

Enhanced year round observations at the Korean Jang Bogo Station, Terra Nova Bay

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Korea Polar Research Institute

NCAR, Boulder, Colorado on June 26-28



74° 37.4' S, 164 ° 13.7'E

The Jang Bogo Station, Terra Nova Bay,
Northern Victoria Land, Antarctica

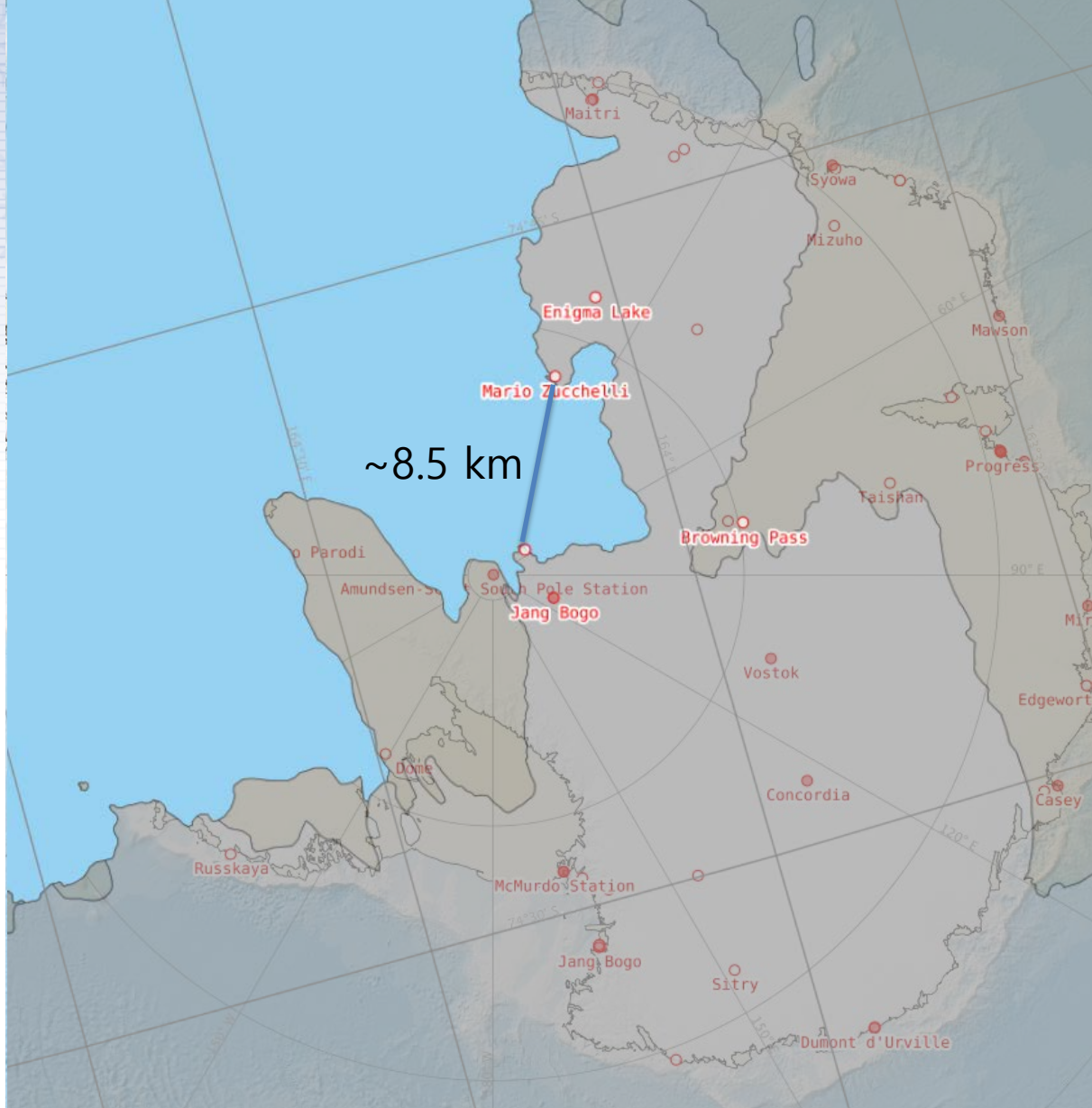
Phone : 032-770-8585

Email : jangbogo@kopri.re.kr

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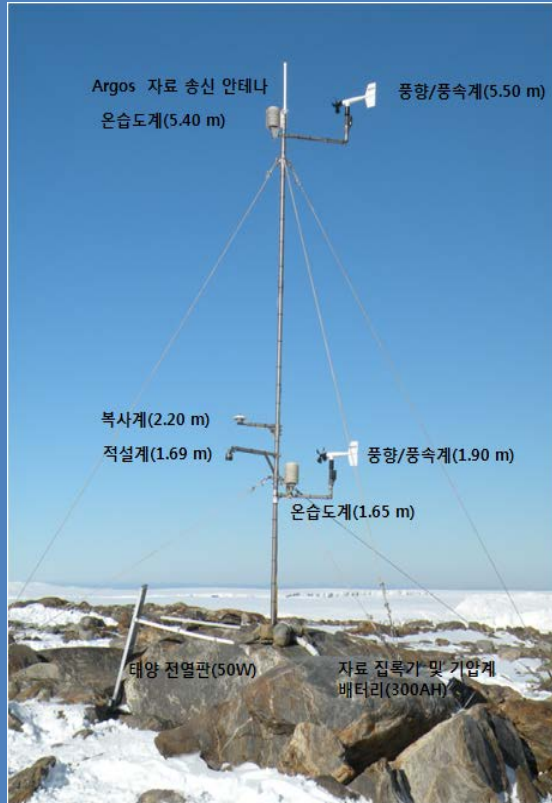


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Downwind of main building to prevailing wind



AWS in Feb. 2010/Moved to present point in Dec. 2012



HAPPY MID-WINTER'S DAY



JANG BOGO STATION
74°37' S 164°12' E
4TH OVERWINTER TEAM



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Automatic weather station
(자동기상관측시스템, 2010~)

Upper air
Observatory(2014.12)
(라디오 존데 비양동/오토 존데)

Space weather Observatory
(우주기상관측동, 2014)

Platforms for radiometer and Brewer
(복사계 및 브루어 분광기 플랫폼)

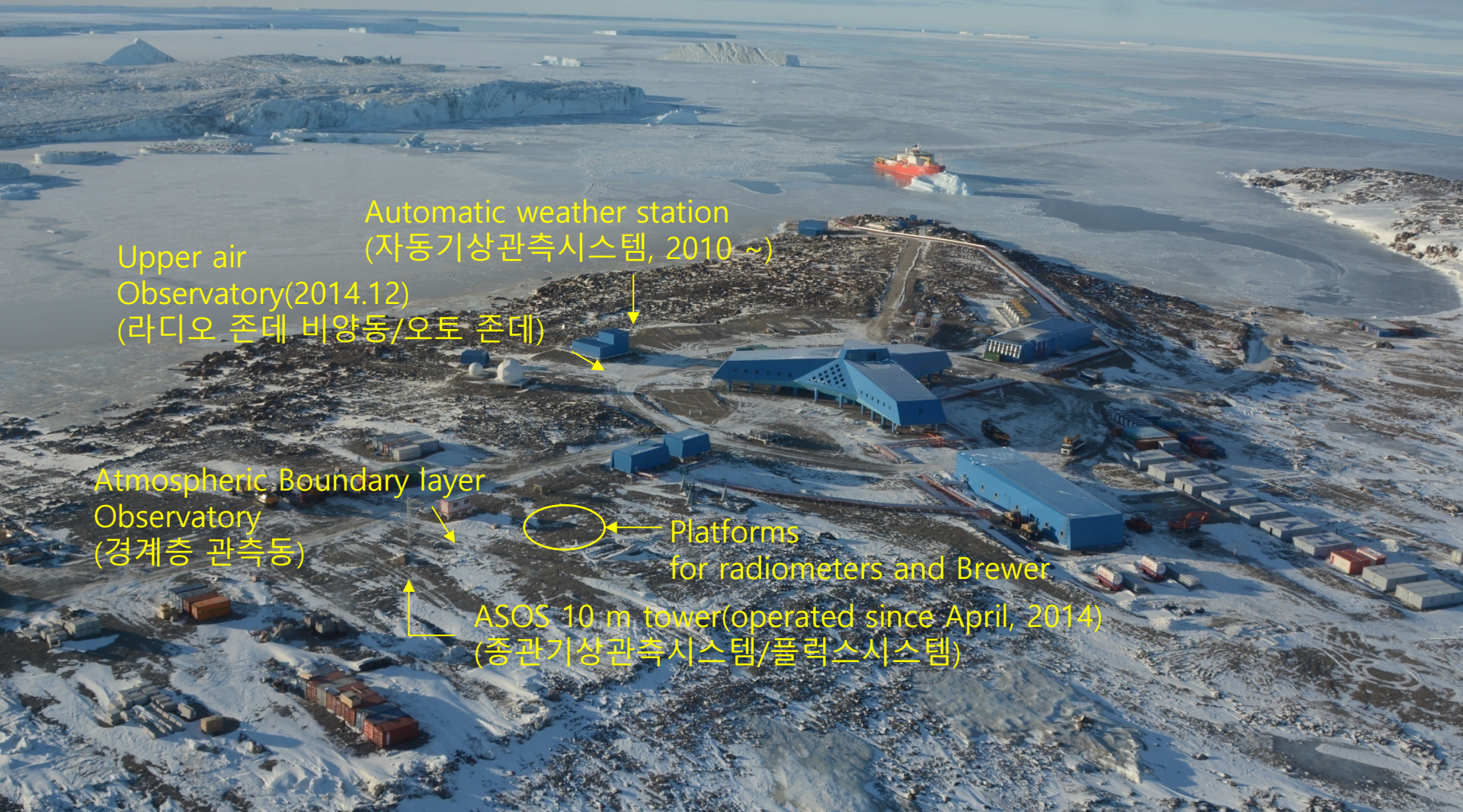
Atmospheric Boundary Layer Observatory
(경계층관측동)

10 m tower
for ASOS(automated synoptic observation system)
/Flux system (Being operated in 2014)
(총관기상관측시스템/플럭스시스템 2014년 설치 및 운영)

30 m Walk-up tower
(워킵 타워)

Observatory for atmospheric constituents
(대기구성물질관측동)





Automatic weather station
(자동기상관측시스템, 2010 ~)

Upper air
Observatory(2014.12)
(라디오 존데 비양동/오토 존데)

Atmospheric Boundary layer
Observatory
(경계층 관측동)

Platforms
for radiometers and Brewer

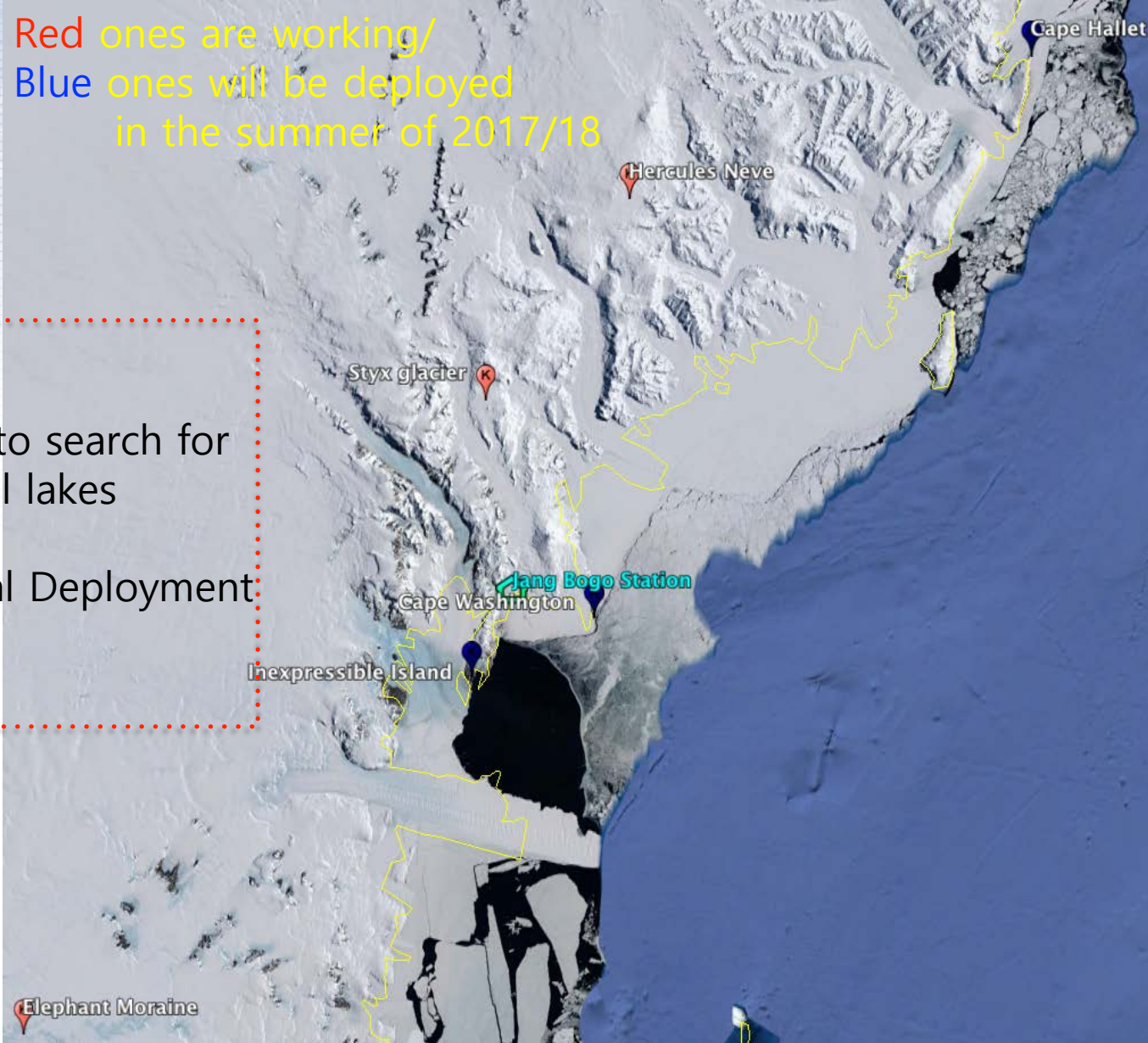
ASOS 10 m tower(operated since April, 2014)
(총관기상관측시스템/플렉스시스템)



