Summary of PLOWS operations and data

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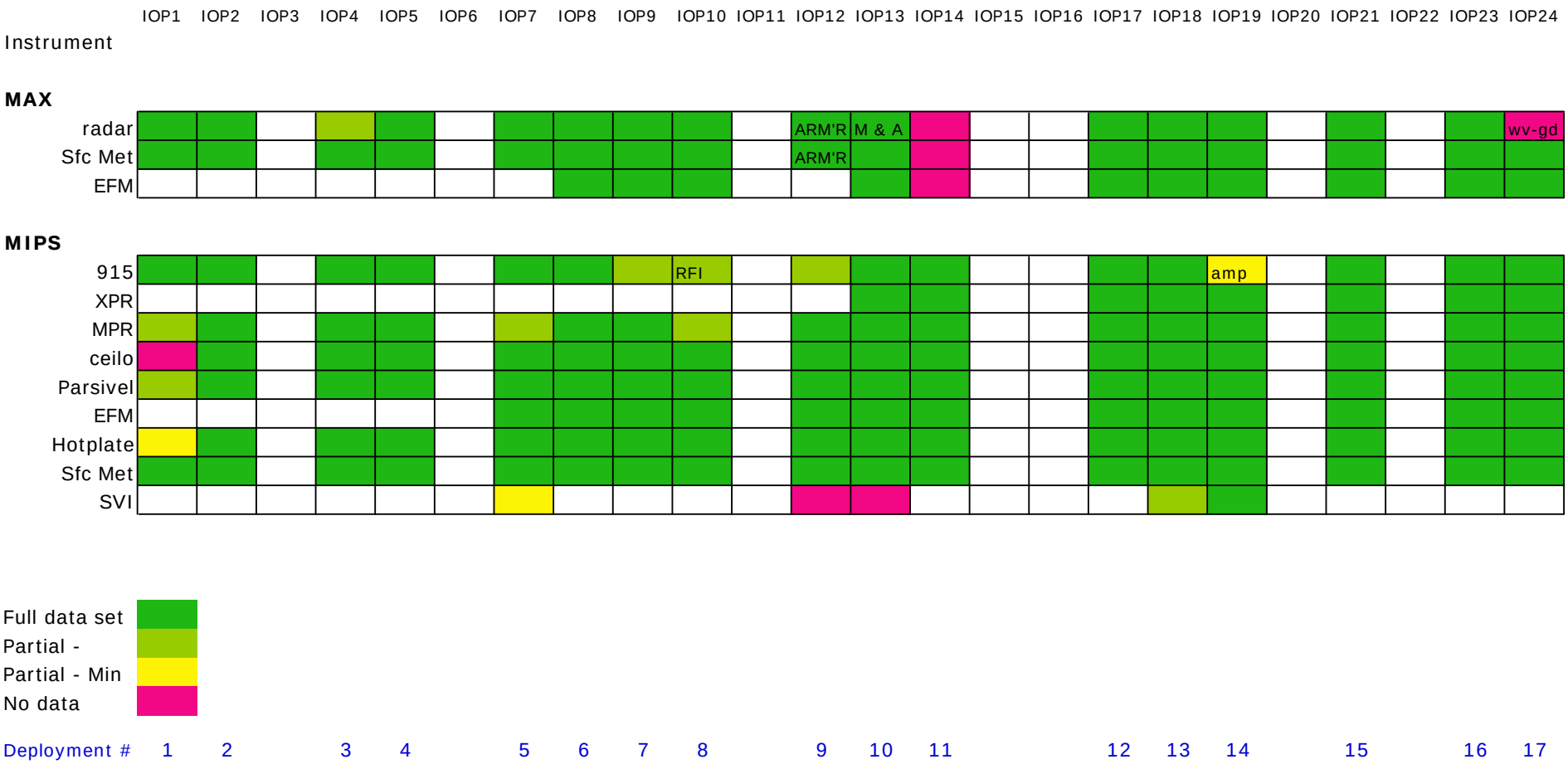
MAX and MIPS data availability



Summary

- MAX - missed two events (waveguide leak, other)
- MIPS
  - 915: degraded data during IOP 19 (amp problem)
  - XPR: started with IOP 13
  - Hotplate data quality was degraded at locations where turbulence was sigificant
  - All other instruments were primarily good.

