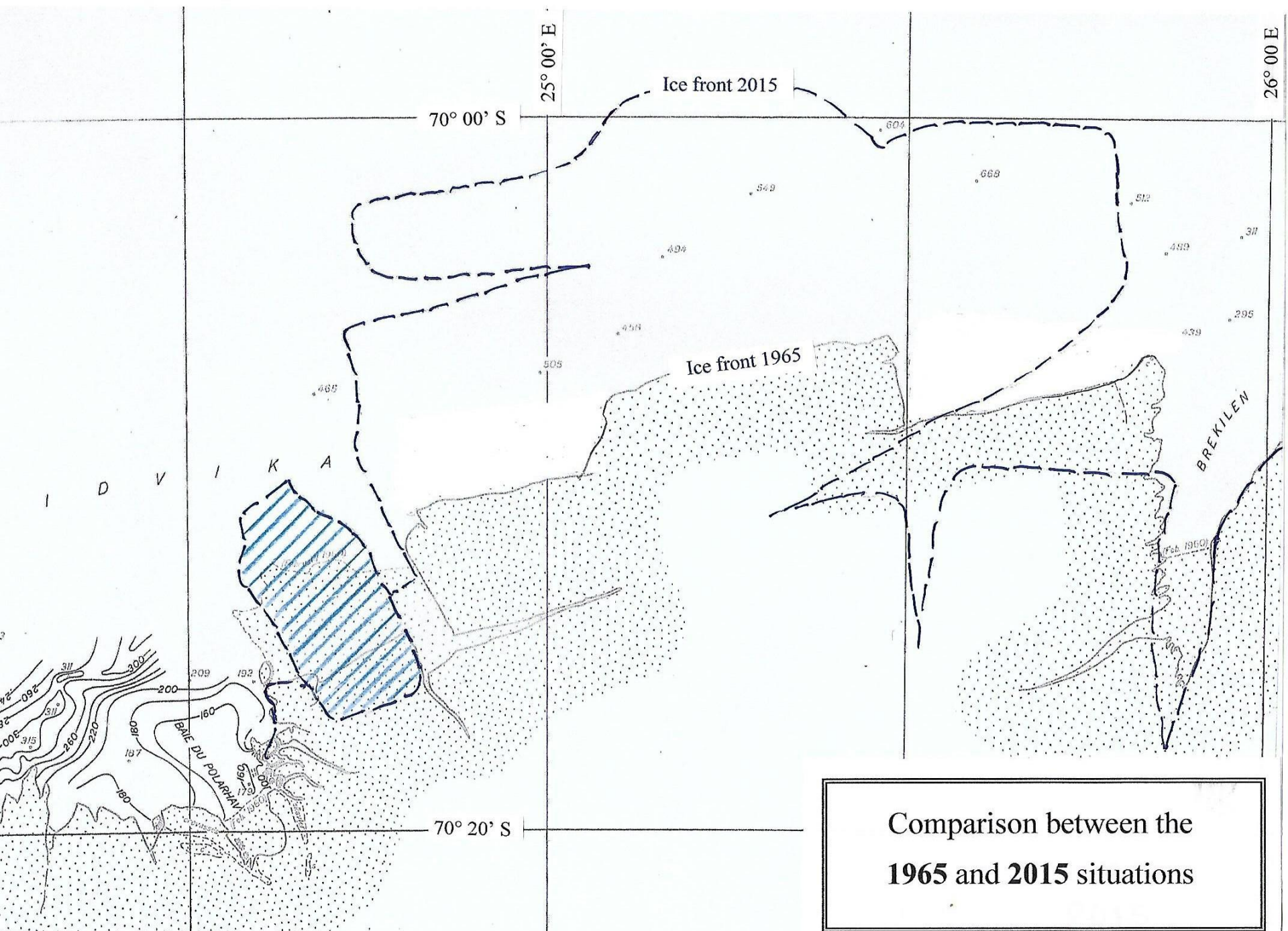
Point S1 => Astro BRB







Comparison between the
1960 and 1965 situations



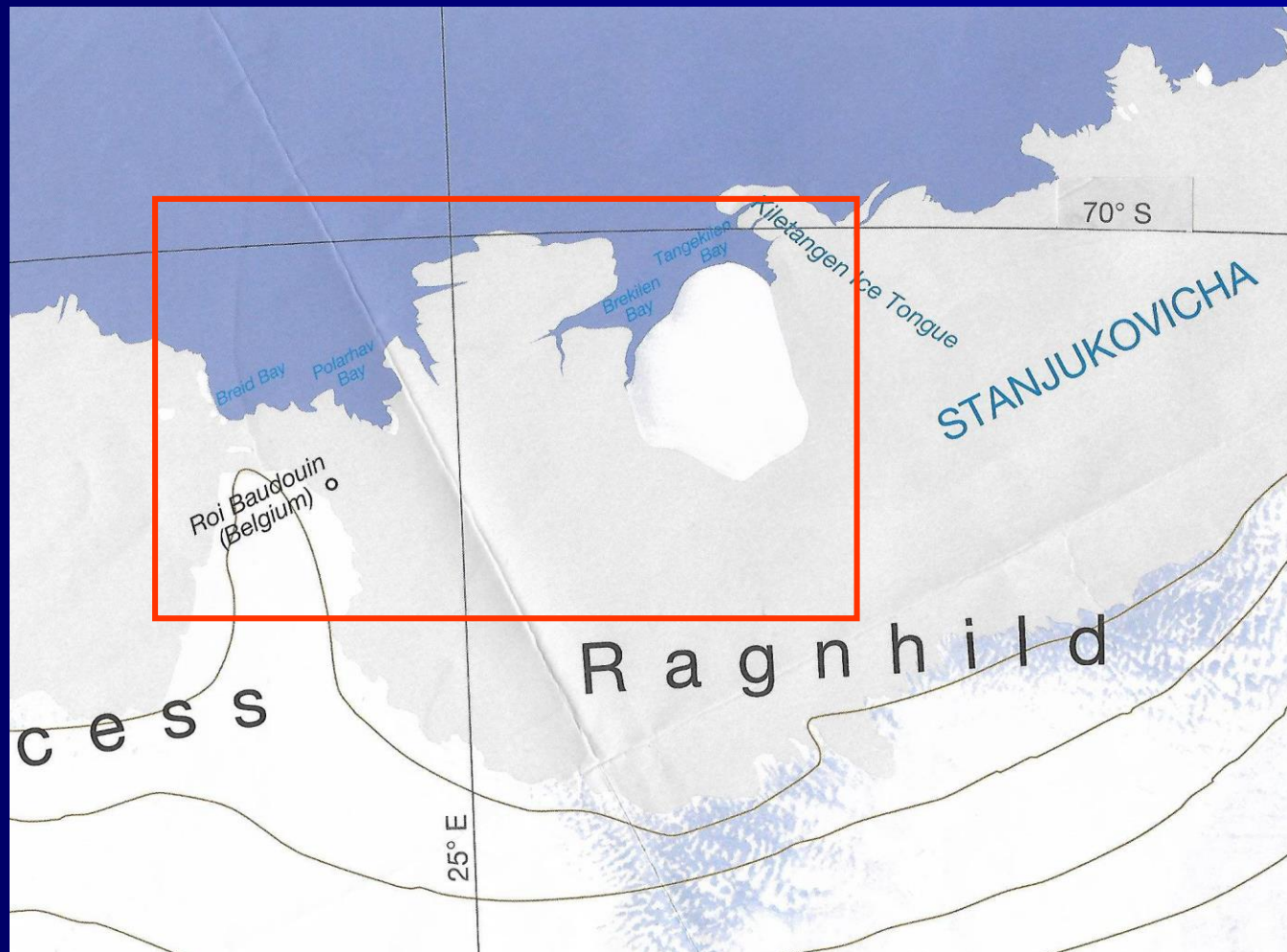
Programme

Calculer le vecteur de déplacement

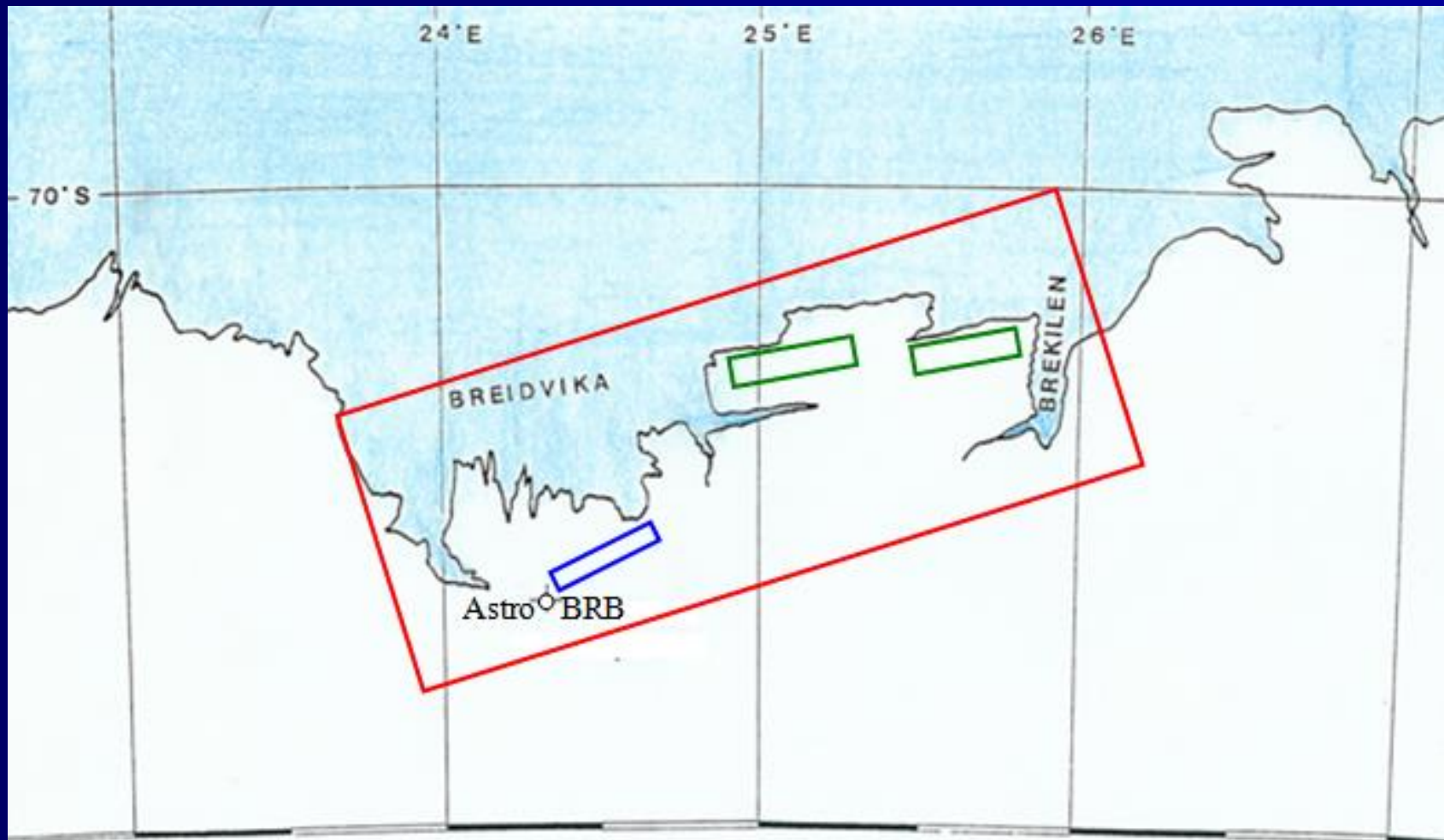
Déterminer l'altitude des points

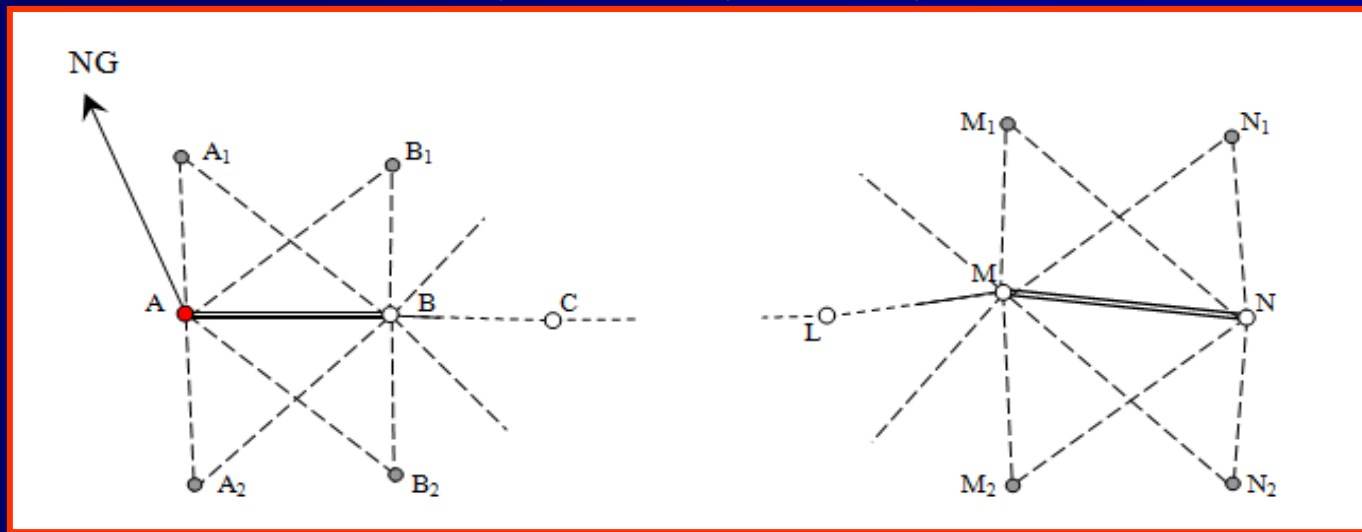
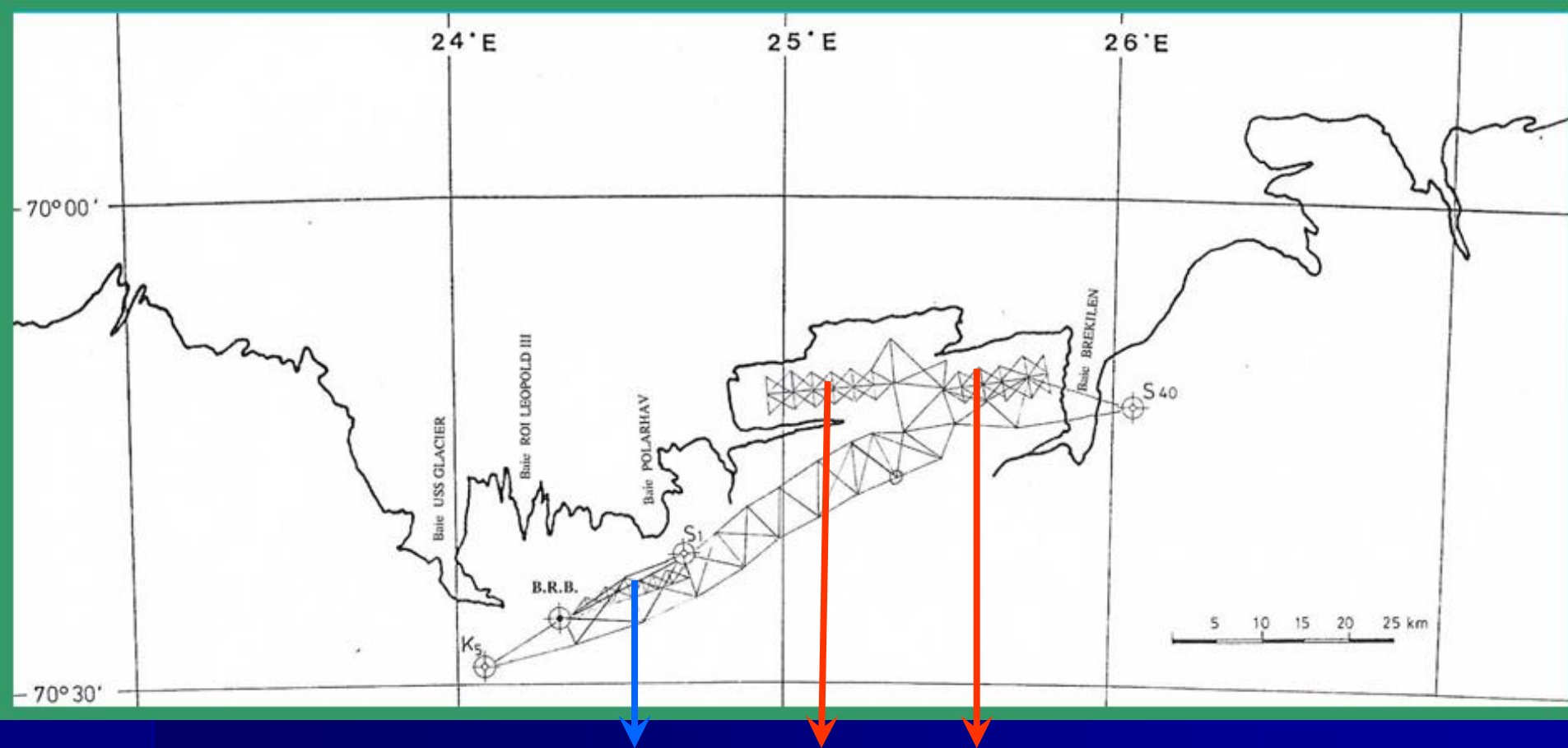
