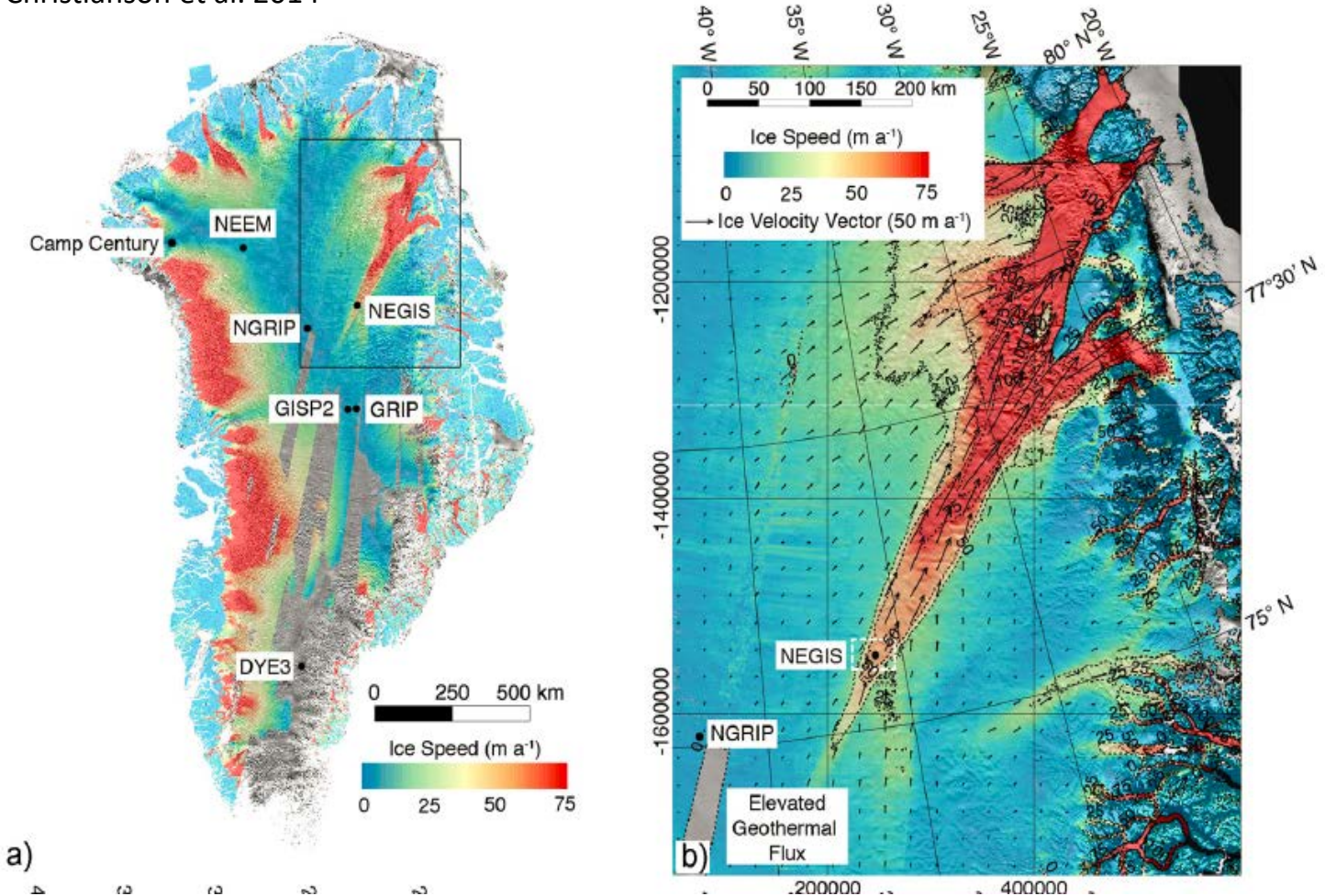
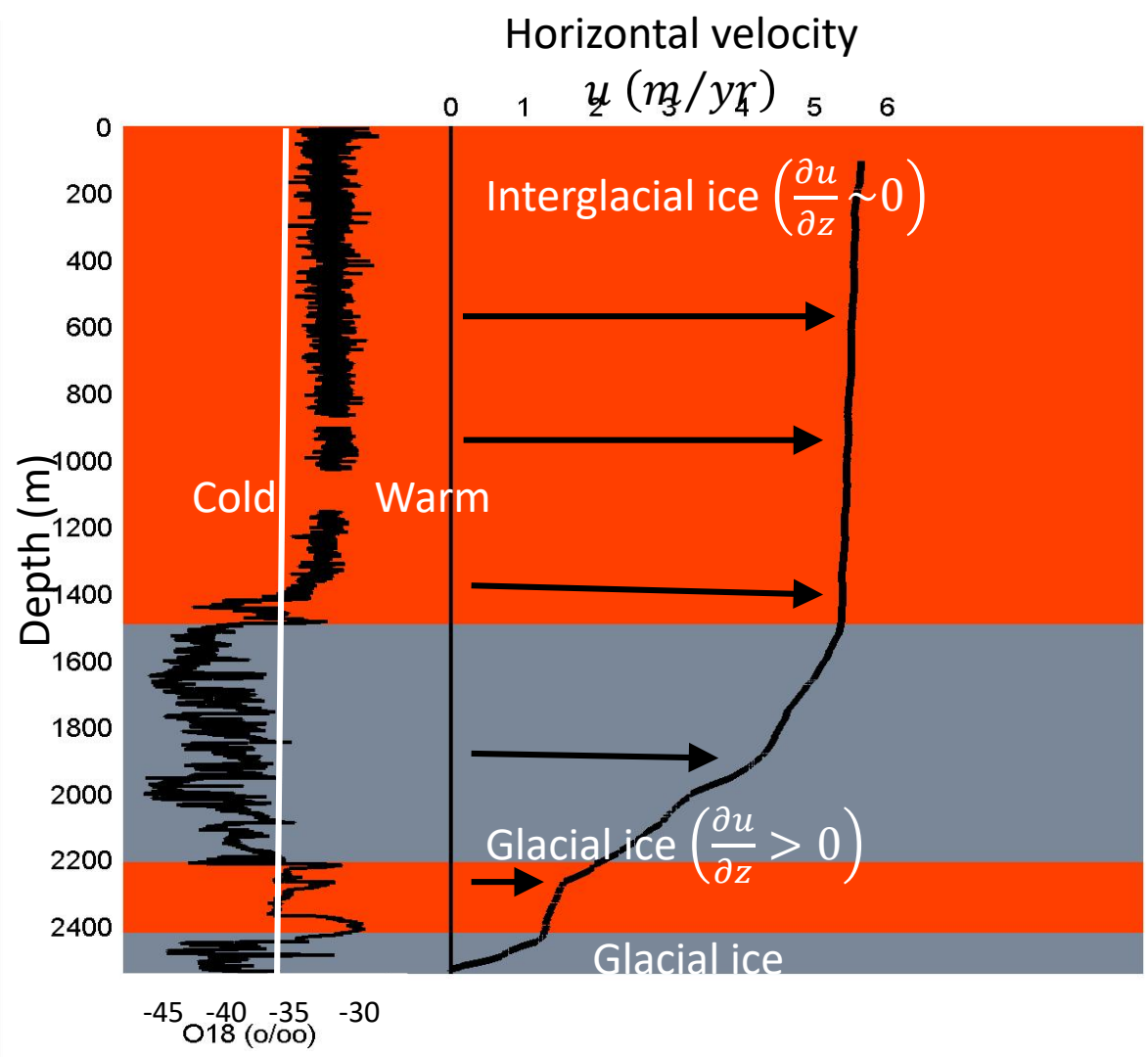
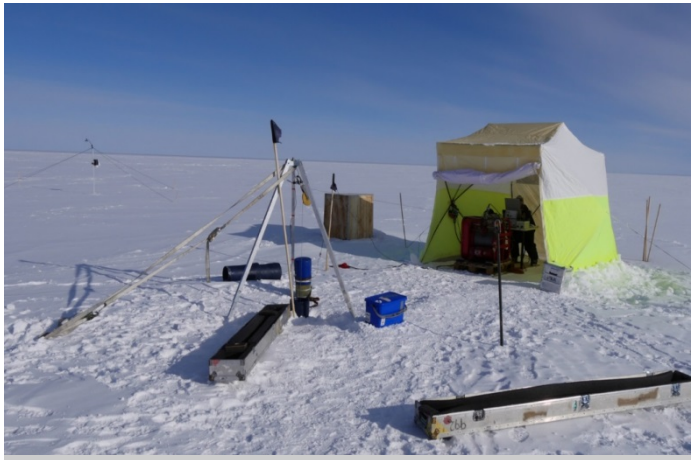
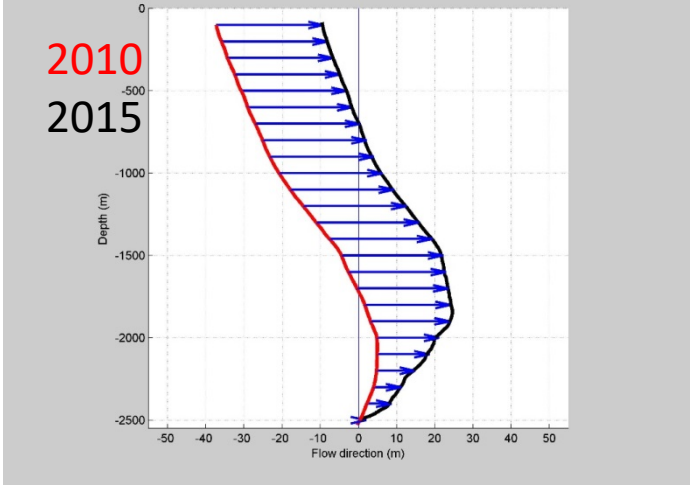
IClimate center opening – 5.december 2017
The North east Greenland Ice Stream – What Makes an ice stream ”go”?
J.P.Steffensen, Niels Bohr Institute

