HAMSR and MERRA Data Comparisons

for

HAMSR−L2−20100916T131219−20100917T141145−v01

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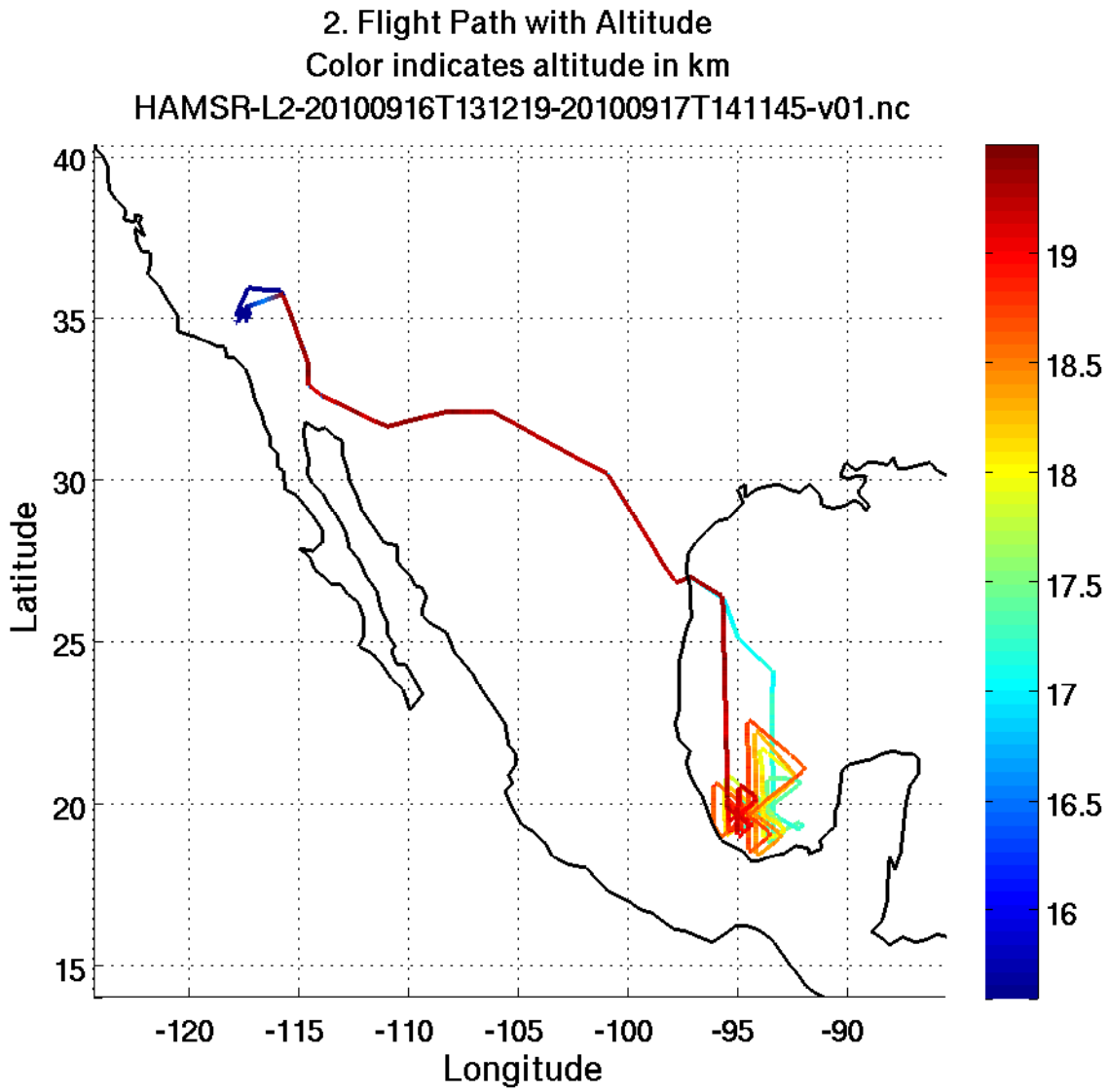
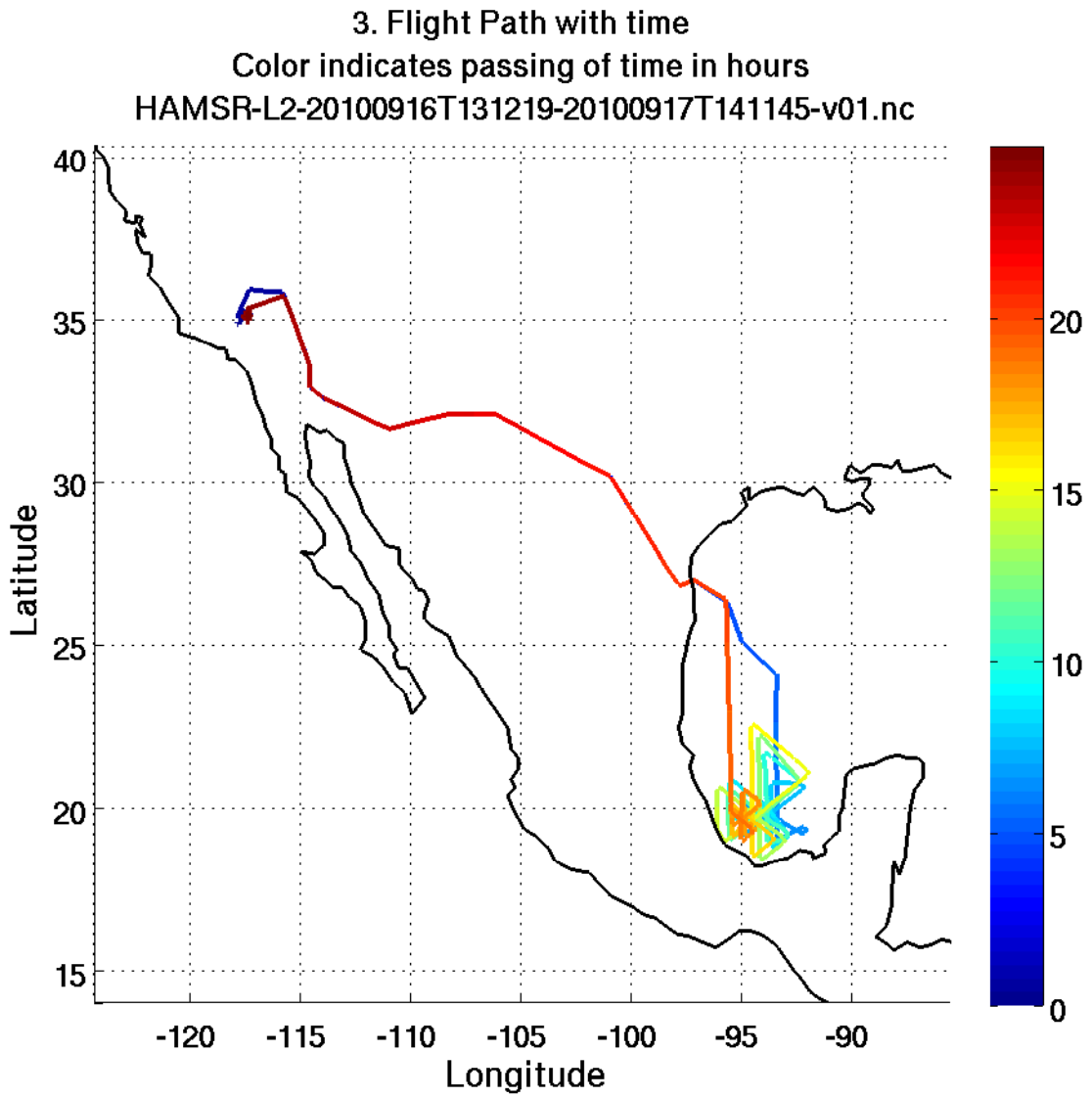
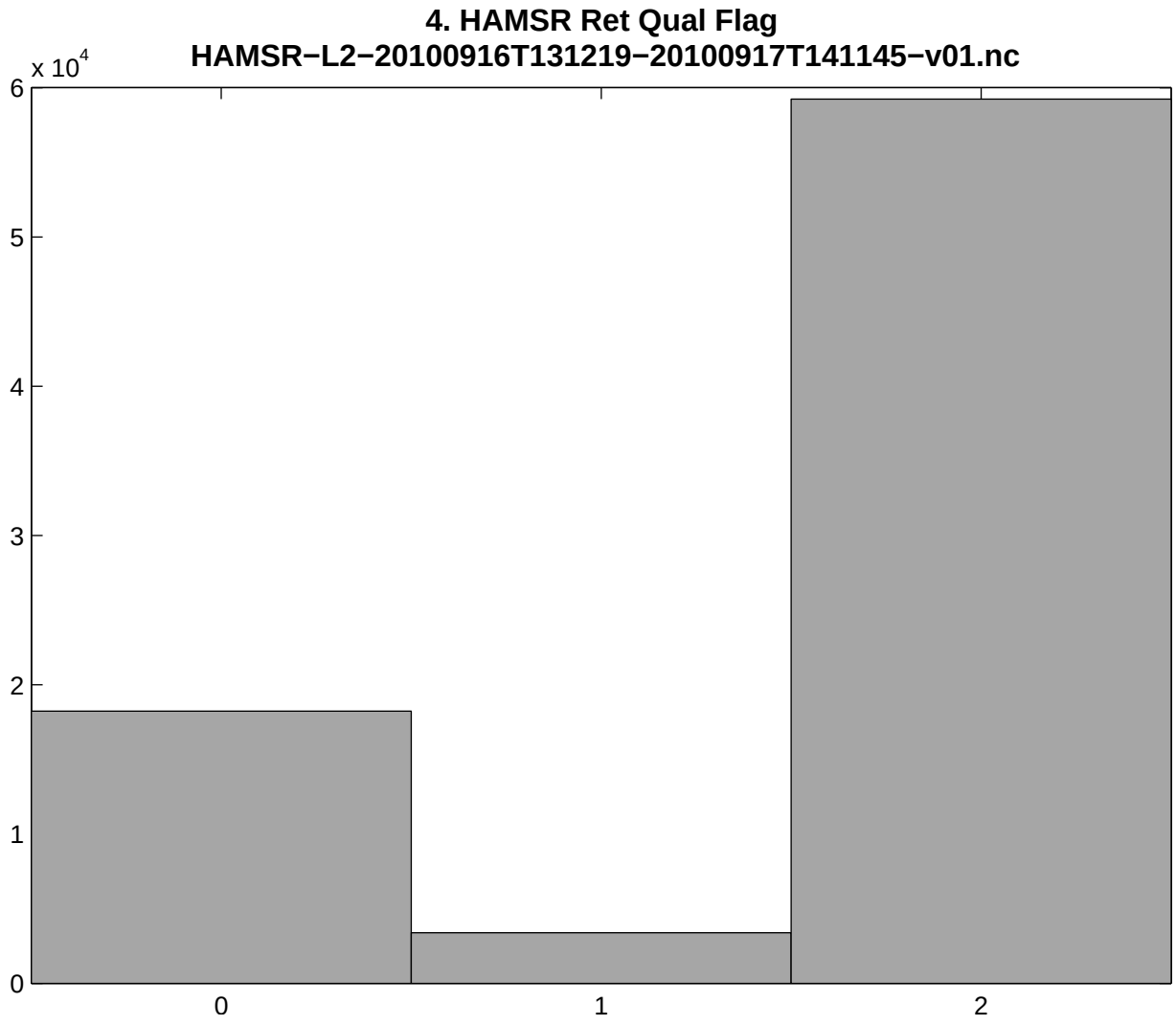
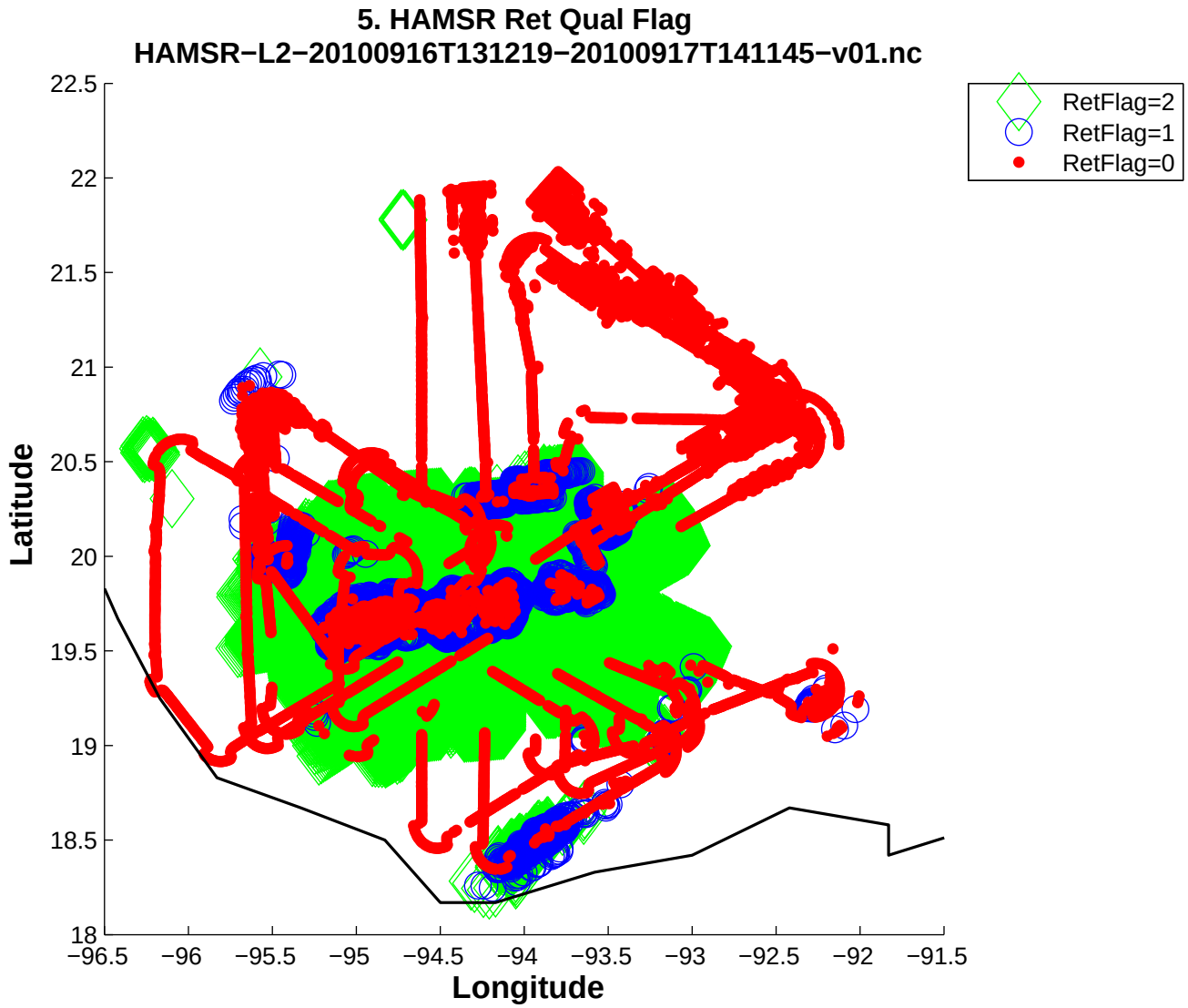
1. Executive Summary

