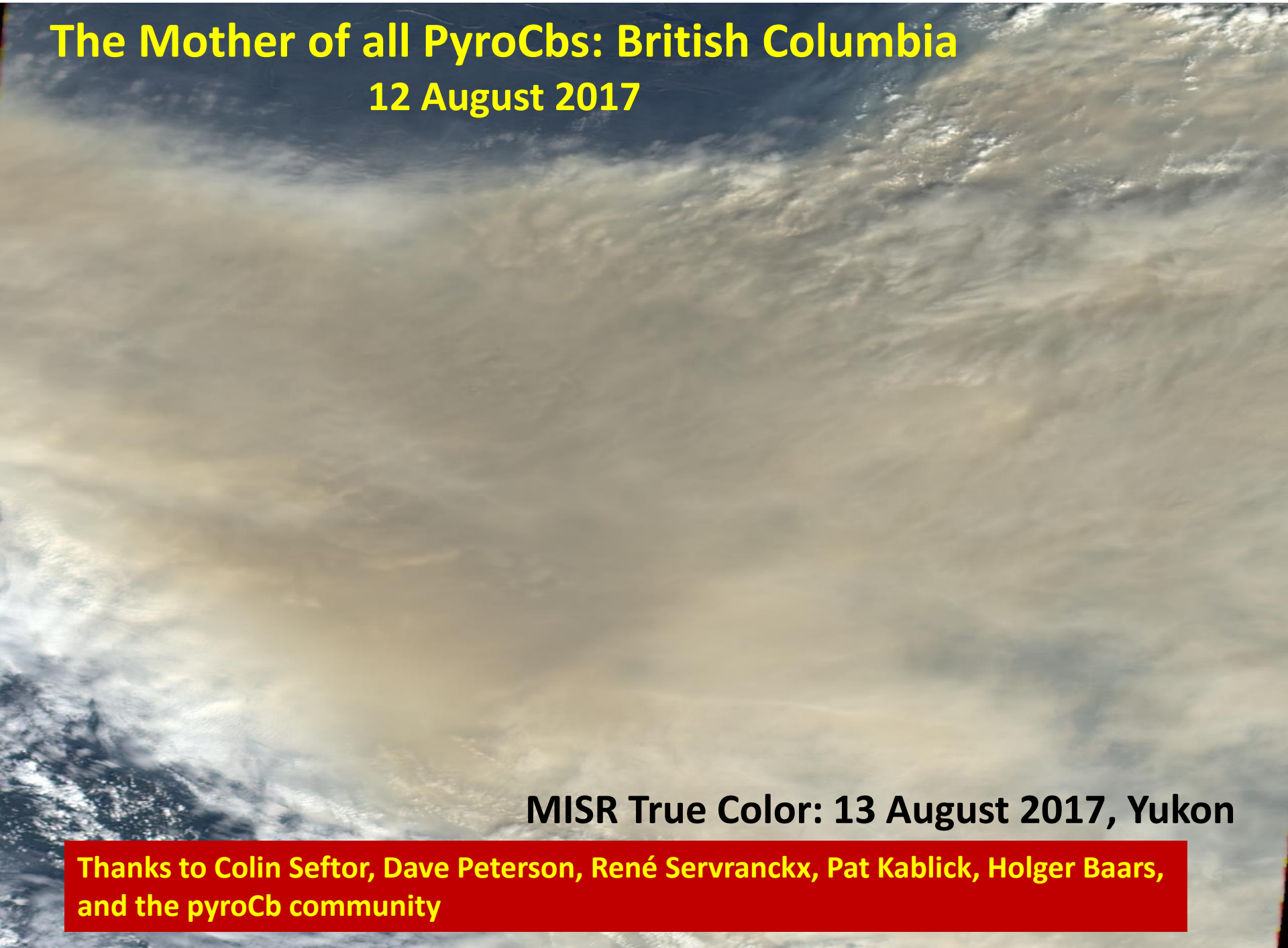
The Mother of all PyroCbs: British Columbia

12 August 2017



MISR True Color: 13 August 2017, Yukon

Thanks to Colin Seftor, Dave Peterson, René Servranckx, Pat Kablick, Holger Baars, and the pyroCb community

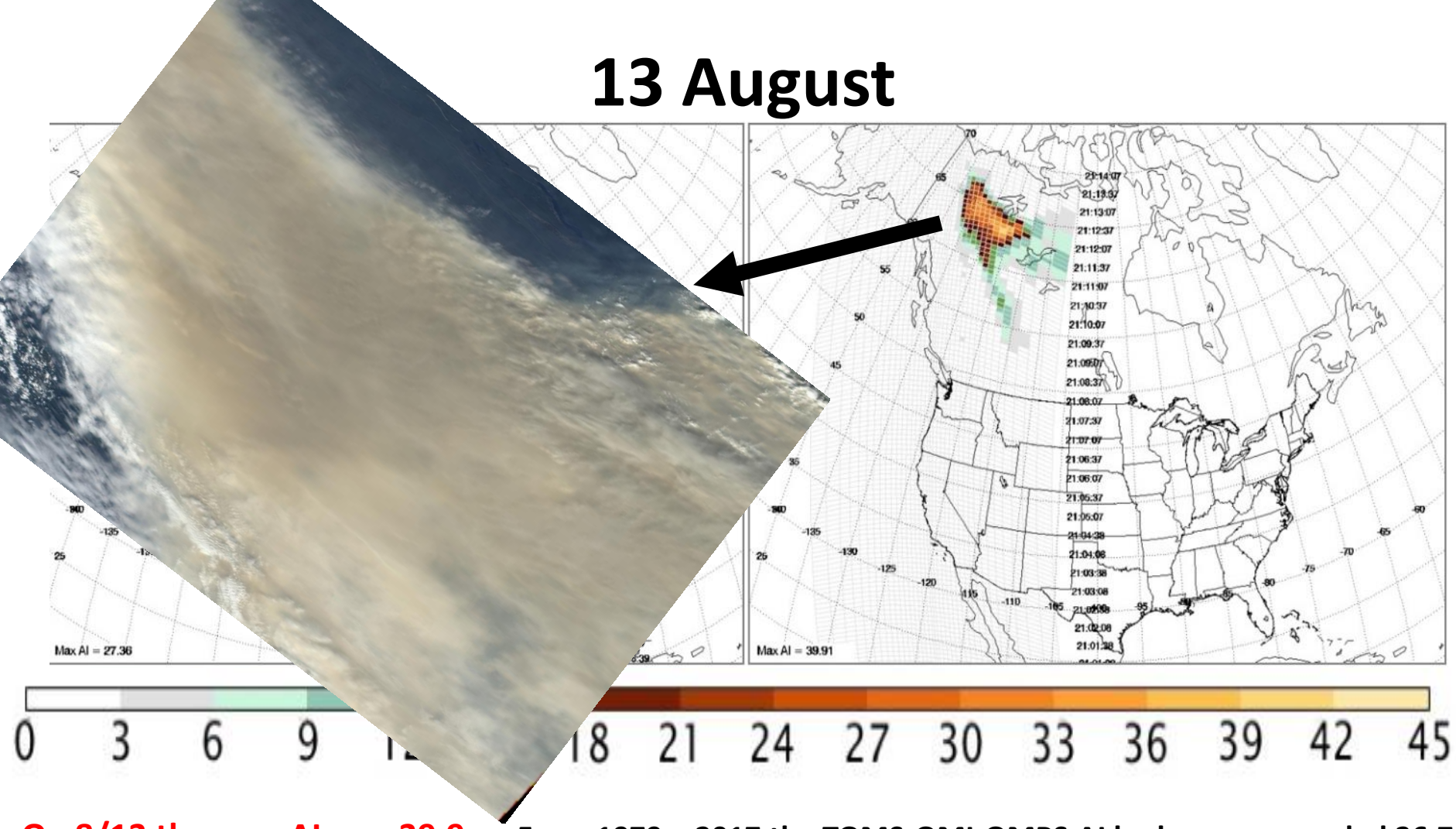
13 August

Email to the pyroCb discussion group, regarding OMPS UV Aerosol Index…

Colin Seftor (NASA GSFC): "I can safely say that I have never used the AI scale that I have on the attached OMPS AI imagery before.

