Chebogue Point Data Workshop

March 10, 2005, NOAA Aeronomy Lab, Boulder

FLEXPART tracer products for Chebogue Point

Andreas Stohl

Norwegian Institute for Air Research (NILU), Norway

GOES Satellite imagery for Chebogue Point

Owen Cooper

Cooperative Institute for Research in Environmental Sciences - University of Colorado/
NOAA Aeronomy Laboratory, Boulder

Presentation of the webpage

http://niwot.al.noaa.gov:8088/icartt_analysis

created by Andreas Stohl

Why does this webpage exist?

1. For your convenience

2. To prevent you from using outdated back trajectories for interpreting valuable measurement data

Why are trajectories outdated?

Trajectories are not state-of-the-art anymore

Trajectories provide no quantitative information

Trajectories do not include turbulence and convection

Trajectories can be VERY misleading

The new way of doing things right

Use a particle dispersion model (FLEXPART) in backward dispersion mode to calculate so-called retroplumes, 20 days back in time.

FLEXPART includes turbulence and convection parameterizations and yields a quantitative response function to emissions eventually taken up.

Do everything twice using two independent datasets (ECMWF + GFS) to compare results and get a „feeling“ for the uncertainties involved.

What are the input data?

GFS analyses:

Resolution 1 x 1 degree

26 pressure levels

Every 3 hours

ECMWF analyses:

Resolution 1x1 degree, but 0.36 x 0.36 degree over North America and the Atlantic

60 model levels

Every 3 hours

Simulations from Chebogue Point

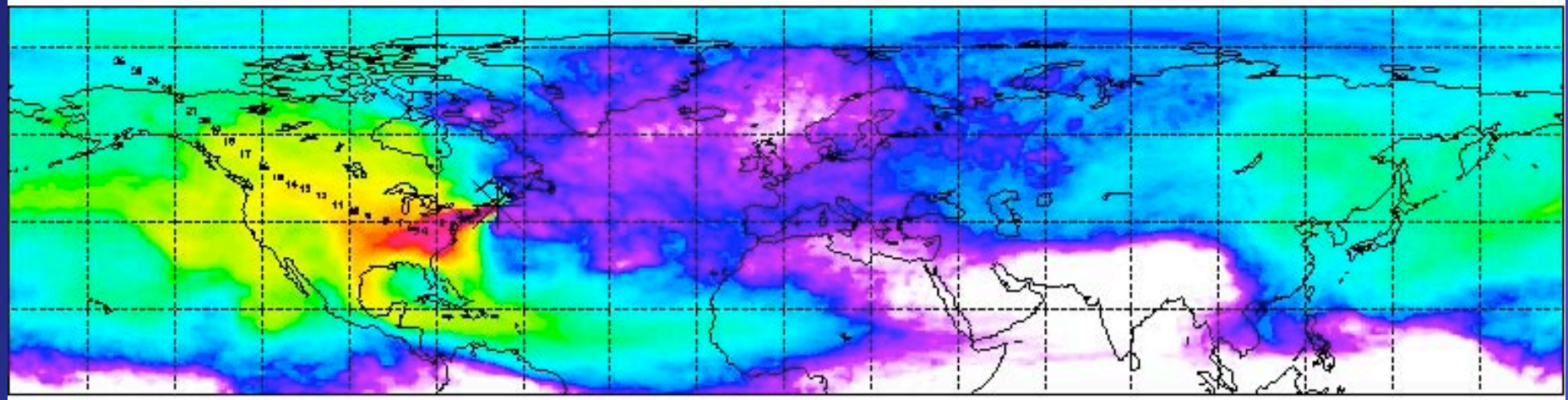
Every 3 hours, and for a 3-hour duration, 40.000 particles are released from Chebogue Point

Column-integrated S-R-Relationship for flight Chebogue_July

Start time of sampling 20040730.150001 End time of sampling 20040730.180001

Lower release height 0 m Upper release height 30 m

Meteorological data used is 1x1 deg ECMWF analyses



ns m / kg

Maximum value 0.148E+04 ns m / kg

Column-integrated S-R-Relationship for flight Chebogue_July

Start time of sampling 20040730.150001 End time of sampling 20040730.180001

Lower release height 0 m Upper release height 30 m

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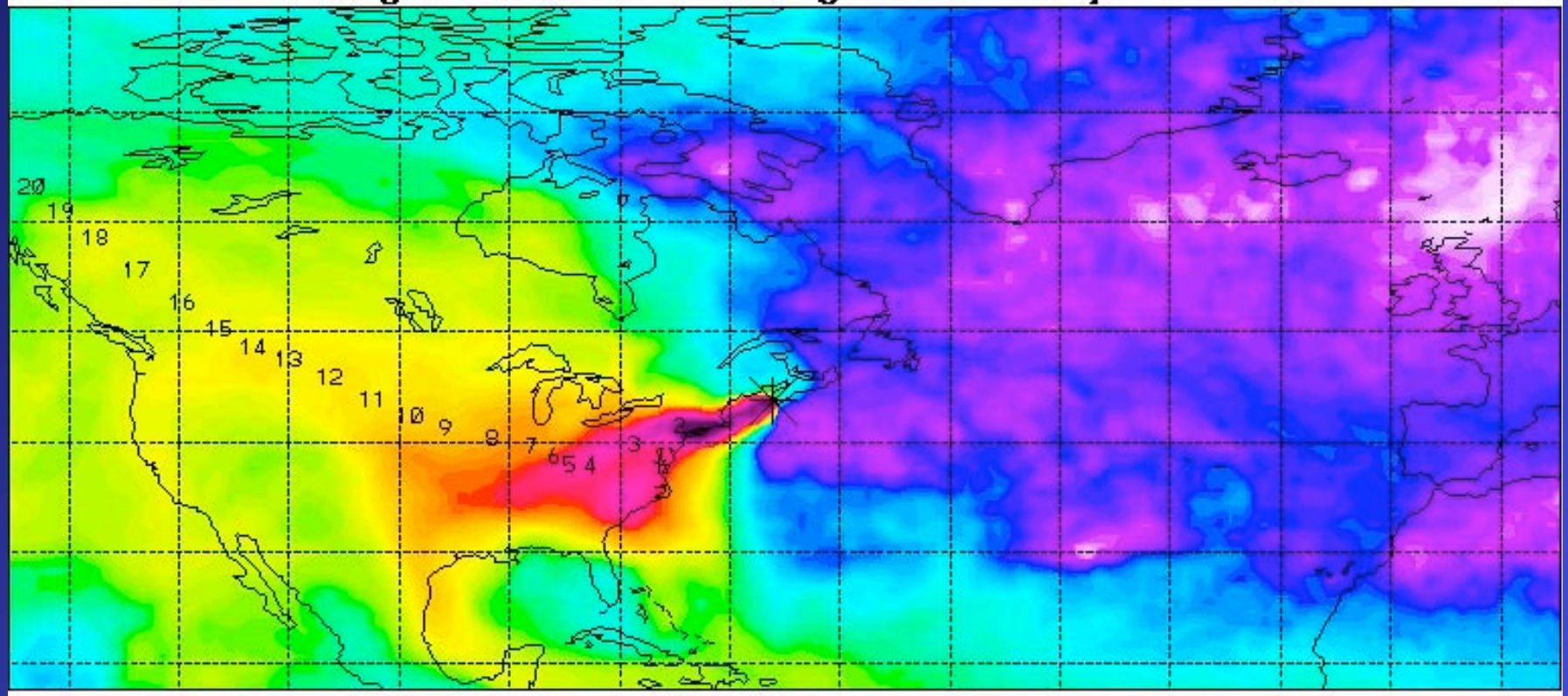

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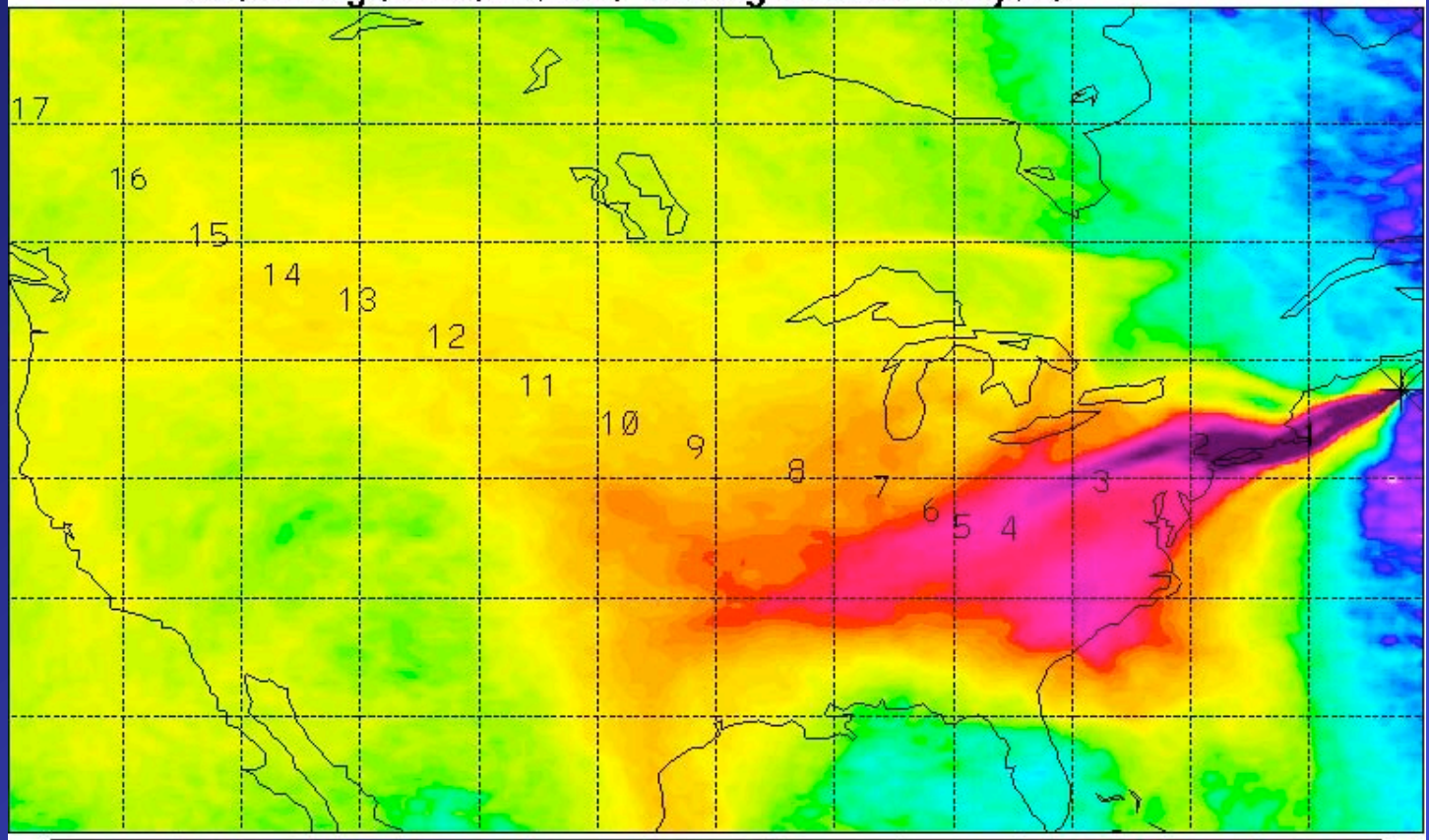