Mesurer l'enneigement des balises

Zone à étudier

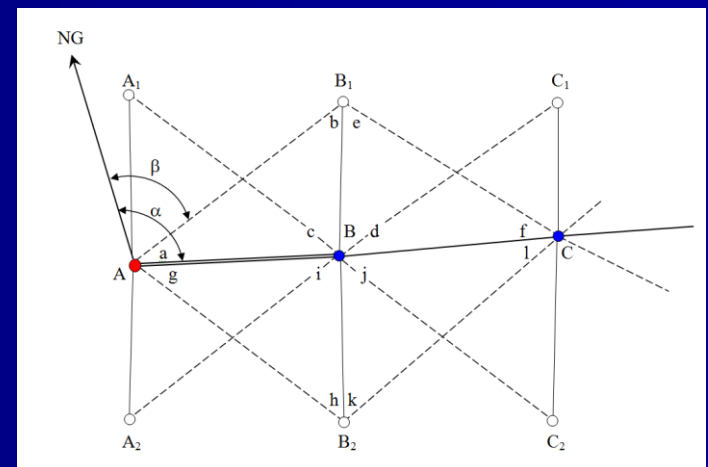
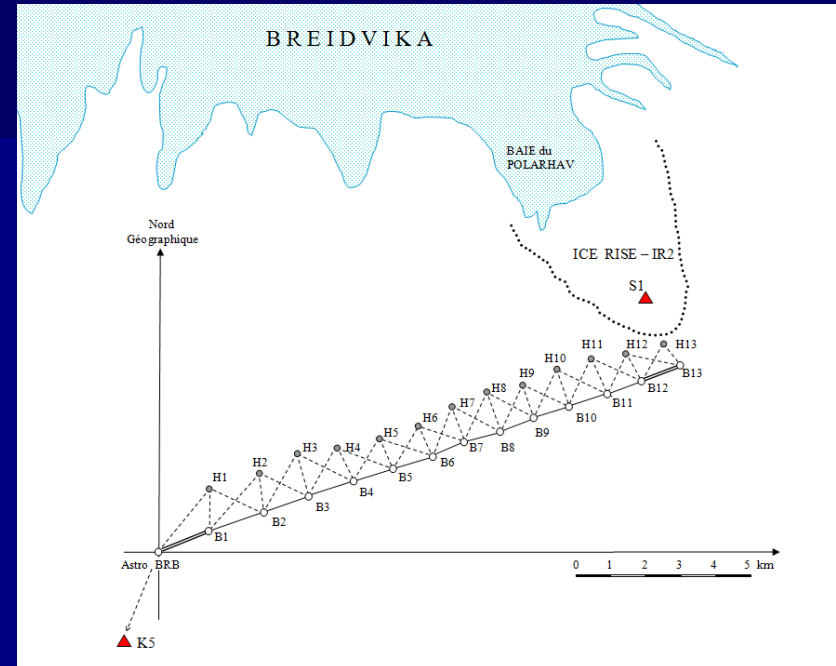
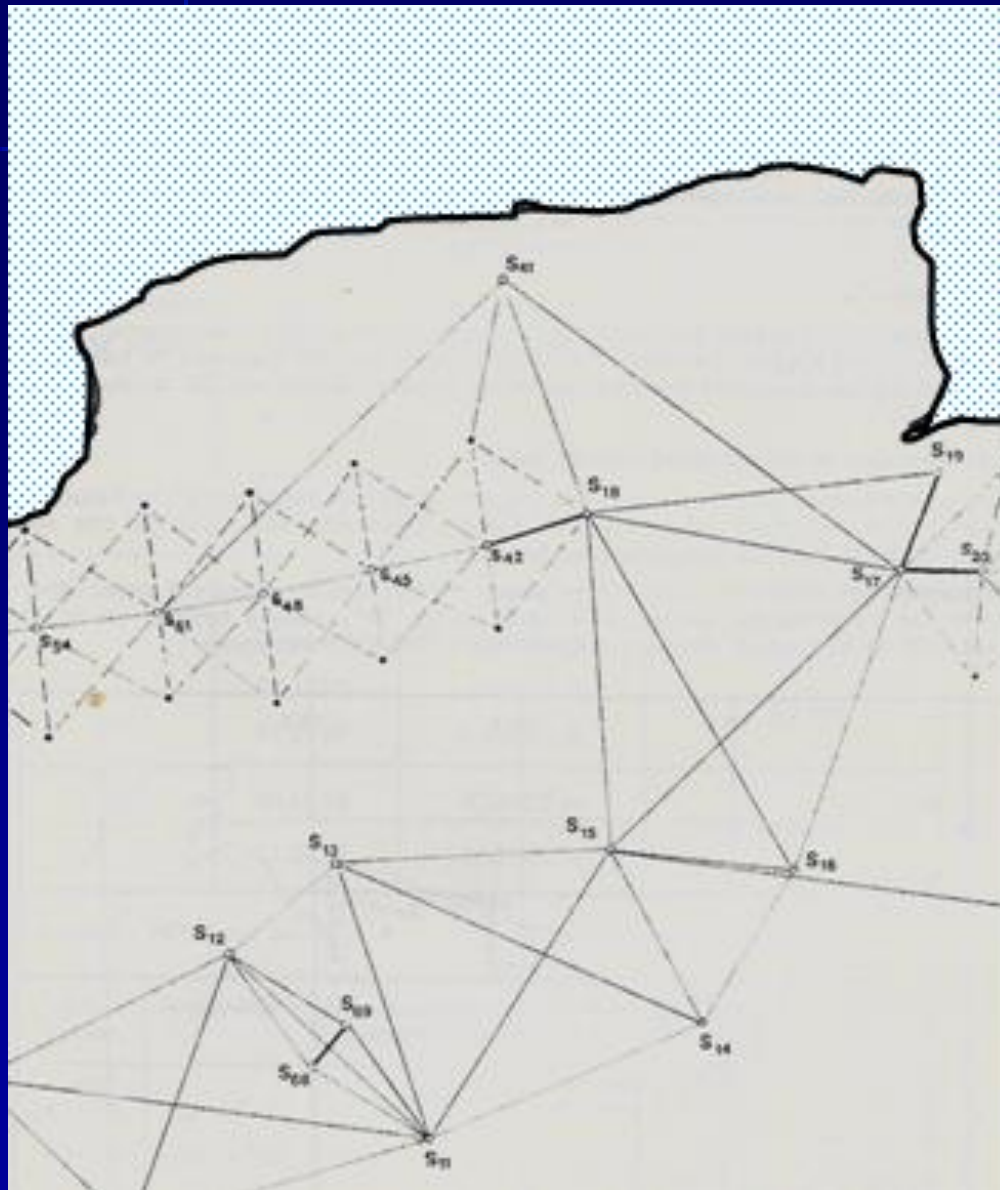


Réseau géodésique sur l'ice shelf





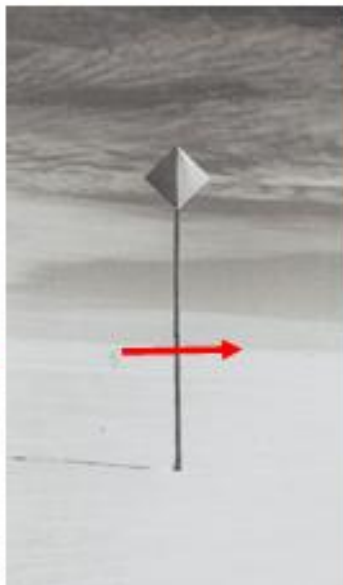
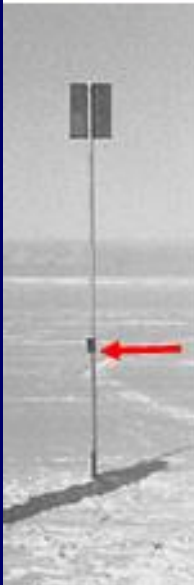
Triangulation – Chaine de triangles