…I think this maximum AI value (39.9) is the highest ever seen (including for volcanic ash). It's the highest I can remember."

13 August

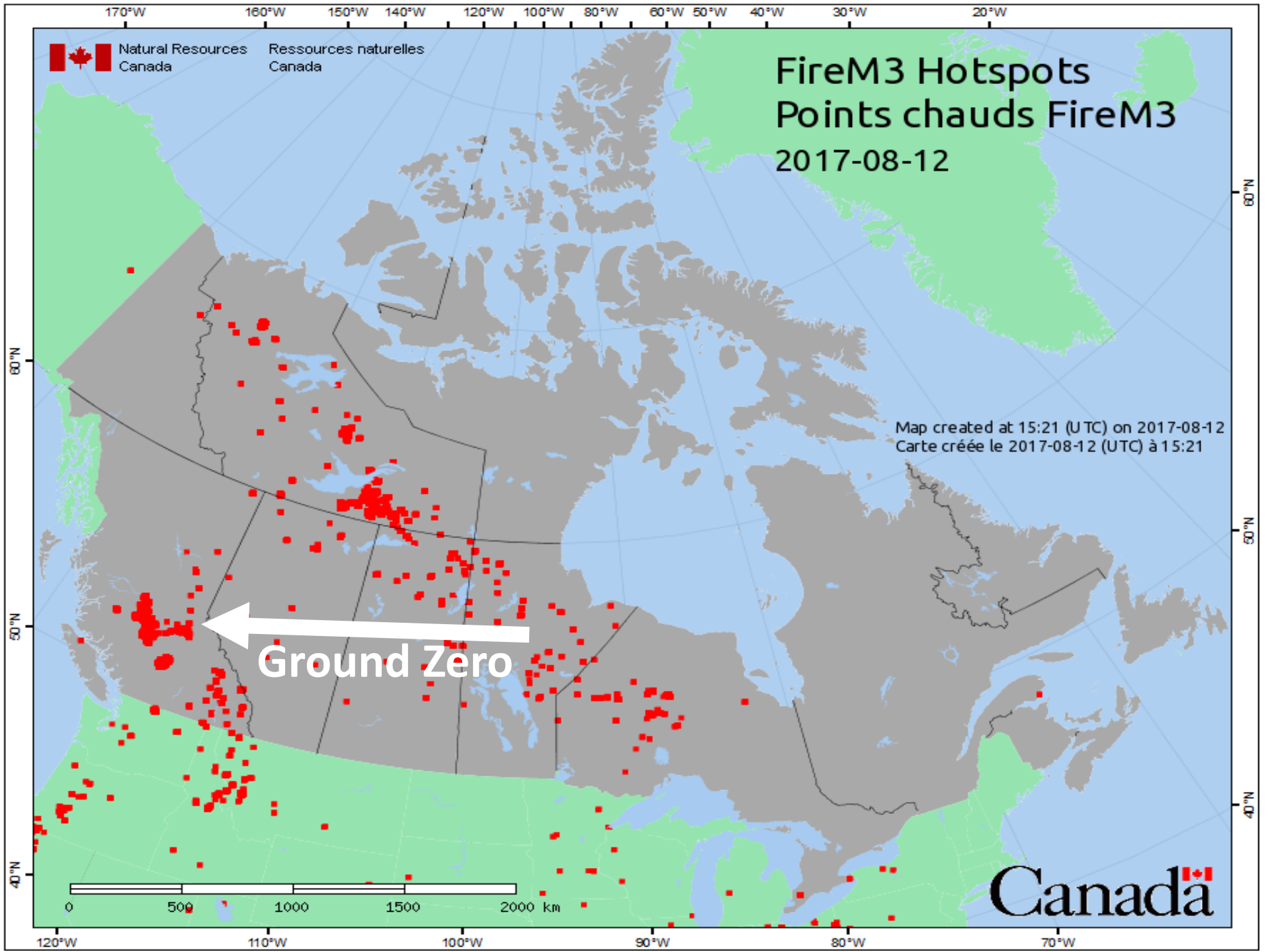


On 8/13 the max AI was 39.9. **From 1979 – 2017 the TOMS-OMI-OMPS AI had never exceeded 36.7.**

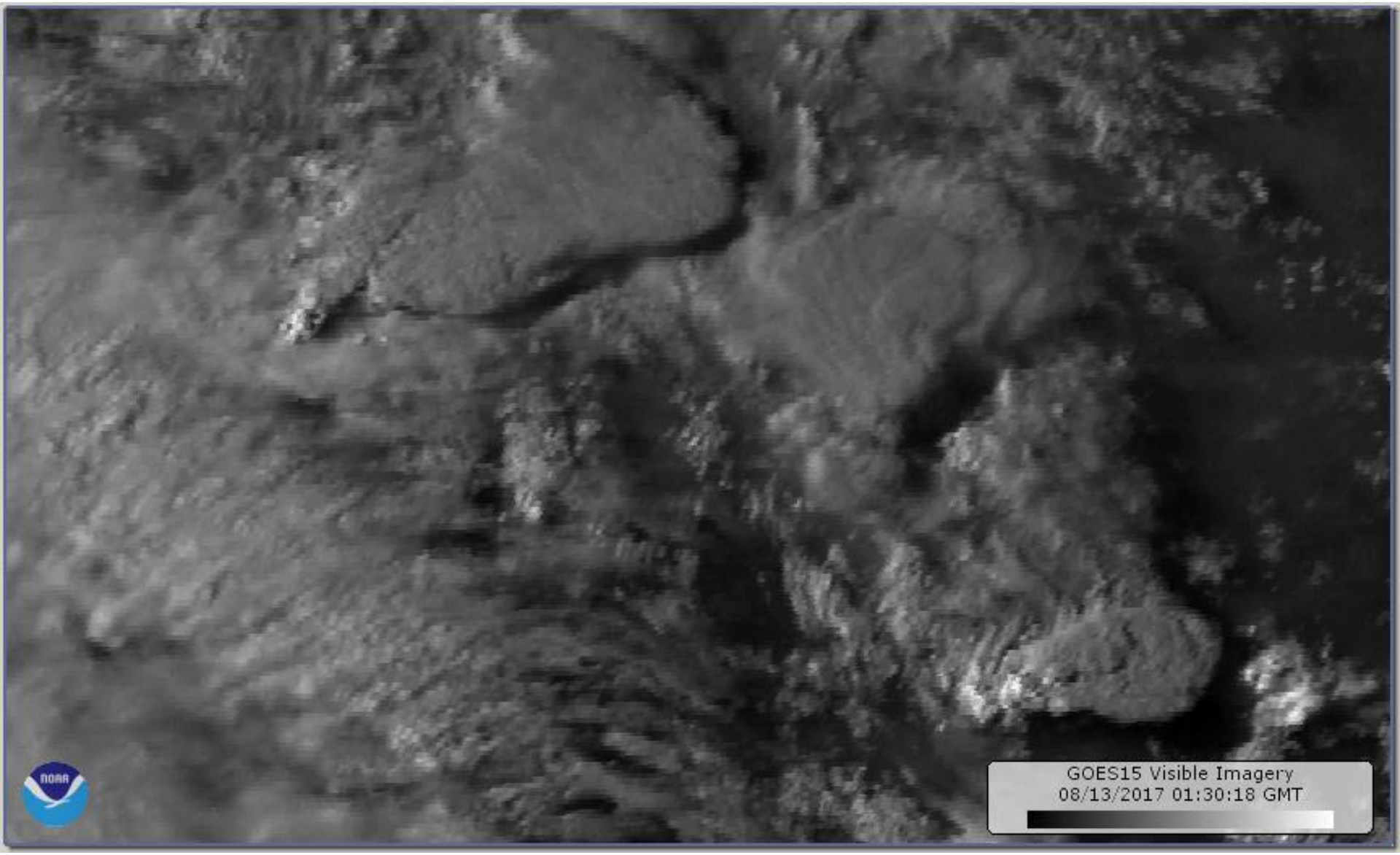
On 8/14 the max AI surged to 49.4. **Such an increase within a plume has never happened.**