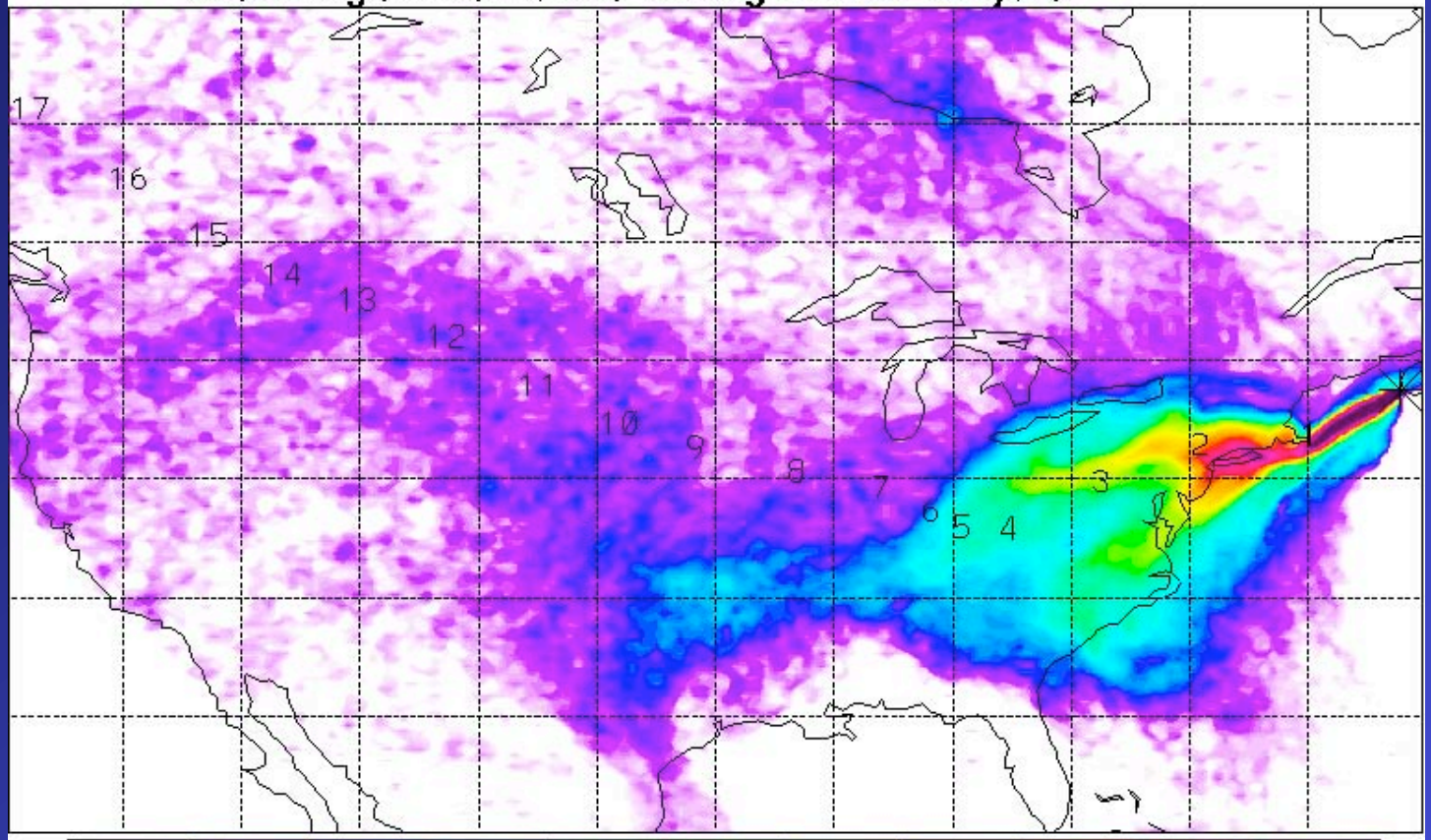
Maximum value 0.480E+04 ns m / kg

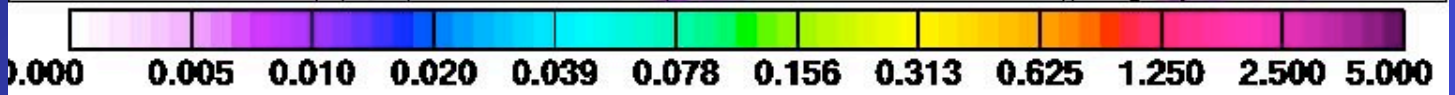
Footprint S-R-Relationship for flight Chebogue_July

Start time of sampling 20040730.150001 End time of sampling 20040730.180001

Lower release height 0 m Upper release height 30 m

Meteorological data used is 1x1 deg ECMWF analyses





ns / kg

Maximum value 0.182E+02 ns / kg

CO source contribution for flight Chebogue_July

Start time of sampling 20040730.150001 End time of sampling 20040730.180001

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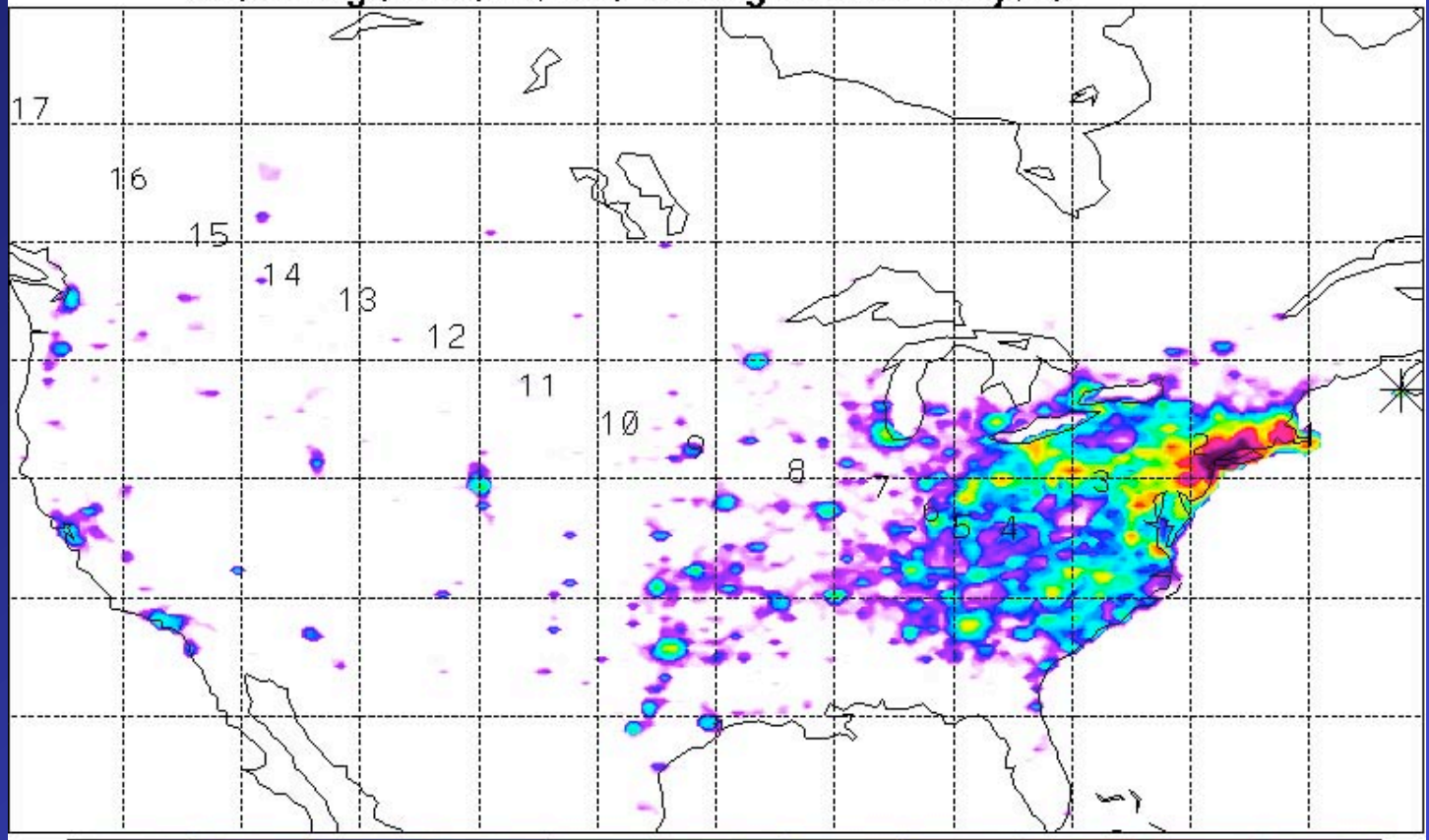
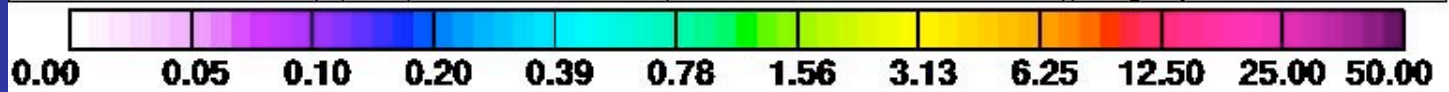
Meteorological data used is 1x1 deg ECMWF analyses