Red ones are working/
Blue ones will be deployed
in the summer of 2017/18

Traverse to search for
Subglacial lakes

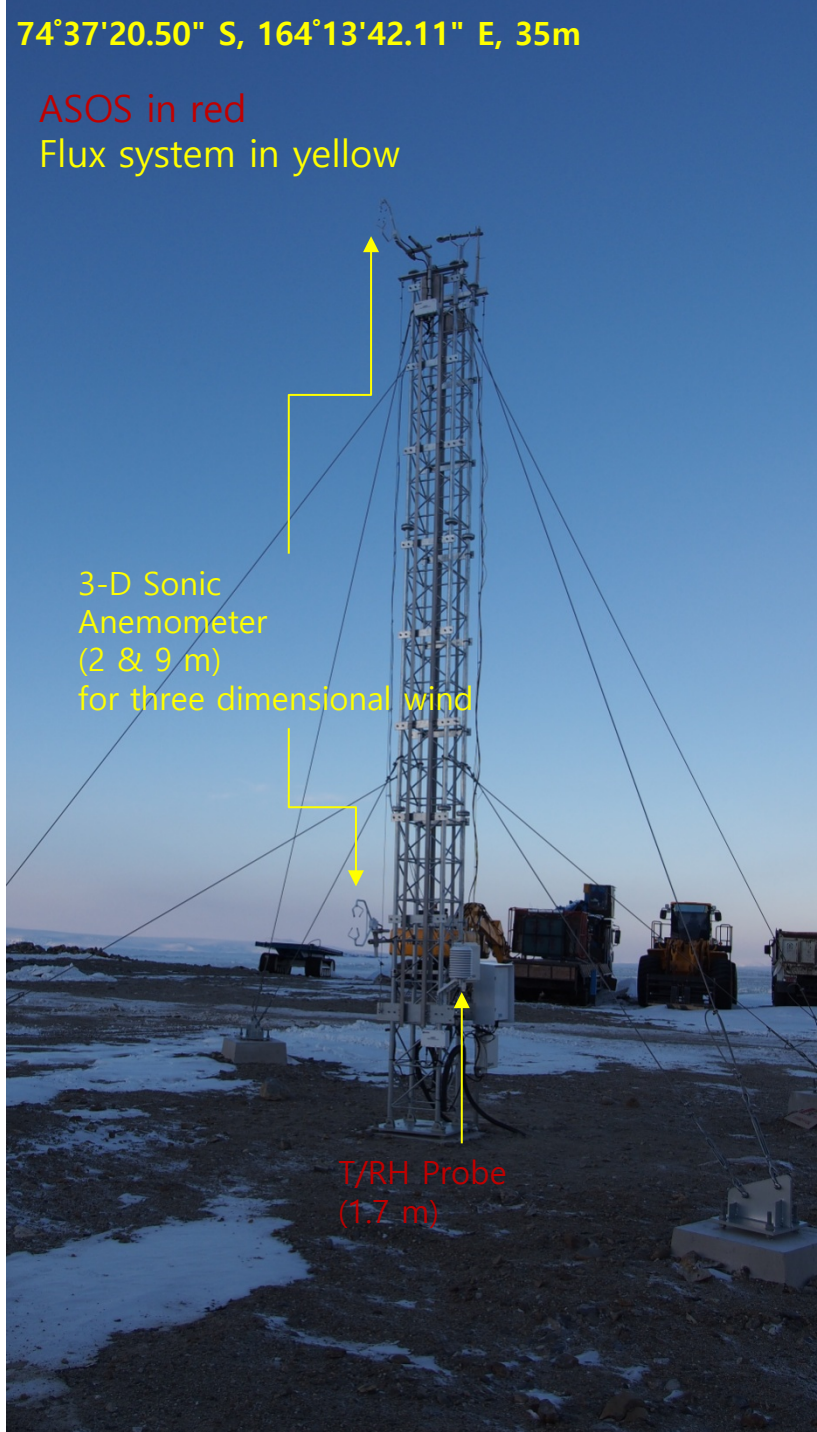
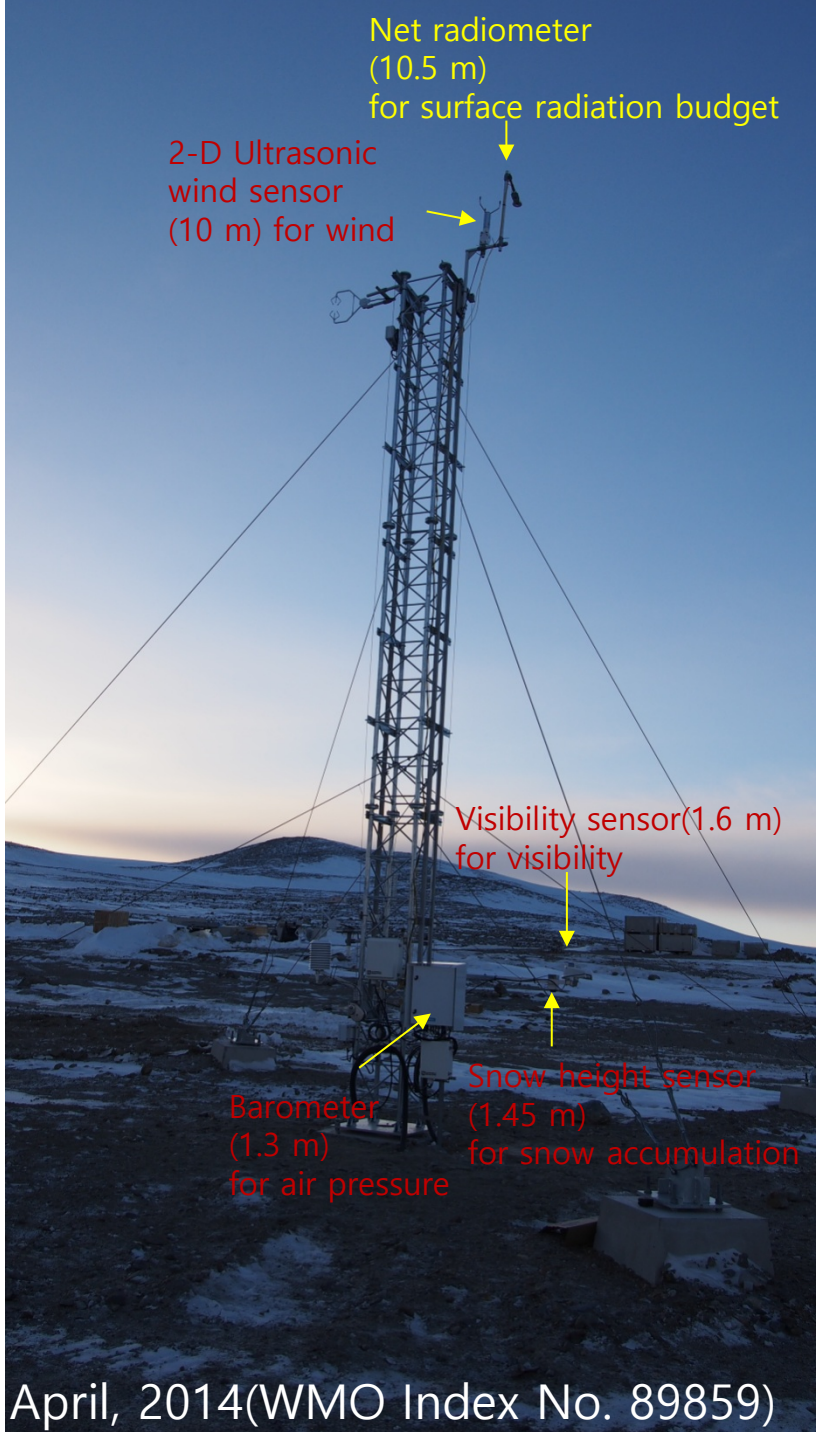
Additional Deployment
of AWSs

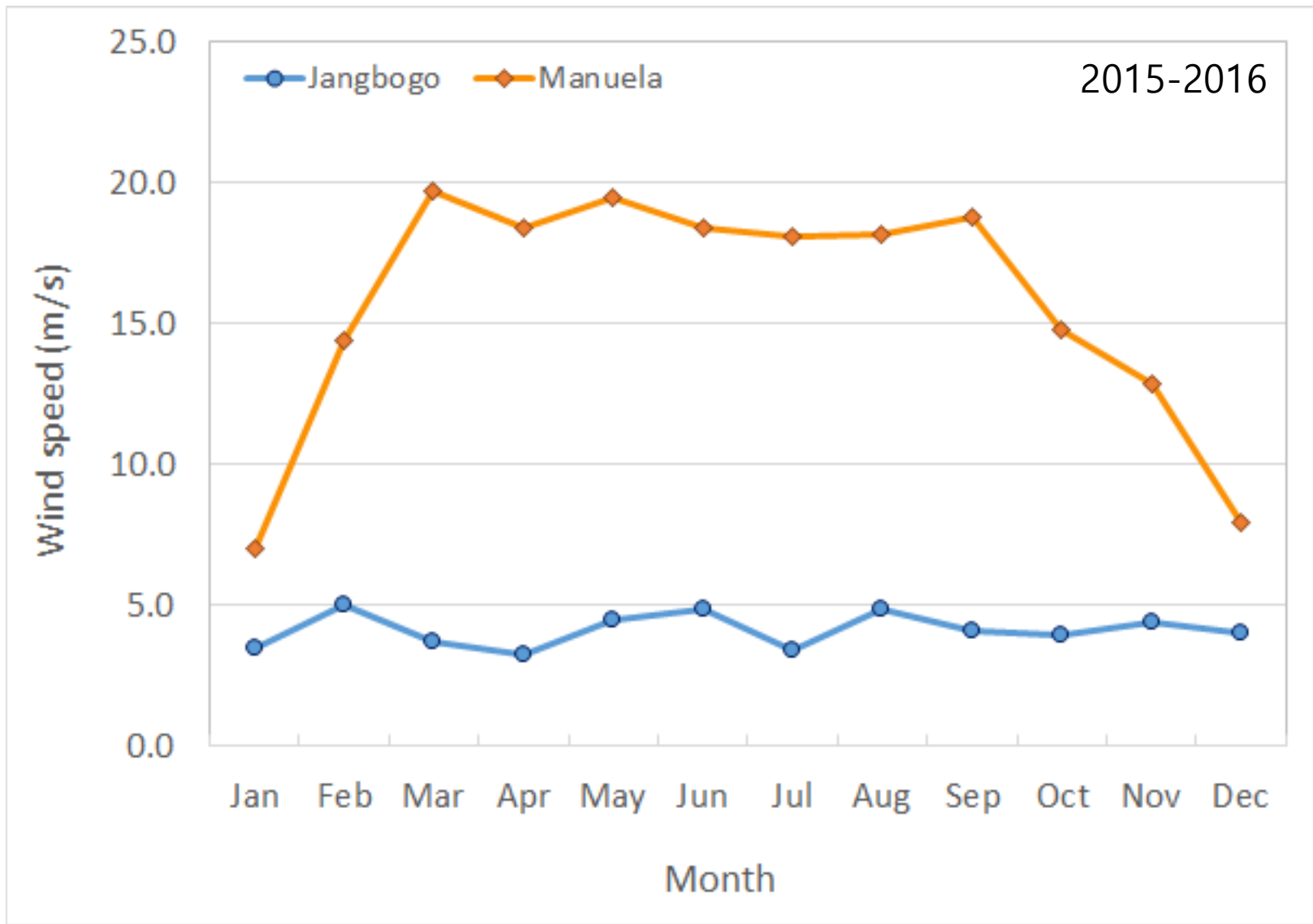


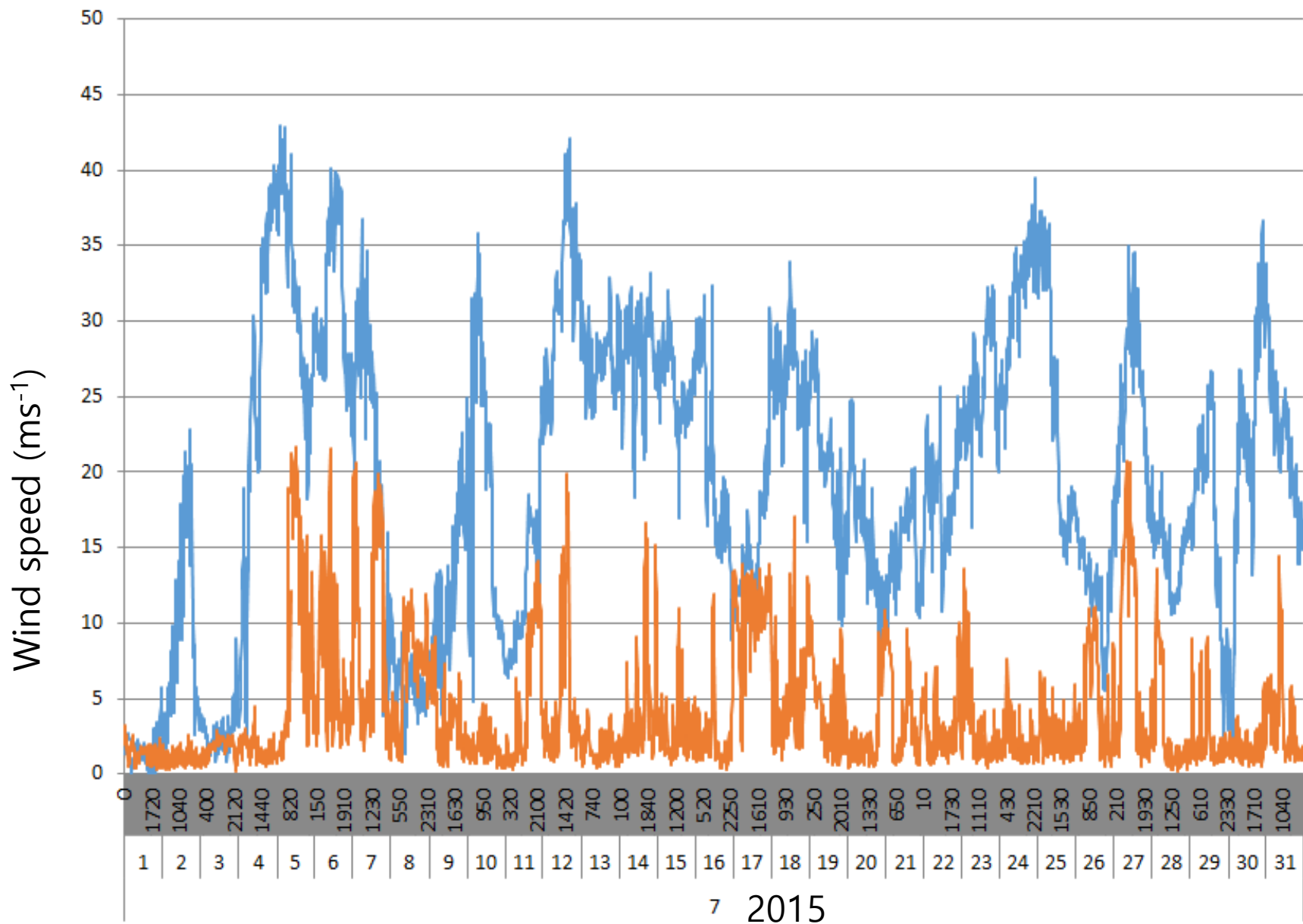
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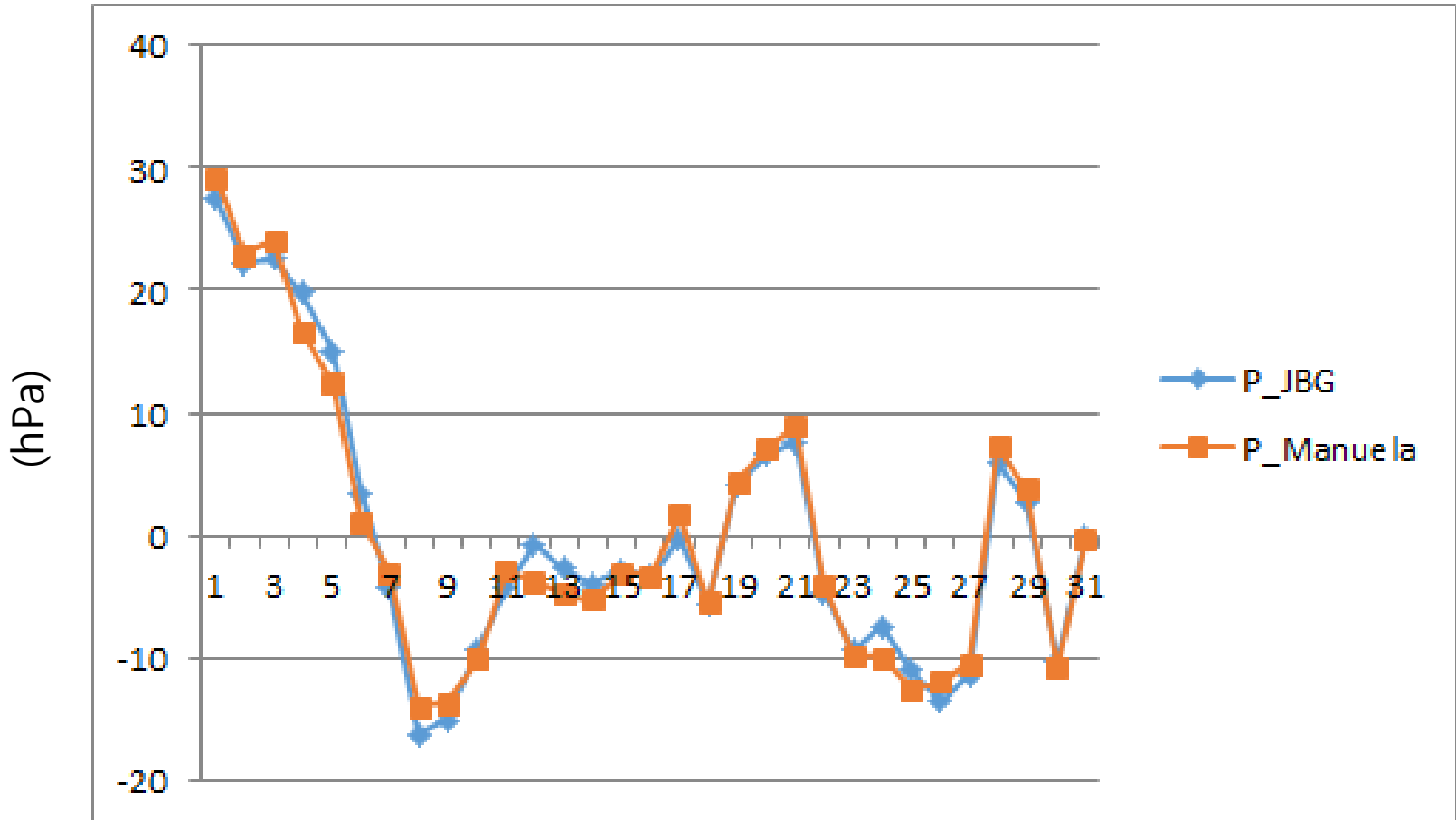