Figures from Christianson et al. 2014




Horizontal velocity
$u\ (m/yr)$
0 1 2 3 4 5 6
Depth (m)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400
Interglacial ice $\left(\frac{\partial u}{\partial z} \sim 0\right)$
Cold
Warm
Glacial ice $\left(\frac{\partial u}{\partial z} > 0\right)$
Glacial ice
-45 -40 -35 -30
O18 (o/oo)



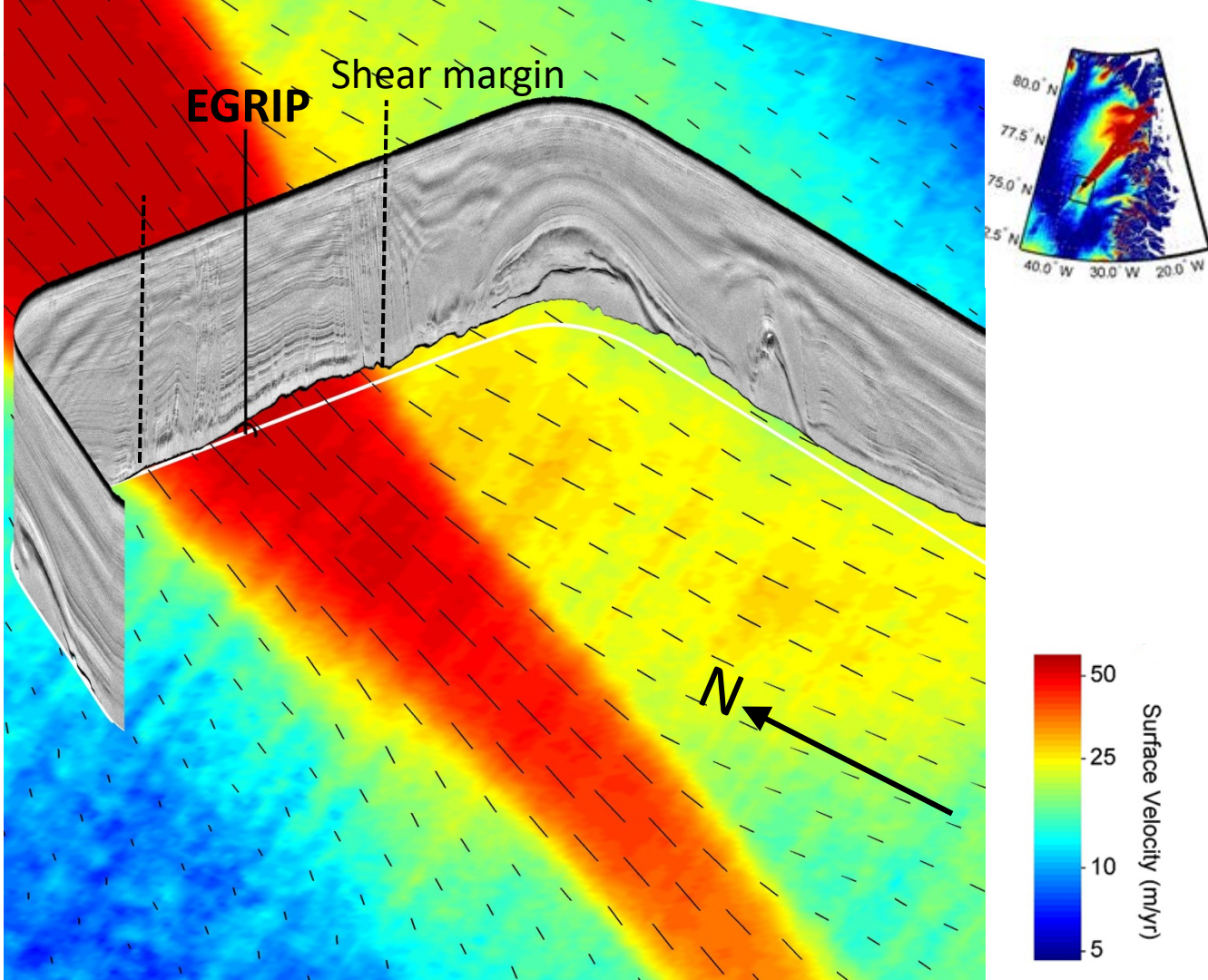

2010
2015
Depth (m)
0 -500 -1000 -1500 -2000 -2500
-50 -40 -30 -20 -10 0 10 20 30 40 50
Flow direction (m)

NEGIS

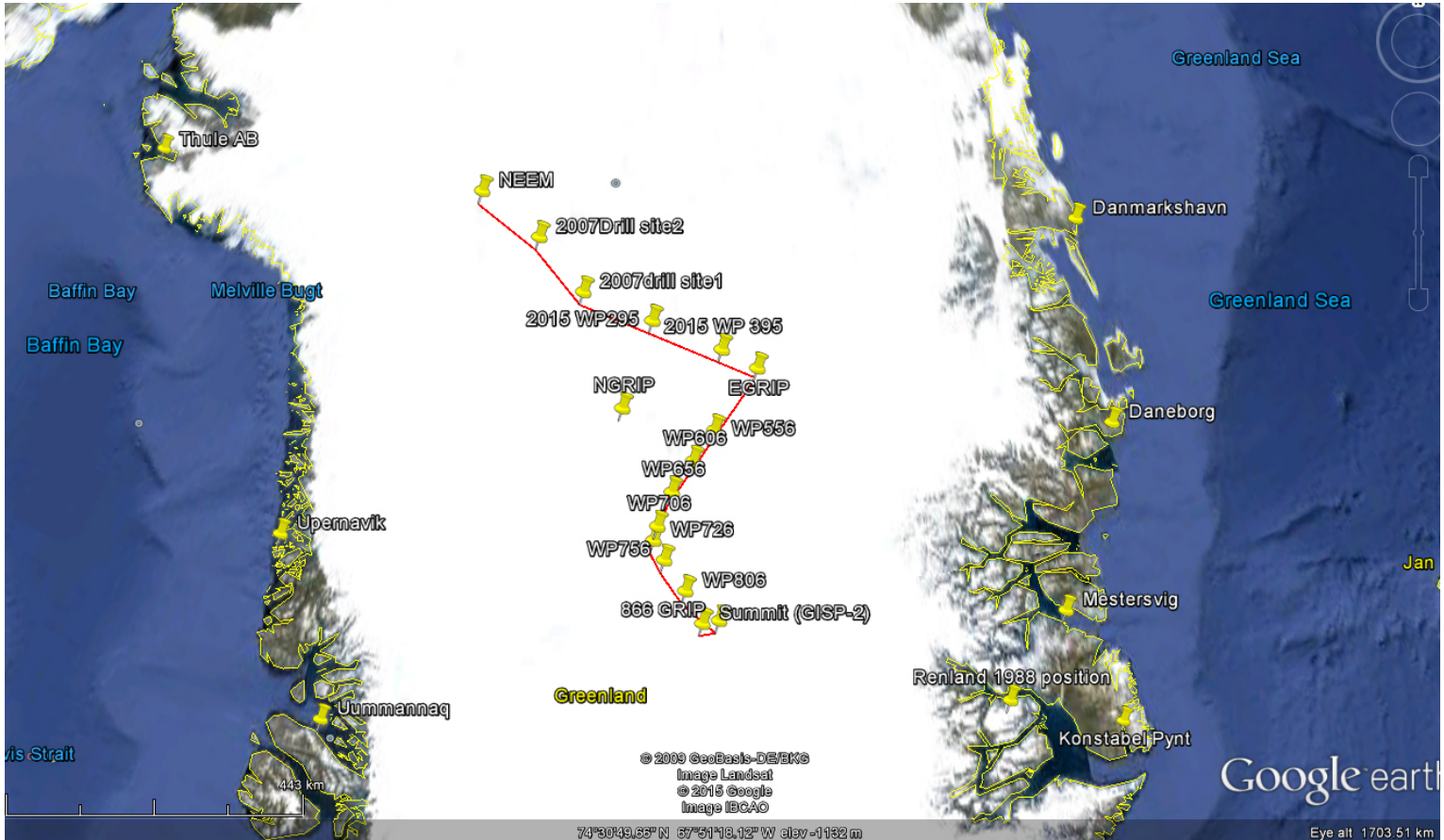
EGRIP drill site in the center of NEGIS with a surface velocity of 55 m/yr.

