OMPS LP Observations of Calbuco Volcano Eruption

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7 May 2015

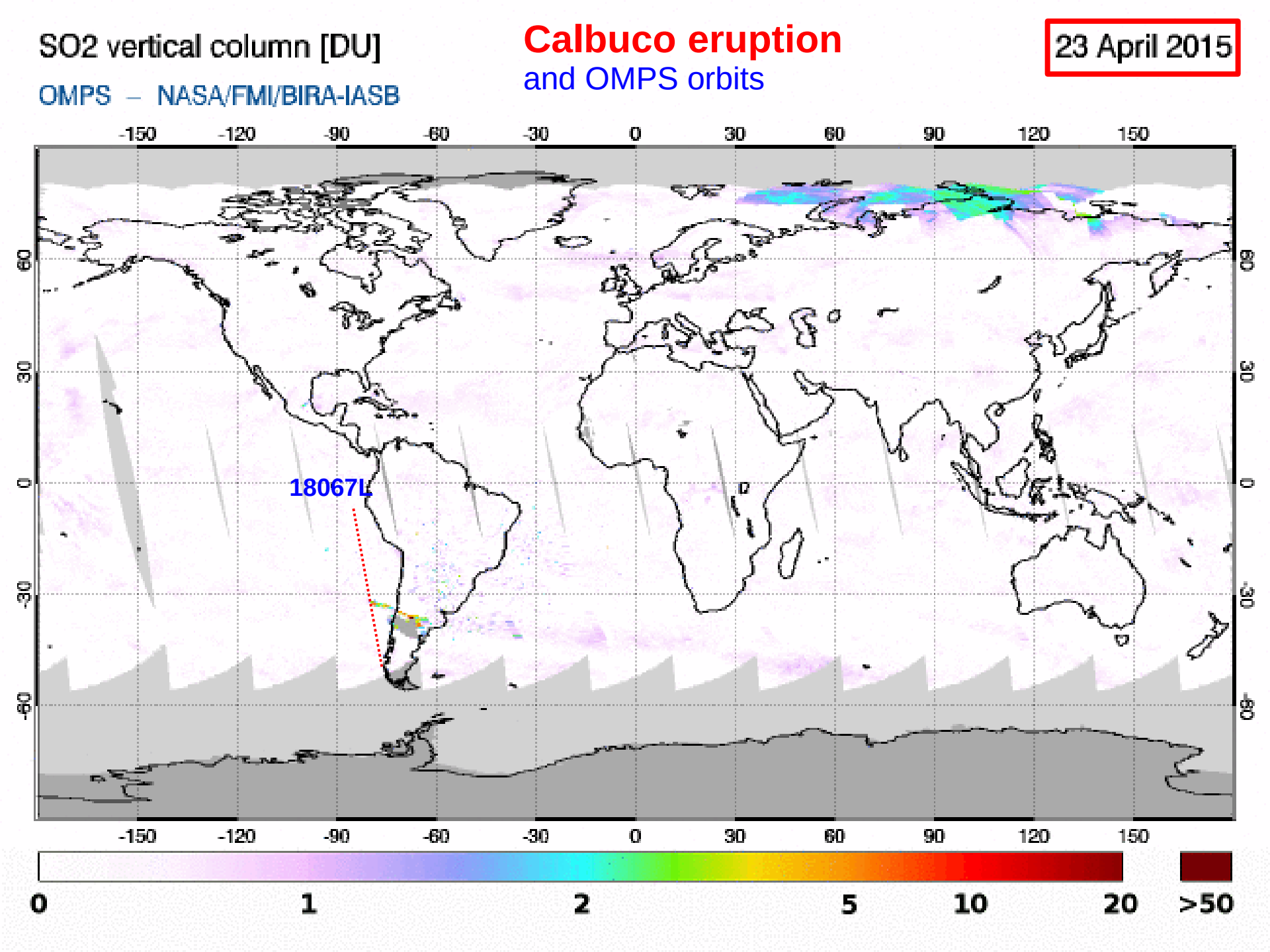
Background

- Calbuco volcano in Chile (41.3°S, 72.6°W, 2 km summit height) erupted at 21:38 UT on April 22. Second episode began at 04:38 UT on April 23.
- Initial plume transport to west, followed by more rapid transport to east.
- GEOS5/GOCART model runs (Eric Hughes, Nick Krotkov, NASA) and HYSPLIT model runs (Barbara Stunder, NOAA) indicate altitude-dependent shear of plume.
- LP observations for April 23-30 discussed here.

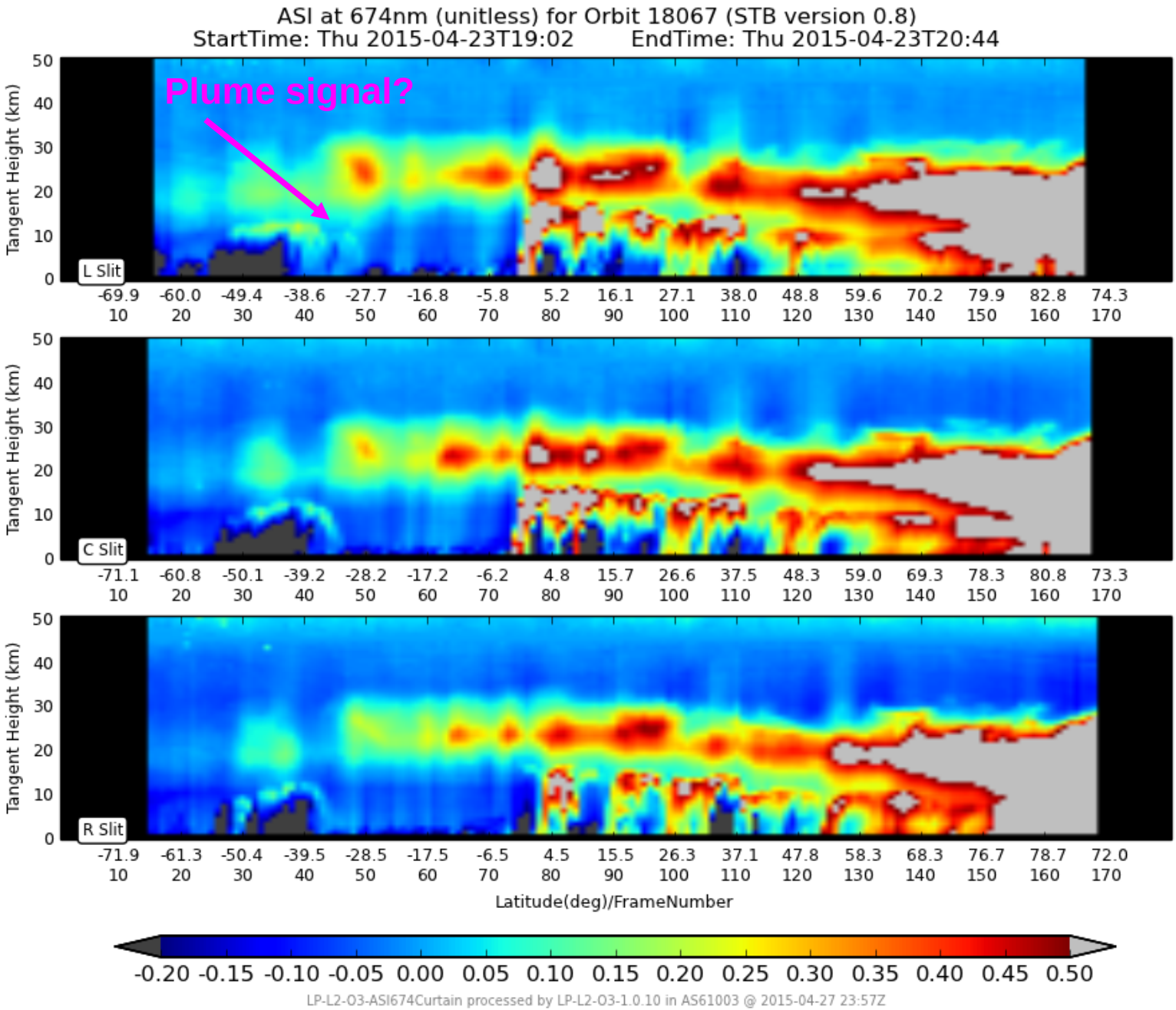
April 22, 2015

http://www.cnn.com/2015/04/30/world/chile-calbuco-volcano/

April 22, 2015
Wikipedia


SO2 vertical column [DU]
OMPS – NASA/FMI/BIRA-IASB
Calbuco eruption
and OMPS orbits
23 April 2015
18067L
-150
-120
-90
-60
-30
0
30
60
90
120
150
60
30
0
-30
-60
0
1
2
5
10
20
>50

OMPS/LP operational ASI plots for orbit 18067 [4/23/2015]



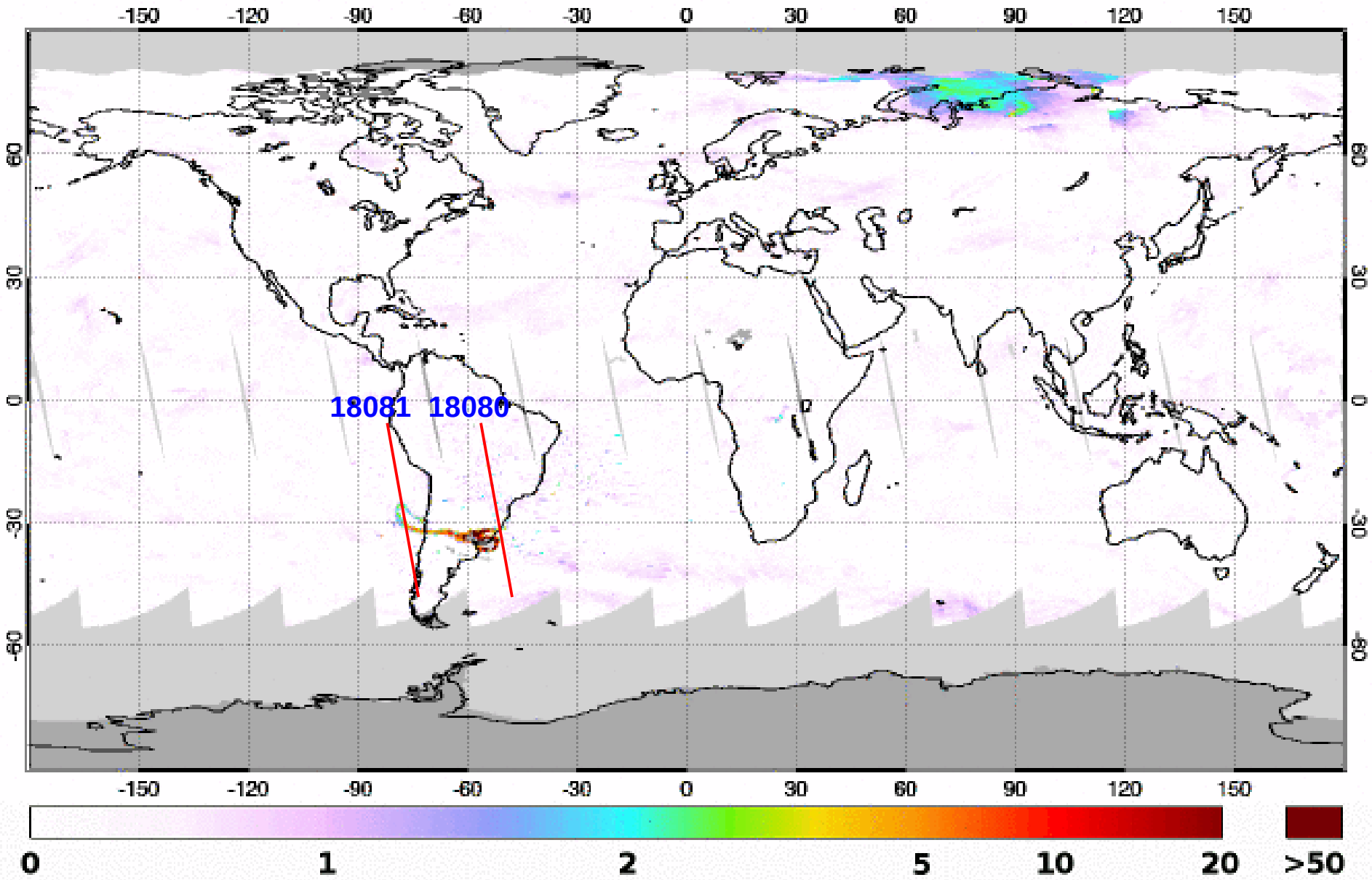
SO2 vertical column [DU]

