

CPR Doppler Validation using WINDAS (L-band wind profiler)

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JAXA AOID 3: EarthCARE CPR and ATLID product validation using ground base remote sensors at Koganei

A Doppler measurement function is one of the unique features of EarthCARE/CPR and calibration using ground-based radar is important to get vertical Doppler velocity with good accuracy.

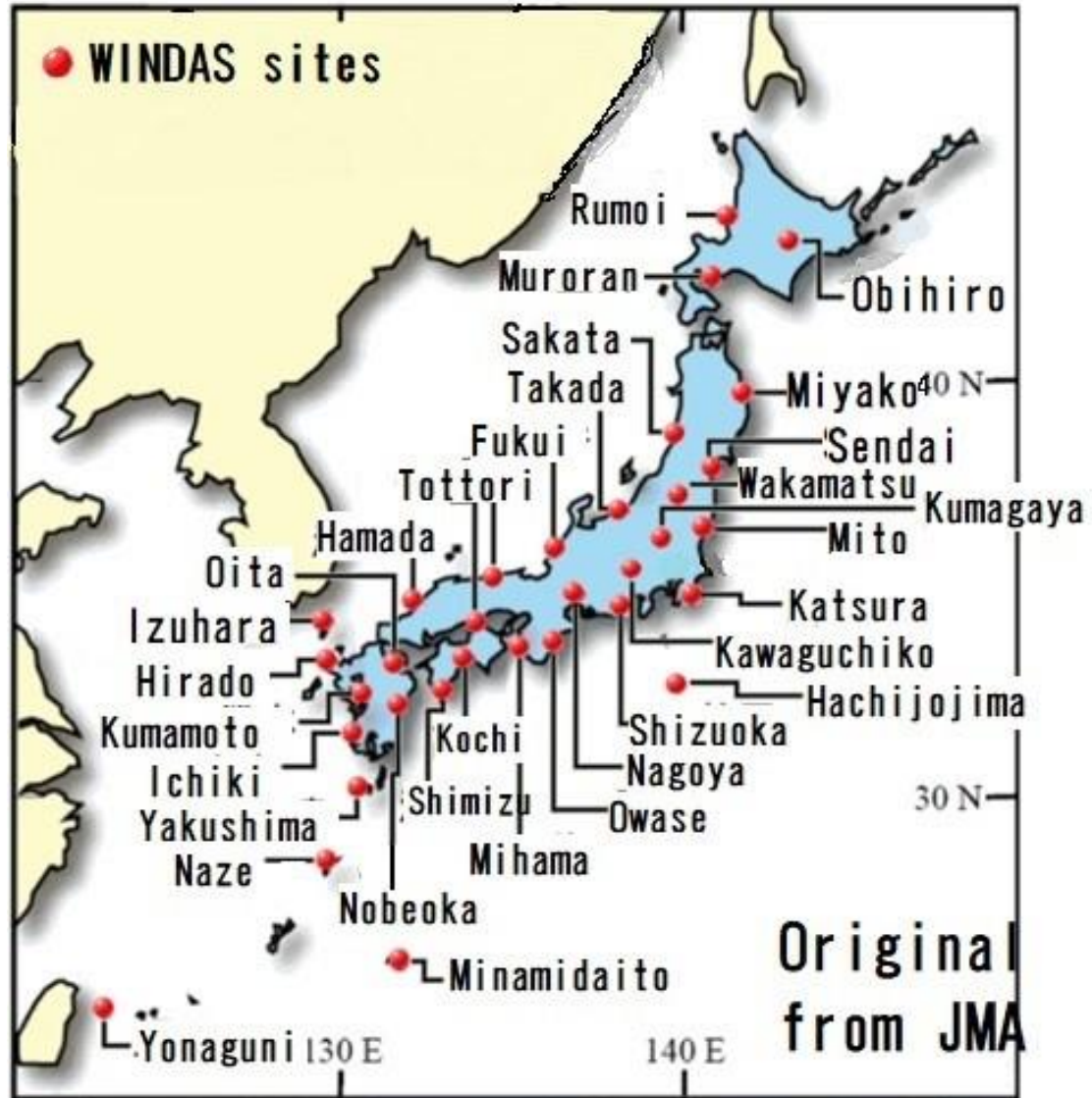
We are preparing ground-based W-band cloud radars at Koganei . However, simultaneous observation chance will be few because of narrow footprint size of CPR and revisiting cycle of 25 days.

In order to validate CPR Doppler velocity, we are planning to utilize the data obtained by wind profiler networks (WINDAS) operated by Japan Meteorological Agency.

WINDAS consist of 33 sites of L-band wind profilers from north to south of Japan. Main object of WINDAS observation is horizontal wind measurement in the troposphere, however vertical velocity is also observed by vertical pointing observation.

Echo target of L-band wind profiler is not only atmospheric turbulent, but also ice cloud and/or rain particle. We will identify ice cloud echo from WINDAS observation. Then, we validate CPR Doppler velocity using its vertical velocity. WINDAS measures vertical velocity every 10 minutes and is operated in 24 hours continuously.