On the IceBridge Radio Echo Sounding line, clear stratigraphy (layering) is seen at least 50,000 years back in time.

The ice is ‘ripped’ at

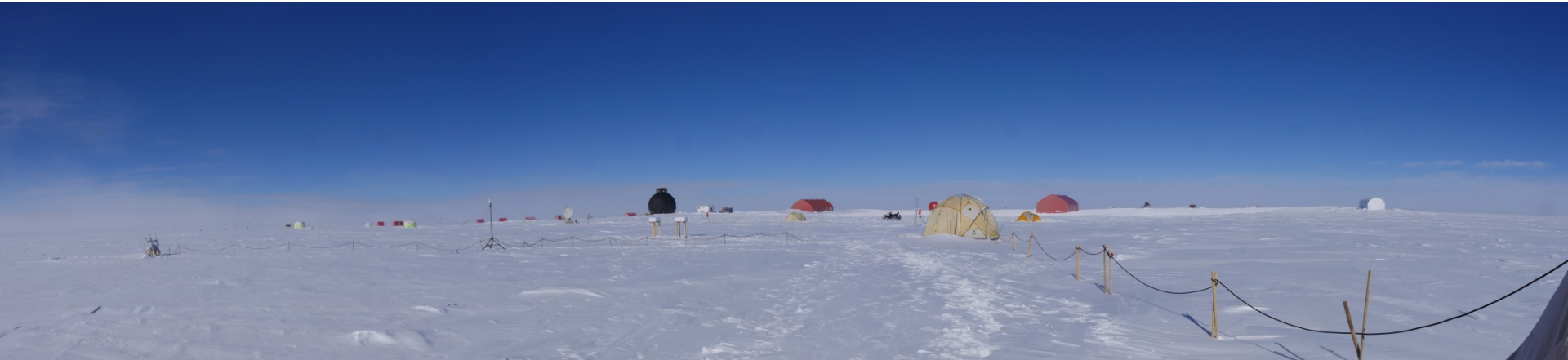


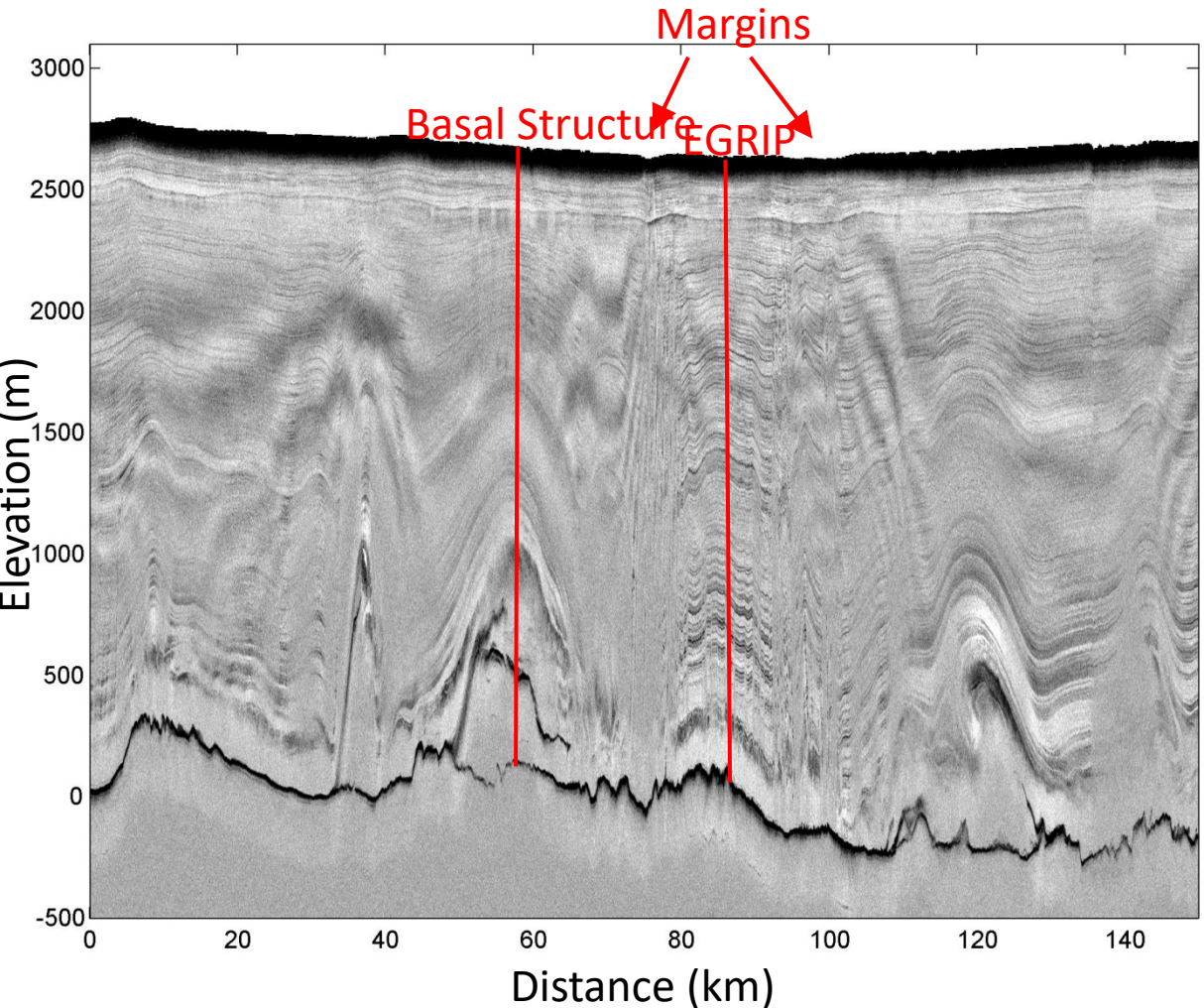
2015 – NEEM EGRIP Traverse

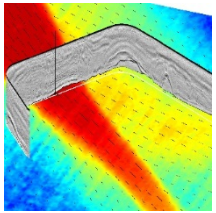


EGRIP 2015-2020

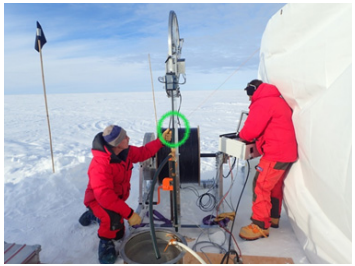
2015: Moving NEEM camp to EGRIP. Completed.
2016: Construction and outfitting of science and drill trenches. 100 m pilot hole and casing.
Expanding camp capacity. Completed.
2017: Drilling to 900 m. Processing; but not brittle zone.
2018: Continue deep drilling. Processing incl. Brittle zone. AWI Basler operations.
2019: Finishing deep drilling (2560m). Experiments in hole. Drilling into base? Shallow coring.
Camp is being down scaled.
2020: Last experiments in hole. Shallow coring. Camp is packed down for next time.