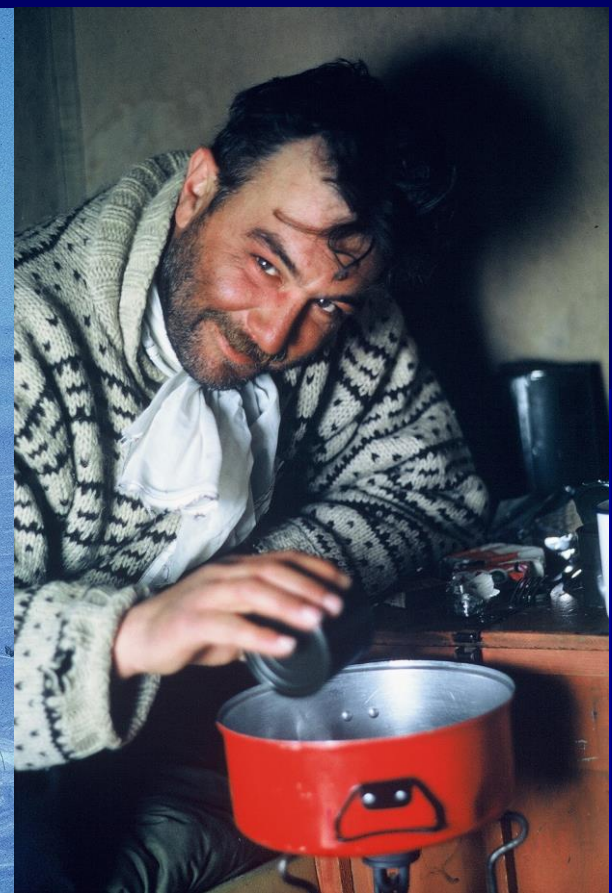


Matérialisation des points



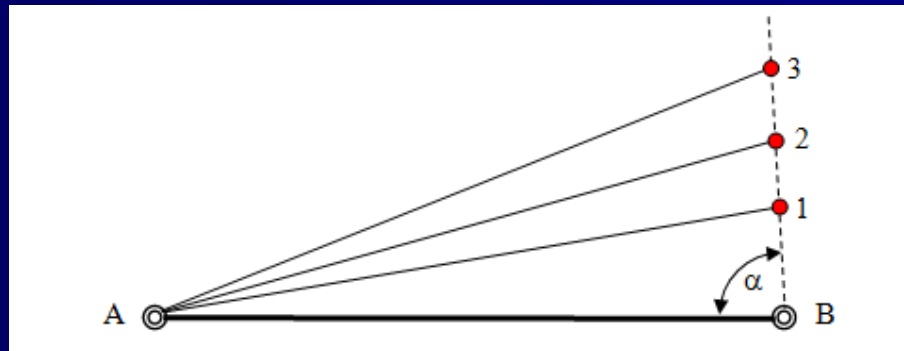
Mesure d'angles théodolite T3



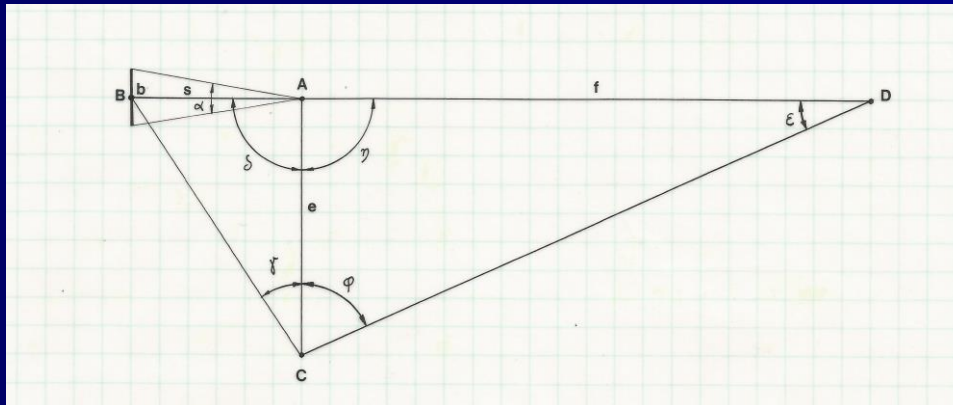


Mesures de distances

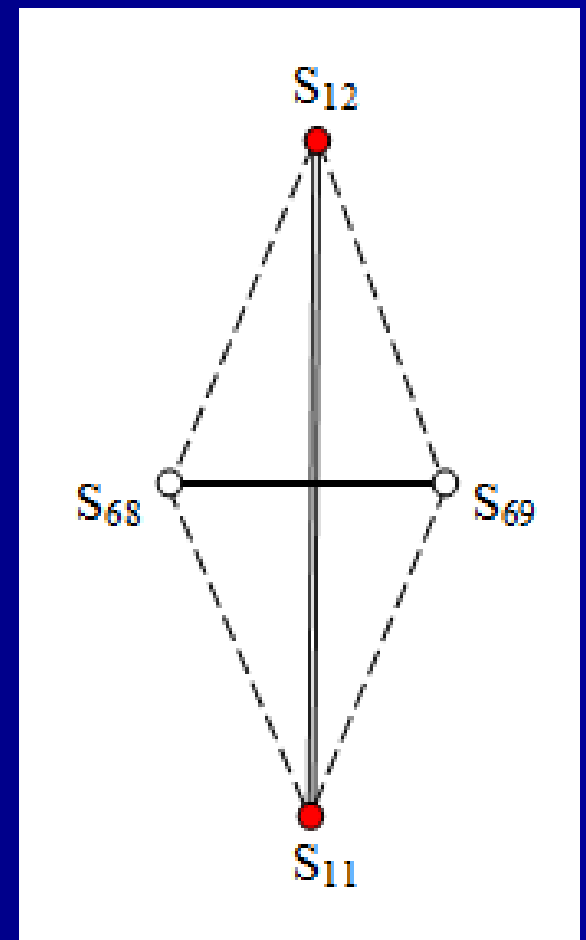
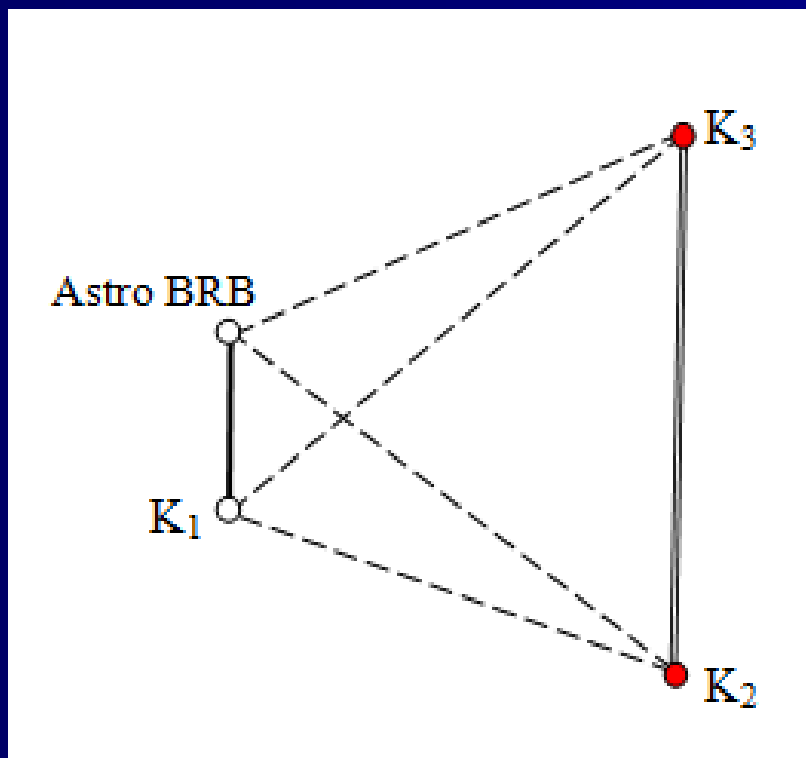
Ruban d'acier



■ Invar



Amplification de base



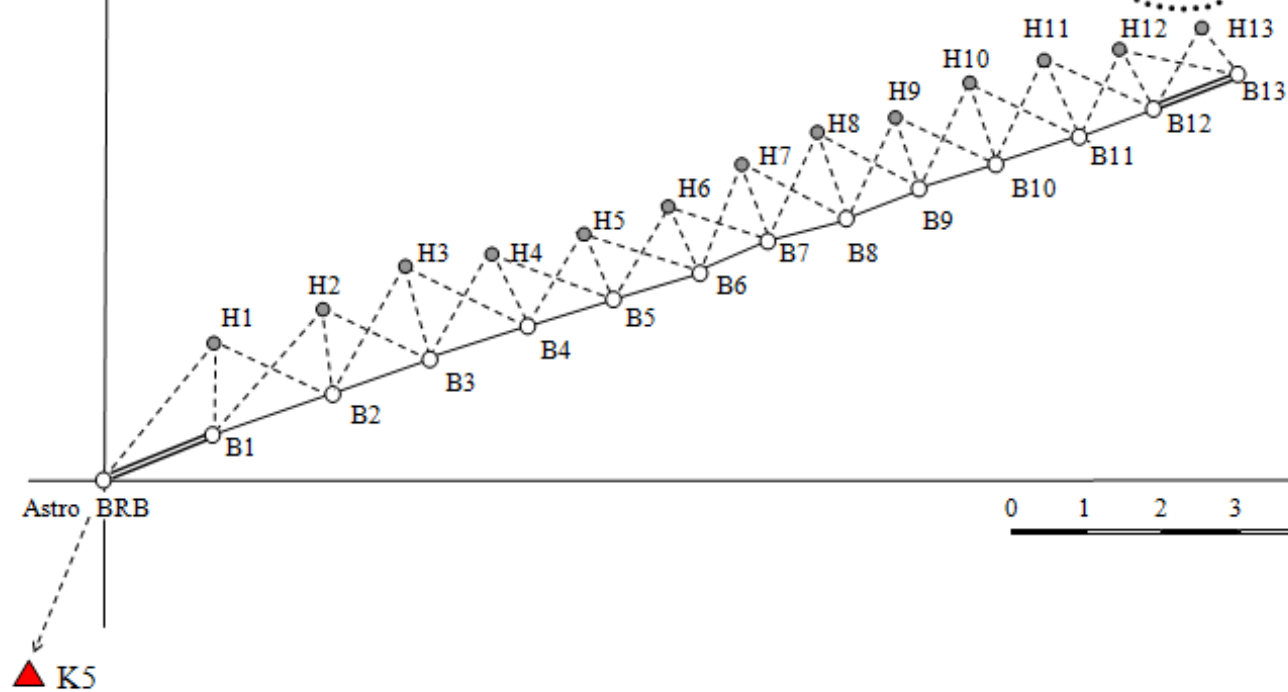
BREIDVIKA

BAIE du
POLARHAV

Nord
Géographique

ICE RISE - IR2

S1



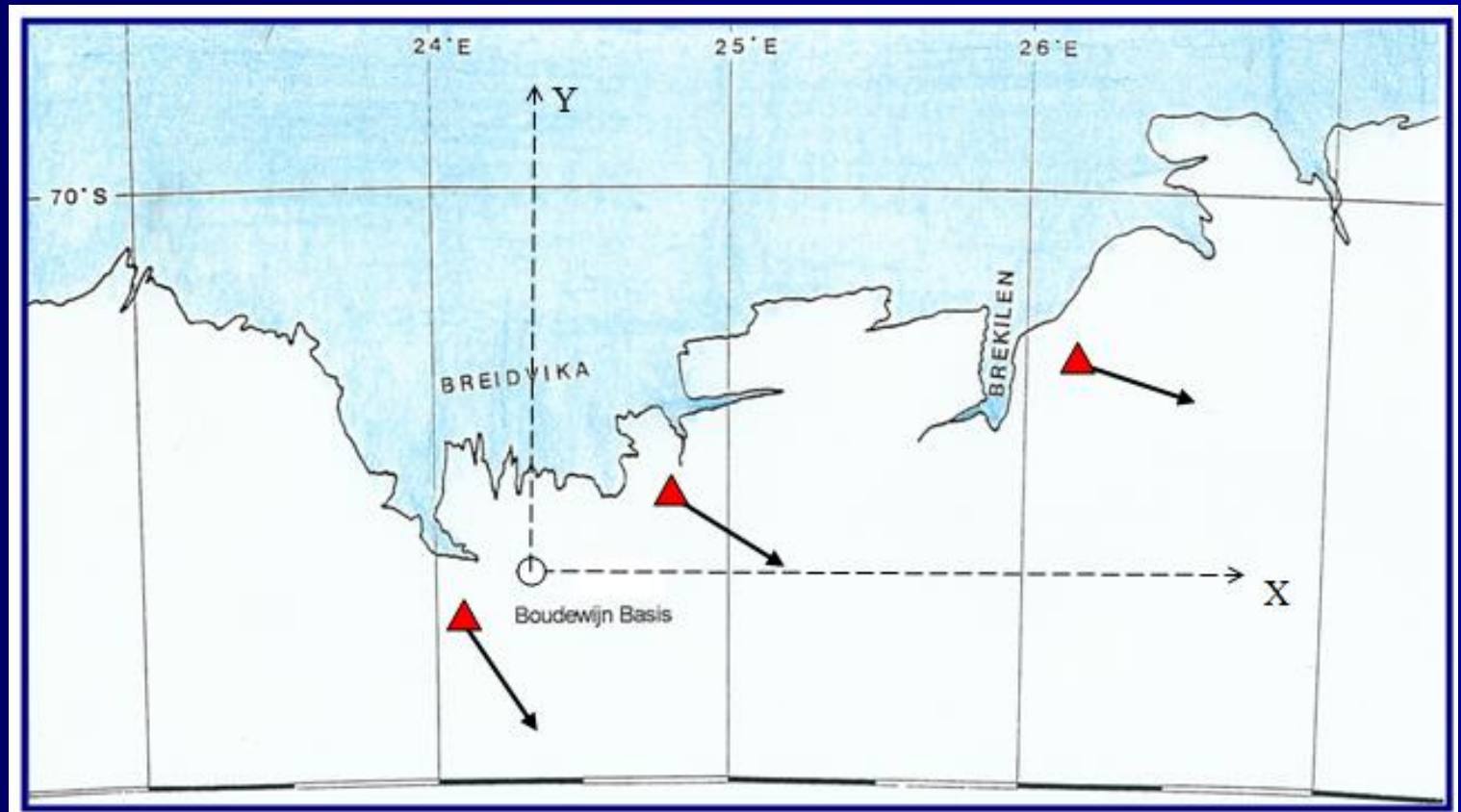


Réseau Géodésique

- 2 points astronomiques stellaires
- 2 points astronomiques solaires
- 6 déterminations d'azimut
- 10 mesures de distances
- 4 amplifications
- 26 points de triangulation
- 3 chaines de triangles (68 balises dont 50 remesurées)