10E-10 ppbv / m2

Maximum value 0.430E-07 ppbv / m2 Total mixing ratio 330.3 ppbv

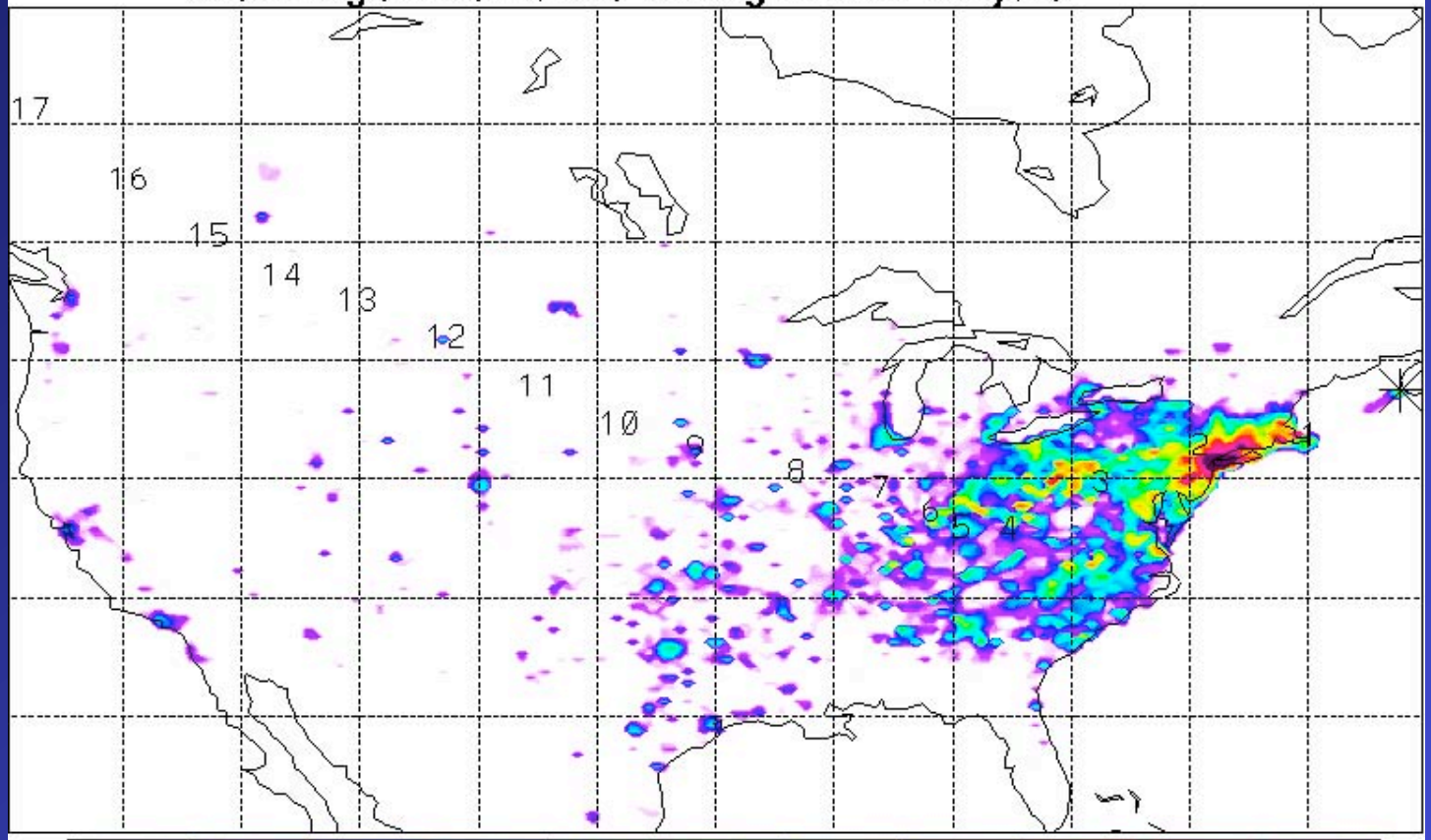
American 330.3 ppbv European 0.0 ppbv Asian 0.0 ppbv

NO2 source contribution for flight Chebogue_July

Start time of sampling 20040730.150001 End time of sampling 20040730.180001

Lower release height 0 m Upper release height 30 m

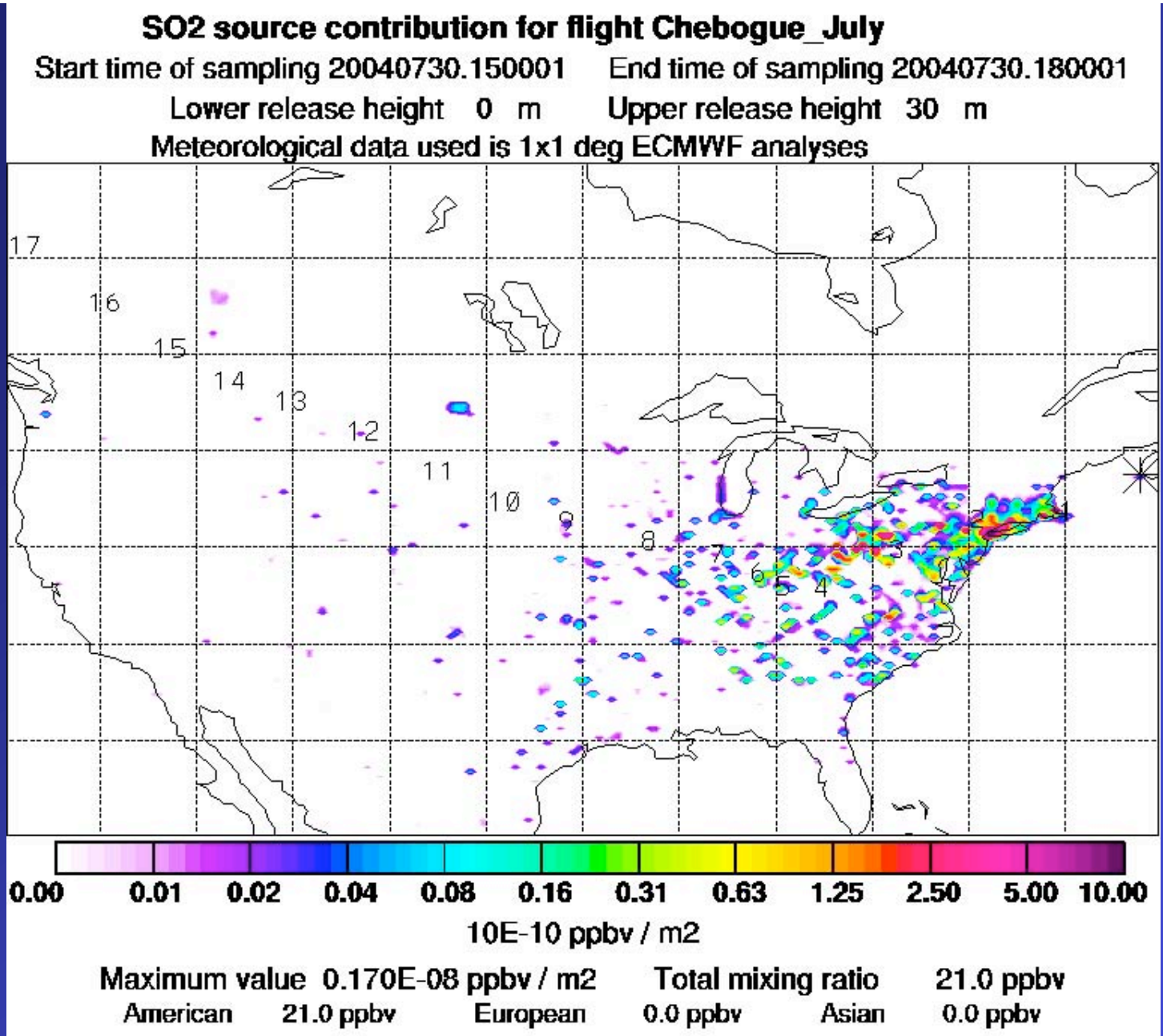
Meteorological data used is 1x1 deg ECMWF analyses