On 8/15 it increased to 49.7. **This is just plain unprecedented.**

The plume is either higher, thicker, or blacker than any smoke plume since 1979. NO VOLCANO has created anything like this.

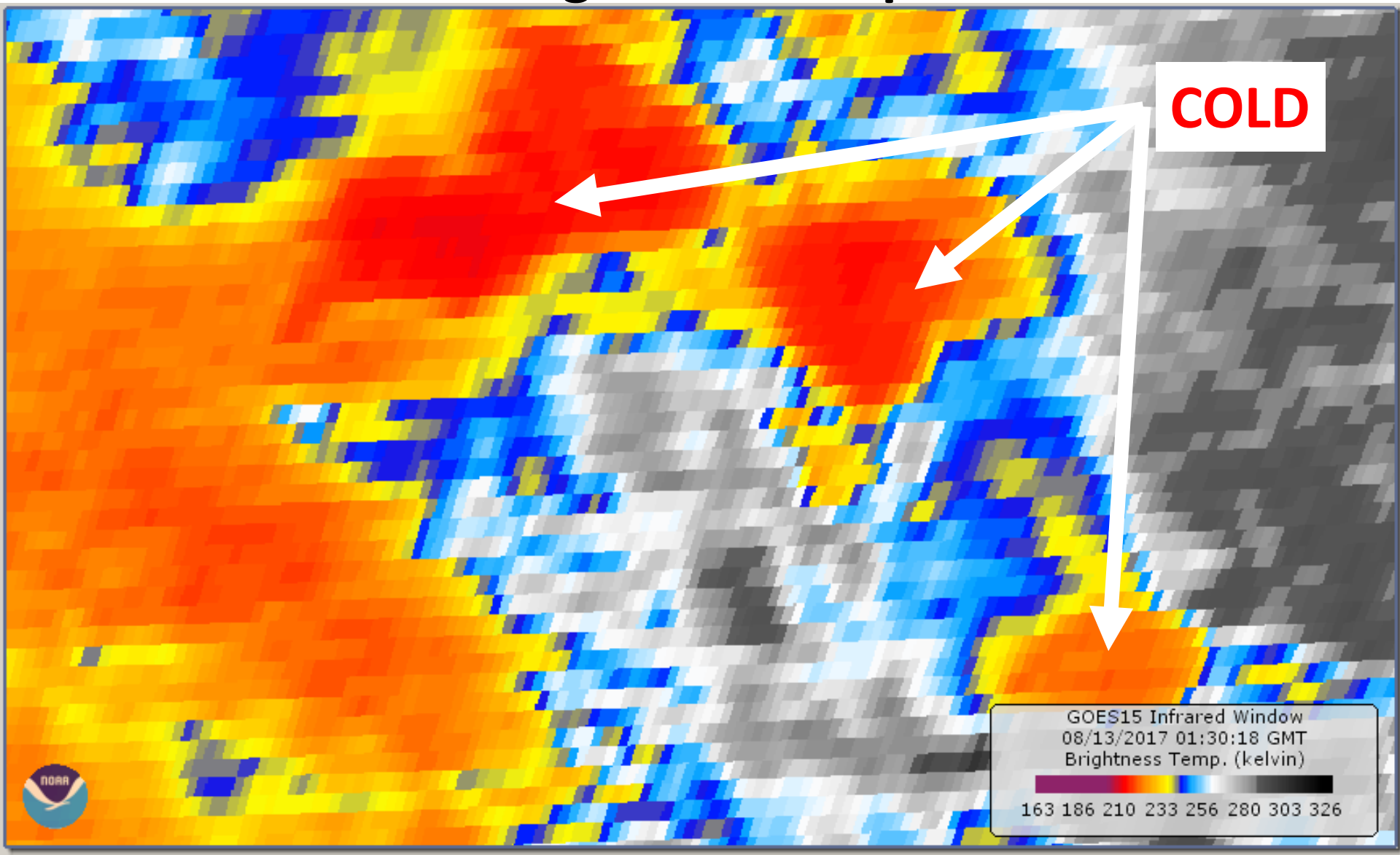

Natural Resources Canada
Ressources naturelles Canada
FireM3 Hotspots
Points chauds FireM3
2017-08-12
Map created at 15:21 (UTC) on 2017-08-12
Carte créée le 2017-08-12 (UTC) à 15:21
Ground Zero
0 500 1000 1500 2000 km
Canada
170°W 160°W 150°W 140°W 120°W 100°W 80°W 60°W 50°W 40°W 30°W 20°W
60°N 50°N 40°N
120°W 110°W 100°W 90°W 80°W 70°W