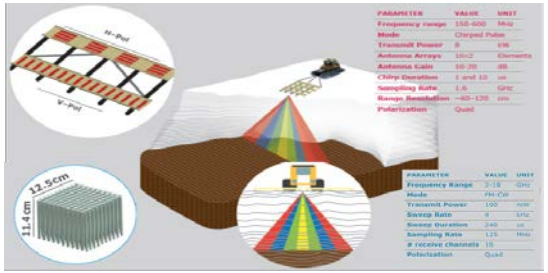




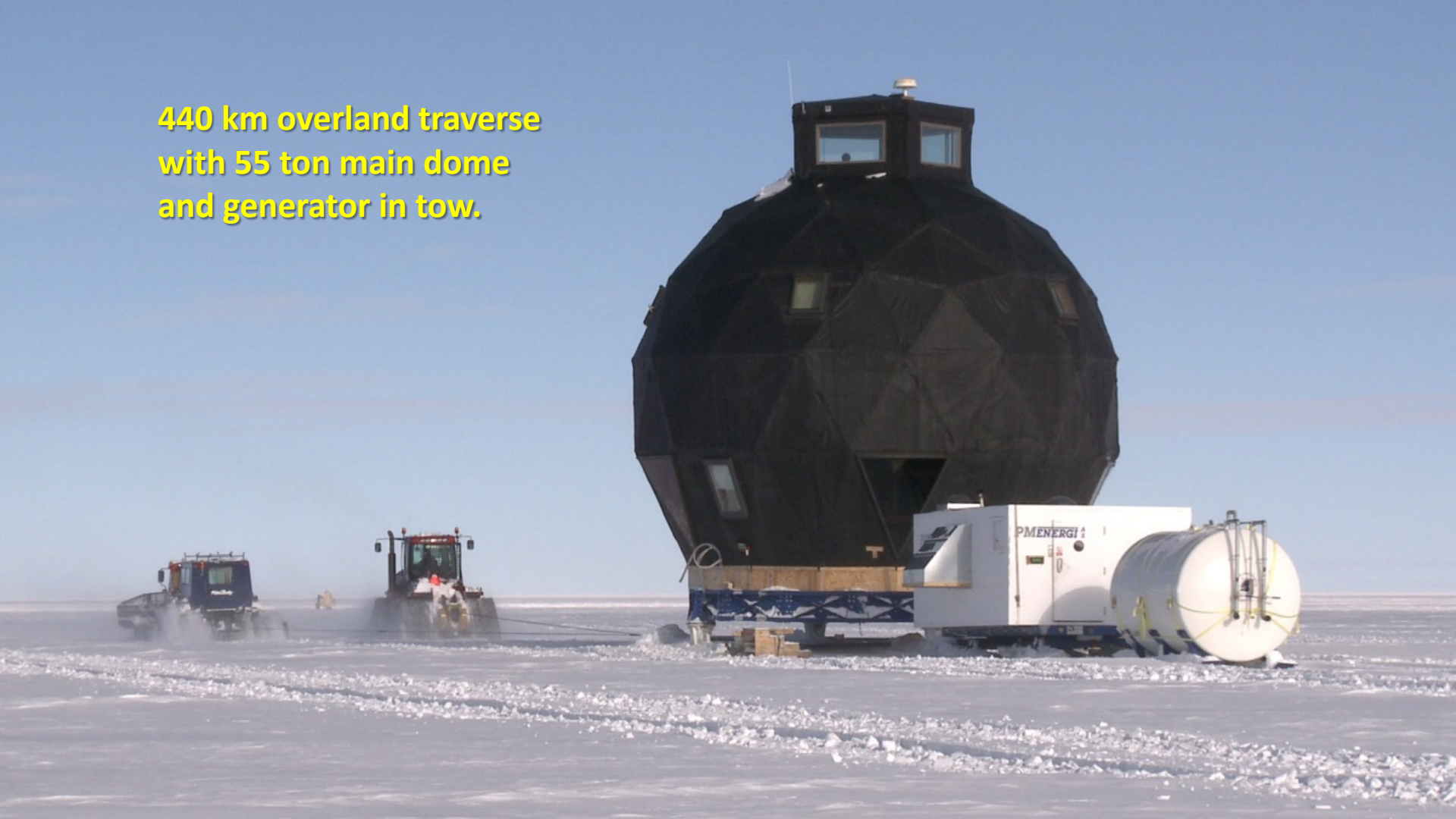
Surface progra
Drone, GPS



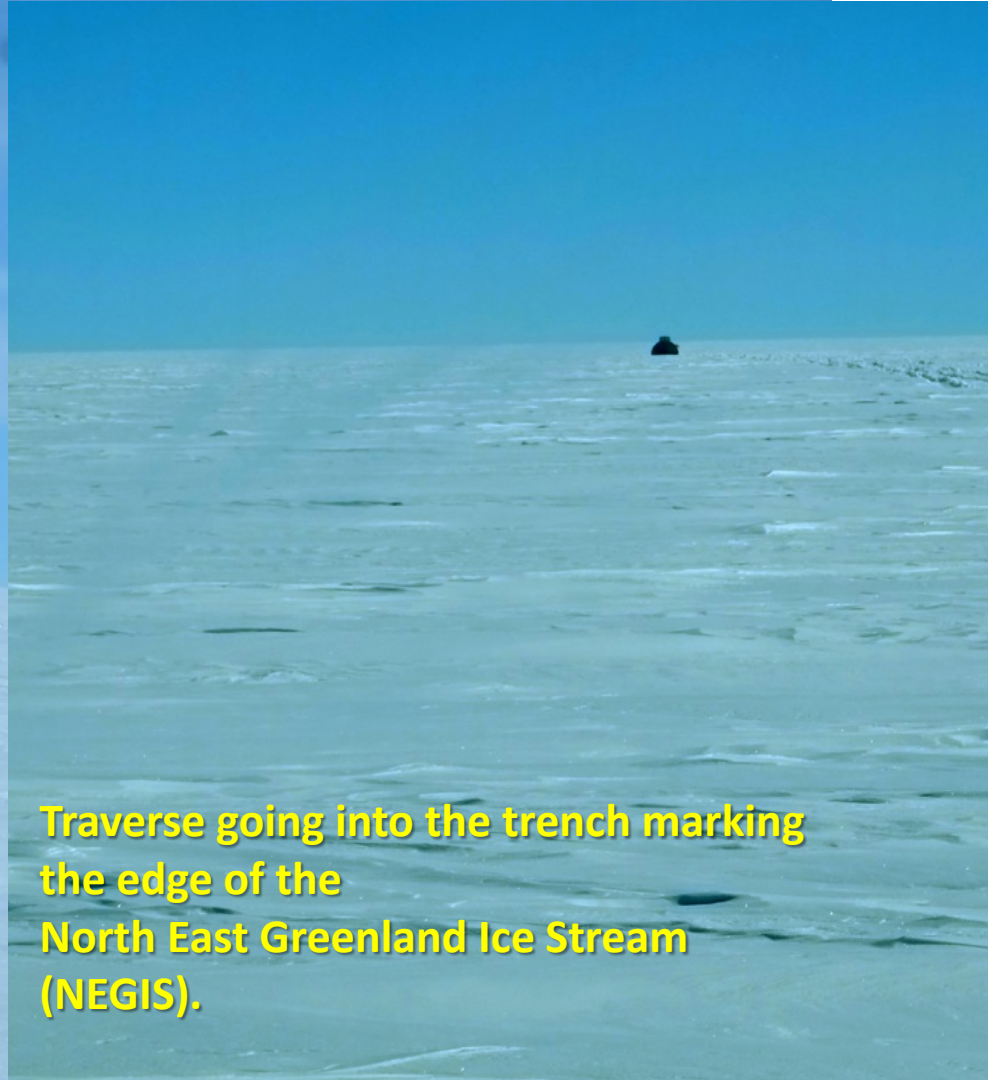
Rapid Access d
RADIX



Surface Radar Measurements


440 km overland traverse
with 55 ton main dome
and generator in tow.

