



Image courtesy: Mt. Washington Observatory

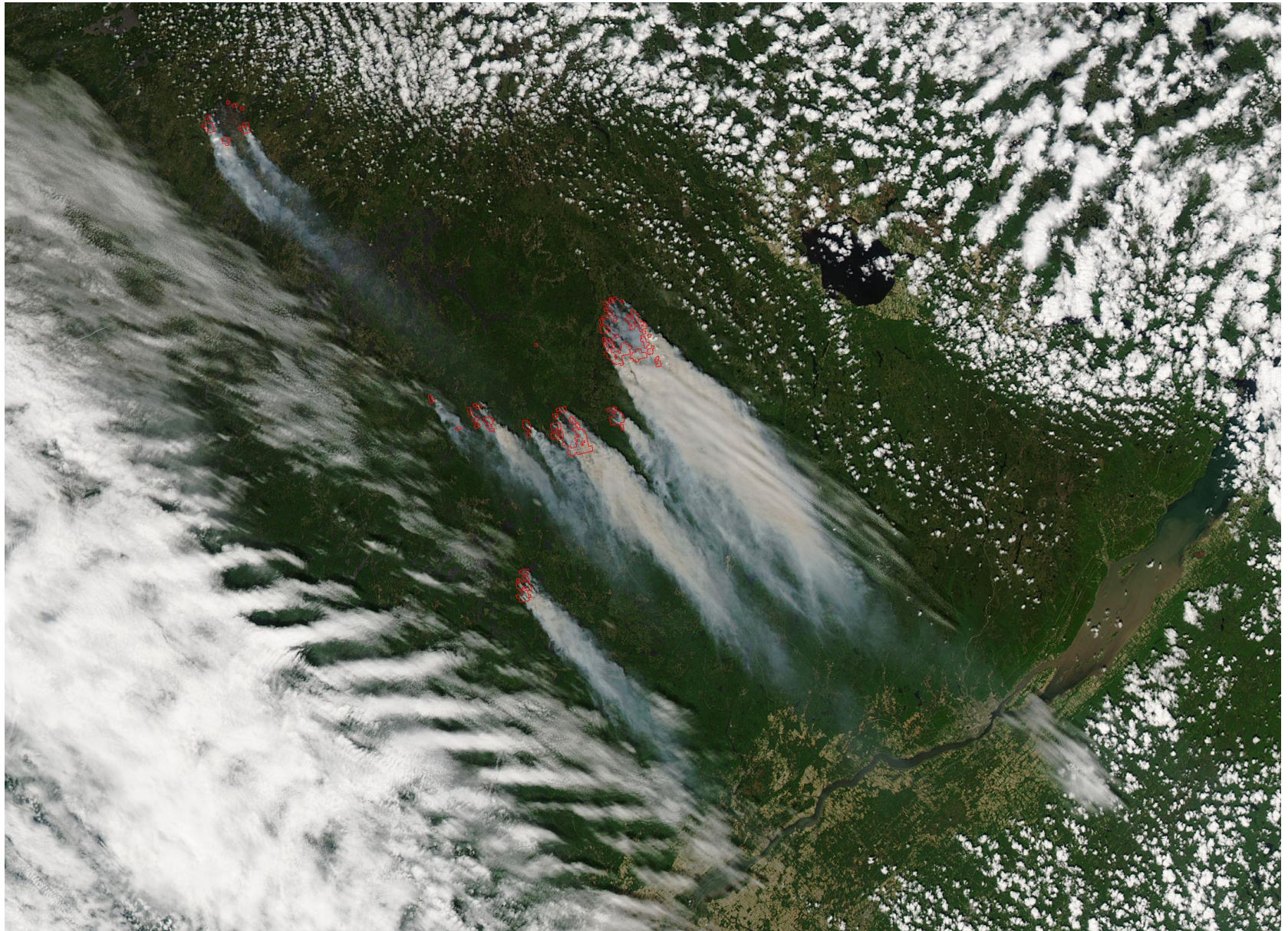
Québec fires – air quality & monitoring via satellites