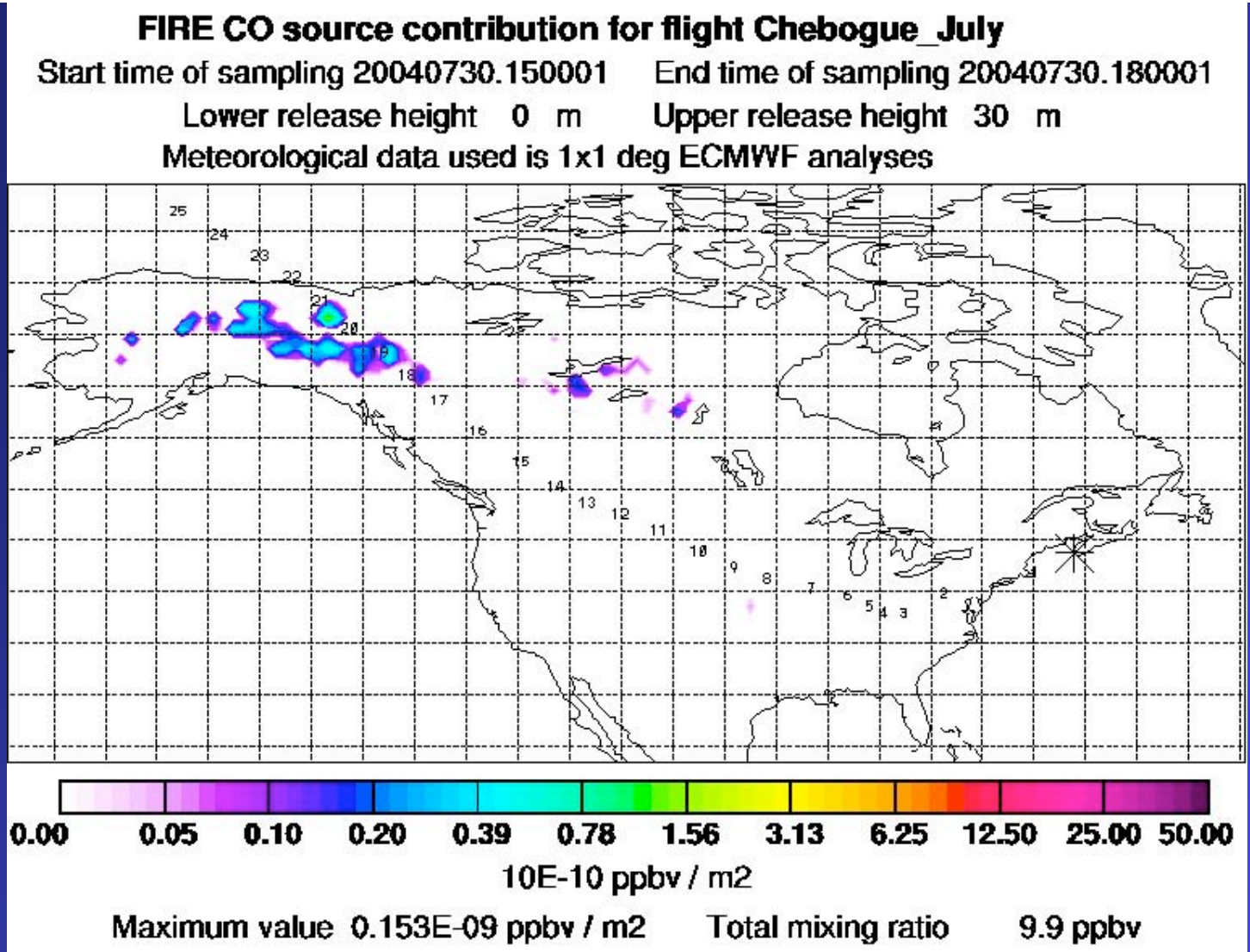
10E-10 ppbv / m2

Maximum value 0.466E-08 ppbv / m2 Total mixing ratio 39.1 ppbv

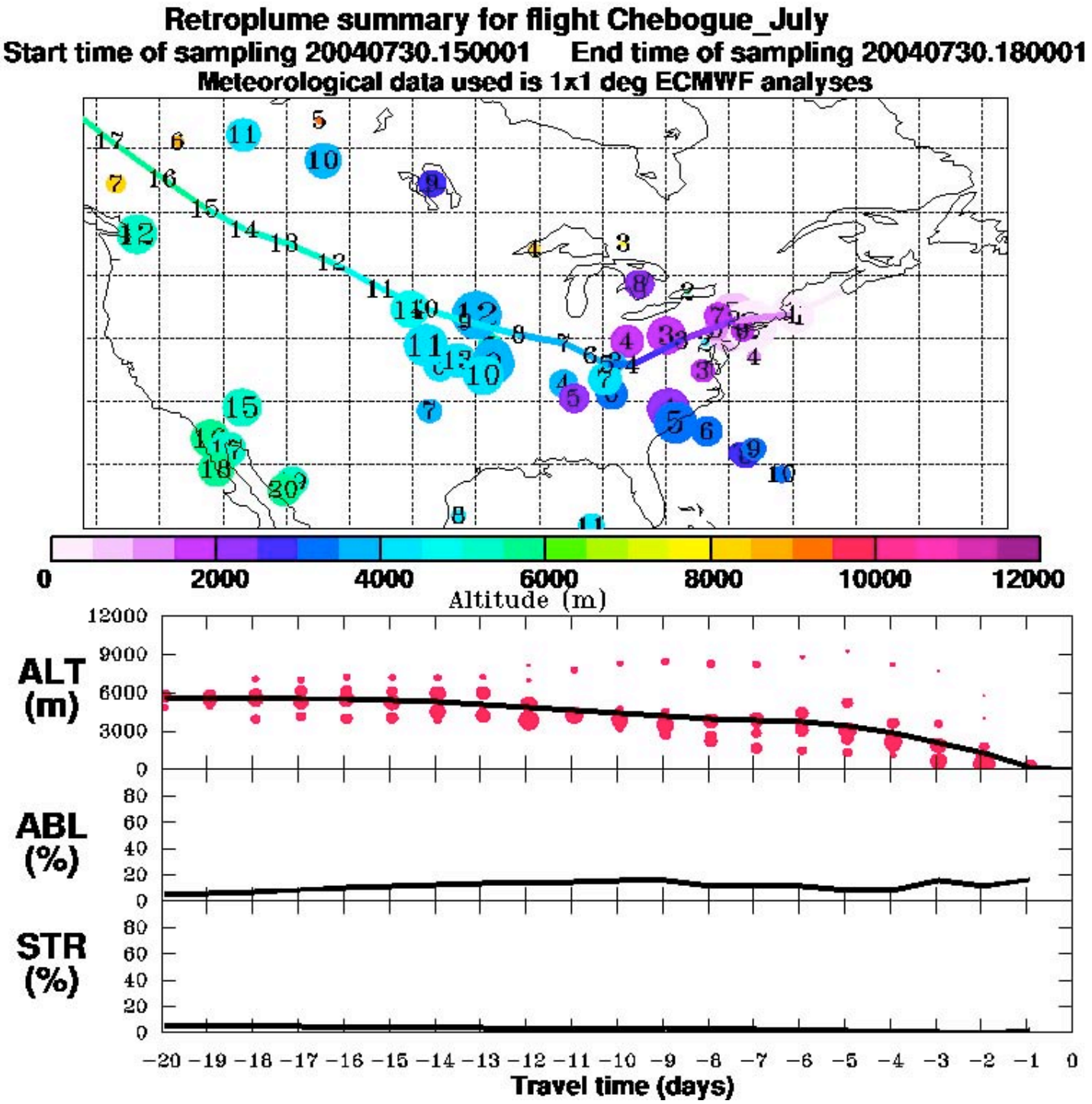
American 39.1 ppbv European 0.0 ppbv Asian 0.0 ppbv

