

第57次南極地域観測隊による

氷床沿岸でのアイスコア掘削と周辺観測の報告

Ice core drilling and related observations by JARE57 in 2015/2016
austral summer on the coastal region of Antarctic ice sheet

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Hideaki Motoyama (NIPR・SOKENDAI), Kenji Kawamura,
Toshimitsu Sakurai, Kenji Sudo, Miho Arai, Toshitaka Suzuki

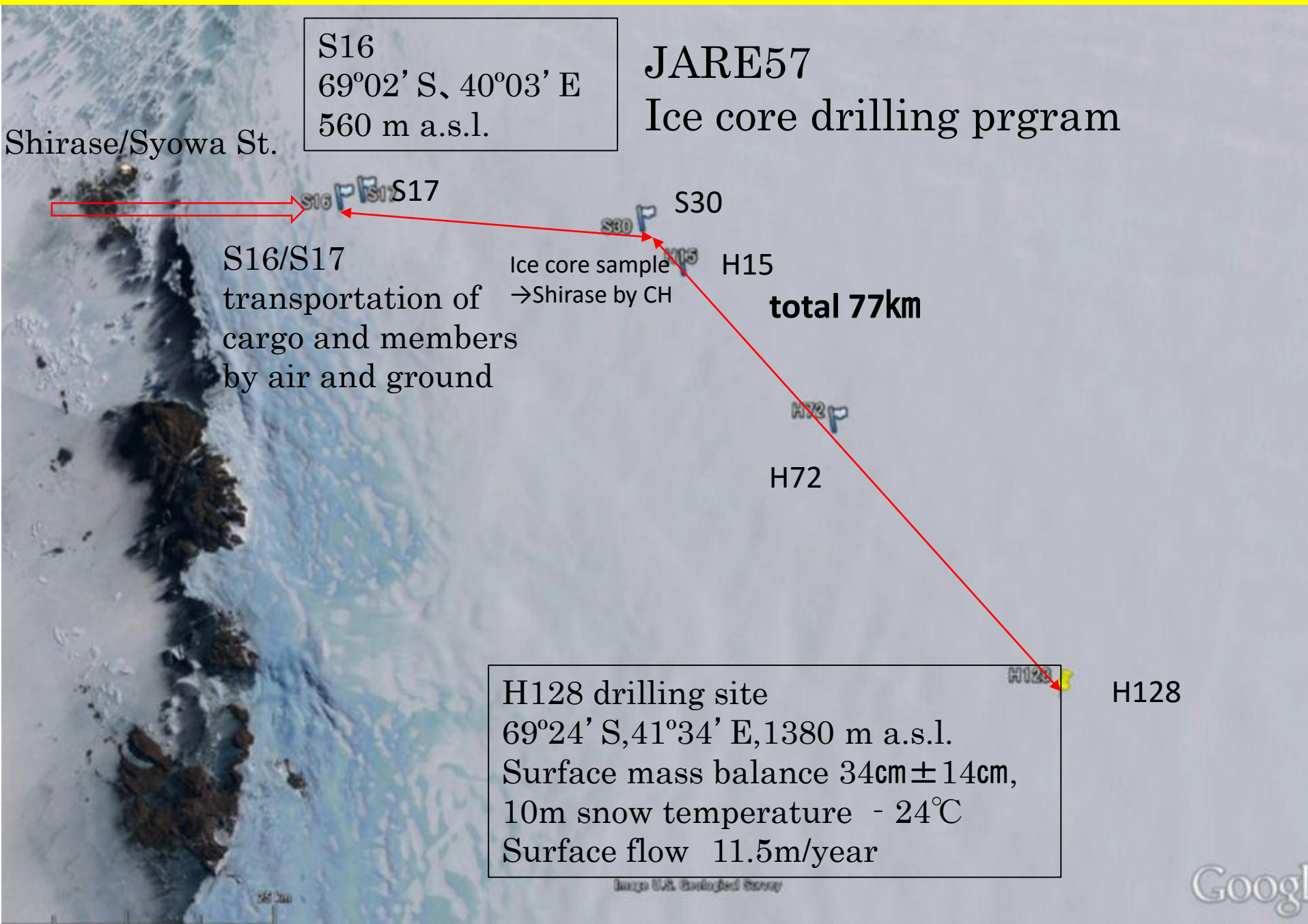
JARE57: 氷床沿岸でのアイスコア中層掘削

Ice core drilling at H128

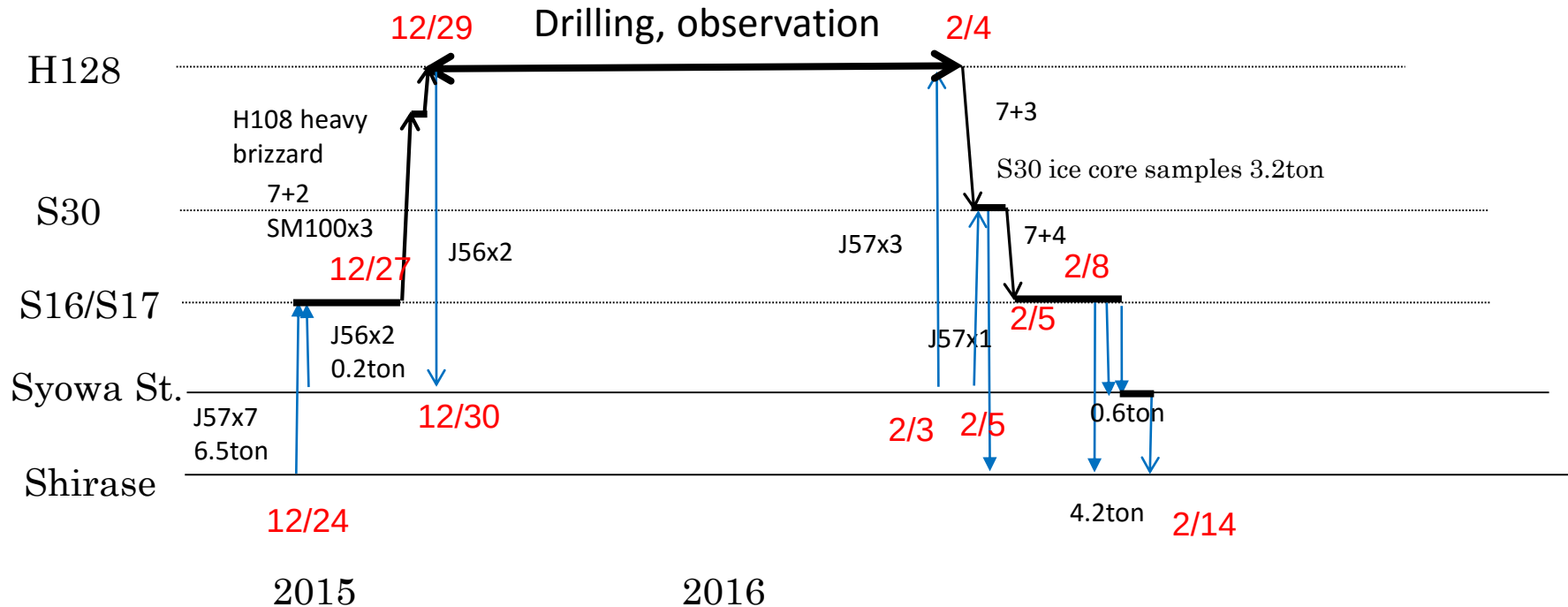
<main purposes>

- ice core drilling → past 2K >300m
- firn air sampling
- borehole logging: diameter, inclination, ice temperature, video recording
- snow pit observation
- automatic weather station, Argos transmitter
- ice flow observation
- snow stake measurement, surface snow sampling

JARE57: H128 inland field operation



H128 field operation



(Drilling team)

L: KAWAMURA Kenji (NIPR/SOKENDAI)

SAKURAI Toshimitsu (NIPR)

SUDO Kenji (SOKENDAI/NIPR)

ARAI Miho (Yamagata Uni.)

GM: MOTOYAMA Hideaki (NIPR/SOKENDAI)

(Aerosol team)

L: TAKENAKA Norimichi (Osaka Pref. Univ.)

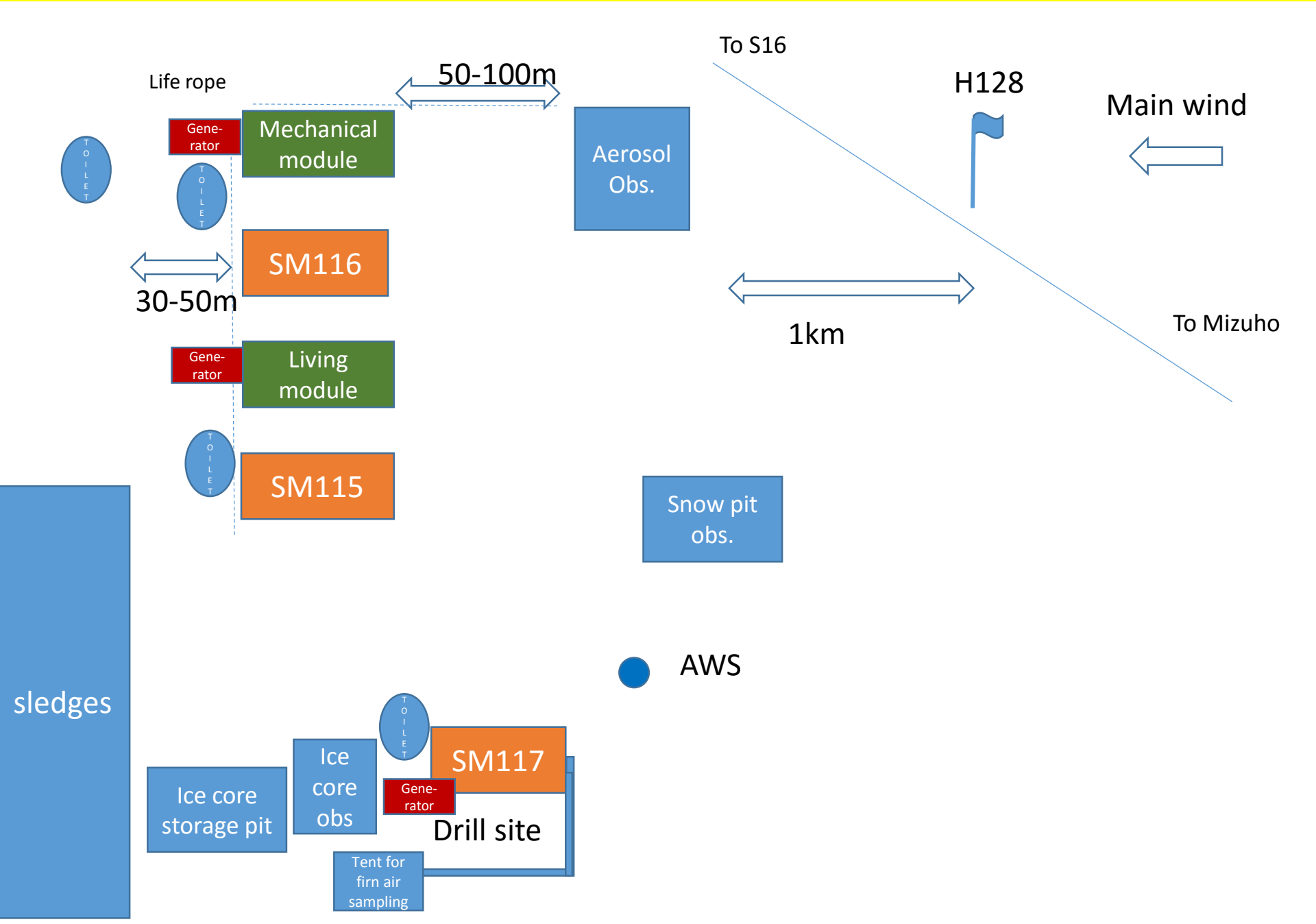
NORO Kazushi (Osaka Pref. Univ.)