Résultats

■ Première constatation

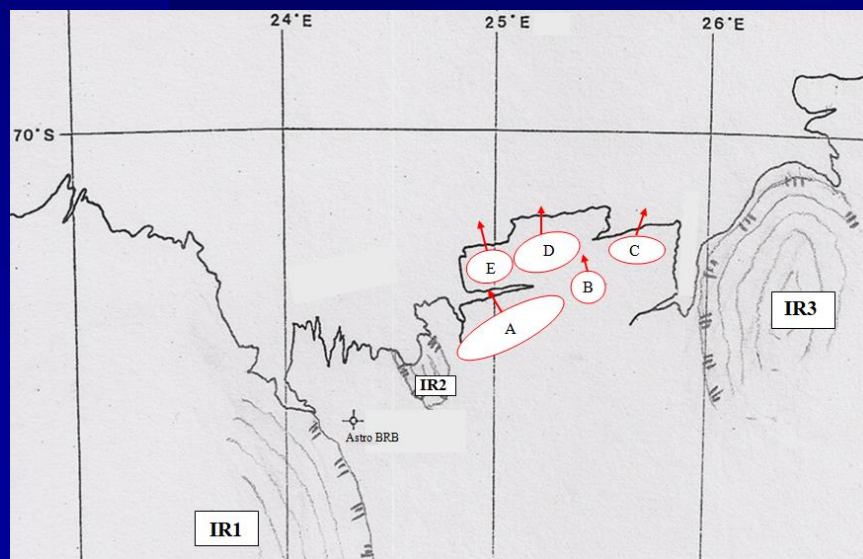
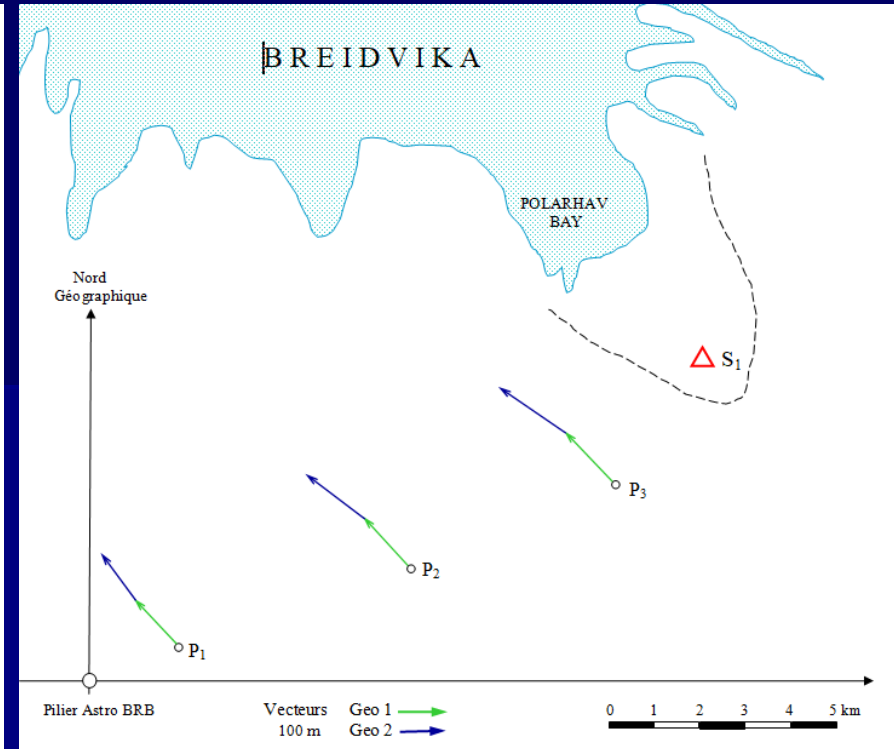
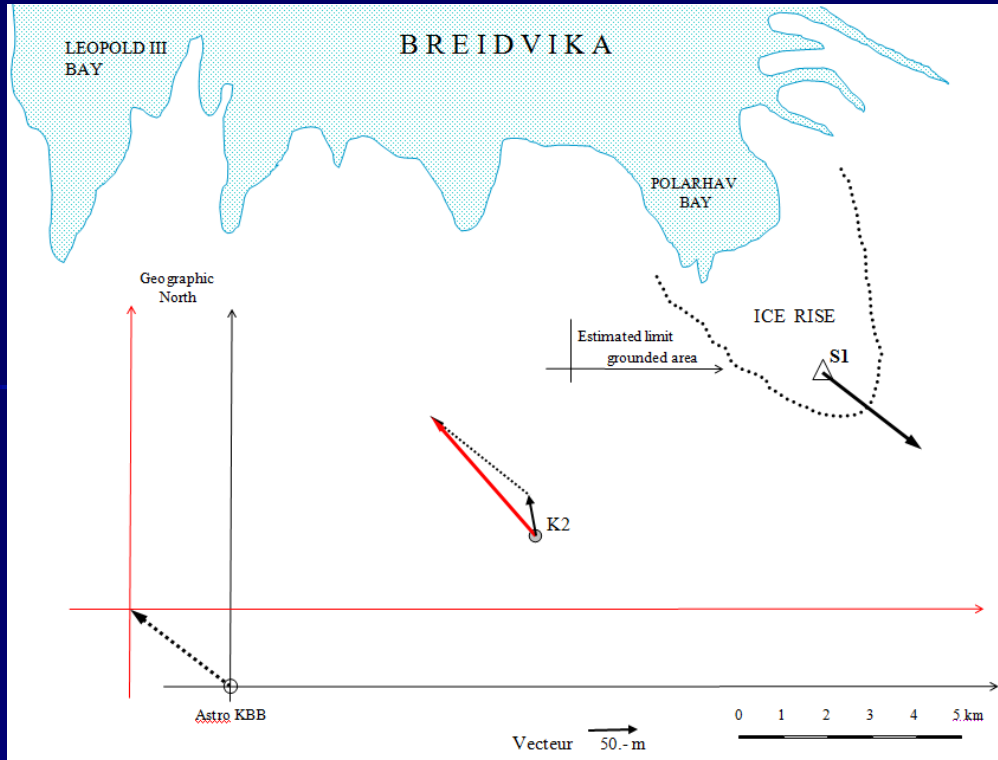


ICE-FLOW MEASUREMENTS - Points K and S

[illegible]

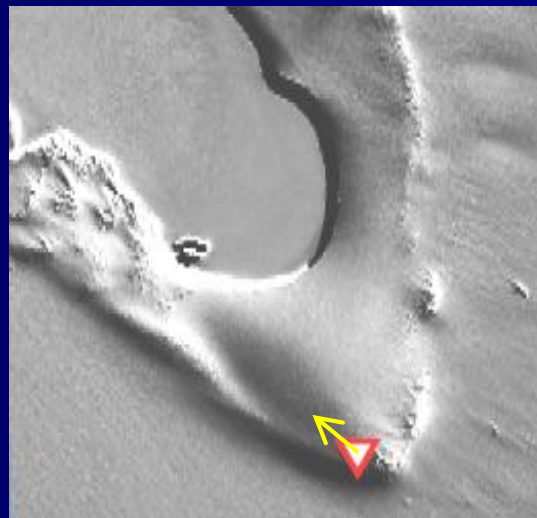
Vecteurs de déplacement





A	$S_5 \Rightarrow S_{12}$	8 points	302,31 m/an 389,647 GON	$\Rightarrow \sigma = 3,87 \text{ m}$ $\Rightarrow \sigma = 3,249 \text{ GON}$
B	$S_{14} \Rightarrow S_{16}$	3 points	287,88m/an 398,653 GON	$\Rightarrow \sigma = 2,84 \text{ m}$ $\Rightarrow \sigma = 1,132 \text{ GON}$
C	$S_{19} \Rightarrow S_{33}$	5 points	291,66 m/an 4,333 GON	$\Rightarrow \sigma = 2,42 \text{ m}$ $\Rightarrow \sigma = 1,387 \text{ GON}$
D	$S_{42} \Rightarrow S_{52}$	9 points	323,63 m/an 0,875 GON	$\Rightarrow \sigma = 5,76 \text{ m}$ $\Rightarrow \sigma = 0,752 \text{ GON}$
E	$S_{54} \Rightarrow S_{65}$	11 points	346,67 m/an 397,050 GON	$\Rightarrow \sigma = 8,80 \text{ m}$ $\Rightarrow \sigma = 2,103 \text{ GON}$

Mesures GNSS 2013 - 2014



Output from INVERSE

Ellipsoid : GRS80 / WGS84 (NAD83)
Equatorial axis, a = 6378137.0000
Polar axis, b = 6356752.3141
Inverse flattening, 1/f = 298.25722210088

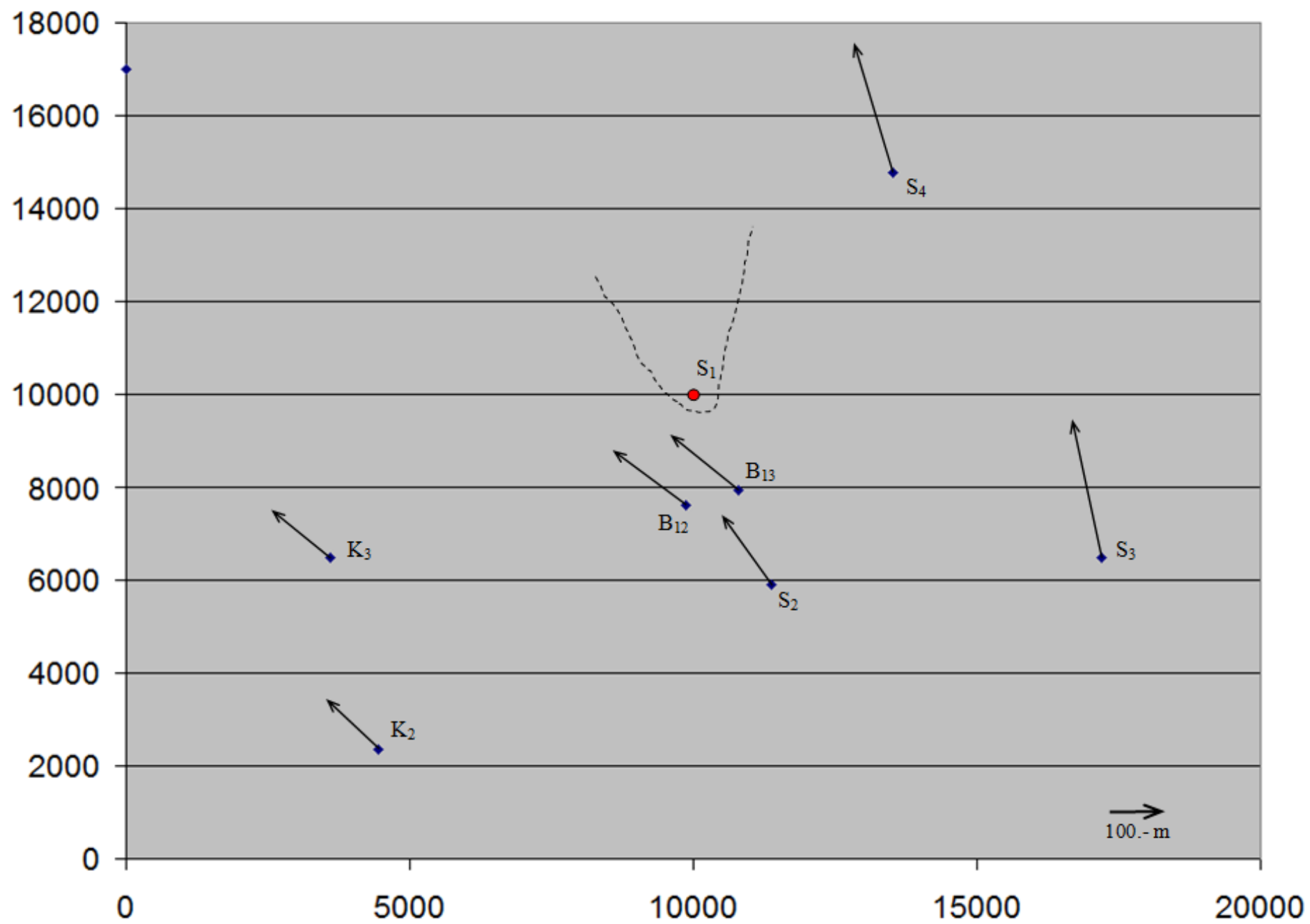
First Station : 2013

LAT = 70 21 43.70830 South
LON = 24 38 26.68680 East

Second Station : 2014

LAT = 70 21 43.61370 South
LON = 24 38 26.31100 East

Forward azimuth FAZ = 306 48 48.0439 From North
Back azimuth BAZ = 126 48 48.3978 From North
Ellipsoidal distance S = 4.8926 m





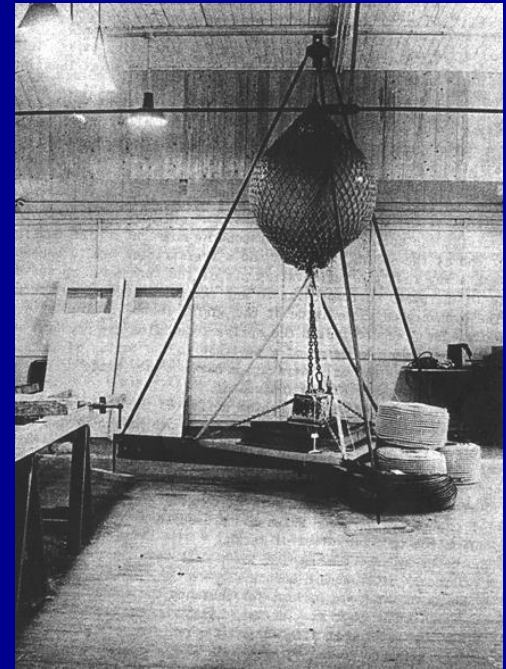
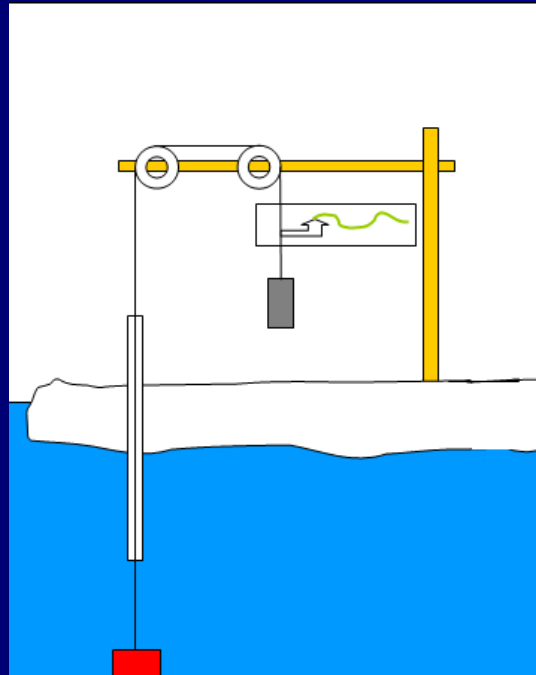
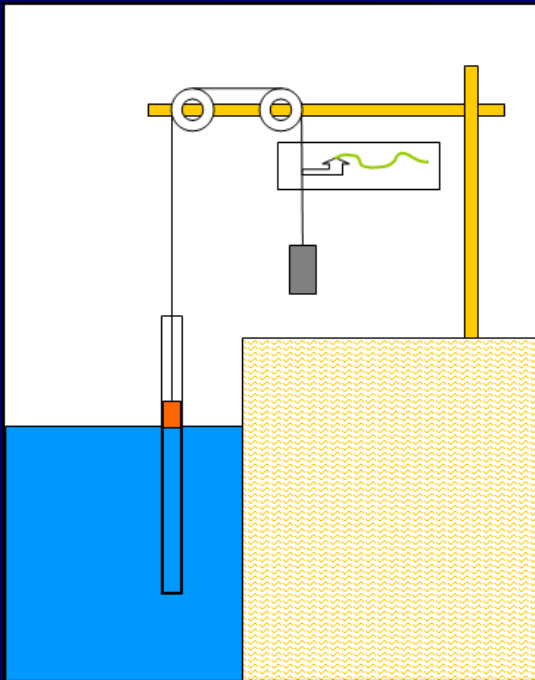
Nivellement