31 May, 2010 event

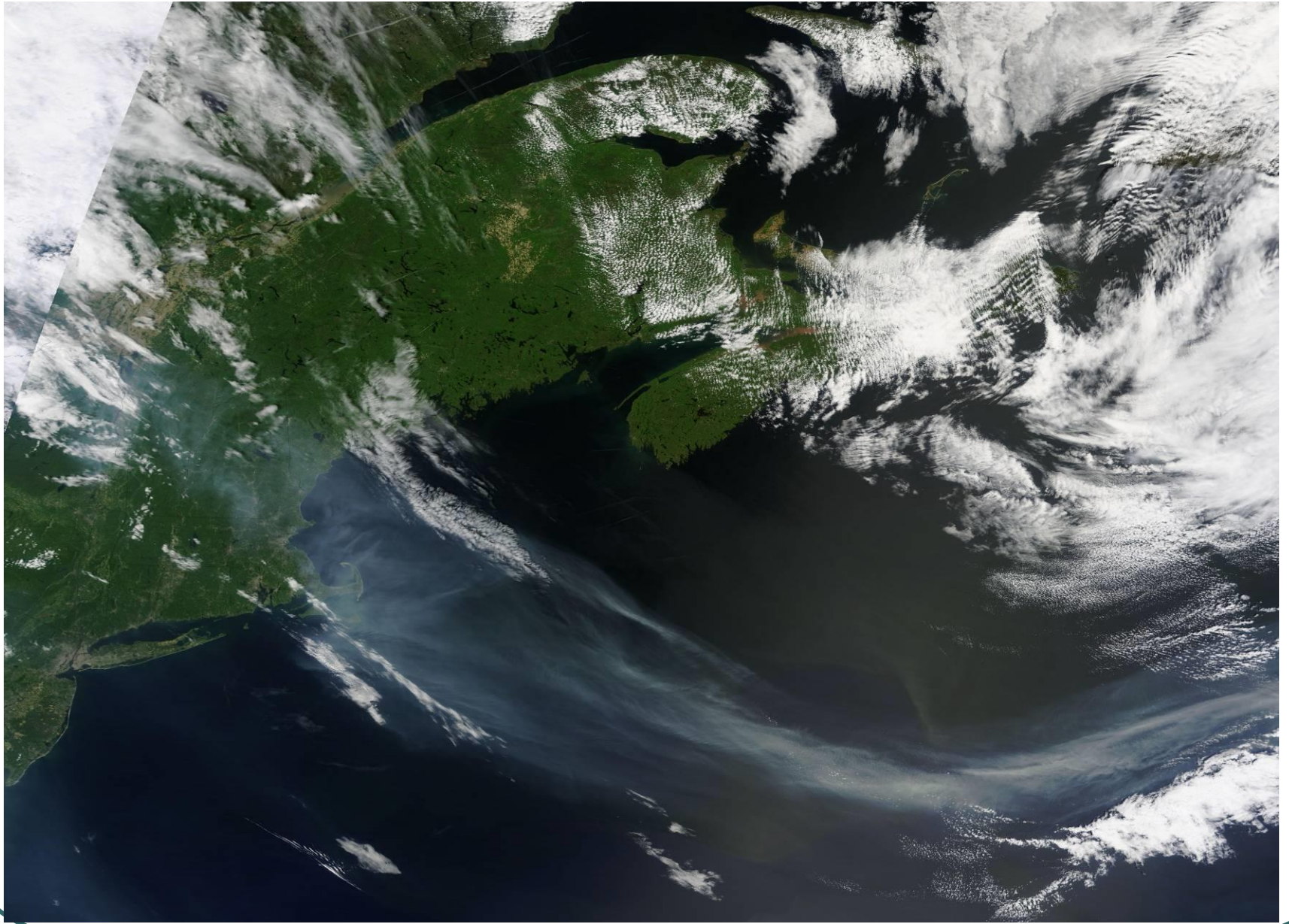


The
UNIVERSITY
of **VERMONT**



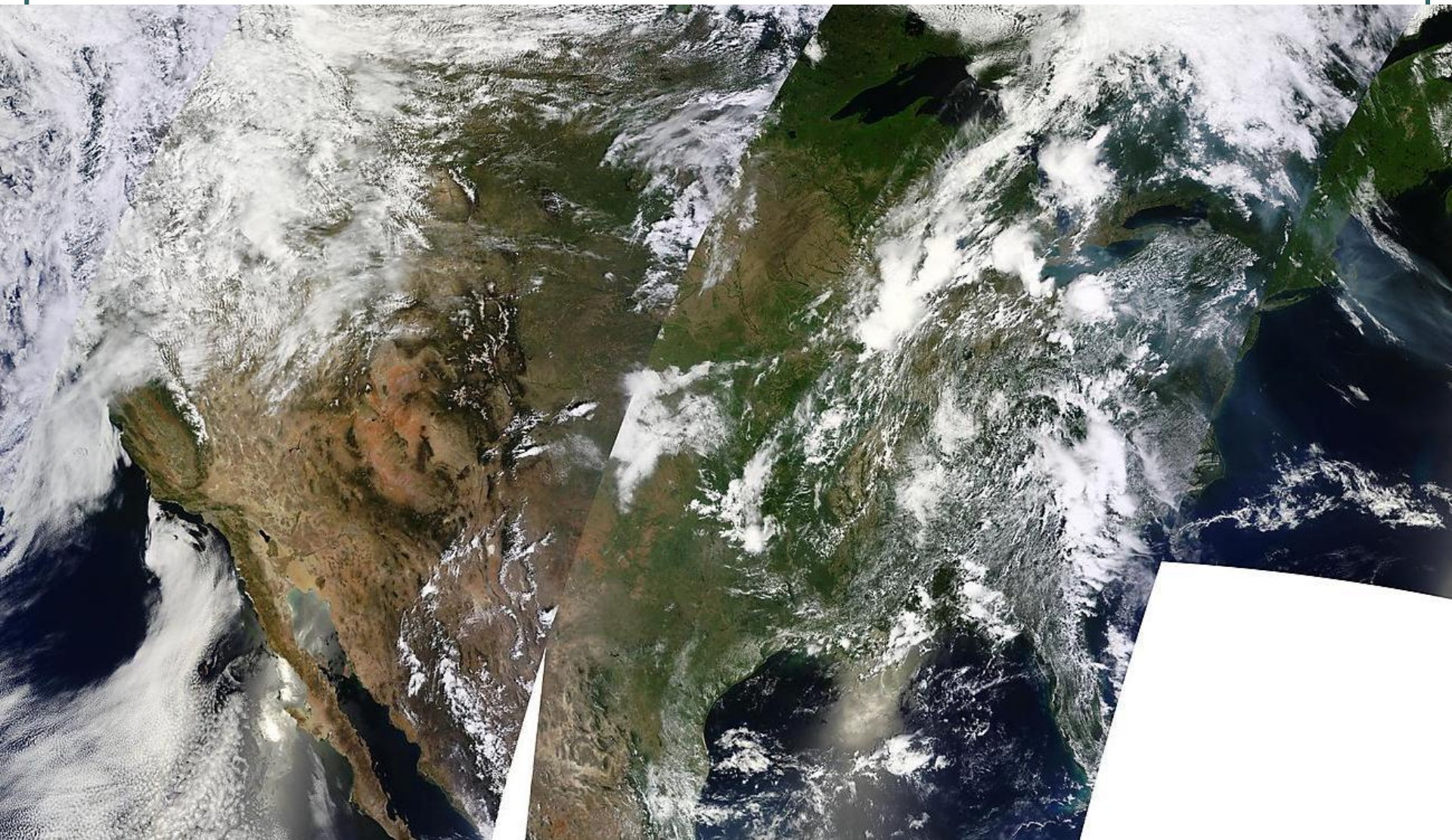


At least 54 fires in southern Québec – NASA