大学院生3名参加

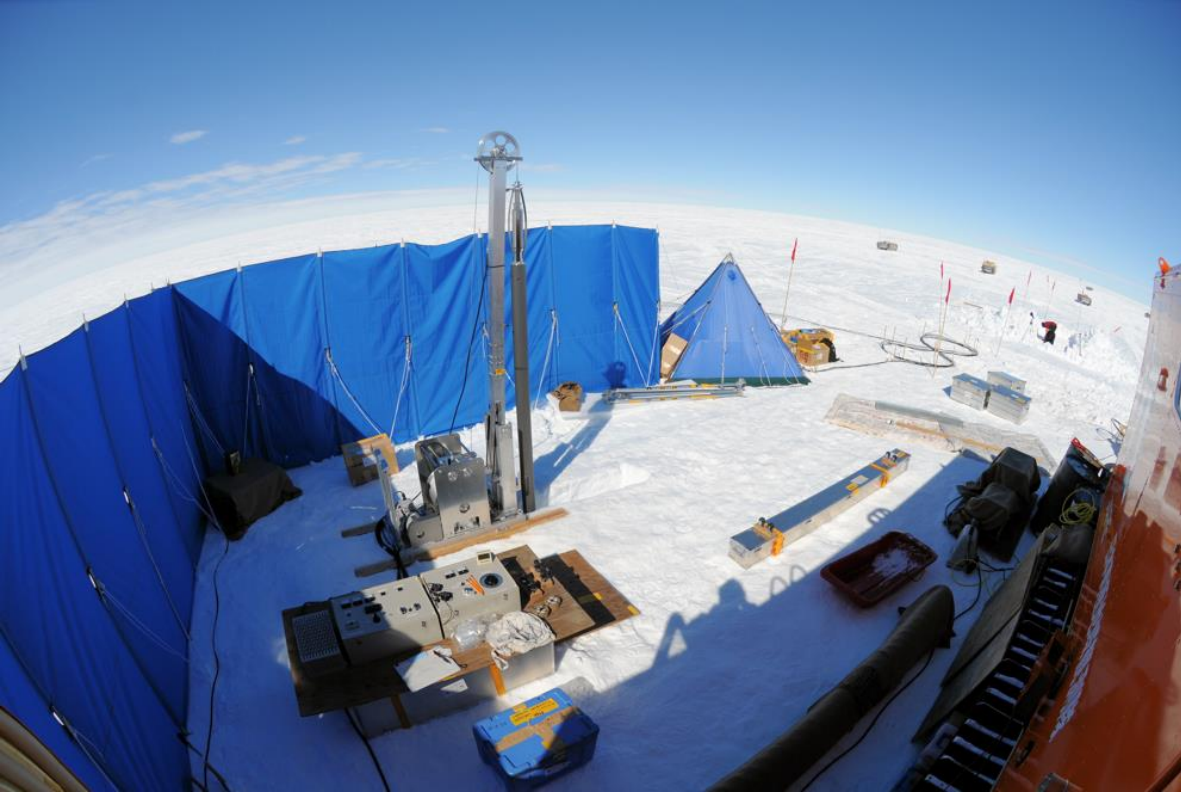
H128 camp site



JARE57: H128 camp

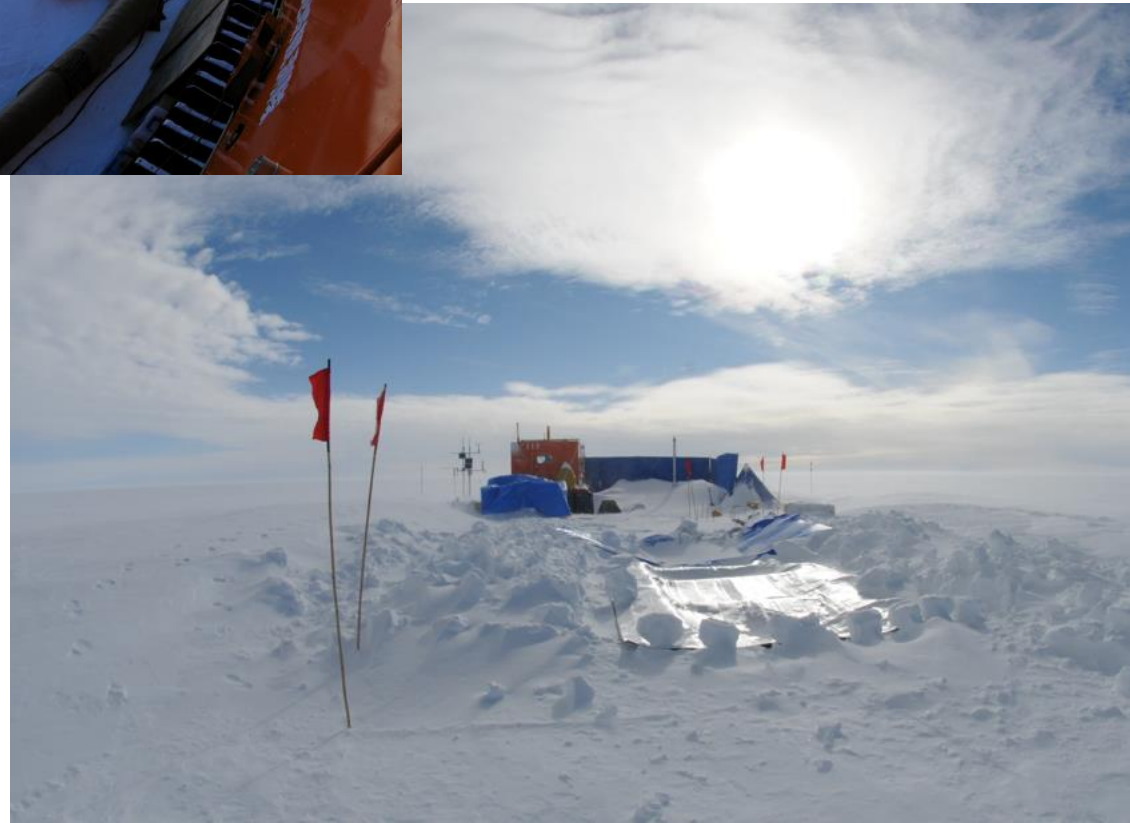


H128 drill site

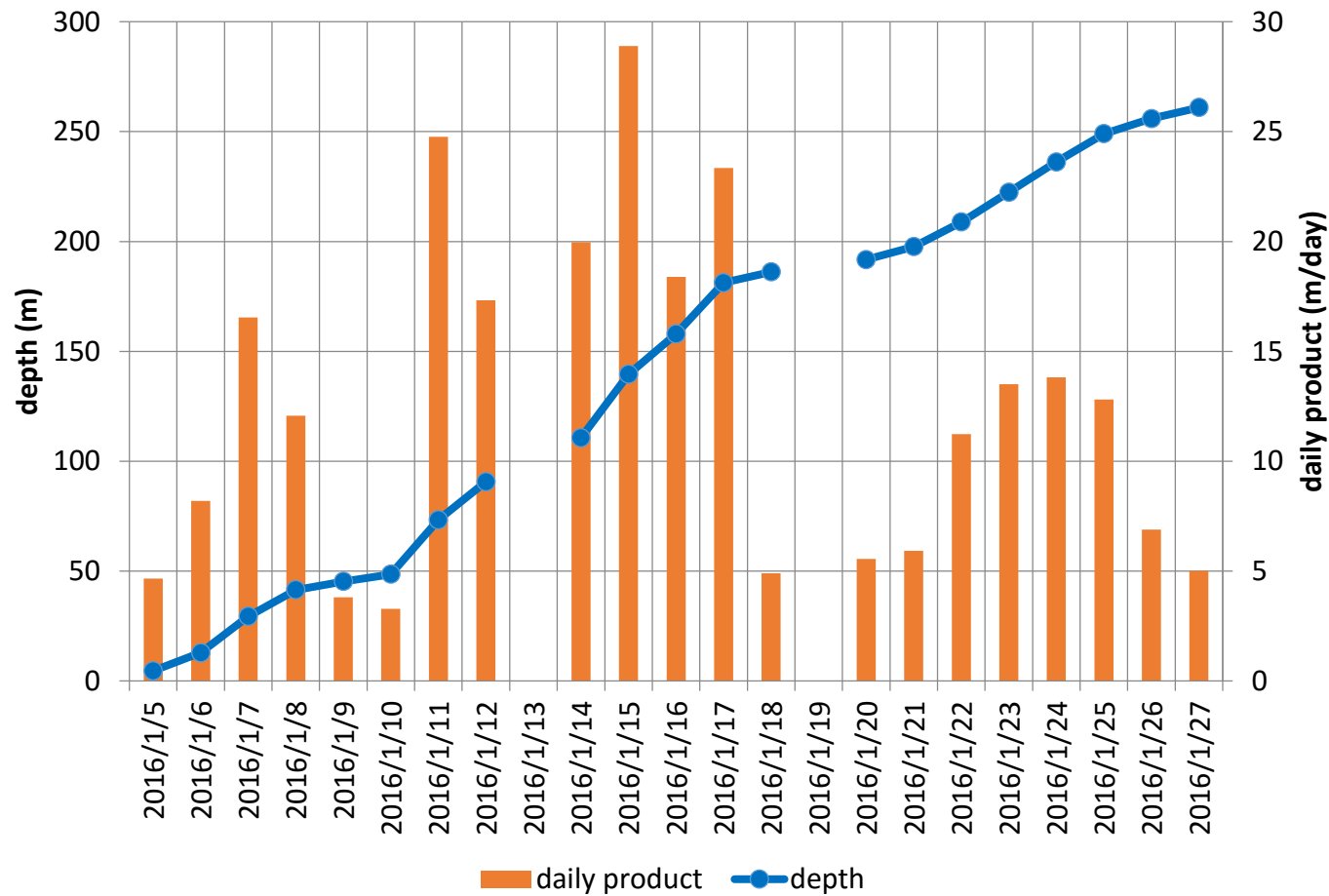