- Nivellement géométrique
 - Hauteur orthométrique $\sigma = 16,2 \text{ mm}$
- Nivellement barométrique
 - Variation de pression atm. $\sigma = 3,4 \text{ m}$
- Nivellement altimètre radio
 - Profil par avion $\sigma = 5 \text{ m}$

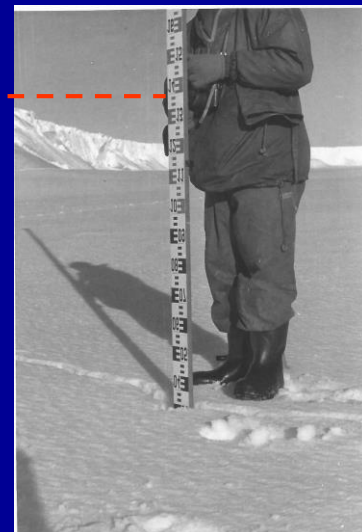
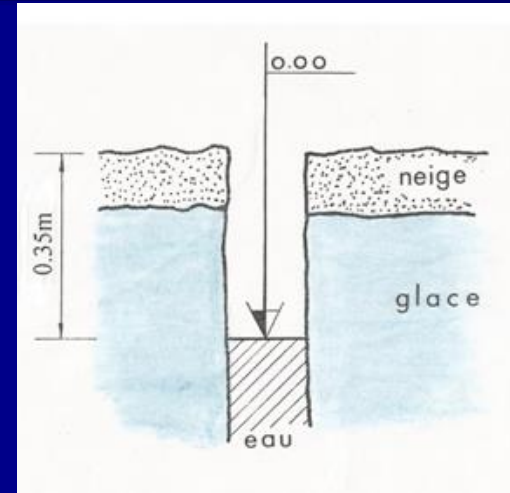
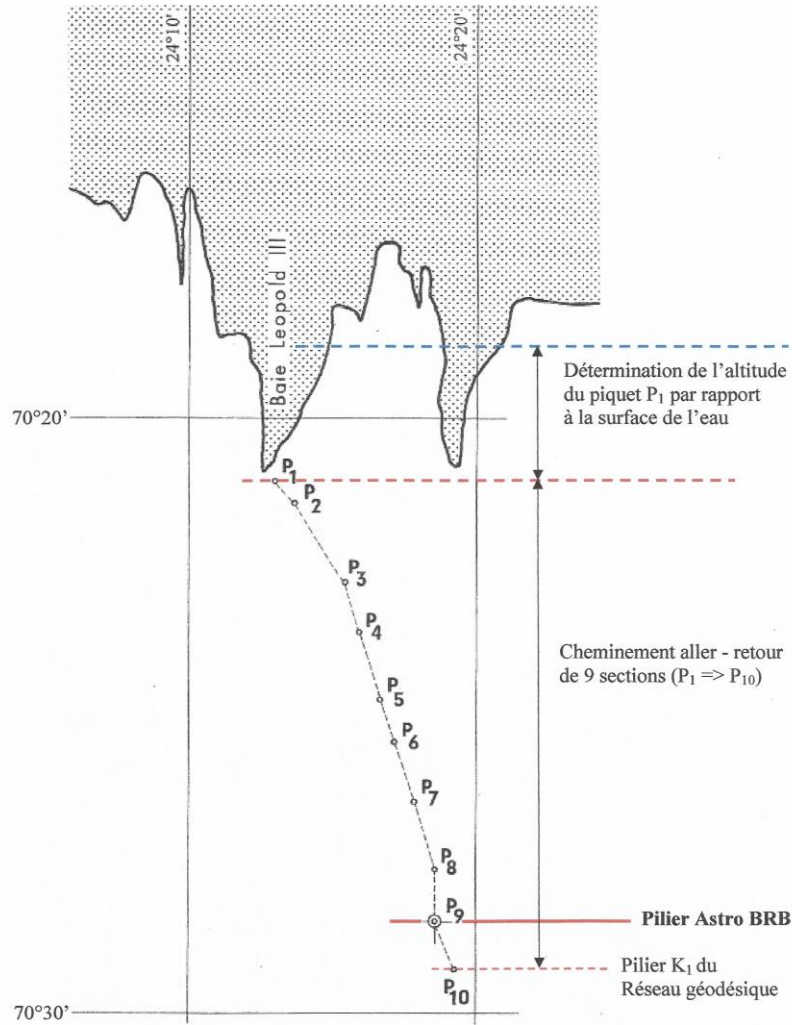
Surface de niveau zéro

Hauteur orthométrique

■ Mesure de la marée

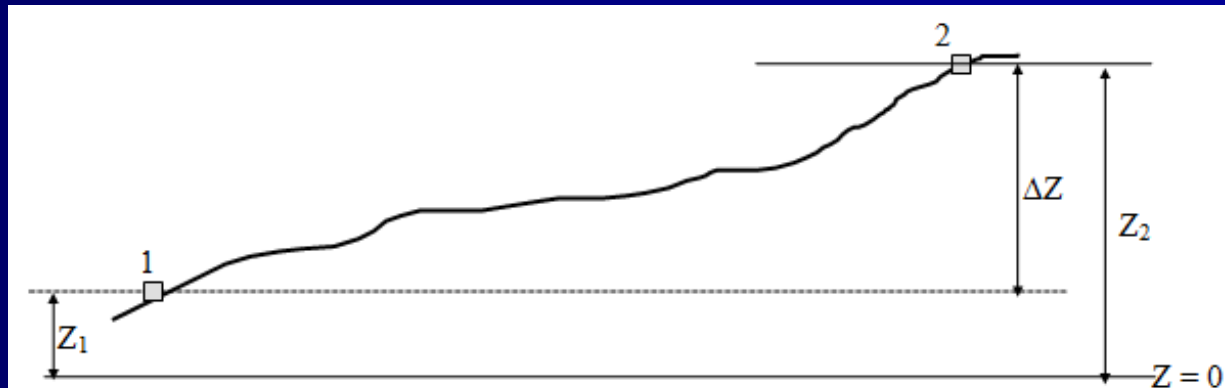


Nivellement Géométrique



Nivellement barométrique

■ Principe



$$\Delta Z = Z_2 - Z_1 = 18.400 (\log p_1 - \log p_2) \cdot (1 + \alpha t)$$

p_1 et p_2 sont les pressions atmosphériques mesurées
respectivement à la B.R.B. et en la station

t = la moyenne des températures (t_1 et t_2) de l'air $t = \frac{t_1 + t_2}{2}$

$$\alpha = \frac{1}{273}$$

Instruments

- Altimètres géodésiques (baromètres)



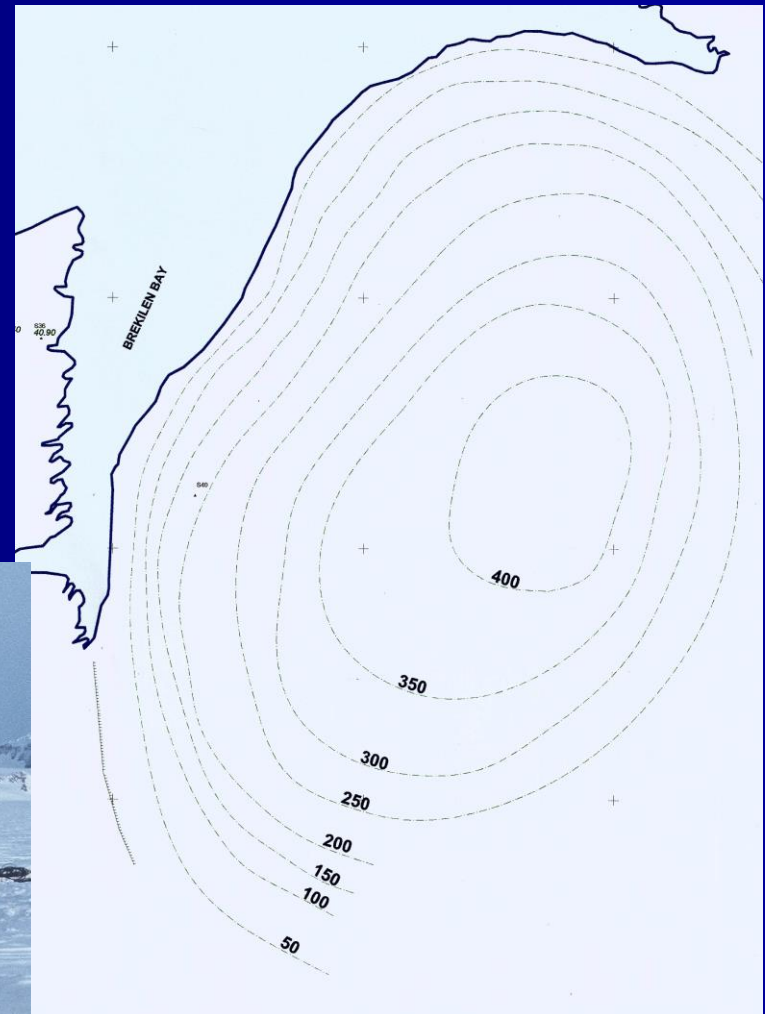
- Thermomètres
- Montre

The top portion of the image is a detailed topographic map of the Princess Coast in Antarctica. The map shows the coastline with labels for 'BREKILEN' and 'TANGKILEN'. It includes numerous contour lines indicating elevation, with values ranging from 400 to 1500 meters. A network of lines, possibly representing a survey or flight path, is drawn across the map. The map is oriented with North at the top.

Below the map, the text 'EXPÉDITION ANTARCTIQUE BELGE 1959-1960' is printed in a bold, sans-serif font. Below this, the title 'CÔTE DE LA PRINCESSE' is written in a large, stylized, serif font. To the right of the title, the name 'J. VAN DER HAEGHE' is visible in a smaller font.

The bottom portion of the image is a color photograph of a red and white twin-engine propeller aircraft, likely a Cessna 441, on a snowy, icy terrain. The aircraft is positioned diagonally, with its nose pointing towards the left. Several people are visible near the aircraft, and the background shows a vast, flat, white landscape under a clear sky.

At the very bottom of the image, there is a small scale bar and the text '26° 00''.



This is a bathymetric chart of the Weddell Sea, Antarctica, showing depth contours, station numbers, and geographical features like the Filchner-Ronne Ice Shelf. The chart includes a coordinate grid and a title block with survey details.

Chart Details:

- Geographical Features:** Filchner-Ronne Ice Shelf, Filchner Depression, Filchner Plateau, Filchner Sea, Filchner Strait, Filchner Channel, Filchner Bay, Filchner Sound, Filchner Fjord, Filchner Gulf, Filchner Inlet, Filchner Harbour, Filchner Anchorage, Filchner Wharf, Filchner Pier, Filchner Jetty, Filchner Breakwater, Filchner Dock, Filchner Quay, Filchner Wharves, Filchner Mole, Filchner Jetty, Filchner Breakwater, Filchner Dock, Filchner Quay, Filchner Wharves, Filchner Mole.
- Depth Contours:** 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200, 3300, 3400, 3500, 3600, 3700, 3800, 3900, 4000, 4100, 4200, 4300, 4400, 4500, 4600, 4700, 4800, 4900, 5000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000, 6100, 6200, 6300, 6400, 6500, 6600, 6700, 6800, 6900, 7000, 7100, 7200, 7300, 7400, 7500, 7600, 7700, 7800, 7900, 8000, 8100, 8200, 8300, 8400, 8500, 8600, 8700, 8800, 8900, 9000, 9100, 9200, 9300, 9400, 9500, 9600, 9700, 9800, 9900, 10000.
- Station Numbers:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Coordinate Grid:** 20° 20' N, 20° 40' N, 21° 00' N, 21° 20' N, 21° 40' N, 22° 00' N, 22° 20' N, 22° 40' N, 23° 00' N, 23° 20' N, 23° 40' N, 24° 00' N, 24° 20' N, 24° 40' N, 25° 00' N, 25° 20' N, 25° 40' N, 26° 00' N, 26° 20' N, 26° 40' N, 27° 00' N, 27° 20' N, 27° 40' N, 28° 00' N, 28° 20' N, 28° 40' N, 29° 00' N, 29° 20' N, 29° 40' N, 30° 00' N, 30° 20' N, 30° 40' N, 31° 00' N, 31° 20' N, 31° 40' N, 32° 00' N, 32° 20' N, 32° 40' N, 33° 00' N, 33° 20' N, 33° 40' N, 34° 00' N, 34° 20' N, 34° 40' N, 35° 00' N, 35° 20' N, 35° 40' N, 36° 00' N, 36° 20' N, 36° 40' N, 37° 00' N, 37° 20' N, 37° 40' N, 38° 00' N, 38° 20' N, 38° 40' N, 39° 00' N, 39° 20' N, 39° 40' N, 40° 00' N, 40° 20' N, 40° 40' N, 41° 00' N, 41° 20' N, 41° 40' N, 42° 00' N, 42° 20' N, 42° 40' N, 43° 00' N, 43° 20' N, 43° 40' N, 44° 00' N, 44° 20' N, 44° 40' N, 45° 00' N, 45° 20' N, 45° 40' N, 46° 00' N, 46° 20' N, 46° 40' N, 47° 00' N, 47° 20' N, 47° 40' N, 48° 00' N, 48° 20' N, 48° 40' N, 49° 00' N, 49° 20' N, 49° 40' N, 50° 00' N, 50° 20' N, 50° 40' N, 51° 00' N, 51° 20' N, 51° 40' N, 52° 00' N, 52° 20' N, 52° 40' N, 53° 00' N, 53° 20' N, 53° 40' N, 54° 00' N, 54° 20' N, 54° 40' N, 55° 00' N, 55° 20' N, 55° 40' N, 56° 00' N, 56° 20' N, 56° 40' N, 57° 00' N, 57° 20' N, 57° 40' N, 58° 00' N, 58° 20' N, 58° 40' N, 59° 00' N, 59° 20' N, 59° 40' N, 60° 00' N, 60° 20' N, 60° 40' N, 61° 00' N, 61° 20' N, 61° 40' N, 62° 00' N, 62° 20' N, 62° 40' N, 63° 00' N, 63° 20' N, 63° 40' N, 64° 00' N, 64° 20' N, 64° 40' N, 65° 00' N, 65° 20' N, 65° 40' N, 66° 00' N, 66° 20' N, 66° 40' N, 67° 00' N, 67° 20' N, 67° 40' N, 68° 00' N, 68° 20' N, 68° 40' N, 69° 00' N, 69° 20' N, 69° 40' N, 70° 00' N, 70° 20' N, 70° 40' N, 71° 00' N, 71° 20' N, 71° 40' N, 72° 00' N, 72° 20' N, 72° 40' N, 73° 00' N, 73° 20' N, 73° 40' N, 74° 00' N, 74° 20' N, 74° 40' N, 75° 00' N, 75° 20' N, 75° 40' N, 76° 00' N, 76° 20' N, 76° 40' N, 77° 00' N, 77° 20' N, 77° 40' N, 78° 00' N, 78° 20' N, 78° 40' N, 79° 00' N, 79° 20' N, 79° 40' N, 80° 00' N, 80° 20' N, 80° 40' N, 81° 00' N, 81° 20' N, 81° 40' N, 82° 00' N, 82° 20' N, 82° 40' N, 83° 00' N, 83° 20' N, 83° 40' N, 84° 00' N, 84° 20' N, 84° 40' N, 85° 00' N, 85° 20' N, 85° 40' N, 86° 00' N, 86° 20' N, 86° 40' N, 87° 00' N, 87° 20' N, 87° 40' N, 88° 00' N, 88° 20' N, 88° 40' N, 89° 00' N, 89° 20' N, 89° 40' N, 90° 00' N, 90° 20' N, 90° 40' N, 91° 00' N, 91° 20' N, 91° 40' N, 92° 00' N, 92° 20' N, 92° 40' N, 93° 00' N, 93° 20' N, 93° 40' N, 94° 00' N, 94° 20' N, 94° 40' N, 95° 00' N, 95° 20' N, 95° 40' N, 96° 00' N, 96° 20' N, 96° 40' N, 97° 00' N, 97° 20' N, 97° 40' N, 98° 00' N, 98° 20' N, 98° 40' N, 99° 00' N, 99° 20' N, 99° 40' N, 100° 00' N, 100° 20' N, 100° 40' N, 101° 00' N, 101° 20' N, 101° 40' N, 102° 00' N, 102° 20' N, 102° 40' N, 103° 00' N, 103° 20' N, 103° 40' N, 104° 00' N, 104° 20' N, 104° 40' N, 105° 00' N, 105° 20' N, 105° 40' N, 106° 00' N, 106° 20' N, 106° 40' N, 107° 00' N, 107° 20' N, 107° 40' N, 108° 00' N, 108° 20' N, 108° 40' N, 109° 00' N, 109° 20' N, 109° 40' N, 110° 00' N, 110° 20' N, 110° 40' N, 111° 00' N, 111° 20' N, 111° 40' N, 112° 00' N, 112° 20' N, 112° 40' N