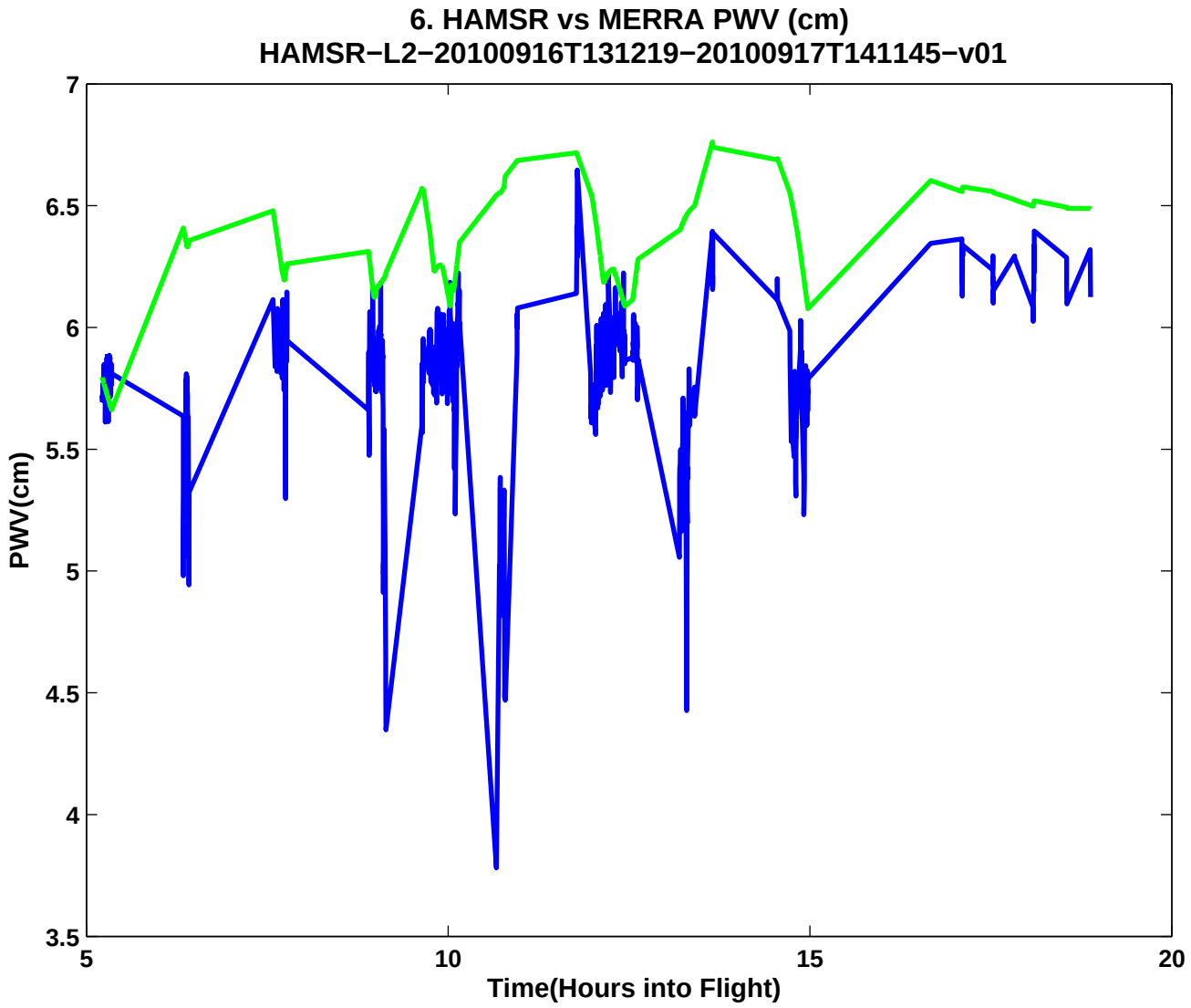
The HAMSR L2 retrieved temperature and moisture profiles are compared with interpolated MERRA simulation with satisfactory results dispite the large differences in spatial resolution between the two data sets for Hurricane Karl. Hurricane Karl hit the Golf of Maxico on Sept 16 and Sept 17 2010. The rms temperature difference is within 4K in the lower tropsphere and decreasing to 2K in the upper troposphere. Mean temperature difference is within +/− 2K throughout the troposphere. gradually decreasing to 5K in the upper troposphere. The rms and mean relative humidity difference curves resemble that of a pitcher in a picture with a minimum of +/− 5%, respectively, at 850 mb. The difference increases higher up in the troposphere with a maximum nearly +/− 50% for the rms and the bias, respectively.

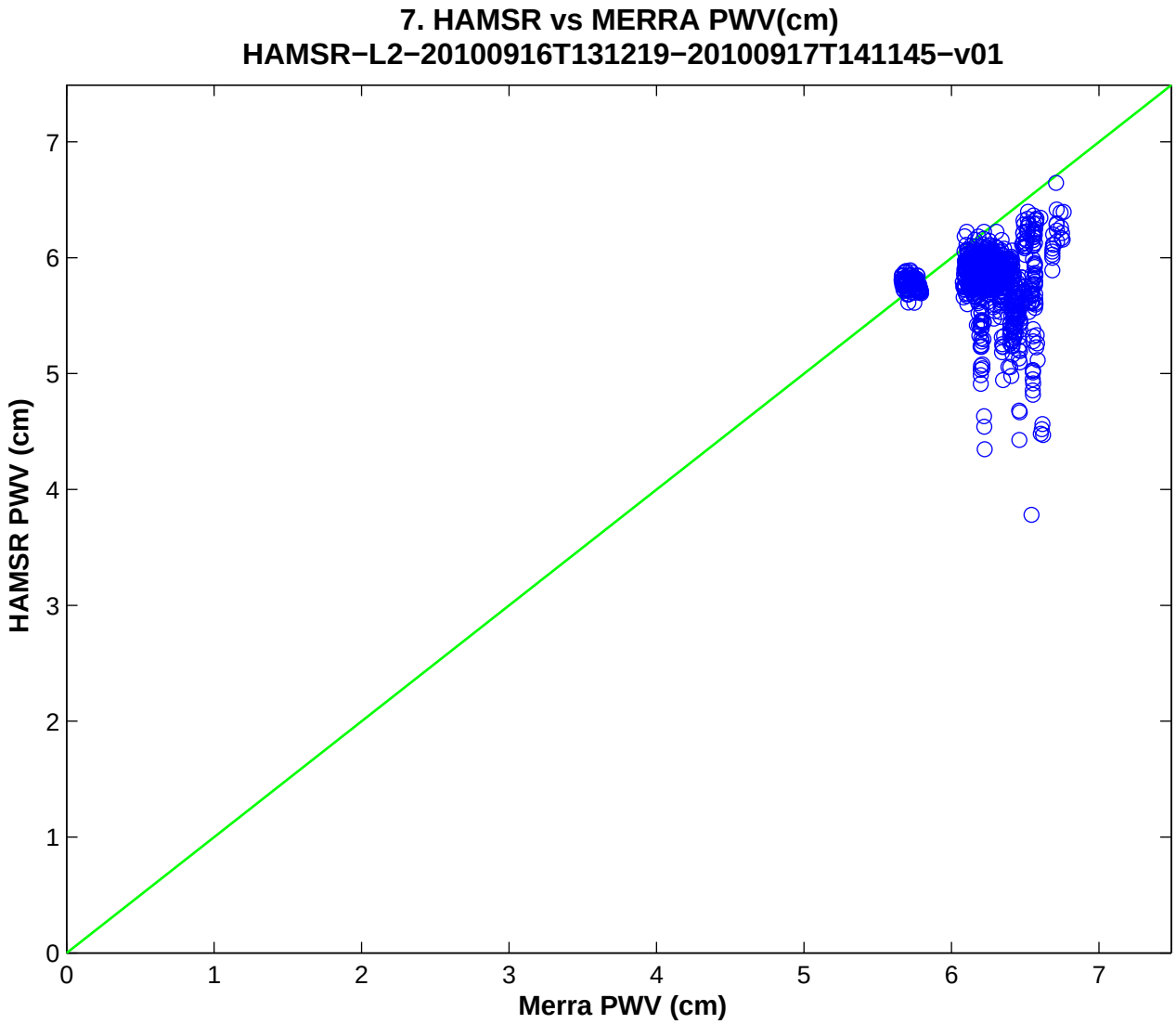

2. Flight Path with Altitude
Color indicates altitude in km
HAMSR-L2-20100916T131219-20100917T141145-v01.nc
Latitude
Longitude
40
35
30
25
20
15
-120
-115
-110
-105
-100
-95
-90
19
18.5
18
17.5
17
16.5
16

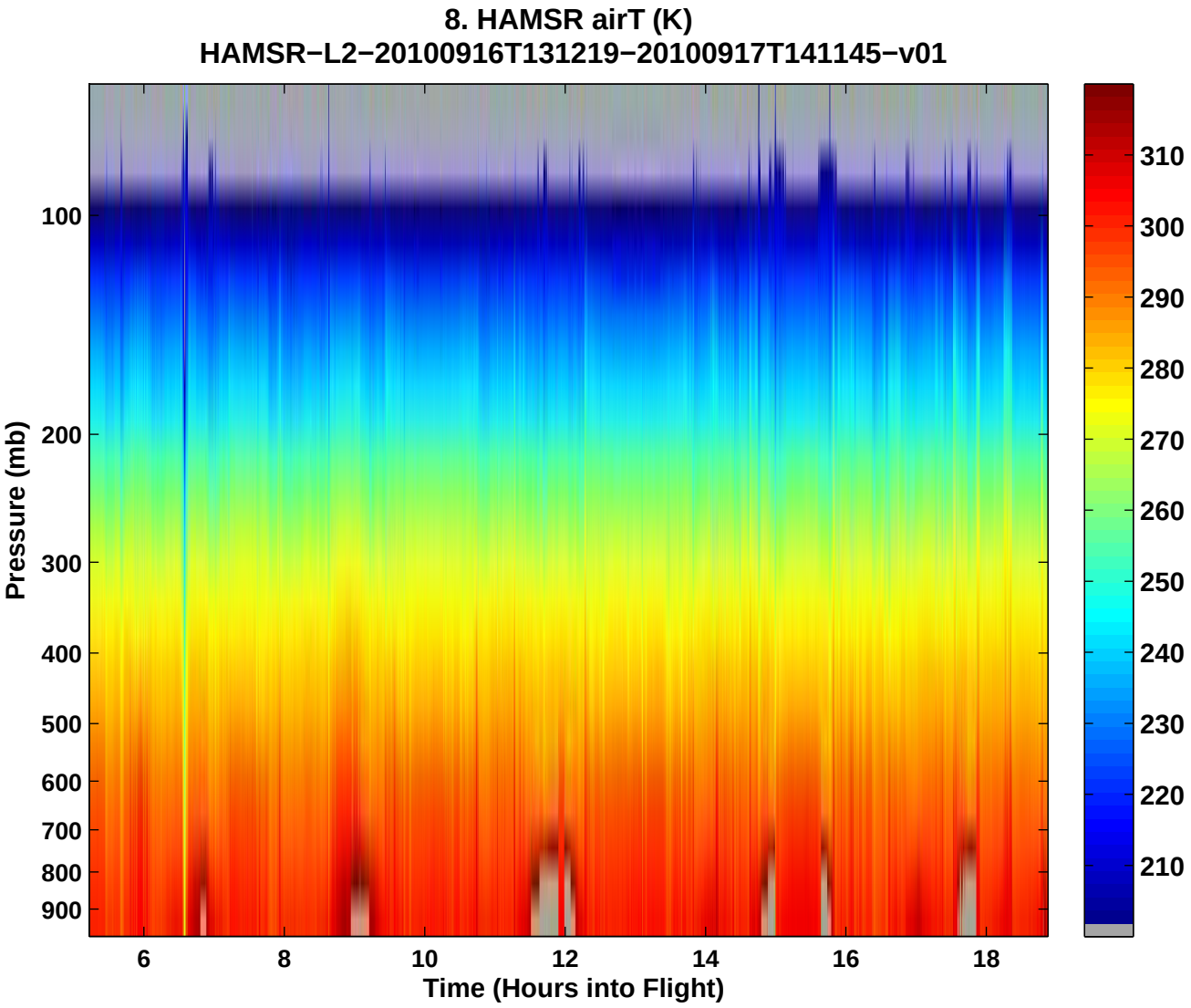

3. Flight Path with time
Color indicates passing of time in hours
HAMSR-L2-20100916T131219-20100917T141145-v01.nc
Latitude
Longitude
40
35
30
25
20
15
-120
-115
-110
-105
-100
-95
-90
20
15
10
5
0