MODIS image – 30 May 2010

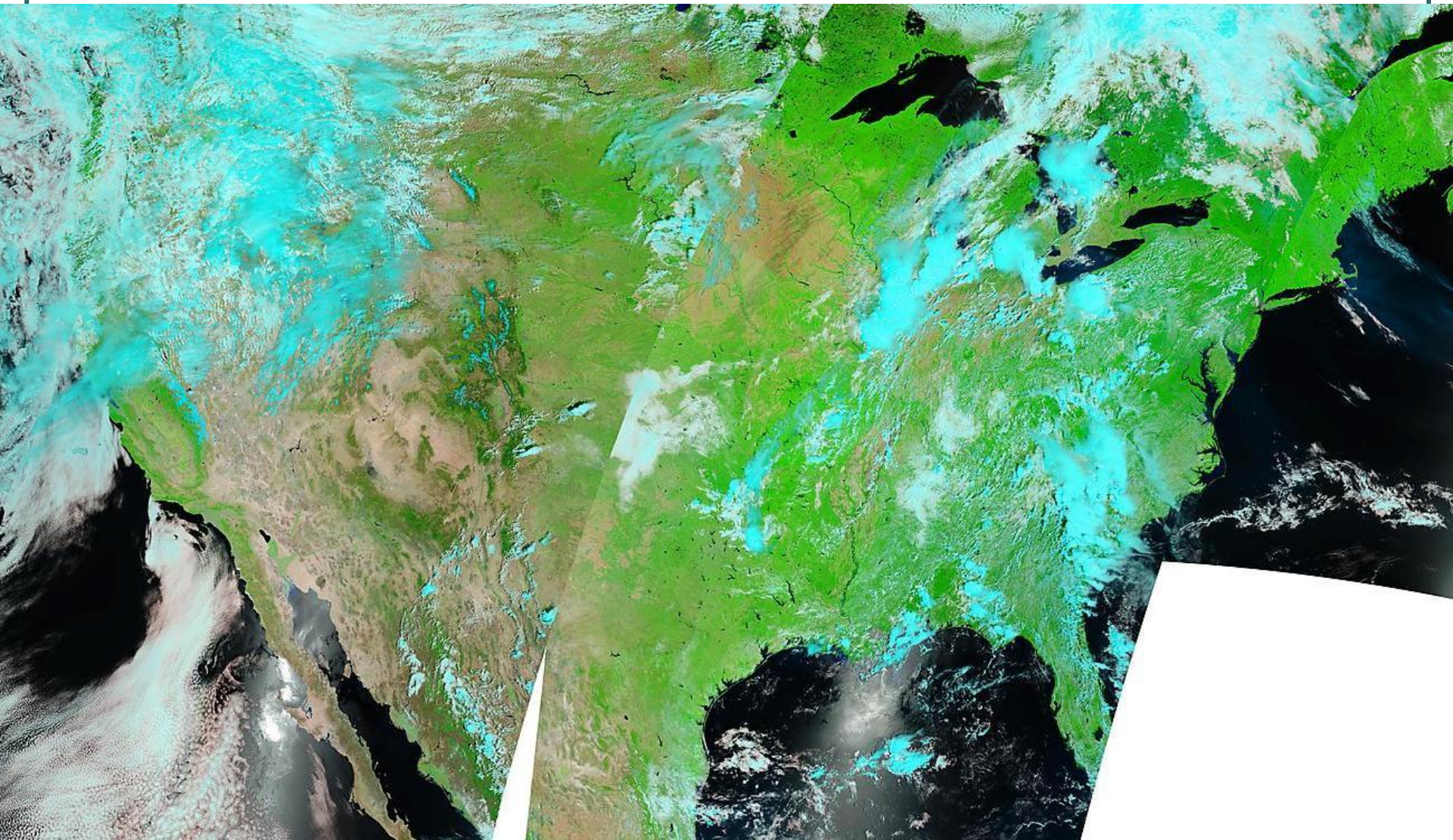


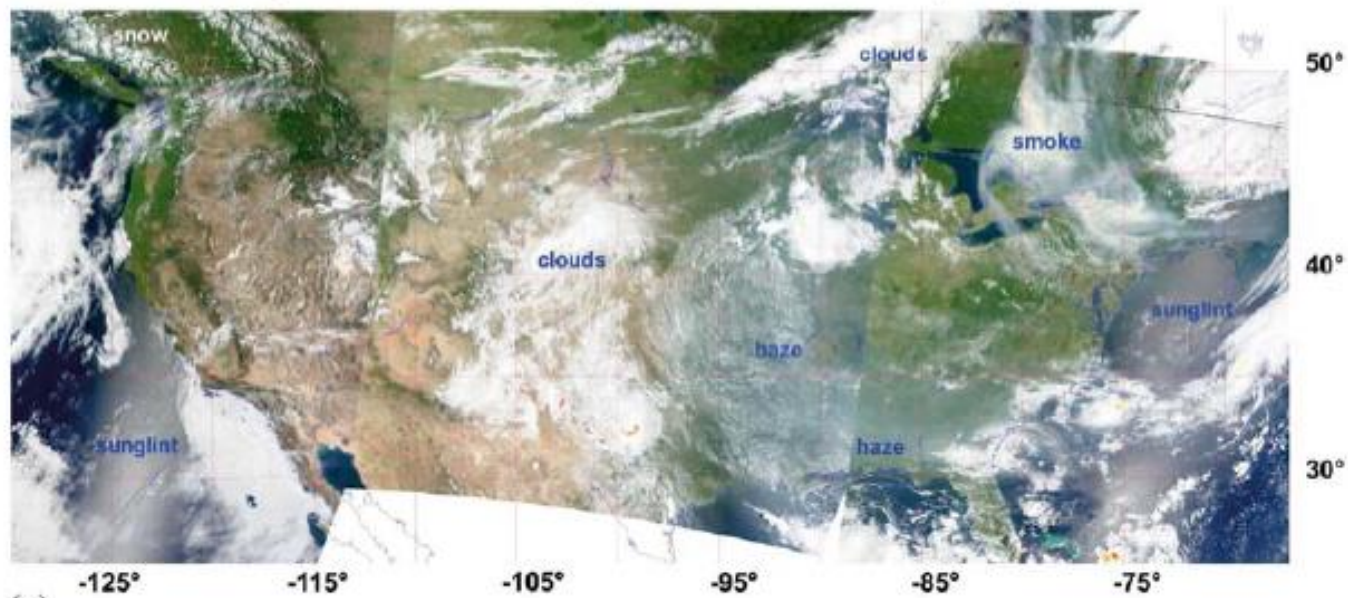
MODIS close-up of the smoke from the Quebec fires – 31 May, 2010