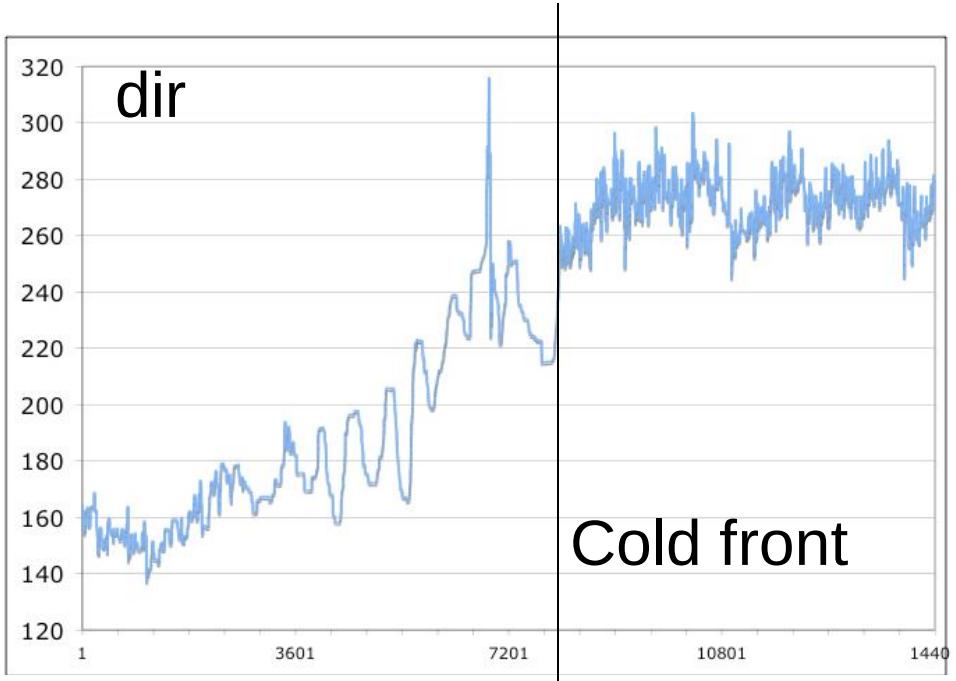
Snowflake video imager data uncertain

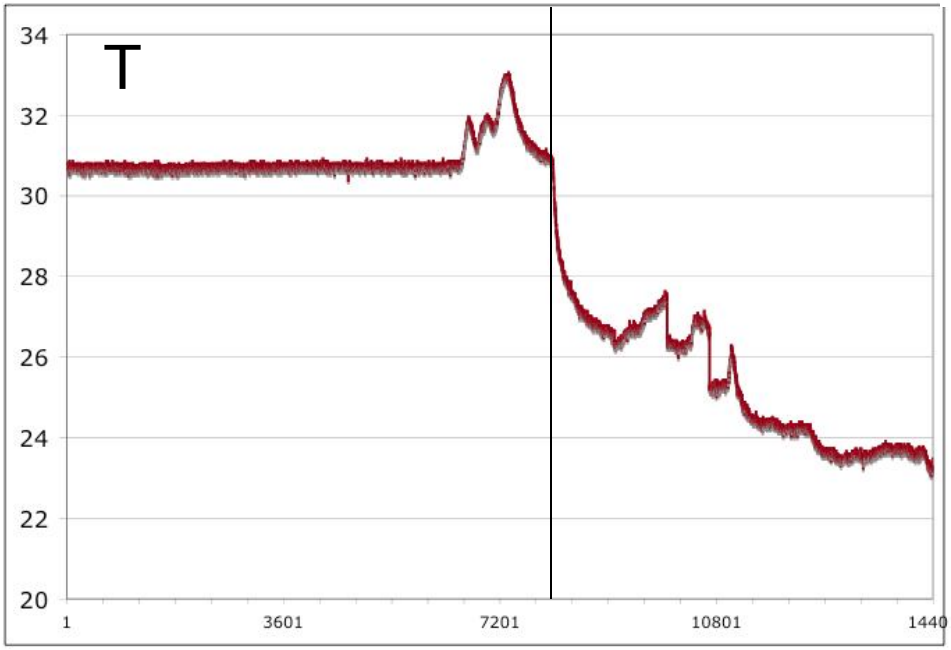
Example: IOP 19

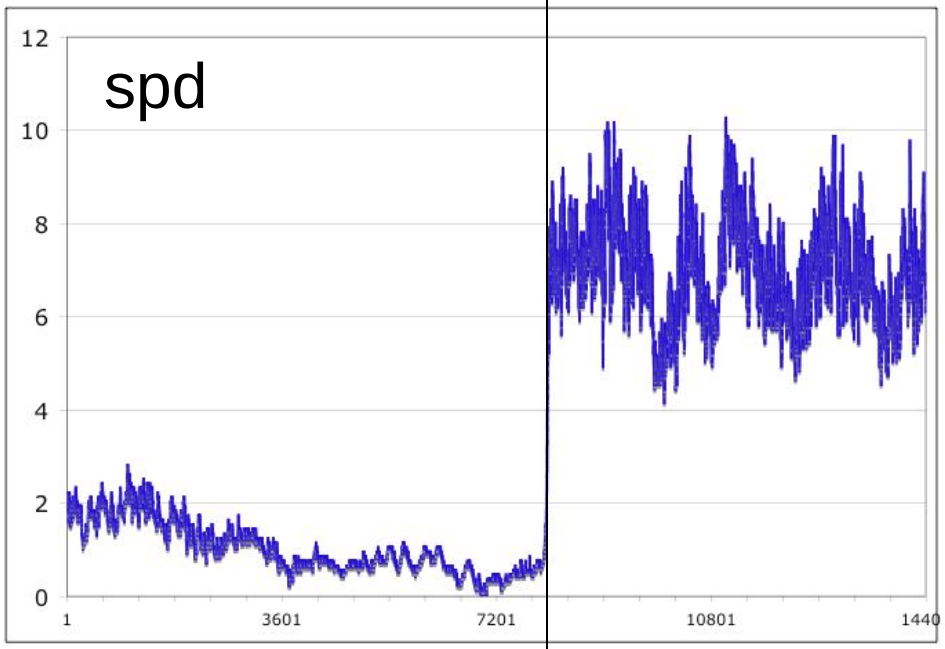
- The one occasion when the 915 was not healthy (anemic -- amplifier)
- Excellent XPR data
- Excellent MAX data
- The 2-D experiment

Cold frontal passage at the MAX site (10 m wind and T)