OMPS – NASA/FMI/BIRA-IASB

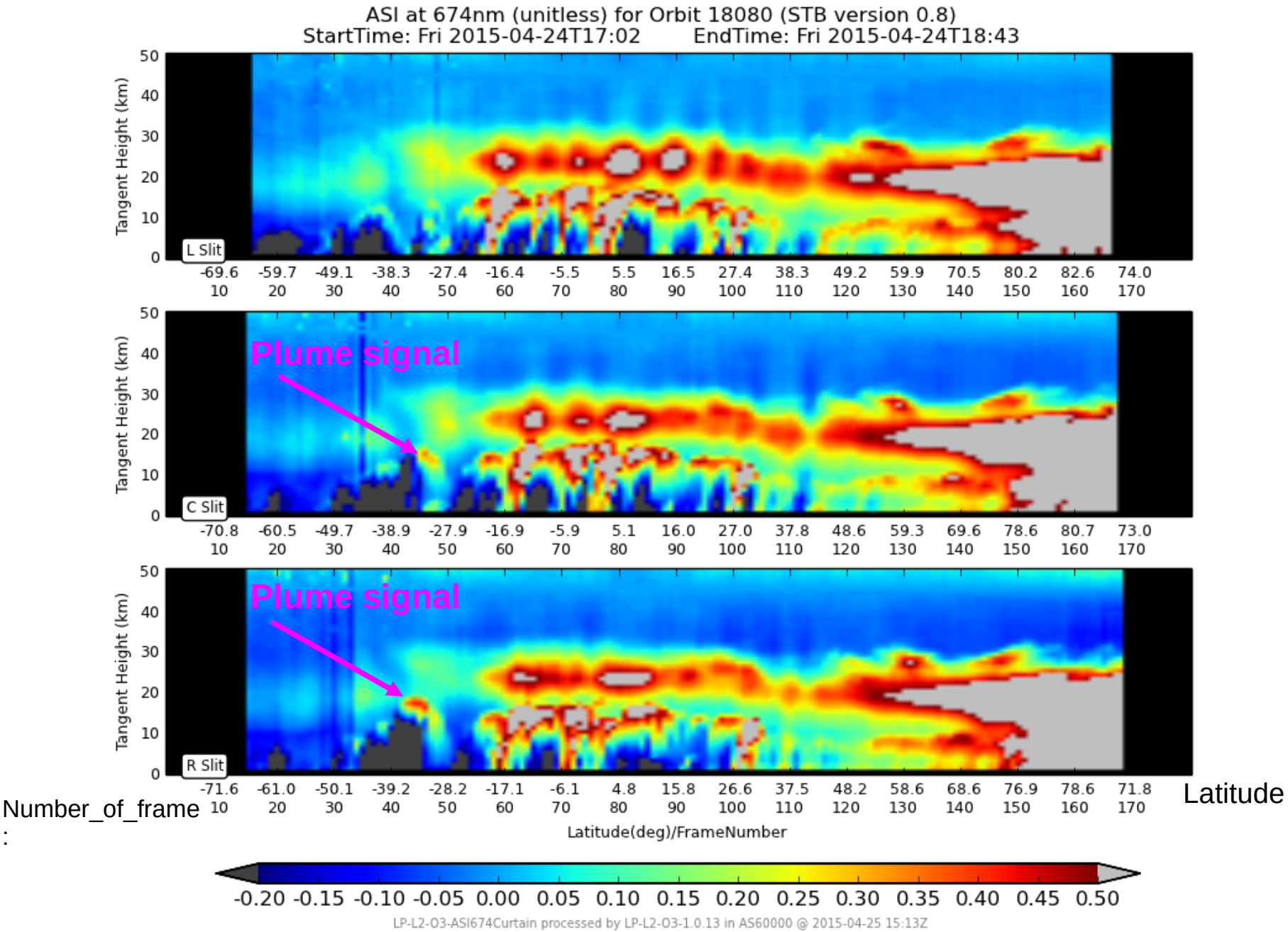
Calbuco eruption

and OMPS orbits

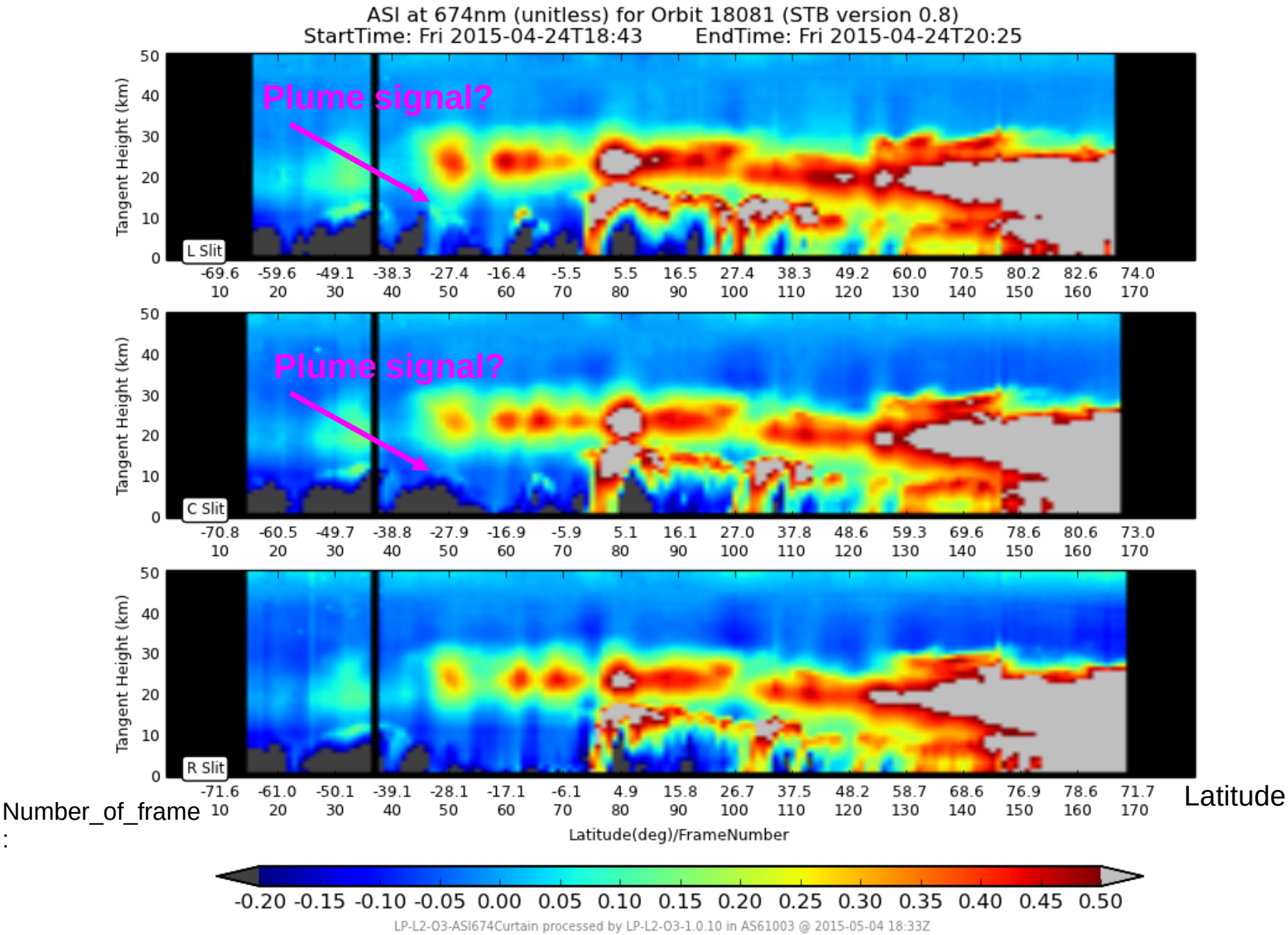
24 April 2015

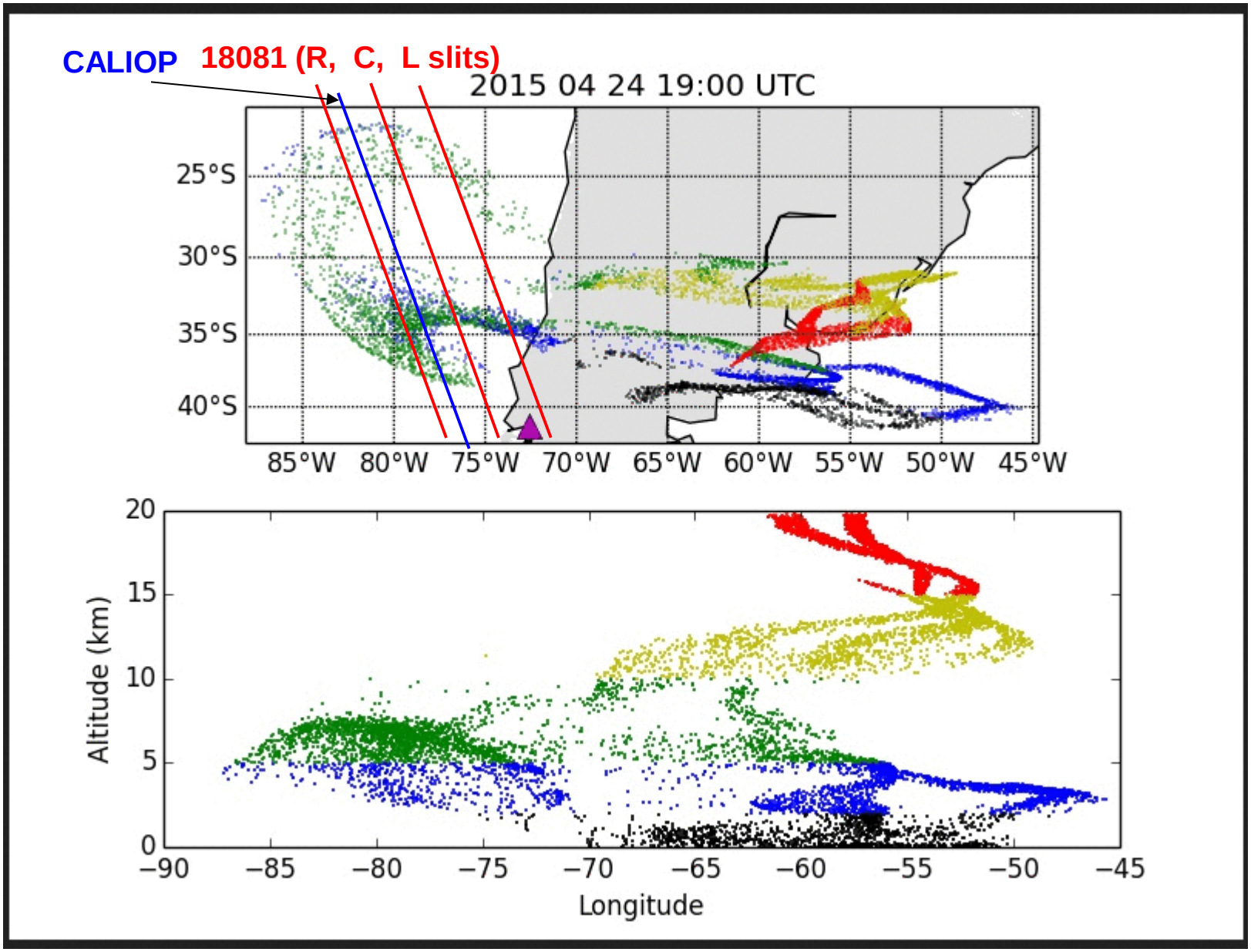


OMPS/LP operational ASI plots for orbit 18080 [4/24/2015]



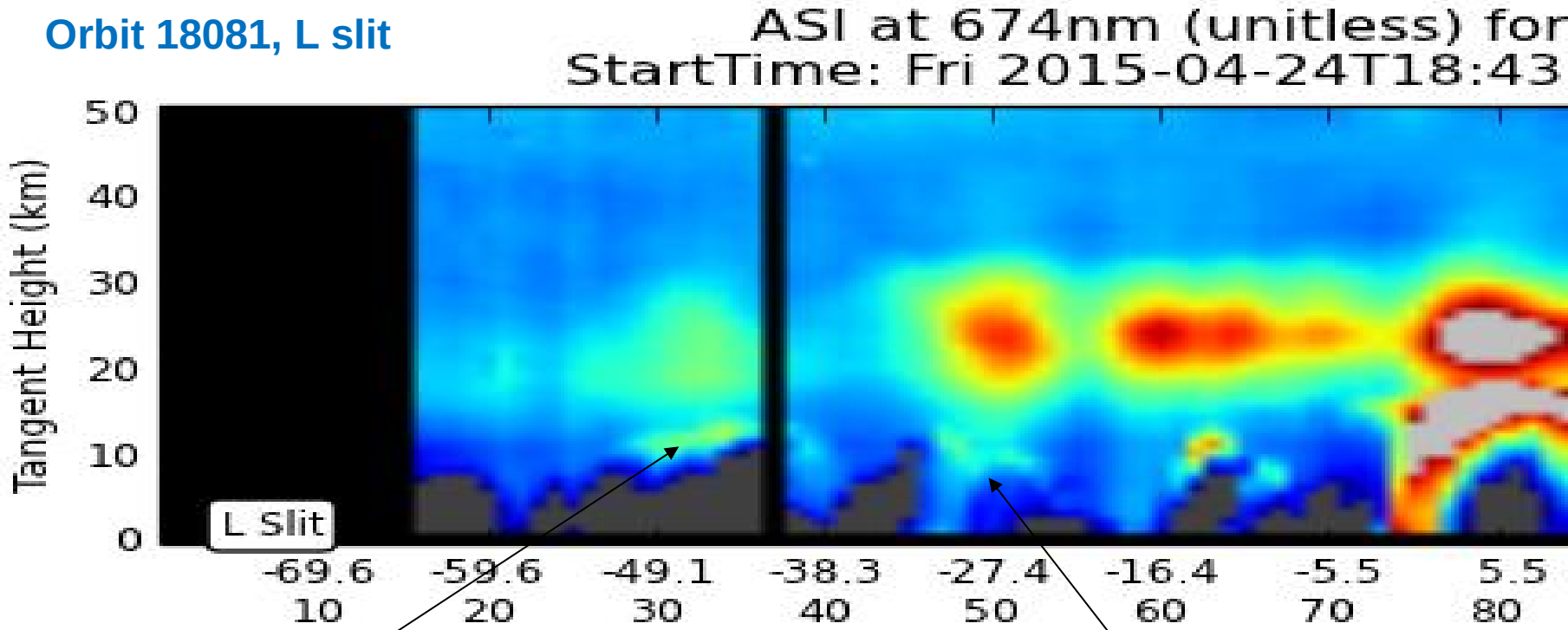
OMPS/LP operational ASI plots for orbit 18081 [4/24/2015]