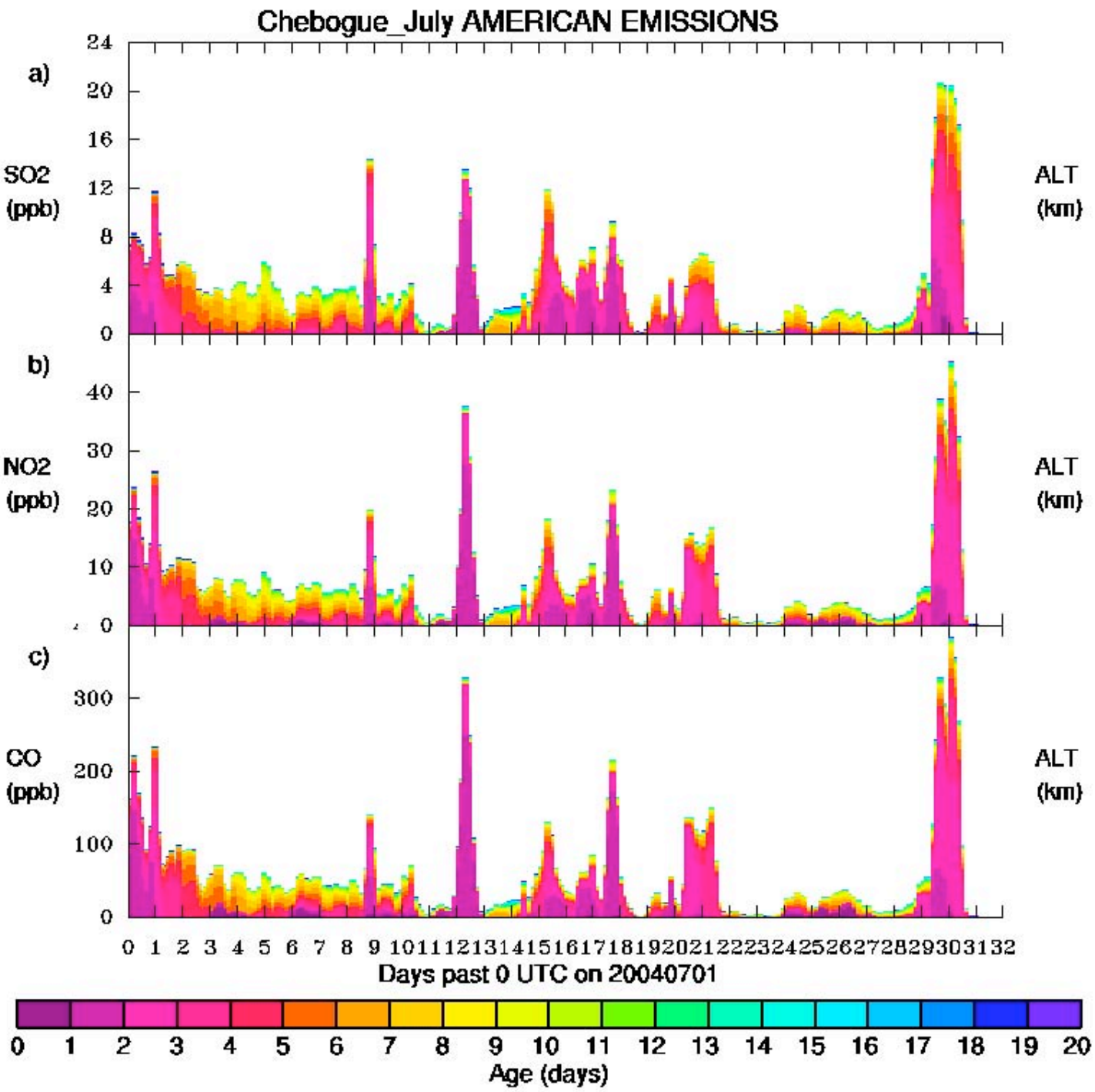


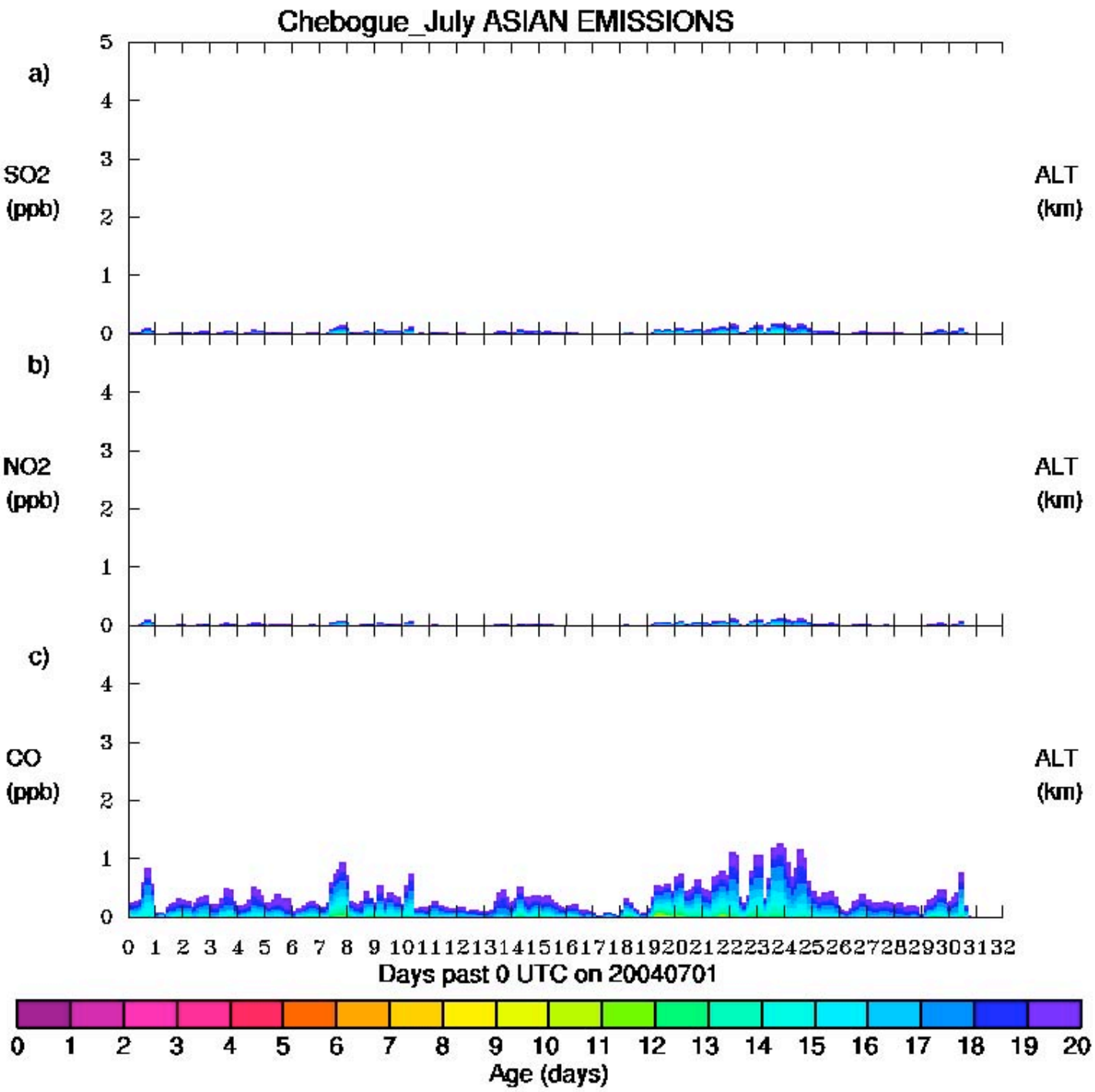
.25 x .33 degree output resolution

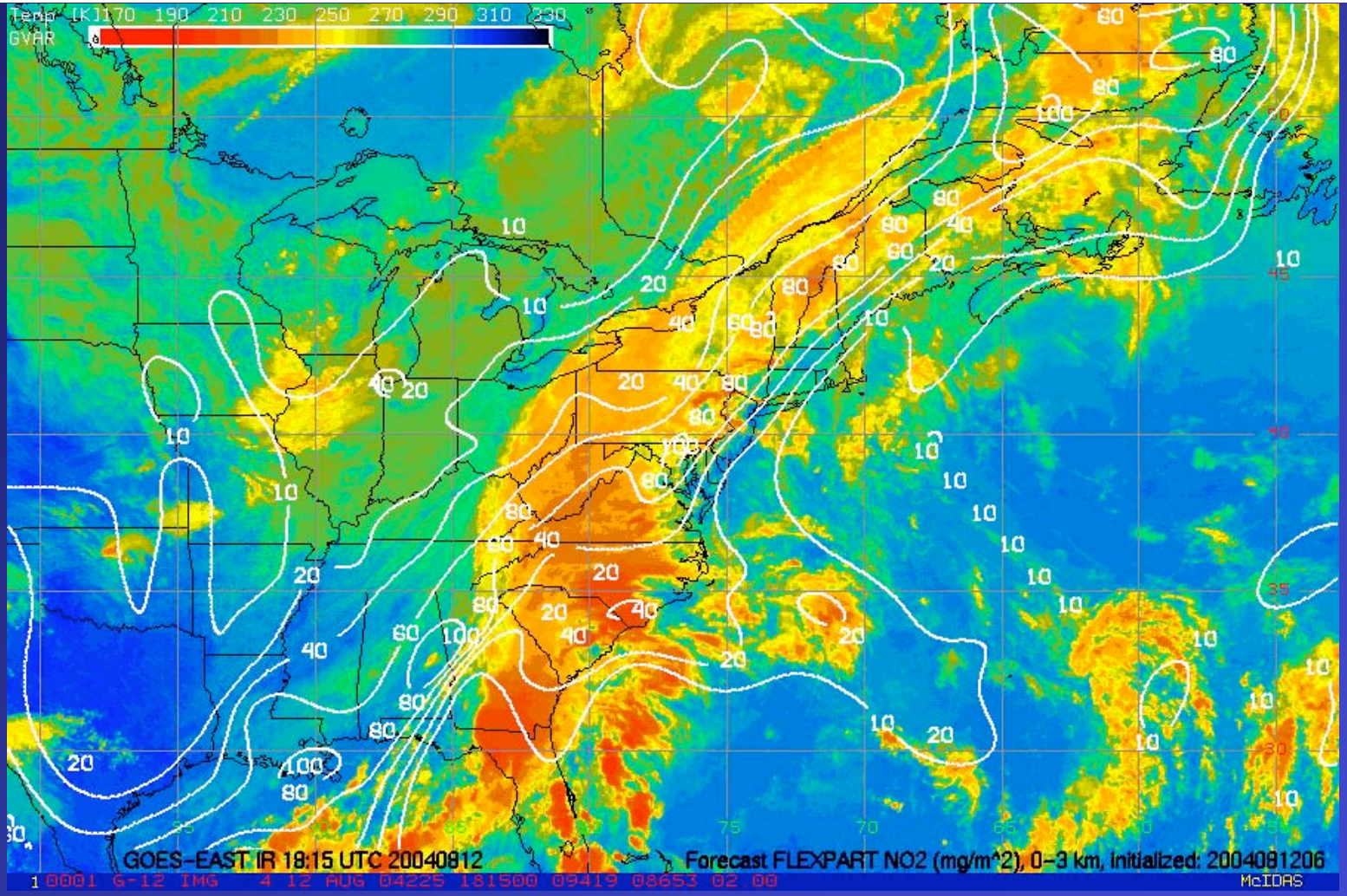


1 x 1 degree output resolution

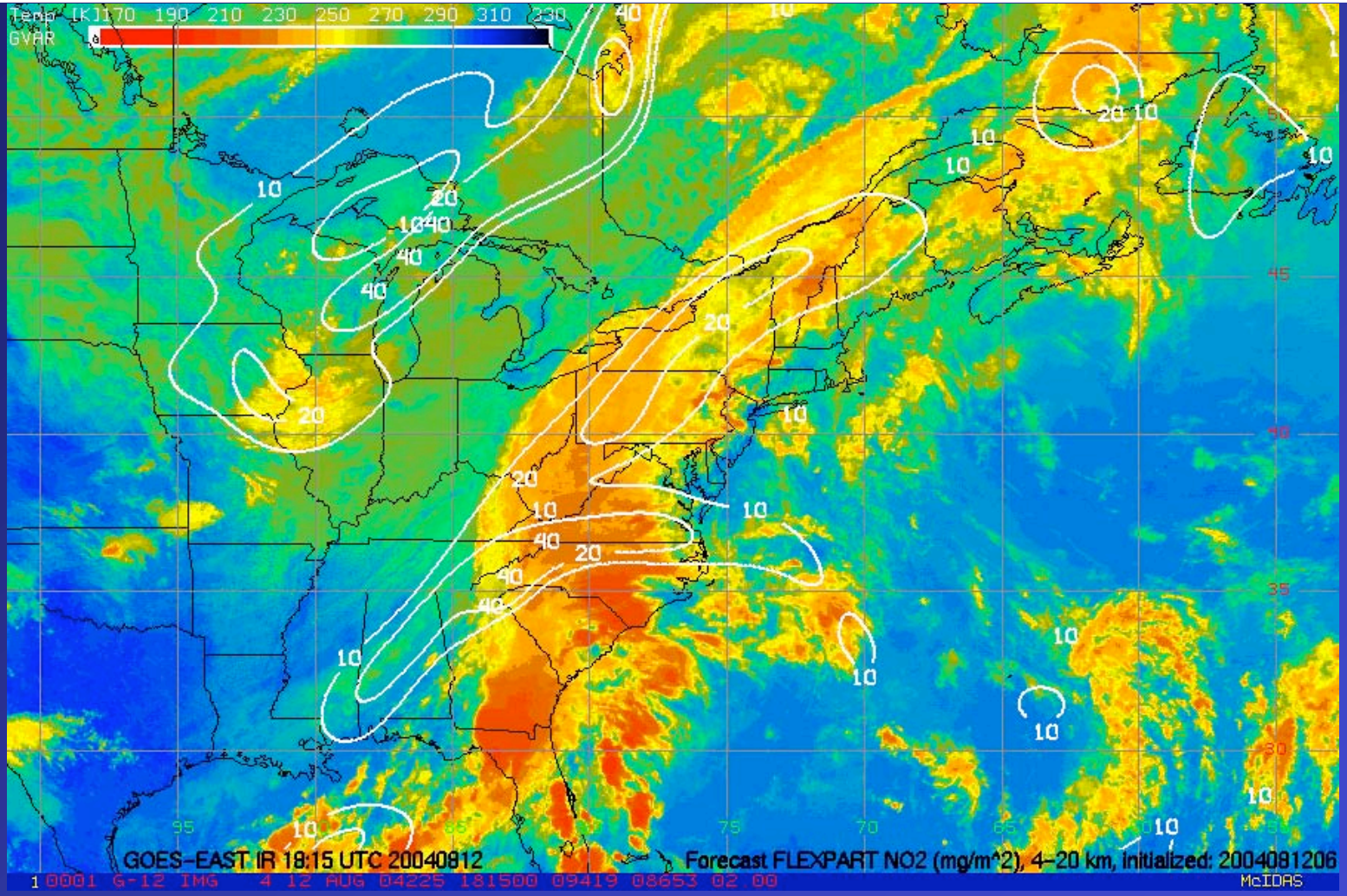

Retroplume summary for flight Chebogue_July
Start time of sampling 20040730.150001 End time of sampling 20040730.180001
Meteorological data used is 1x1 deg ECMWF analyses
0
2000
4000
6000
8000
10000
12000
Altitude (m)
ALT (m)
ABL (%)
STR (%)
12000
9000
6000
3000
0
80
60
40
20
0
−20 −19 −18 −17 −16 −15 −14 −13 −12 −11 −10 −9 −8 −7 −6 −5 −4 −3 −2 −1 0