31 May 2010 - MODIS

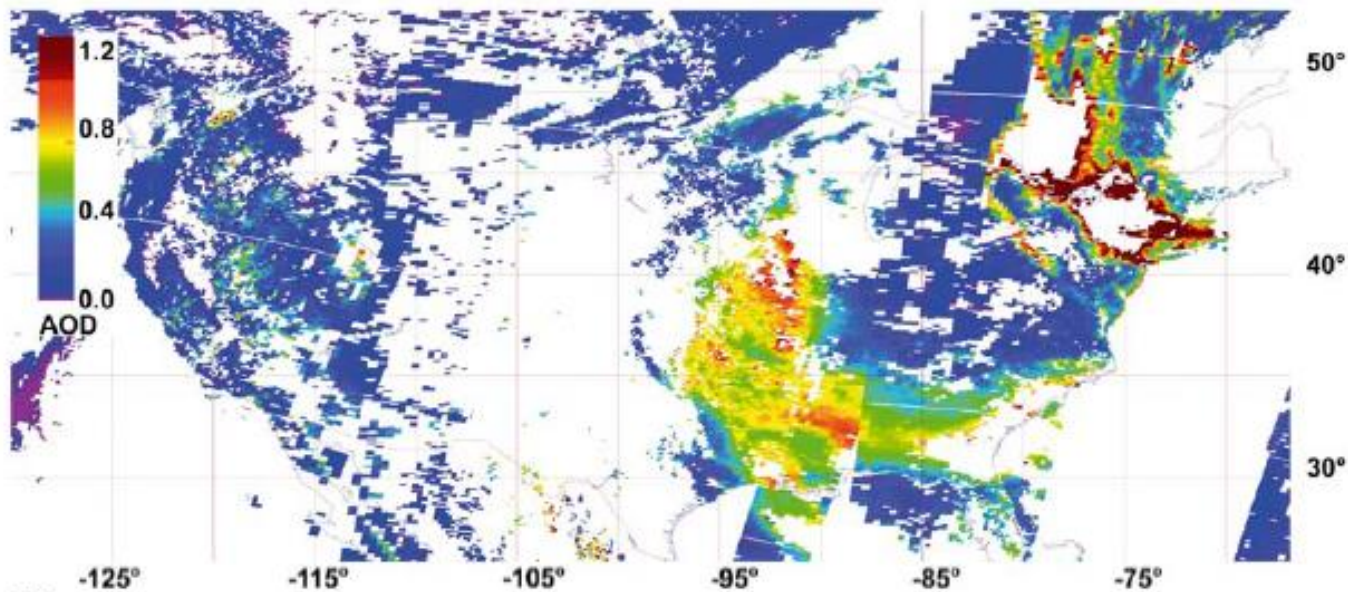


31 May 2010 – MODIS false color



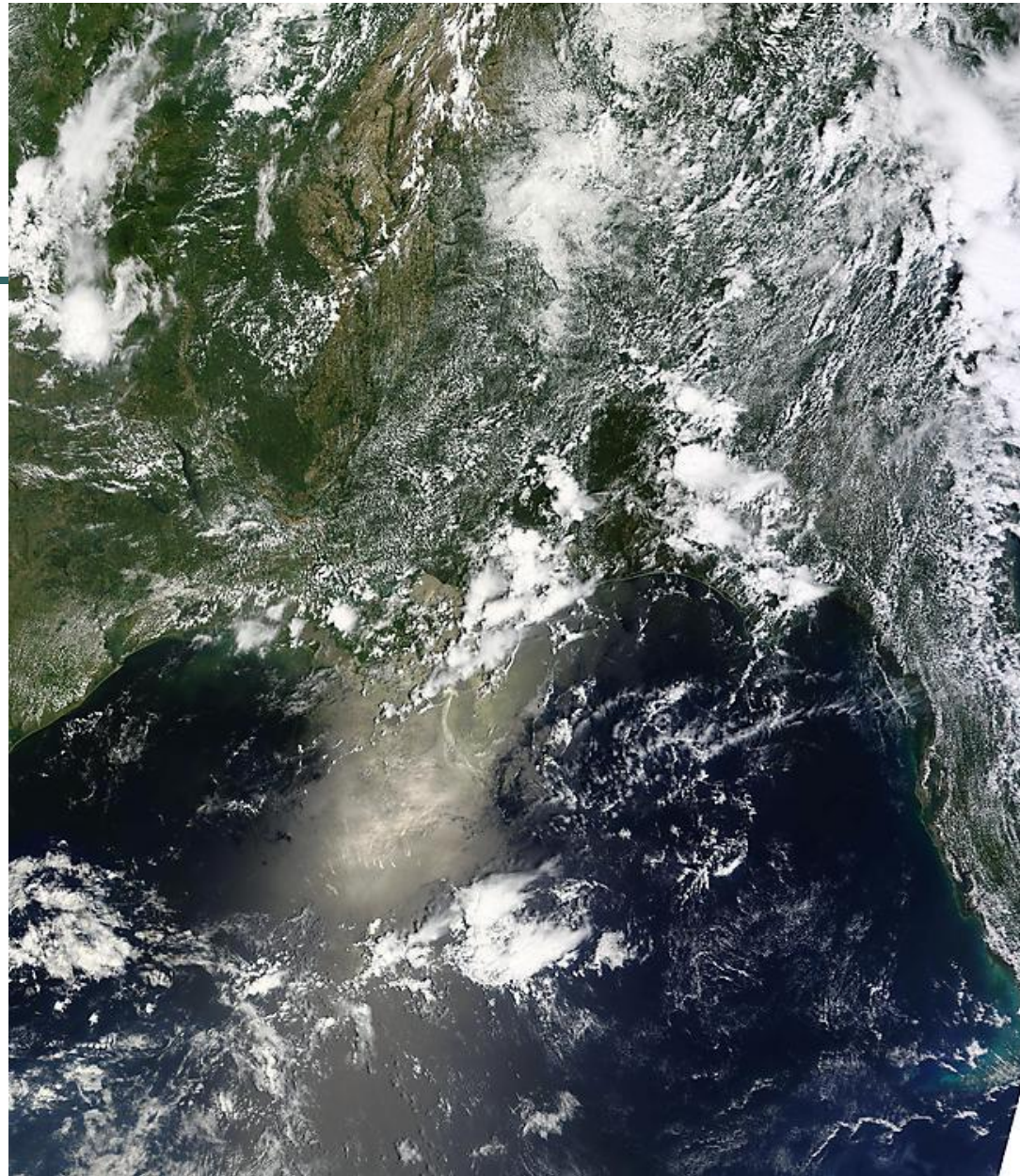


(a)



(b)

MODIS Data, 6 July 2002. (Upper) Level 1b RGB composite image; (Lower) Level 2 AOD.