2016/1/5

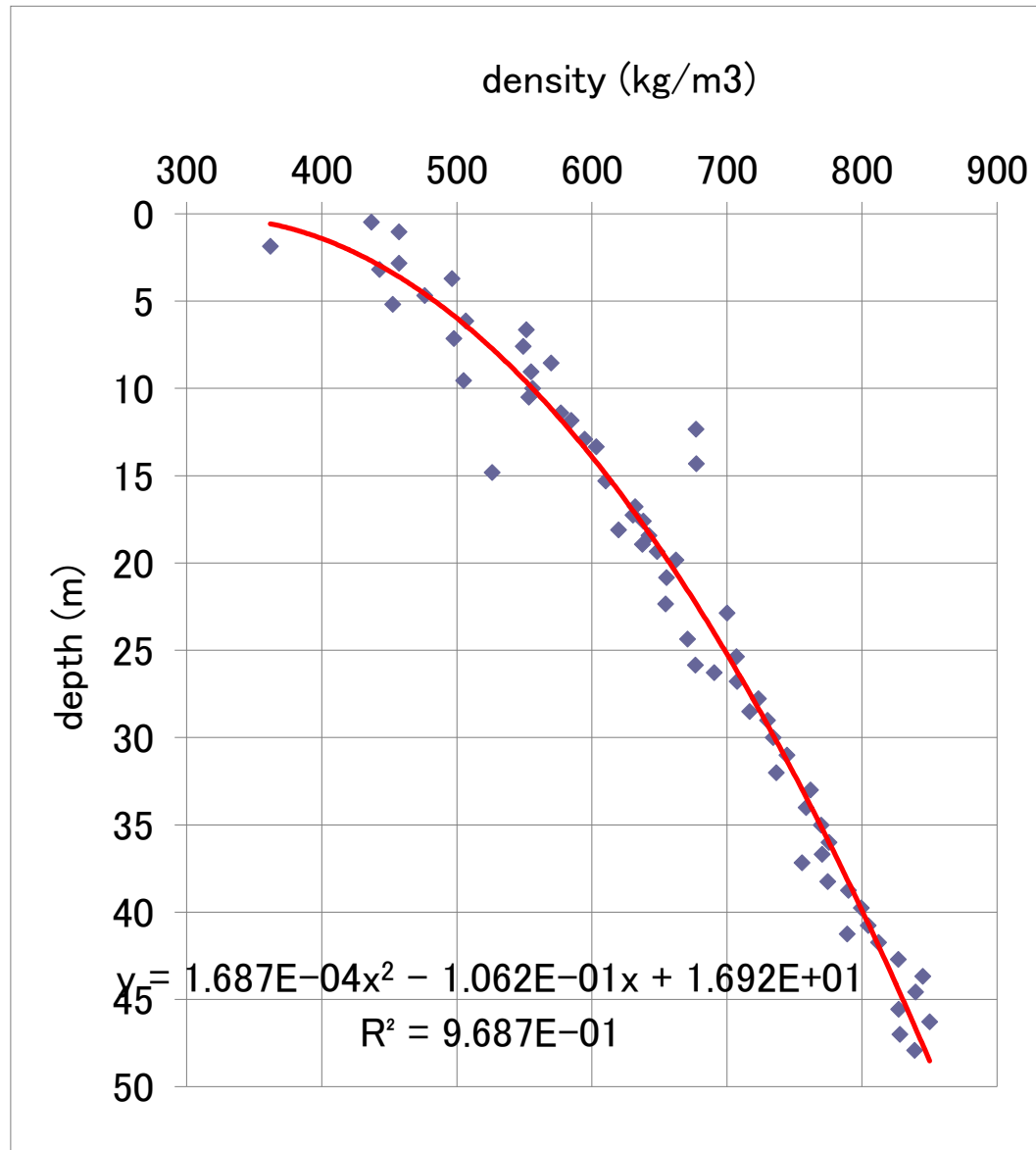
2016/1/20



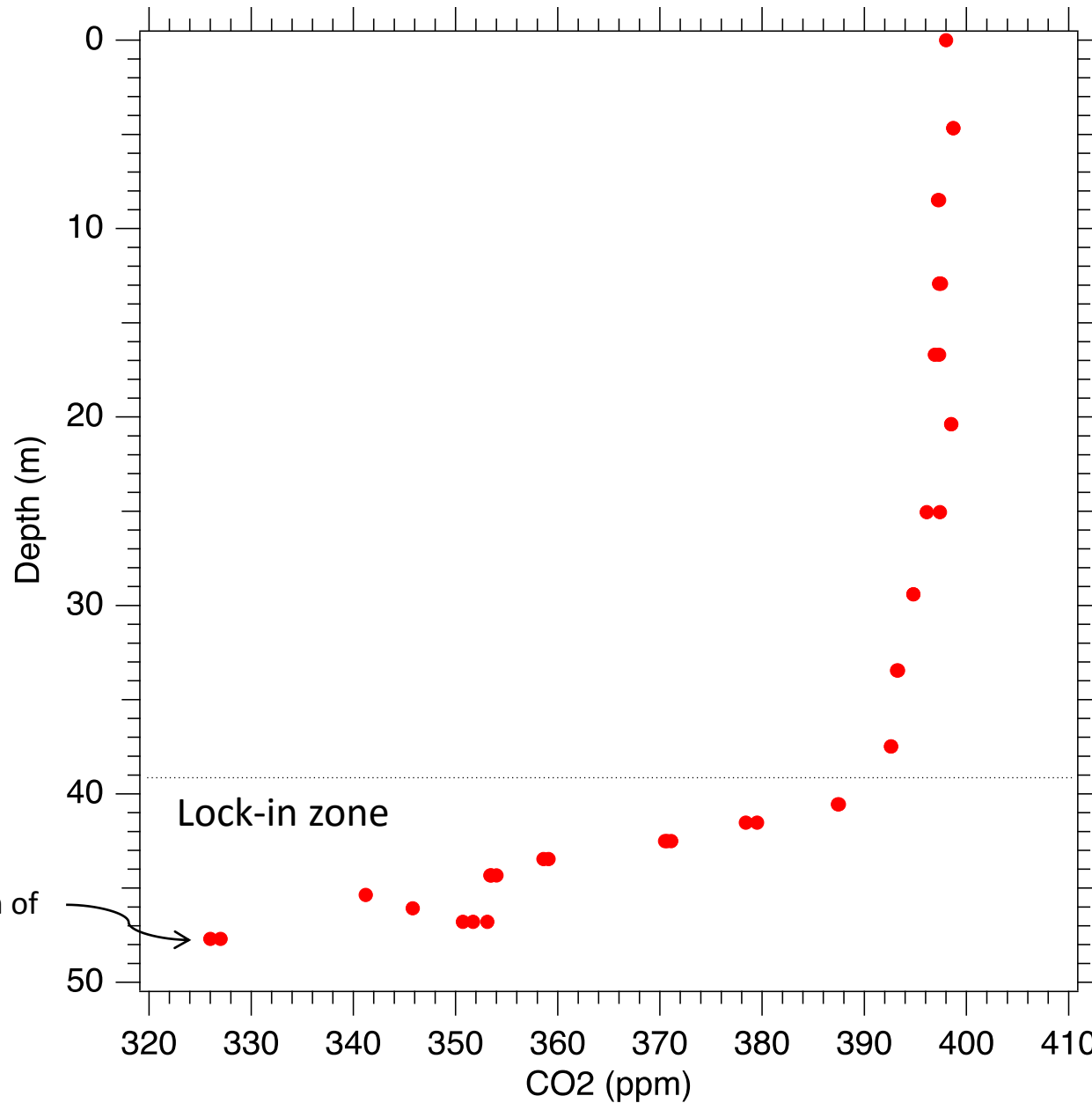
H128 drilling progress①: drill depth and daily product