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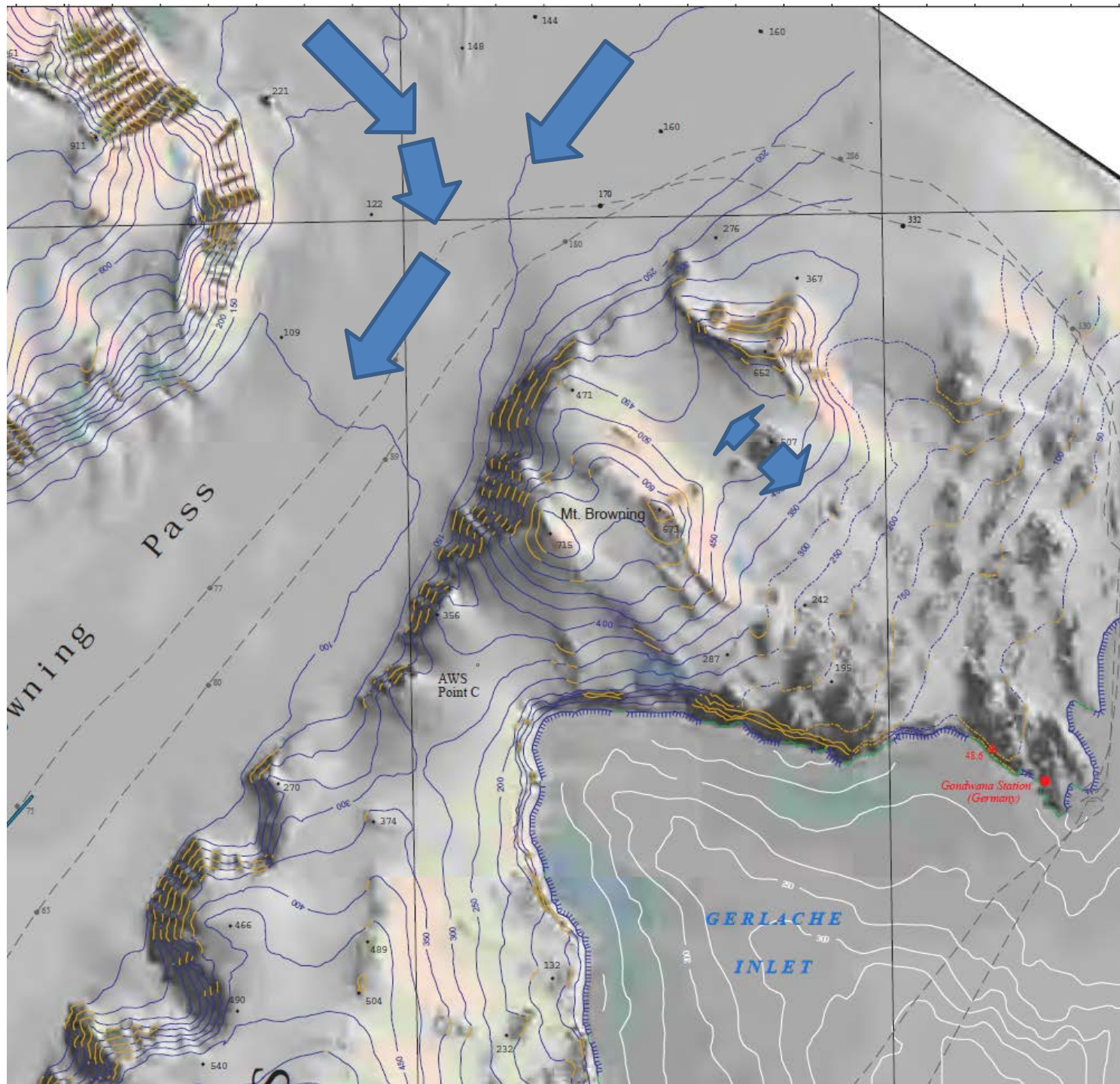
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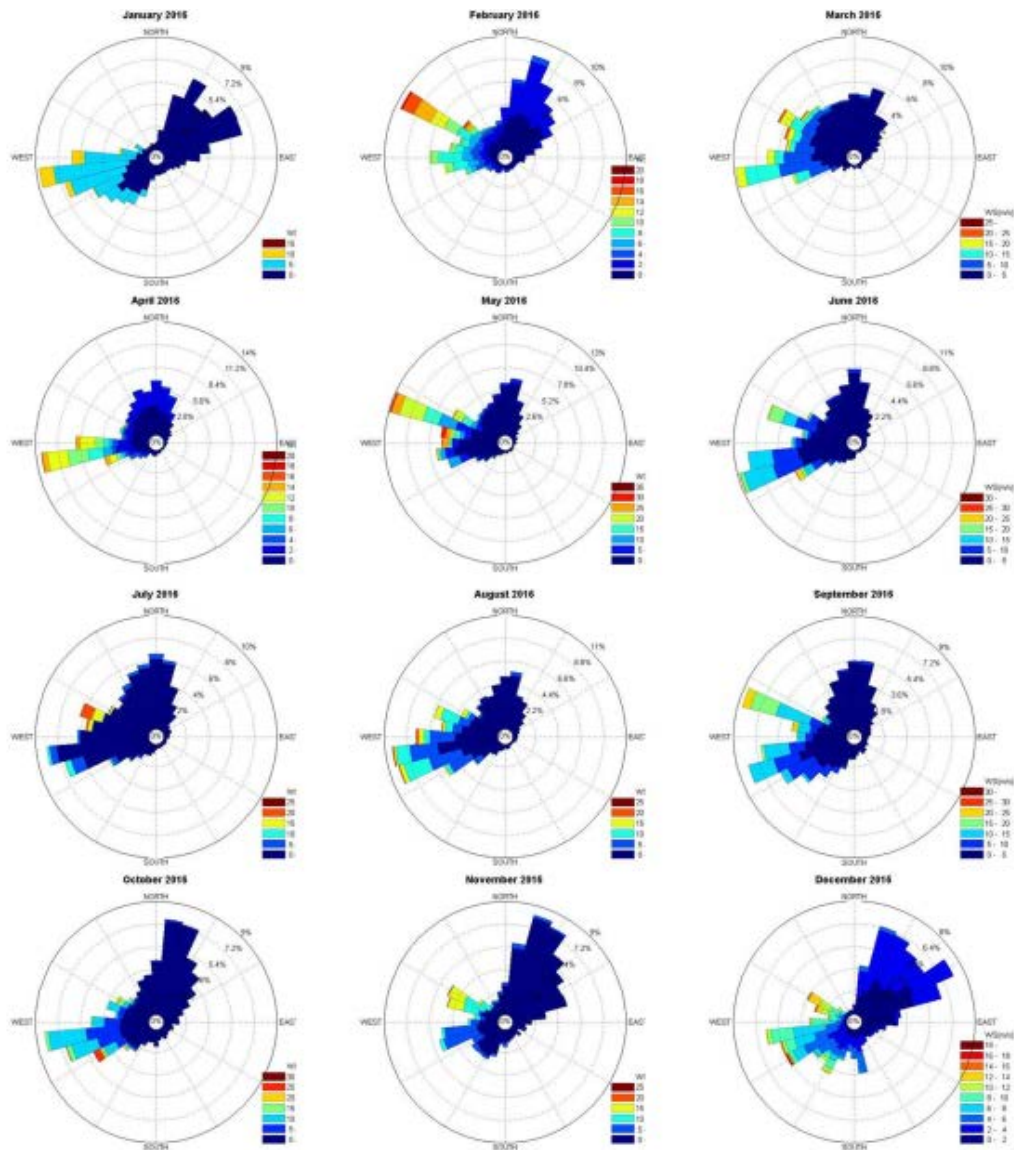


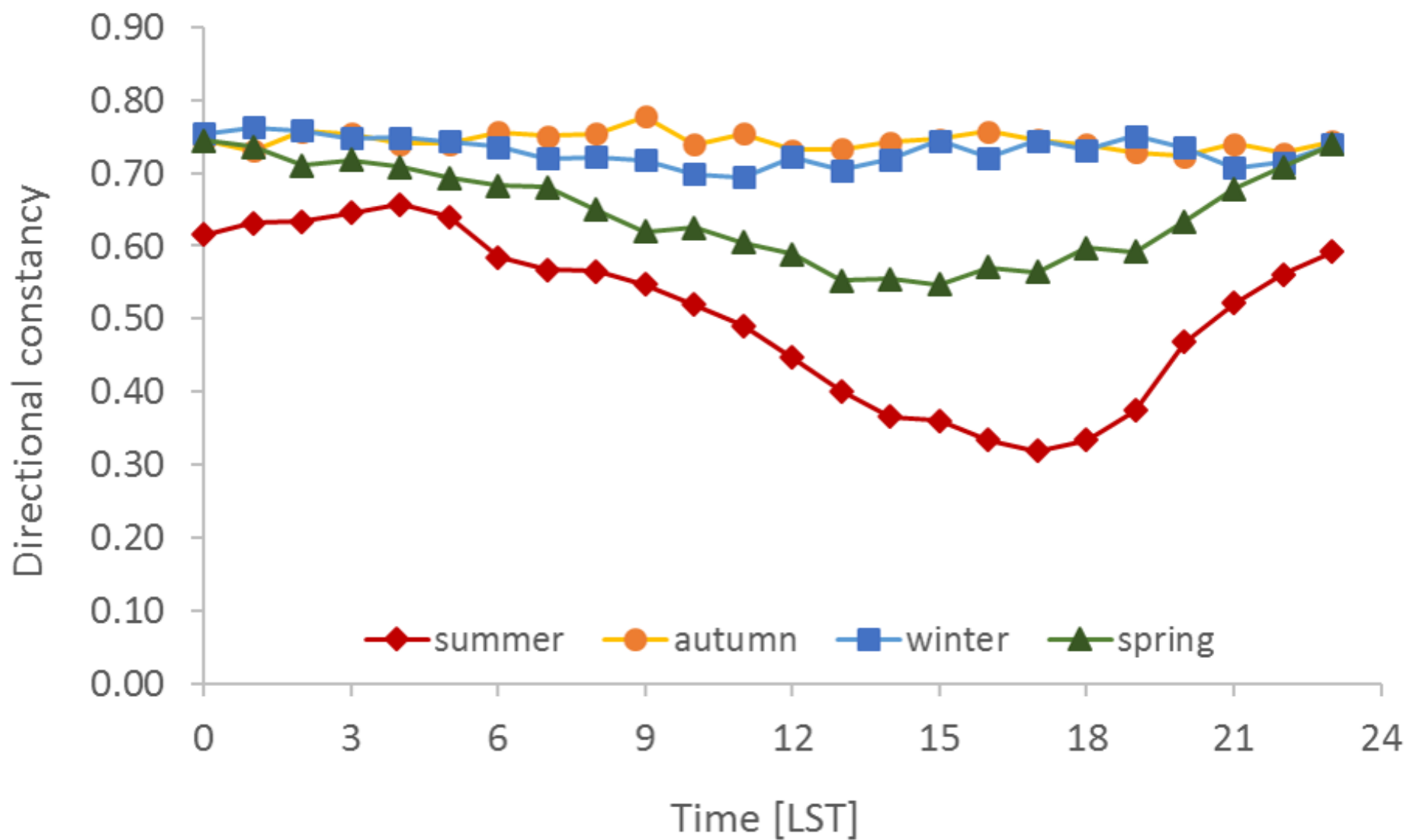


July 2015





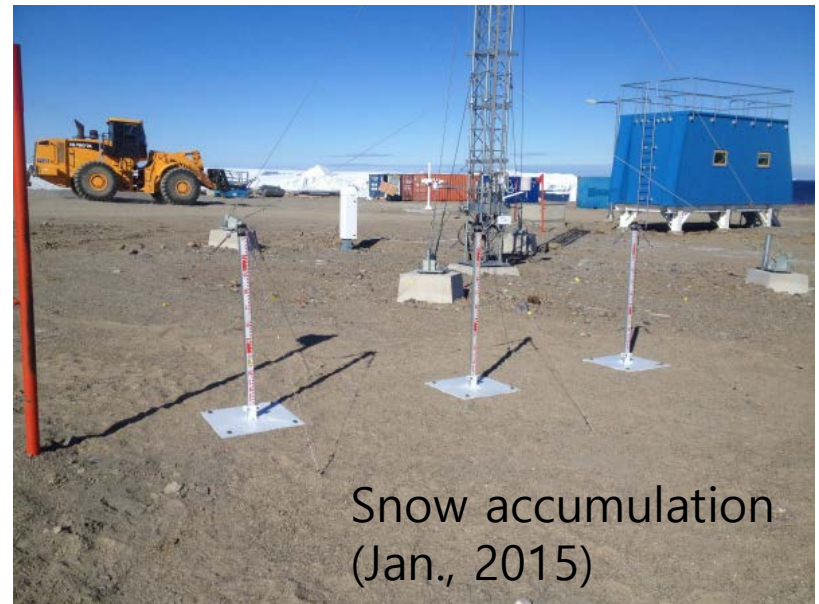




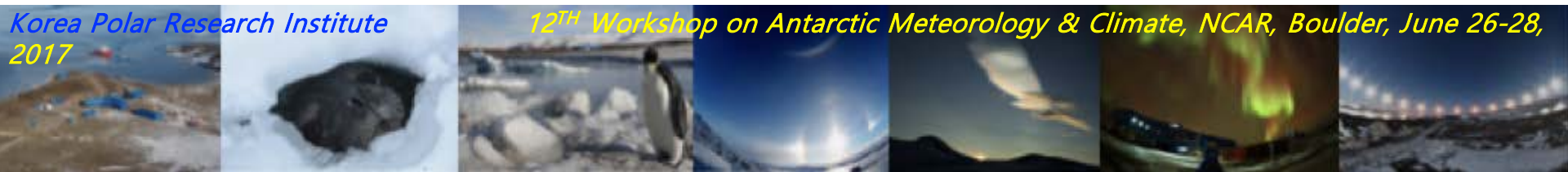



Ceilometer (CL51, ~13 km,
Detection of Cirrus cloud, Nov. 2014)