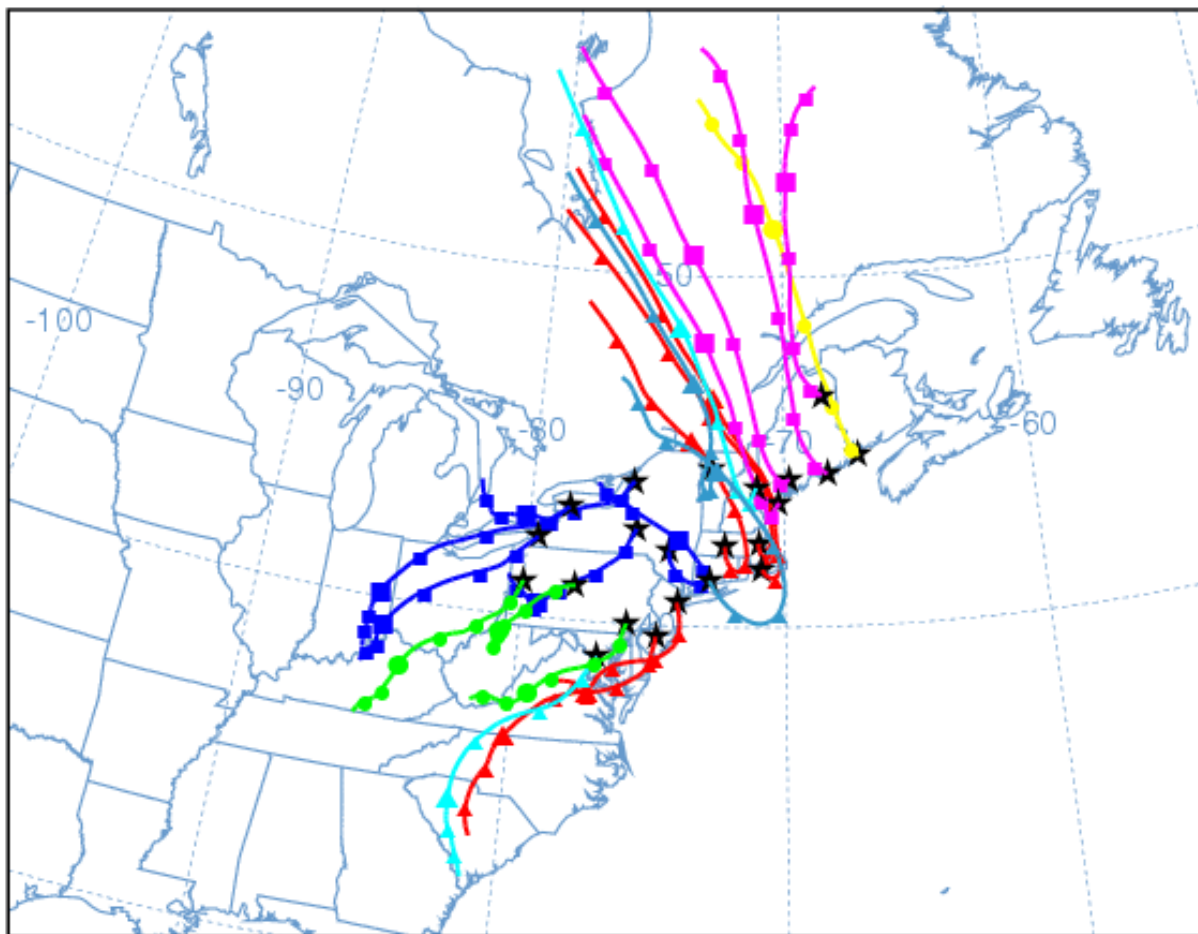


Sunglint in Gulf of Mexico – 31 May

**How do we know where
the smoke originated?**

NOAA HYSPLIT MODEL
Backward trajectories ending at 2100 UTC 31 May 10
NAM Meteorological Data

Source ★ at multiple locations



Ground observations



**Webcam view of downtown Burlington on the morning of May 31, 2010
showing visibility reduced to below 2 miles in smoke.**

National Weather Service Burlington

Mt. Washington – 31 May, 2010

Mount Washington Observatory (MWOBS) - White Mountains, New Hampshire (NH) - Mozilla Firefox

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Bitter cold, dense fog, heavy snow, and record wind... 6,288-foot Mount Washington is the Home of the World's Worst Weather.SM

Since 1932, the non-profit Mount Washington Observatory has been monitoring the elements at one of the planet's most extreme places—the rocky, windswept summit of Mount Washington, New Hampshire. **We invite you to join in the adventure.**

Current Summit Conditions

Temperature	50.7°F
Wind	37.9 mph
Direction	252° (W)
Gust	
Wind Chill	
Tuesday 12:30 PM	

VIEW MORE WEBCAMS

Observer Comments

22:17 Mon May 31st

It seems that there's always something new to see on this mountain. Even here in late May, as we get into the summer months that tend to be much tamer than the winter months (that I have now gotten to see 5 sets of), something new can sneak up on you. Today, that happened in the form of a whole lot of smoke coming from wildfires, some burning out of control, to our north in Quebec.

Old Glory in the sun today

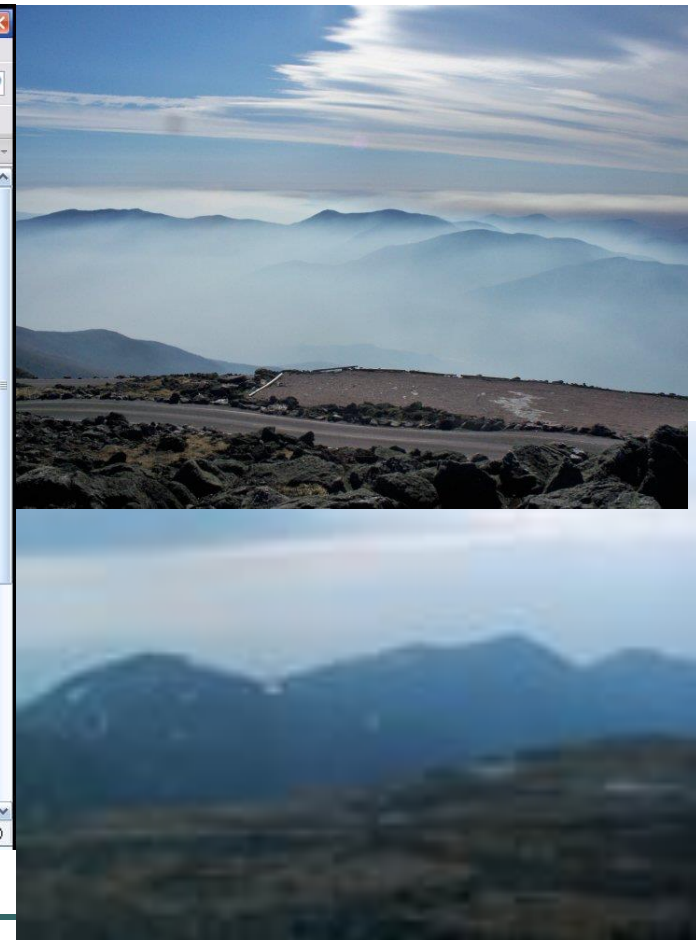
Photo Journal

SUMMIT

A SEEK THE PEAK BENEFIT SHOW

http://www.mountwashington.org/

One active download (41 minutes remaining)