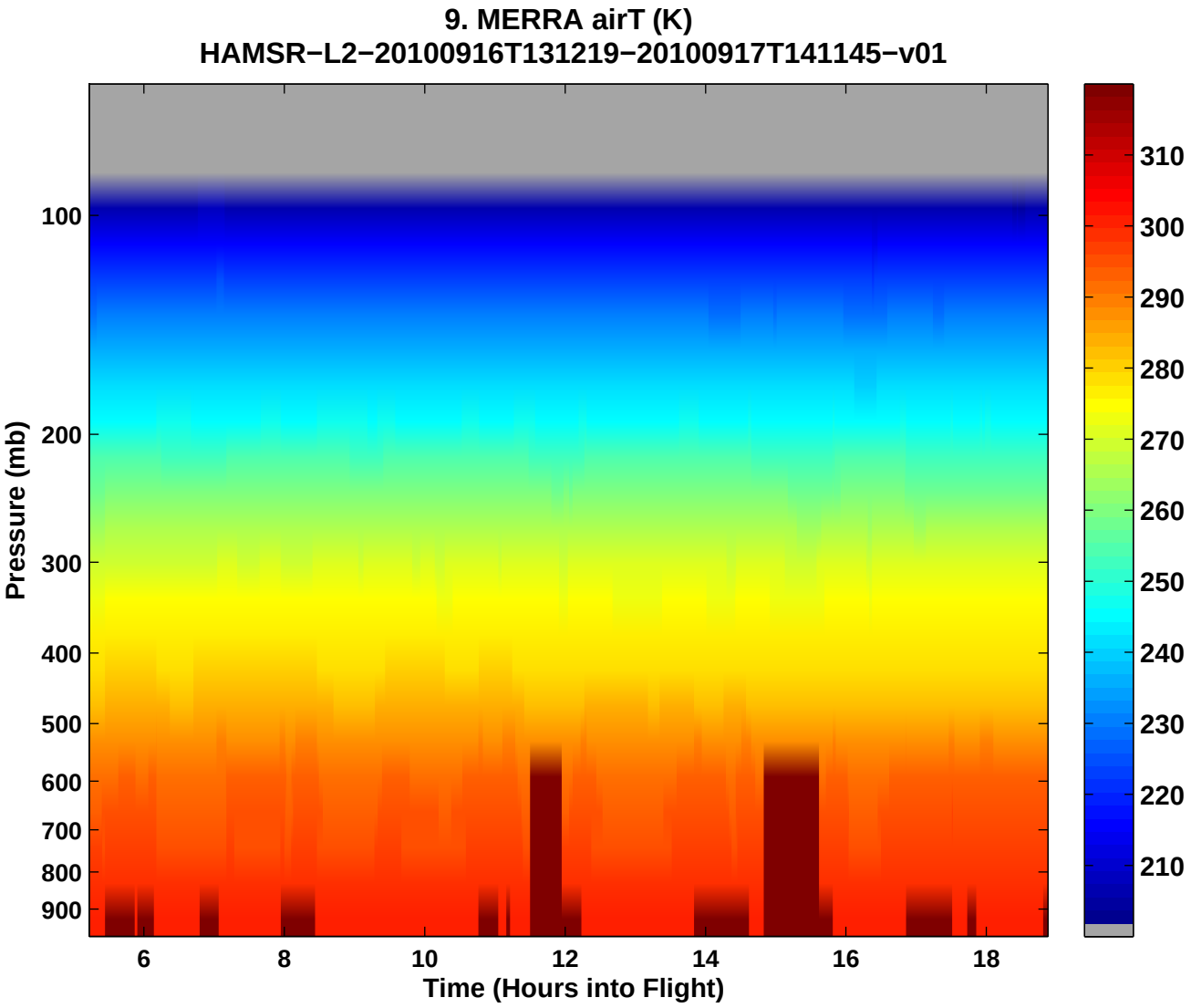

4. HAMSR Ret Qual Flag
HAMSR−L2−20100916T131219−20100917T141145−v01.nc
x 10^4
6
5
4
3
2
1
0
0
1
2

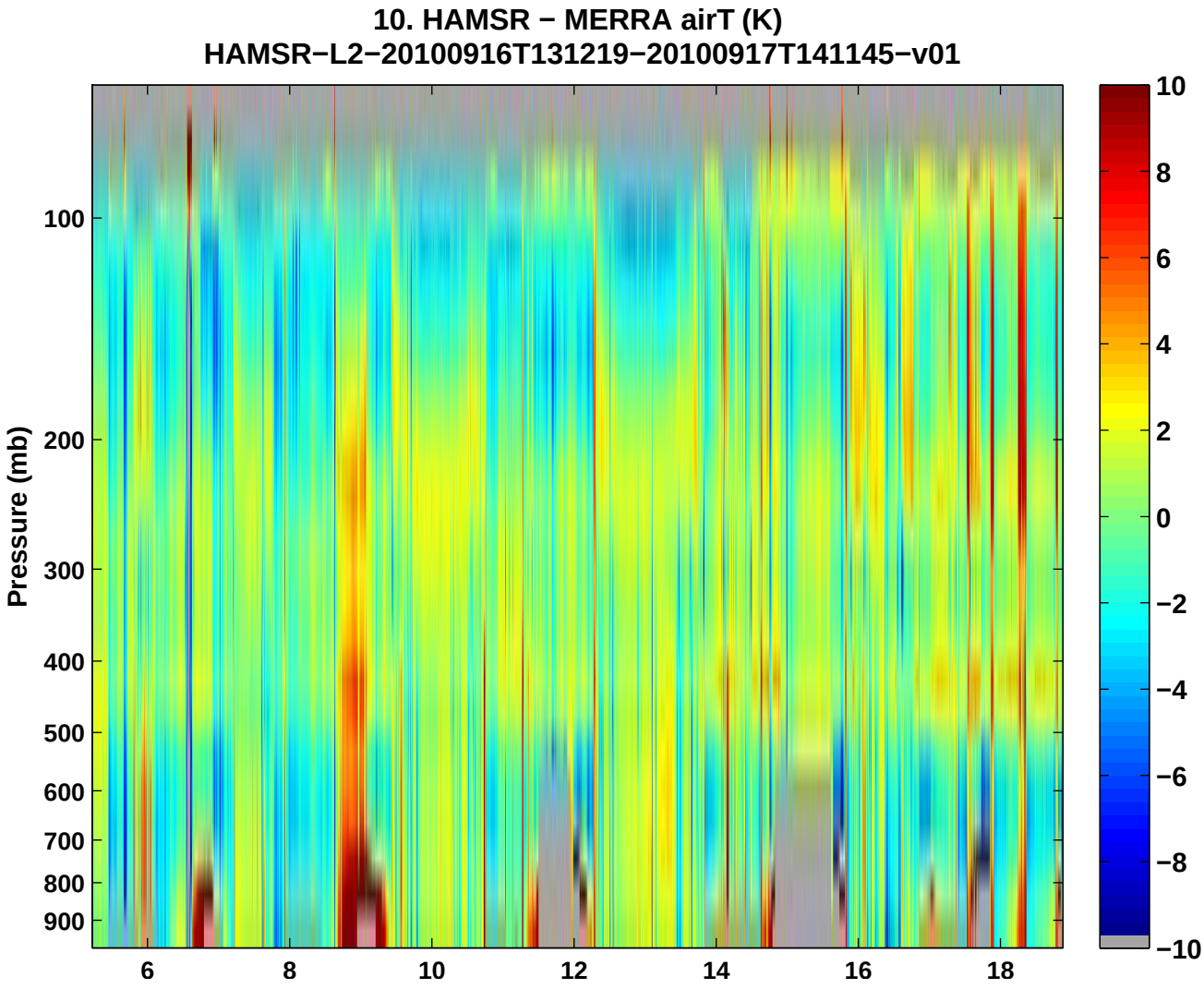

5. HAMSR Ret Qual Flag
HAMSR−L2−20100916T131219−20100917T141145−v01.nc
RetFlag=2
RetFlag=1
RetFlag=0
Latitude
Longitude
22.5
22
21.5
21
20.5
20
19.5
19
18.5
18
−96.5
−96
−95.5
−95
−94.5
−94
−93.5
−93
−92.5
−92
−91.5

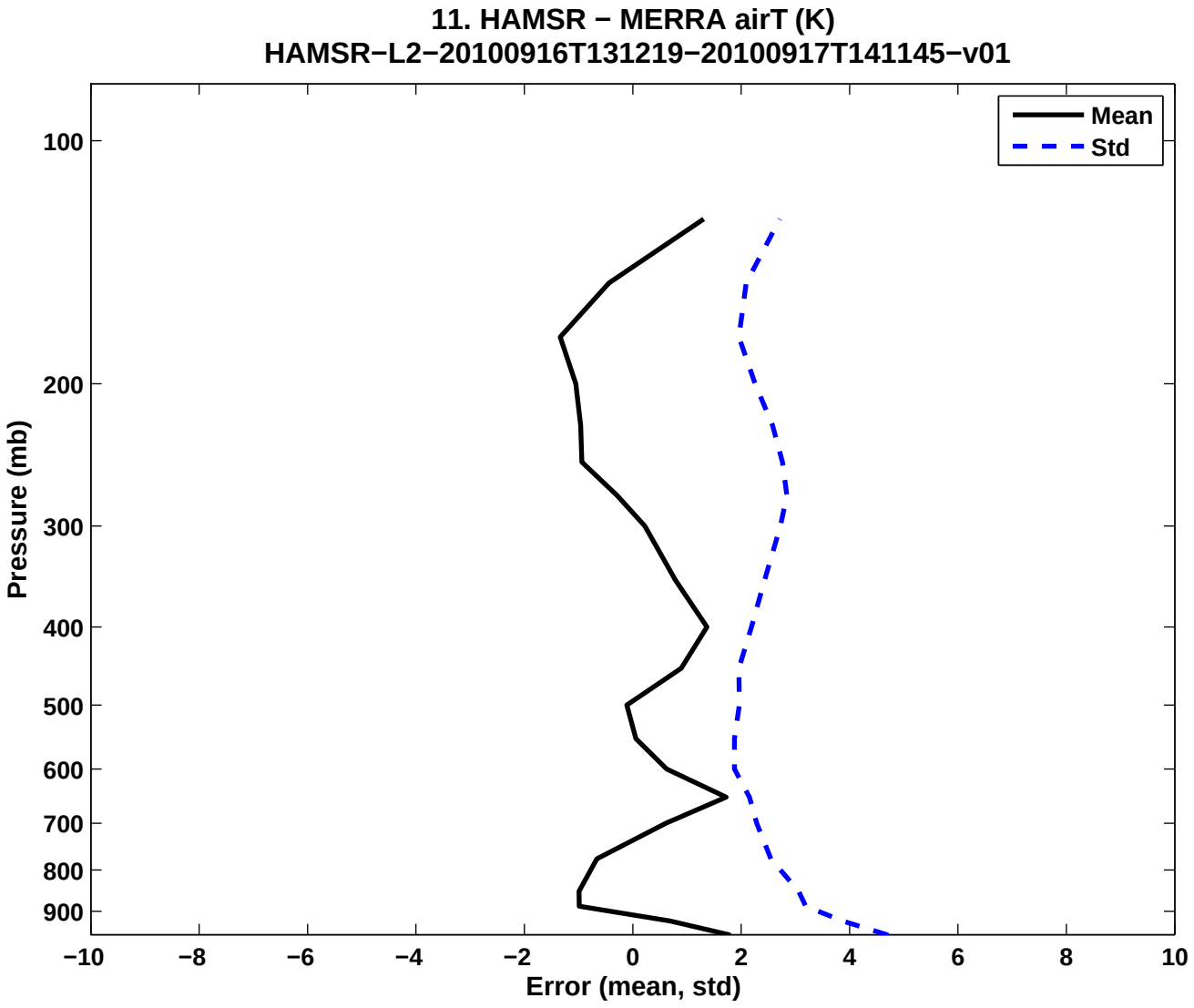

6. HAMSR vs MERRA PWV (cm)
HAMSR−L2−20100916T131219−20100917T141145−v01
PWV(cm)
Time(Hours into Flight)
7
6.5
6
5.5
5
4.5
4
3.5
5
10
15
20

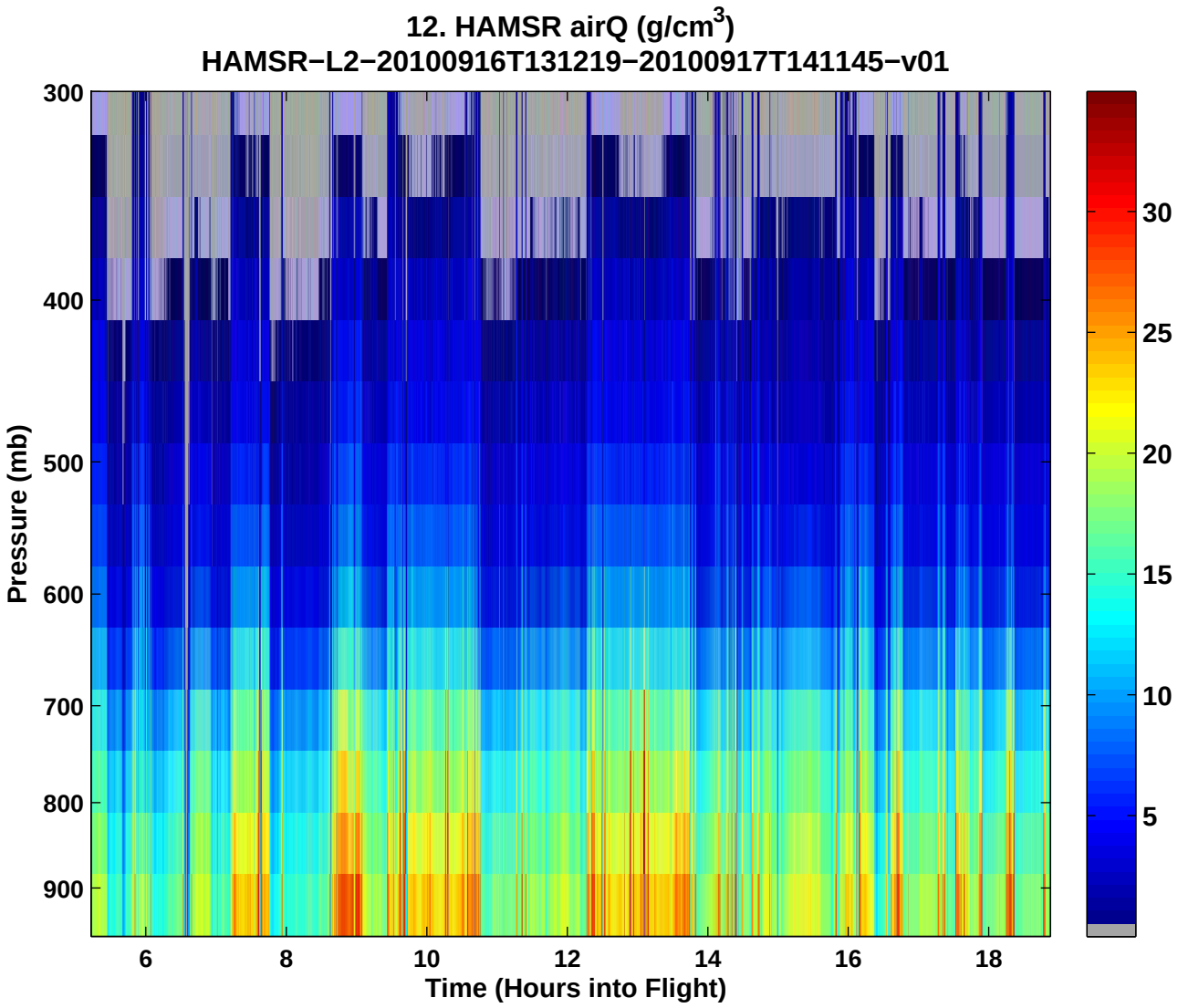

7. HAMSR vs MERRA PWV(cm)
HAMSR−L2−20100916T131219−20100917T141145−v01
HAMSR PWV (cm)
Merra PWV (cm)
0
1
2
3
4
5
6
7

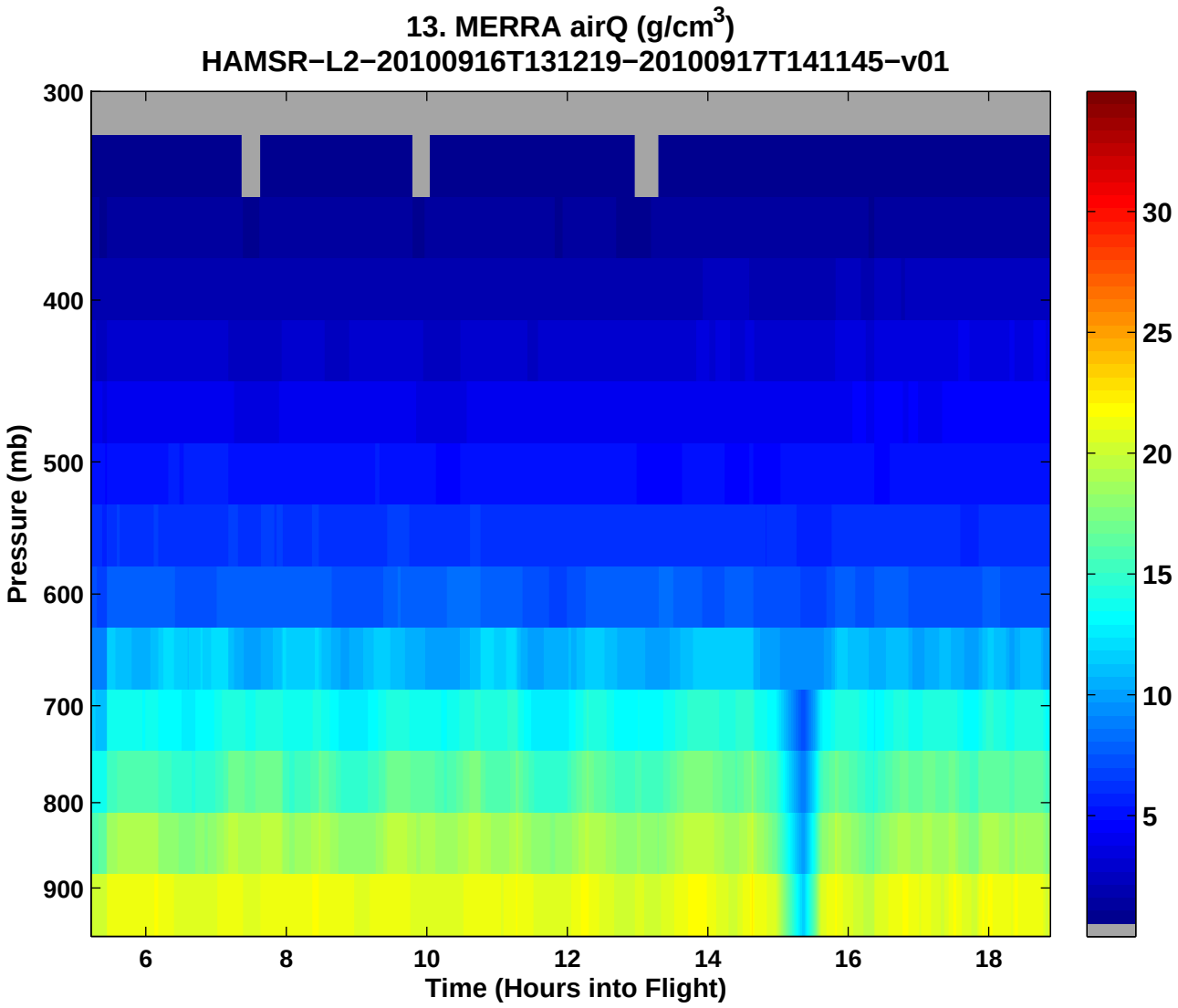

8. HAMSR airT (K)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
100
200
300
400
500
600
700
800
900
6
8
10
12
14
16
18
Time (Hours into Flight)
310
300
290
280
270
260
250
240
230
220
210