PyroCbs in action: dinnertime on 12 August
GOES West Visible



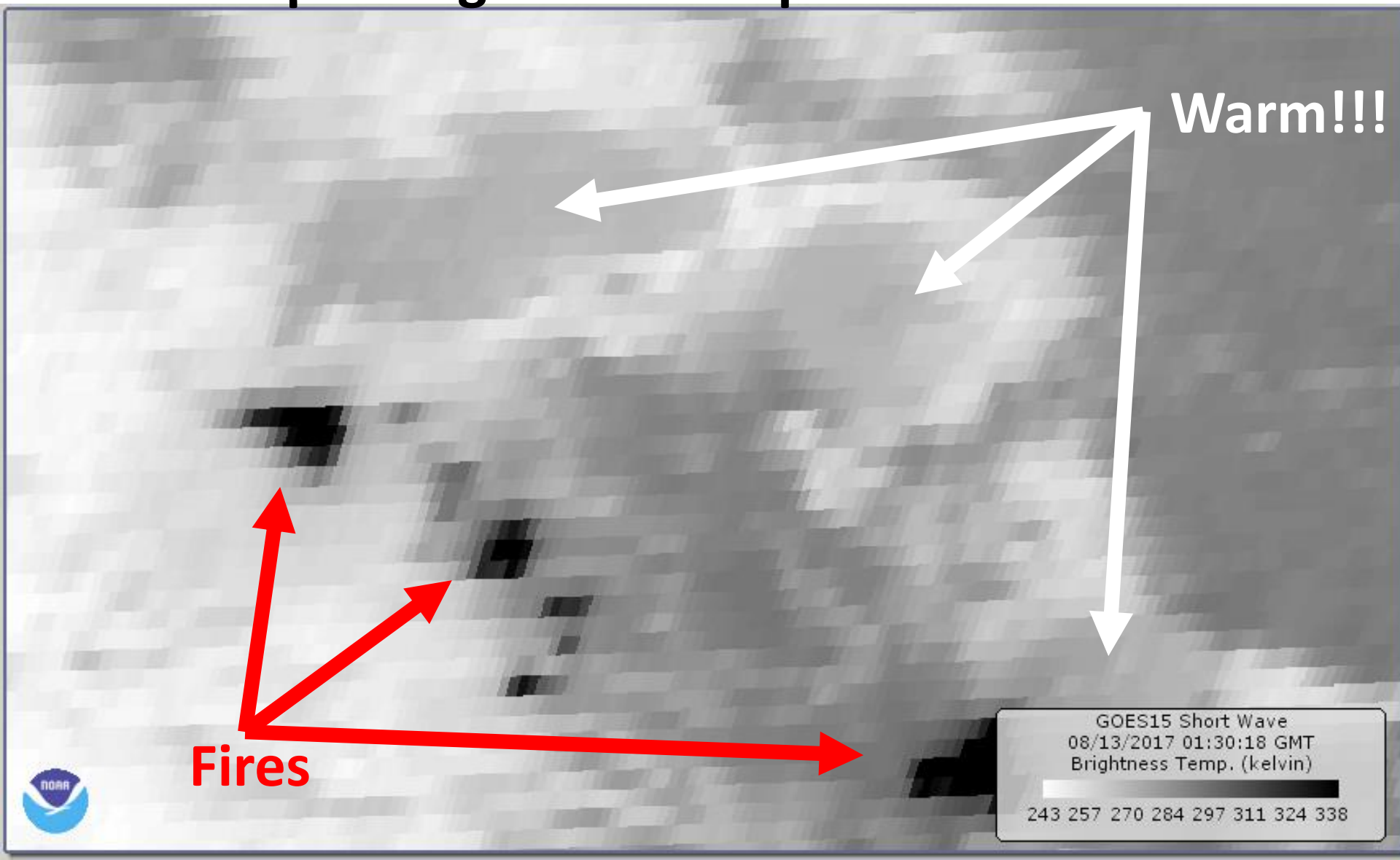
PyroCbs in action: dinnertime on 12 August