Travel time (days)


Chebogue_July AMERICAN EMISSIONS
a)
SO2
(ppb)
ALT
(km)
b)
NO2
(ppb)
ALT
(km)
c)
CO
(ppb)
ALT
(km)
Days past 0 UTC on 20040701
Age (days)


Chebogue_July ASIAN EMISSIONS
a)
SO2
(ppb)
ALT
(km)
b)
NO2
(ppb)
ALT
(km)
c)
CO
(ppb)
ALT
(km)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Days past 0 UTC on 20040701
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Age (days)



http://www.al.noaa.gov/metproducts/icartt04/



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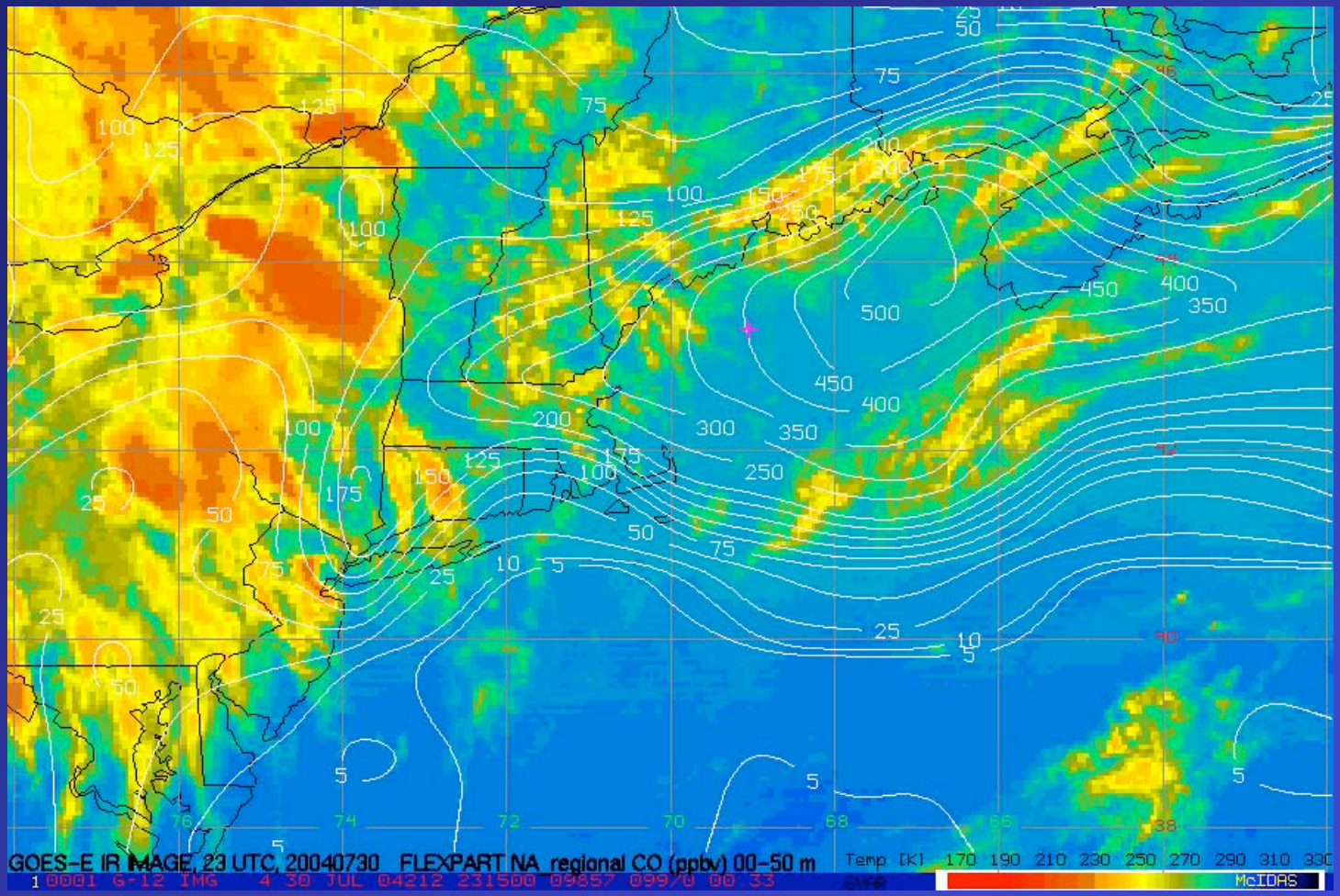