WINDAS sites in Japan



WINDAS: 1.357GHz Wind profiler

Main target: atmospheric turbulence

Horizontal wind profile with good height and time resolution

Sub target: ice cloud and rain

Vertical velocity of cloud & rain particle

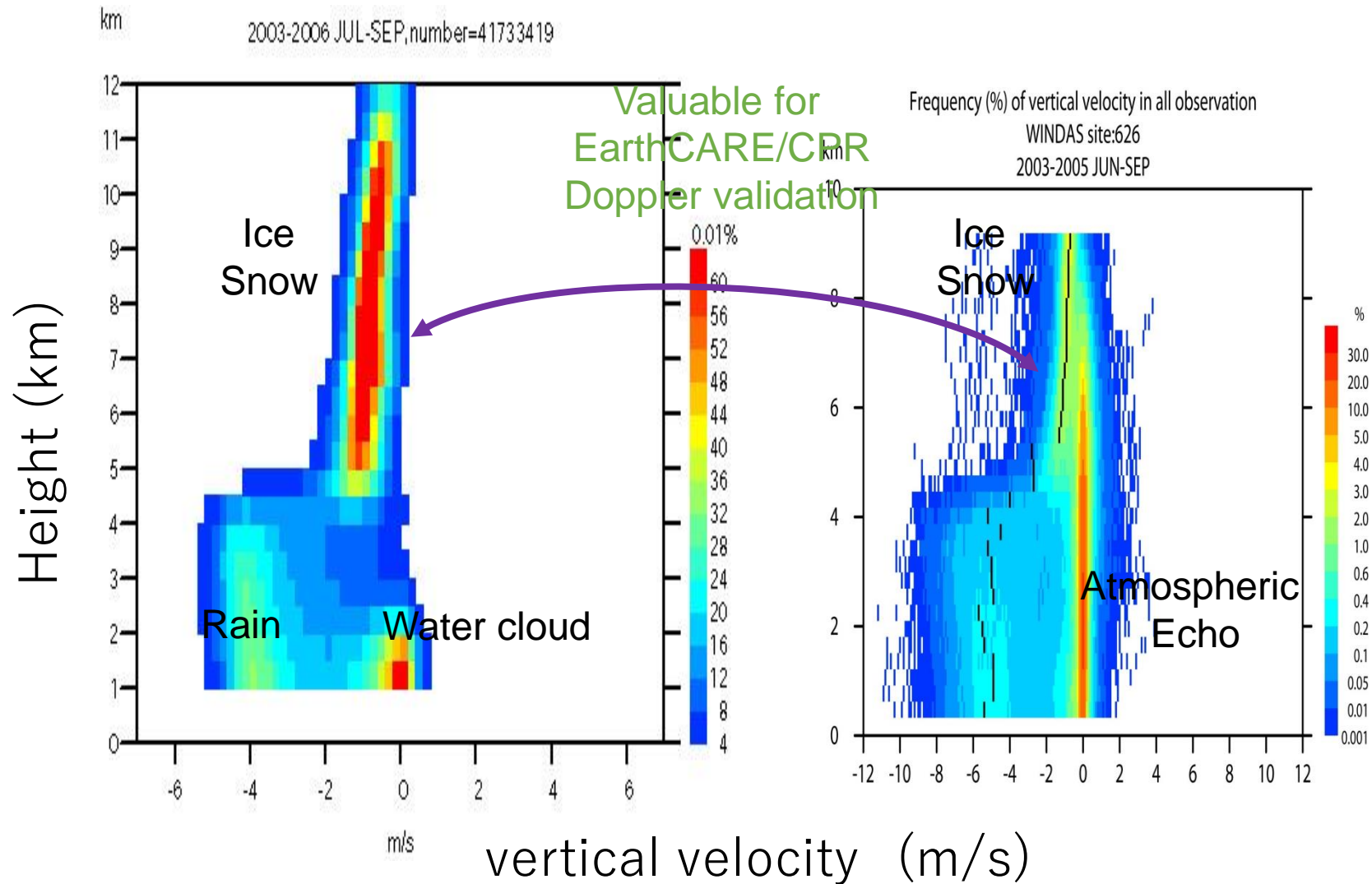
EarthCARE Doppler validation



Echo appearances (SPIDER & WINDAS)

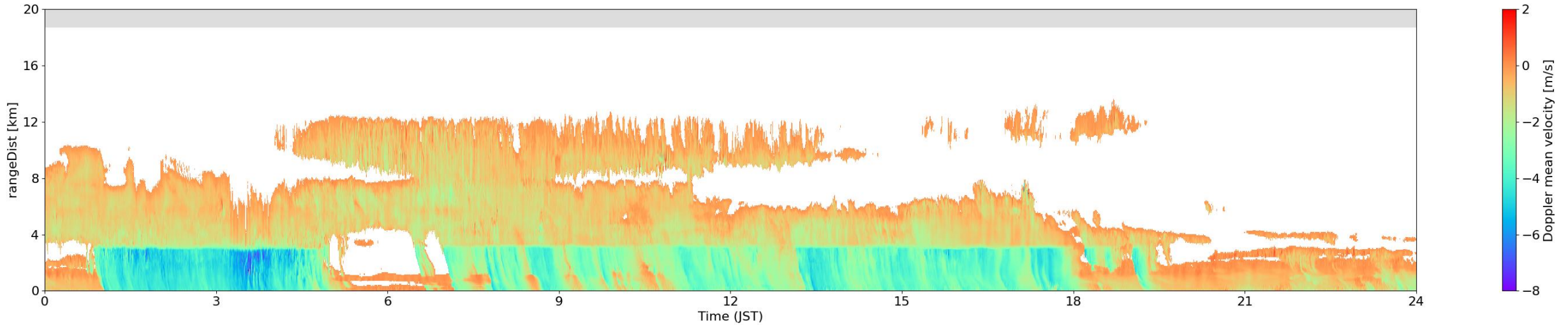
W-band SPIDER (Koganei)

L-band WINDAS (Kumagaya)

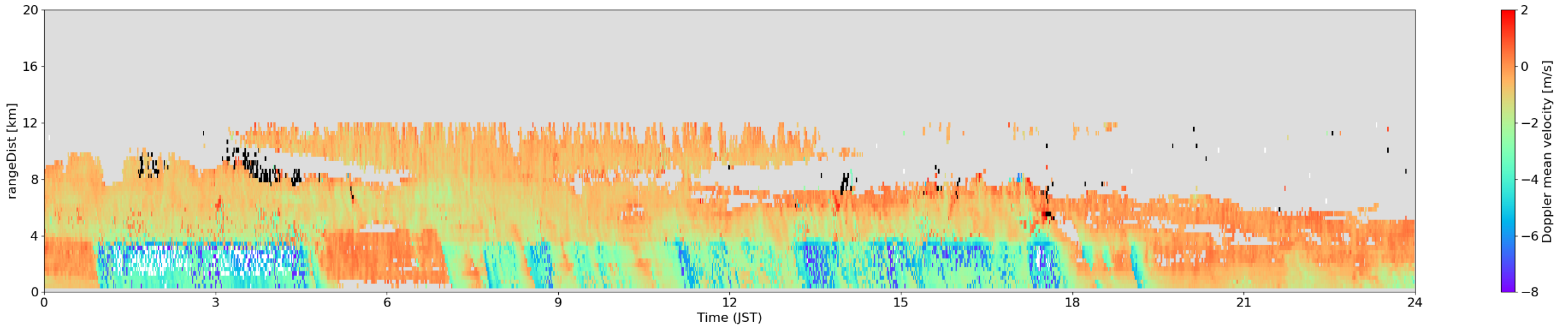


Comparison of **vertical velocity** time-height sections between W-band cloud radar and L-band wind profiler

W-band Cloud Radar(HG SPIDER)