H128 drilling progress②: density of ice core

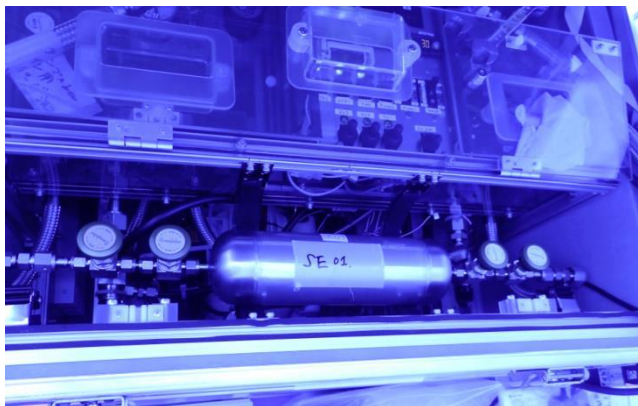


CO₂ concentration in firn air at H128



CO₂ concentration of
early 1970s

Firn air sampling at H128



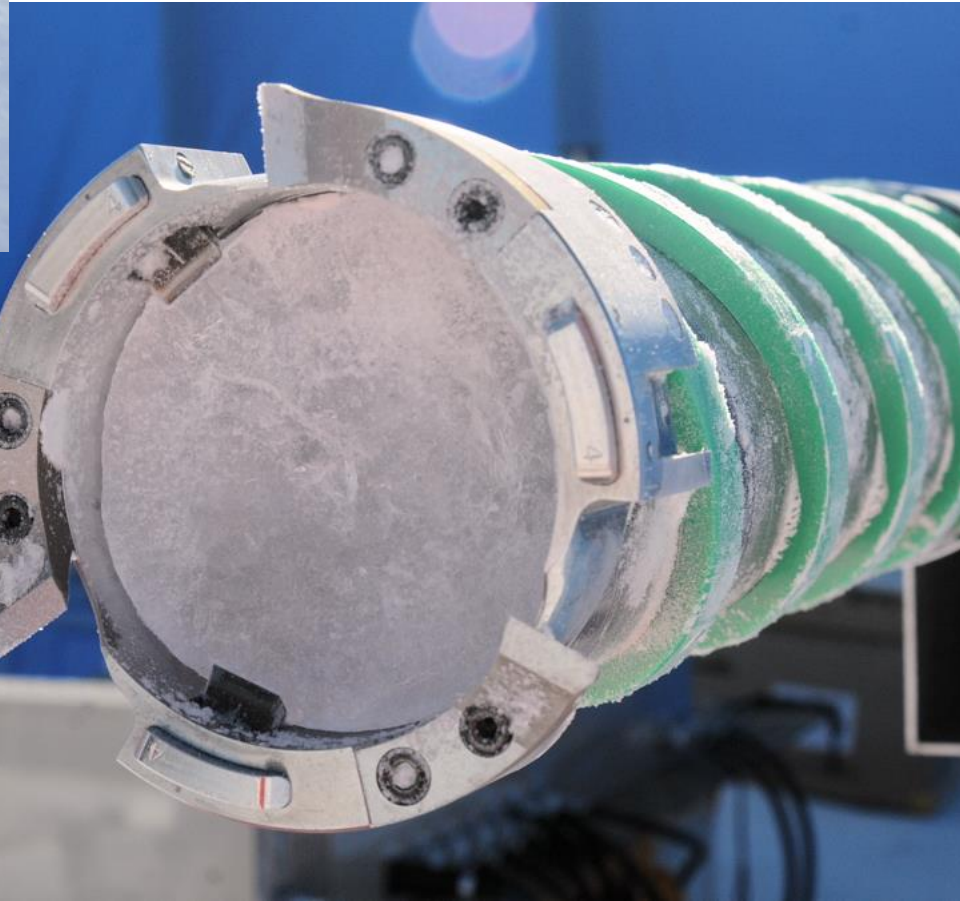
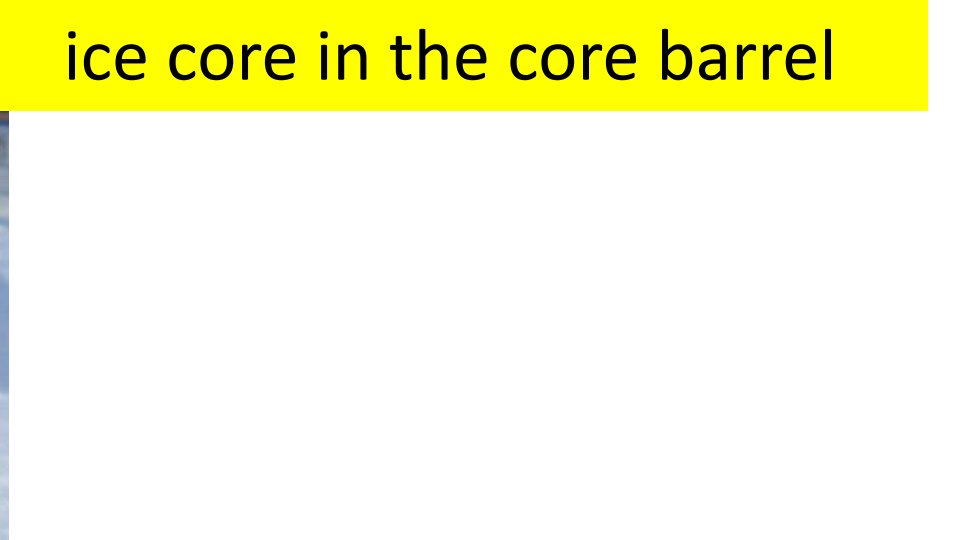
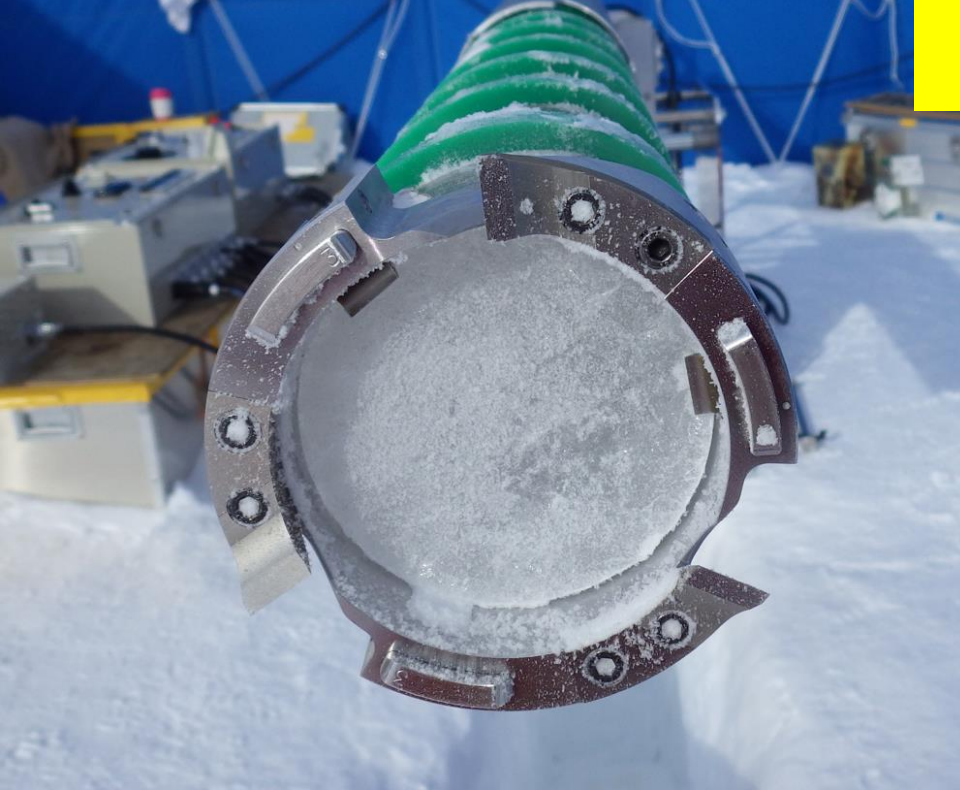
sampling bottle of NIPR
(GHG, N₂, O₂, noble gas)



sampling bottle of NIES (halocarbon)

depth(m)	NIPR(bottle number)	NIES(bottle number)
4. 67	2	2
8. 49	2	
12. 92	2	1
16. 69	2	
20. 38	2	
25. 05	2	2
29. 41	2	
33. 45	2	
37. 48	2	1
40. 55	2	1
41. 52	2	2
42. 50	3	1
43. 46	2	1
44. 32	3	2
45. 36	2	1
46. 07	2	1
46. 79	3	2
47. 69	2	1
Sub total	39	18
Surface air	10	5
total	49	23