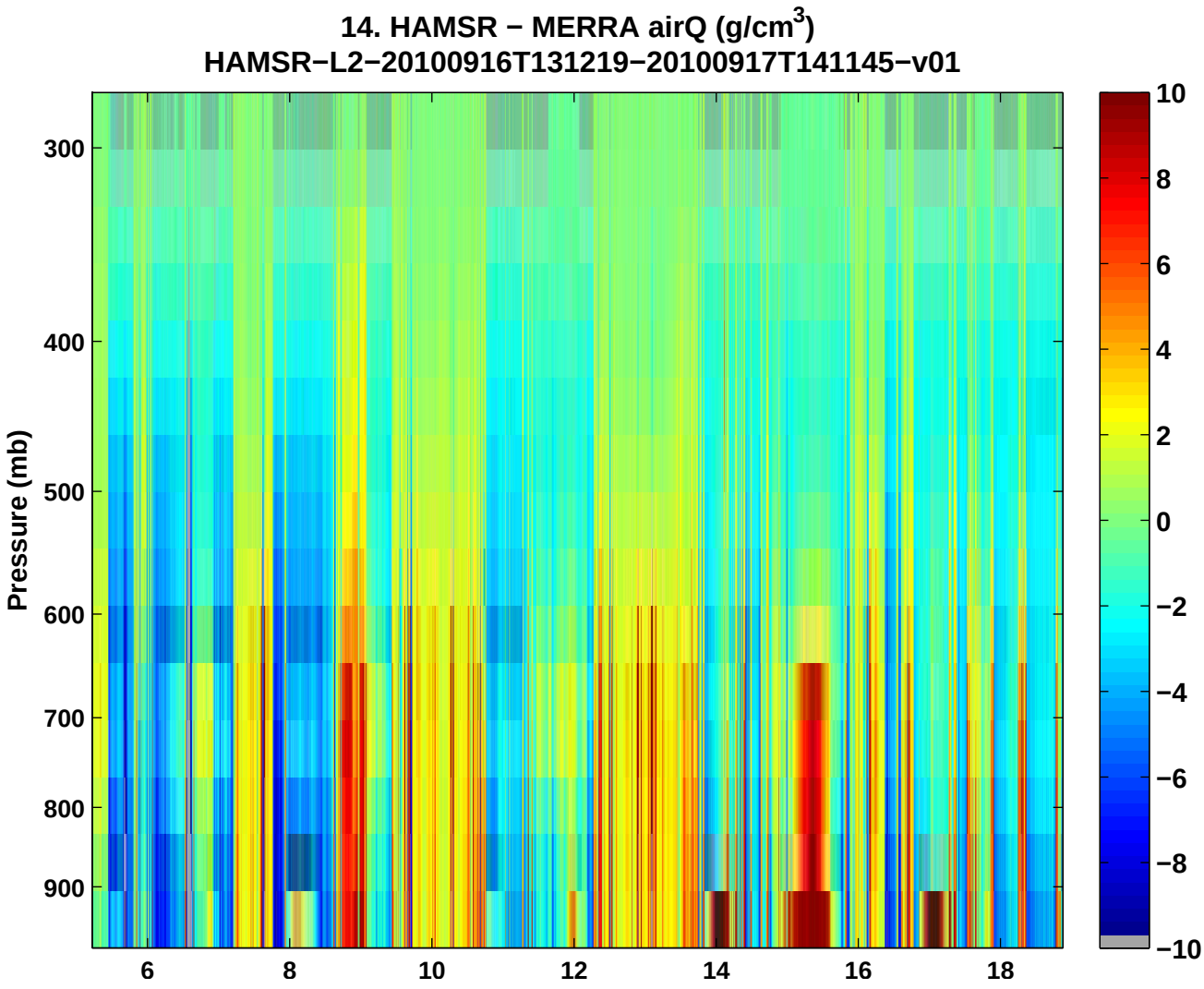

9. MERRA airT (K)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
100
200
300
400
500
600
700
800
900
6
8
10
12
14
16
18
Time (Hours into Flight)
310
300
290
280
270
260
250
240
230
220
210

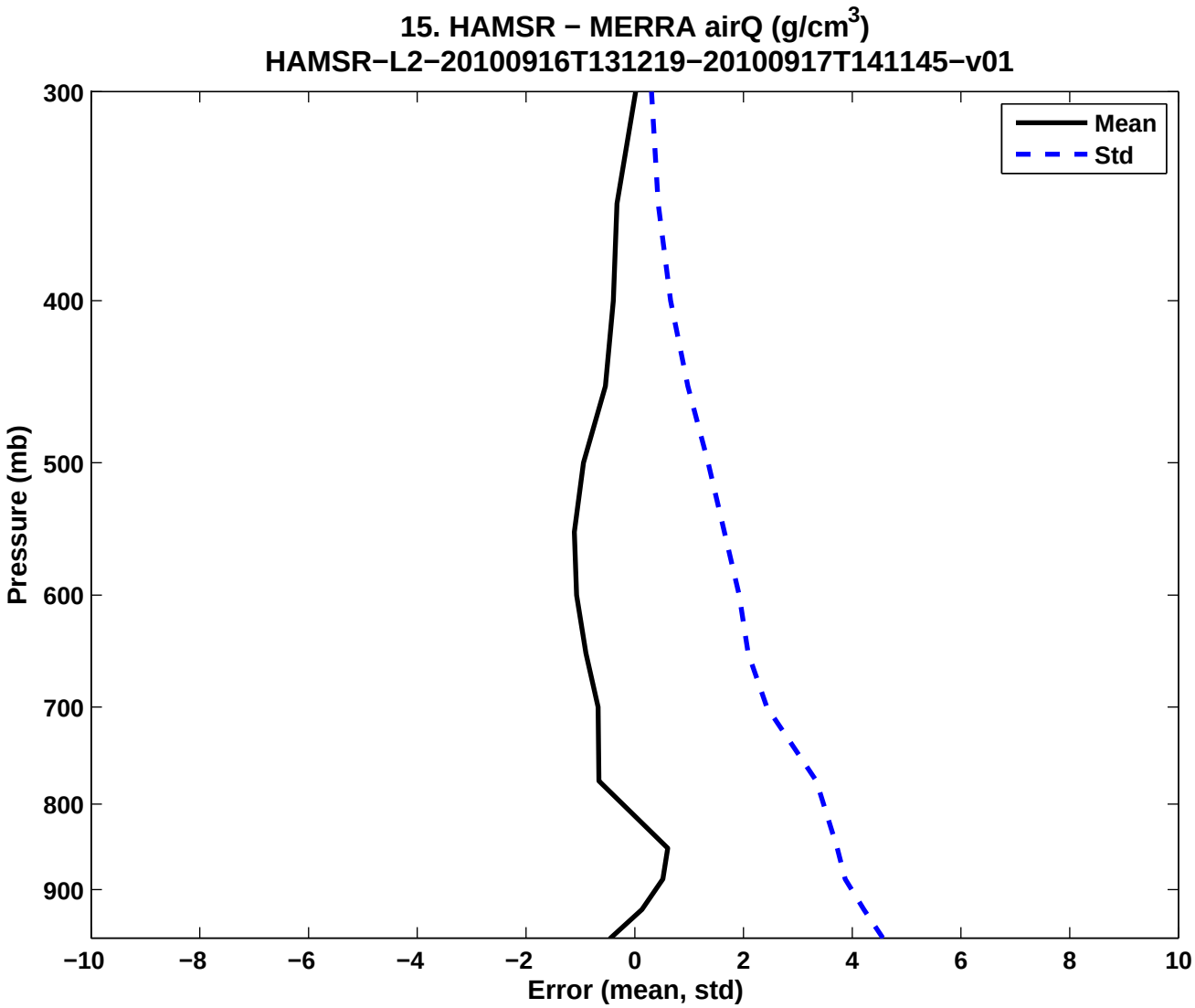

10. HAMSR − MERRA airT (K)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
100
200
300
400
500
600
700
800
900
6
8
10
12
14
16
18
10
8
6
4
2
0
−2
−4
−6
−8
−10

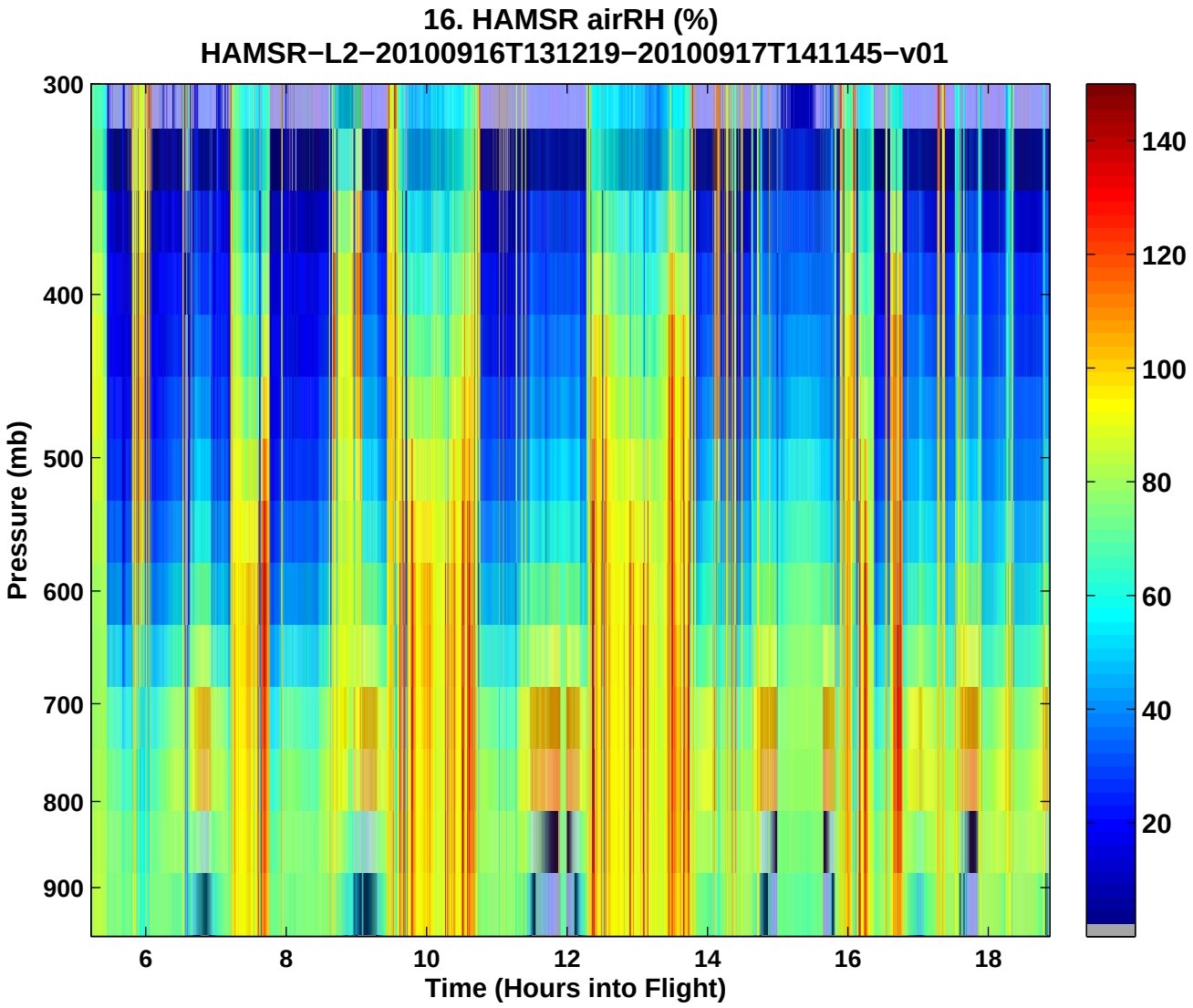

11. HAMSR − MERRA airT (K)
HAMSR−L2−20100916T131219−20100917T141145−v01
Mean
Std
Pressure (mb)
100
200
300
400
500
600
700
800
900
−10
−8
−6
−4
−2
0
2
4
6
8
10
Error (mean, std)

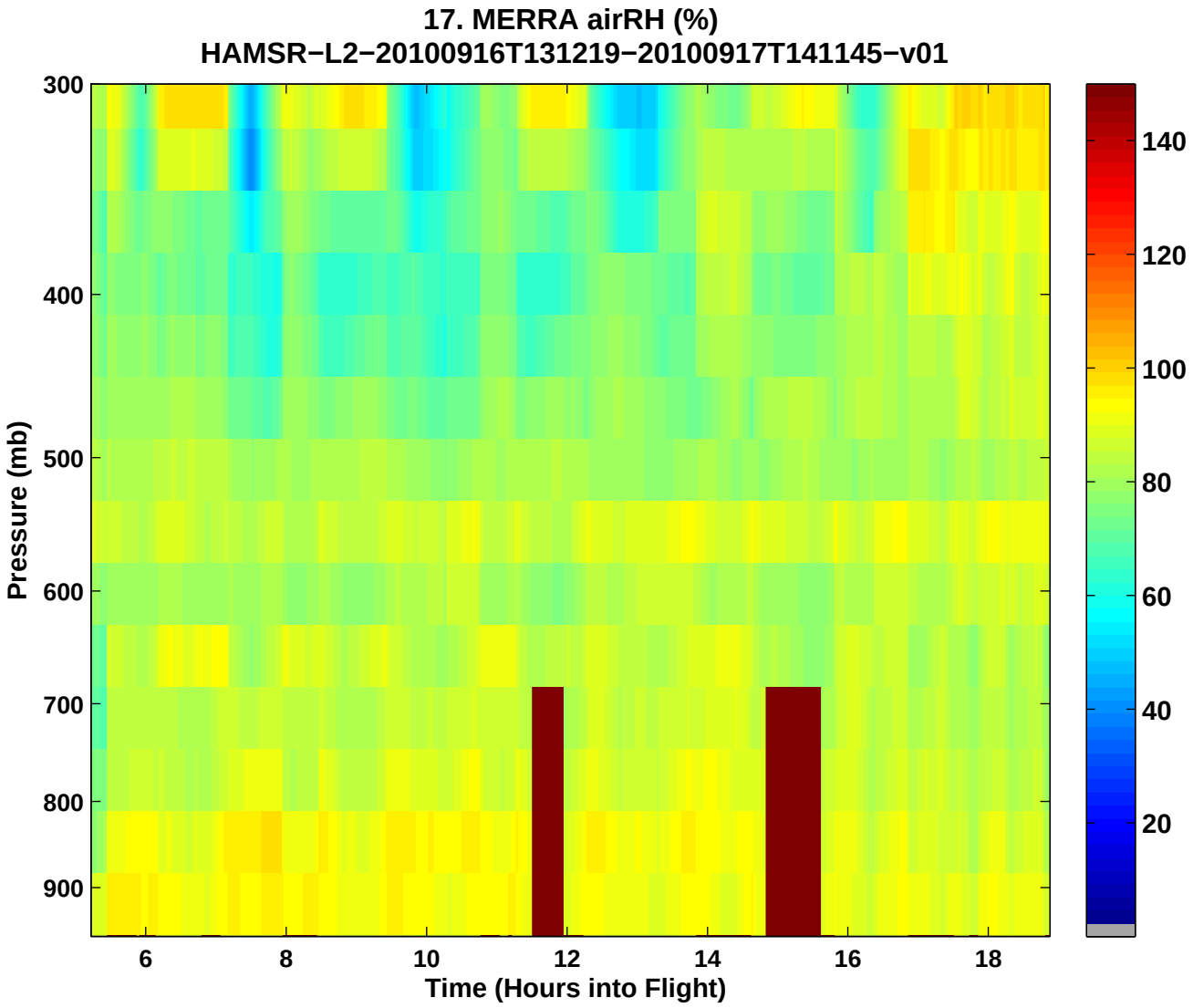

12. HAMSR airQ (g/cm3)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
300
400
500
600
700
800
900
6
8
10
12
14
16
18
Time (Hours into Flight)
30
25
20
15
10
5