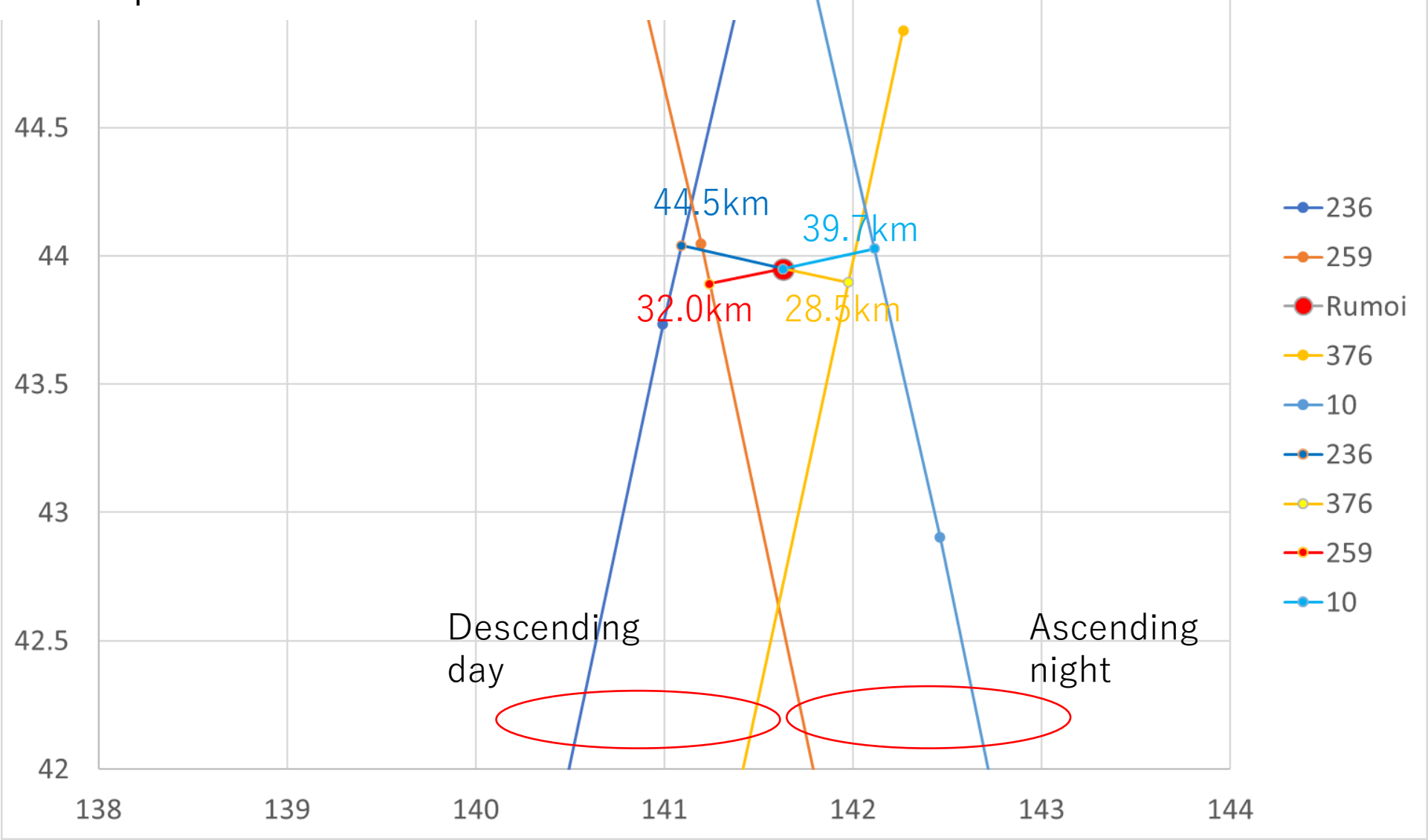


L-band Wind Profiler (LQ13)

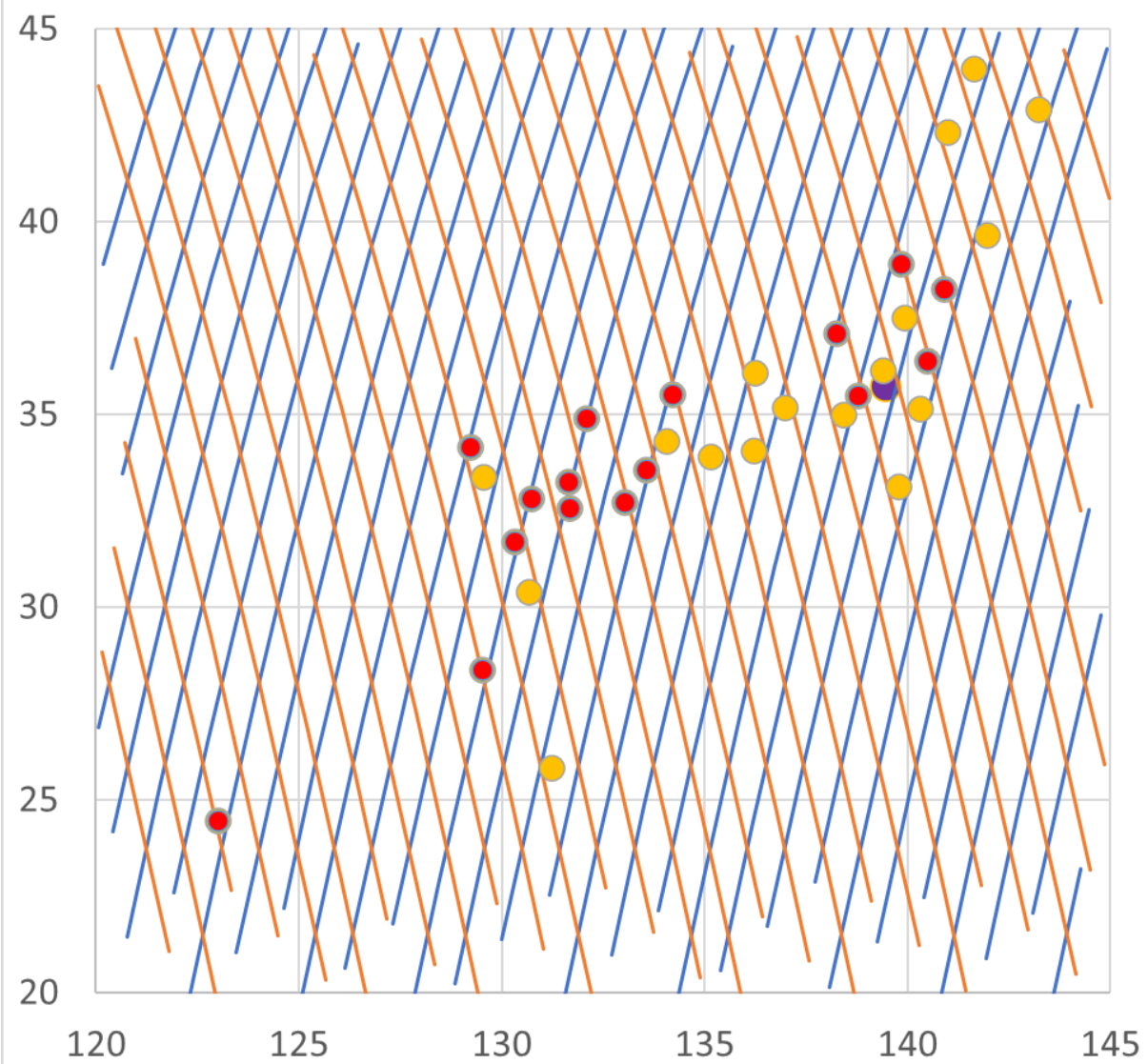


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Example of distance between EC Satellite path & WINDAS site