ice core in the core barrel

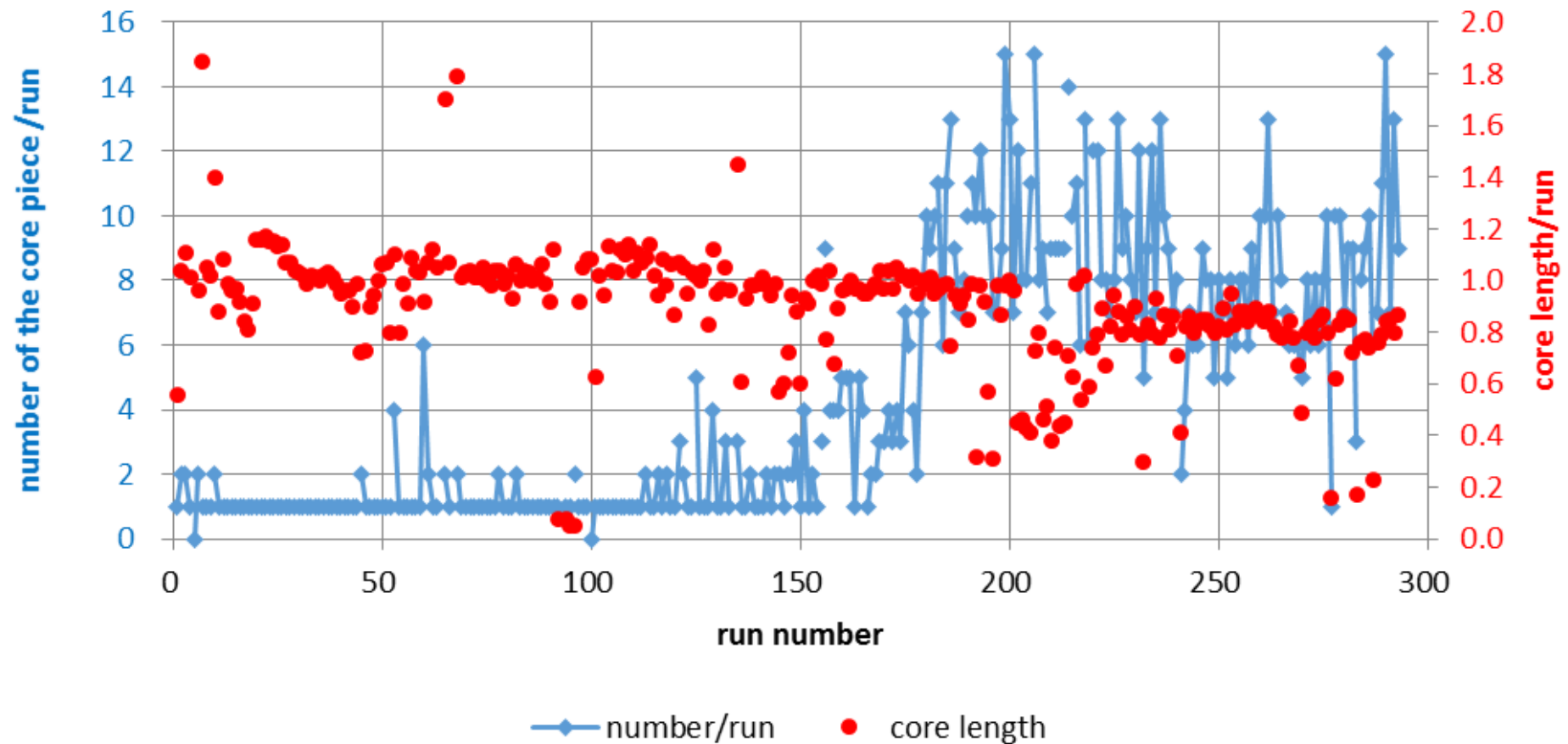


2016/1/23

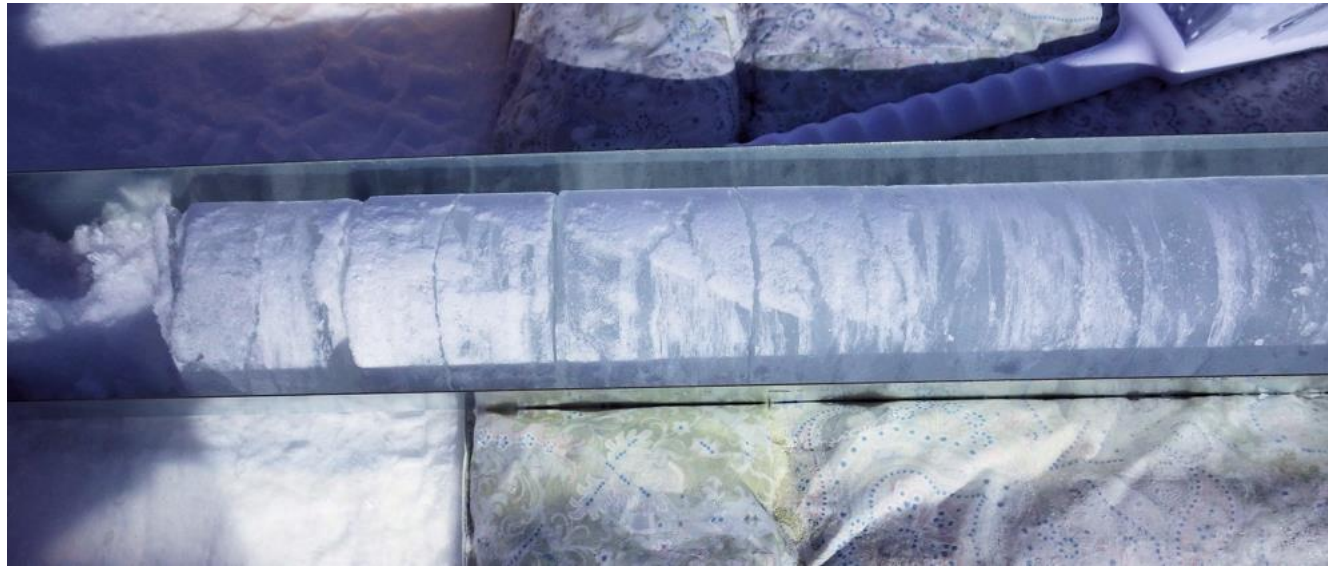
2016/1/26

H128 drilling progress(3):