Sharp front;
looks similar to a density current;
shallow at ~1000 m

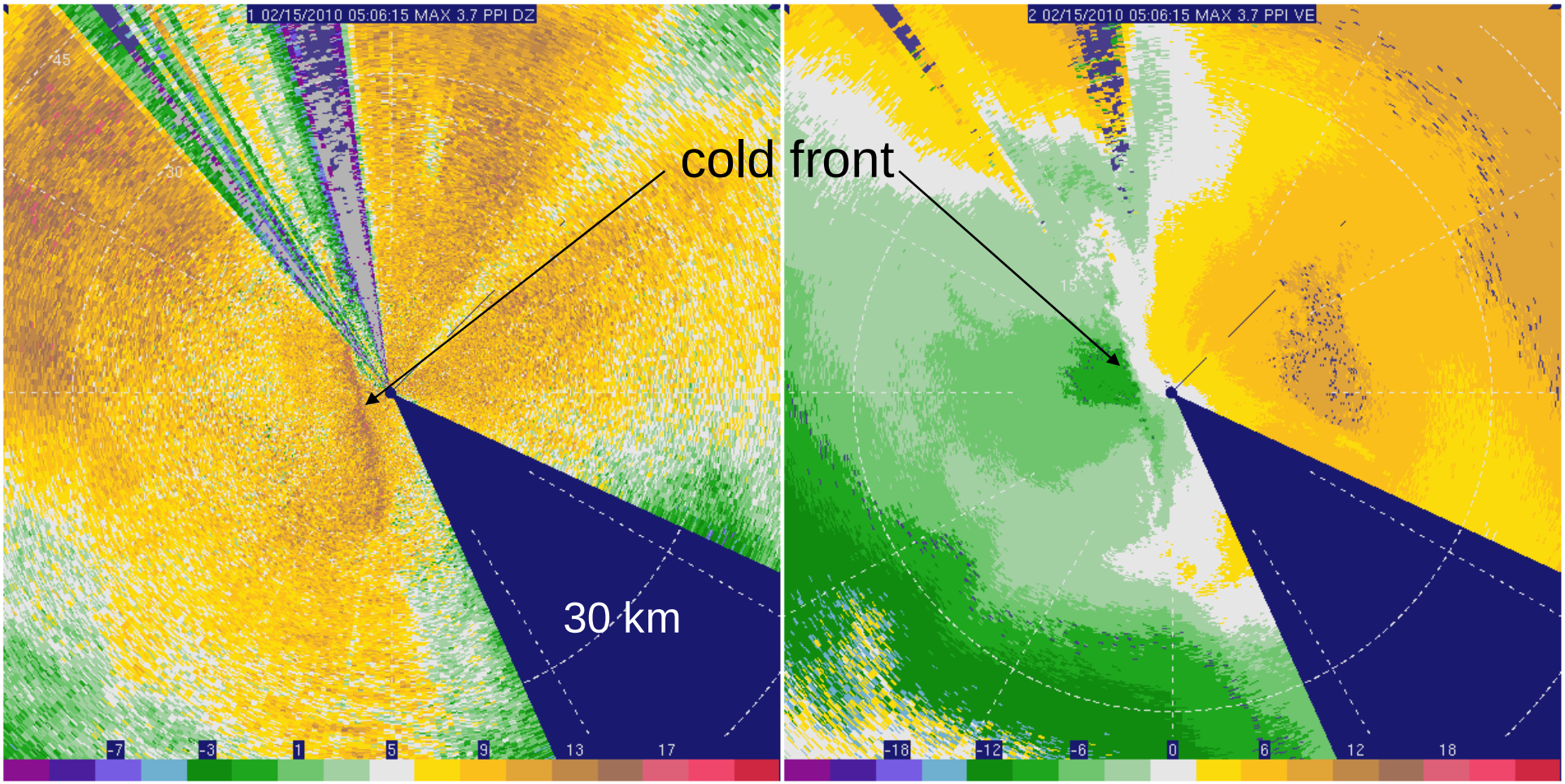




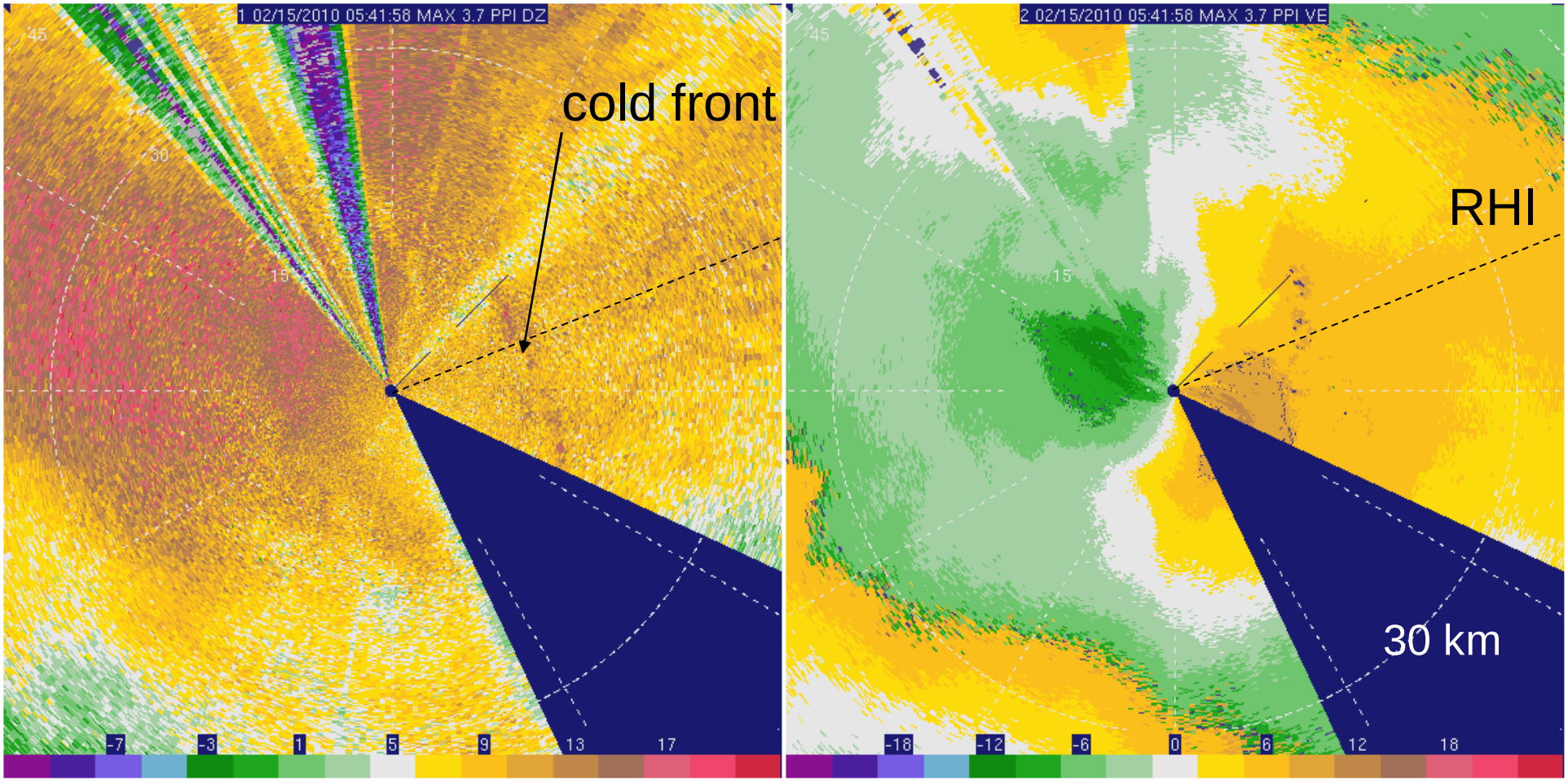


Time: 03 - 07 UTC

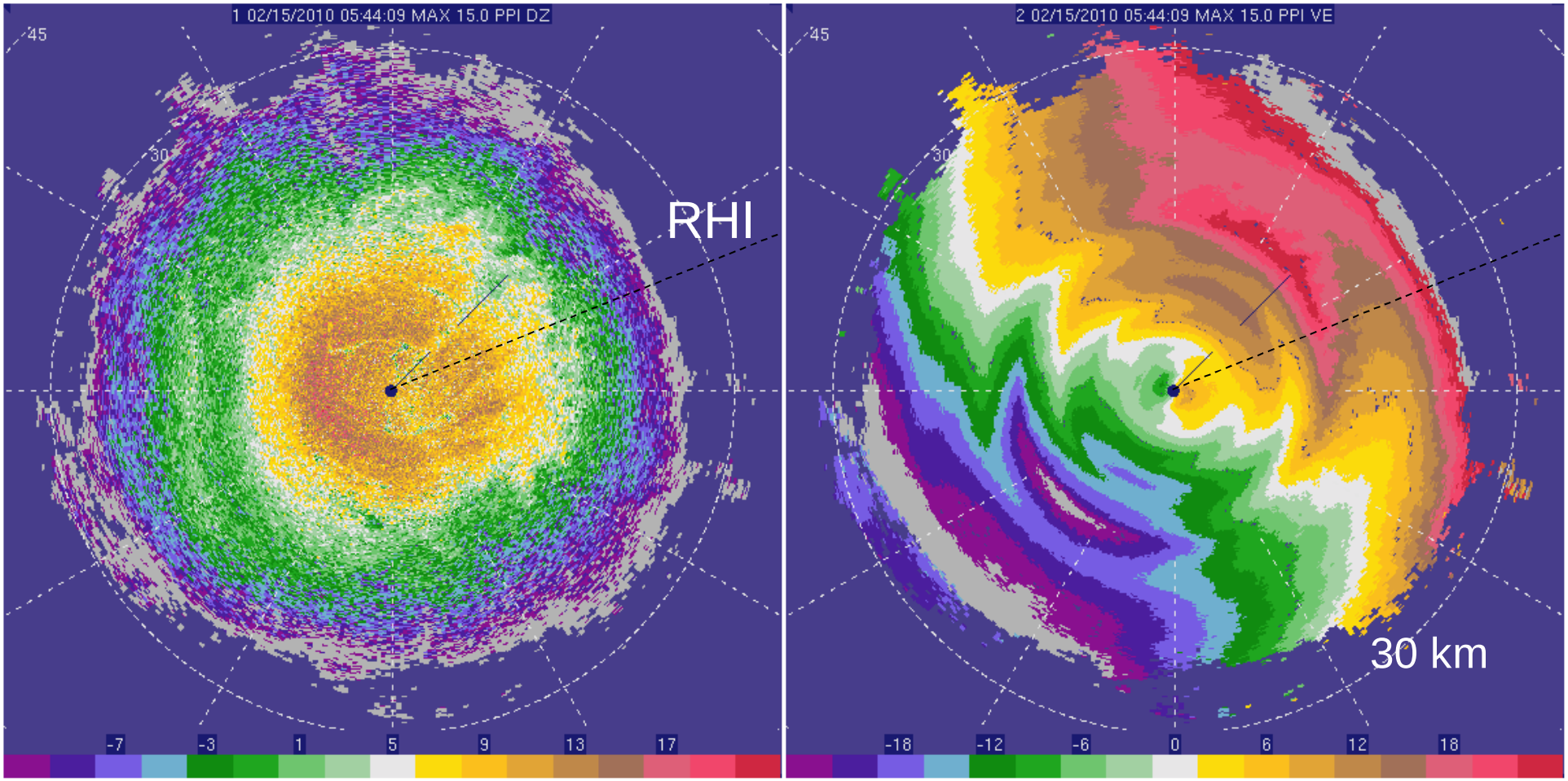