HYSPLIT model simulation from Barbara Stunder - NOAA

Orbit 18081, L slit

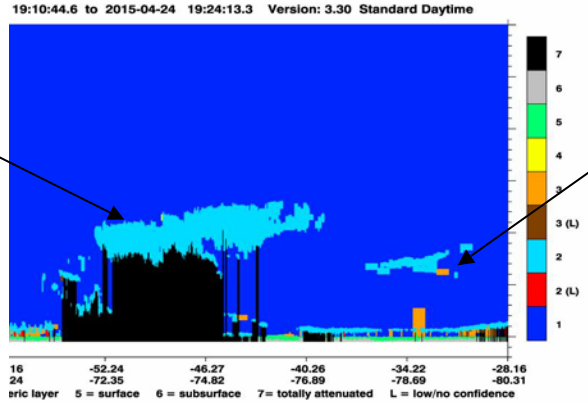


Long: -68.9 -73.4 -76.8

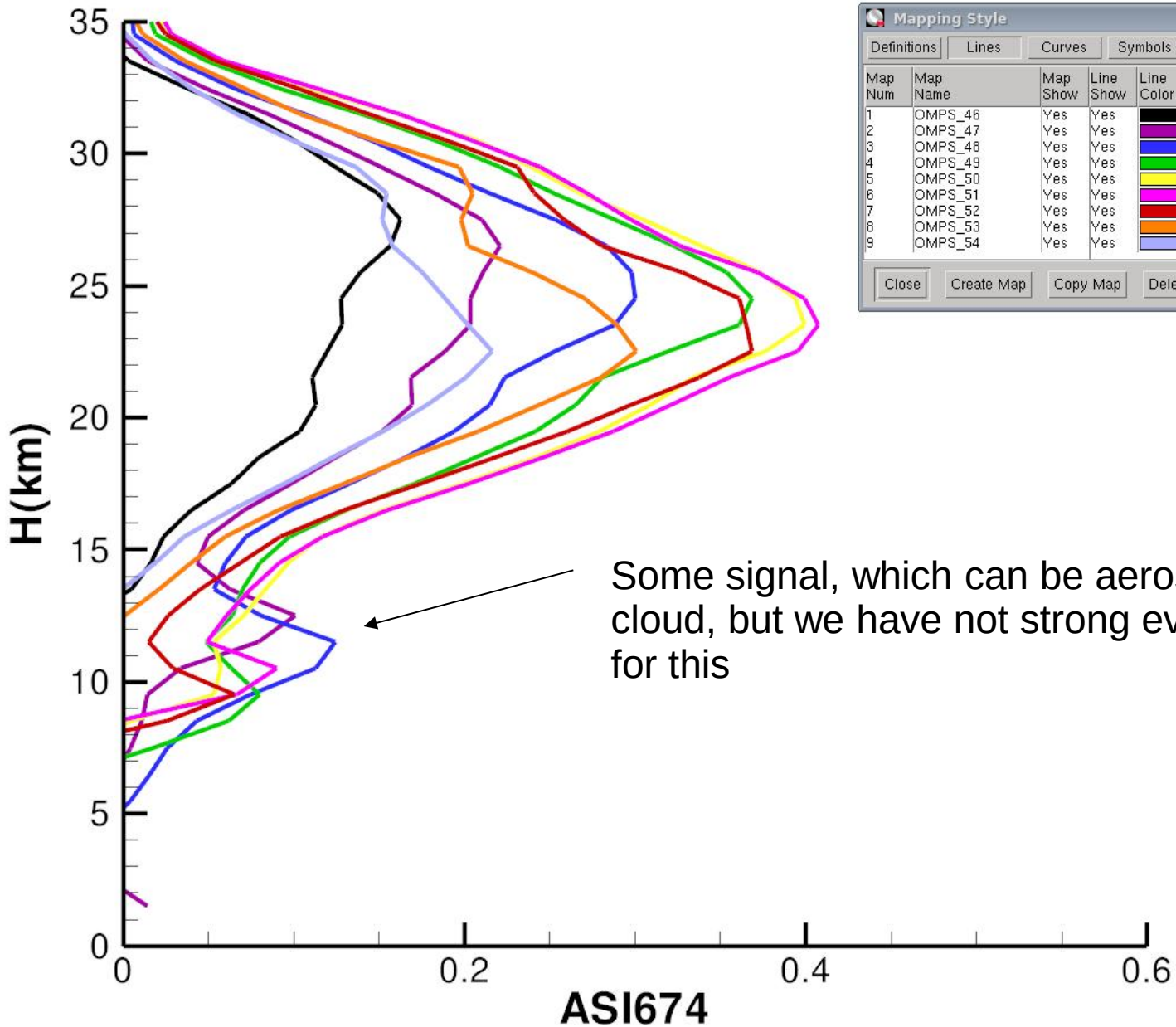
Water/ice cloud

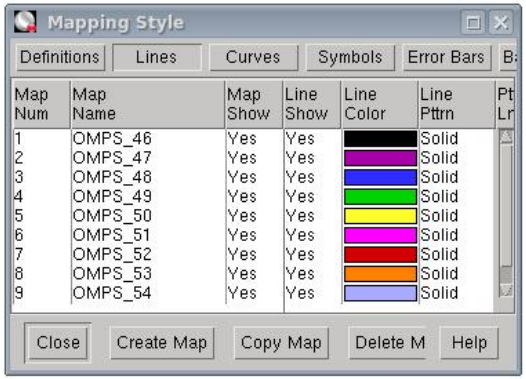
?

CALIOP have signature of aerosol

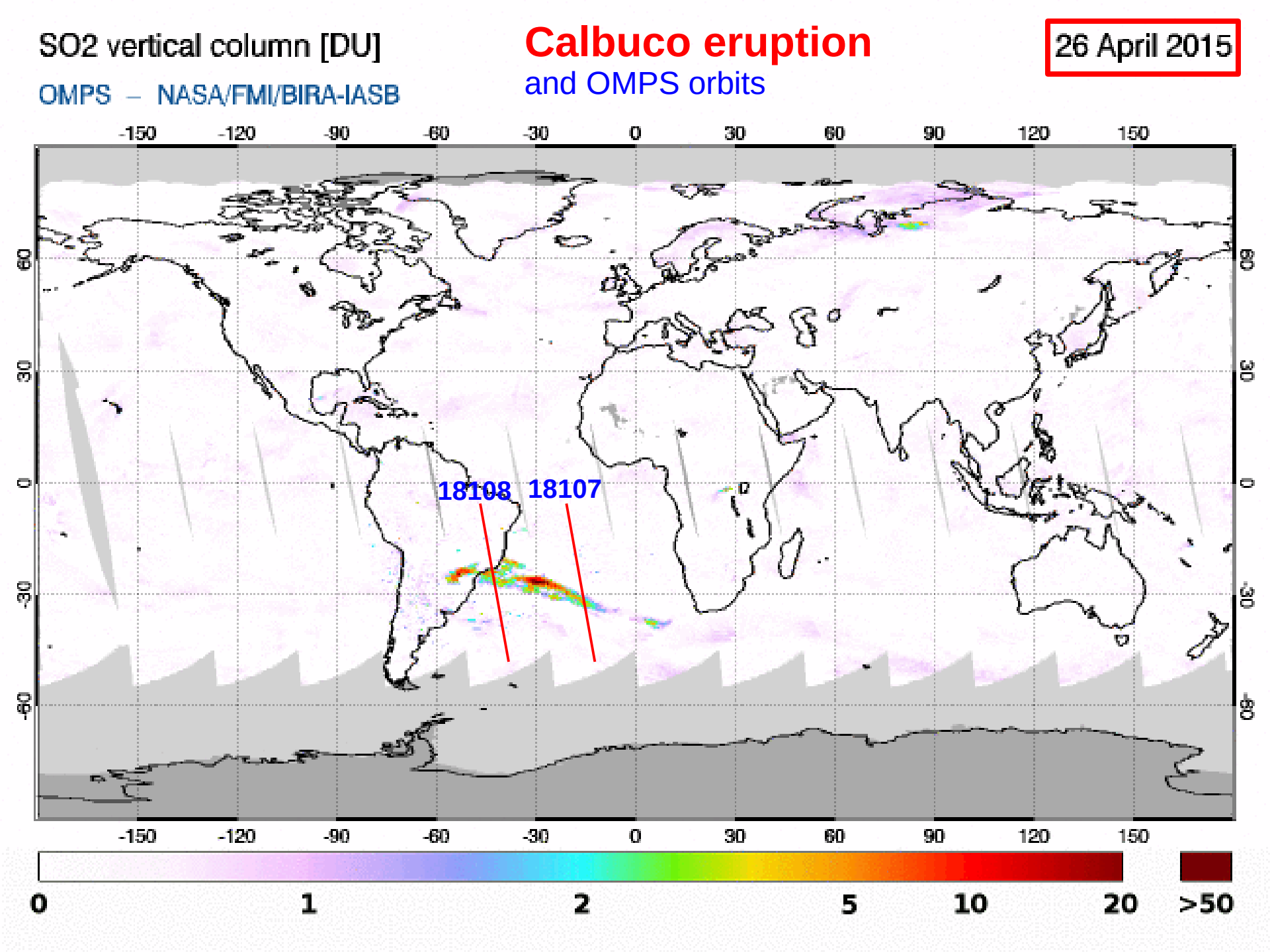


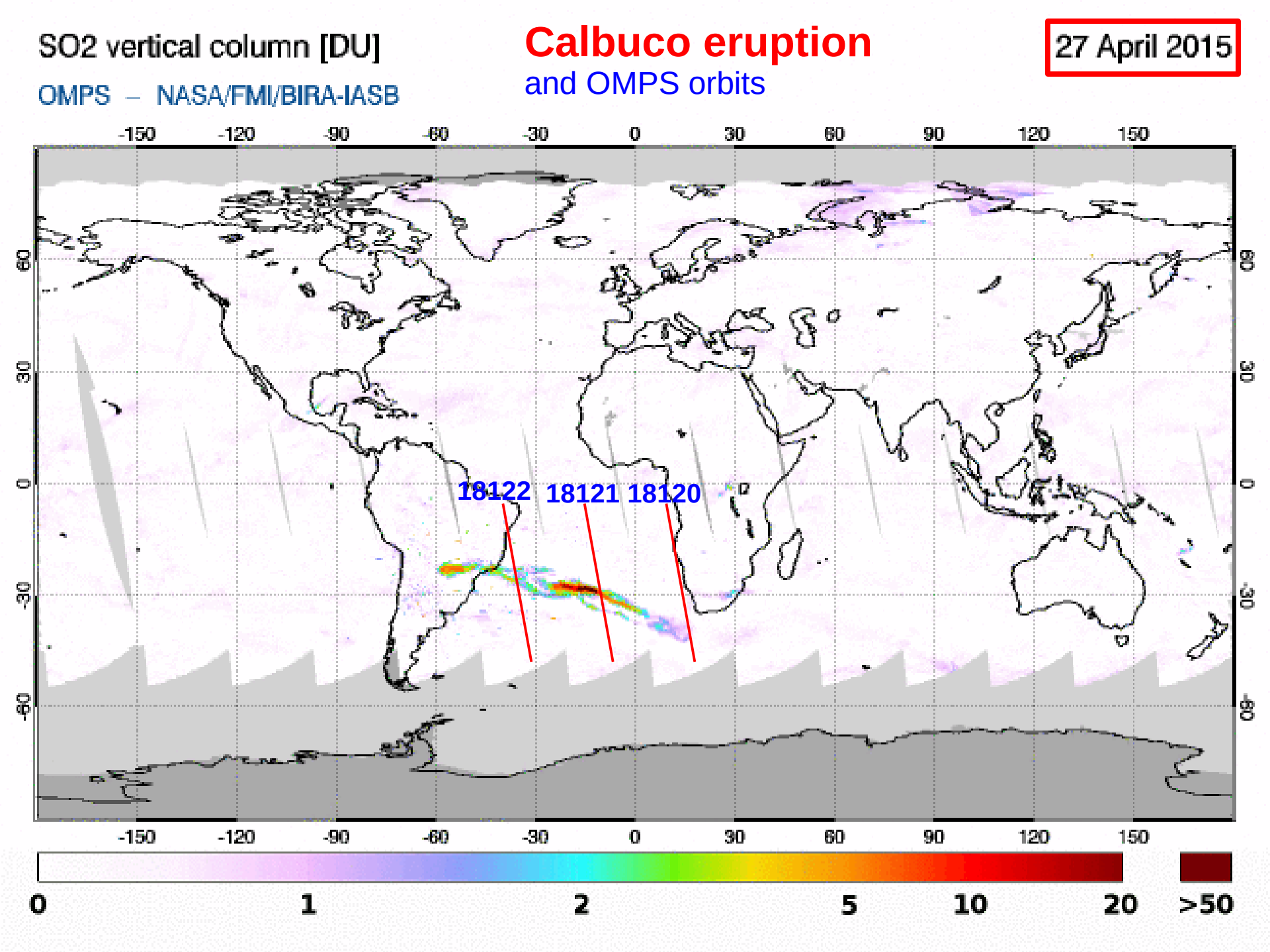
April 24, 2015, ASI674, Left slit, event 46-54, orbit 18081