Core length and number of the core piece



broken ice core below 150m

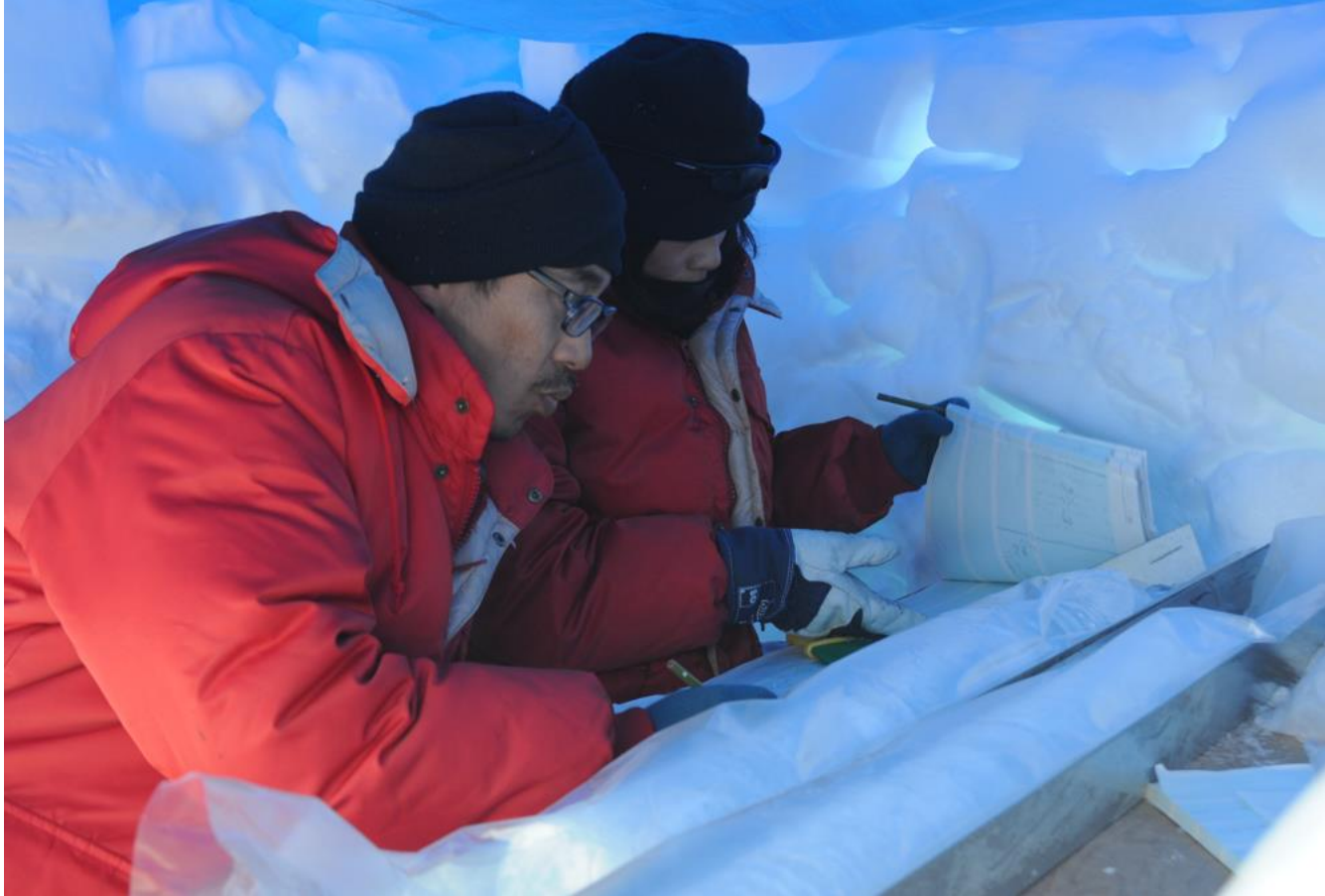


2016/1/23
210m



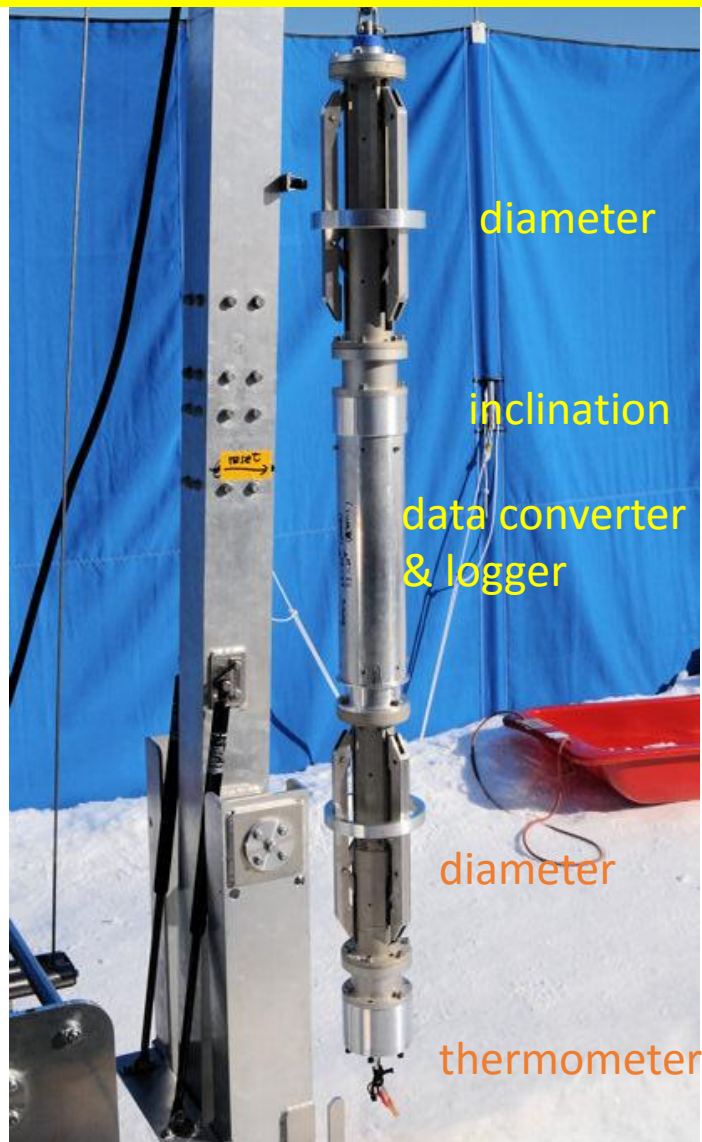
2016/1/27
250m

Sketch of ice core stratigraph



2016/1/24

borehole logging: (L) diameter, inclination, temperature
(R) video camera



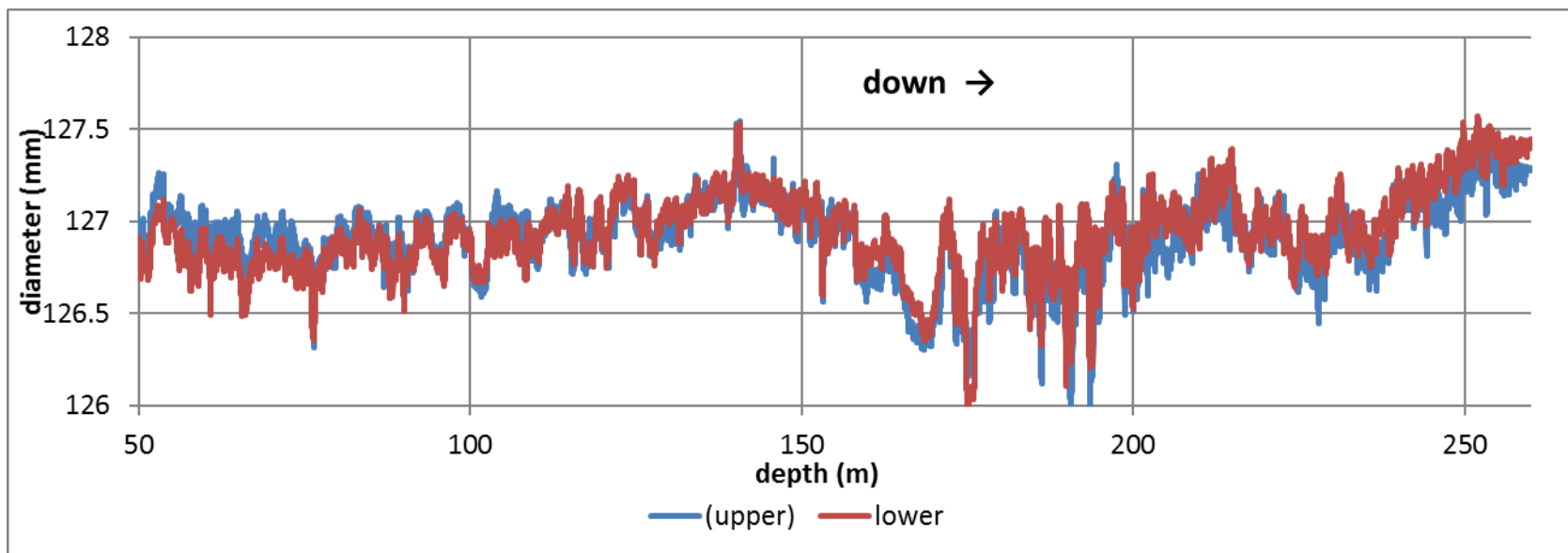
logging machine