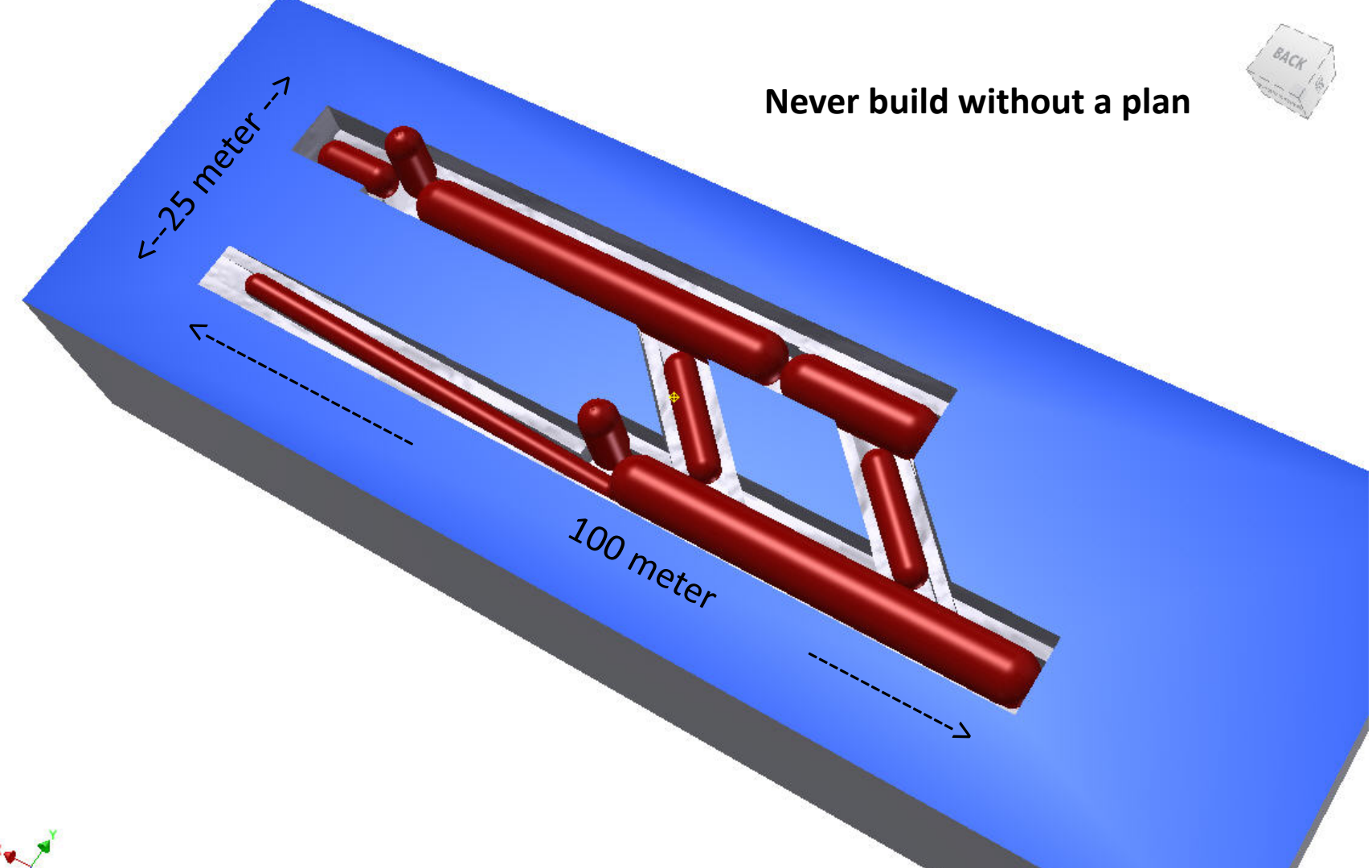
Traverse heading SEE towards EGRIP.



Traverse going into the trench marking the edge of the
North East Greenland Ice Stream (NEGIS).

Test of 5 m wide and 40 m long balloon at Presenco A/S, Kolding.