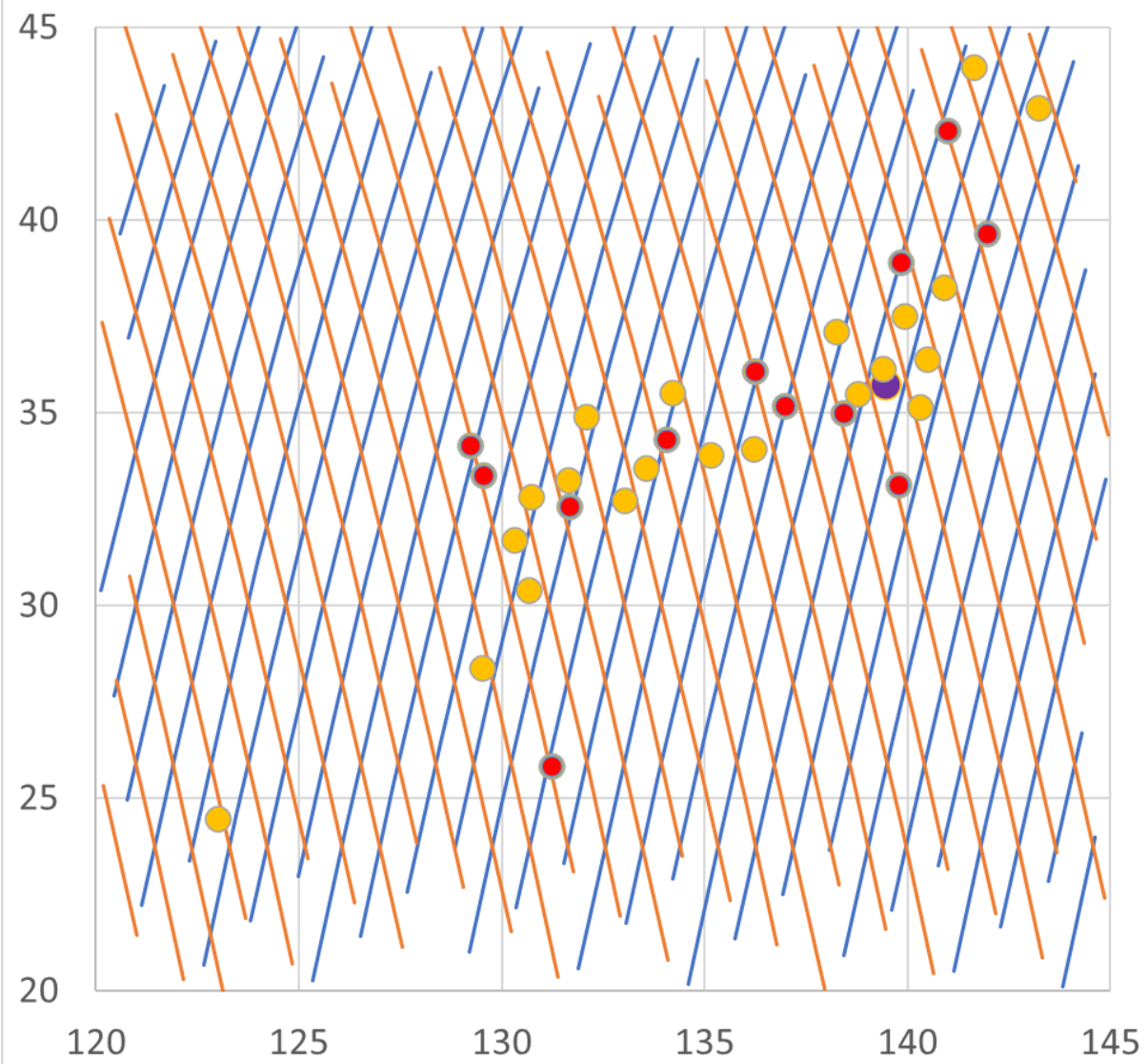
ANX_LONGTITUDE 0.0



Distance within 10km
16 stations
17 profiles

Distance within 1km
1 stations
1 profiles

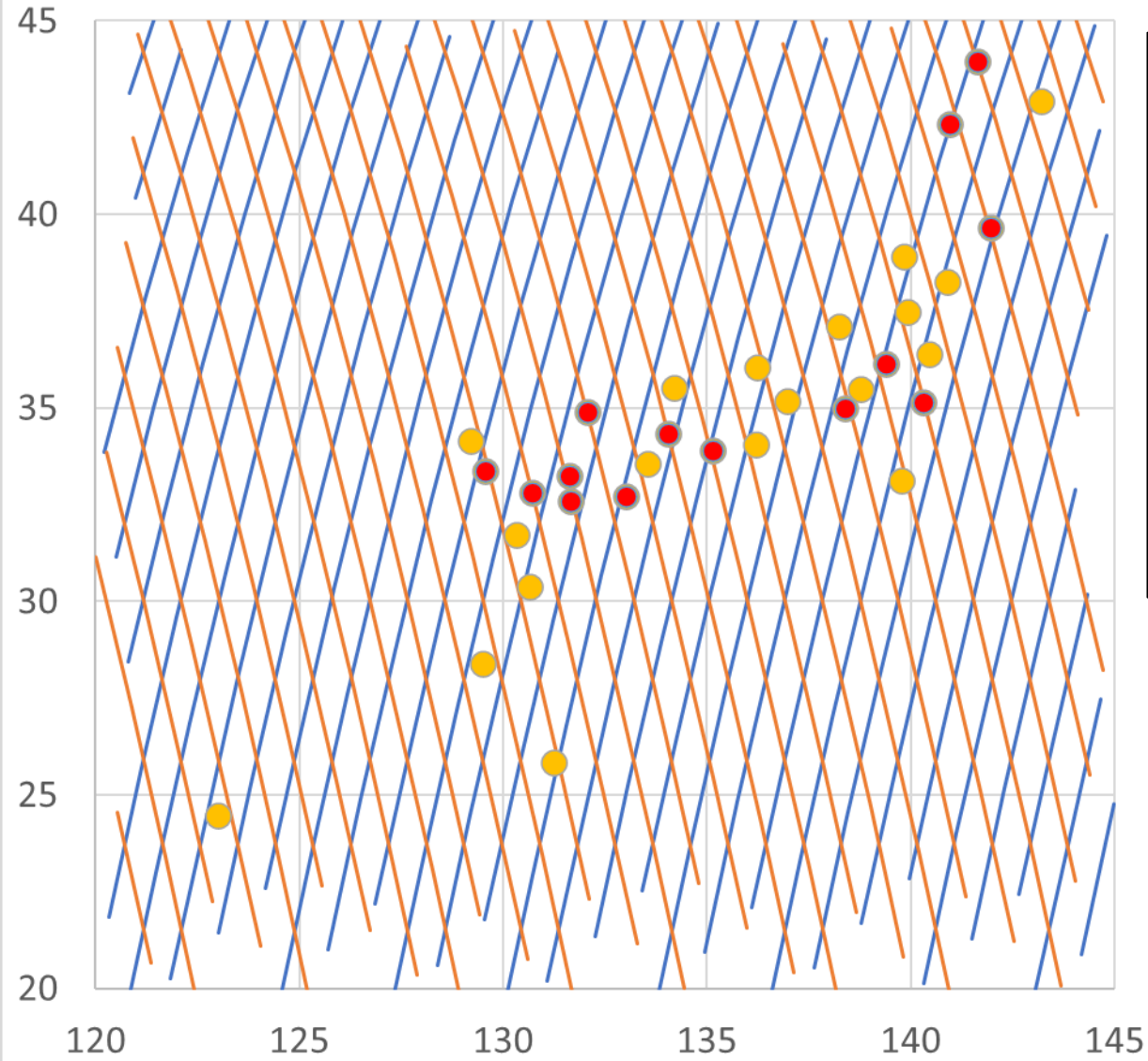
ANX_LONGTITUDE 0.2



Distance within 10km
12 stations