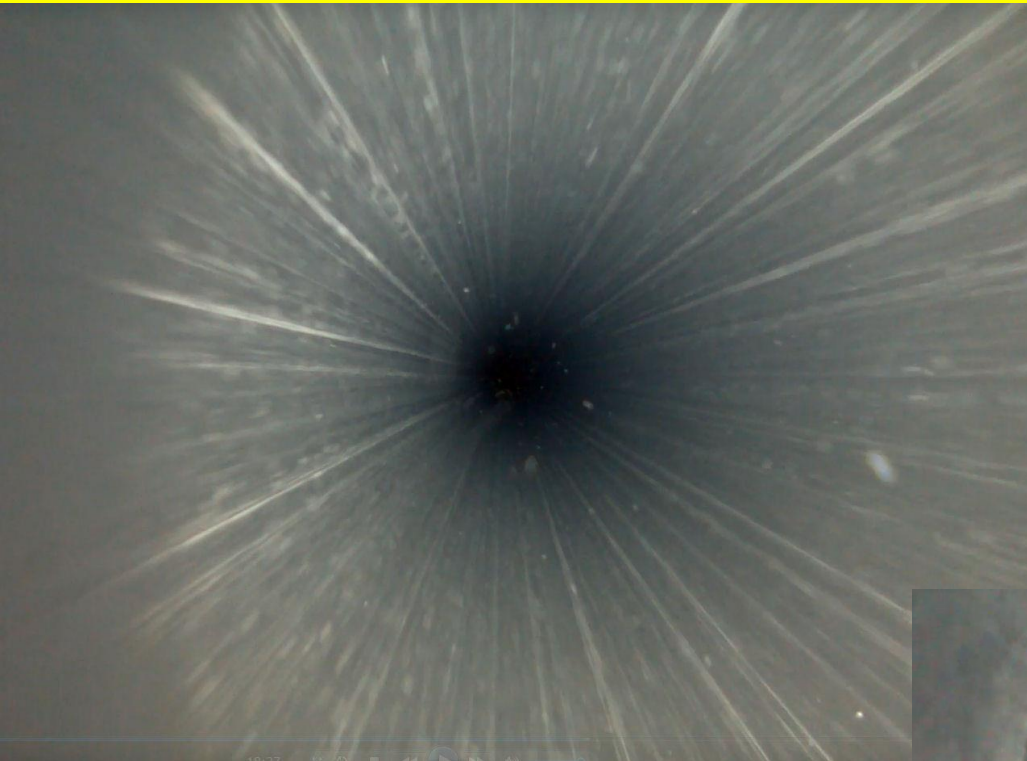
bottom of logging machine



video camera & light



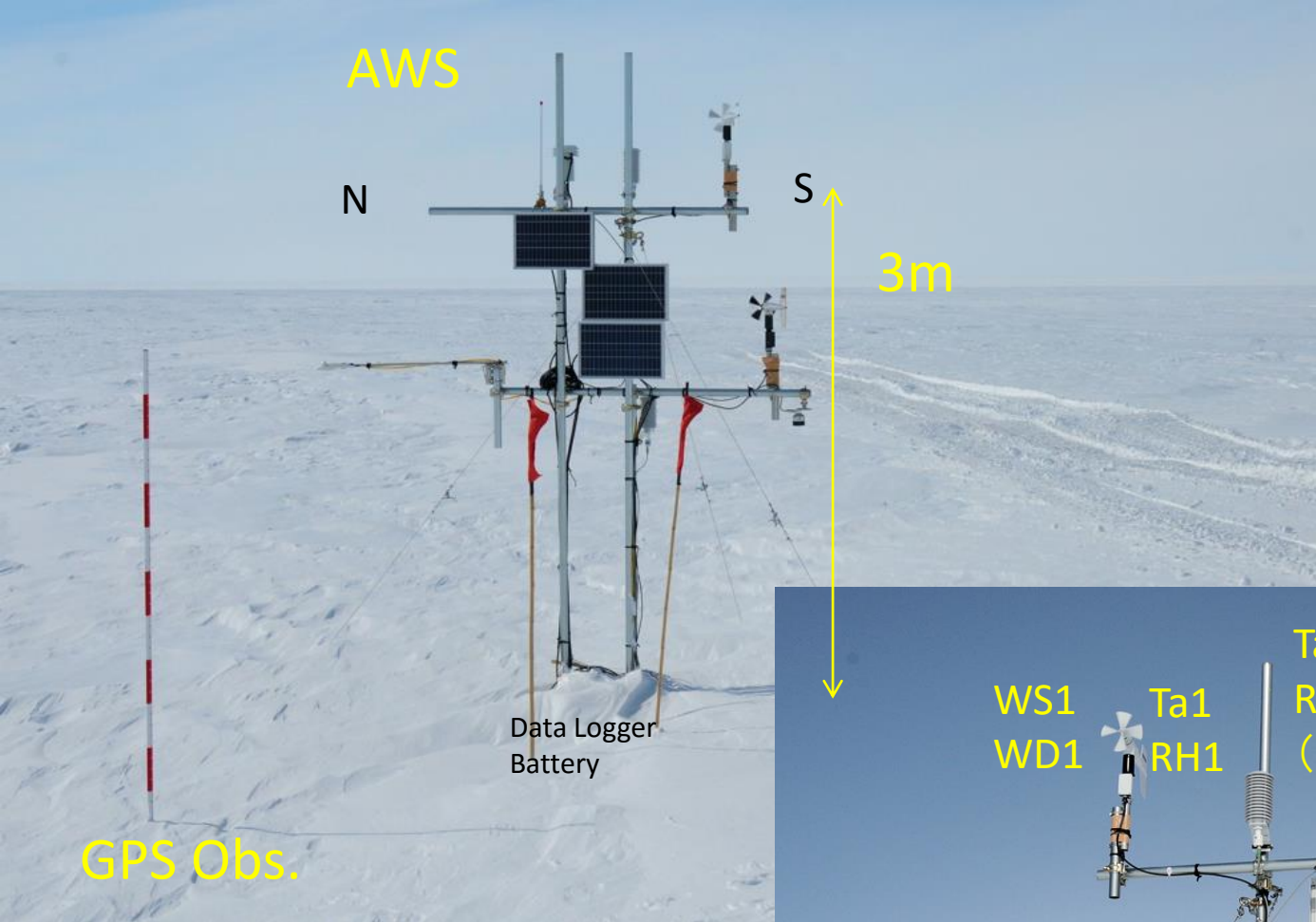
surface image in the borehole



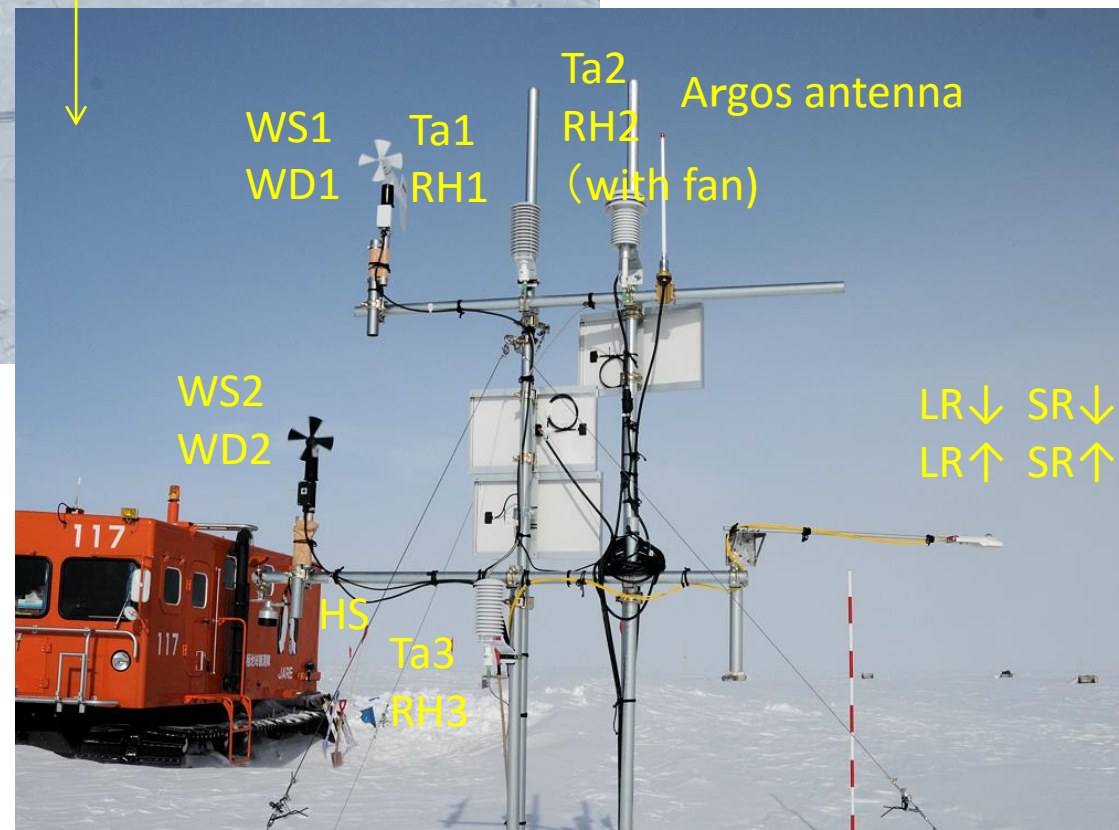
upper part 50m

lower part 200m

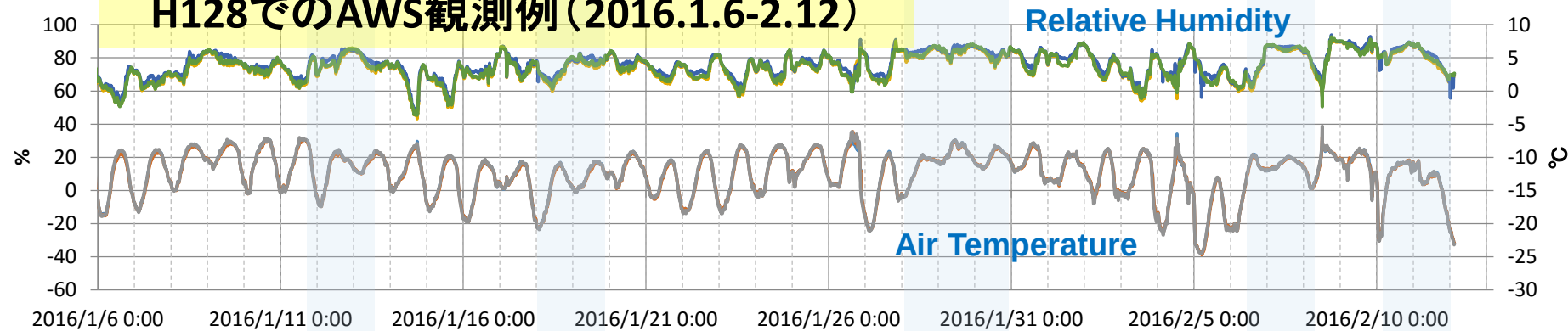




Automatic weather station AWS

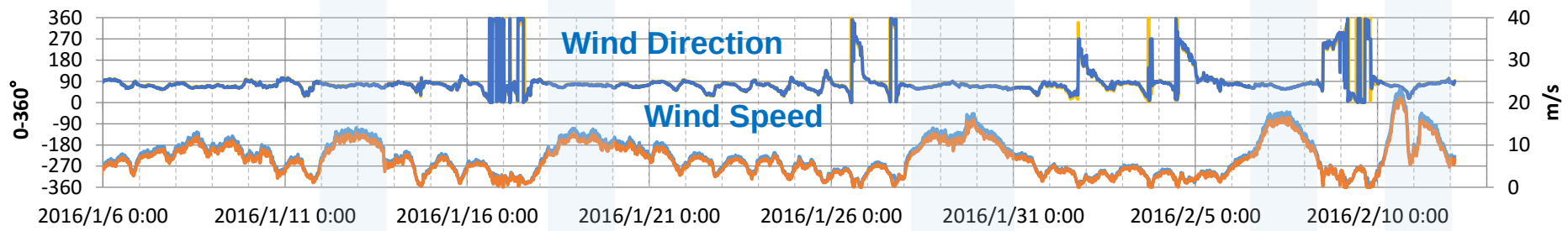


H128でのAWS観測例 (2016.1.6-2.12)