Rain gauge (March, 2015)



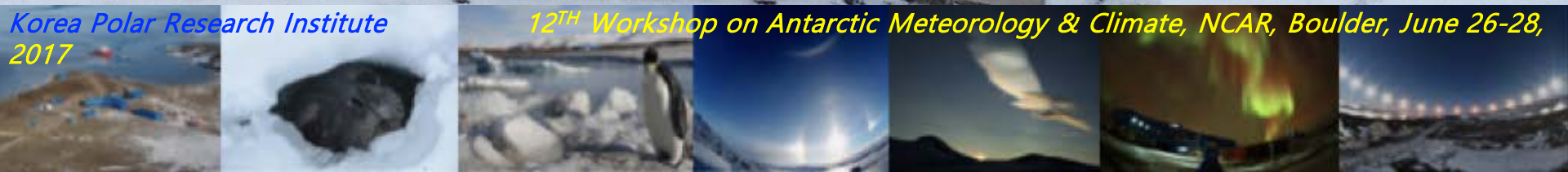
Snow accumulation
(Jan., 2015)

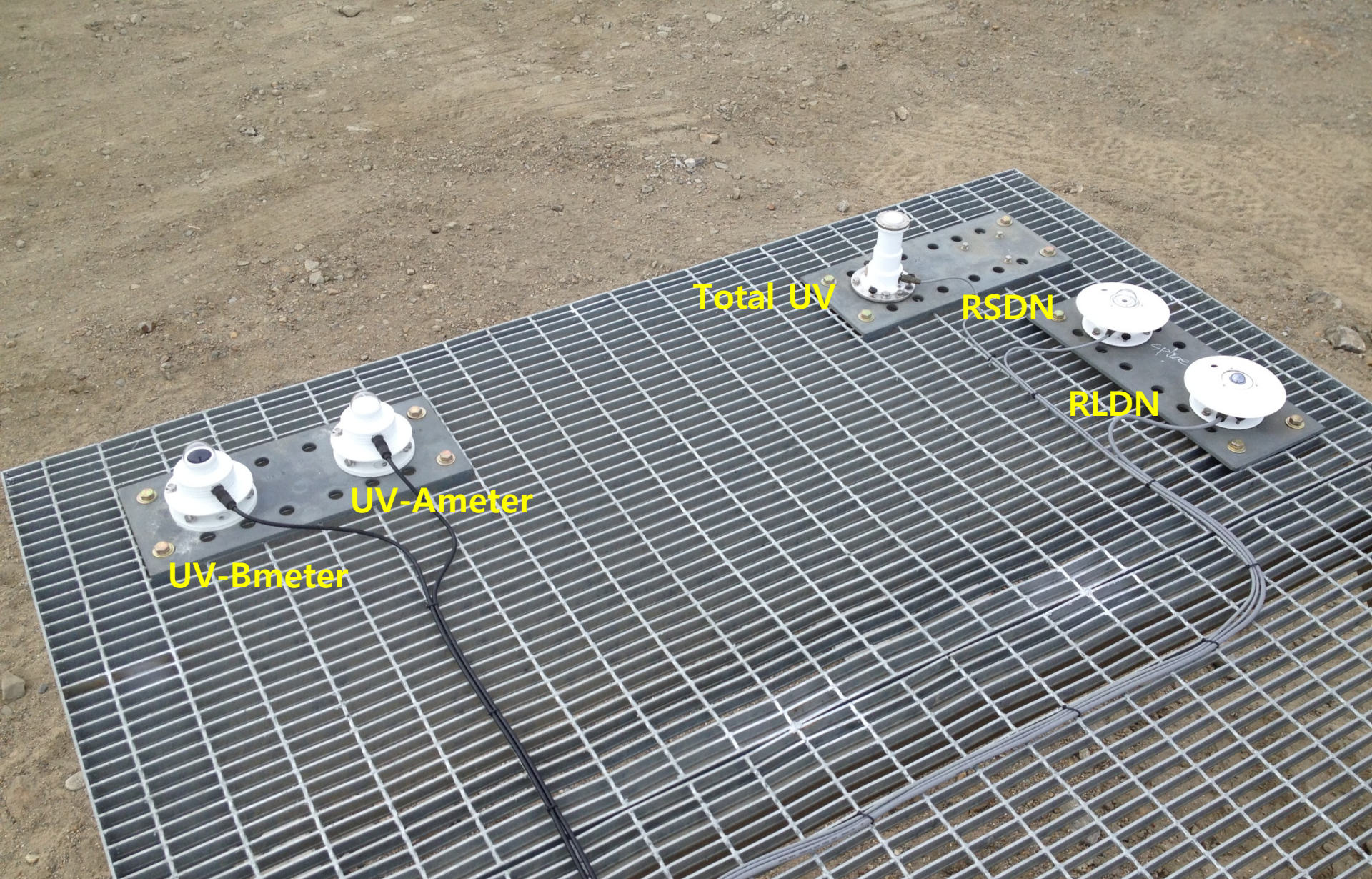




Radiometers (January, 2015)

Brewer Ozone spectrophotometer
(Under test, February, 2015)





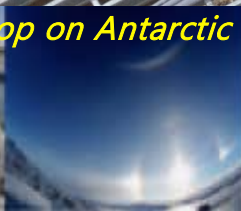
UV-Bmeter

UV-Ameter

Total UV

RSDN

RLDN



Upper air observatory (Autosonde with RS92-SGPA from Feb. 2015 to mid Nov. 2017) with RS41-SG from mid Nov. 2017)



ㄱ 위에서 바라본 모습
본관동에서 바라 본 모습
정면
ㄴ
ㄷ 오토 존데
(설치될 제품과 유사 모델)



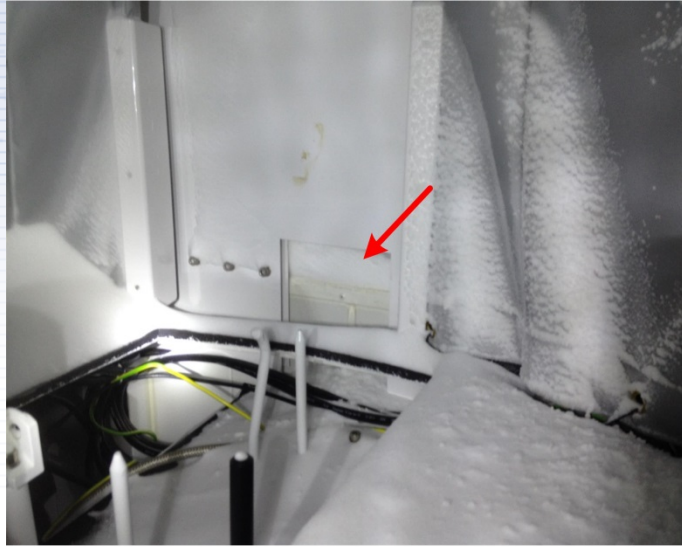
- Launching: Once a day: 1200 UTC from February to October
- 24 consecutive observation



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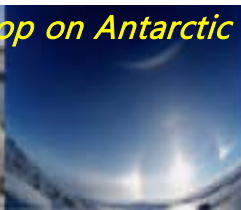
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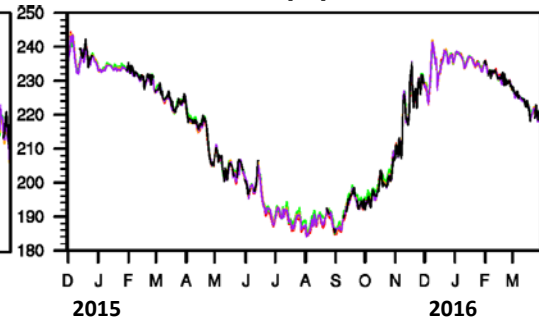
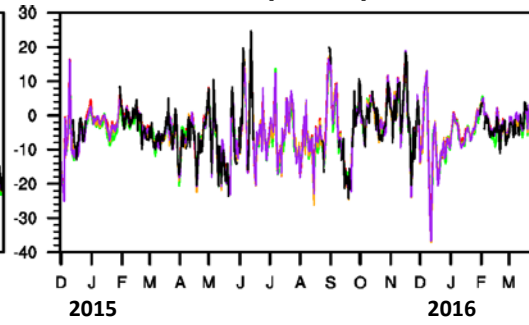
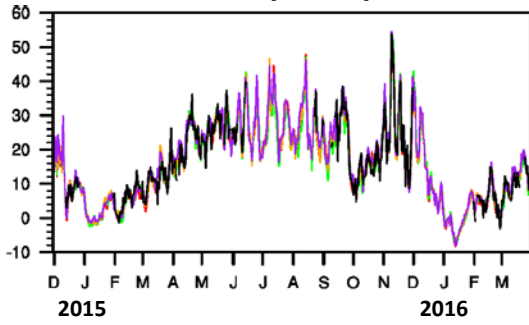
Comparison between rawindsonde and reanalysis data

U (m s⁻¹)

V (m s⁻¹)

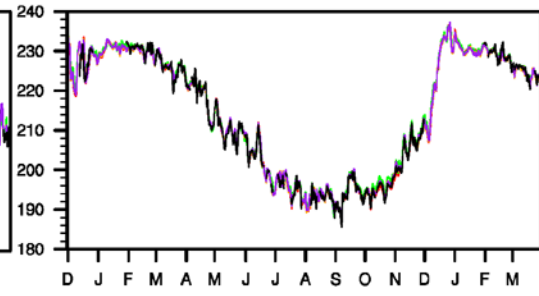
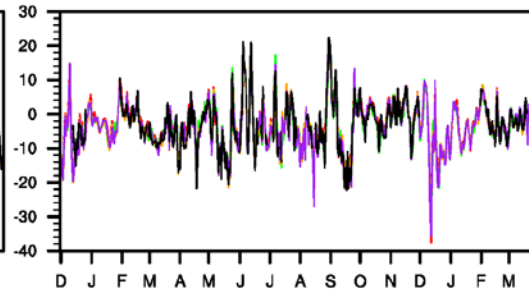
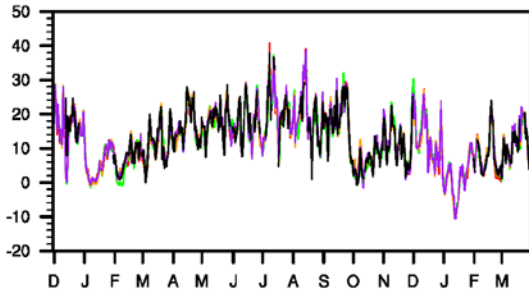
T (K)

10 hPa

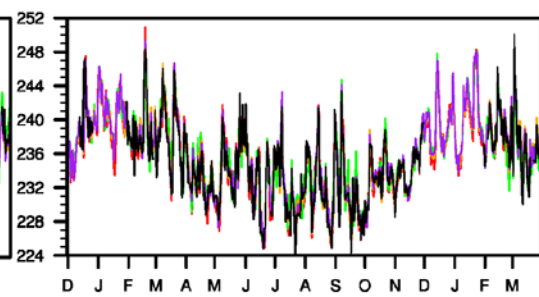
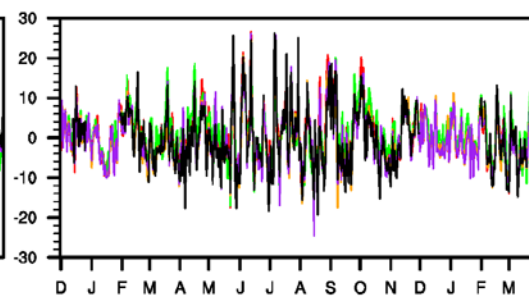
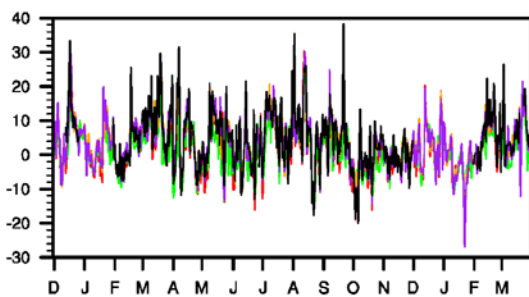


- MERRA
- NCEP
- ERA
- CFSR
- Sonde

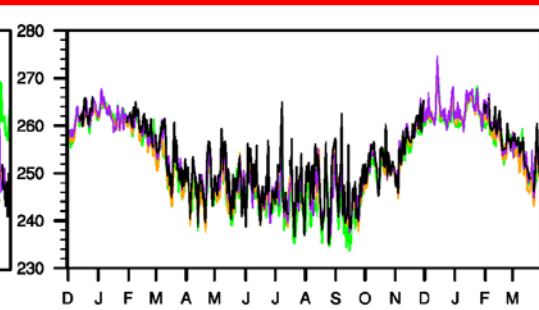
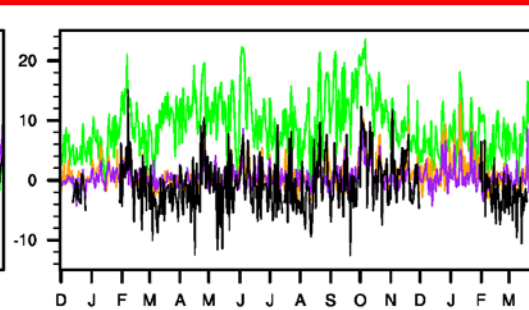
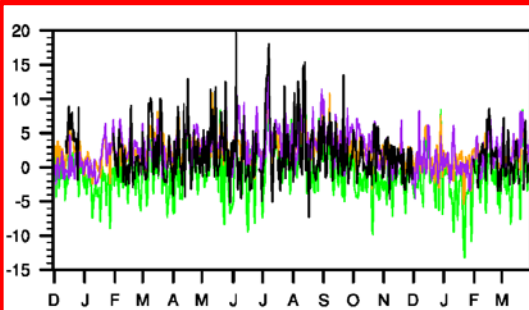
100 hPa