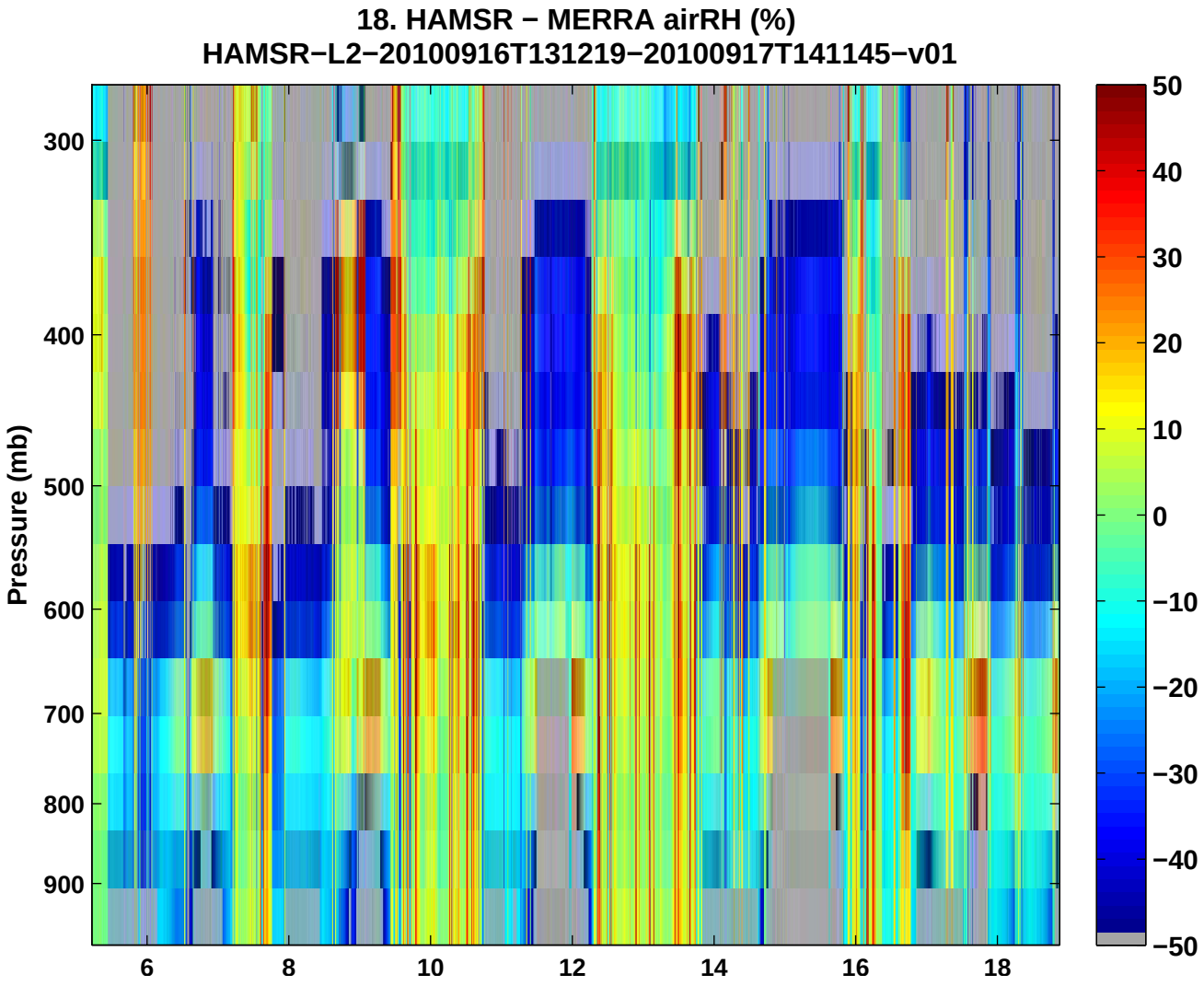

13. MERRA airQ (g/cm3)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
300
400
500
600
700
800
900
6
8
10
12
14
16
18
Time (Hours into Flight)
30
25
20
15
10
5

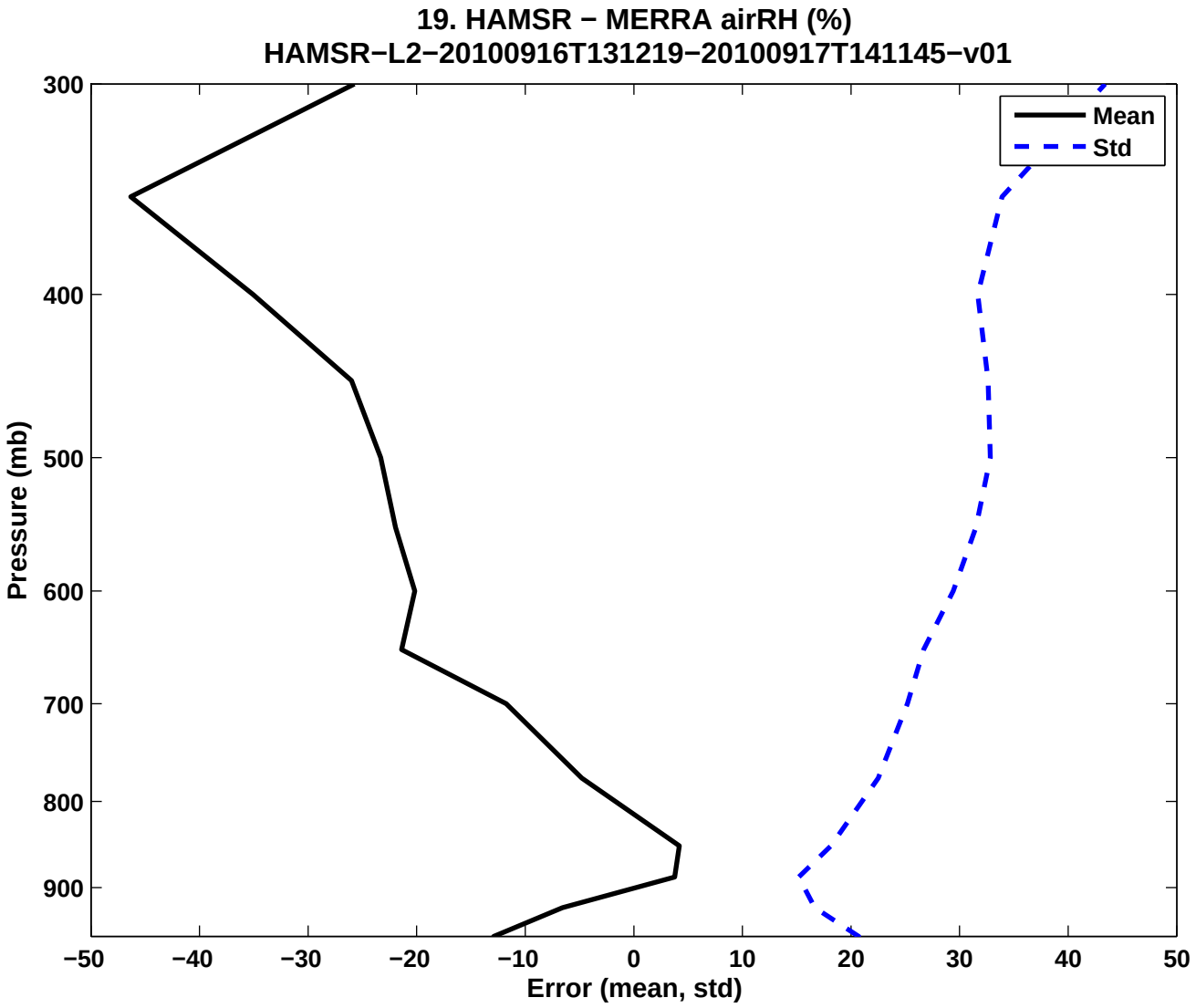

14. HAMSR − MERRA airQ (g/cm3)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
300
400
500
600
700
800
900
6
8
10
12
14
16
18
10
8
6
4
2
0
−2
−4
−6
−8
−10

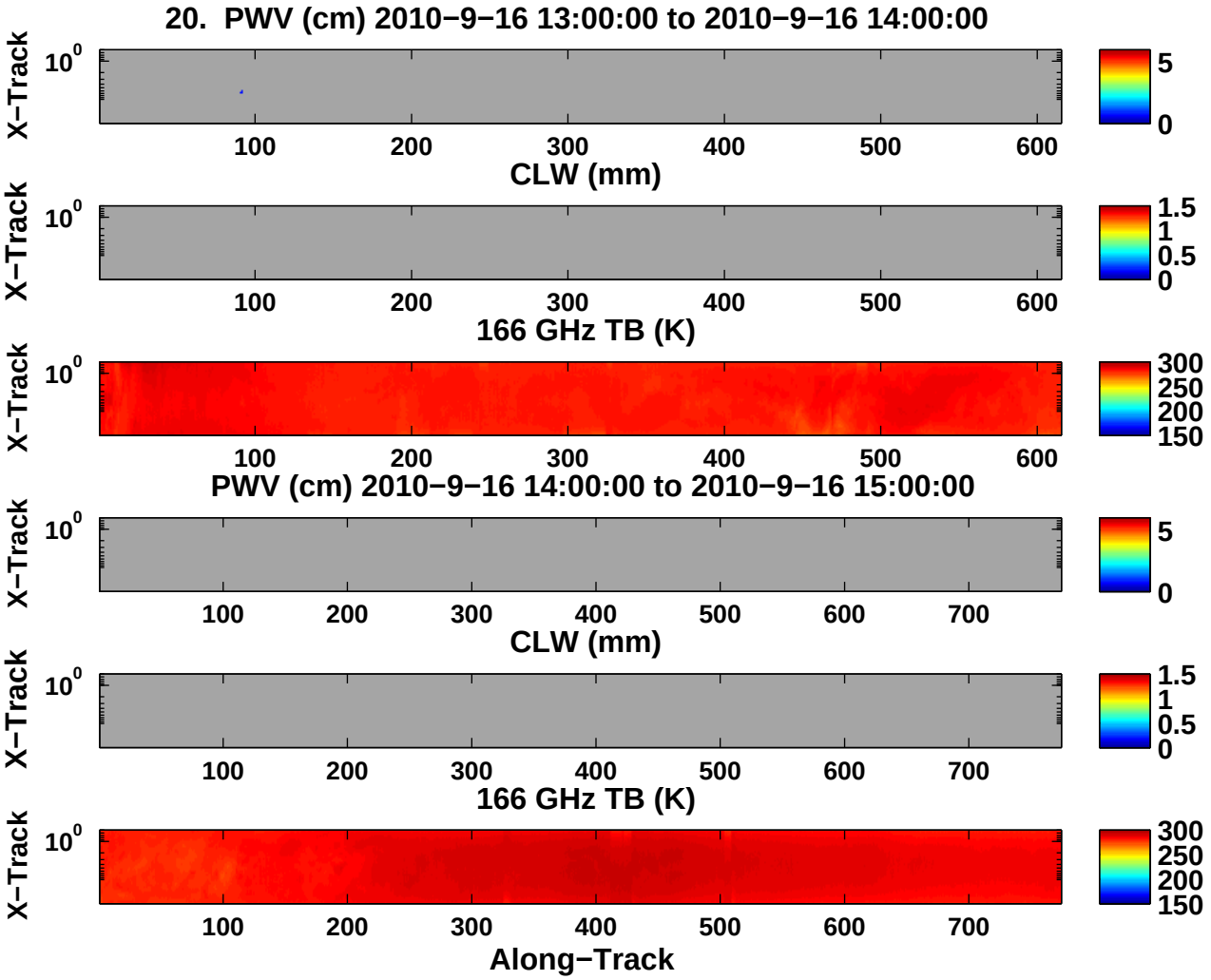

15. HAMSR − MERRA airQ (g/cm3)
HAMSR−L2−20100916T131219−20100917T141145−v01
Mean
Std
Pressure (mb)
300
400
500
600
700
800
900
−10
−8
−6
−4
−2
0
2
4
6
8
10
Error (mean, std)

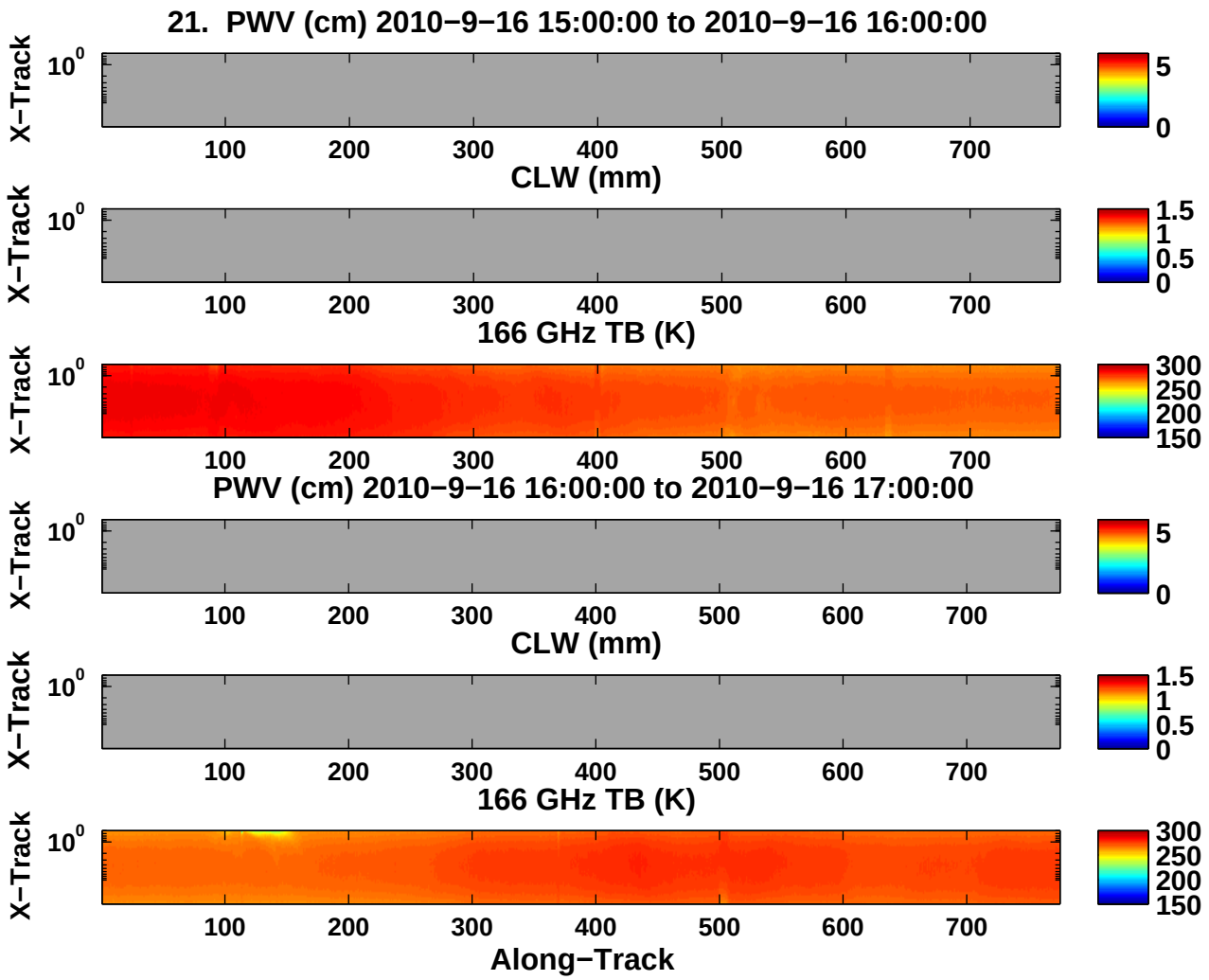

16. HAMSR airRH (%)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
300
400
500
600
700
800
900
6
8
10
12
14
16
18
Time (Hours into Flight)
140
120
100
80
60
40
20