MAX PPI (3.7 deg) at 0506 UTC

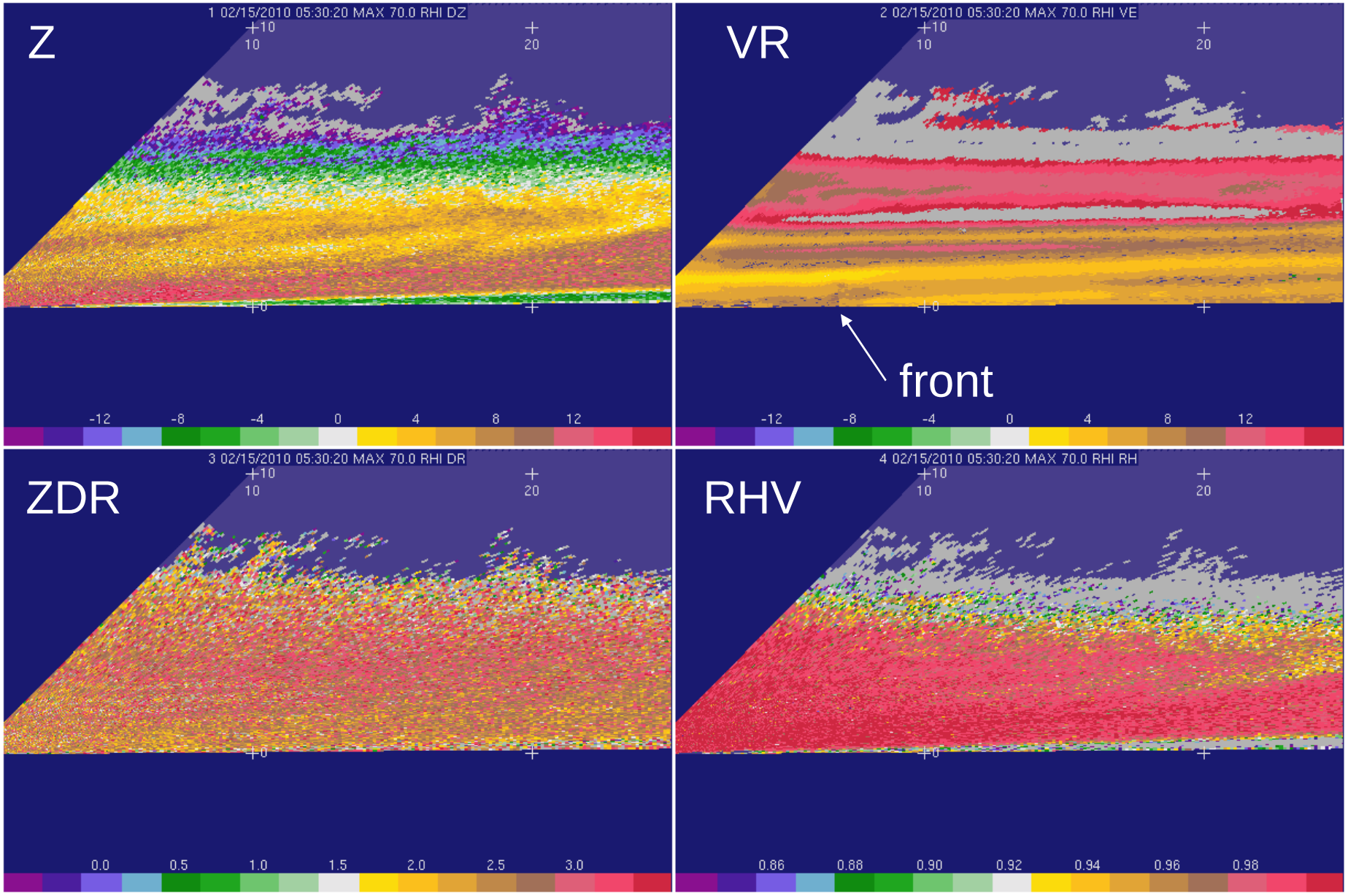


MAX PPI (3.7 deg) at 0542 UTC

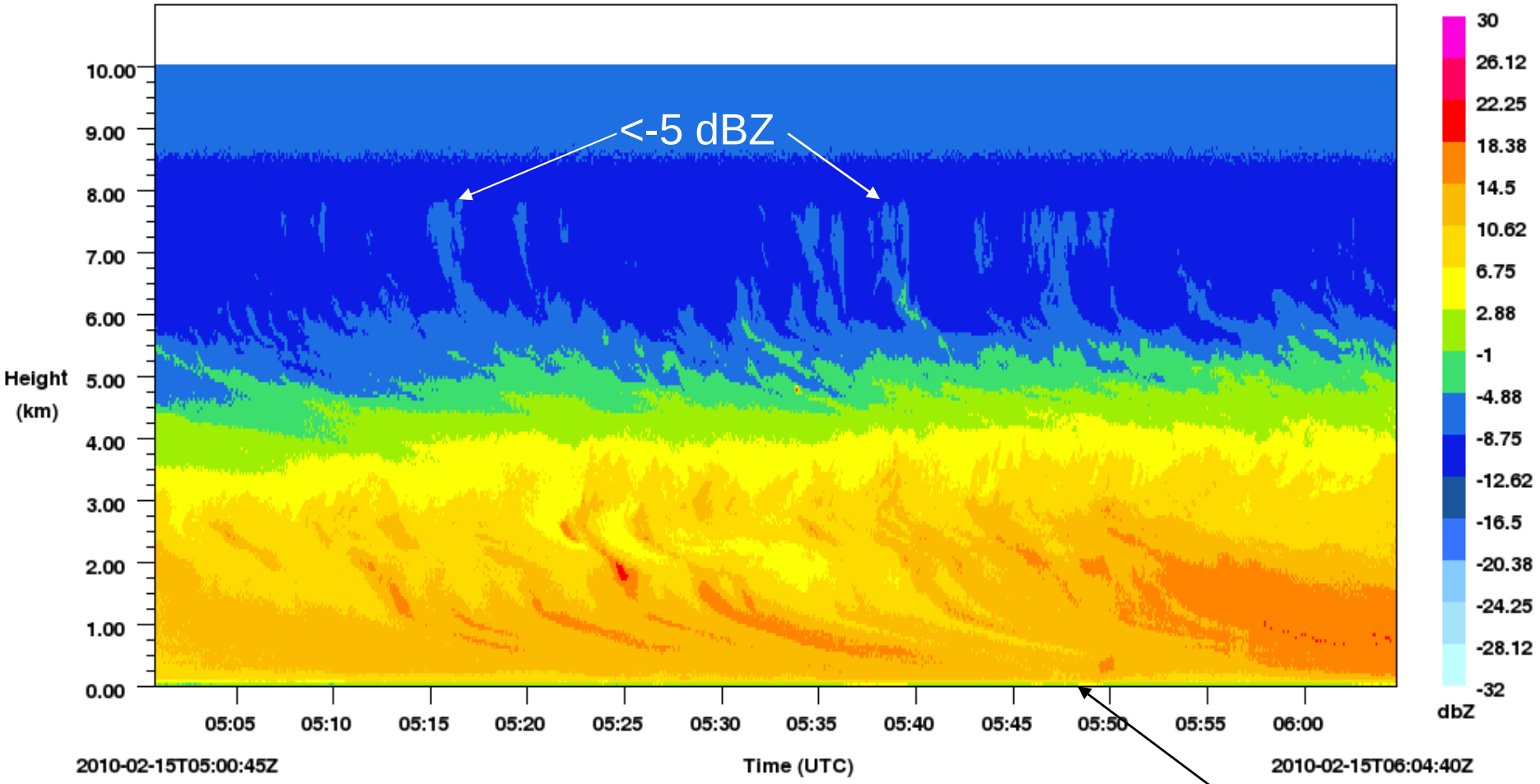


MAX PPI (15 deg) at 0544 UTC




Z
1 02/15/2010 05:30:20 MAX 70.0 RHI DZ
-12 -8 -4 0 4 8 12
VR
2 02/15/2010 05:30:20 MAX 70.0 RHI VE
front
-12 -8 -4 0 4 8 12
ZDR
3 02/15/2010 05:30:20 MAX 70.0 RHI DR
0.0 0.5 1.0 1.5 2.0 2.5 3.0
RHV
4 02/15/2010 05:30:20 MAX 70.0 RHI RH
0.86 0.88 0.90 0.92 0.94 0.96 0.98