Window IR Brightness Temperature

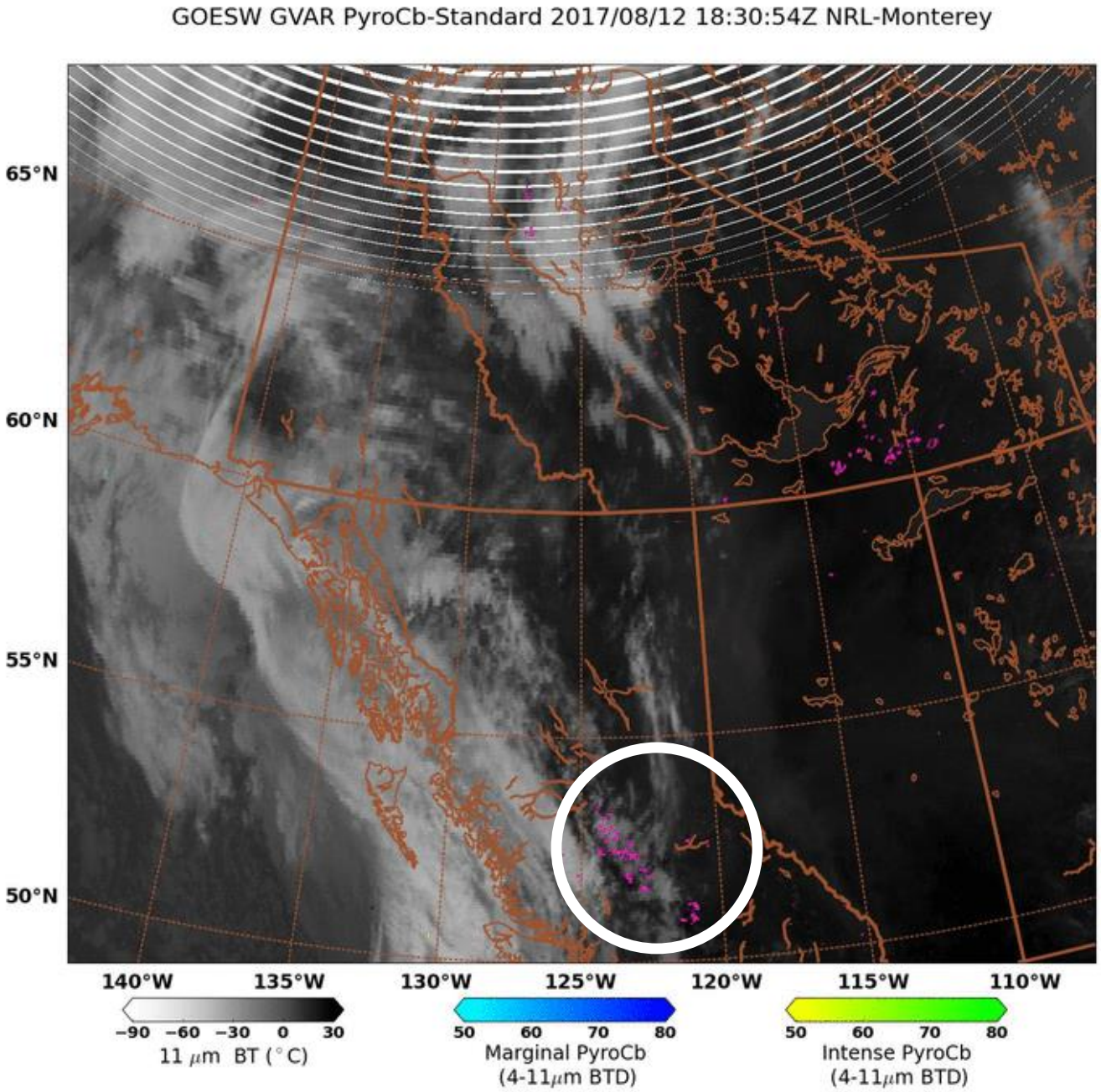


PyroCbs in action: dinnertime on 12 August

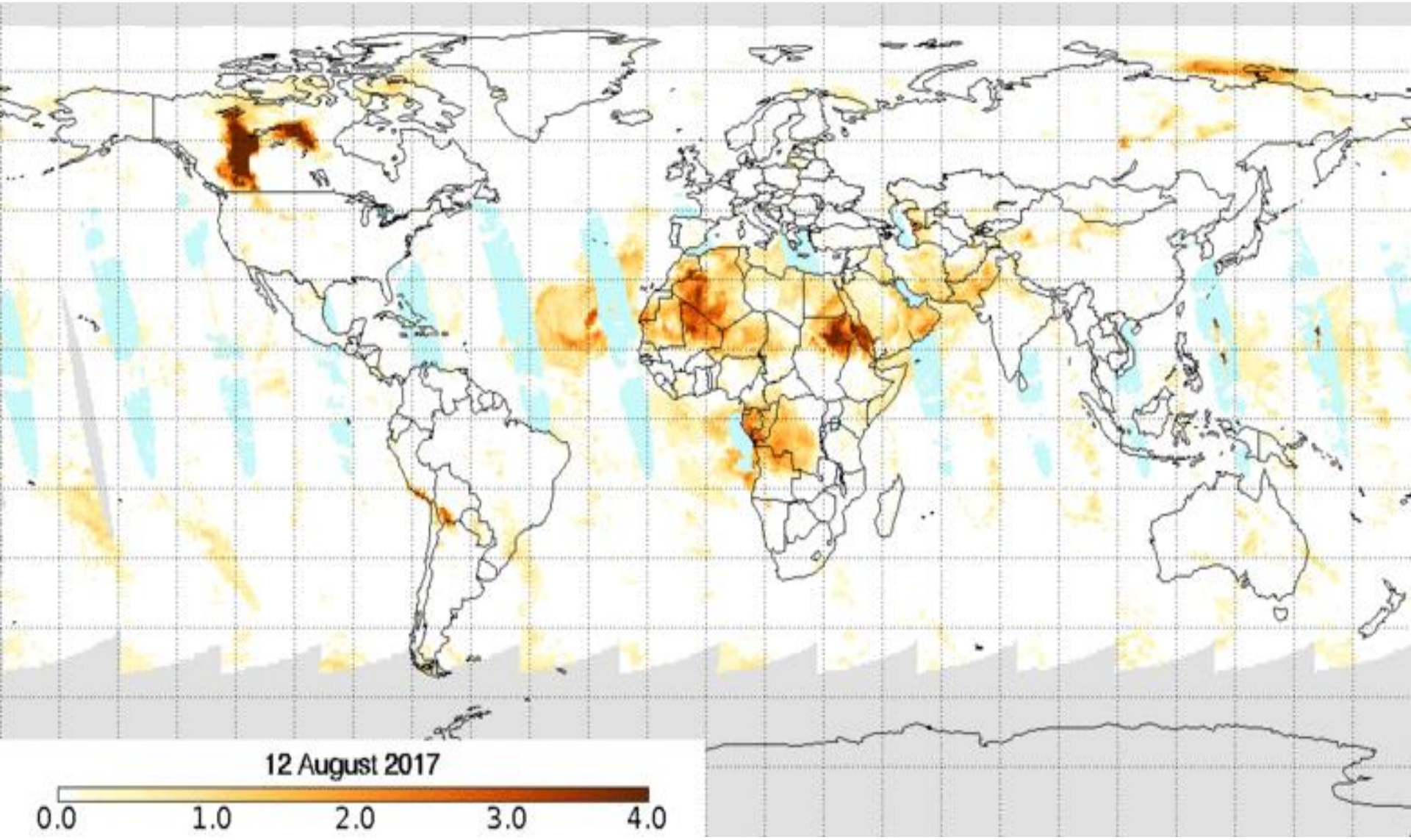
3.9µm Brightness Temperature



NRL pyroCb automated, near-real-time pyroCb detection algorithm



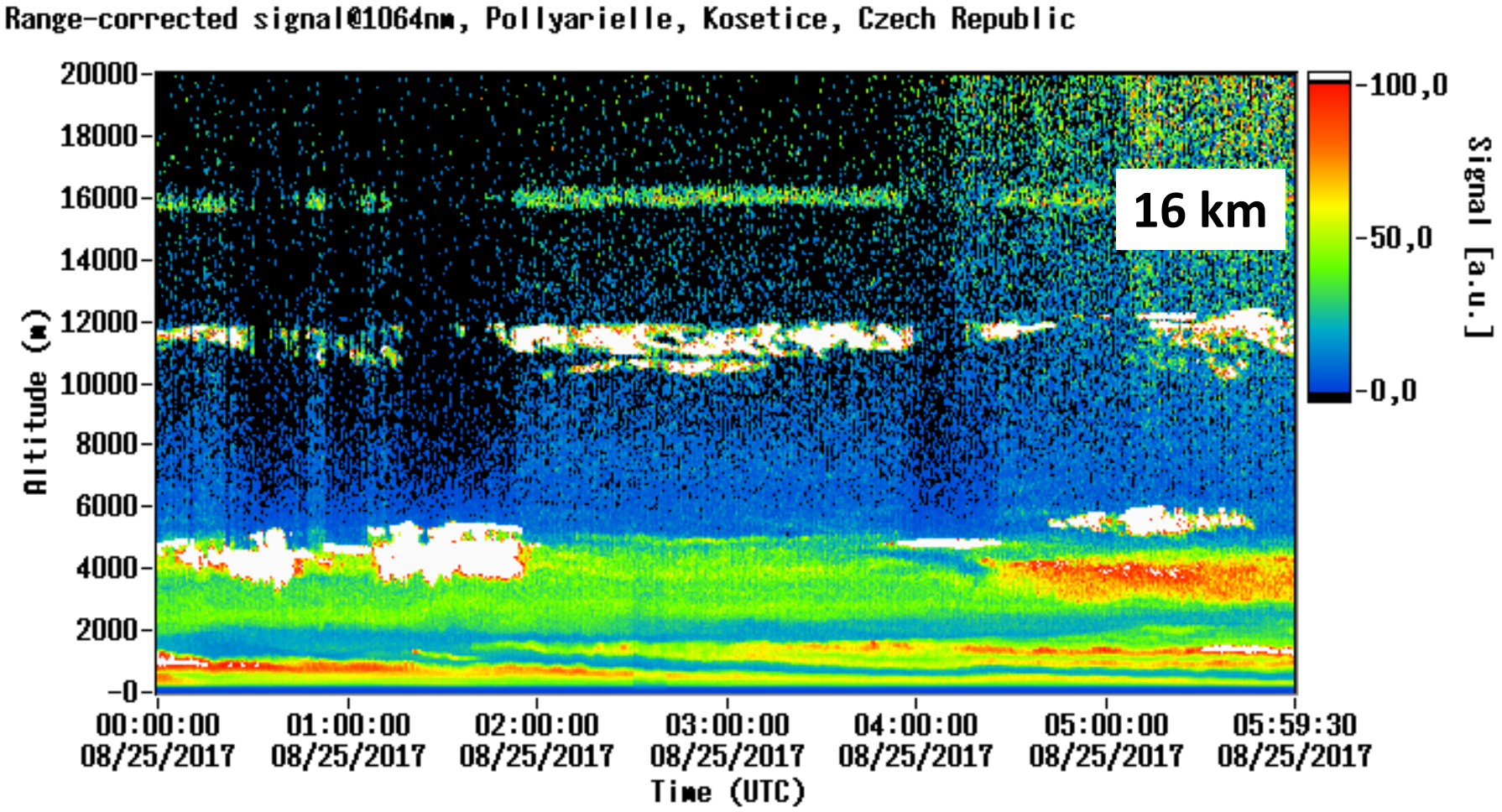
OMPS AI Animation, 12-27 August 2017



Thanks to Holger Baars:

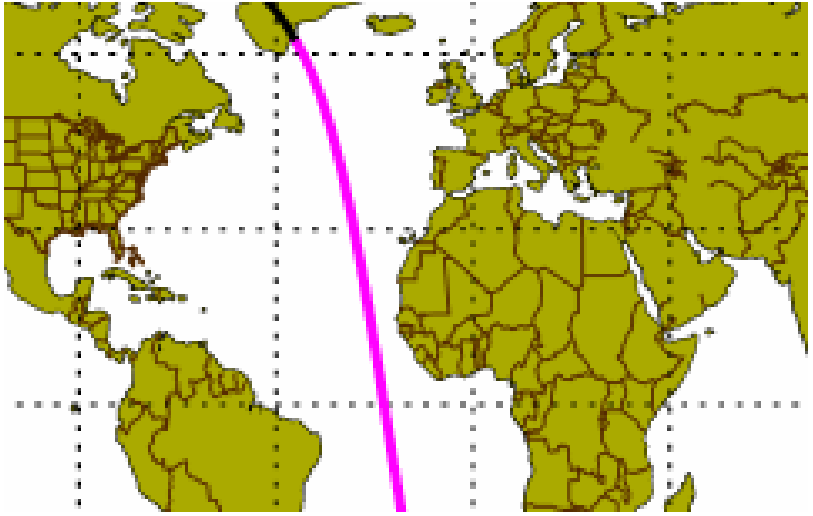
"…lidar in Kosetice, Czech Republic as part of an ACTRIS campaign"