500 hPa



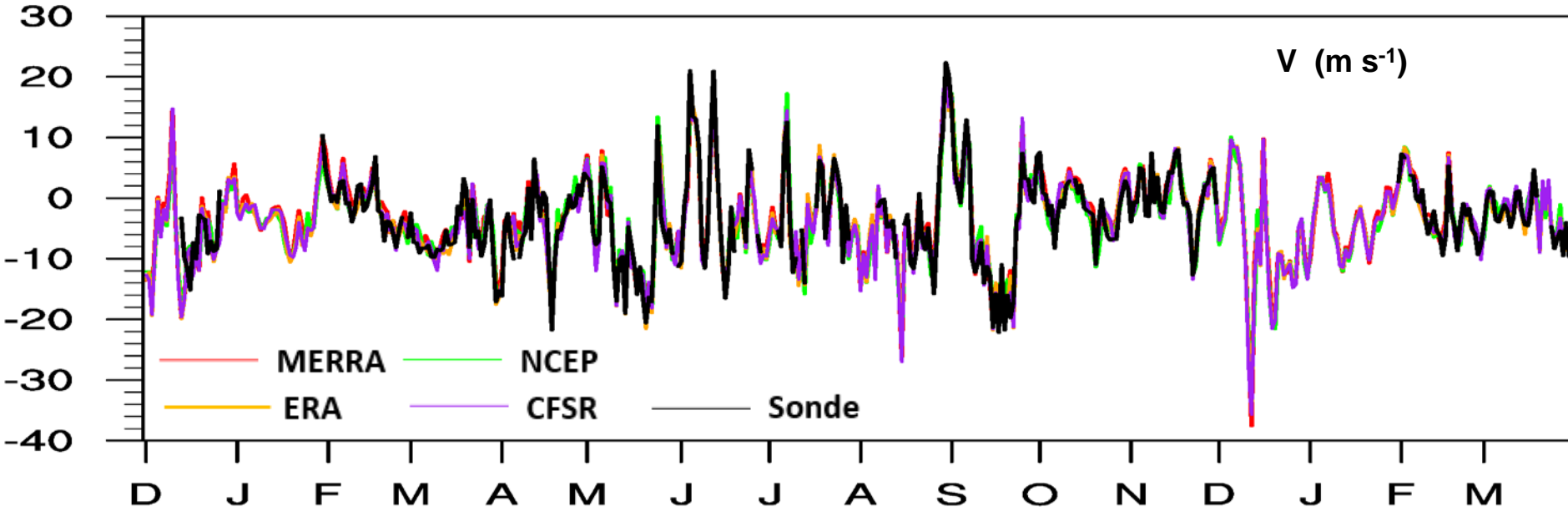
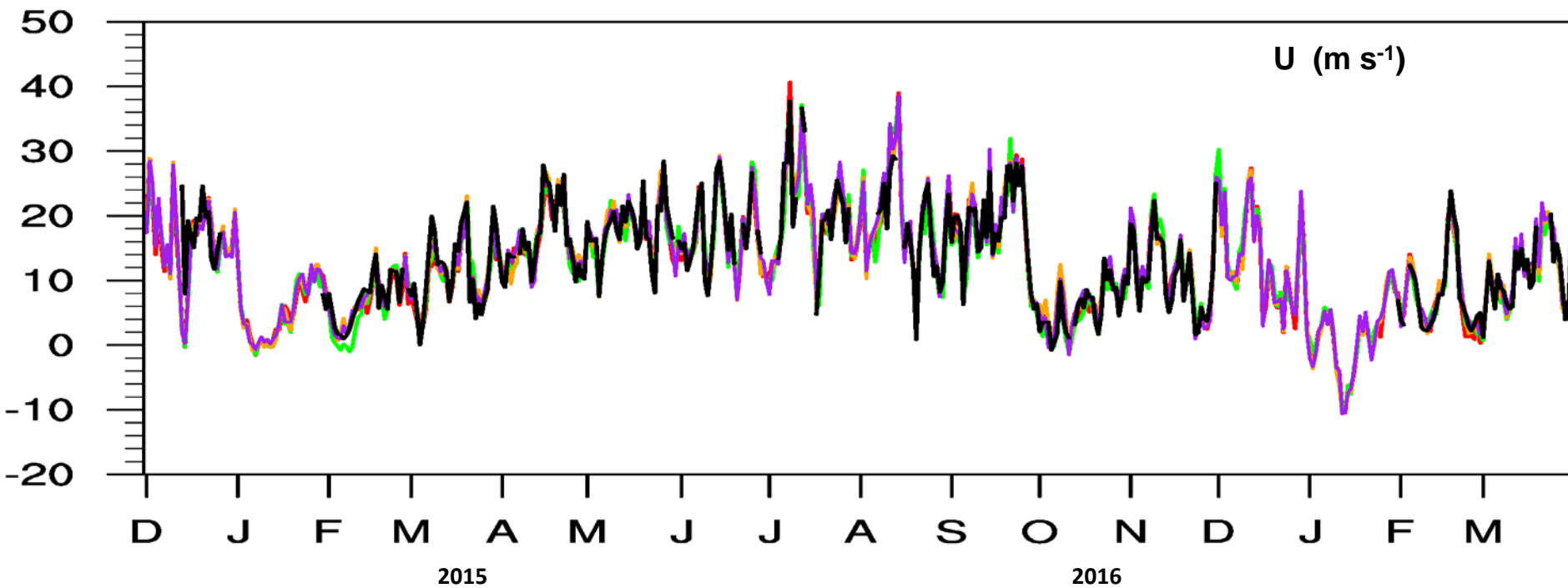
850 hPa



June 26-28,

K
2

Zonal and meridional wind at 100 hPa

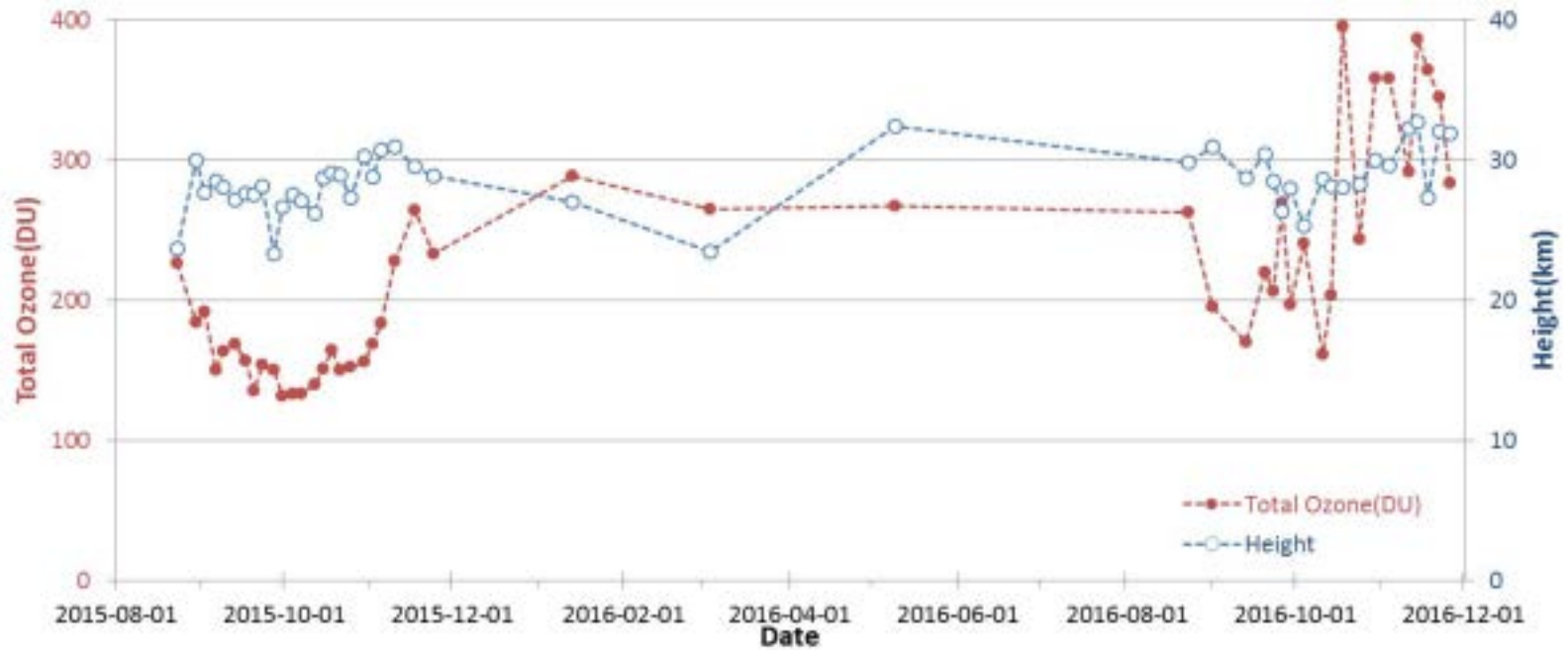




오존 зон데
(ECC6A/RS92-SPGA/TOTEX1200)

| Date | Height(m) | MinT(oC) | Press(hPa) |
|------------|-----------|----------|------------|
| 2015.08.23 | 23,654 | -83.15 | 19.4 |
| 2015.08.31 | 29,994 | -90.65 | 6.6 |
| 2015.09.03 | 27,657 | -90.45 | 9.6 |
| 2015.09.07 | 28,470 | -90.75 | 8.7 |
| 2015.09.10 | 28,031 | -84.35 | 9.3 |
| 2015.09.14 | 27,183 | -81.55 | 11.1 |
| 2015.09.18 | 27,620 | -76.65 | 10.7 |
| 2015.09.21 | 27,546 | -81.75 | 10.8 |
| 2015.09.24 | 28,108 | -81.15 | 10 |
| 2015.09.28 | 23,334 | -81.75 | 20.6 |
| 2015.10.01 | 27,394 | -82.05 | 11.1 |
| 2015.10.05 | 27,518 | -81.15 | 11.6 |
| 2015.10.08 | 27,097 | -80.45 | 12.3 |
| 2015.10.12 | 11,526 | -73.75 | 170.7 |
| 2015.10.13 | 26,205 | -80.05 | 14.4 |
| 2015.10.16 | 28,722 | -77.35 | 10.4 |
| 2015.10.19 | 29,064 | -78.65 | 10.3 |
| 2015.10.22 | 28,902 | -84.05 | 10.3 |
| 2015.10.26 | 27,333 | -77.55 | 12.9 |
| 2015.10.29 | 20,224 | -76.85 | 38.9 |
| 2015.10.31 | 30,256 | -75.55 | 9.4 |



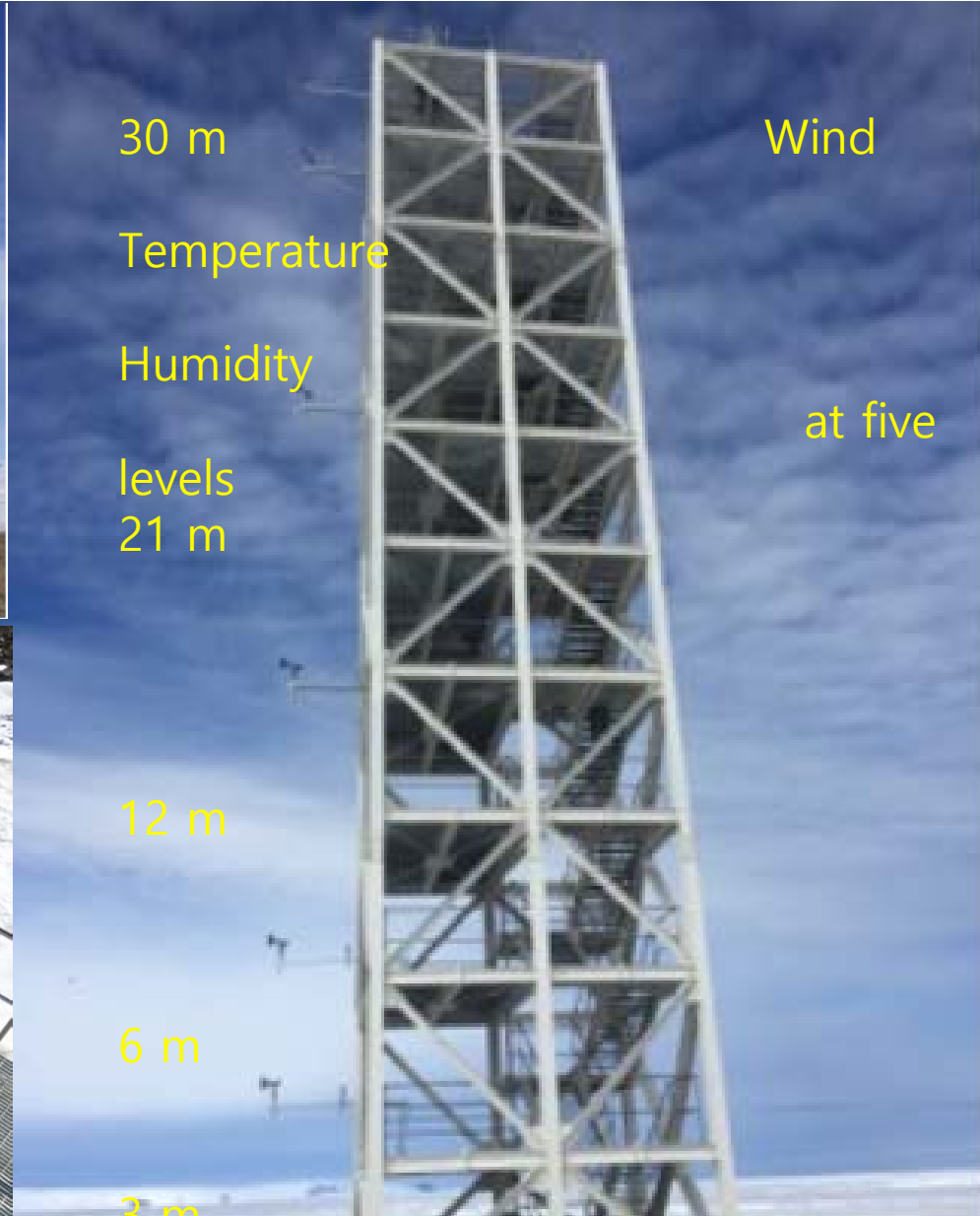


Cameras for sea ice & cloud monitoring /Snow distribution & Cloud Interval: Every half hour





SODAR(MFAS) in 2017
(National Antarctic
Research Center, Malaysia)