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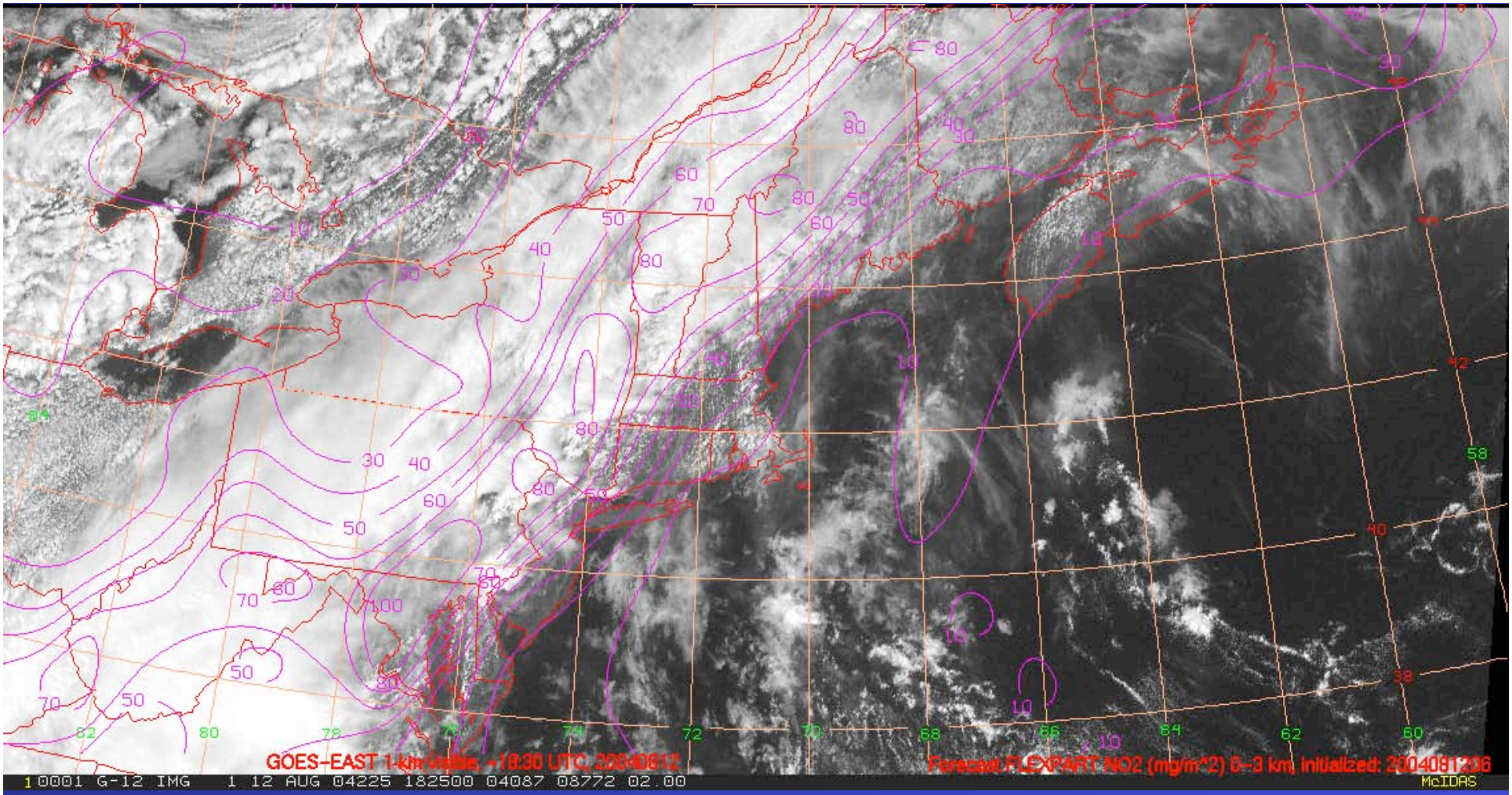

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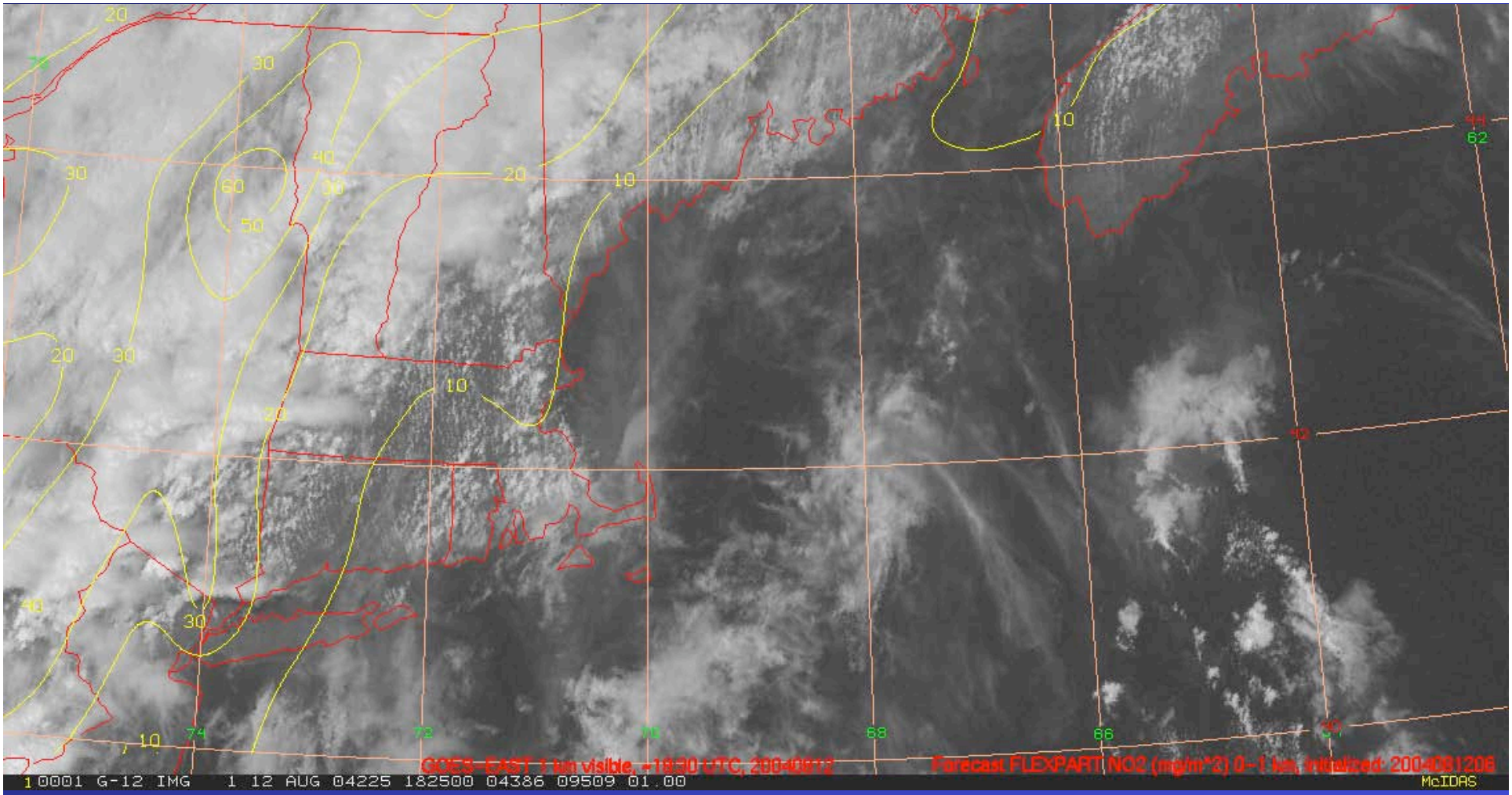

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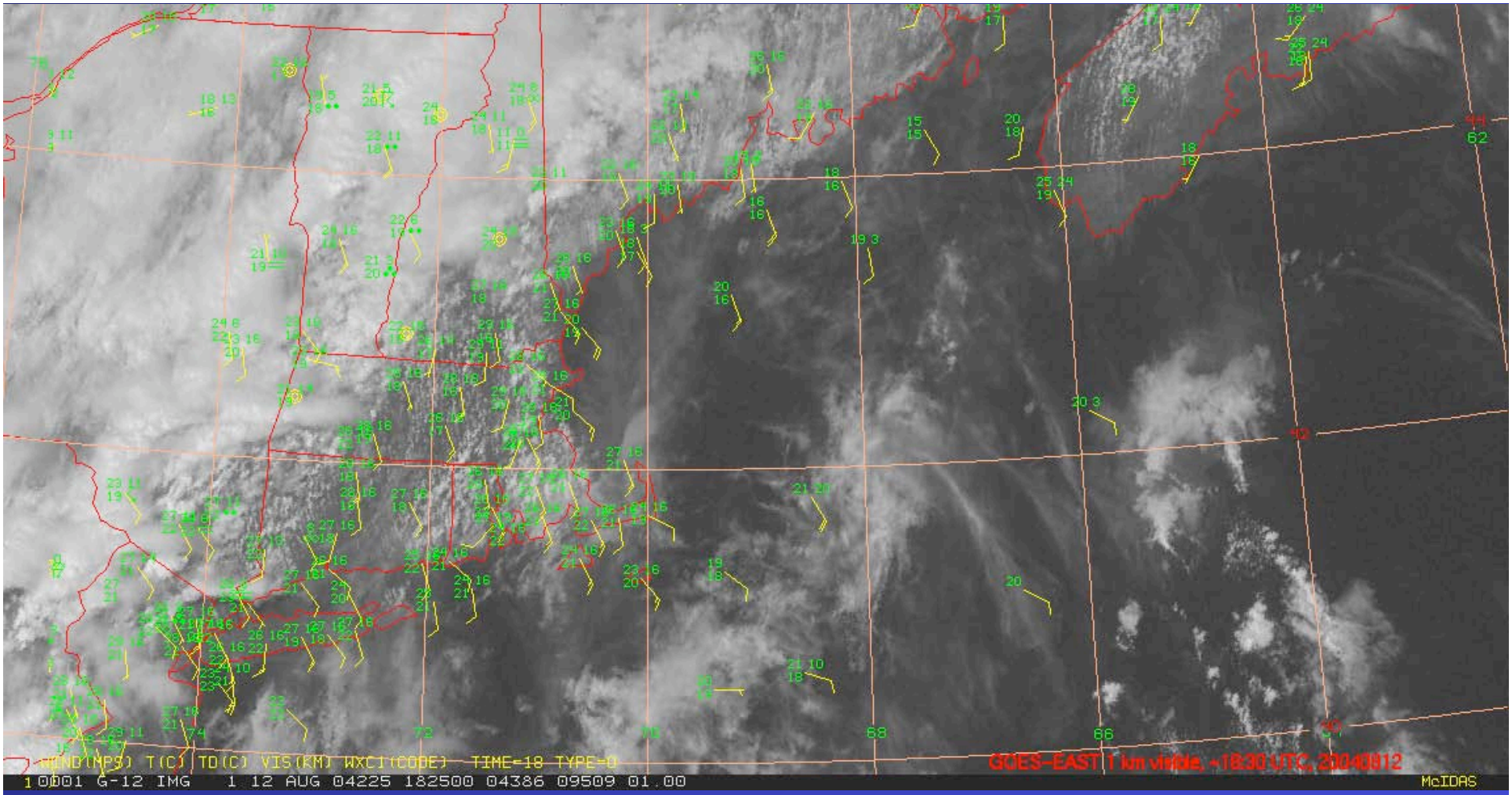