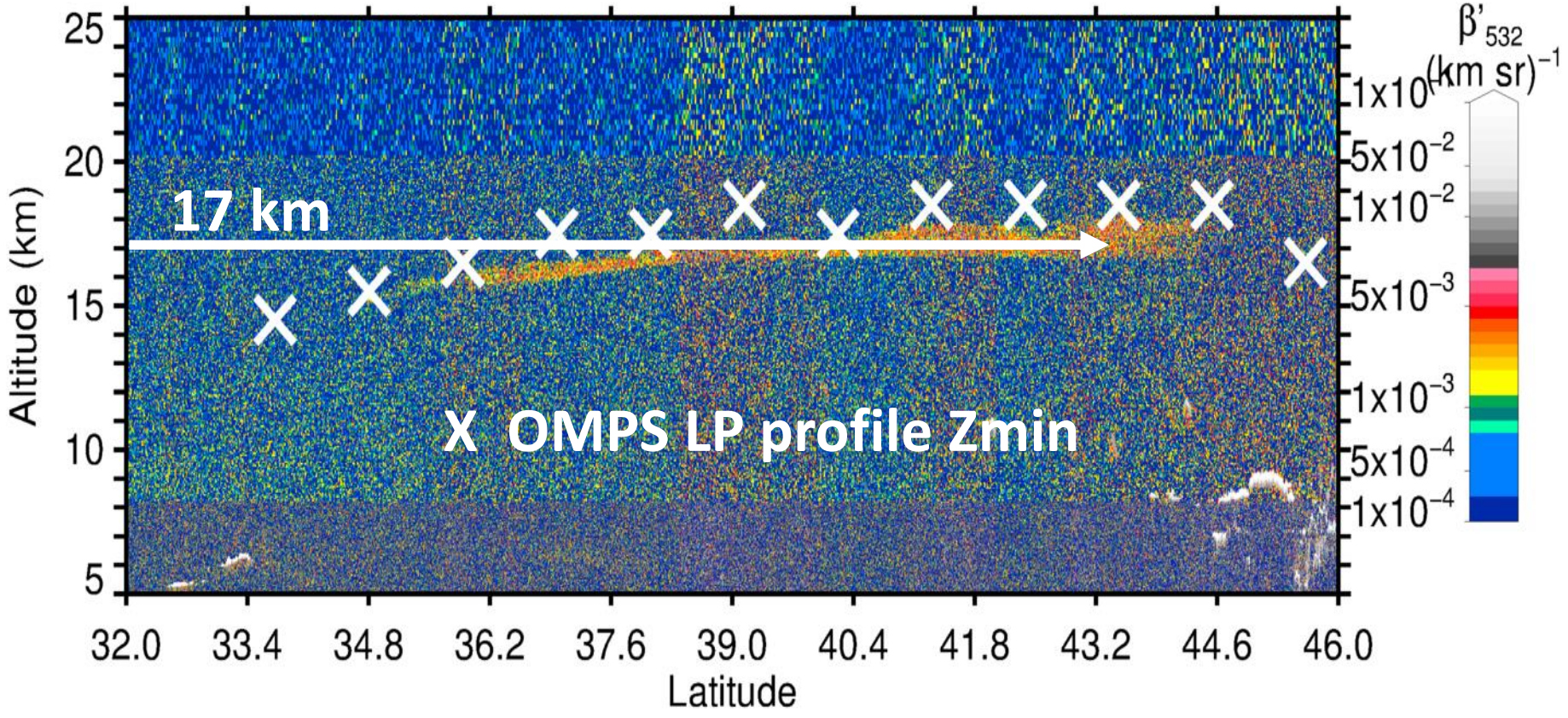
- Stratospheric smoke on 25 August

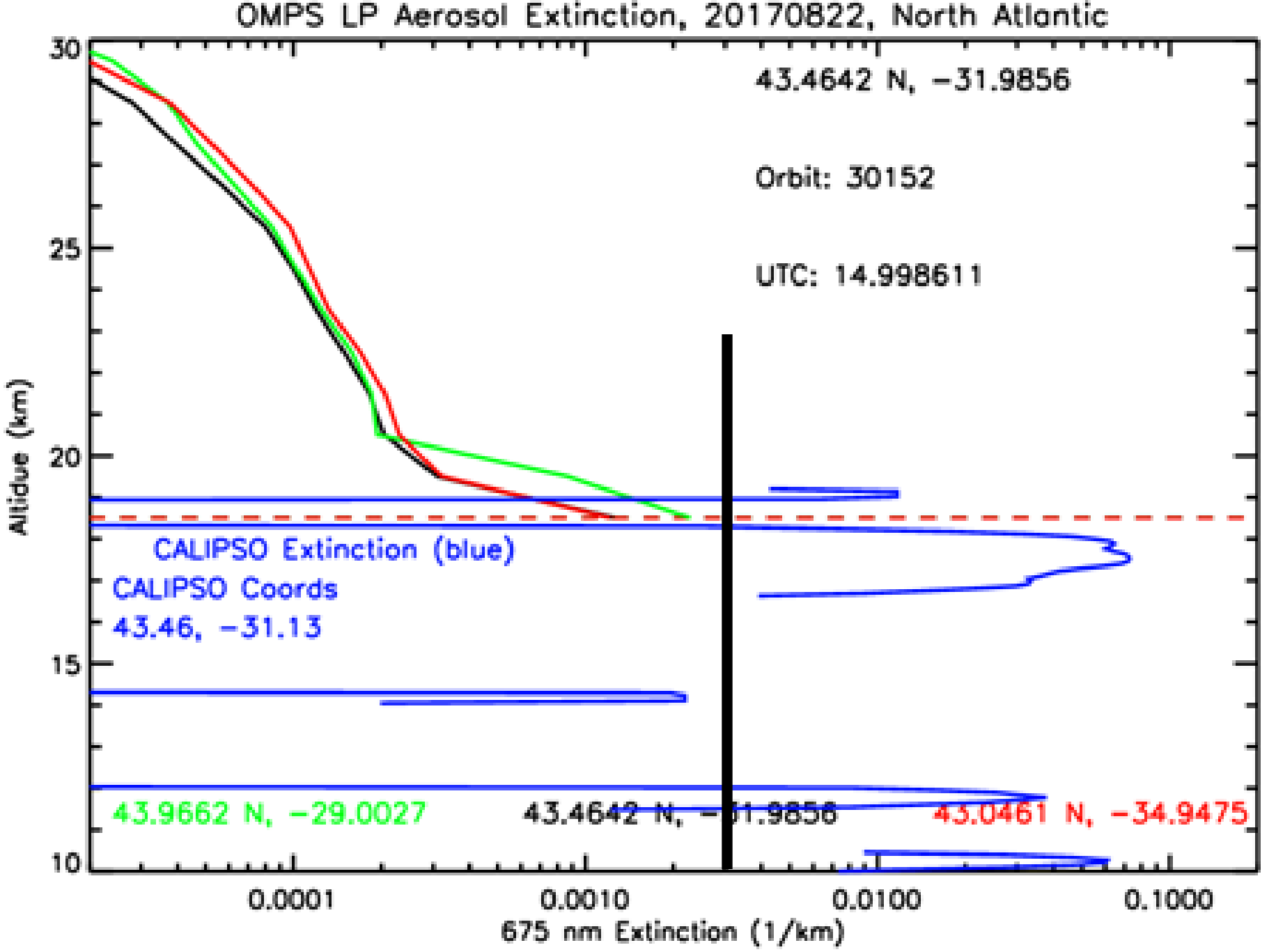


9-day old strat. smoke

22 August 2017
CALIPSO 532 nm
Backscatter






OMPS LP Aerosol Extinction, 20170822, North Atlantic
43.4642 N, −31.9856
Orbit: 30152
UTC: 14.998611
CALIPSO Extinction (blue)
CALIPSO Coords
43.46, −31.13
43.9662 N, −29.0027
43.4642 N, −31.9856
43.0461 N, −34.9475
Altidue (km)
30
25
20
15
10
0.0001
0.0010
0.0100
0.1000
675 nm Extinction (1/km)