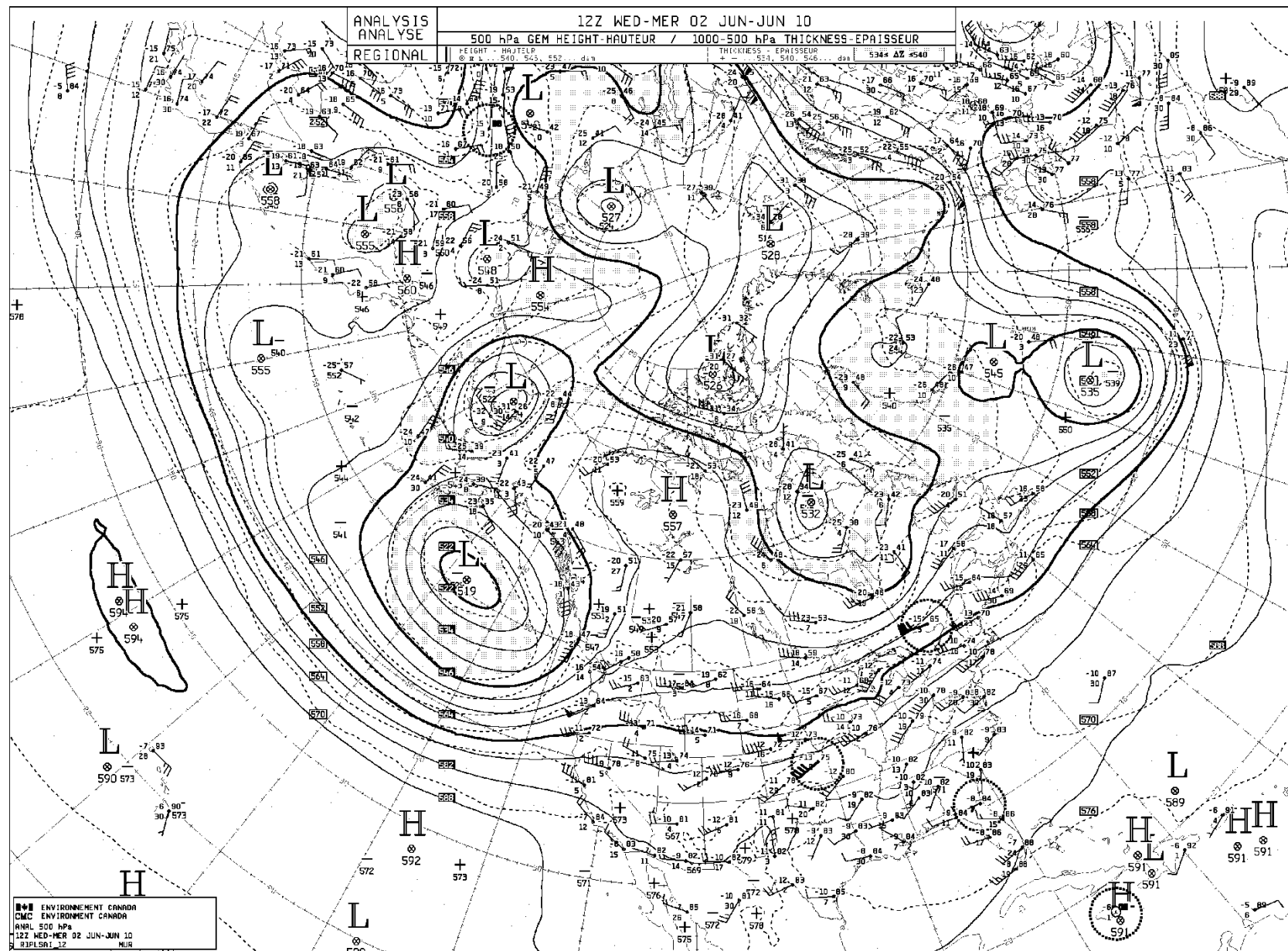


Images courtesy: Mt. Washington Observatory

Brian Clark – Observer and Meteorologist (Mt. Washington)

- “We actually started to see effects from these wildfires earlier in our shift last week. Ryan commented on the red moon he saw a few days ago, which in retrospect, was most certainly caused by smoke or ash aloft. Yesterday morning, we saw the first signs of significant amounts of smoke with what I have been calling a "smoke undercast", for lack of better term, below the summit. We often see cloud undercasts, which are simply clouds that we are looking down on the tops of below the mountain. In this case, there was a distinct layer of smoke filling the valleys below and blocking our view of anything below about 5,000 feet.”
22:17 31 May, 2010

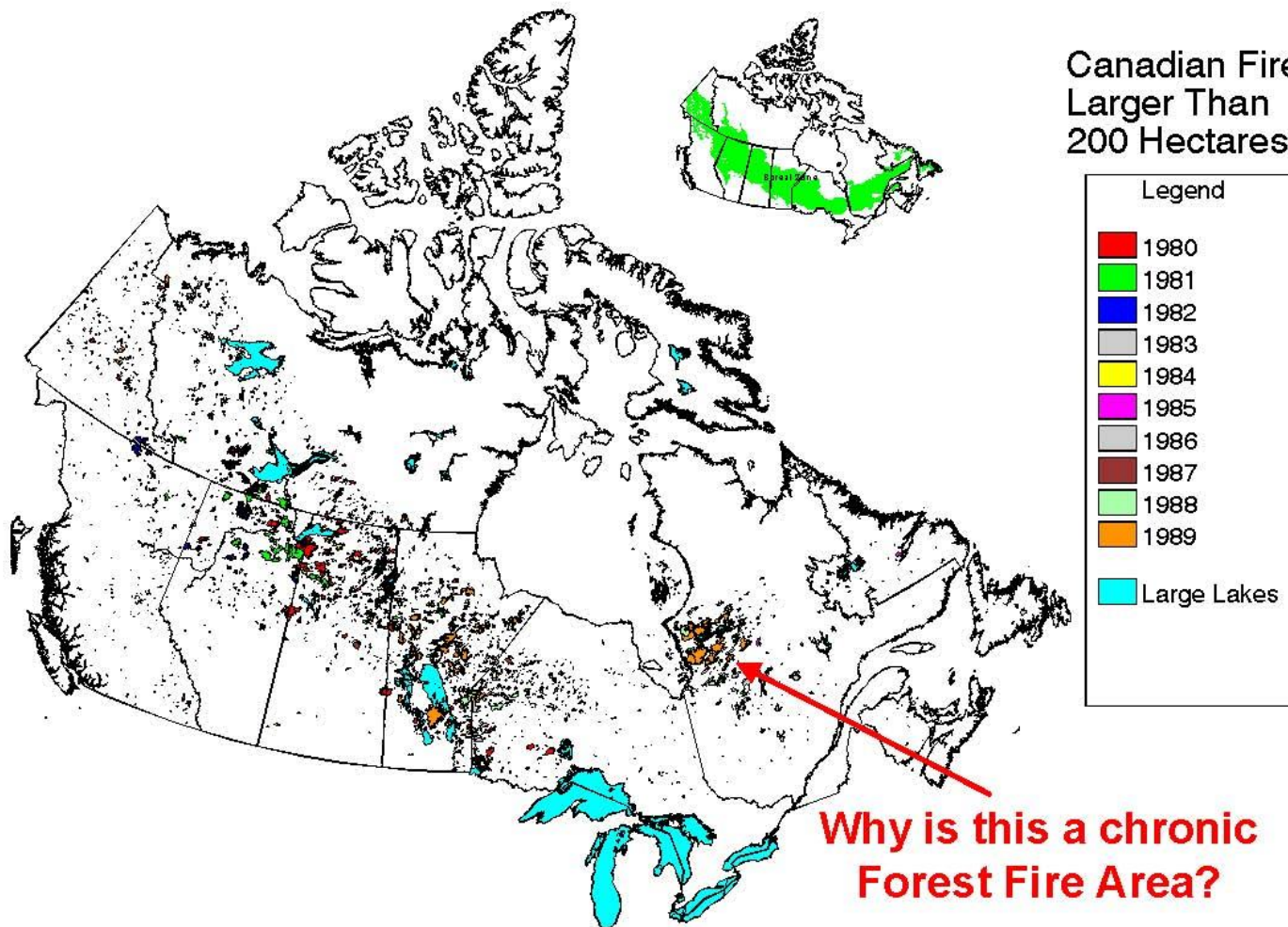
**Why was this episode
relatively short-lived?**