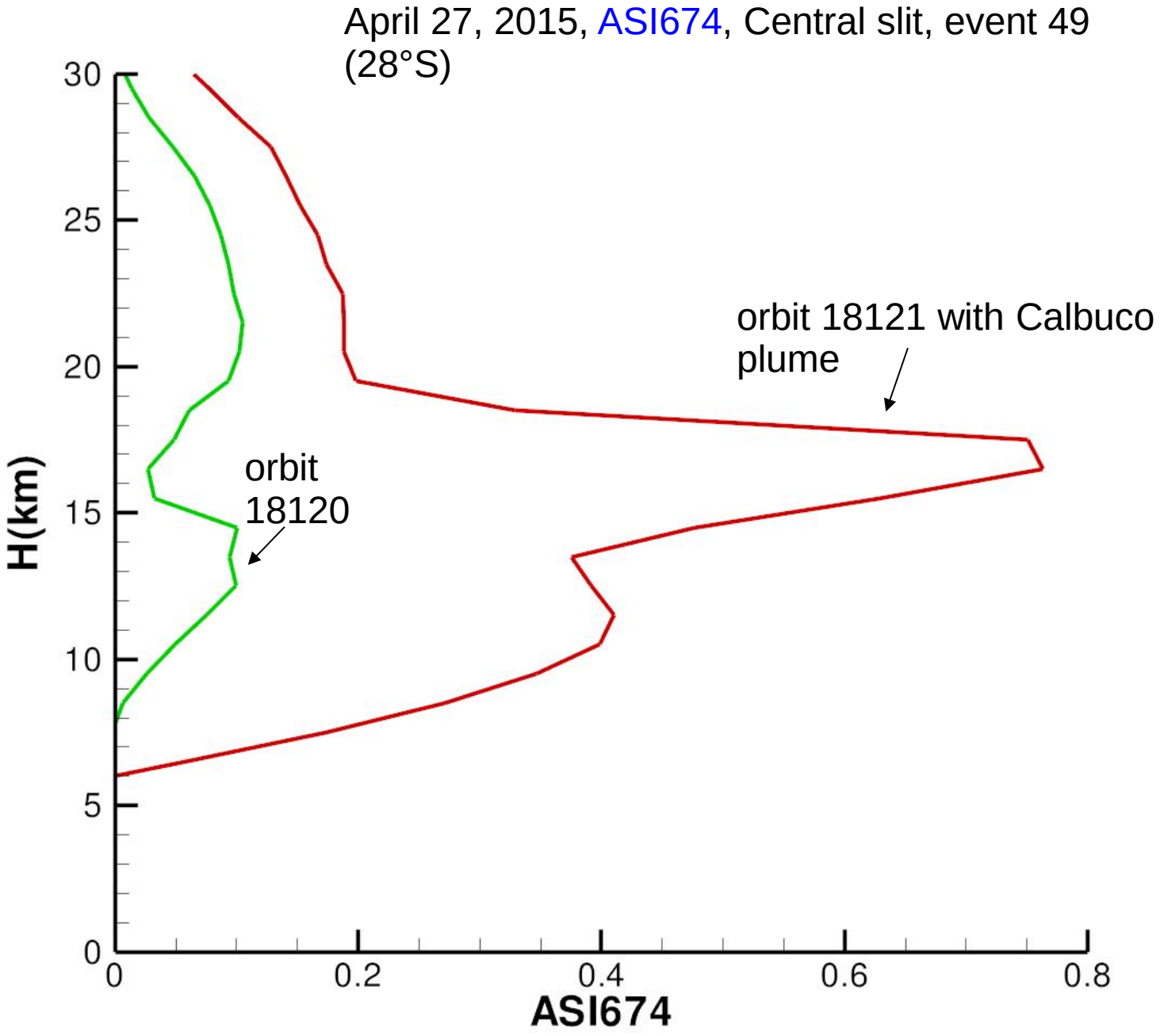


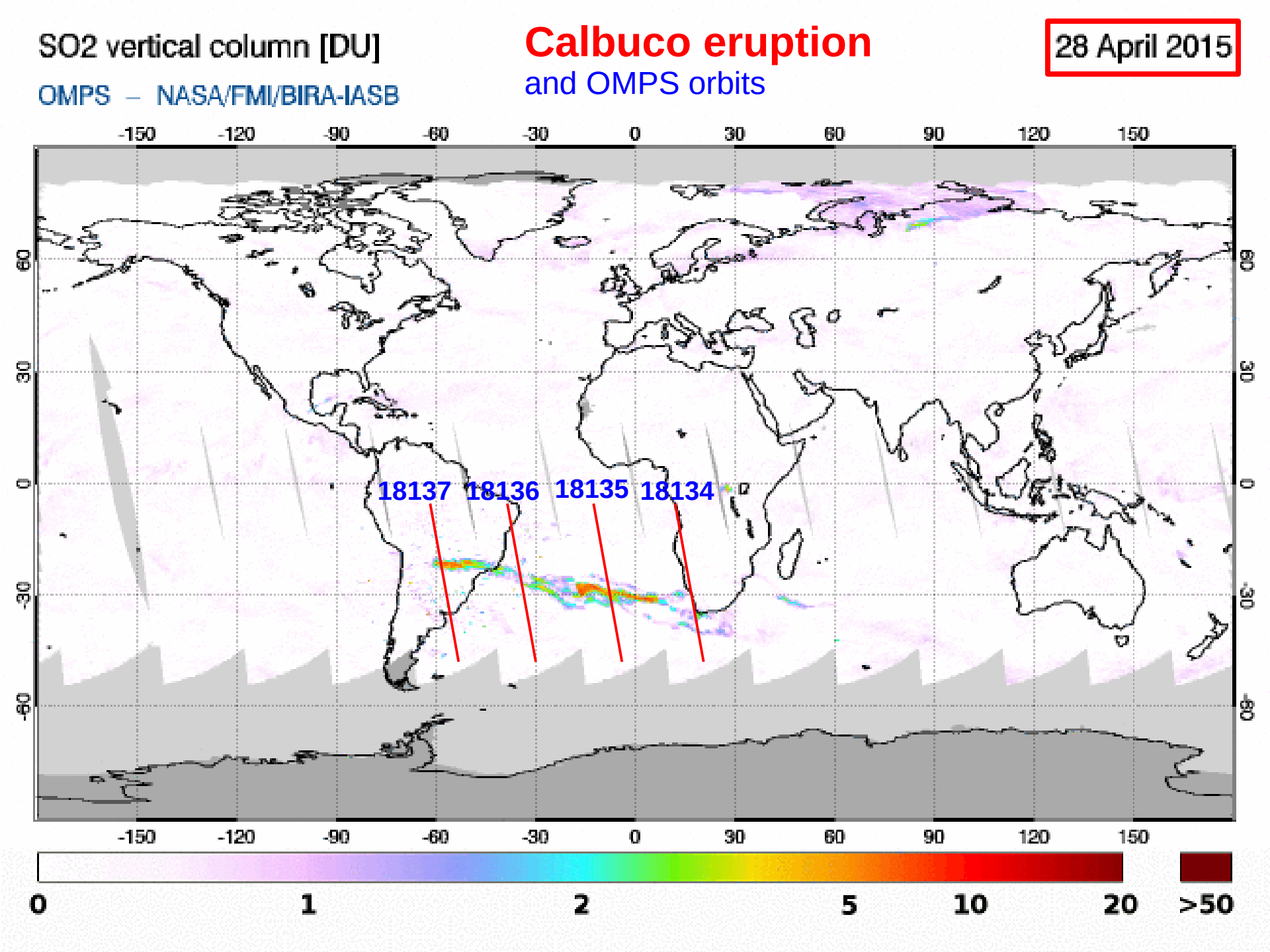


Some signal, which can be aerosol cloud, but we have not strong evidence for this

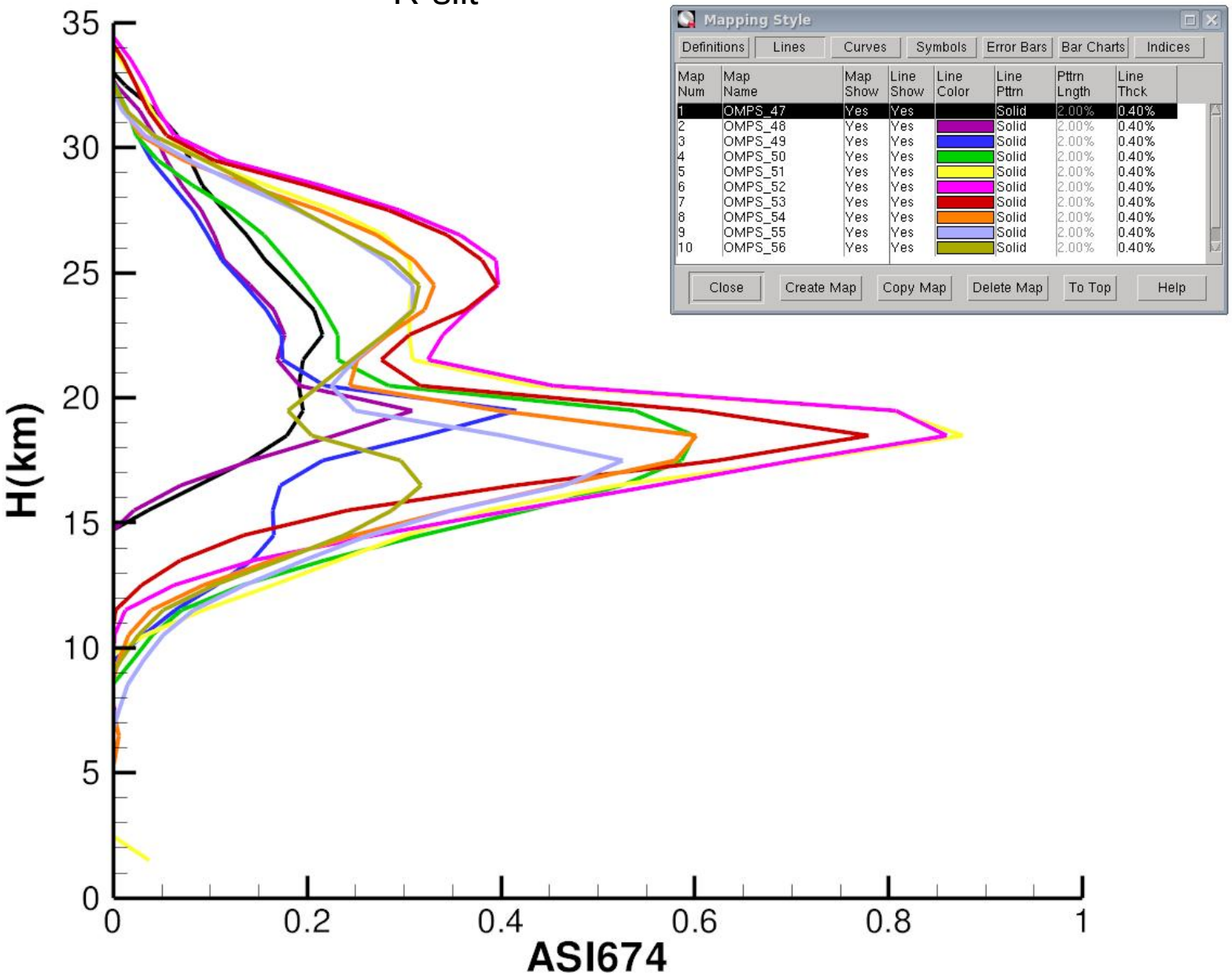

SO2 vertical column [DU]
OMPS – NASA/FMI/BIRA-IASB
Calbuco eruption
and OMPS orbits
26 April 2015
18108
18107
-150
-120
-90
-60
-30
0
30
60
90
120
150
60
30
0
-30
-60
0
1
2
5
10
20
>50


SO2 vertical column [DU]
OMPS – NASA/FMI/BIRA-IASB
Calbuco eruption
and OMPS orbits
27 April 2015
18122
18121
18120
-150
-120
-90
-60
-30
0
30
60
90
120
150
60
30
0
-30
-60
0
1
2
5
10
20
>50

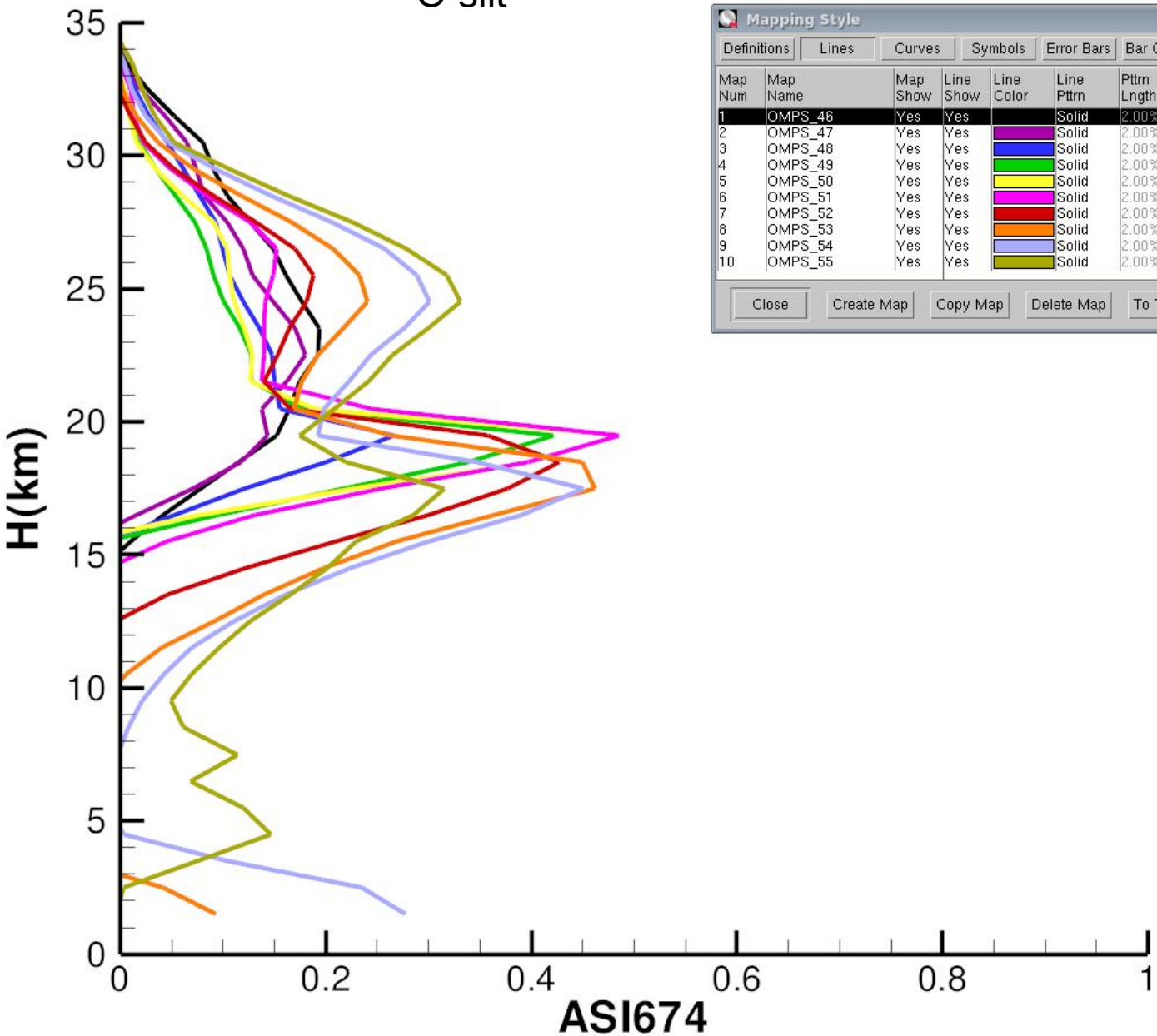

April 27, 2015, ASI674, Central slit, event 49
(28°S)
orbit 18121 with Calbuco
plume
orbit
18120
H(km)
ASI674
0
5
10
15
20
25
30
0
0.2
0.4
0.6
0.8