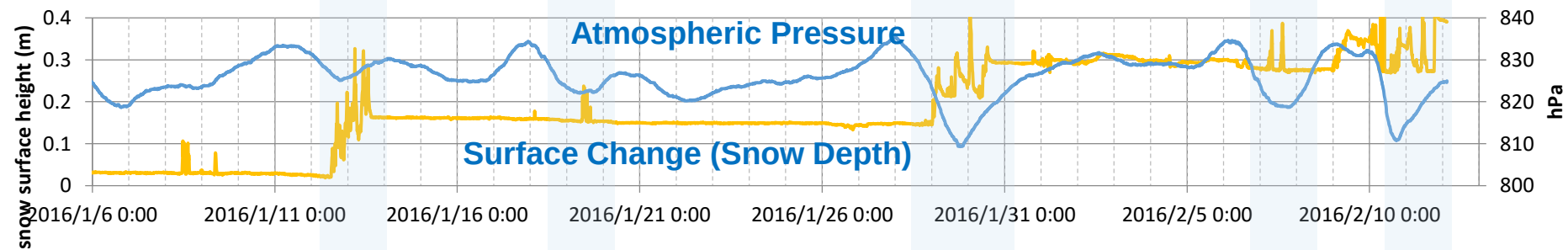


H128 AWS observation: blizzard

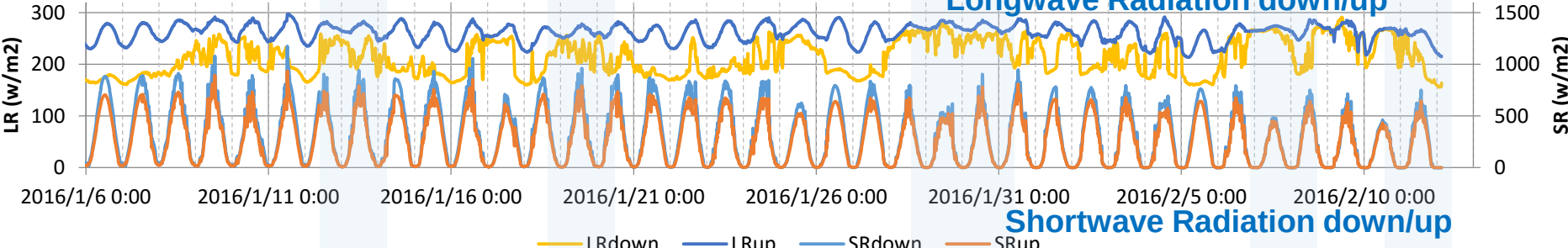
— RH1 — RH2 — RH3 — Ta1 — Ta2 — Ta3



— WD1 — WD2 — WS1 — WS2

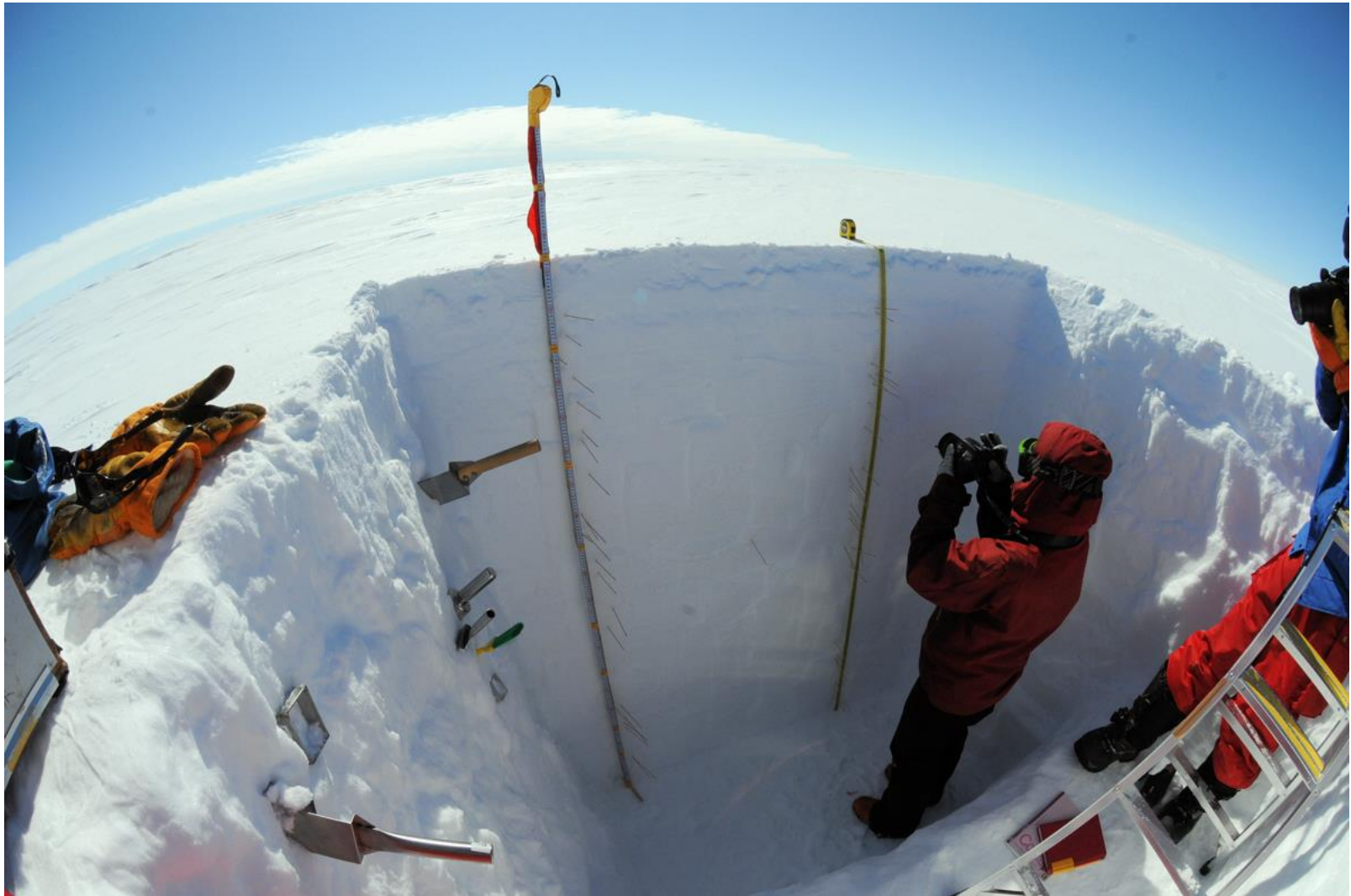


— HS — AP

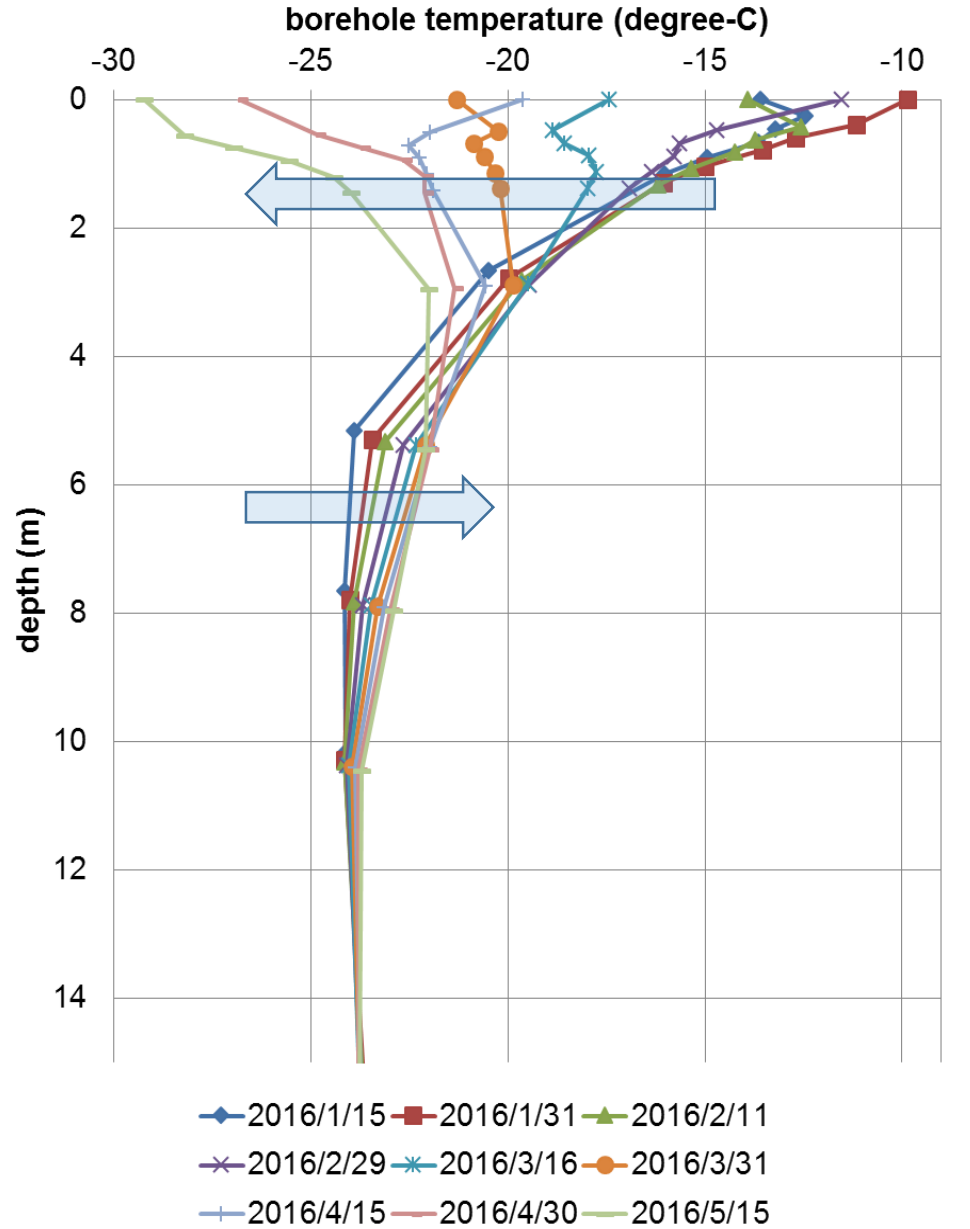
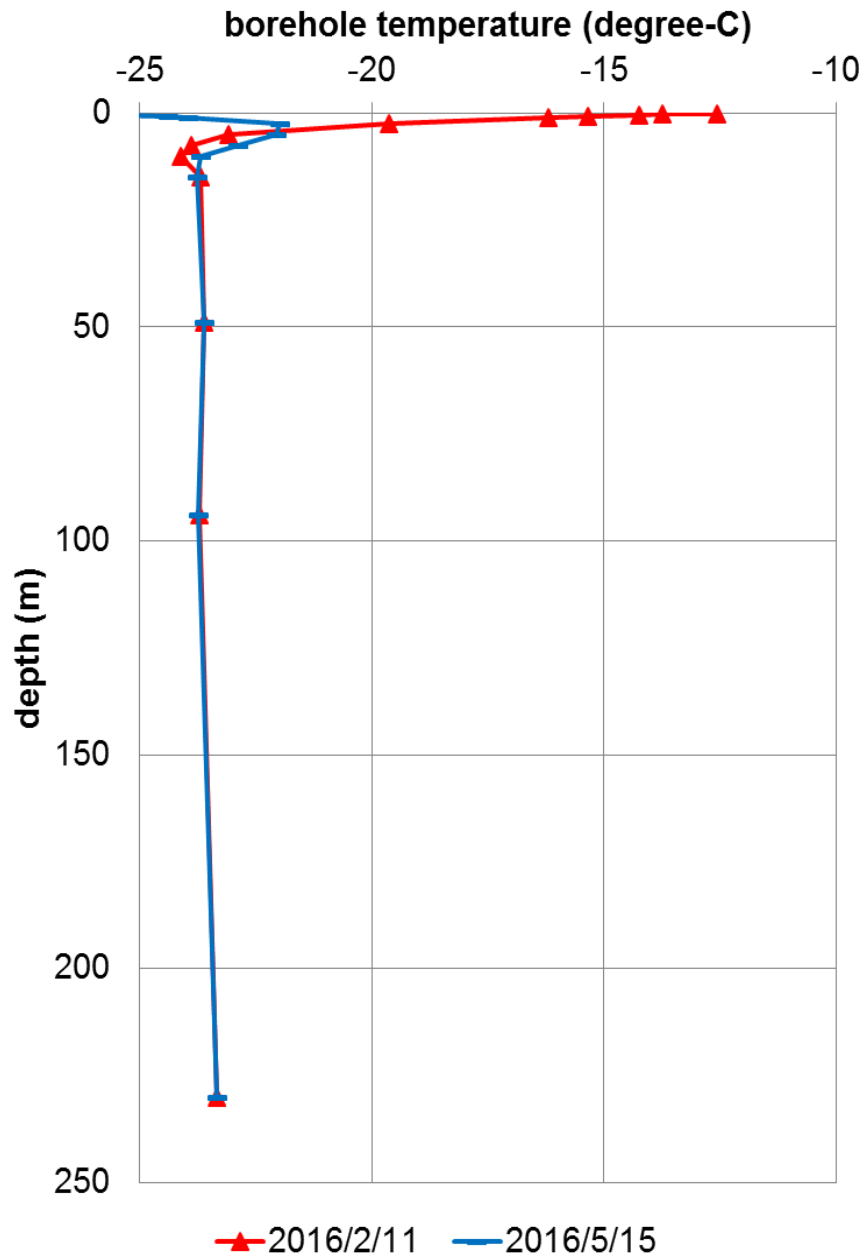


— LRdown — LRup — SRdown — SRup

H128 2m-snow pit observation 2016/2/1



Snow and ice temperature profile



GPS observation for ice flow measurement

しらせ/昭和基地

S16 S17

S16
人員、物資の空輸
氷床上輸送

(帰路)
冷凍試料空輸

S30

H15

total 77km

H72

H72



H128

2016.1.1/1.2, 2016.1.31/2.1

0.96m/month → 11.5m/year

JARE57: 氷床沿岸でのアイスコア中層掘削

Ice core drilling at H128

<main results>

- ice core drilling : 261m → past 1.5K
- firn air sampling: 18 different depth + surface air
- borehole logging: diameter, inclination, ice temperature, video recording
- snow pit observation: 2m
- automatic weather station, Argos transmitter
- ice flow observation: 11.5m/year
- snow stake measurement, surface snow sampling