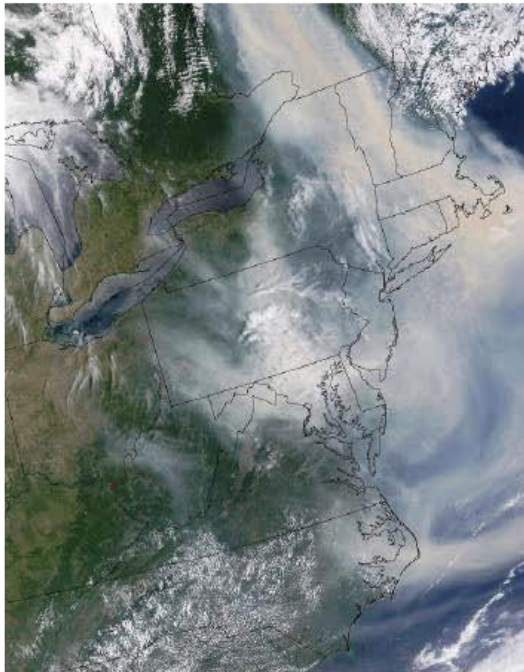
Jet stream (500-mb) map from Environment Canada – 2 June 2010

**Why should we be interested
in Quebec forest fires?**

Canadian Fires Larger Than 200 Hectares



July 7, 2002 was one of the haziest days ever observed in VT
High PM concentrations, Poor Visibility, & unusual “Yellow” color

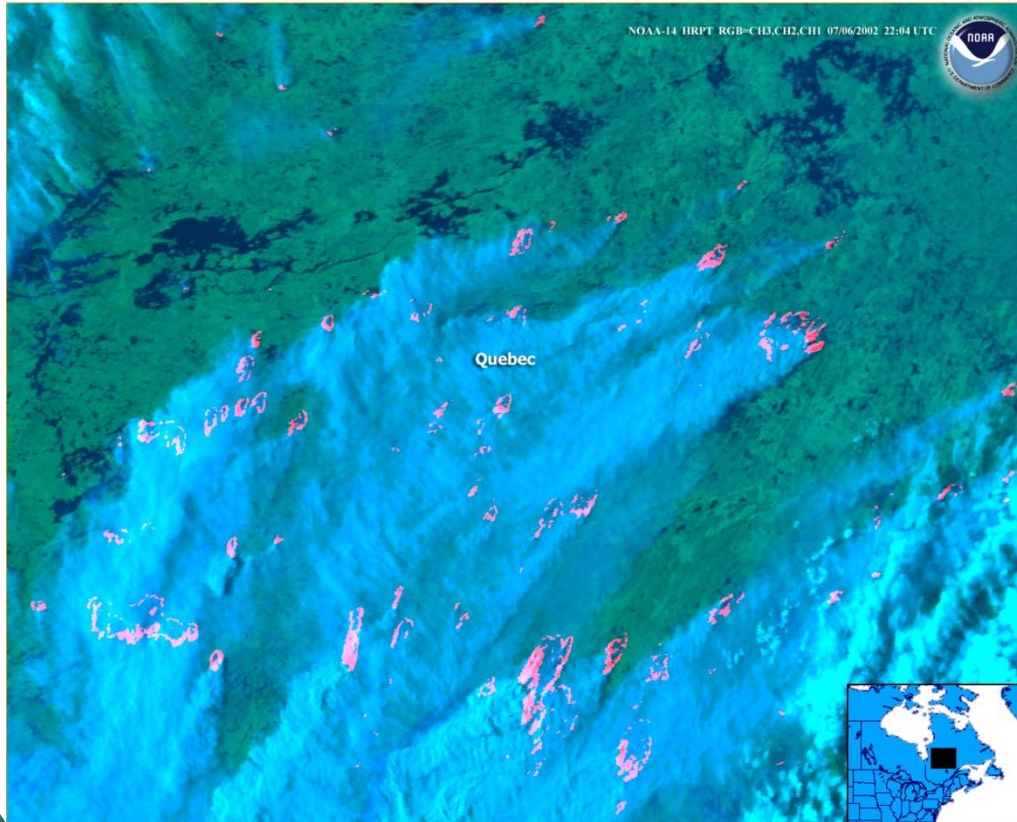


Smoke from Canadian forest fires casts a haze over Vermont.

Photo by Peter Huoppi in the Burlington (VT) Free Press 7/8/02 (taken 7/7/02)