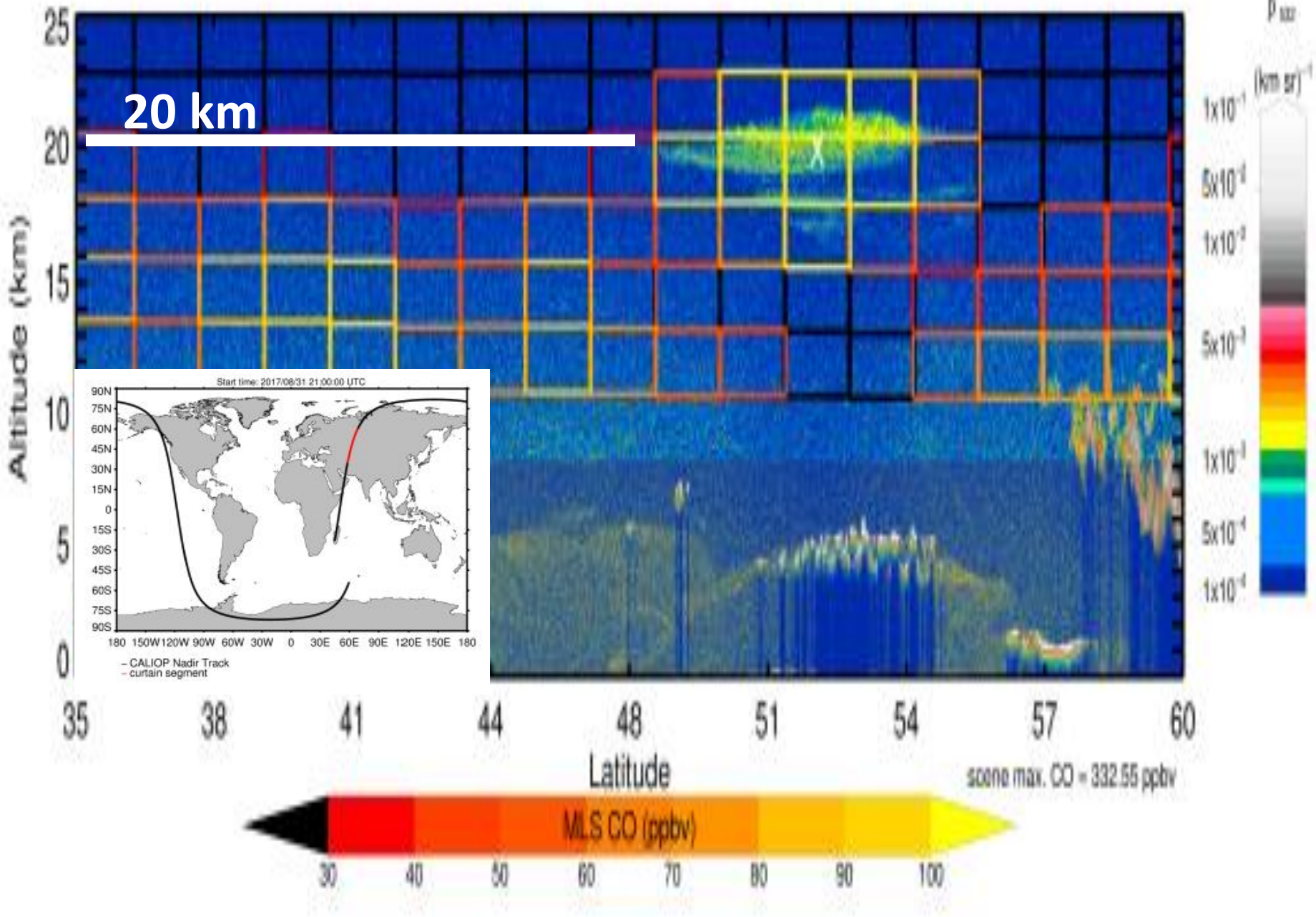
CALIPSO aerosol and Aura MLS Carbon Monoxide together

* **31 August (pyroCb + 19 days)**

* **Plume height above 20 km!!**
  * **That's Θ > 500 K**

* **MLS CO > 330 ppbv!!**

Michael Schwartz: "Also, I'd just like to note how unprecedented these values are in the MLS record at 215 hPa and 147 hPa. At 100 hPa they are rivaled only by Black Saturday.


20 km
Altitude (km)
25
20
15
10
5
0
Start time: 2017/08/31 21:00:00 UTC
90N
75N
60N
45N
30N
15N
0
15S
30S
45S
60S
75S
90S
180 150W 120W 90W 60W 30W 0 30E 60E 90E 120E 150E 180
– CALIOP Nadir Track
– curtain segment
1x10⁻¹
5x10⁻²
1x10⁻²
5x10⁻³
1x10⁻³
5x10⁻⁴
1x10⁻⁴
(km sr)⁻¹
35 38 41 44 48 51 54 57 60
Latitude
scene max. CO = 332.55 ppbv
MLS CO (ppbv)
30 40 50 60 70 80 90 100

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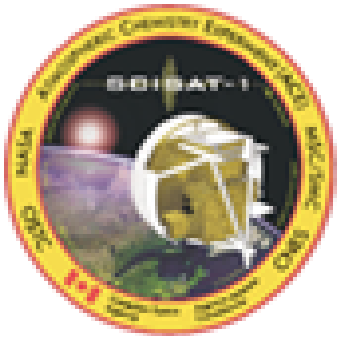
12 August 2017