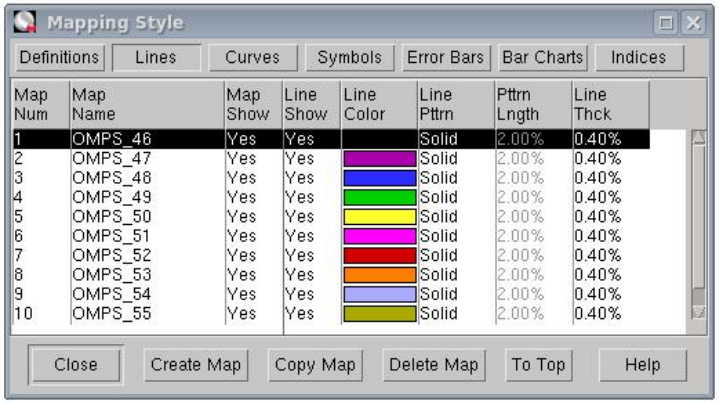

SO2 vertical column [DU]
OMPS – NASA/FMI/BIRA-IASB
Calbuco eruption
and OMPS orbits
28 April 2015
18137
18136
18135
18134
-150
-120
-90
-60
-30
0
30
60
90
120
150
60
30
0
-30
-60
0
1
2
5
10
20
>50

April 28, 2015, orbit 18136,
R-slit

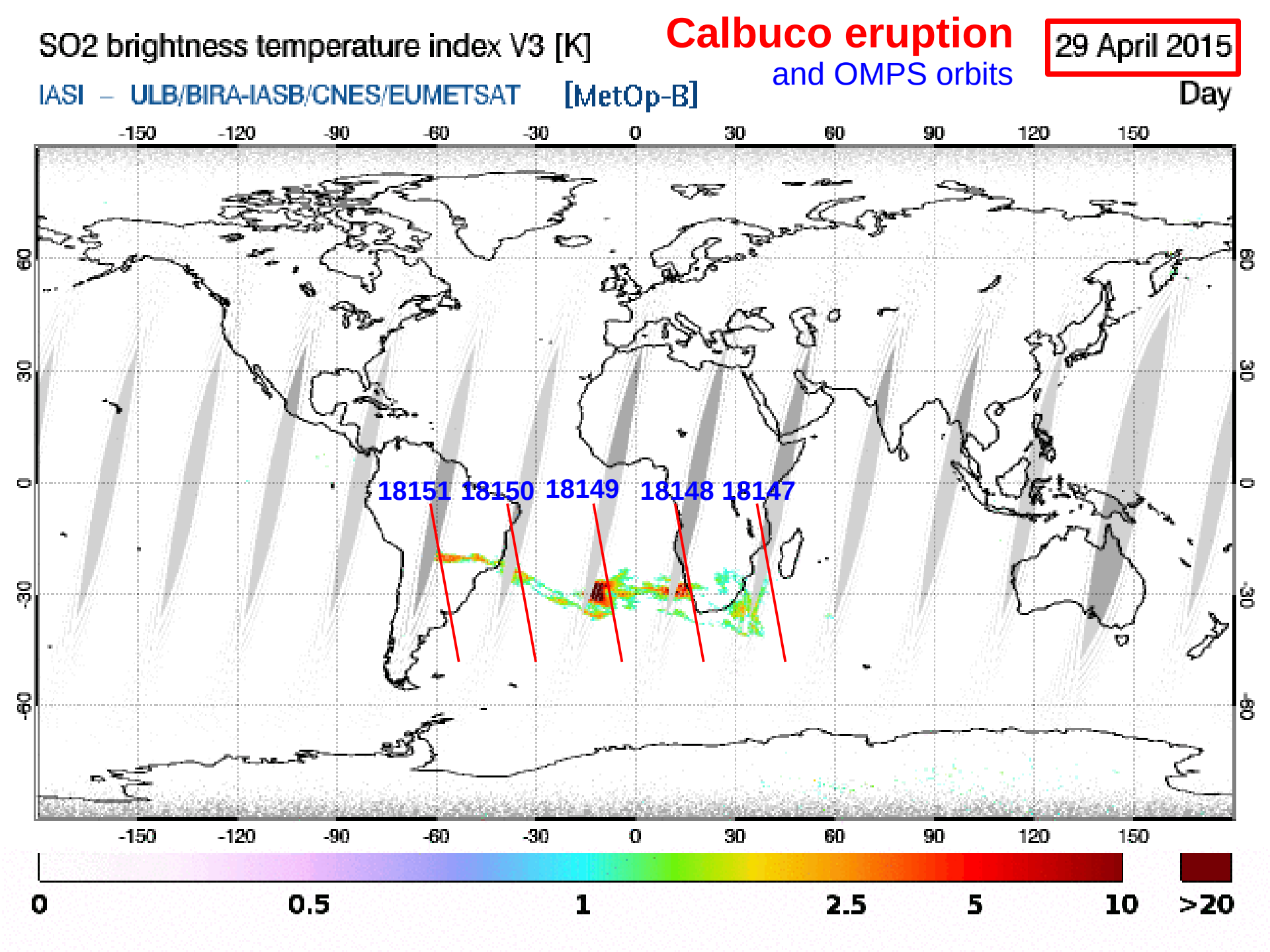


April 28, 2015, orbit 18136,
C-slit

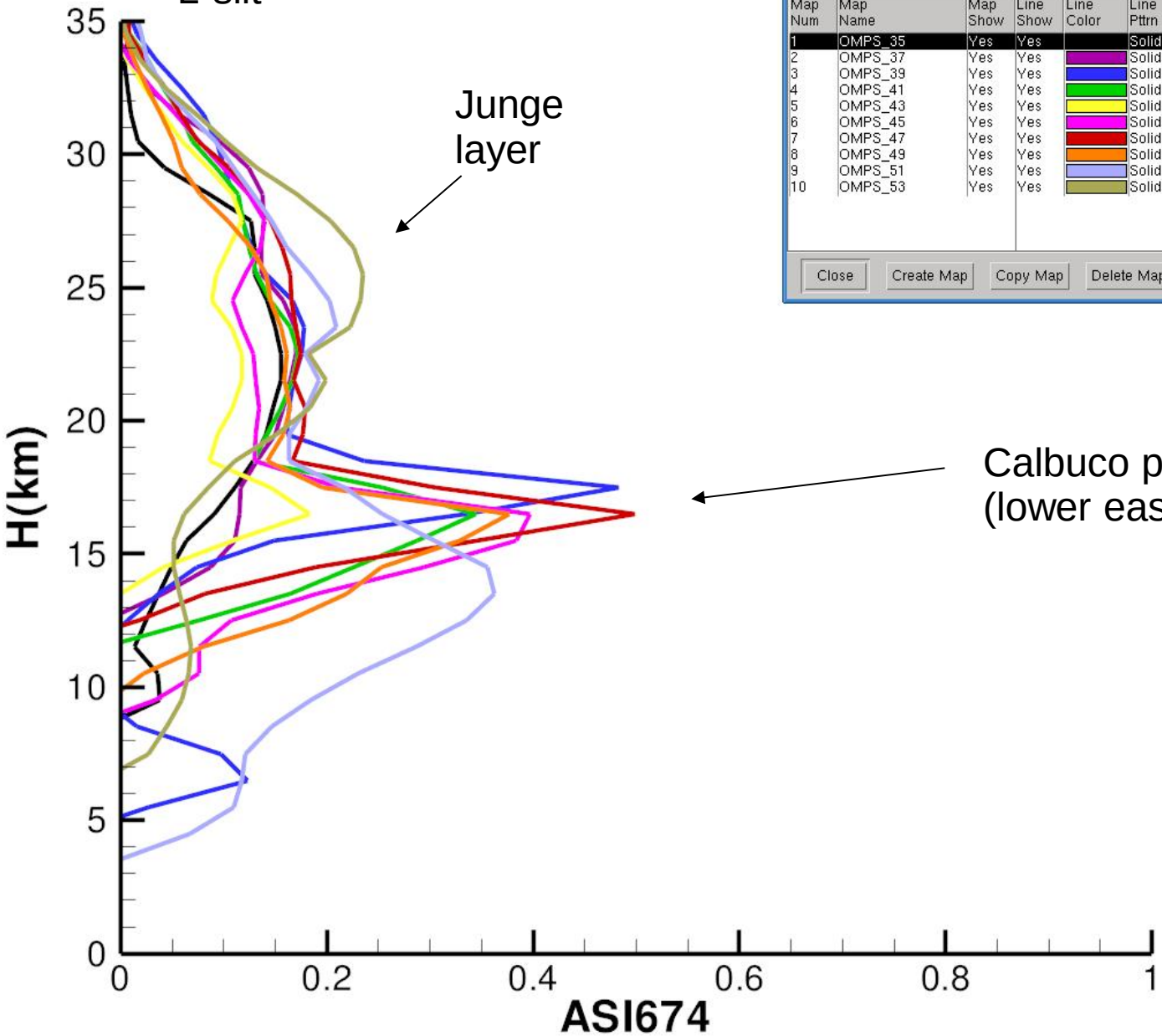


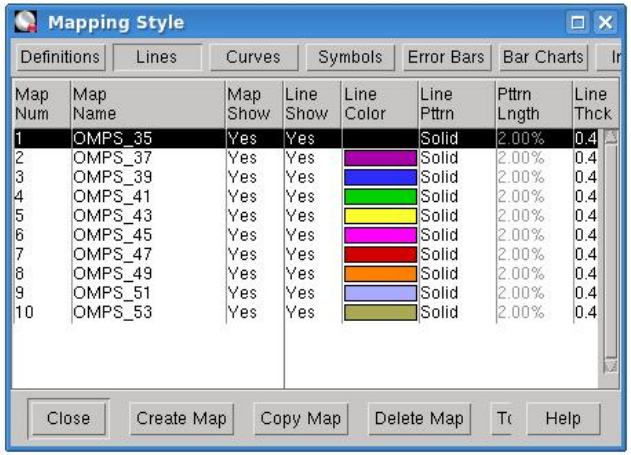


Map Num	Map Name	Map Show	Line Show	Line Color	Line Pttrn	Pttrn Lngth	Line Thck
1	OMPS_46	Yes	Yes		Solid	2.00%	0.40%
2	OMPS_47	Yes	Yes		Solid	2.00%	0.40%
3	OMPS_48	Yes	Yes		Solid	2.00%	0.40%
4	OMPS_49	Yes	Yes		Solid	2.00%	0.40%
5	OMPS_50	Yes	Yes		Solid	2.00%	0.40%
6	OMPS_51	Yes	Yes		Solid	2.00%	0.40%
7	OMPS_52	Yes	Yes		Solid	2.00%	0.40%
8	OMPS_53	Yes	Yes		Solid	2.00%	0.40%
9	OMPS_54	Yes	Yes		Solid	2.00%	0.40%
10	OMPS_55	Yes	Yes		Solid	2.00%	0.40%


SO2 brightness temperature index V3 [K]
Calbuco eruption
and OMPS orbits
29 April 2015
Day
IASI – ULB/BIRA-IASB/CNES/EUMETSAT [MetOp-B]
18151
18150
18149
18148
18147
0
0.5
1
2.5
5
10
>20