XPR reflectivity (W), 0600 - 0605 UTC

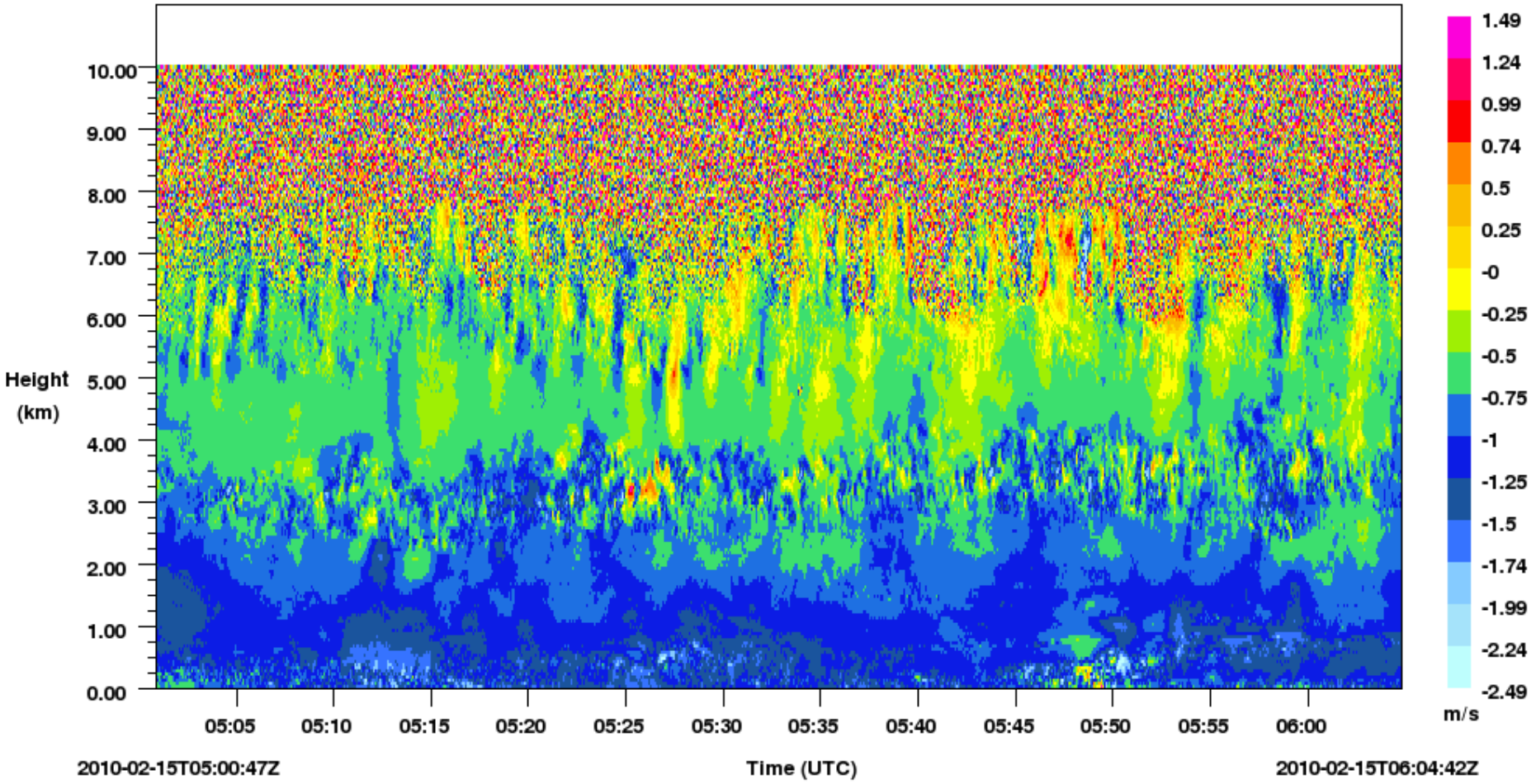


The XPR detects fine scale structures not seen in either MAX or 915 (if if had been healthy).

front

[TSC: 10 m/s x 3900 s = 39 km]