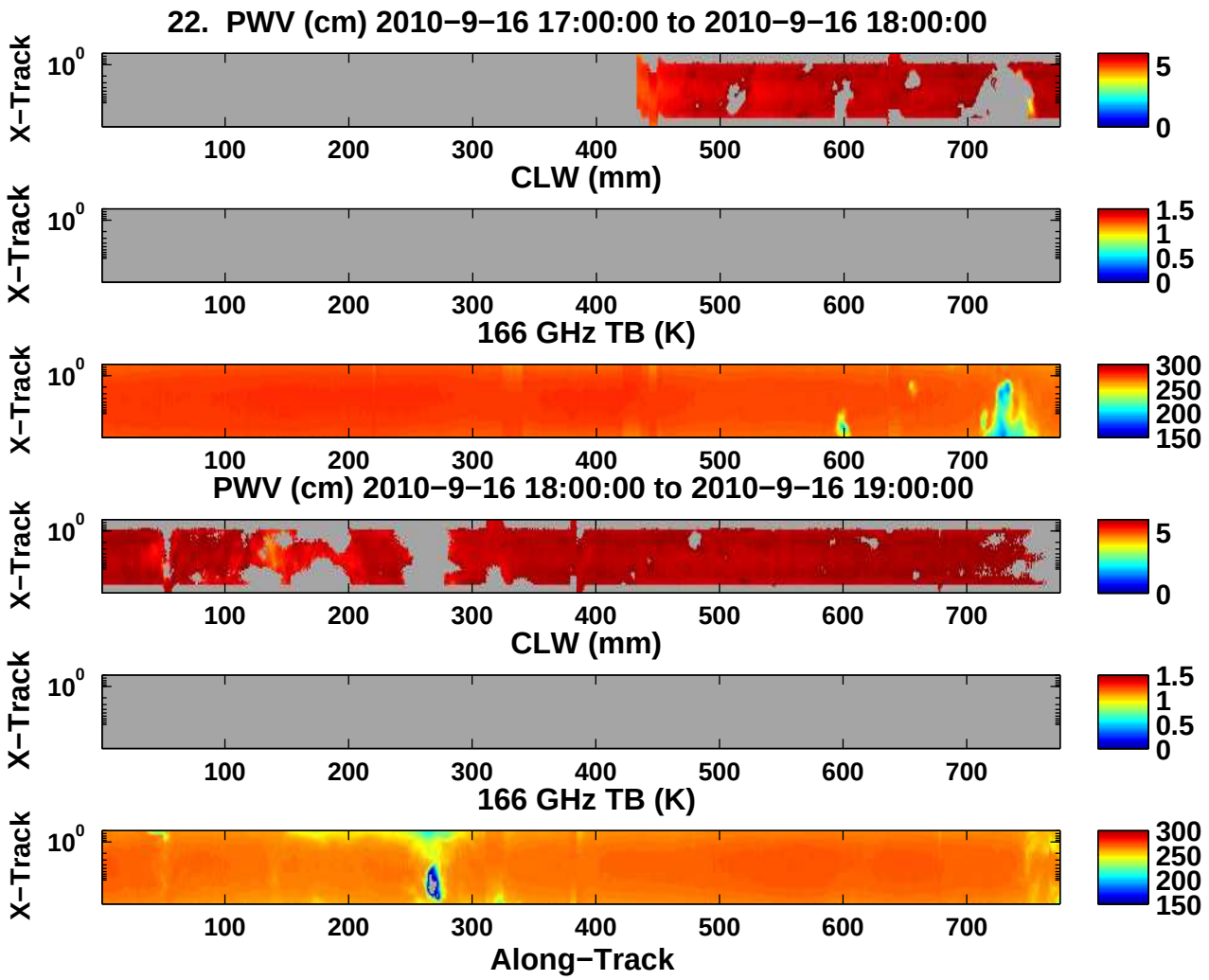

17. MERRA airRH (%)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
300
400
500
600
700
800
900
6
8
10
12
14
16
18
Time (Hours into Flight)
140
120
100
80
60
40
20

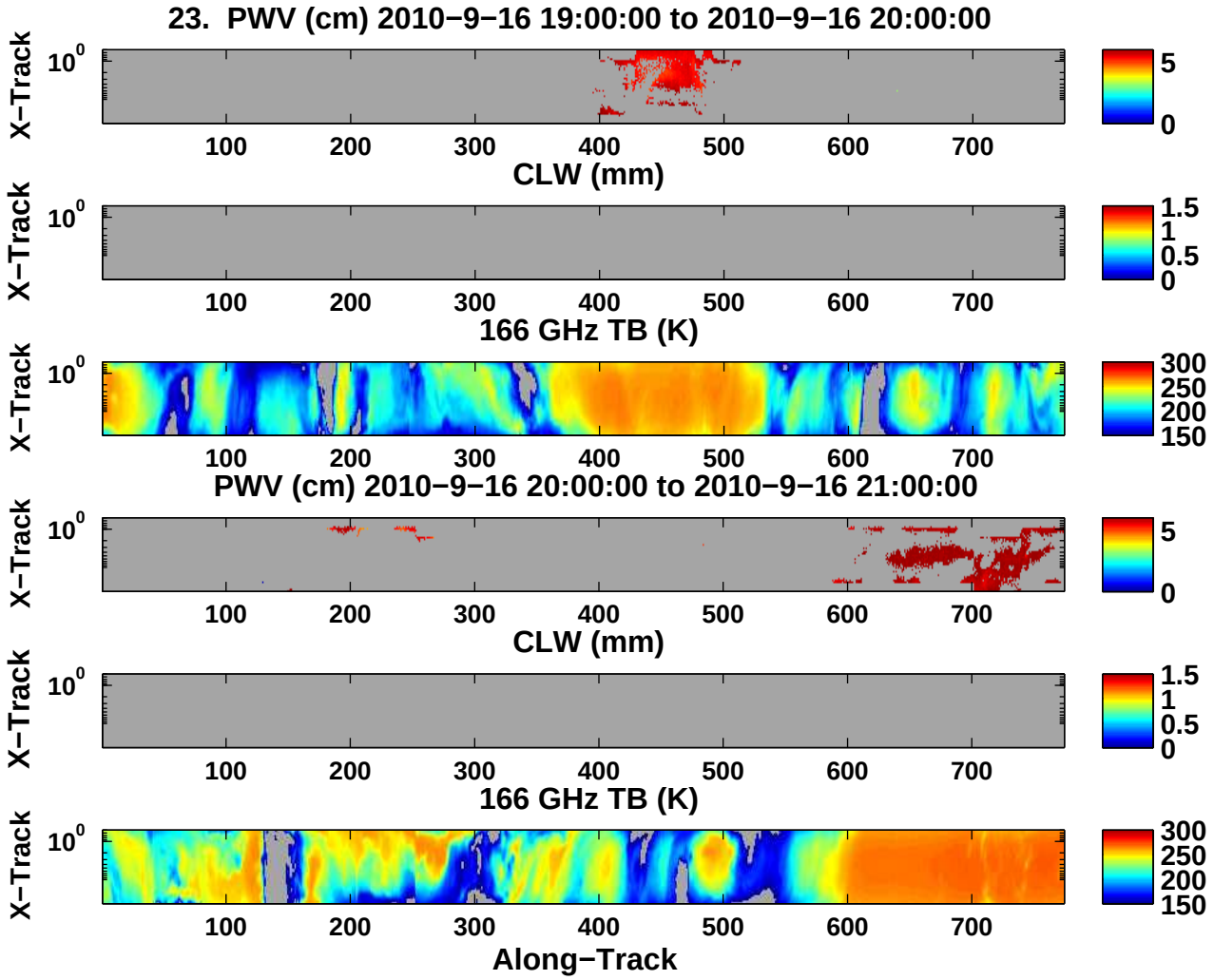

18. HAMSR − MERRA airRH (%)
HAMSR−L2−20100916T131219−20100917T141145−v01
Pressure (mb)
300
400
500
600
700
800
900
6
8
10
12
14
16
18
50
40
30
20
10
0
−10
−20
−30
−40
−50

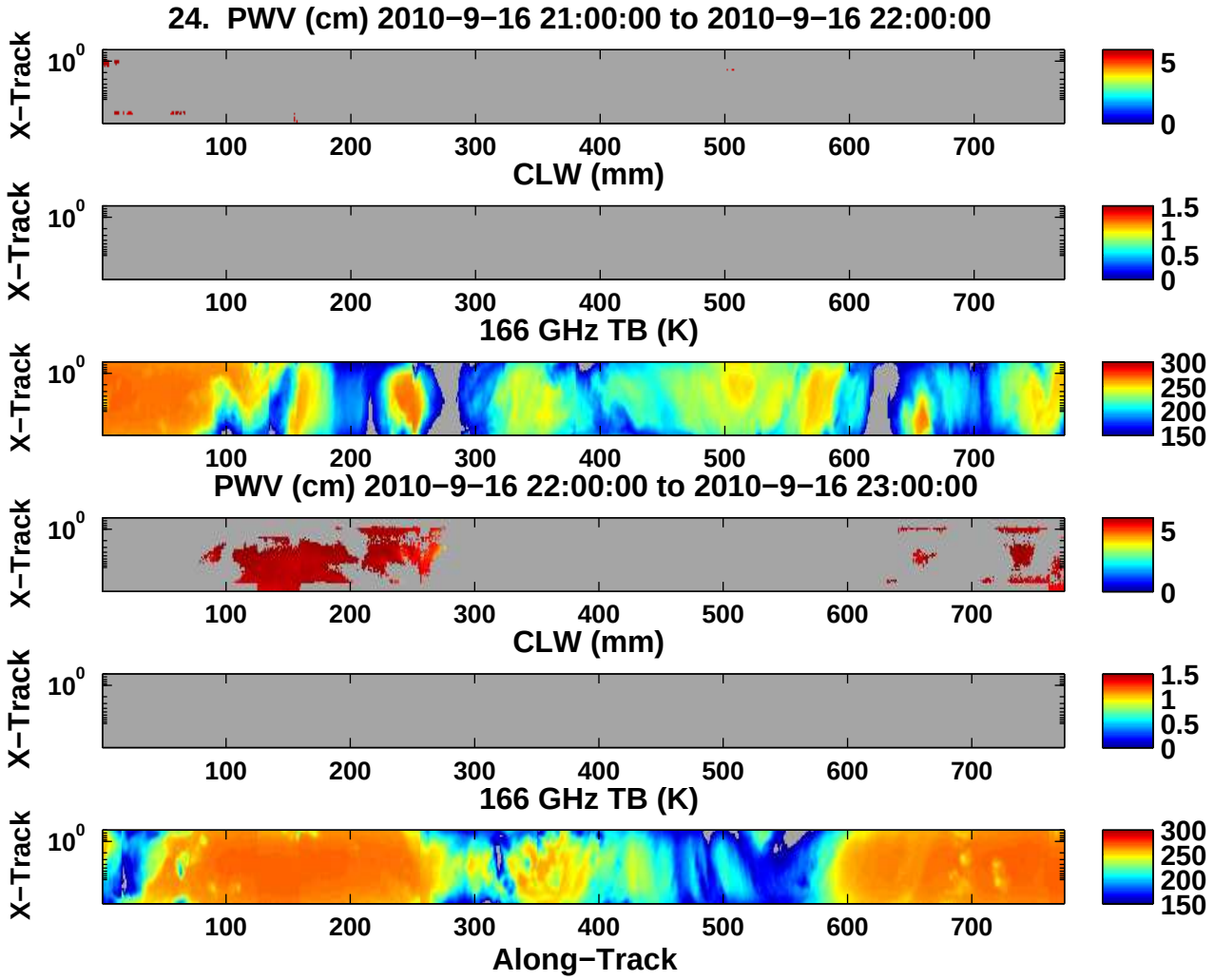

19. HAMSR − MERRA airRH (%)
HAMSR−L2−20100916T131219−20100917T141145−v01
Mean
Std
Pressure (mb)
300
400
500
600
700
800
900
−50
−40
−30
−20
−10
0
10
20
30
40
50
Error (mean, std)

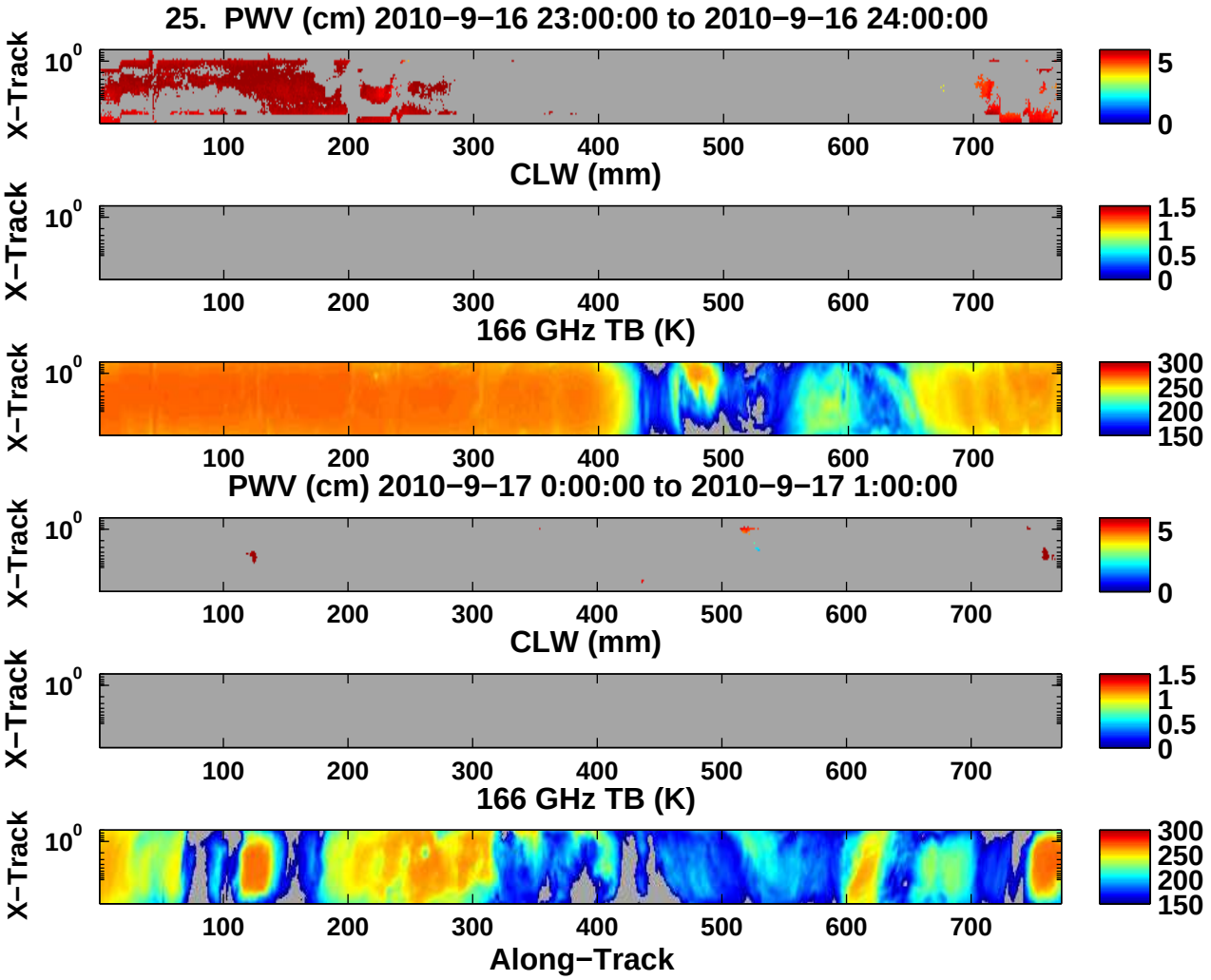

20. PWV (cm) 2010−9−16 13:00:00 to 2010−9−16 14:00:00
X−Track
10^0
100
200
300
400
500
600
5
0
CLW (mm)
1.5
1
0.5
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−16 14:00:00 to 2010−9−16 15:00:00
700
Along−Track