14 profiles

Distance within 1km
1 stations
1 profiles

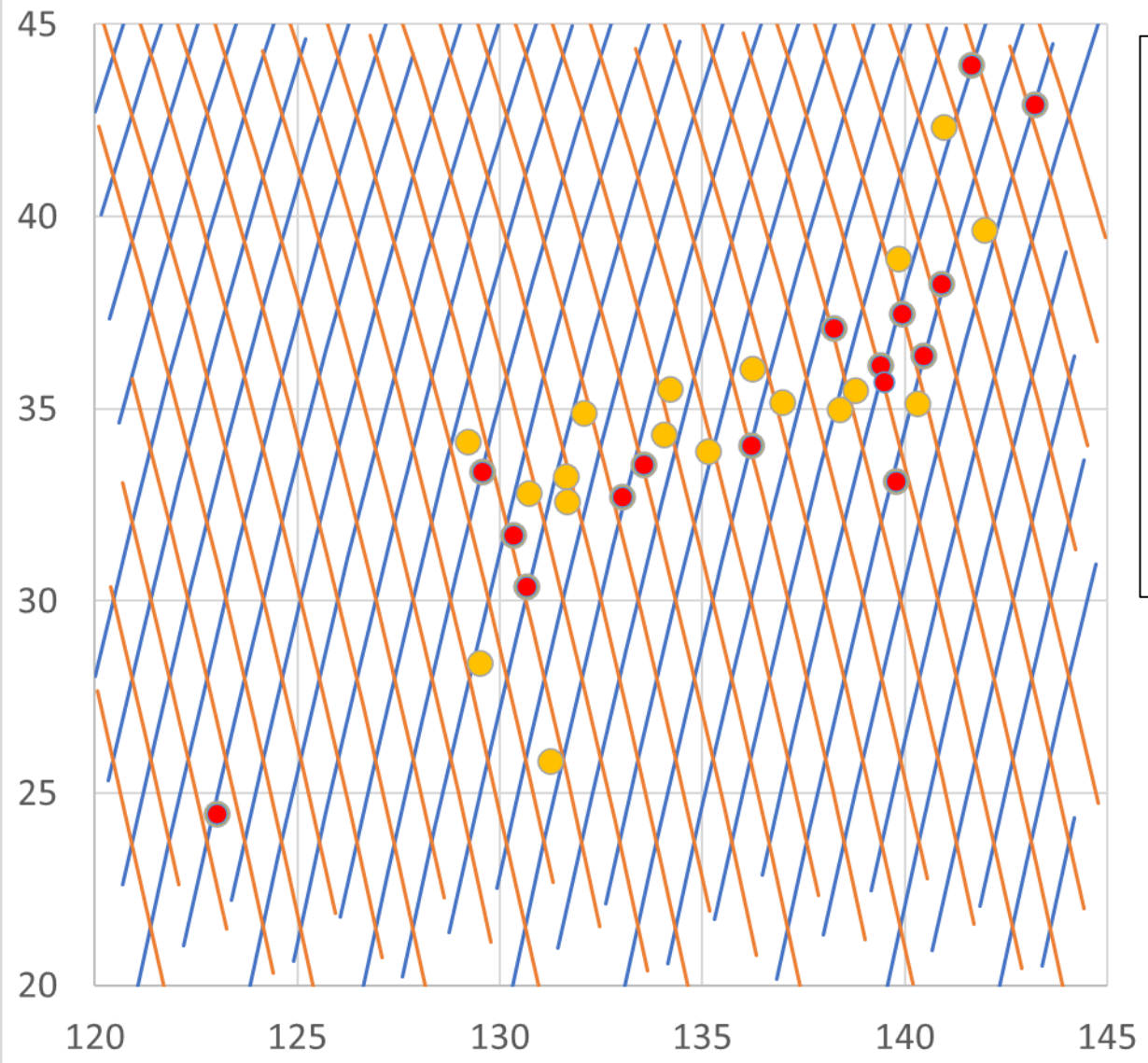
ANX_LONGTITUDE 0.4



Distance within 10km
14 stations
16 profiles

Distance within 1km
1 stations
1 profiles

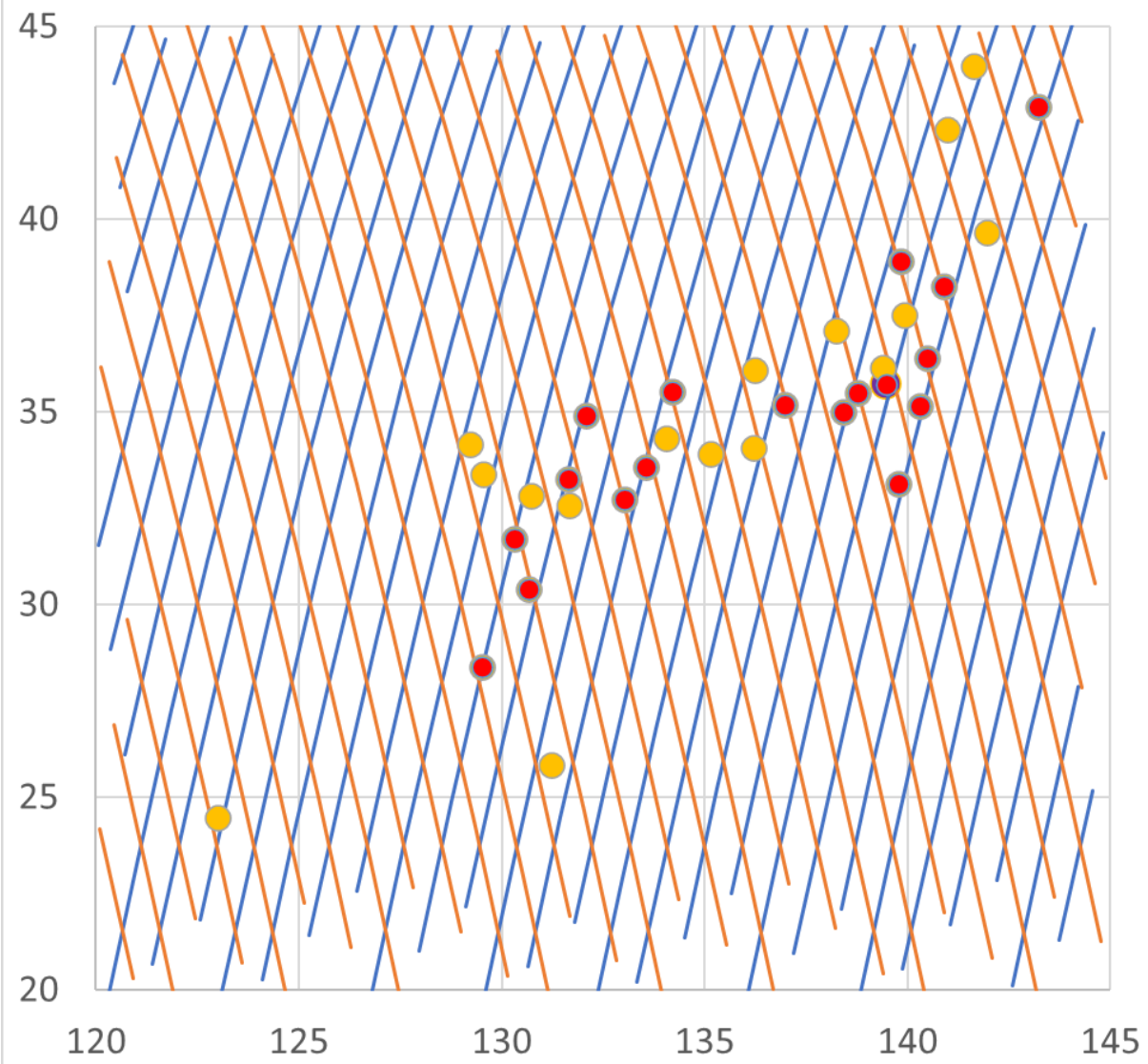