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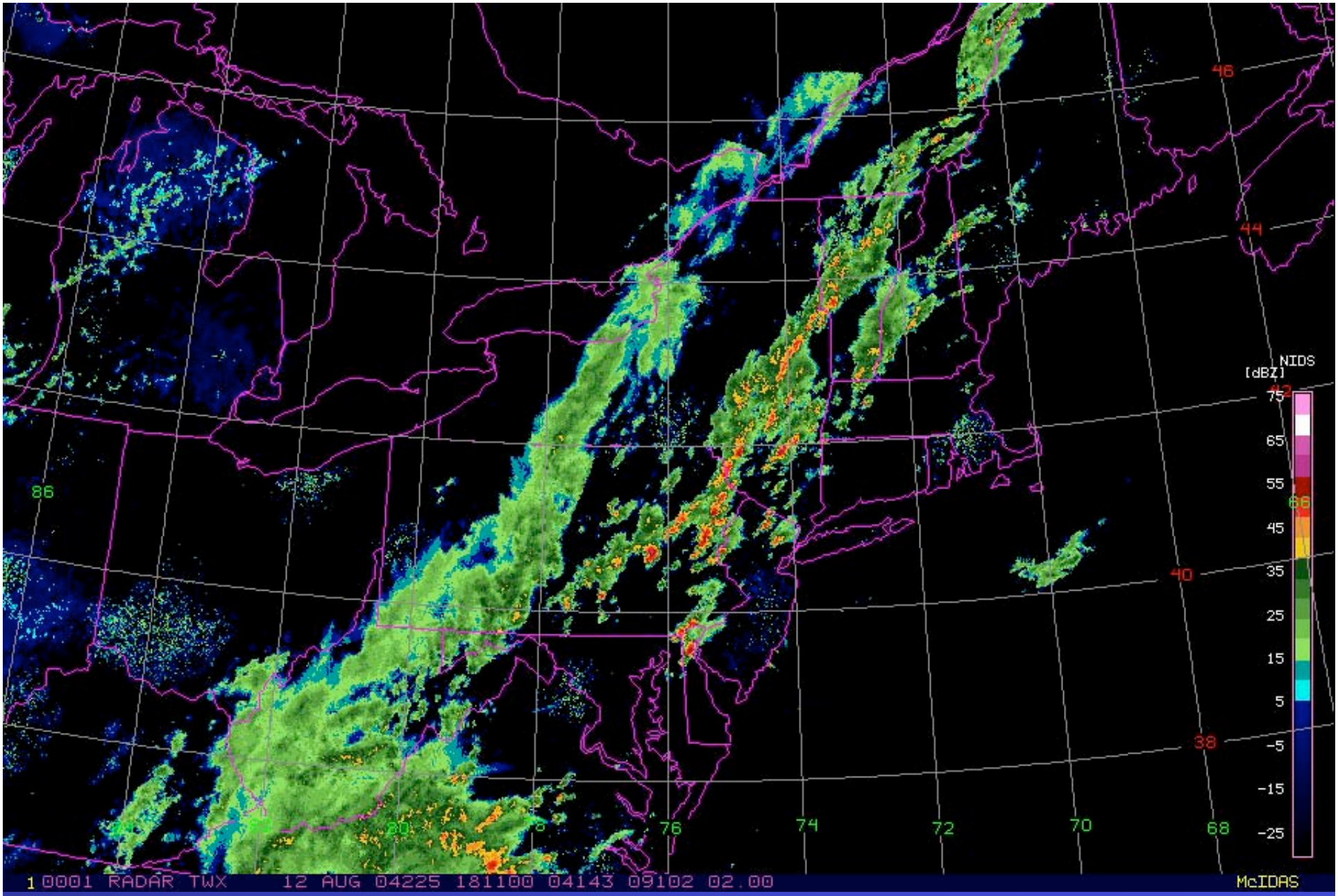

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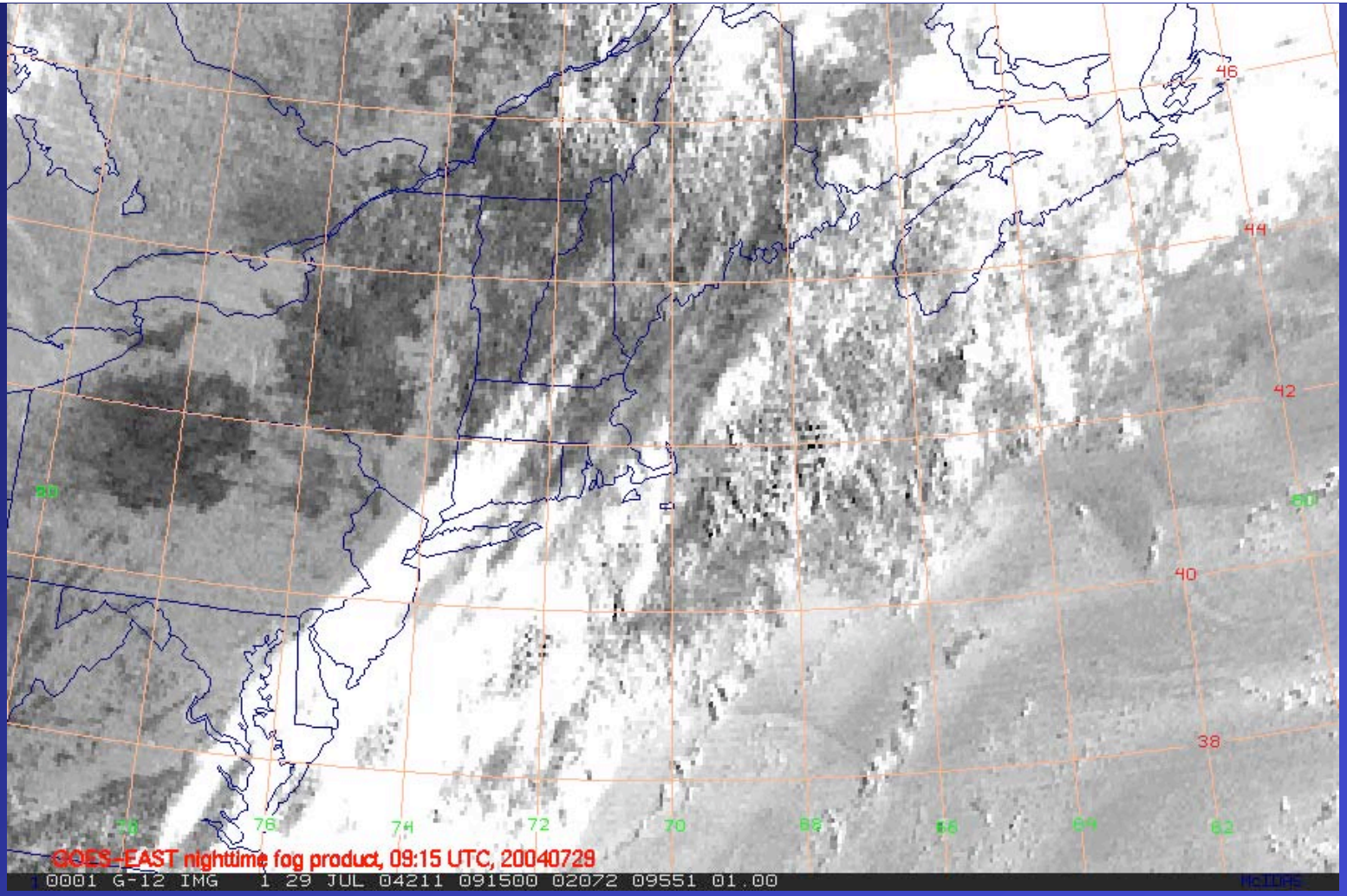

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