April 29, 2015, orbit 18148,
L-slit





Map Num	Map Name	Map Show	Line Show	Line Color	Line Pttrn	Pttrn Lngth	Line Thck
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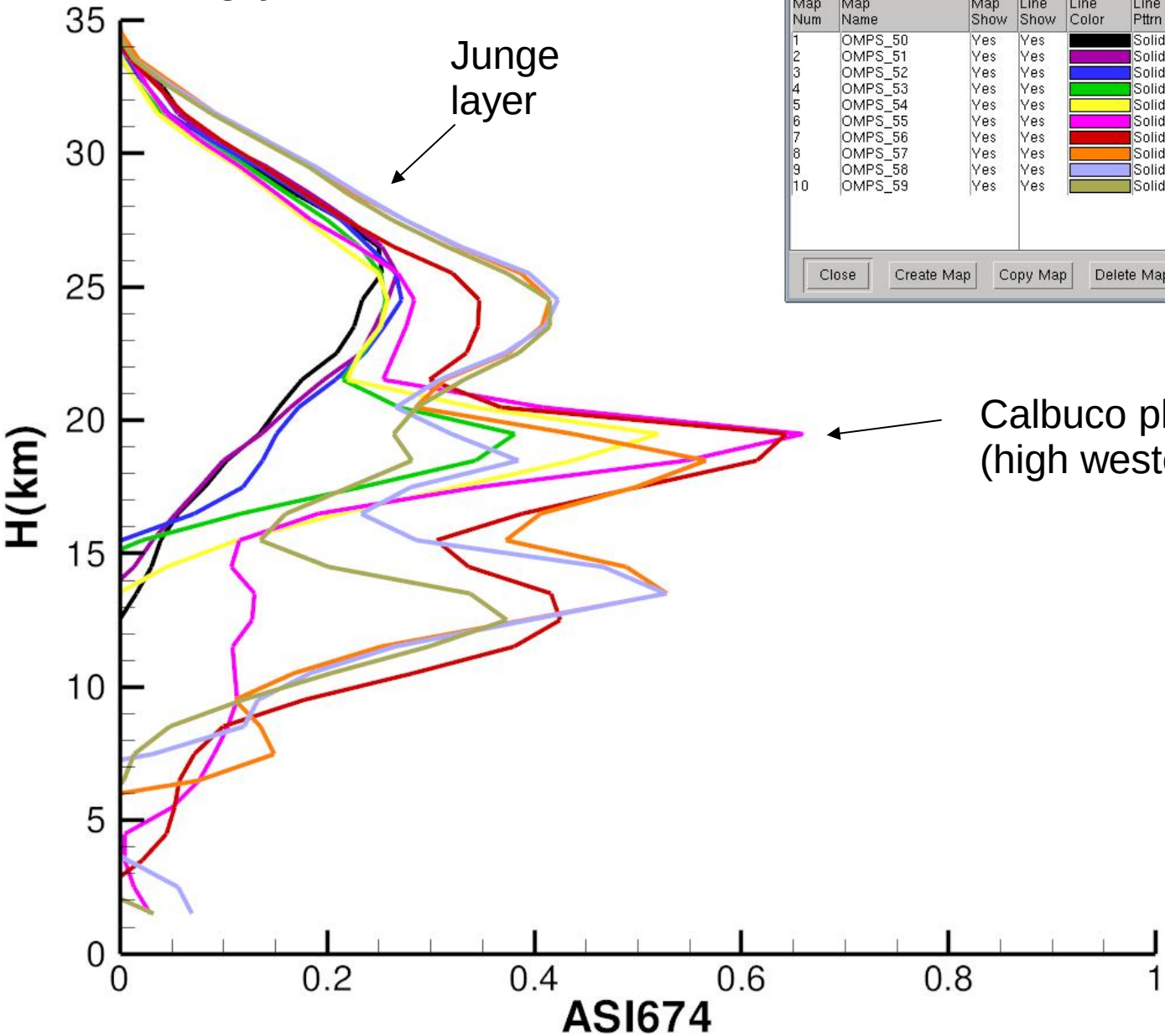
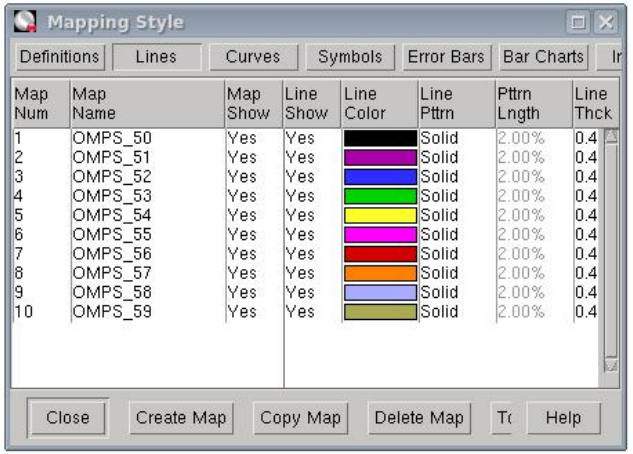
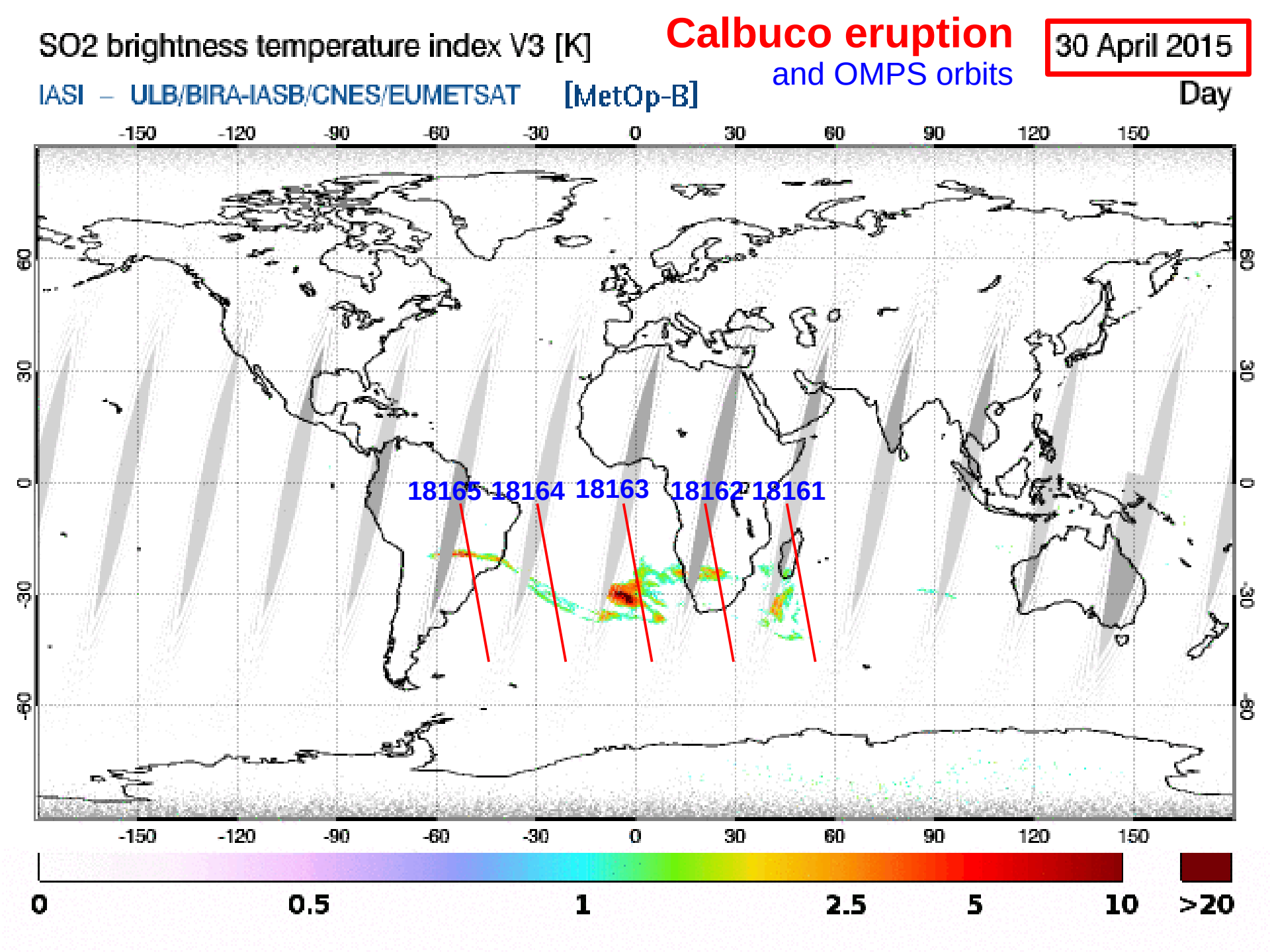
2	OMPS_37	Yes	Yes		Solid	2.00%	0.4
3	OMPS_39	Yes	Yes		Solid	2.00%	0.4
4	OMPS_41	Yes	Yes		Solid	2.00%	0.4
5	OMPS_43	Yes	Yes		Solid	2.00%	0.4
6	OMPS_45	Yes	Yes		Solid	2.00%	0.4
7	OMPS_47	Yes	Yes		Solid	2.00%	0.4
8	OMPS_49	Yes	Yes		Solid	2.00%	0.4
9	OMPS_51	Yes	Yes		Solid	2.00%	0.4
10	OMPS_53	Yes	Yes		Solid	2.00%	0.4

April 29, 2015, orbit 18151,
L-slit

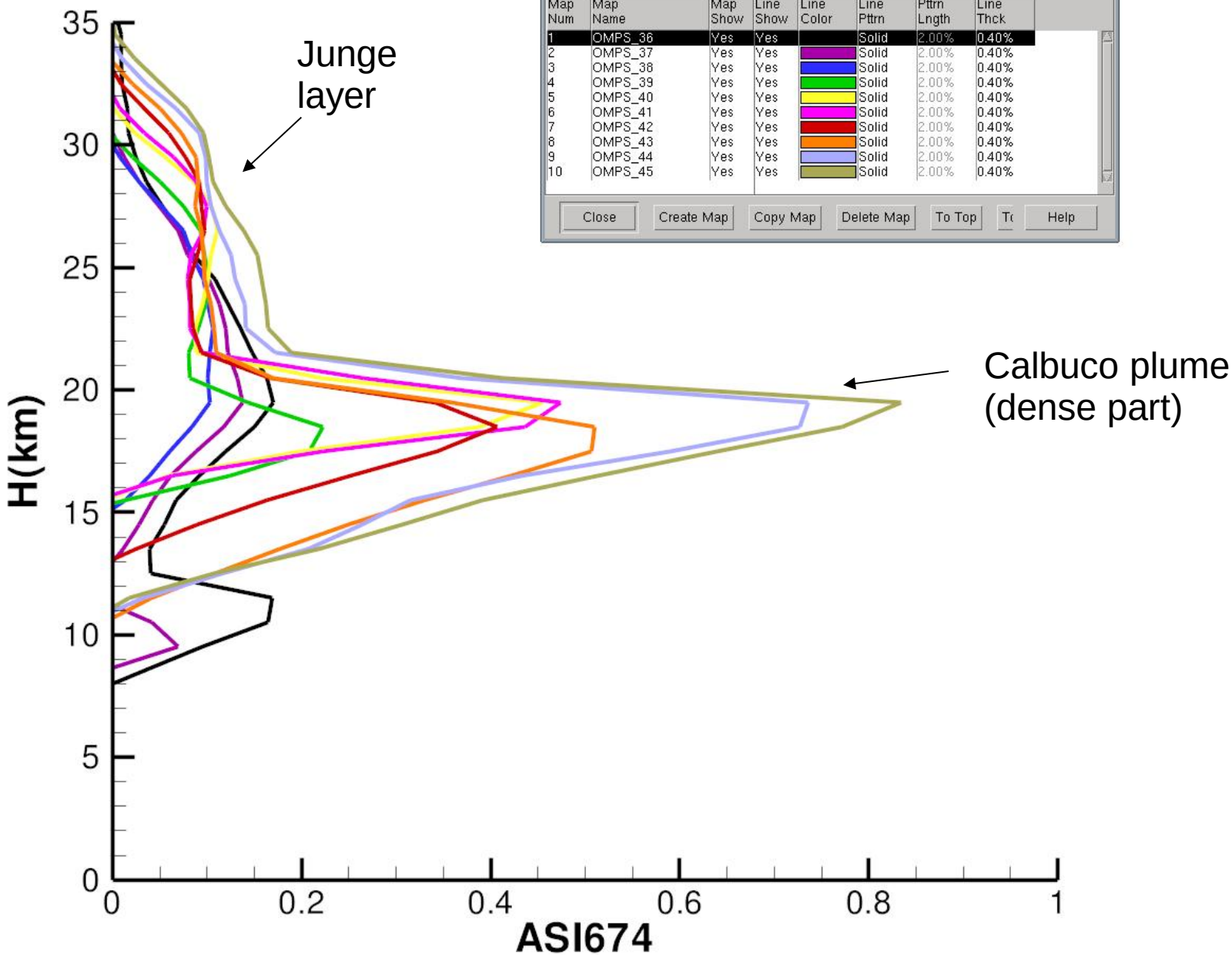




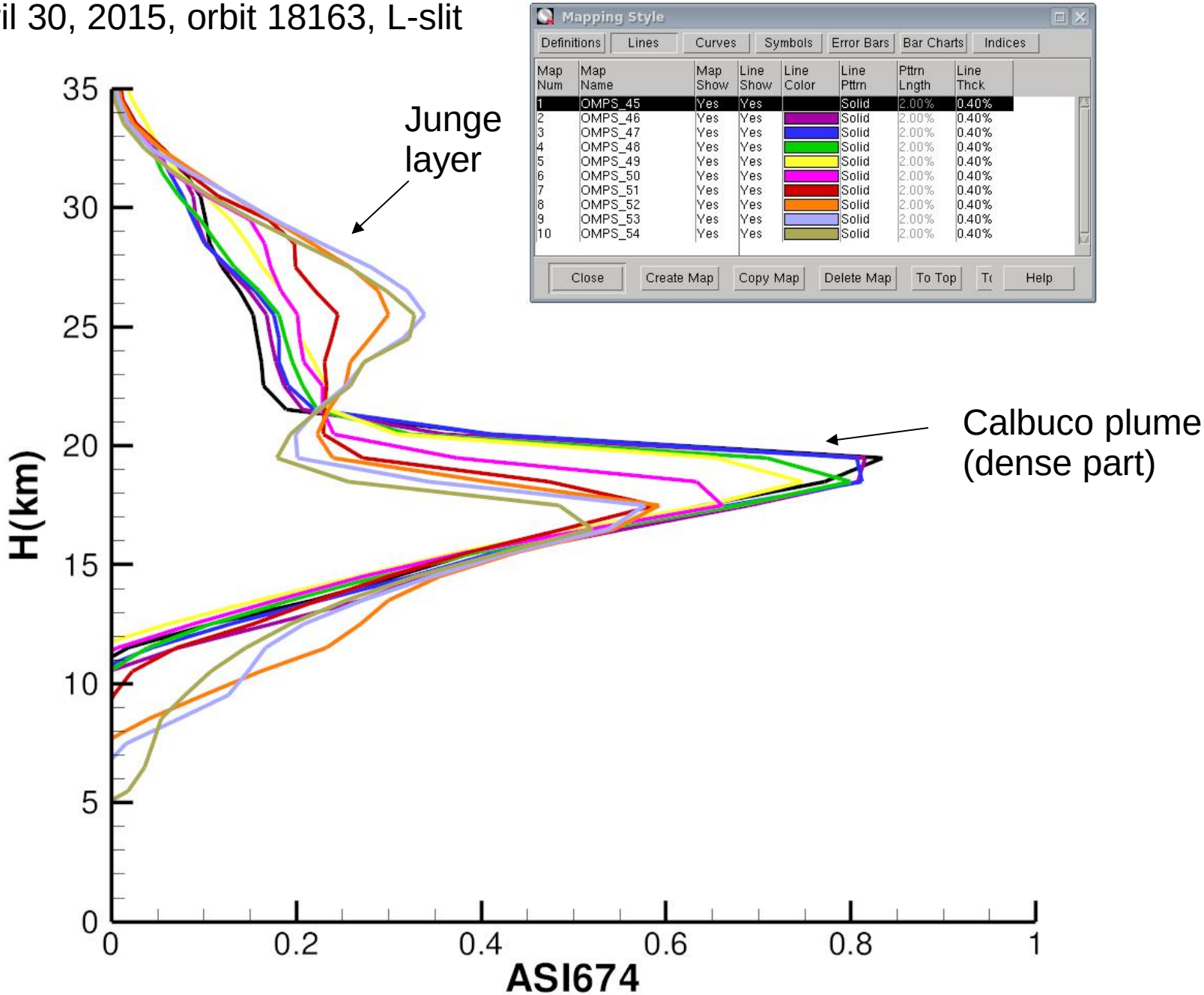
Map Num	Map Name	Map Show	Line Show	Line Color	Line Pttrn	Pttrn Lngth	Line Thck
1	OMPS_50	Yes	Yes		Solid	2.00%	0.4
2	OMPS_51	Yes	Yes		Solid	2.00%	0.4
3	OMPS_52	Yes	Yes		Solid	2.00%	0.4
4	OMPS_53	Yes	Yes		Solid	2.00%	0.4
5	OMPS_54	Yes	Yes		Solid	2.00%	0.4
6	OMPS_55	Yes	Yes		Solid	2.00%	0.4
7	OMPS_56	Yes	Yes		Solid	2.00%	0.4
8	OMPS_57	Yes	Yes		Solid	2.00%	0.4
9	OMPS_58	Yes	Yes		Solid	2.00%	0.4
10	OMPS_59	Yes	Yes		Solid	2.00%	0.4