ANX_LONGTITUDE 0.6



Distance within 10km
16 stations
20 profiles

Distance within 1km
1 stations
1 profiles

ANX_LONGTITUDE 0.8



Distance within 10km
18 stations
18 profiles

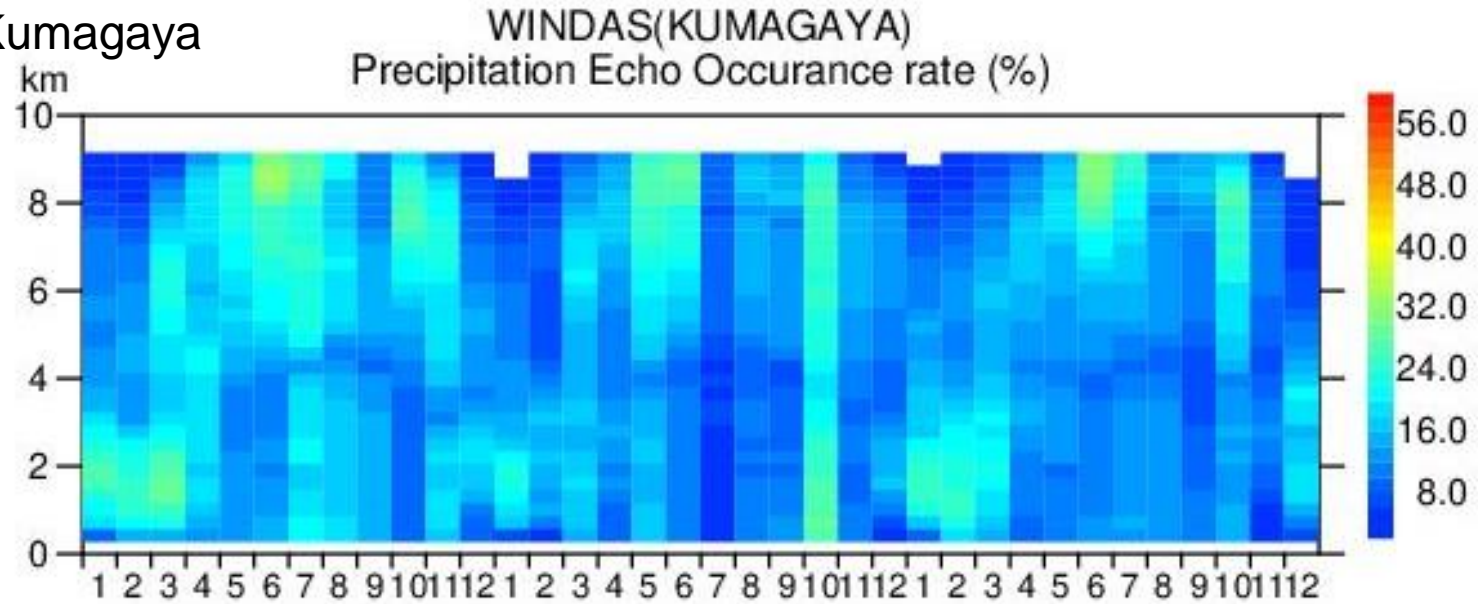
Distance within 1km
0 stations
0 profiles