Never build without a plan

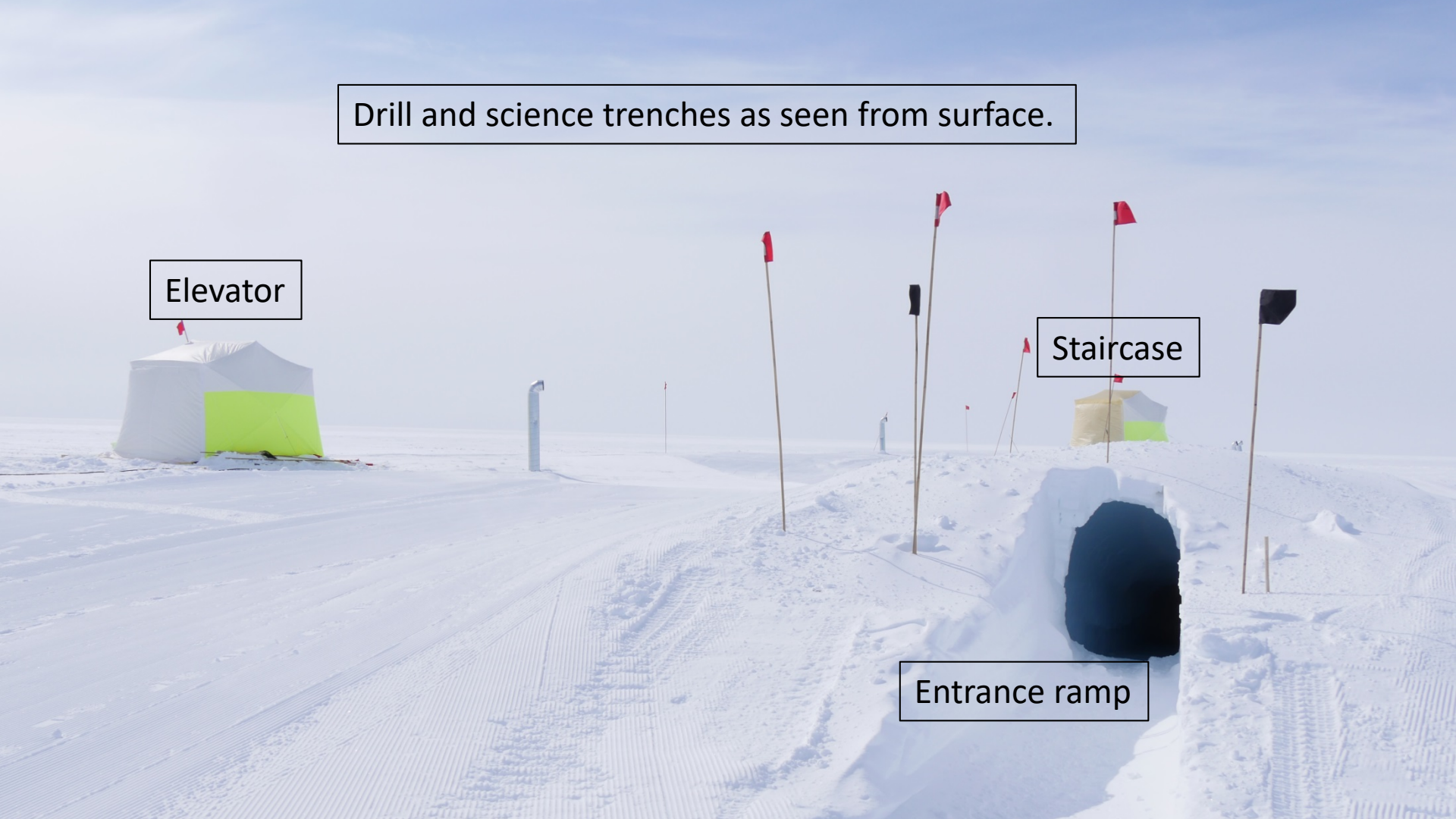



Excavation of trenches, EGRIP camp, May 2016


30490
NEW YORK AIR GUARD

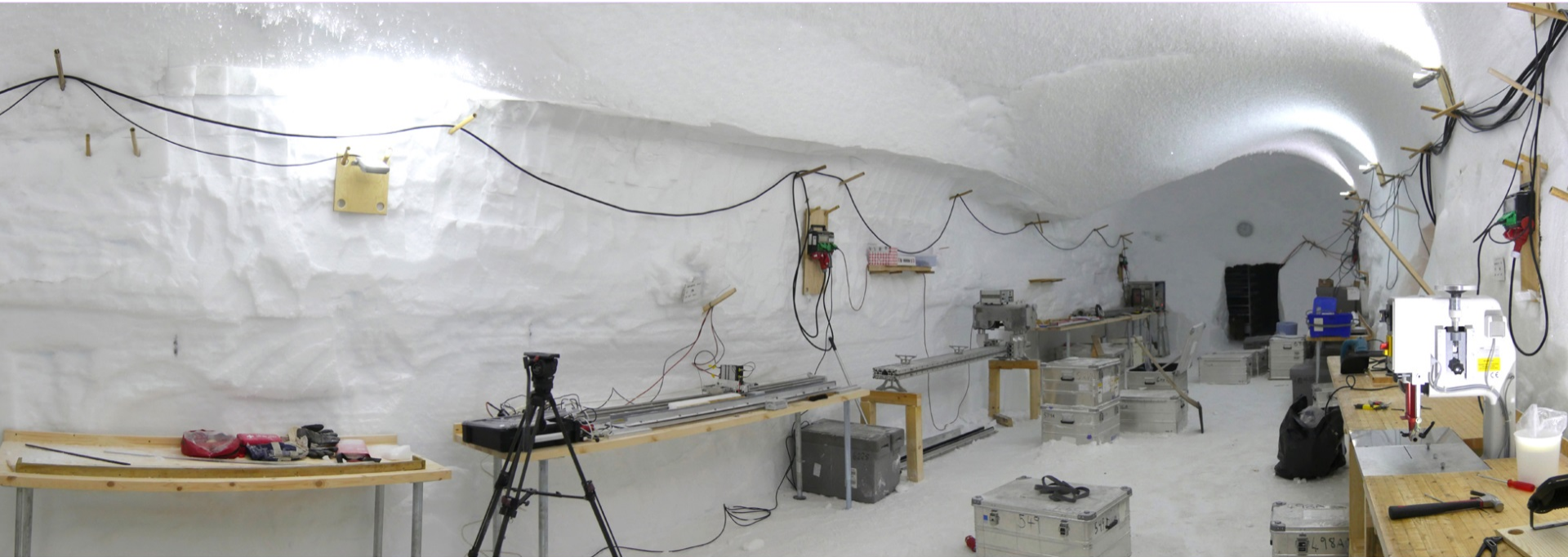
Elevator shaft after deflation of balloon

Cleaning out after balloon removal
EGRIP camp, May 2016


Drill and science trenches as seen from surface.
Elevator
Staircase
Entrance ramp

Drill trench 2017

Science trench 2017



EGRIP communication revolution:
3m VSAT disk linked to satellite. Large bandwidth – video streaming possible (Better than Kangerlussuaq).
Unlimited comms. All private cell phones functional using WIFI and IP-telephony.
Extra safety. All have an extra personal ”radio”.
Price: 76,000 DKK for one season. Price for disk 120,000 DKK.
2017: 1300 GB download. (Iridium price: 10.4 million USD)

Previous Iridium OpenPort costs:
360,000 DKK per season.

Info page EGRIP and Center for Ice and Climate.