XPR velocity (W), 0600 - 0605 UTC

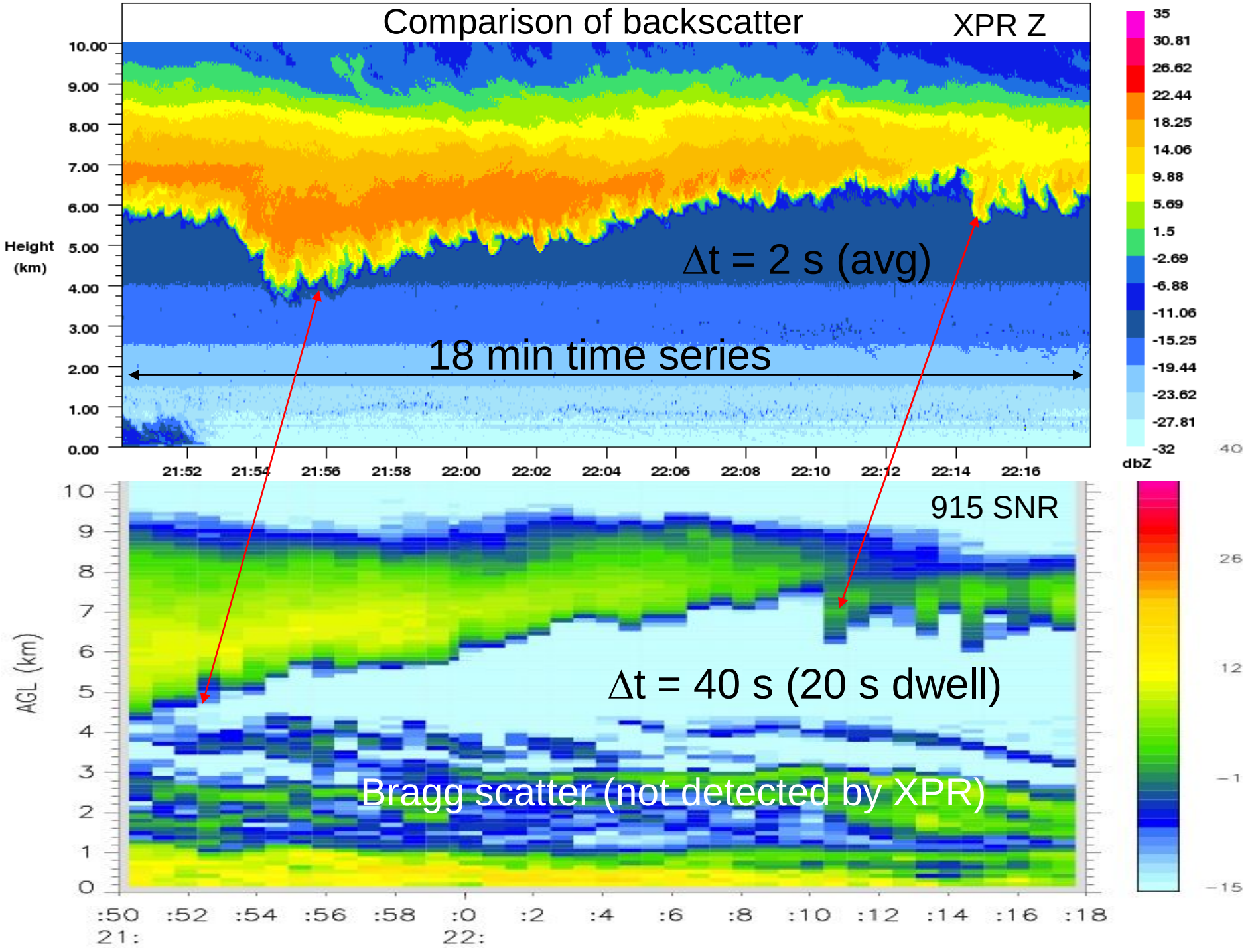


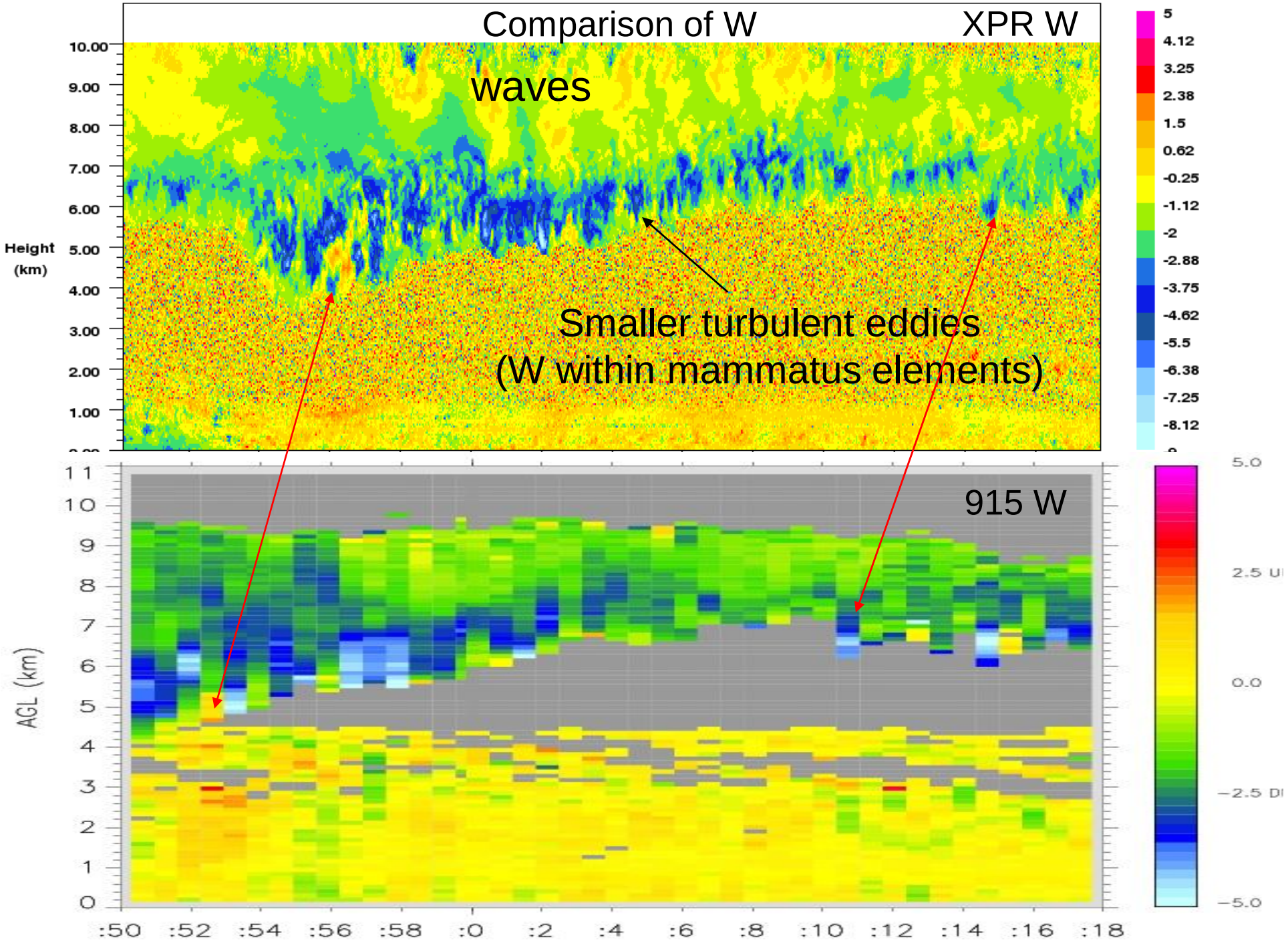
PRF = 1200 Hz, 250 pulses averaged, 0.208 s resolution

Here, a running average of 30 samples $\rightarrow$ 6.25 s resolution

Example XPR measurements illustrate the high resolution

- 18 min time series of mammatus formations from an anvil in northern AL
- Wave motions prevailed over the upper anvil region
- Turbulent motions were associated with the mammatus over the lower anvil


Comparison of backscatter
XPR Z
Height (km)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
21:52
21:54
21:56
21:58
22:00
22:02
22:04
22:06
22:08
22:10
22:12
22:14
22:16
Δt = 2 s (avg)
18 min time series
35
30.81
26.62
22.44
18.25
14.06
9.88
5.69
1.5
-2.69
-6.88
-11.06
-15.25
-19.44
-23.62
-27.81
-32
dbZ
40
915 SNR
AGL (km)
10
9
8
7
6
5
4
3
2
1
0
Δt = 40 s (20 s dwell)
Bragg scatter (not detected by XPR)
26
12
−1
−15
:50
21:
:52
:54
:56
:58
:0
22:
:2
:4
:6
:8
:10
:12
:14
:16
:18


Comparison of W
XPR W
waves
Smaller turbulent eddies
(W within mammatus elements)
Height
(km)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
5
4.12
3.25
2.38
1.5
0.62
-0.25
-1.12
-2
-2.88
-3.75
-4.62
-5.5
-6.38
-7.25
-8.12
915 W
AGL (km)
11
10
9
8
7
6
5
4
3
2
1
0
:50
:52
:54
:56
:58
:0
:2
:4
:6
:8
:10
:12
:14
:16
:18
5.0
2.5
0.0
−2.5
−5.0

Questions?