Number of WINDAS sites near the EC satellite path

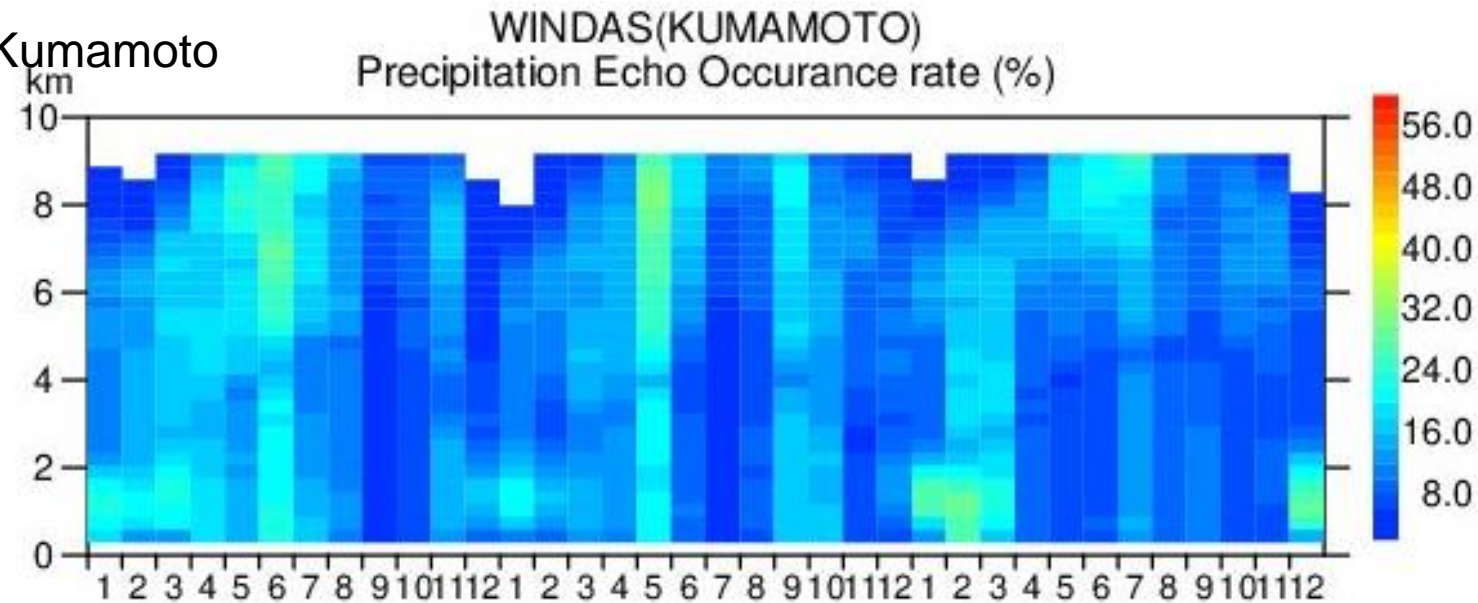
ANX	0.0	0.2	0.4	0.6	0.8
<10km	17	14	16	20	18
<1km	1	1	1	1	0

Cloud/rain echo monthly mean appearance at each WINDAS site (2003-2005)