SO2 brightness temperature index V3 [K]
Calbuco eruption
and OMPS orbits
30 April 2015
Day
IASI – ULB/BIRA-IASB/CNES/EUMETSAT [MetOp-B]
18165
18164
18163
18162
18161
0
0.5
1
2.5
5
10
>20

April 30, 2015, orbit 18163, L-slit

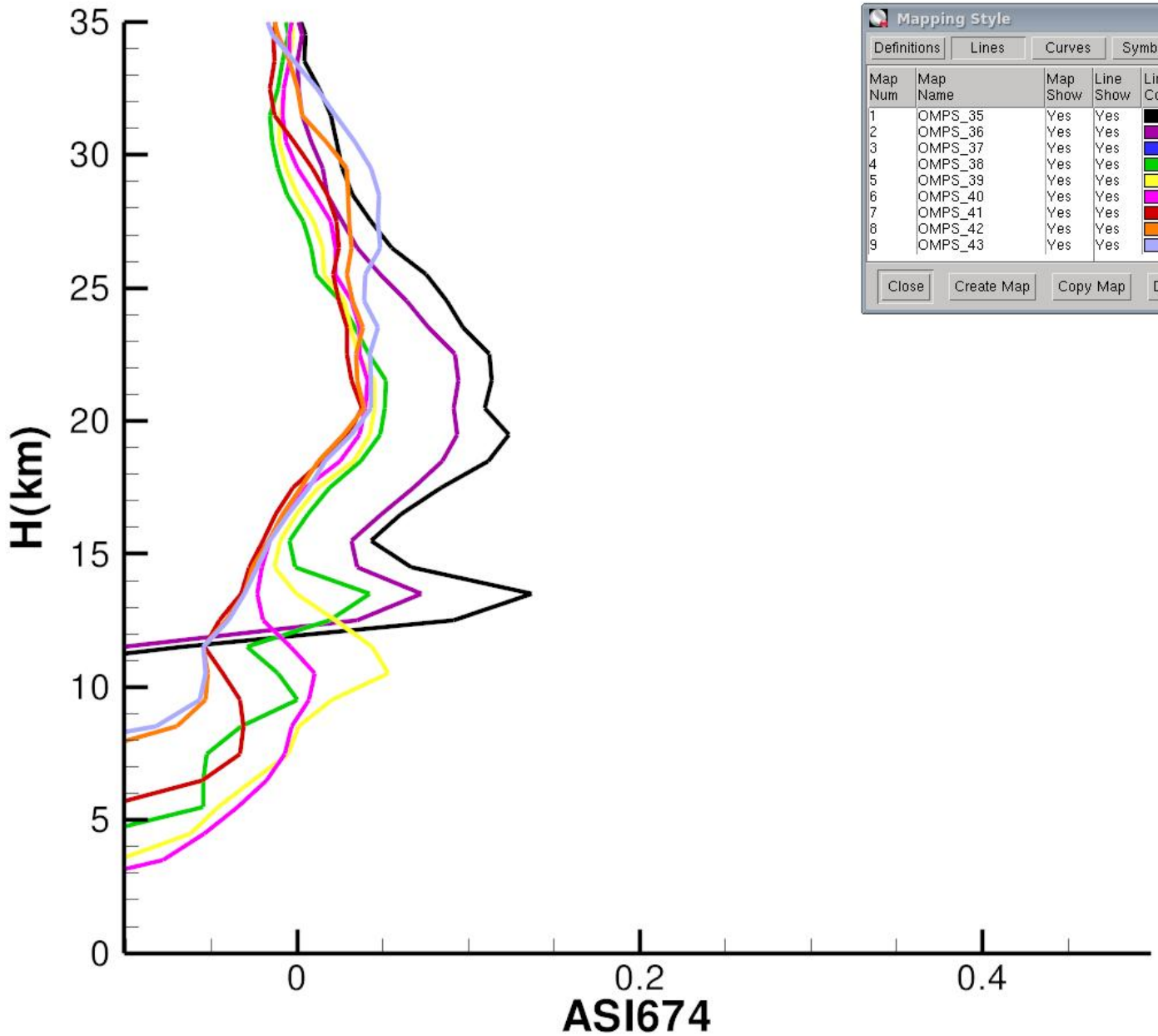


April 30, 2015, orbit 18163, L-slit

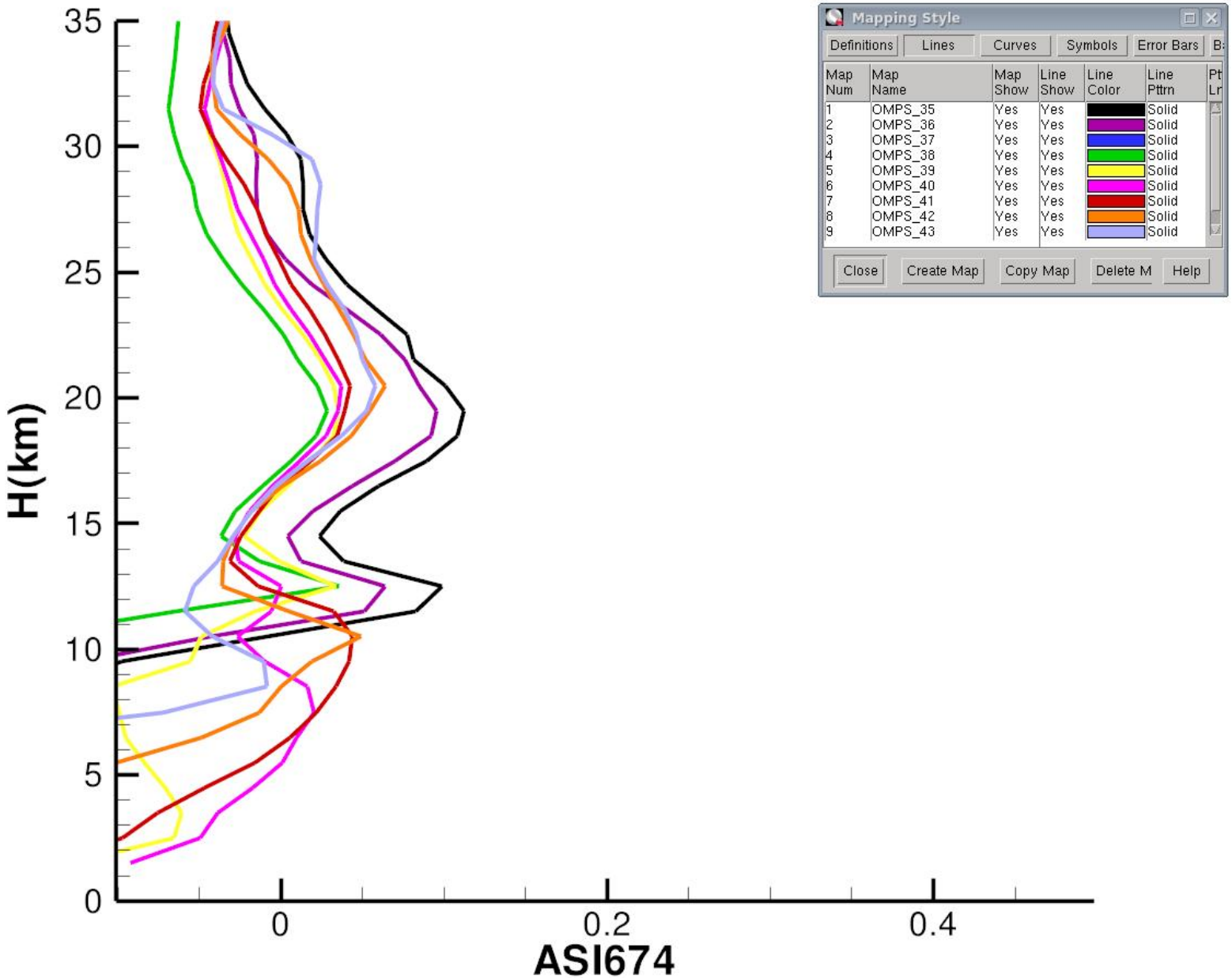


Backup Slides

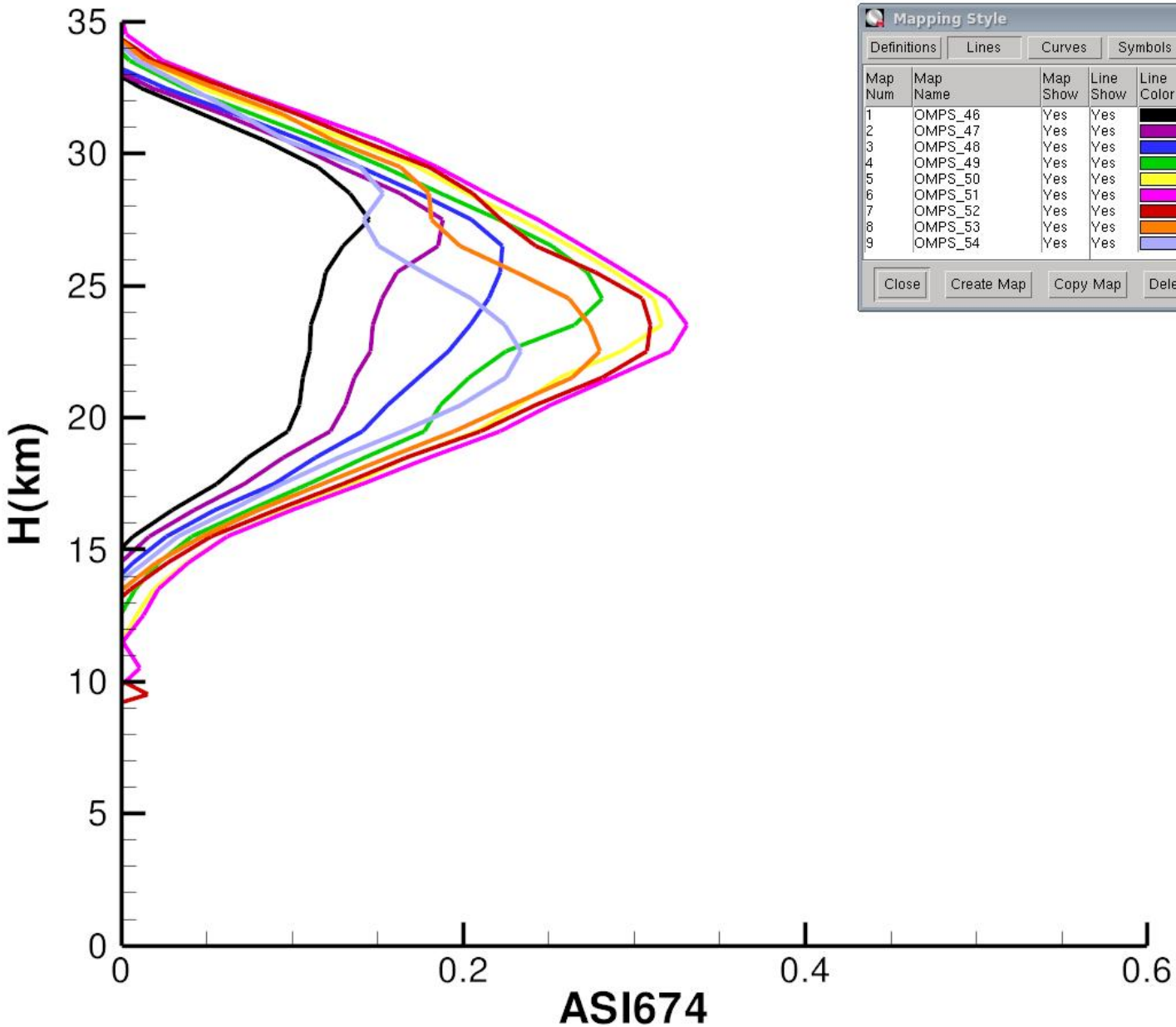
April 24, 2015, ASI674, Left slit, event 35-43, orbit 18081