Aujourd'hui !



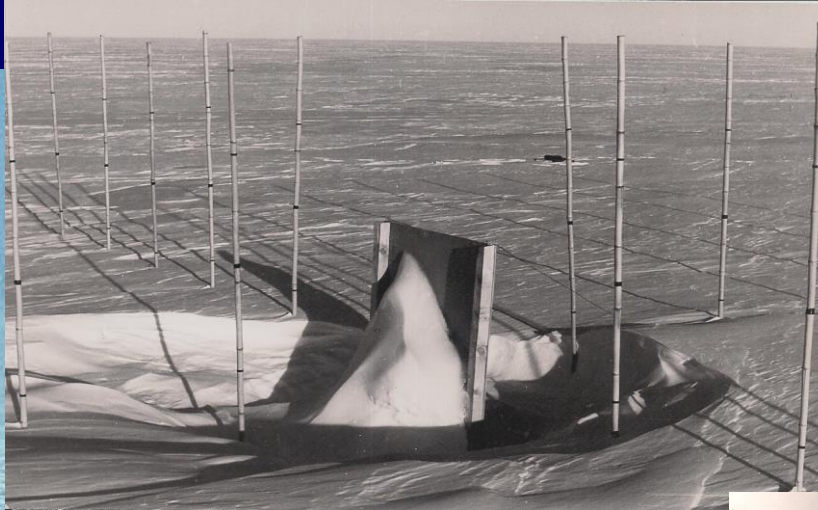




Photogrammetrie



Enneigement 1D, 2D et 3D

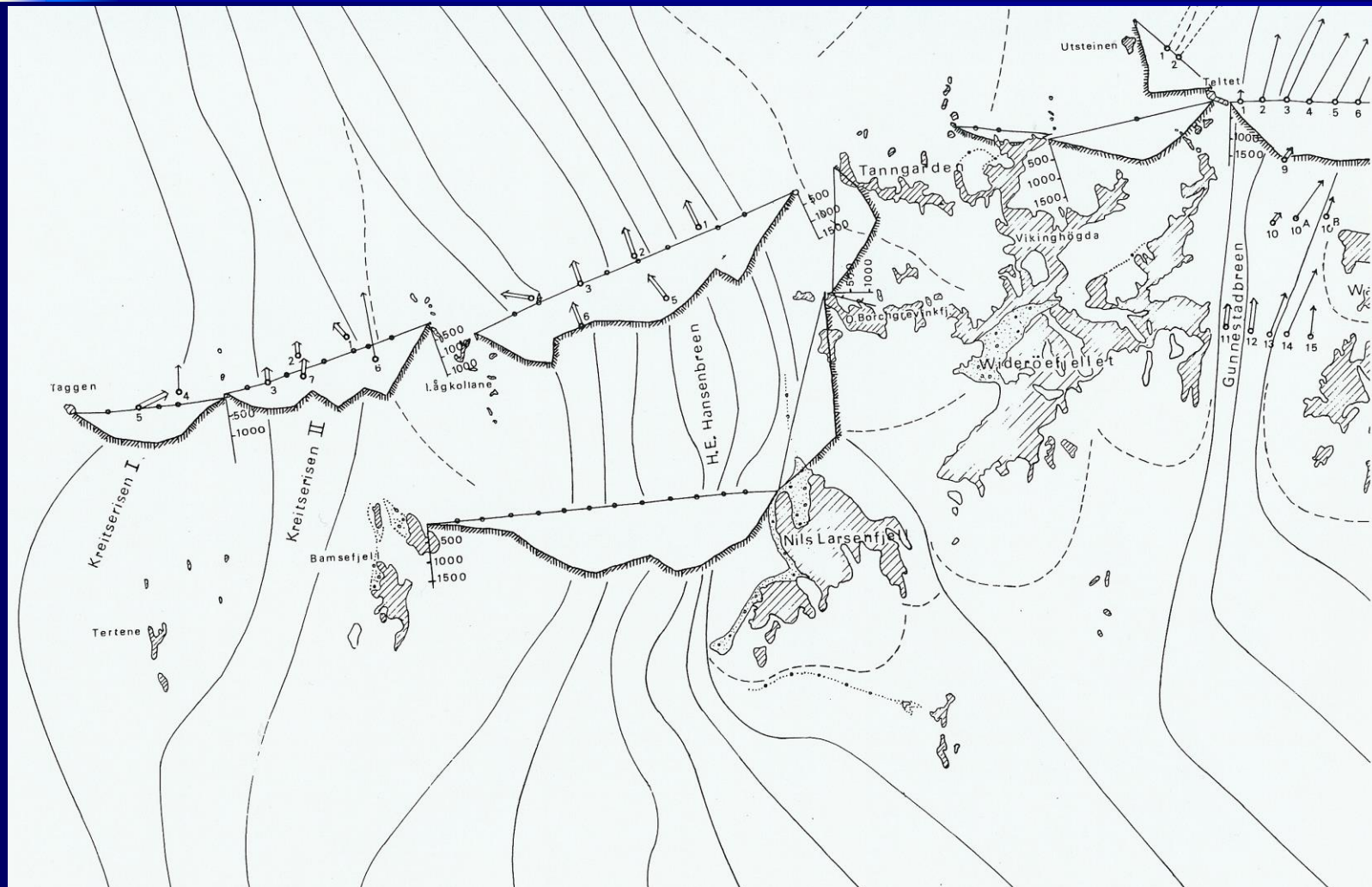


En montagne

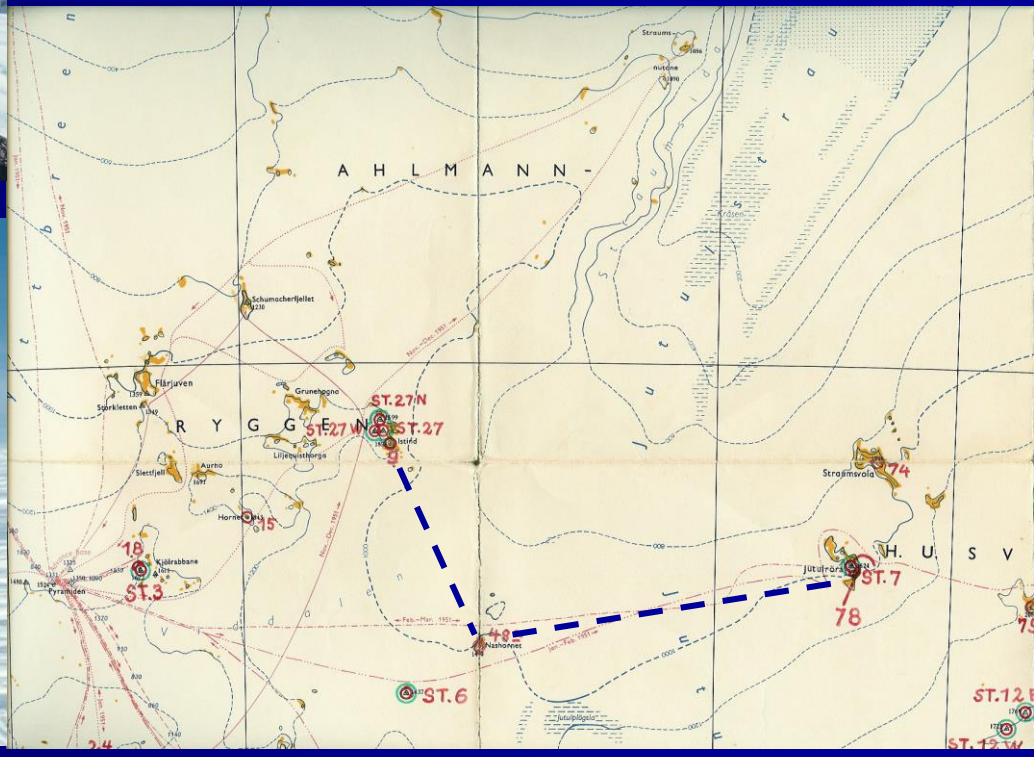




Mouvement des glaciers



Traversée du Jutulstraumen





2004 - 2022

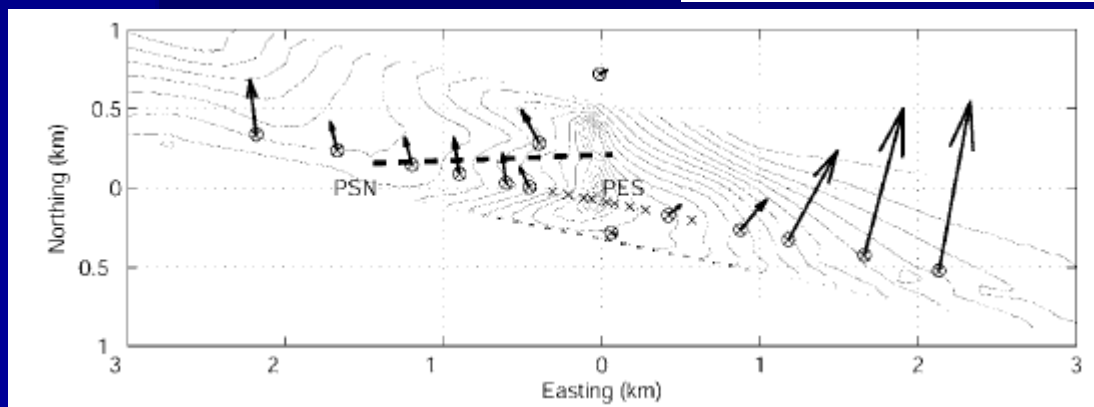
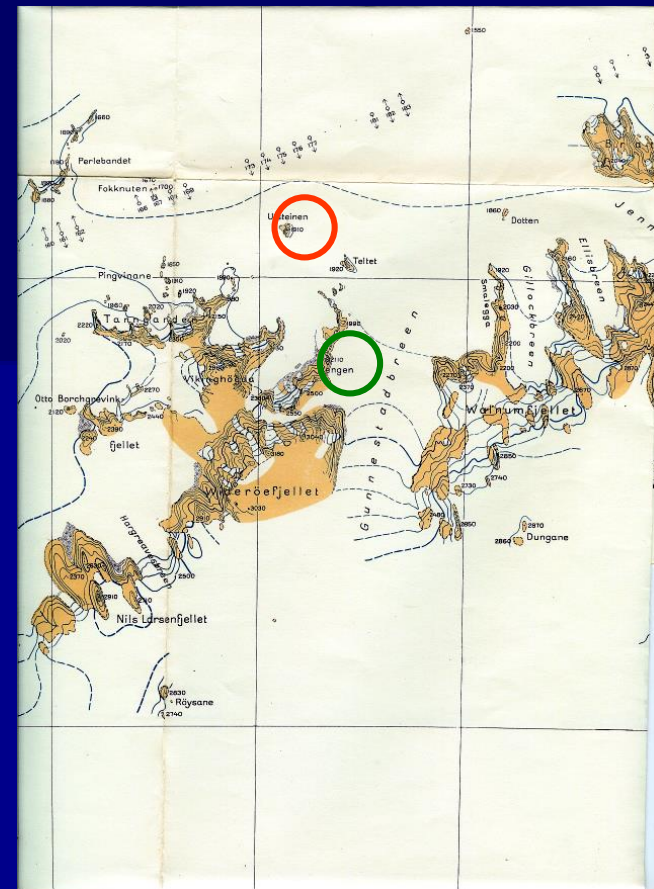
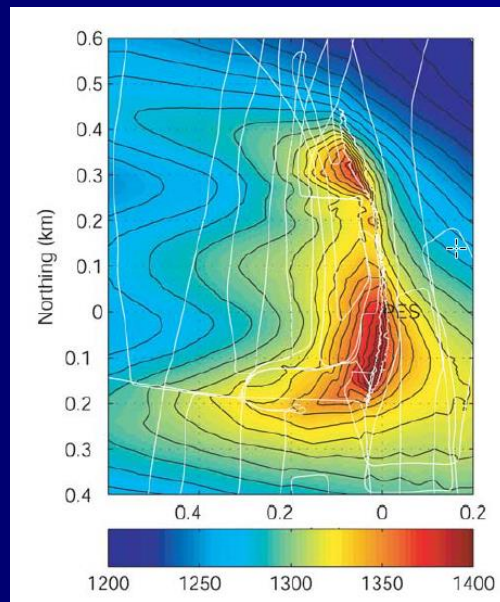
Princess Elisabeth Station