WINDAS Kumagaya

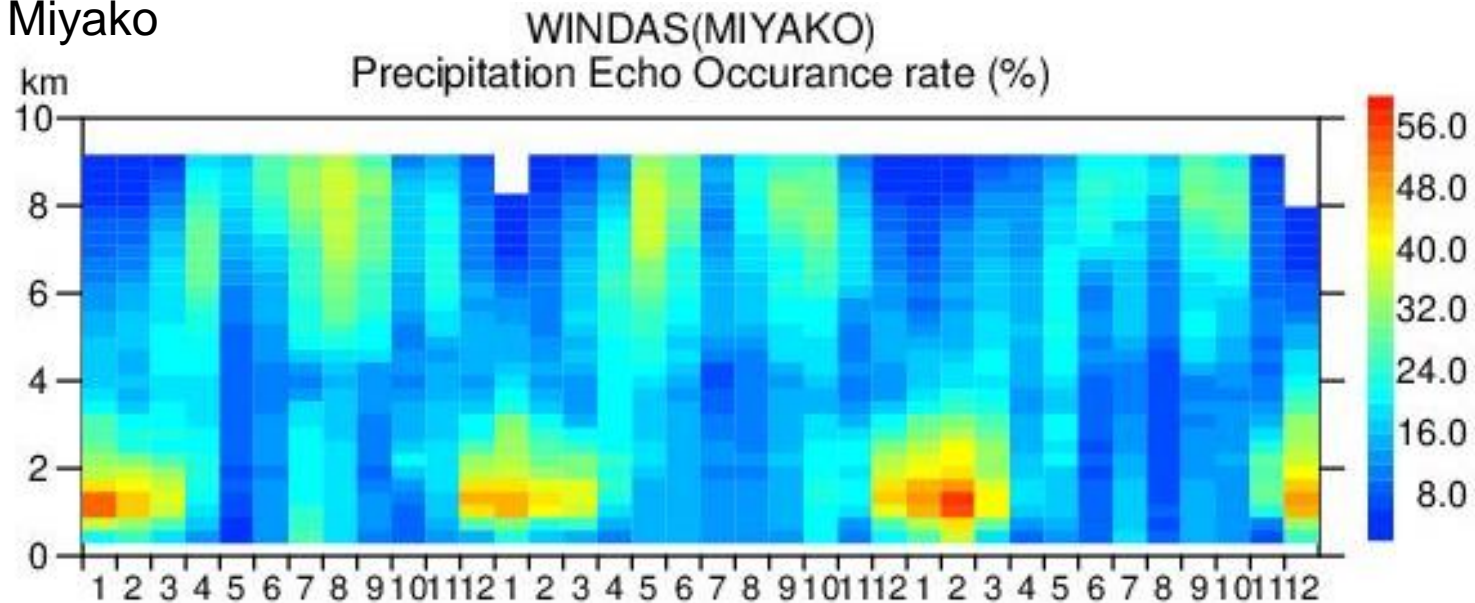


WINDAS Kumamoto

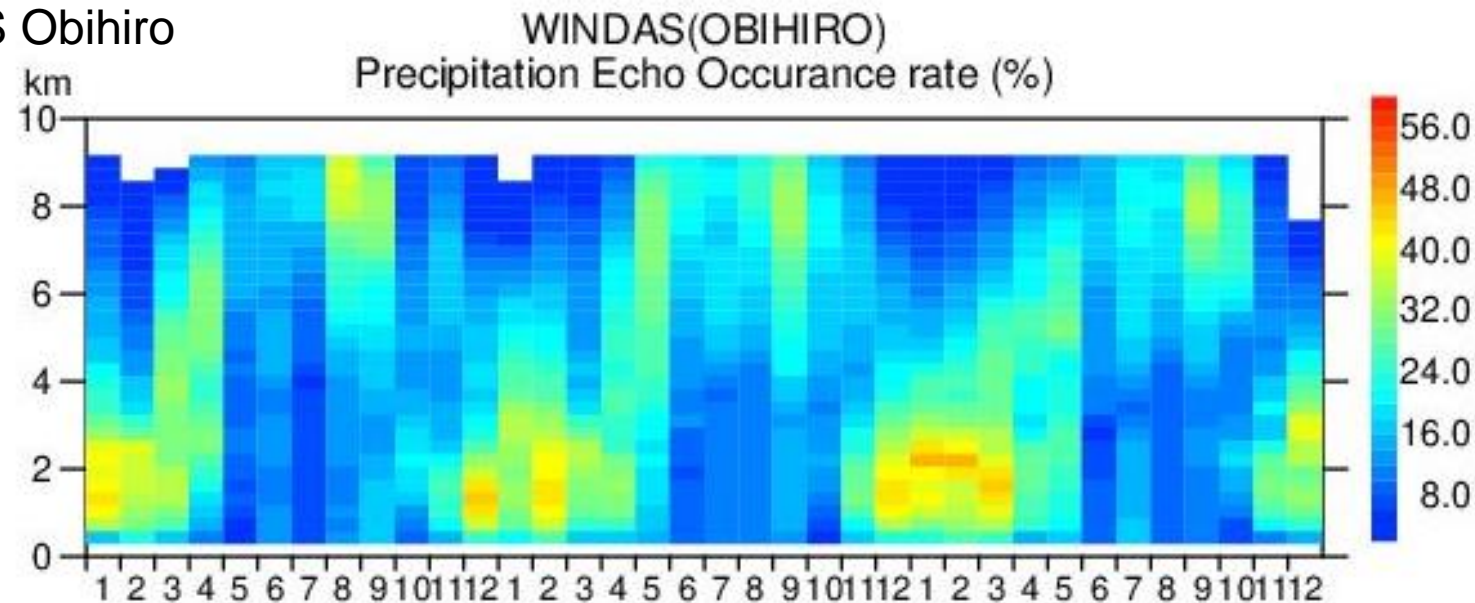


Cloud/rain echo monthly mean appearance at each WINDAS site (2003-2005)

WINDAS Miyako



WINDAS Obihiro



Summary

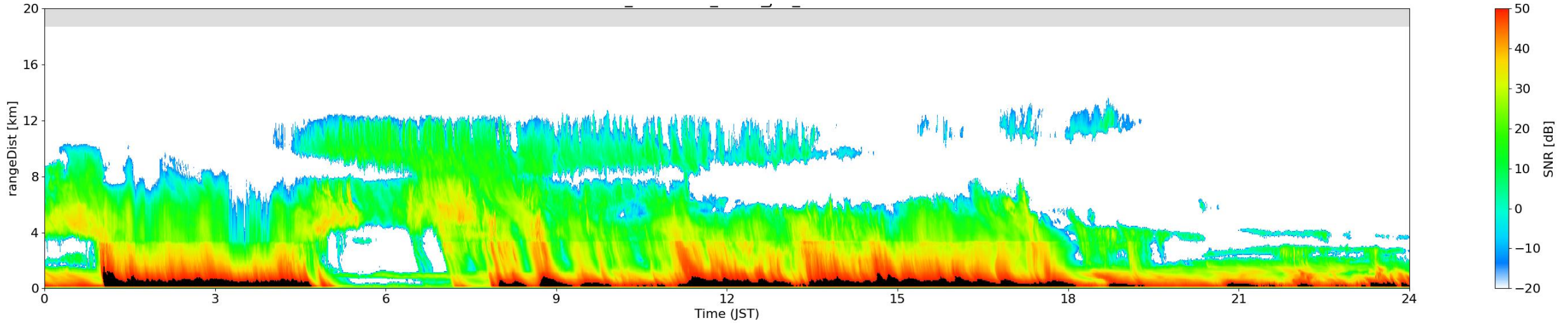
WINDAS is L-band wind profiler network in Japan operated by Japan Meteorological Agency.

Using ice cloud echo of vertical beam of WINDAS, we plan to validate CPR Doppler velocity.

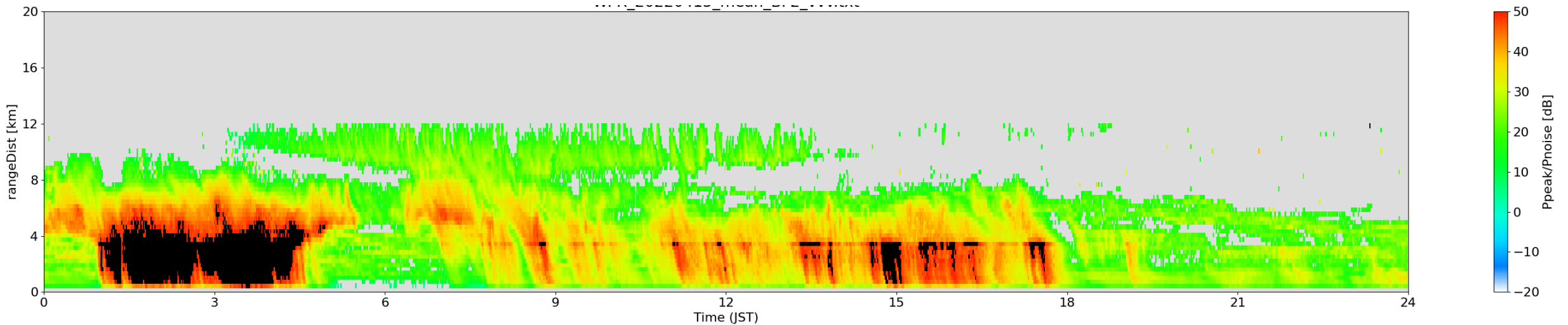
Since there are 33 wind profiler sites, it can cover the variation of EarthCARE satellite paths. In more than 14 WINDAS sites, the EarthCARE/CPR validation data will be get within 10 km from satellite path in 25 days repeat cycle. Ice/Snow echo appearance is around 20% through the season.

Comparison of **Reflectivity** time-height sections between W-band cloud radar and L-band wind profiler

W-band Cloud Radar(HG SPIDER)



L-band Wind Profiler (LQ13)



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