- Description of Center for Ice and Climate: www.iceandclimate.dk
- Rationale and program for EGRIP: www.eastgrip.org
- EGRIP logistics (69 mill. kr): 25 mill. DKK (A.P.Møller foundation), 10 mill.(K.U. co-financing), 10 mill. (U.S.A. - NSF), 6 mill. (Germany), 5 mill. (Japan), 5 mill. (Norway) and 8 mill. (fra Schweiz, China, S.Korea, Italia og France)
- EGRIP (og center) science, a.o. Villum investigator (70 mill.), ERC synergy grant (ca 25 mill.).

Actual and planned man days in Greenland :

Year	In camp	In SFJ	FOM	DV's	Average camp load
2015	447	149	40	0	10
2016	1665	237	275	35	20
2017	2862	270	236	30	25
2018	2500	250	230	20	25
2019	2000	200	230	32	20
2020	1500	150	230	20	15
total	10974	1256	1241	137	

Days of field work:

2015:	Apr-27(May-1)	Jun-9 (Jul-20)	43 days (80 days)
2016:	Apr-27 (May-1)	Aug-14 (Aug-15)	105 days
2017:	Apr-26 (May-1)	Aug-22	113 days
2018:	Apr-27 (May-1)	Aug-13 (Aug-15)	104 days
2019:	May-1	Aug-15	107 days
2020:	May-1	Aug-1	92 days