30 m

Wind

Temperature

Humidity

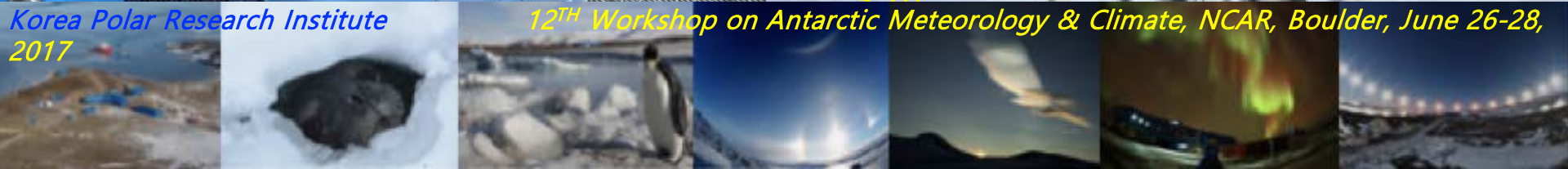
at five

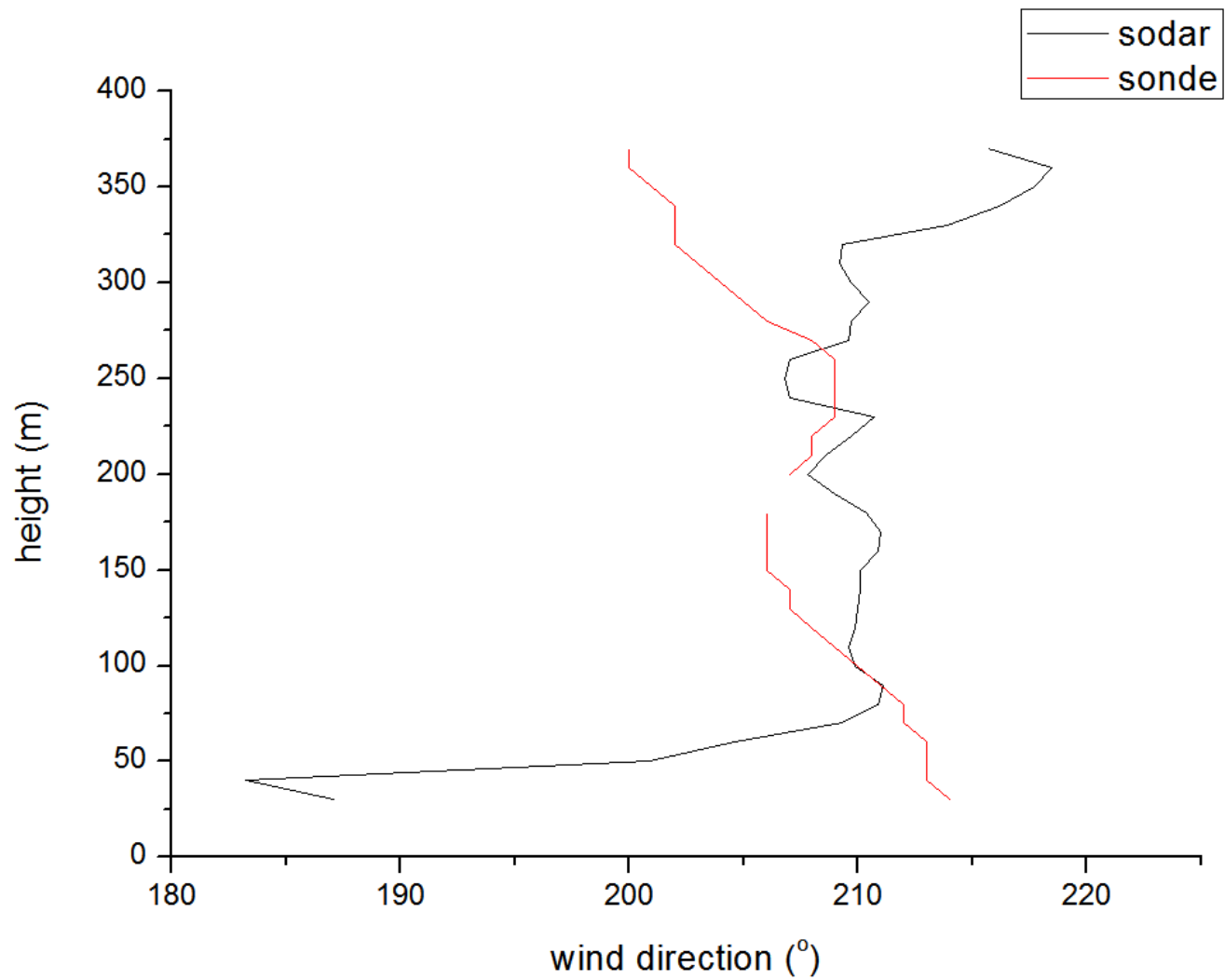
levels
21 m

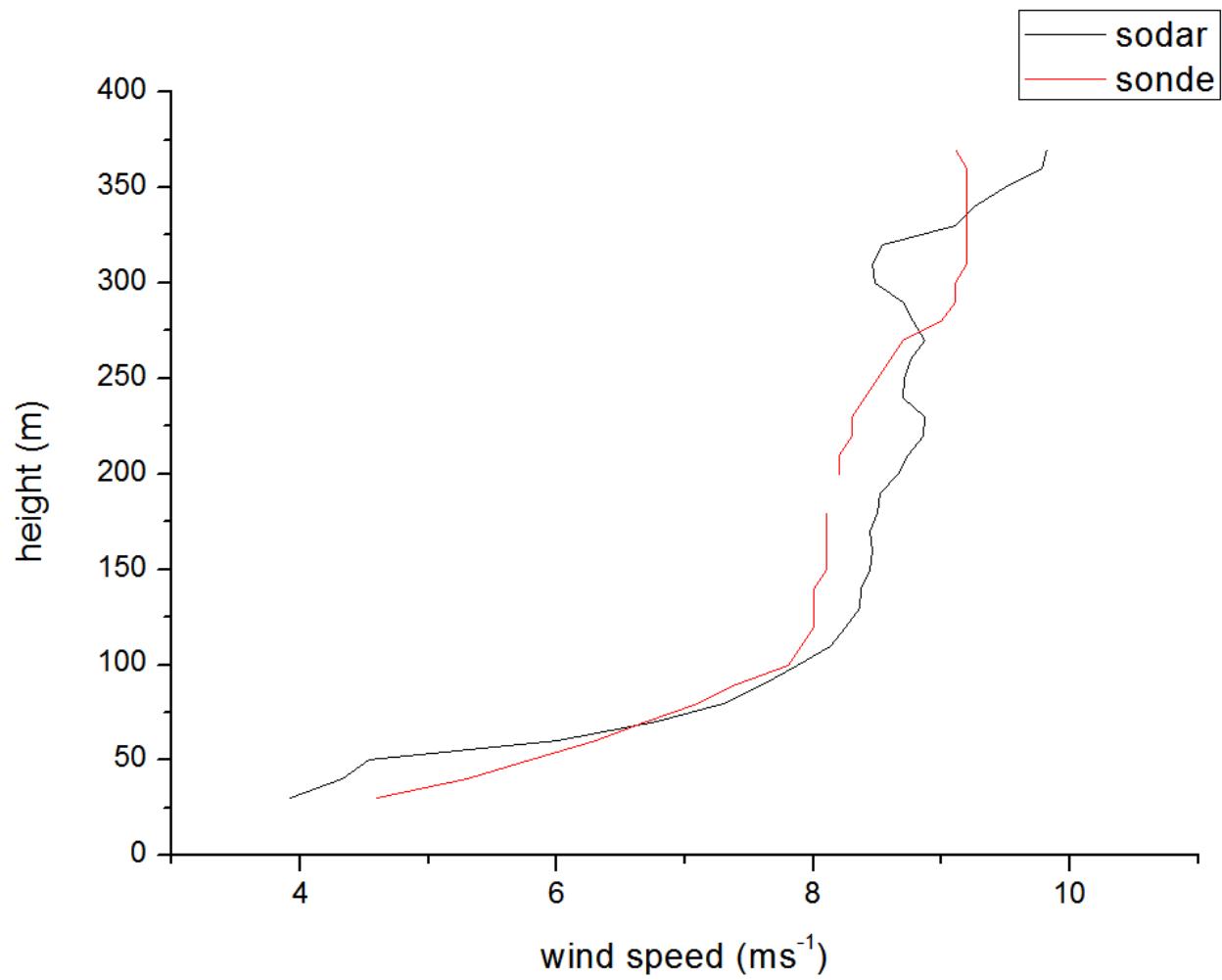
12 m

6 m

3 m

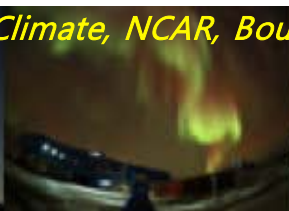
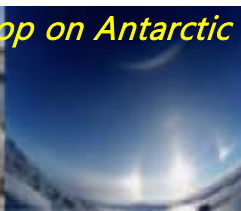