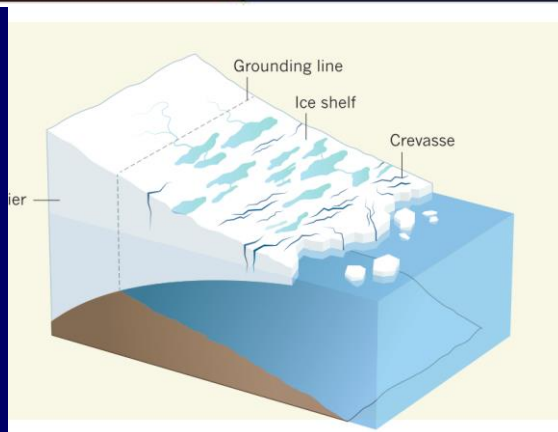
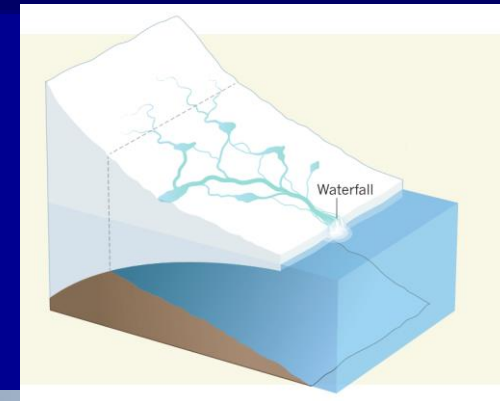
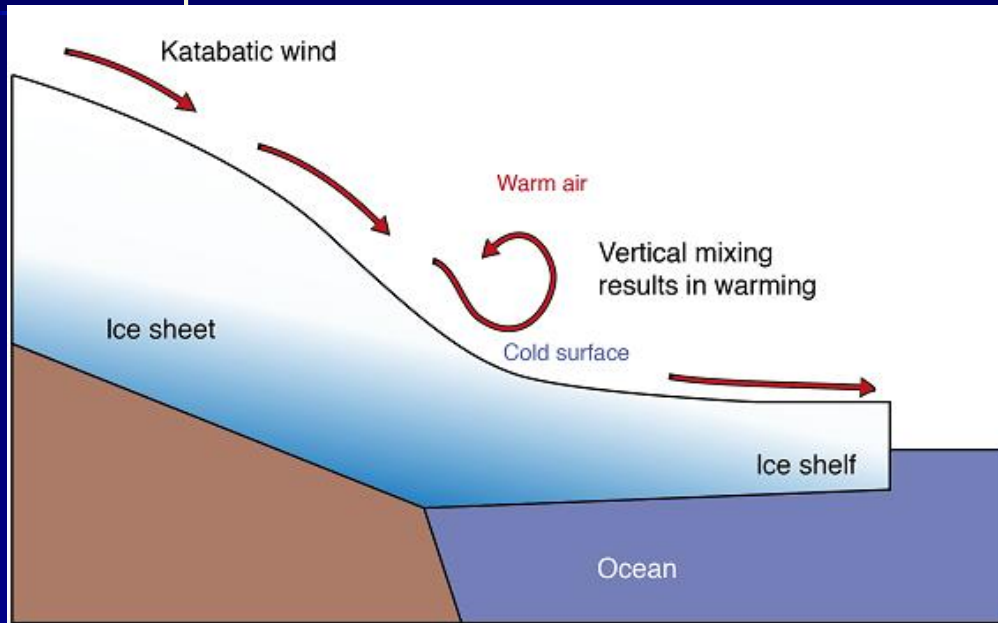
Programme

- « Observations classiques » climat, champ magnétique, ionosphère, ozone ...
- « Global change » recherche sur l'impact des changements anthropogènes en Antarctique.
- « Problem solving science » recherche qui contribue à trouver des solutions pour des problèmes scientifiques fondamentaux.
- Recherche financée sous forme de « Projets » ou de « Bourses »
- Visiteurs => Chercheurs

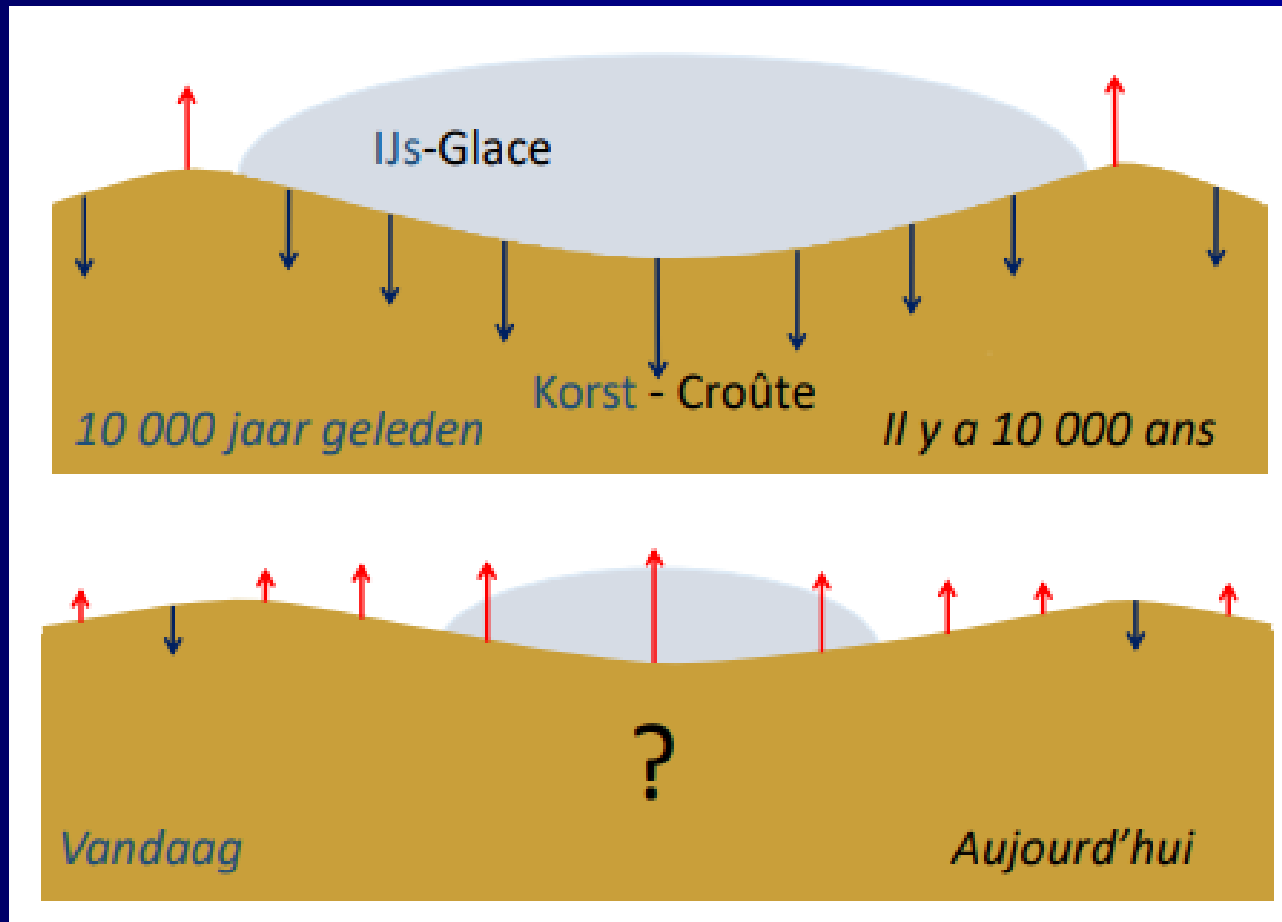


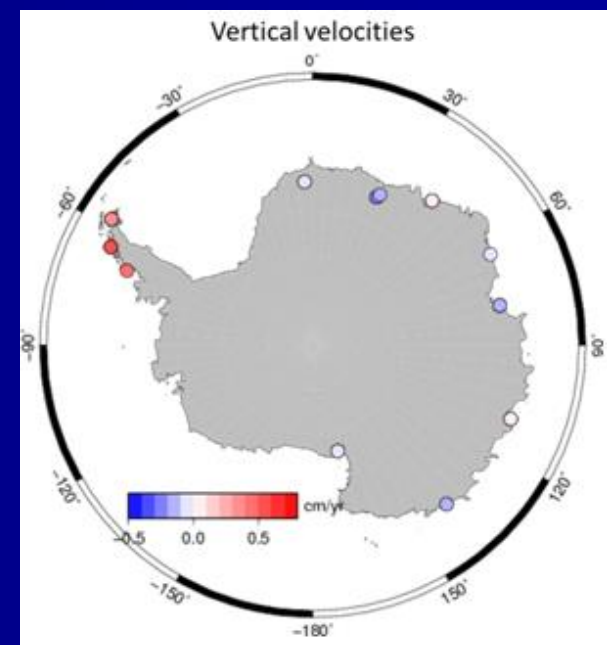
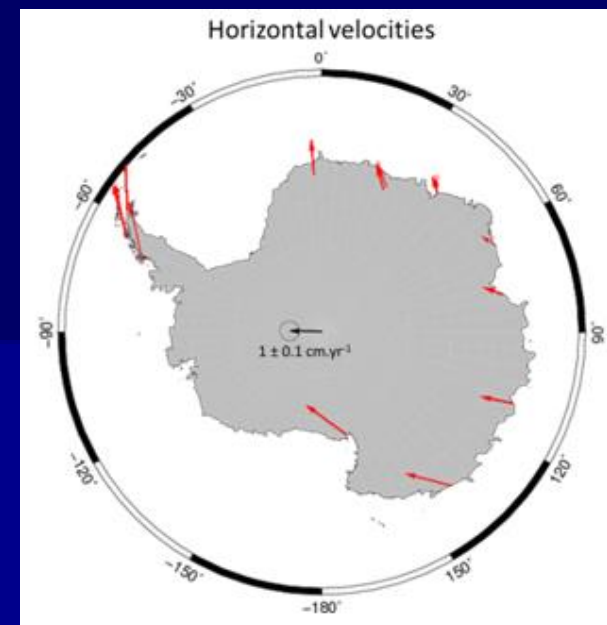
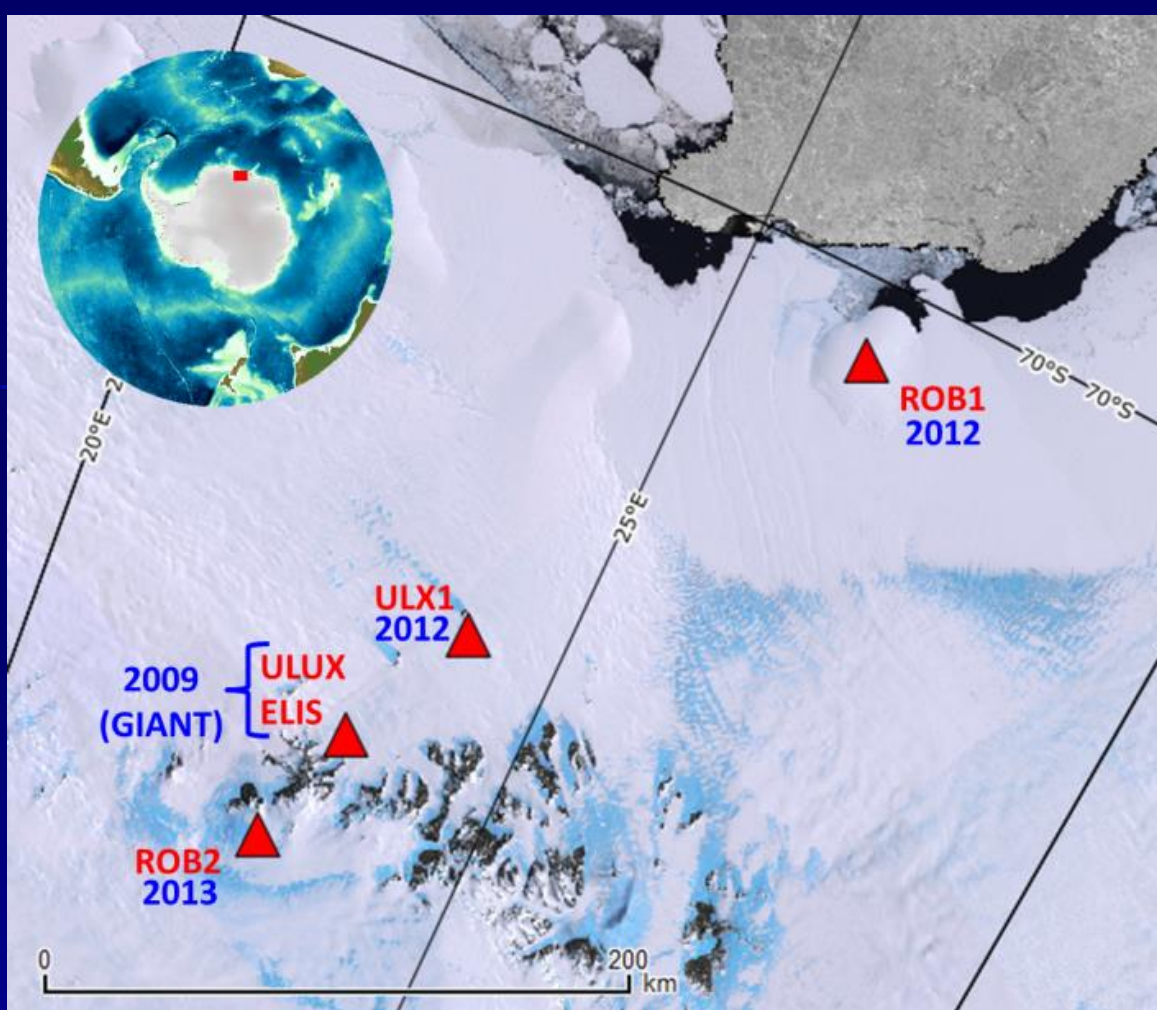
Surface melt on the dark side of the Antarctic ice sheet