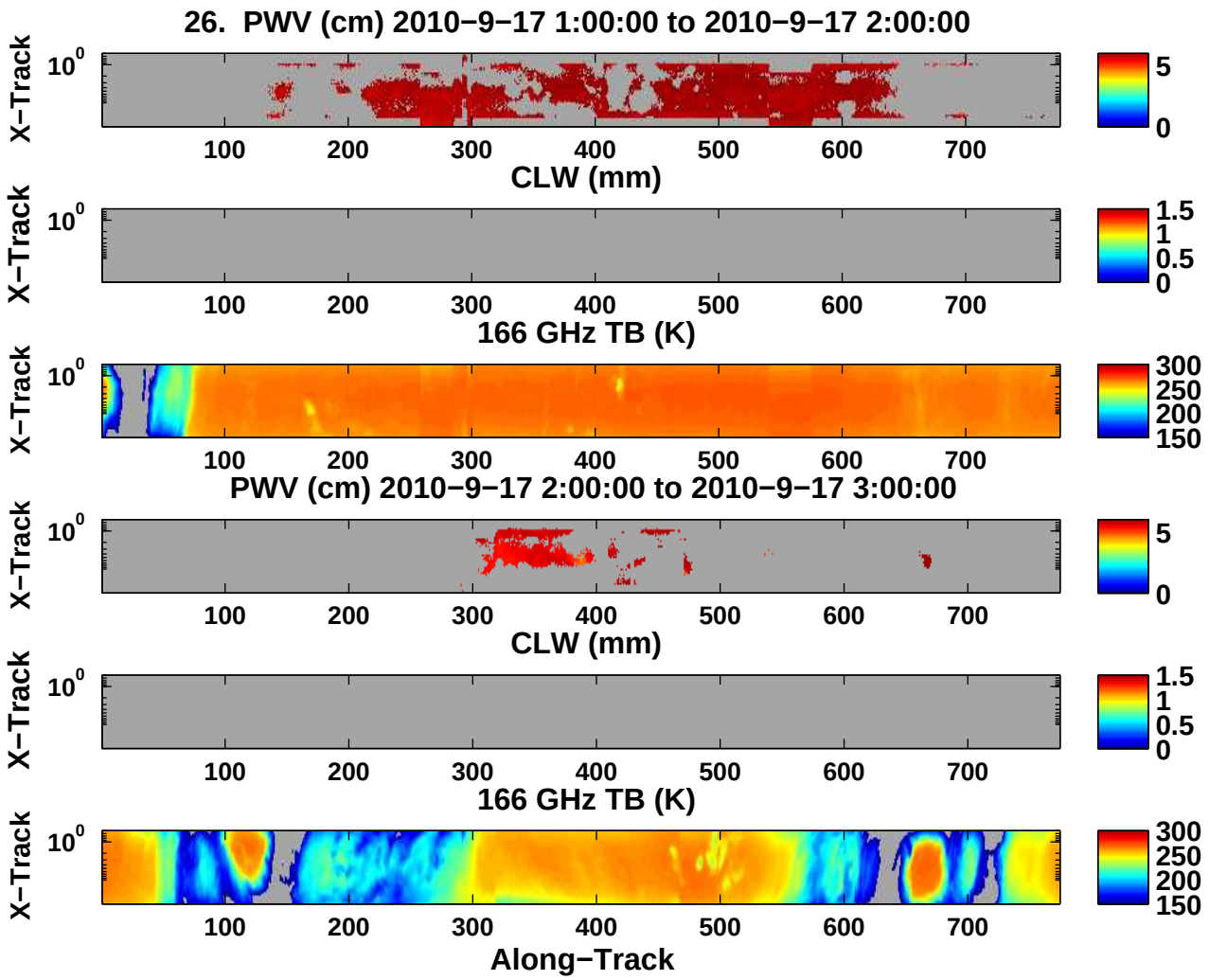

21. PWV (cm) 2010−9−16 15:00:00 to 2010−9−16 16:00:00
X−Track
10^0
100 200 300 400 500 600 700
CLW (mm)
5
0
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−16 16:00:00 to 2010−9−16 17:00:00
Along−Track

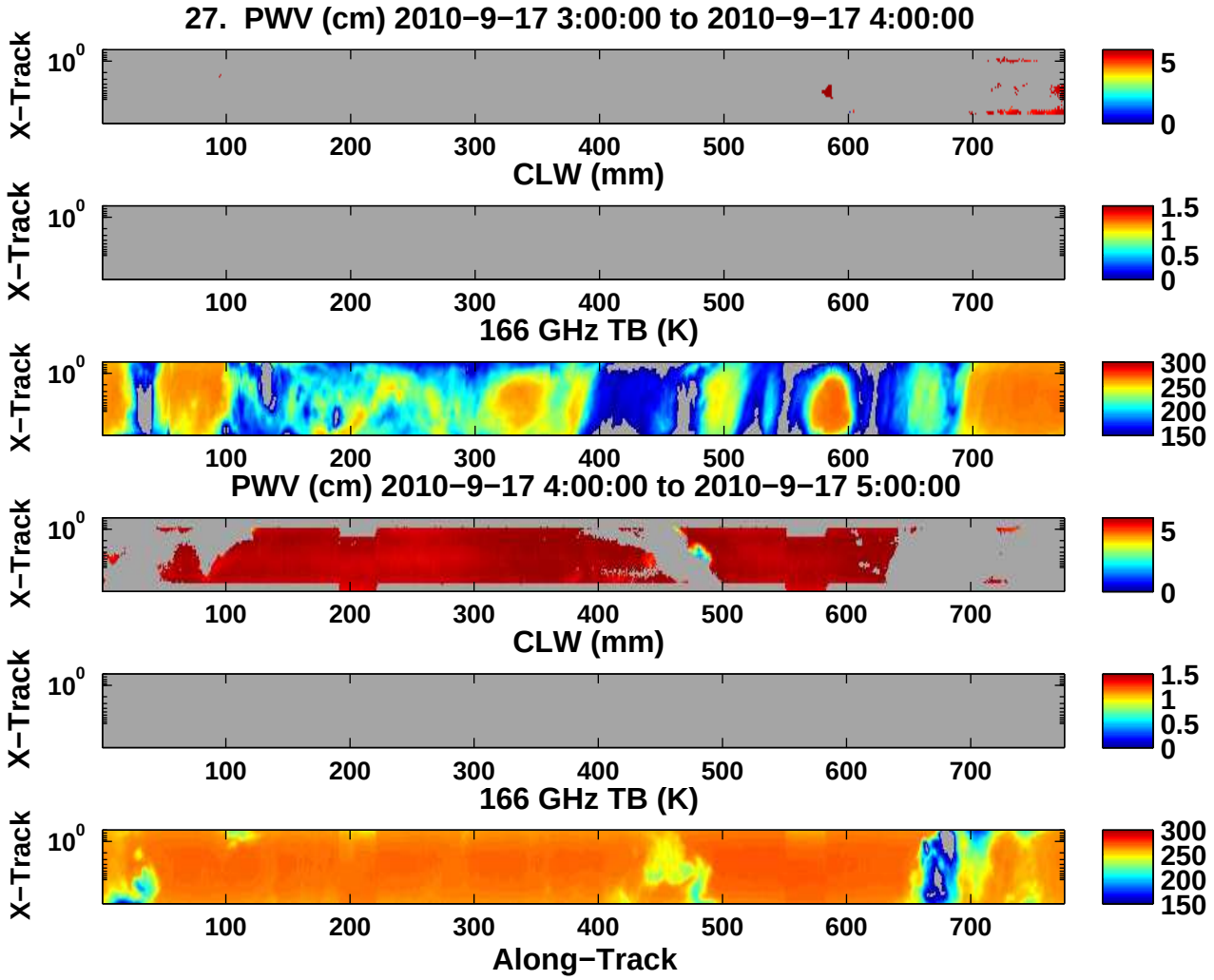

22. PWV (cm) 2010−9−16 17:00:00 to 2010−9−16 18:00:00
X−Track
10^0
100 200 300 400 500 600 700
5
0
CLW (mm)
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−16 18:00:00 to 2010−9−16 19:00:00
Along−Track

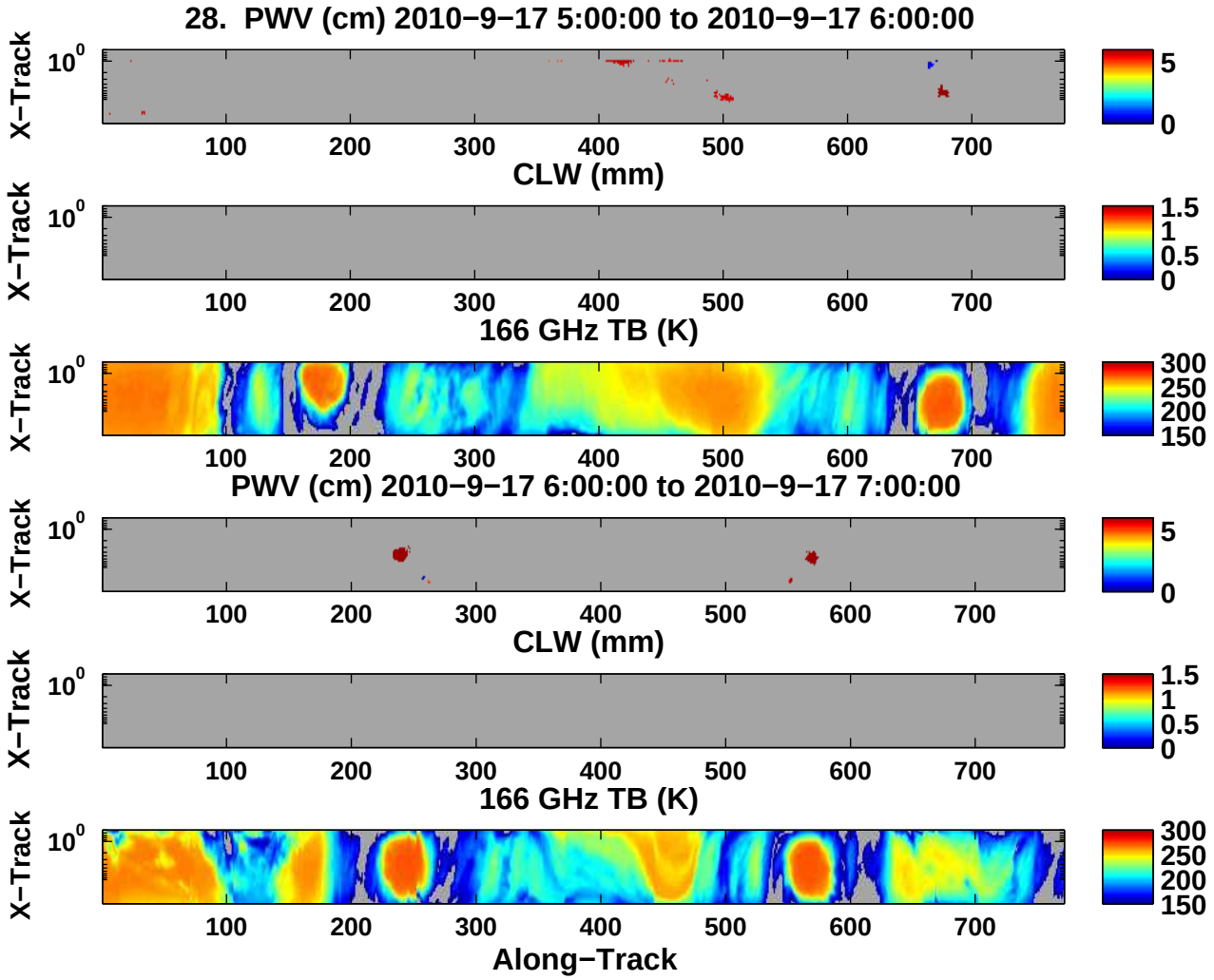

23. PWV (cm) 2010−9−16 19:00:00 to 2010−9−16 20:00:00
X−Track
10^0
100
200
300
400
500
600
700
5
0
CLW (mm)
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−16 20:00:00 to 2010−9−16 21:00:00
Along−Track

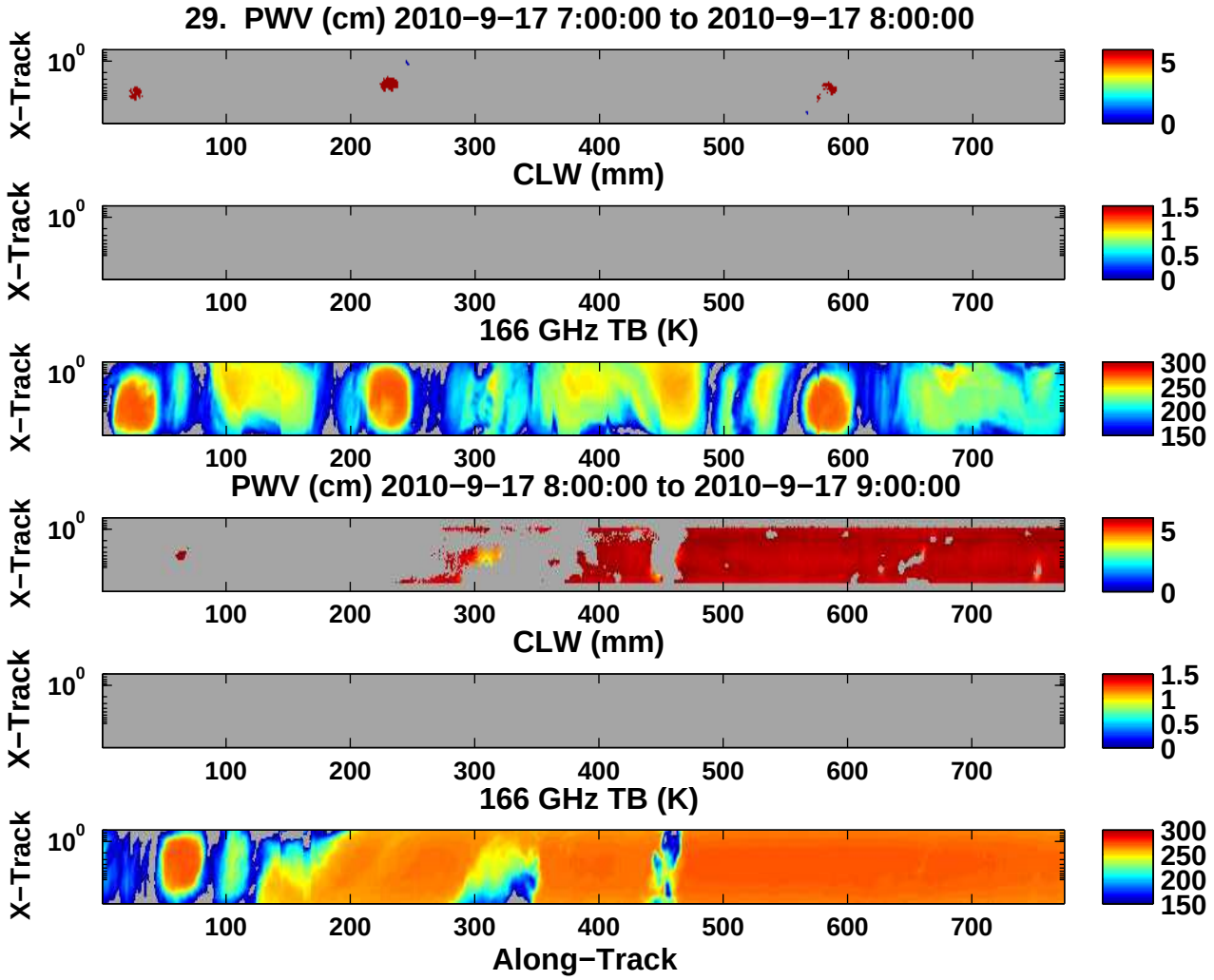

24. PWV (cm) 2010−9−16 21:00:00 to 2010−9−16 22:00:00
X−Track
10^0
100 200 300 400 500 600 700
CLW (mm)
5
0
166 GHz TB (K)
1.5
1
0.5
0
300
250
200
150
PWV (cm) 2010−9−16 22:00:00 to 2010−9−16 23:00:00
Along−Track