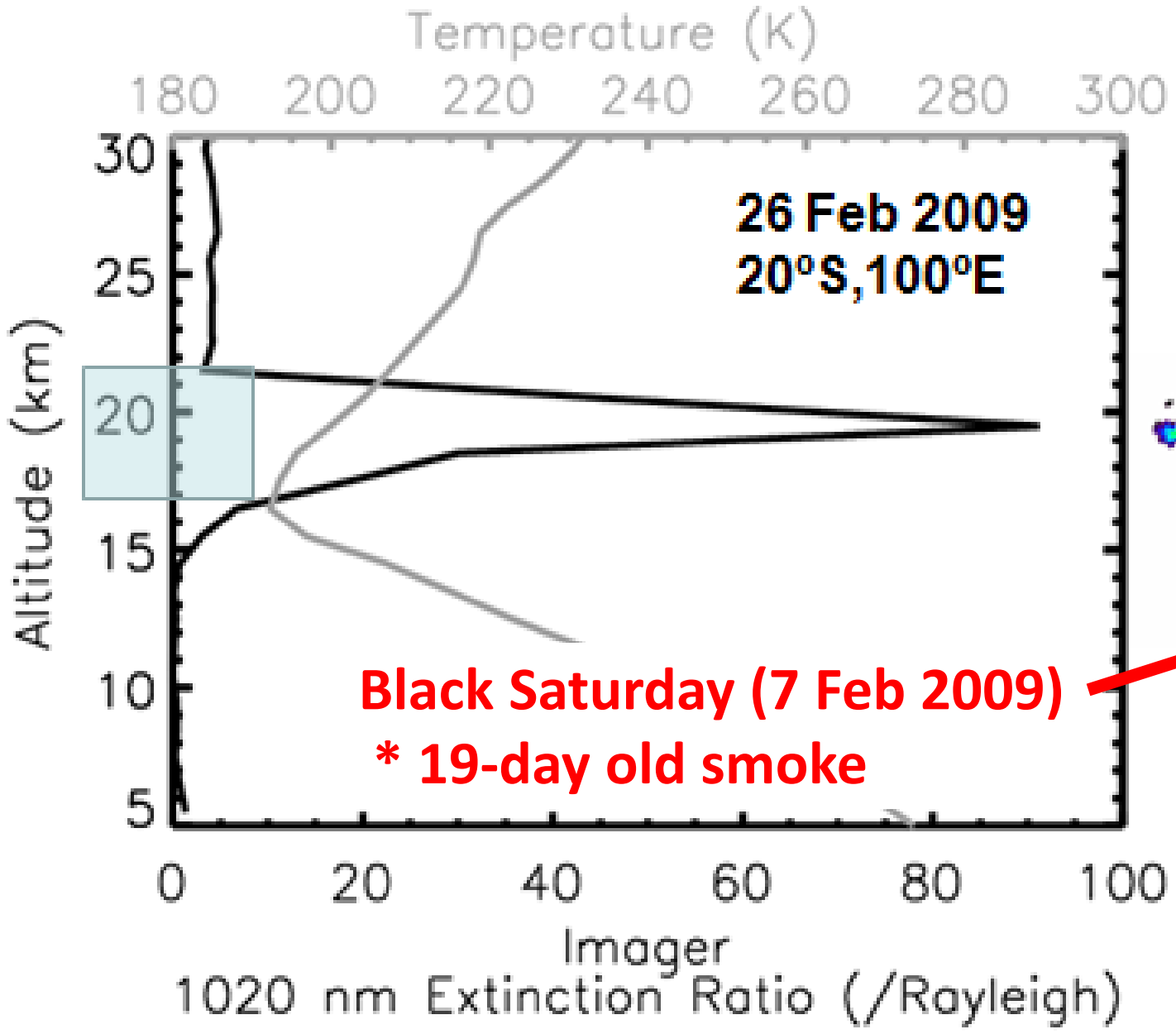
Off the charts:

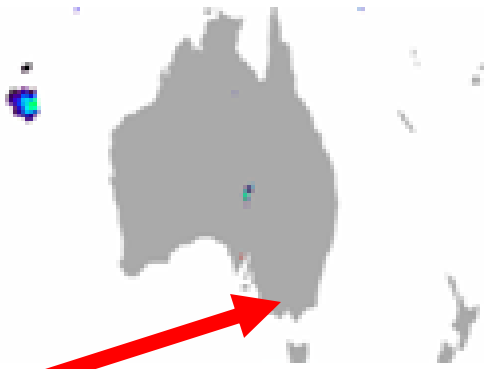
* UVAI
* Stratospheric…
  * MLS CO
  * plume AOD
  * plume altitude
* Evidence of diabatic plume rise

The plume has already circumnavigated the globe.

Atmospheric Chemistry Experiment (ACE) Imager
1 micron Extinction Ratio



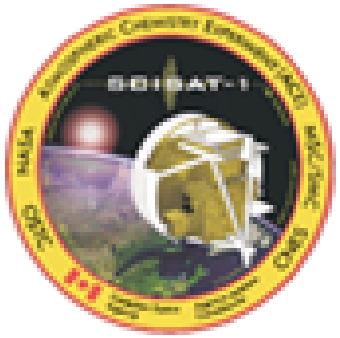


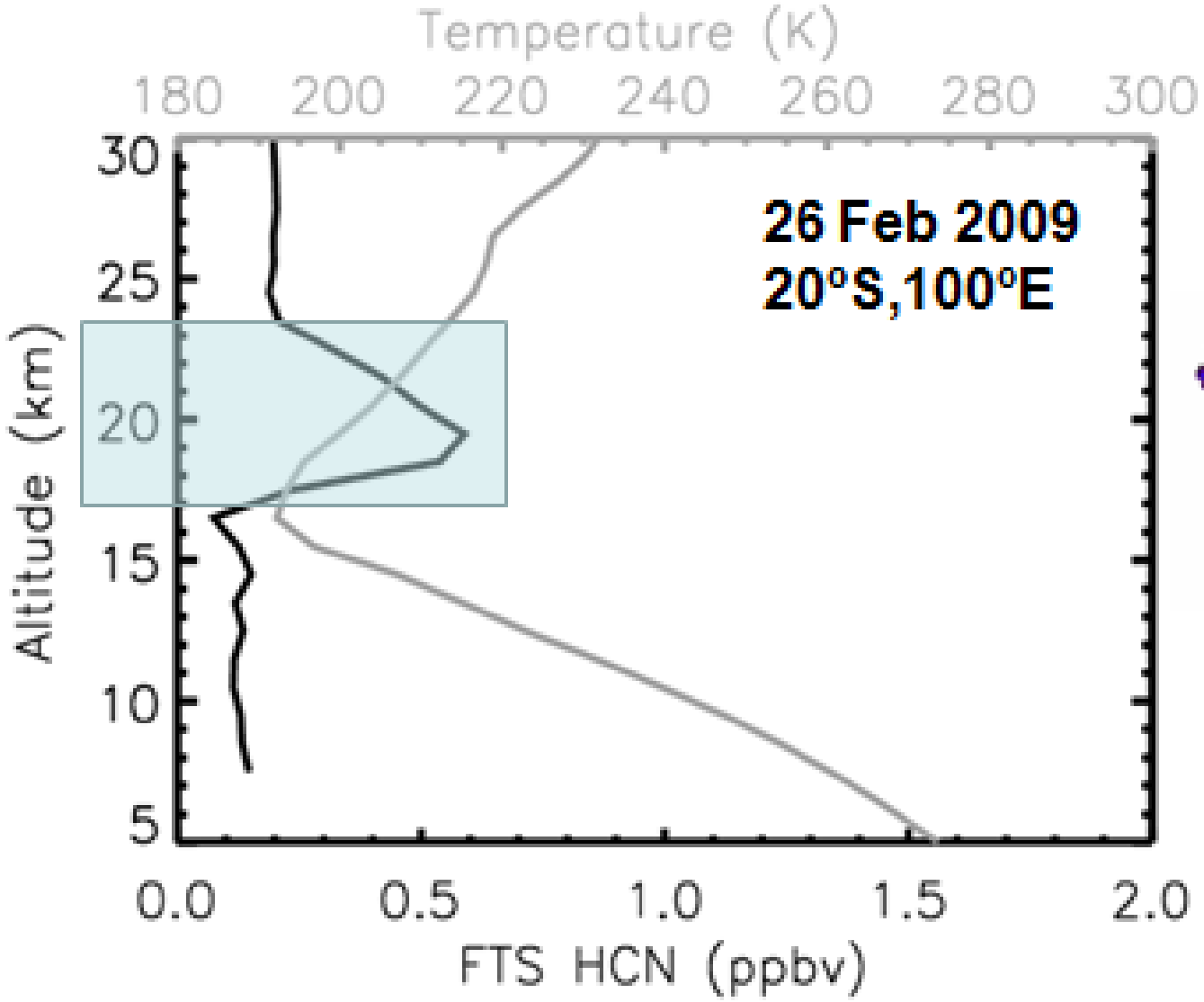


Black Saturday (7 Feb 2009)

*** 19-day old smoke**

Atmospheric Chemistry Experiment (ACE) FTS
Hydrogen Cyanide





Stratospheric Smoke From Equator to Antarctic