dr. Stef Lhermitte TUDelft



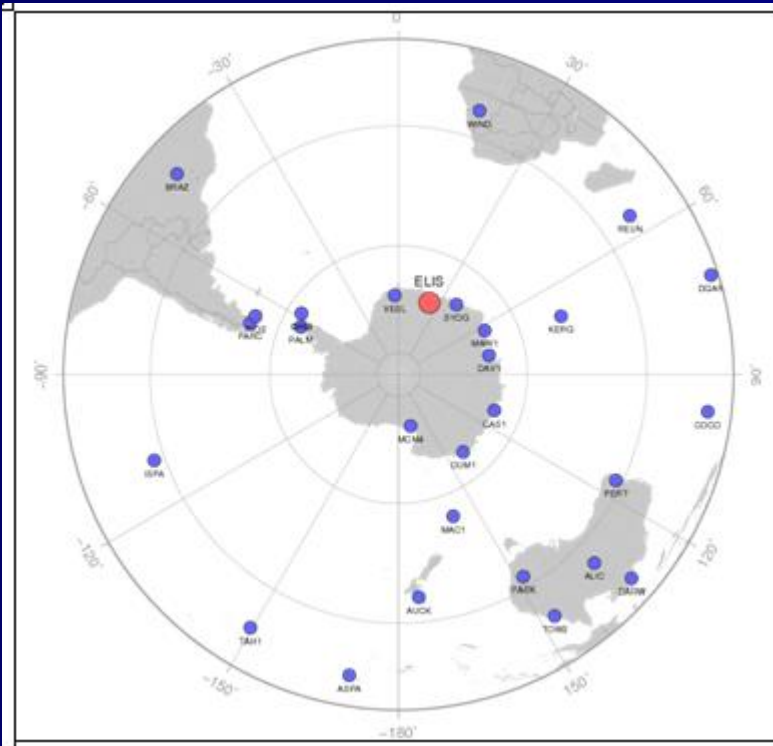
Ajustement Isostatique





Station	East [cm/yr]	North [cm/yr]	Up [cm/yr]
ROB1 (12/342-13/346)	-17.7 $\pm$ 0.2	14.2 $\pm$ 0.3	-139.1 $\pm$ 0.9
ROB1 (13/346-14/338)	-20.3 $\pm$ 0.2	22.8 $\pm$ 0.3	-136.7 $\pm$ 1.0
ROB1 (14/338-16/013)	-21.2 $\pm$ 0.2	11.6 $\pm$ 0.2	-130.0 $\pm$ 0.8
ROB2	-0.2 $\pm$ 0.1	0.3 $\pm$ 0.1	-0.1 $\pm$ 0.4
ULX1	-0.4 $\pm$ 0.1	0.6 $\pm$ 0.1	0.0 $\pm$ 0.4
ELIS	-0.5 $\pm$ 0.1	0.6 $\pm$ 0.1	-0.3 $\pm$ 0.1

Antenne Station ELIS



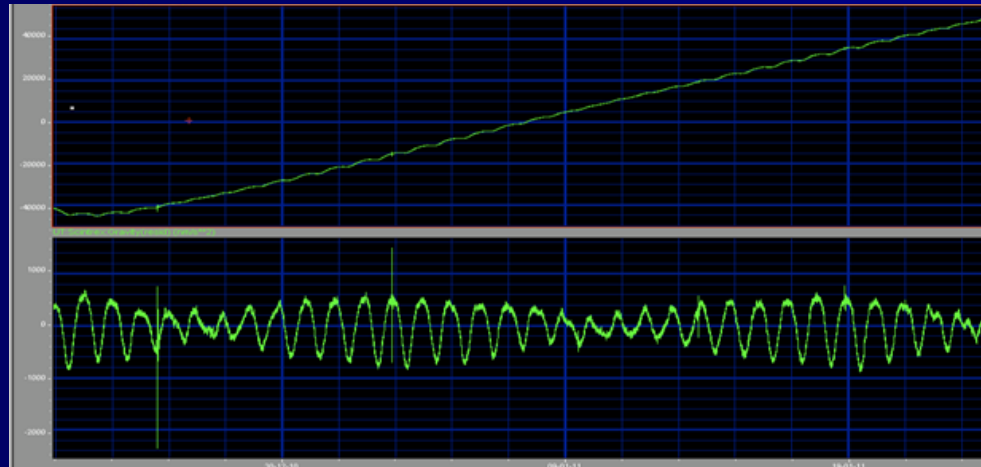
Gravimetrie

Station GNSS « ULUX »

Mesures absolues

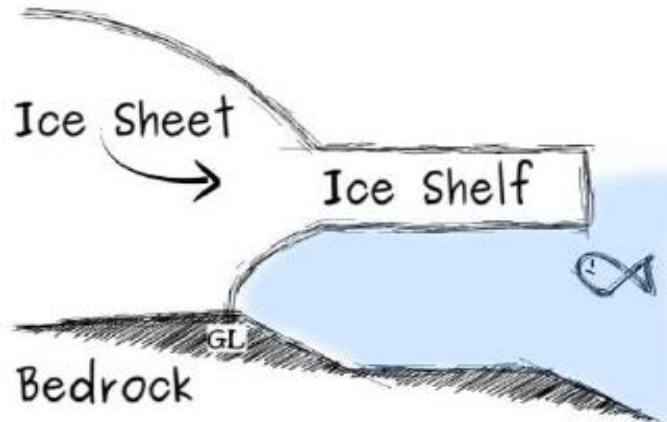
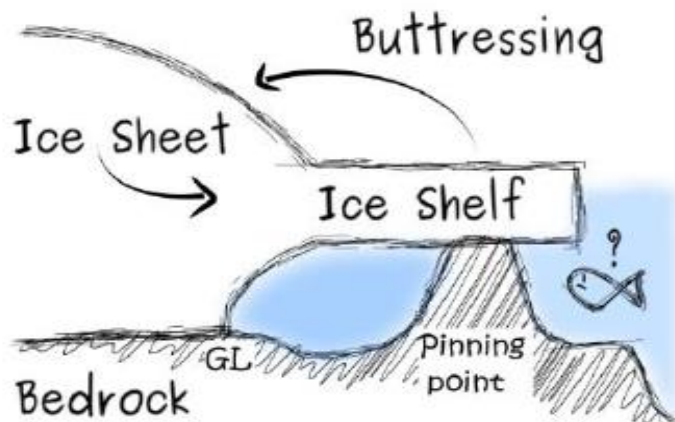
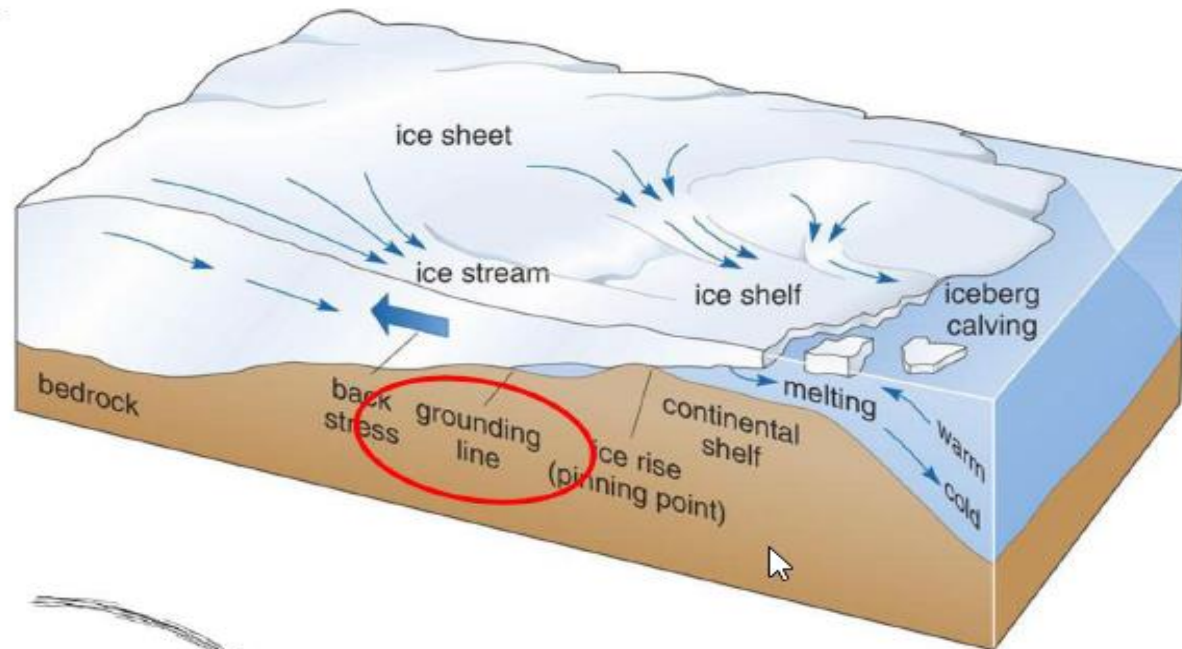
Mesures relatives

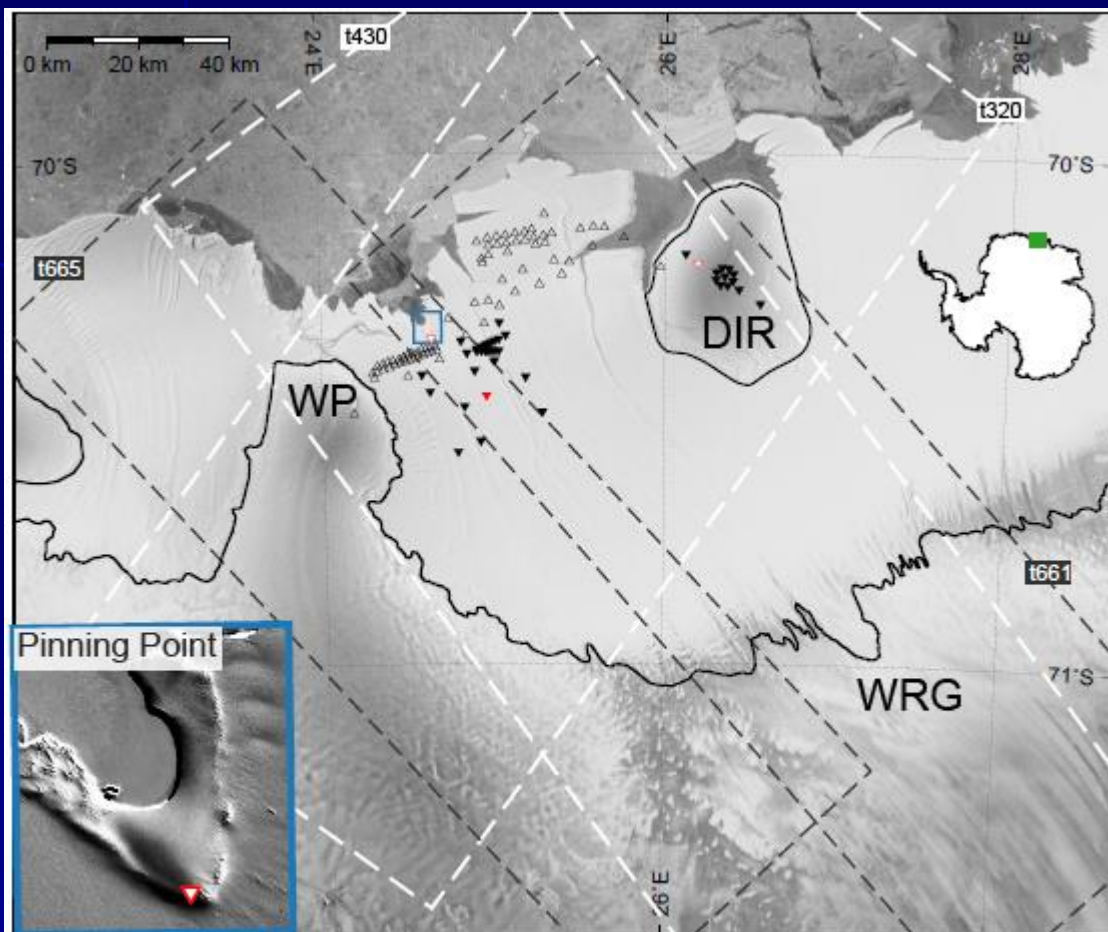
- mesures continues
- gradient vertical
- gravity network



Pinning Points

- Areas within the shelf that are locally grounded (act as pinning points)
- Mostly characterized by a local flow pattern (even the small ones)





- ▼ GNSS velocity -- calibration (all)
- ▼ GNSS velocity -- control
- Grounding line (Bindshadler and others, 2011)
- △ GNSS velocity -- calibration (InSAR)
- △ 1965–67 Velocity (Derwael, 2014)
- Satellite frames (ERS=white, PALSAR=dark gray)