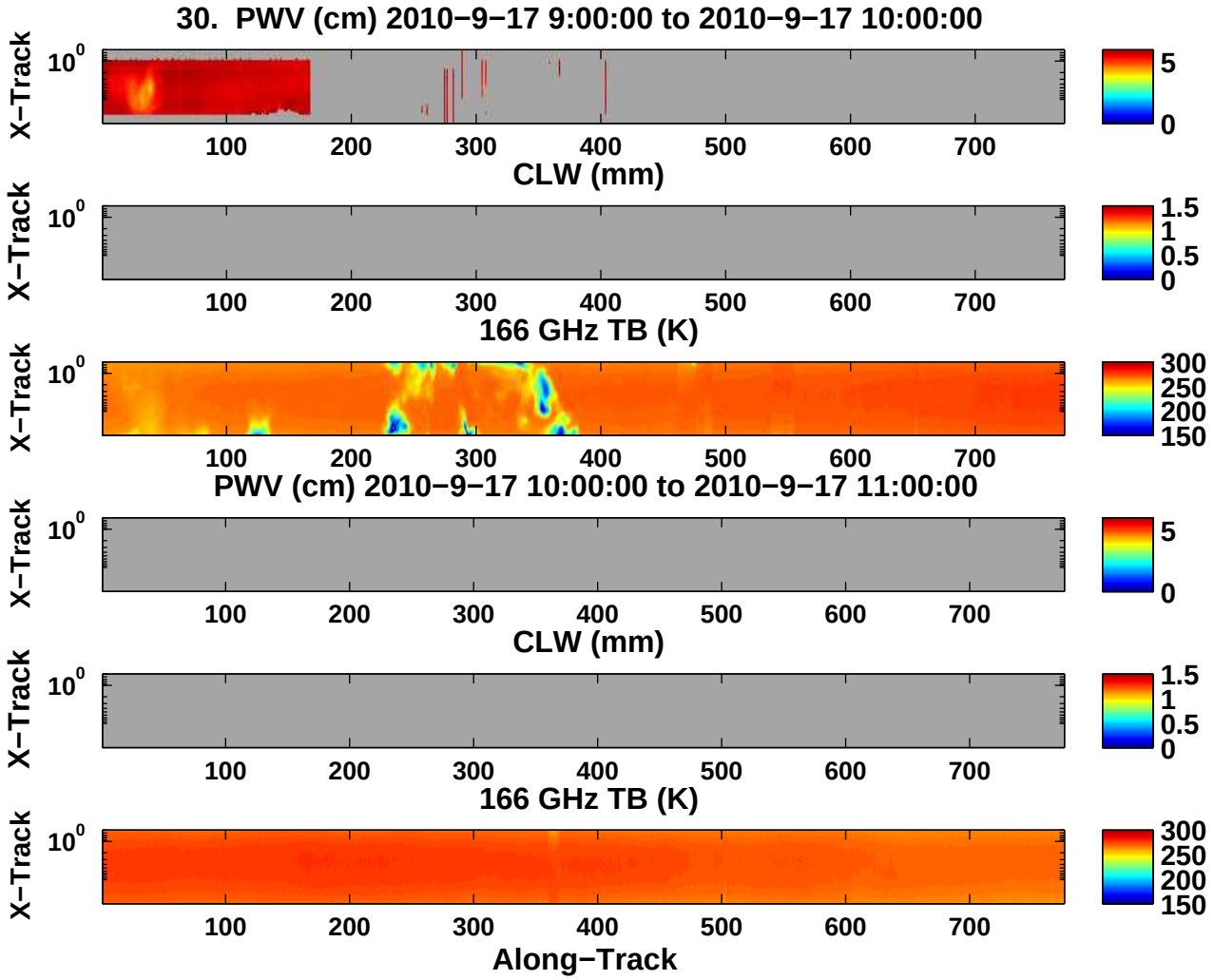

25. PWV (cm) 2010−9−16 23:00:00 to 2010−9−16 24:00:00
X−Track
10^0
100
200
300
400
500
600
700
5
0
CLW (mm)
1.5
1
0.5
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−17 0:00:00 to 2010−9−17 1:00:00
Along−Track

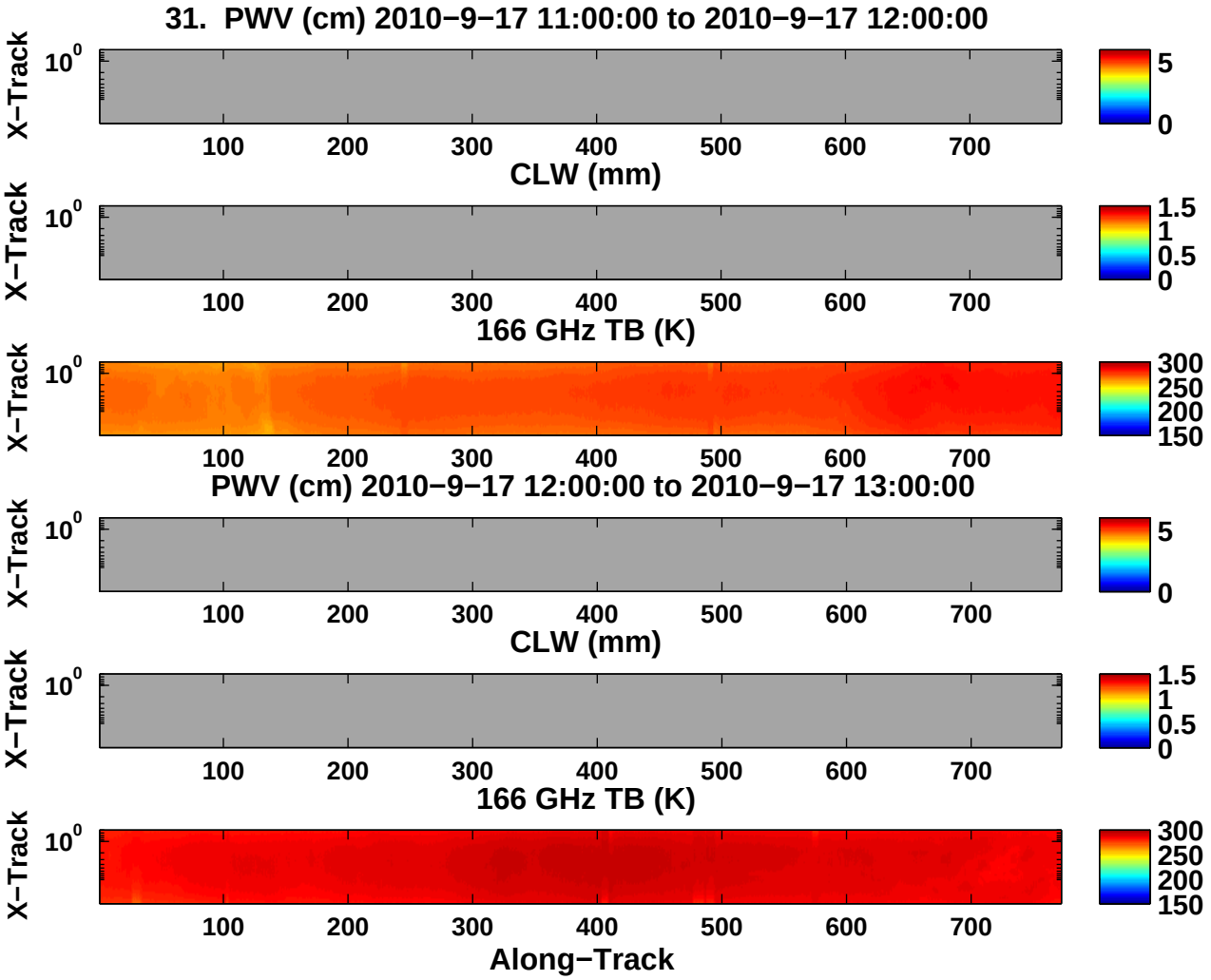

26. PWV (cm) 2010−9−17 1:00:00 to 2010−9−17 2:00:00
X−Track
10^0
100 200 300 400 500 600 700
CLW (mm)
5
0
166 GHz TB (K)
1.5
1
0.5
0
300
250
200
150
PWV (cm) 2010−9−17 2:00:00 to 2010−9−17 3:00:00
Along−Track

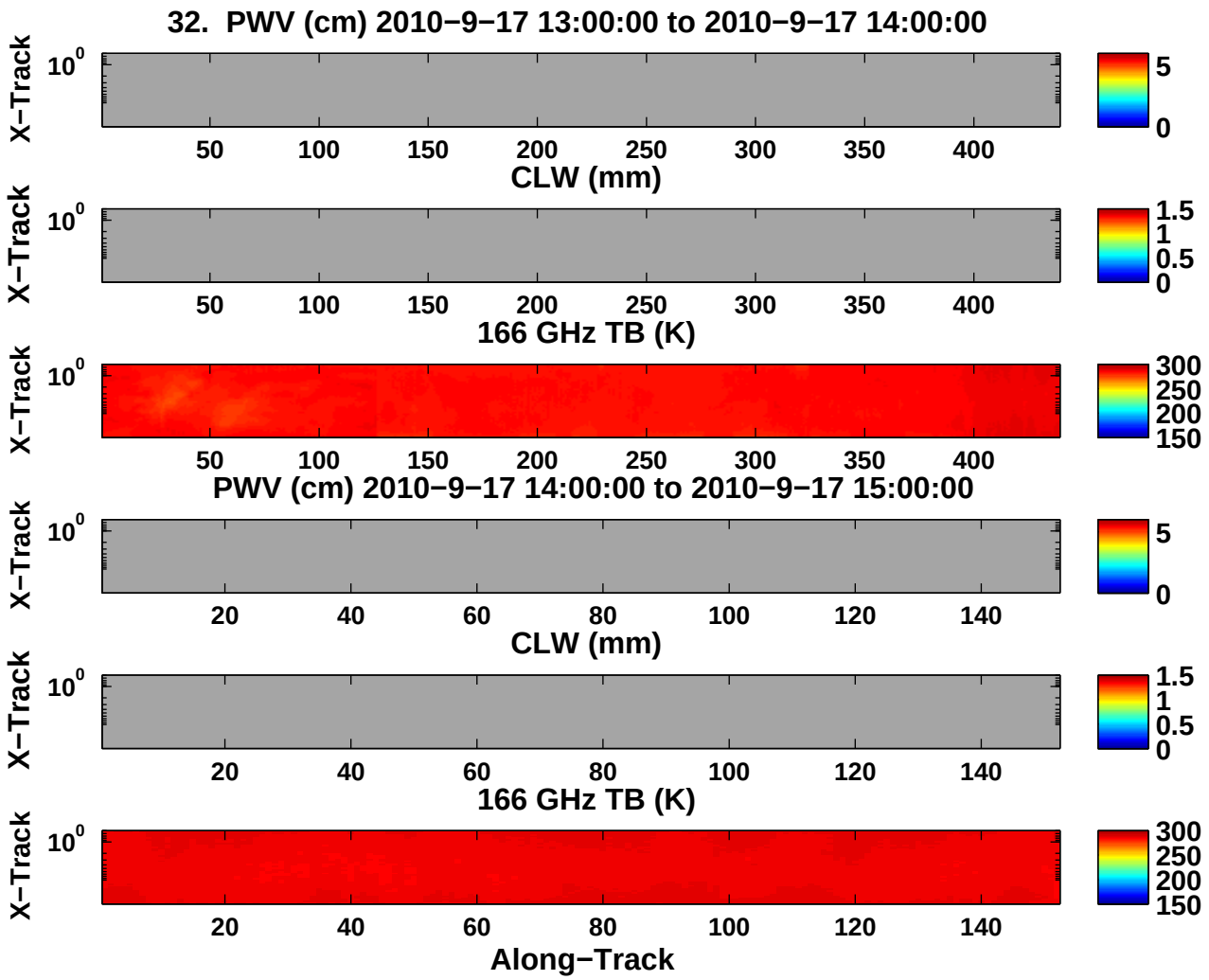

27. PWV (cm) 2010−9−17 3:00:00 to 2010−9−17 4:00:00
X−Track
10^0
100
200
300
400
500
600
700
CLW (mm)
5
0
1.5
1
0.5
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−17 4:00:00 to 2010−9−17 5:00:00
Along−Track


28. PWV (cm) 2010−9−17 5:00:00 to 2010−9−17 6:00:00
X−Track
10^0
100 200 300 400 500 600 700
5
0
CLW (mm)
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−17 6:00:00 to 2010−9−17 7:00:00
Along−Track


29. PWV (cm) 2010−9−17 7:00:00 to 2010−9−17 8:00:00
X−Track
10^0
100 200 300 400 500 600 700
CLW (mm)
5
0
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−17 8:00:00 to 2010−9−17 9:00:00
Along−Track


30. PWV (cm) 2010−9−17 9:00:00 to 2010−9−17 10:00:00
X−Track
10^0
100 200 300 400 500 600 700
CLW (mm)
5
0
166 GHz TB (K)
1.5
1
0.5
0
300
250
200
150
PWV (cm) 2010−9−17 10:00:00 to 2010−9−17 11:00:00
Along−Track


31. PWV (cm) 2010−9−17 11:00:00 to 2010−9−17 12:00:00
X−Track
10^0
100 200 300 400 500 600 700
5
0
CLW (mm)
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−17 12:00:00 to 2010−9−17 13:00:00
Along−Track


32. PWV (cm) 2010−9−17 13:00:00 to 2010−9−17 14:00:00
X−Track
10^0
50 100 150 200 250 300 350 400
5
0
CLW (mm)
1.5
1
0.5
0
166 GHz TB (K)
300
250
200
150
PWV (cm) 2010−9−17 14:00:00 to 2010−9−17 15:00:00
20 40 60 80 100 120 140
Along−Track