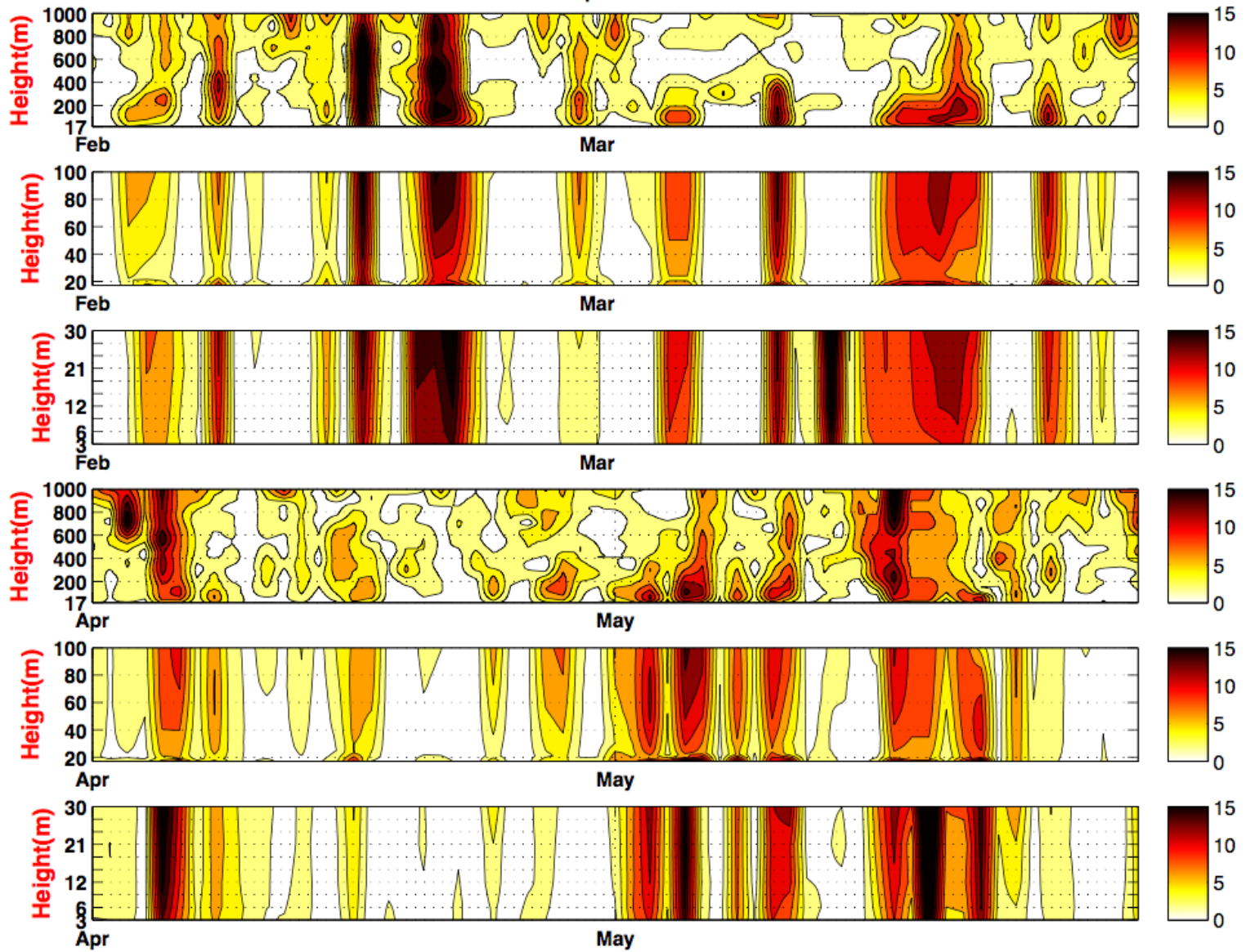


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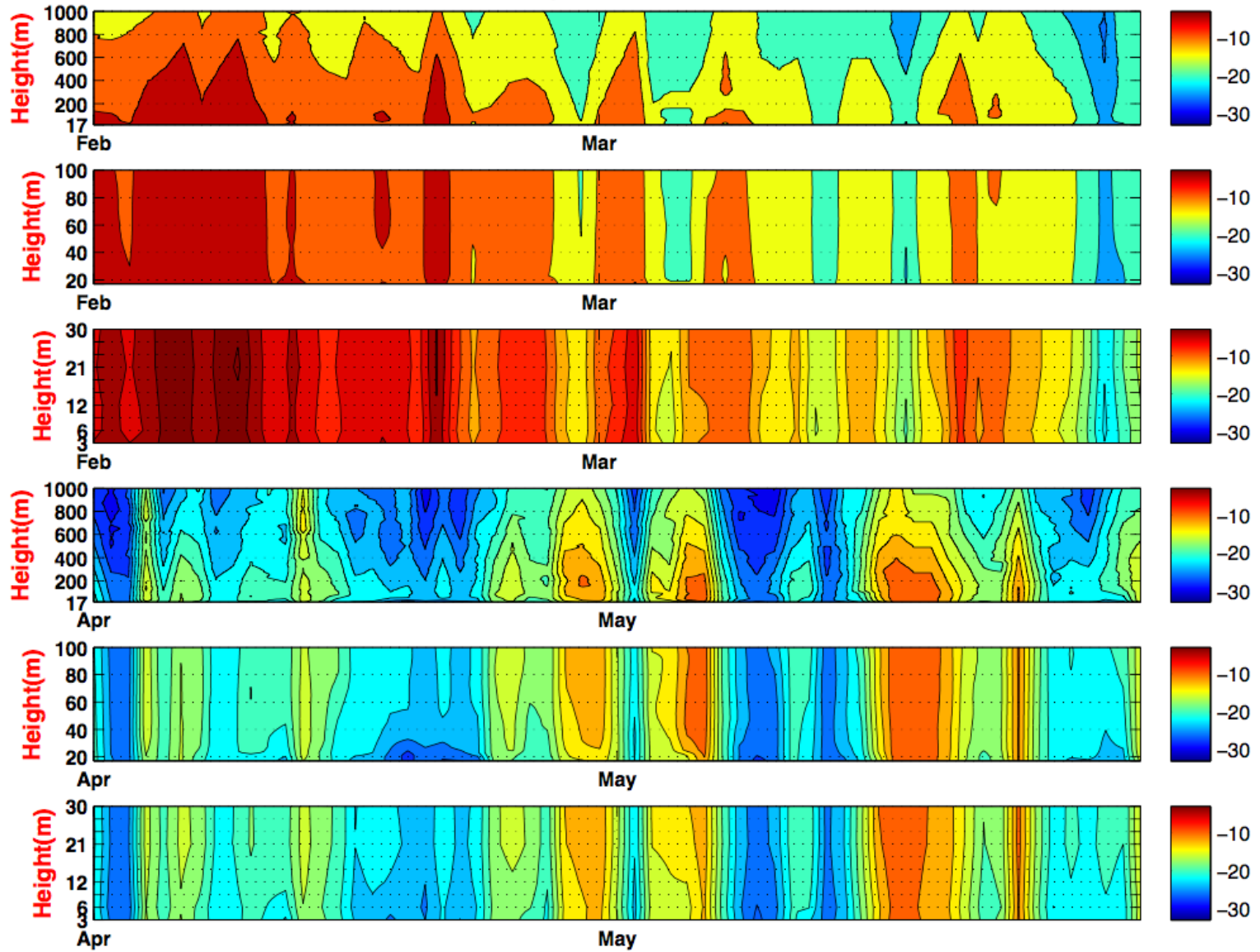
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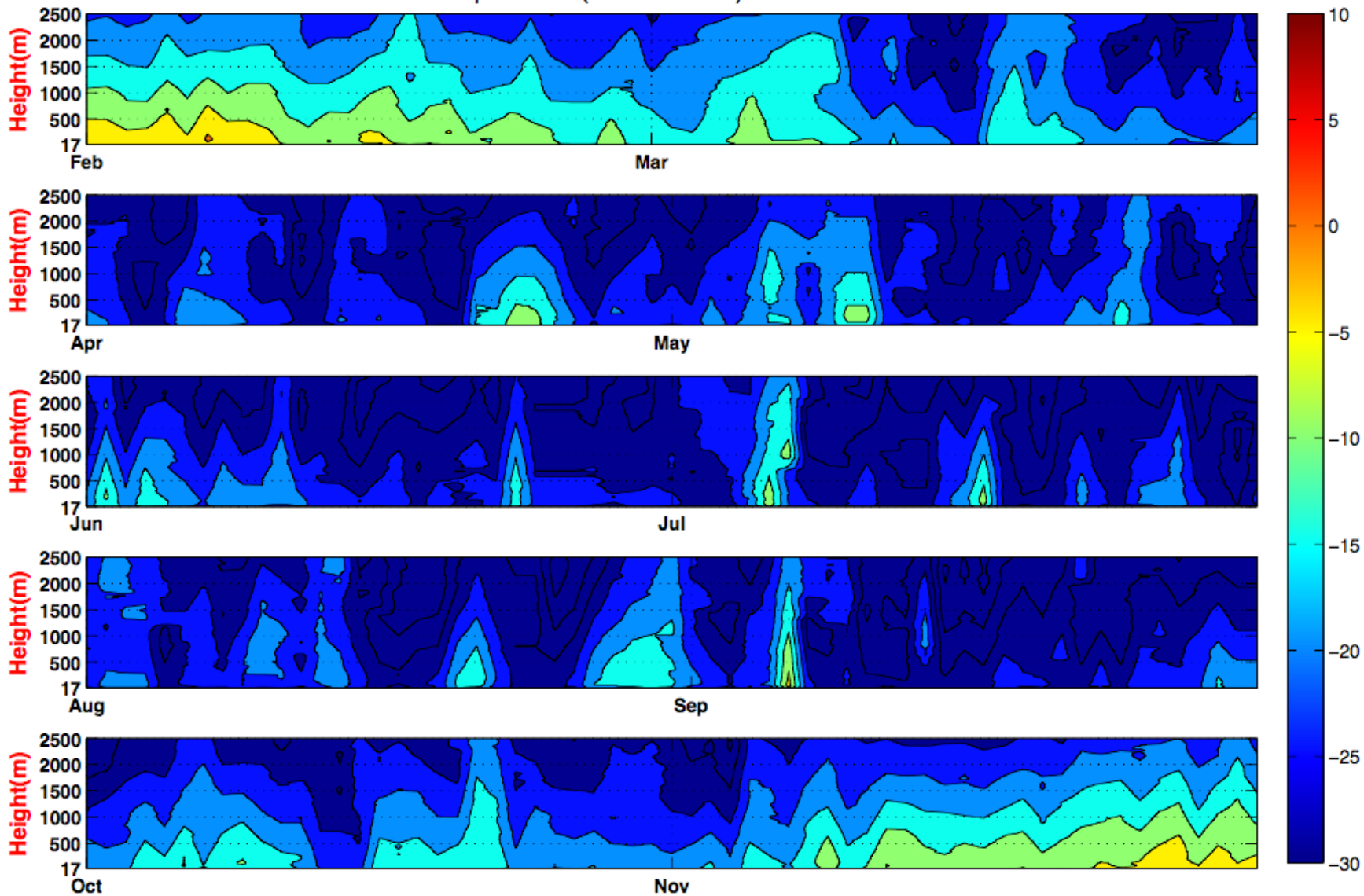
Variation of Wind Speed at JBG Station in 00UTC 2017



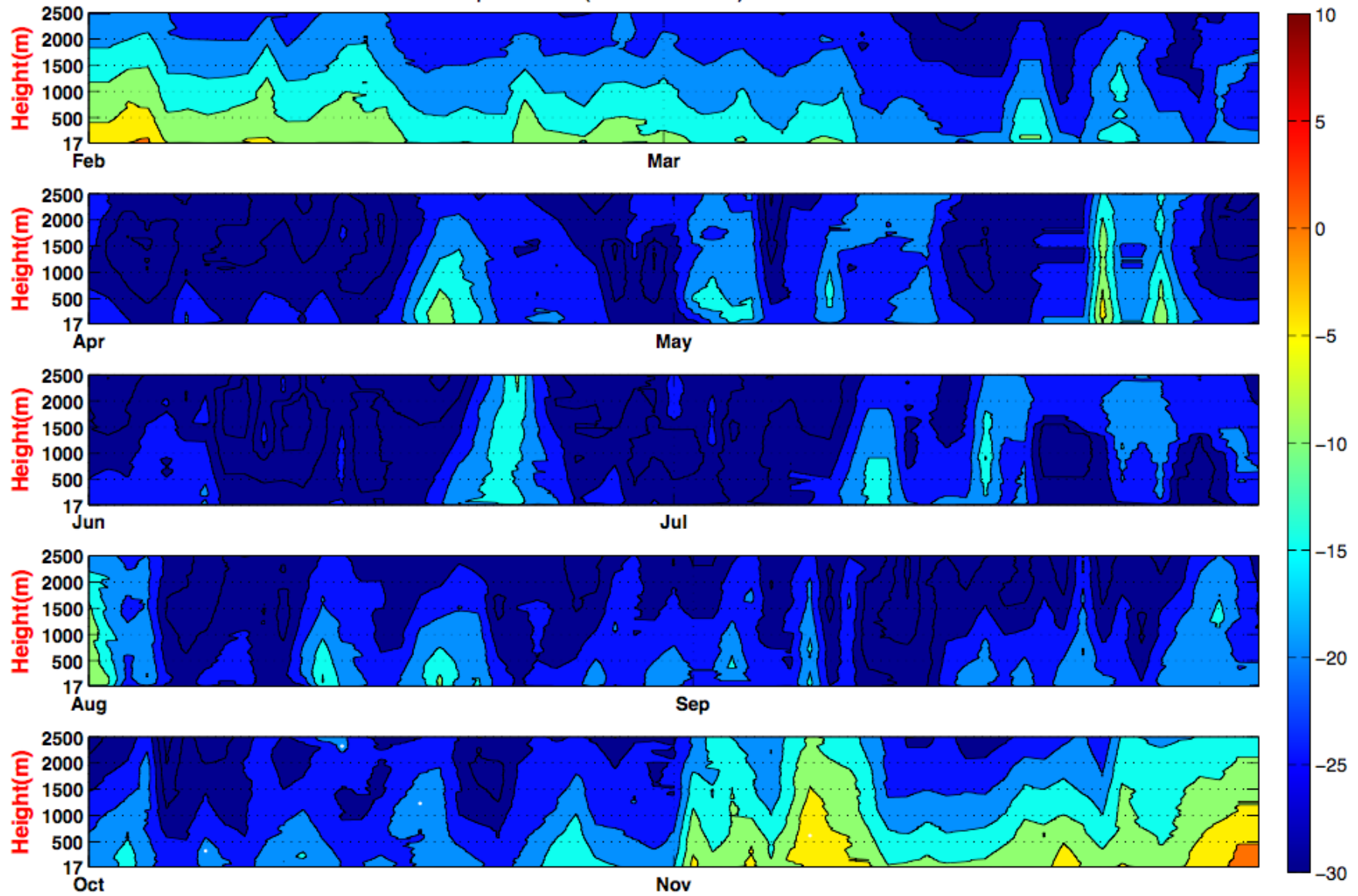
Variation of Temperature at JBG Station in 00UTC 2017



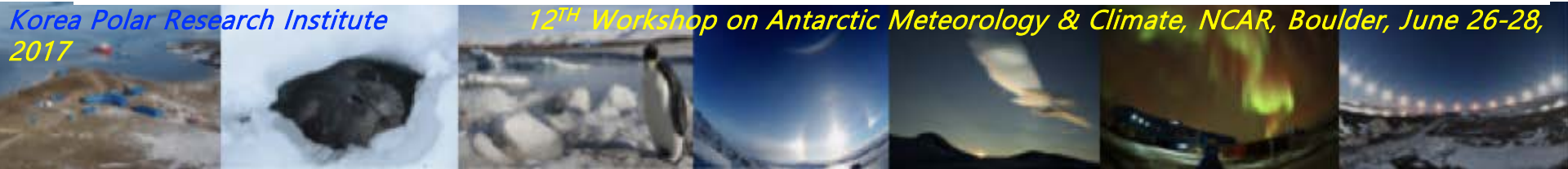
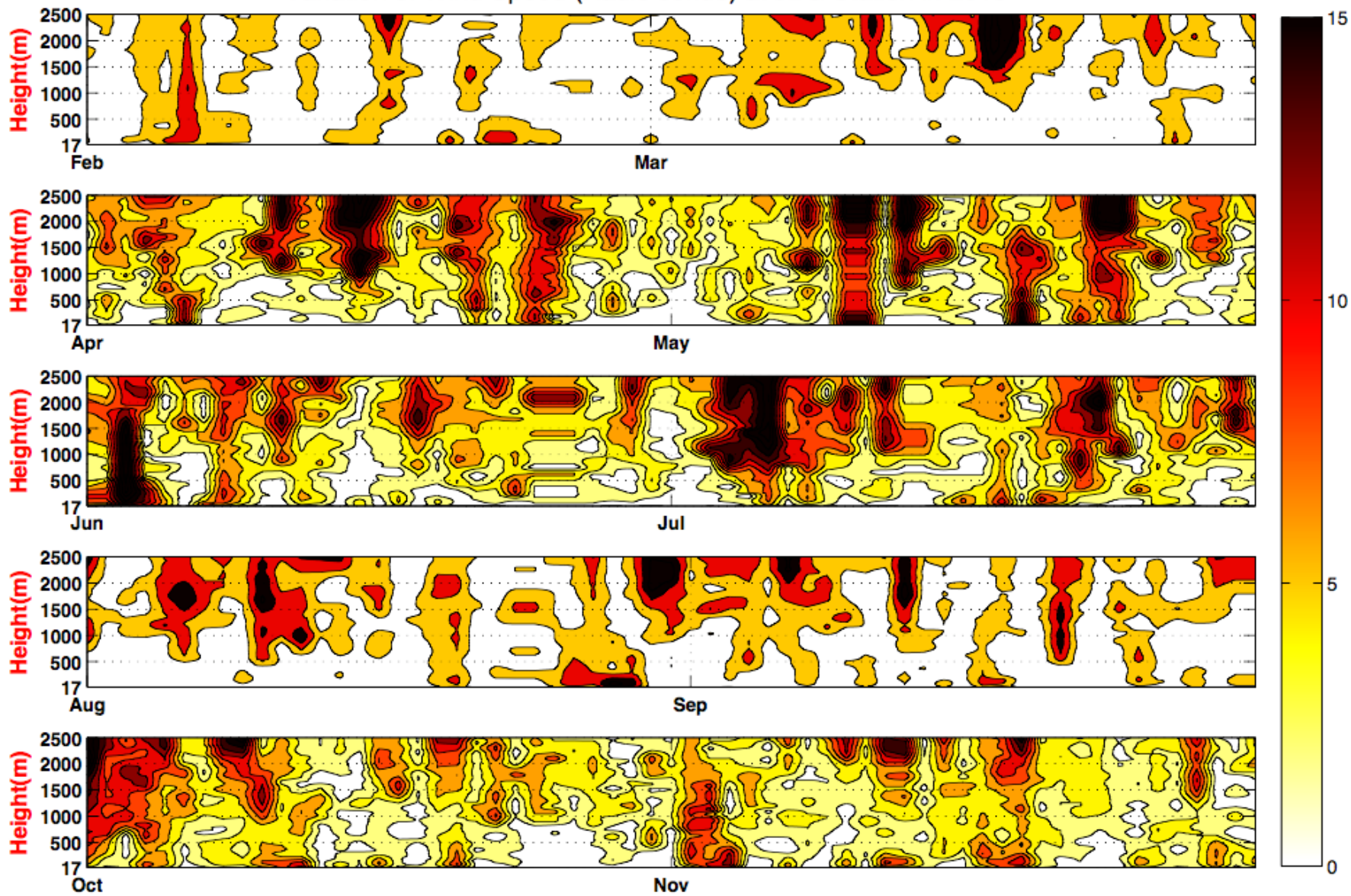
Variation of Temperature (Radio sonde) at JBG Station in 2015