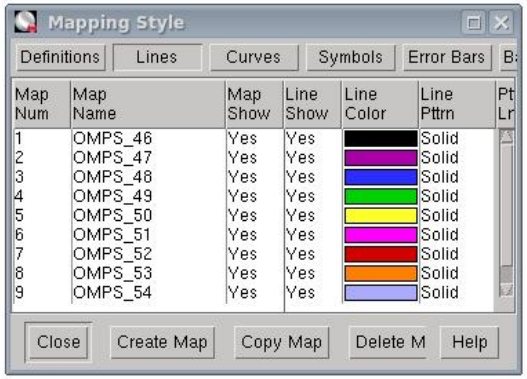


April 24, 2015, ASI674, Right slit, event 35-43, orbit 18081



April 24, 2015, ASI674, Central slit, event 46-54, orbit 18081





Map Num	Map Name	Map Show	Line Show	Line Color	Line Pttrn
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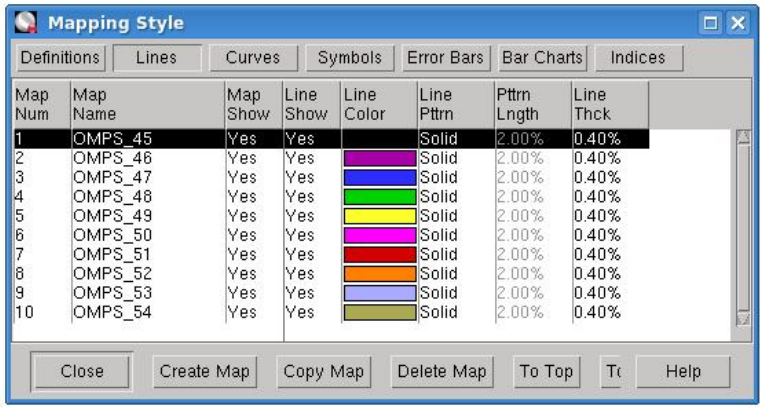
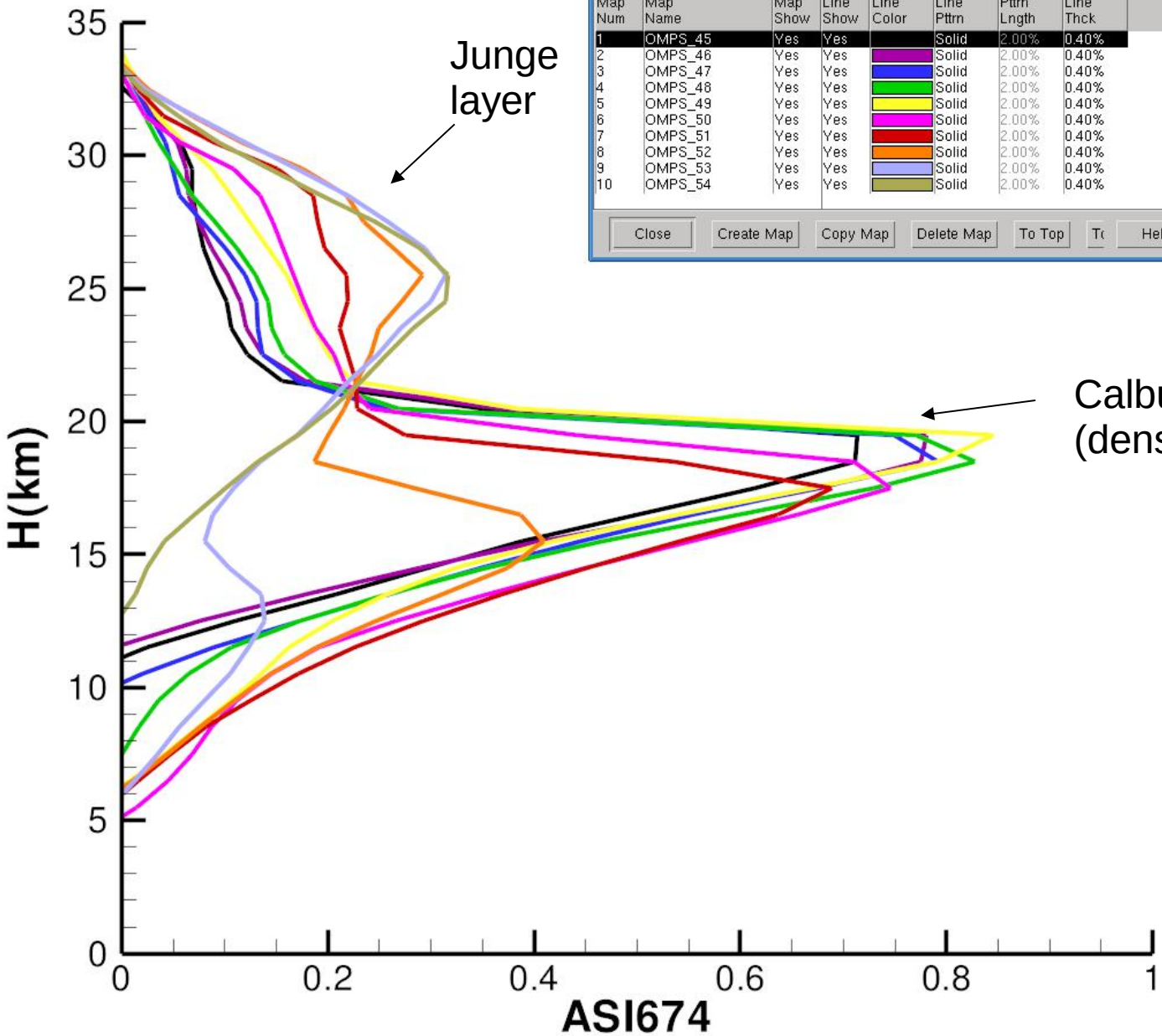
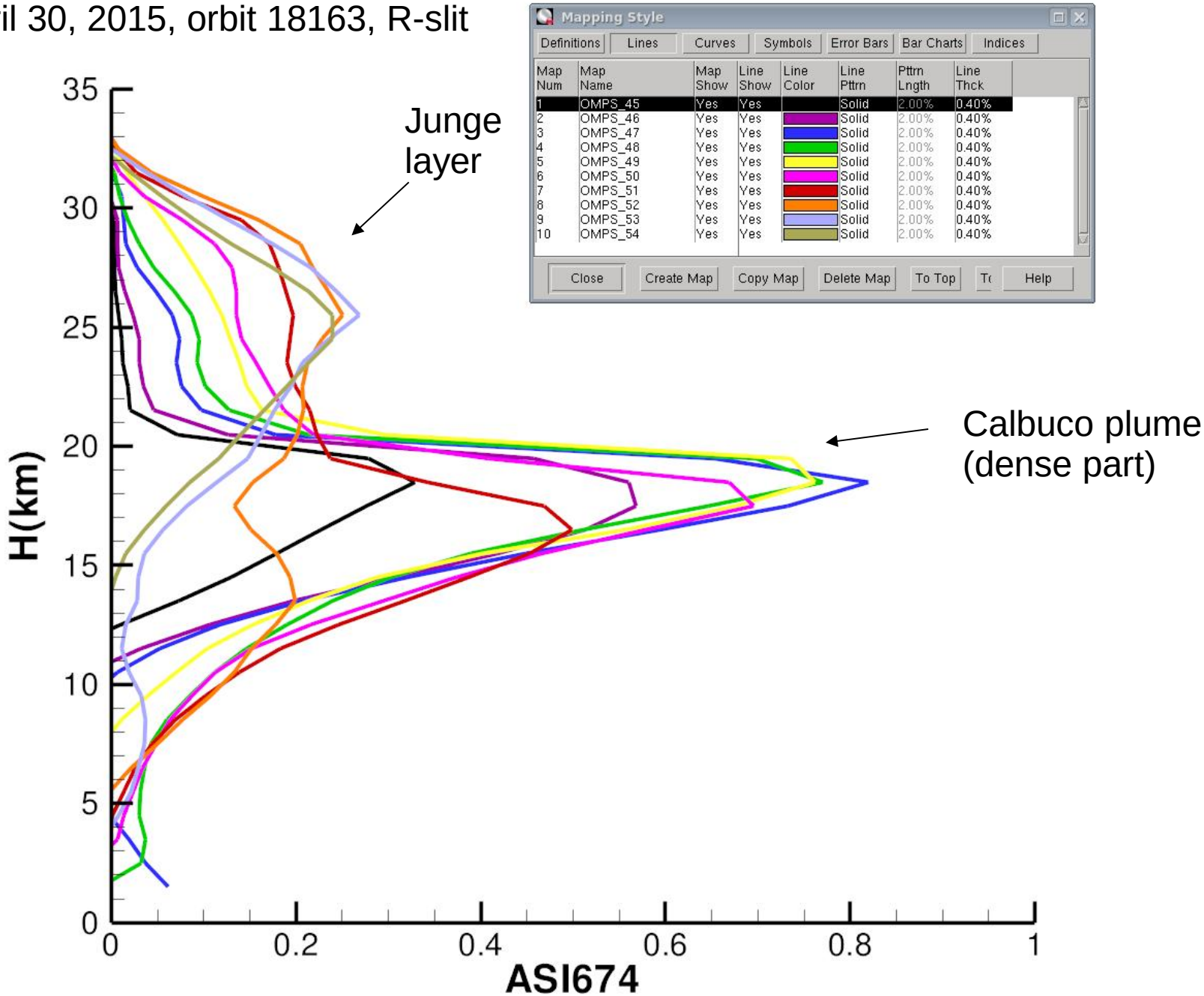
2	OMPS_47	Yes	Yes		Solid
3	OMPS_48	Yes	Yes		Solid
4	OMPS_49	Yes	Yes		Solid
5	OMPS_50	Yes	Yes		Solid
6	OMPS_51	Yes	Yes		Solid
7	OMPS_52	Yes	Yes		Solid
8	OMPS_53	Yes	Yes		Solid
9	OMPS_54	Yes	Yes		Solid

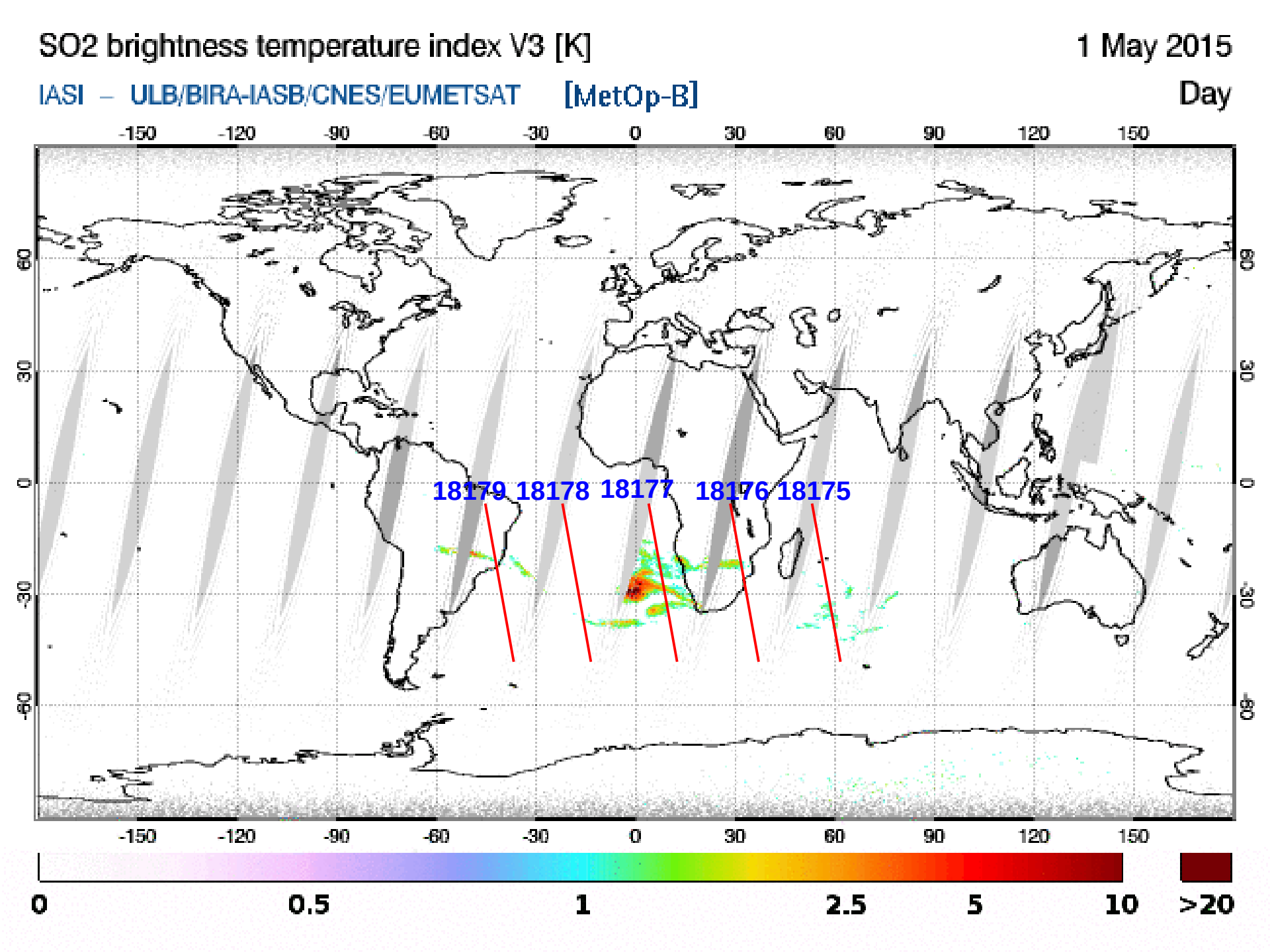
April 30, 2015, orbit 18163, C-slit





April 30, 2015, orbit 18163, R-slit




SO2 brightness temperature index V3 [K]
1 May 2015
IASI – ULB/BIRA-IASB/CNES/EUMETSAT [MetOp-B]
Day
18179 18178 18177 18176 18175
-150 -120 -90 -60 -30 0 30 60 90 120 150
60 30 0 -30 -60
0 0.5 1 2.5 5 10 >20