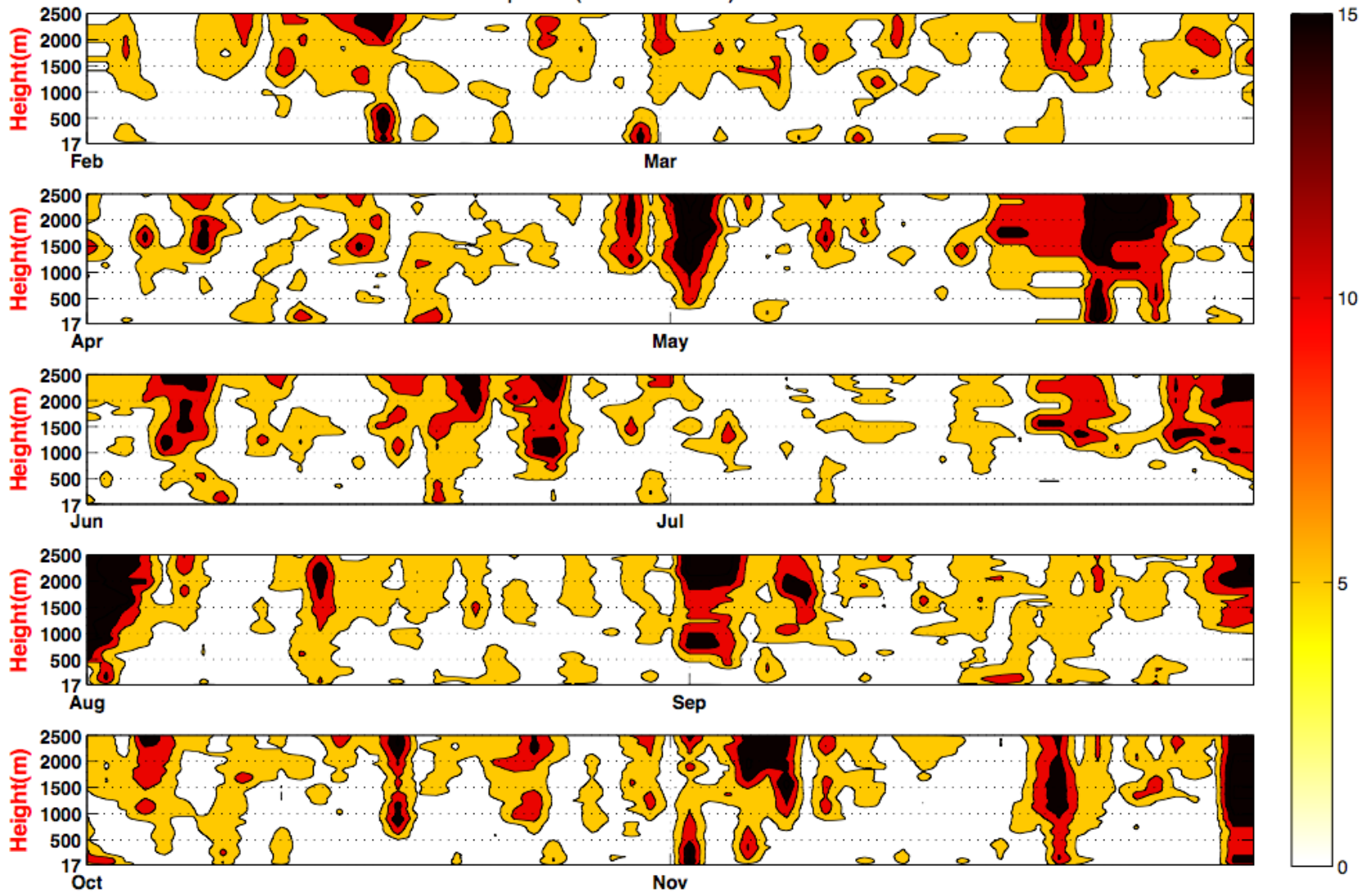
Variation of Temperature (Radio sonde) at JBG Station in 2016



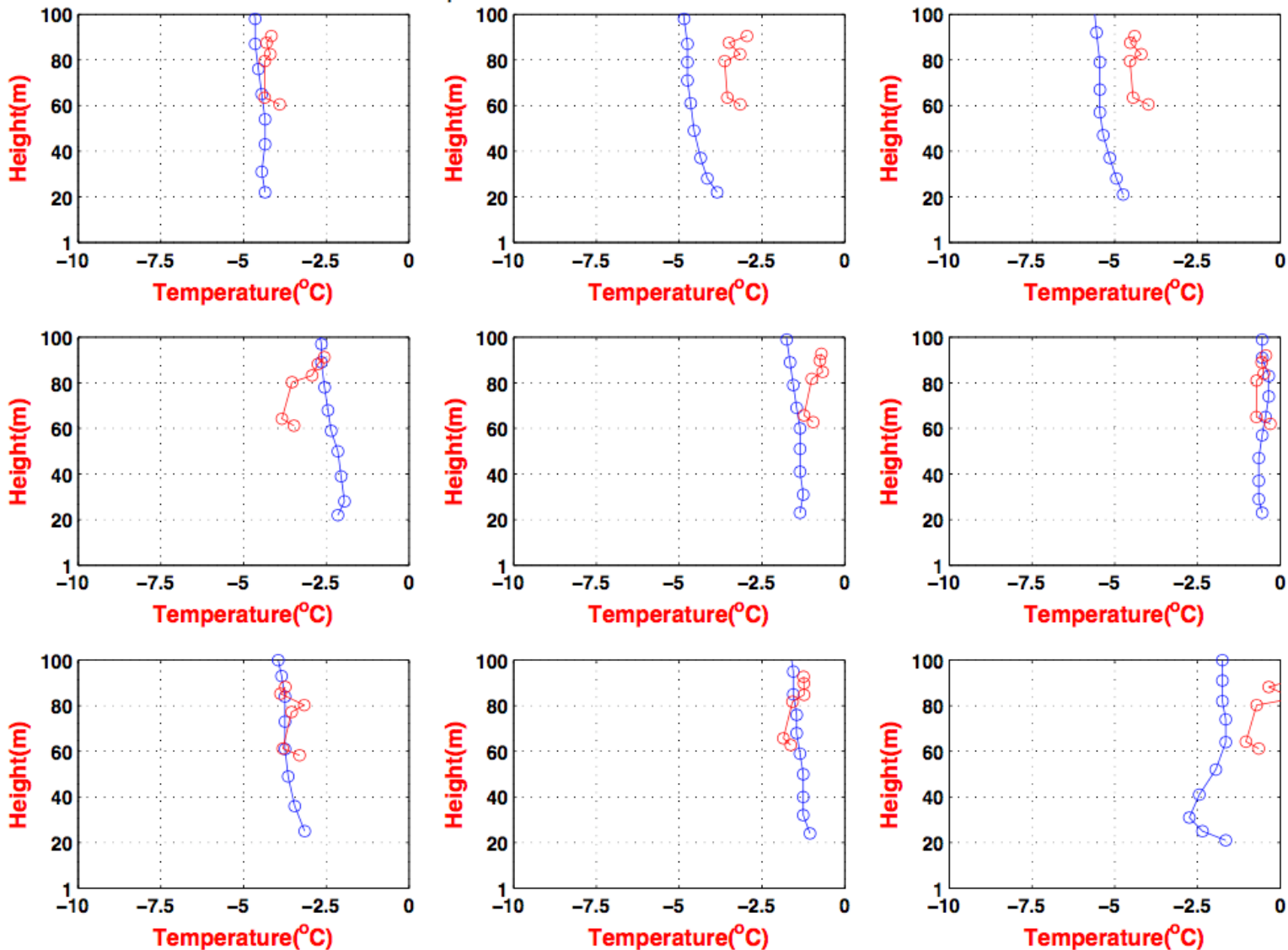
Variation of Wind Speed (Radio sonde) at JBG Station in 2015



Variation of Wind Speed (Radio sonde) at JBG Station in 2016



Variation of Temperature at JBG Station in 00UTC 01~09 Feb 2017



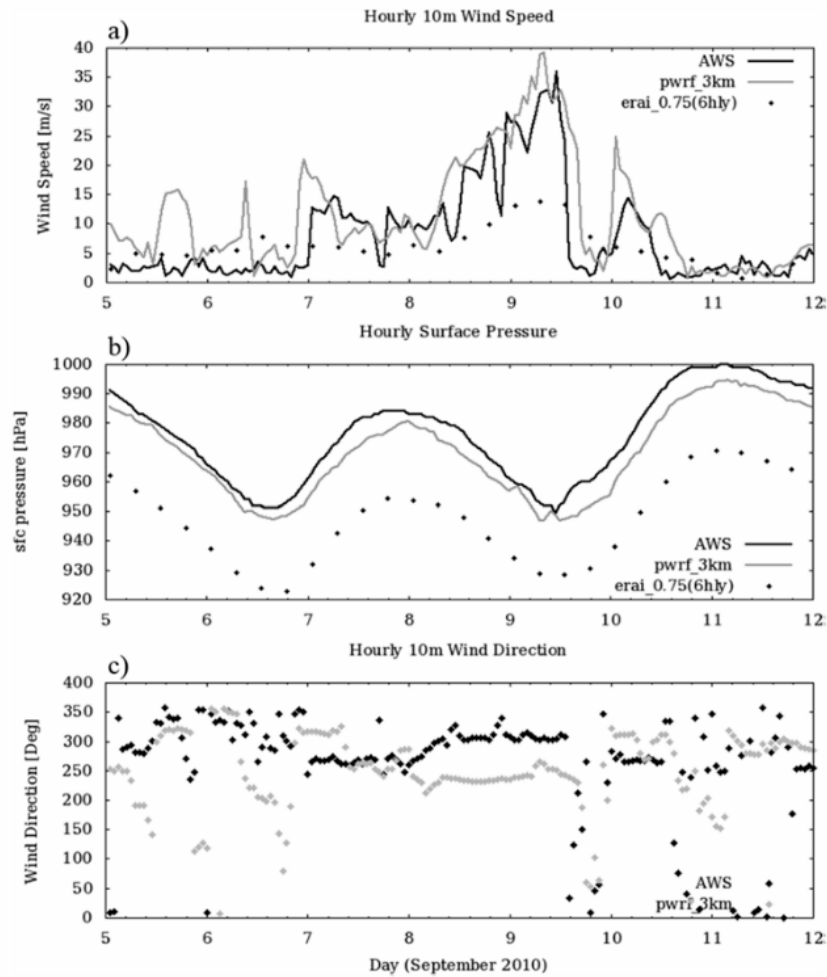


Fig. 9. Time-series of hourly (a) 10-m wind speed (m s^{-1}) and (b) surface pressure (hPa) from AWS (black line), Polar WRF (gray line), and ERA-Interim reanalysis (open diamond), and (c) wind direction from AWS (black closed diamond) and Polar WRF (gray closed diamond) for the 5~11 September 2010.

Polar WRF (version 3.7)

(Kwon *et al*, 2016)



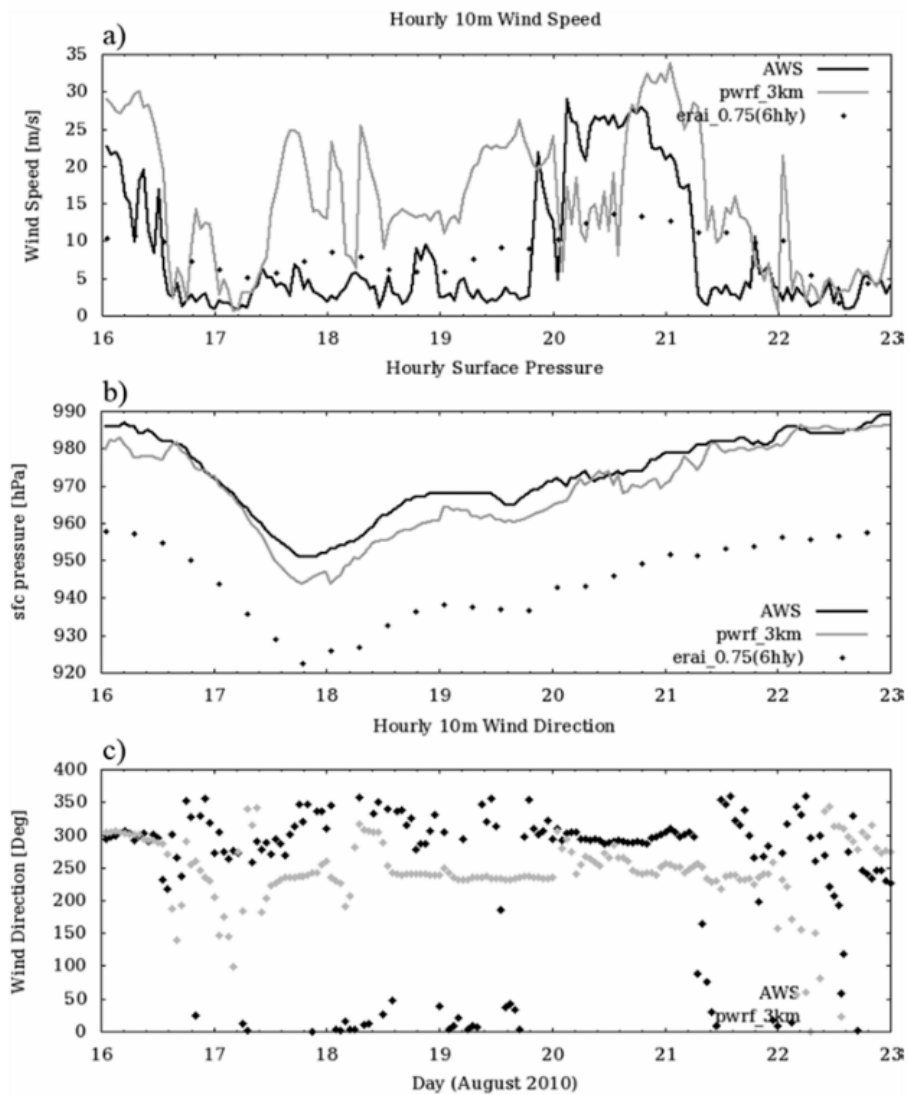


Fig. 10. Same as Fig. 9, except for the period of 16~22 August 2010.



Summary

- Year round observations since 2014 at the Jang Bogo Station, Terra Nova Bay
- The station with overall week wind speed
- Reference for katabatic wind studies
- Regional AWS network from the coastal area to inland
- Numerical modeling study together with surface, boundary layer and upper air observation
- Surface and boundary layer processes, katabatic wind, TNB polynya, surface mass balance



Measurements Summary

| Instruments | Model | Starting dates | Sampling rate/Operation period | Measured variables | Remarks |
|---------------------------------------|-----------------|----------------|--|---|----------------------|
| Automatic Synoptic Observation System | MAWS | 2014. 4. 11 | Three-second for wind, one minute for the others /Year round | WD, WS, T, RH, P, Visibility, Cloud height | |
| Upper air Observation System | AS14 | 2015. 2. 1 | Daily (00UTC) (Feb. - Nov.) | Profiles of WS, WD, T, RH, P (> 25 km) | Automatic (manually) |
| Ozonesonde | ECC6AB | 2015. 8. 28 | Monthly: Feb.-Jul. One or two-time per week: mid Aug. to mid Oct.) | Profile of ozone concentration (~ 50 km) | Manually |
| Brewer Ozone Spectrophotometer | Mark III | 2016.12 | Aug. to Apr. | Total ozone | |
| Eddy covariance flux system | CSAT3/KH20 | 2014.4 | 20Hz/year round | Turbulent fluxes of heat and water vapor | |
| Radiometer | SPP | 2015. 2. 13 | one second/year round | Downward shortwave radiation | |
| | PIR | | | Downward longwave radiation | |
| | TUVR | | | Total ultraviolet | |
| | UV-A | | | UV-A | |
| | UV-B | | | UV-B | |
| Aethalometer | AE22-HS-MC | 2015. 2. 13 | 10-minute/year round | Black carbon | |
| CO/N2O | LGR | 2015.03 | 10-second/year round | CO/NO concentrations | |
| Greenhouse gas analyzer | CRDS G2301 | 2015. 03 | three-second/year round | CO ₂ /CH ₄ concentrations | |
| Thermo O3 analyzer | 49i | 2015.02 | year round | O3 | |
| Thermo NOx analyzer | 42i | 2015. 02 | year round | NO-NO2-NOx | |

Thank you for listening!!

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