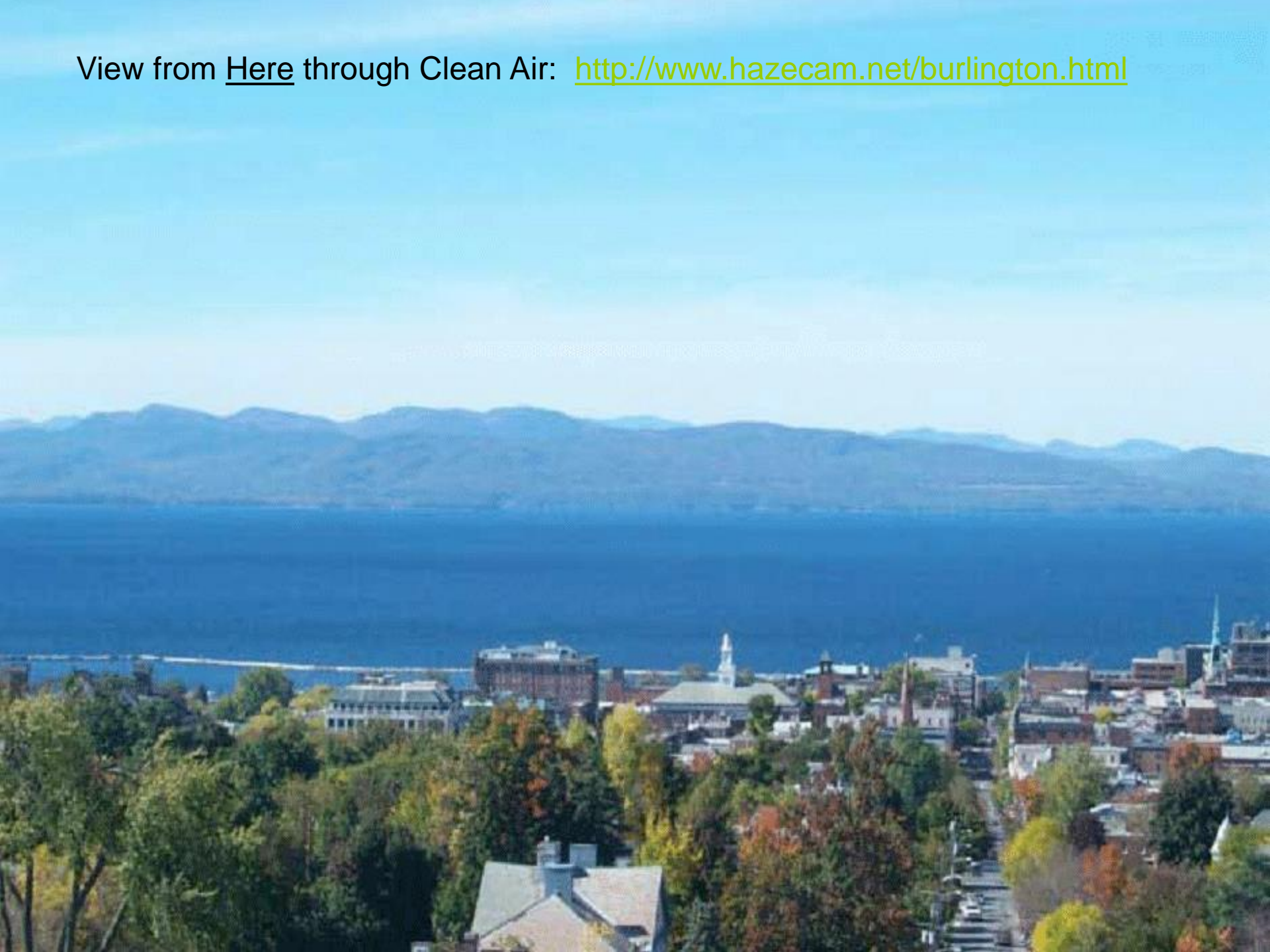
Quebec forest fires

Heat signatures (red) and smoke (light blue haze) are visible from fires burning in Quebec, Canada.



- 6 July, 2002
- smoke shown in light blue
- heat signatures in red
- GOES imagery
- thermal and visible bands

View from Here through Clean Air: <http://www.hazecam.net/burlington.html>



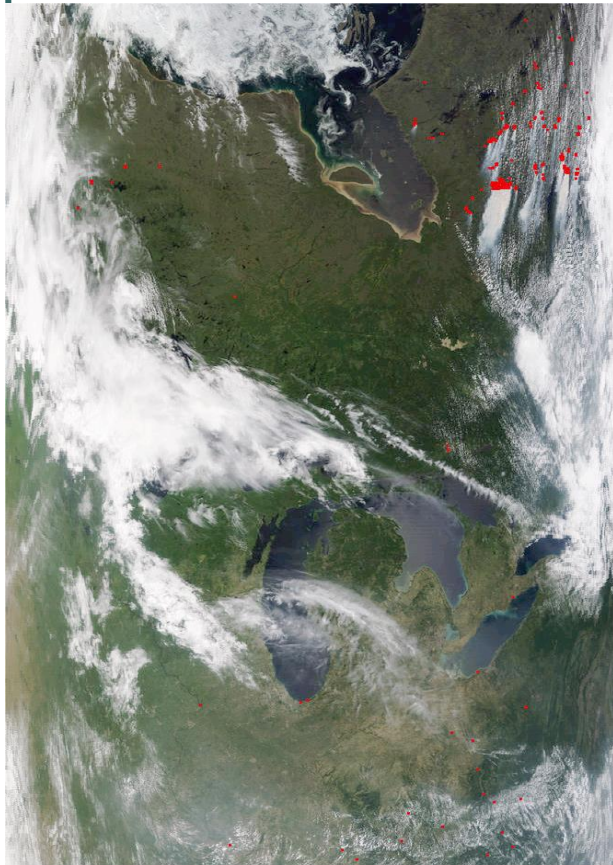
Quebec Forest Fire, 7/7/02



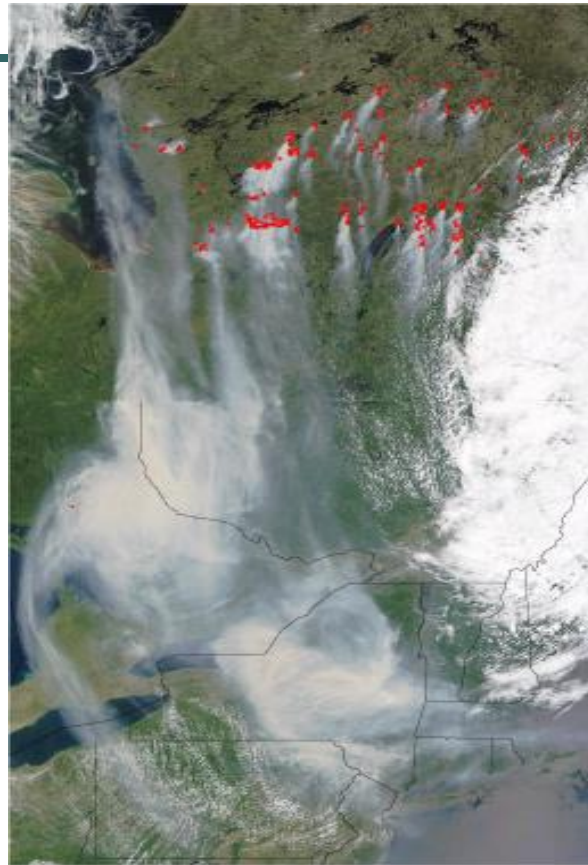
MODIS: The Fine-Scale Picture

[MODIS Land Rapid Response System](#)

The Fires and the Smoke Transport of Smoke from N. Quebec to SE Canada and NE US.



7/5/02 MODIS



7/6/02 MODIS



7/7/02 MODIS

Burlington, VT CAMNET

[illegible]

7/5/02 15:00

7/6/02 15:00

7/7/02 15:00

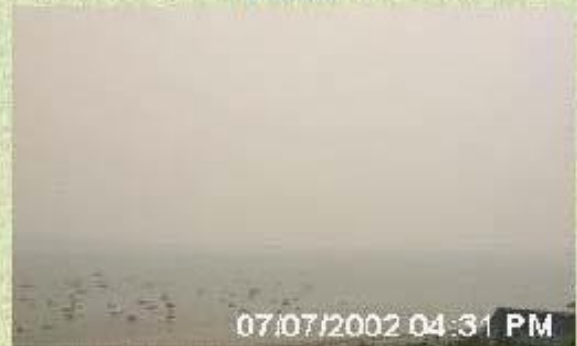
Acadia impact occurred later (7/8-10) than other NE sites.

Burlington, VT camera faces West, so afternoon yellow color may be enhanced, but both the haze and the incident light had distinct yellow tint all day on 7/7/02.

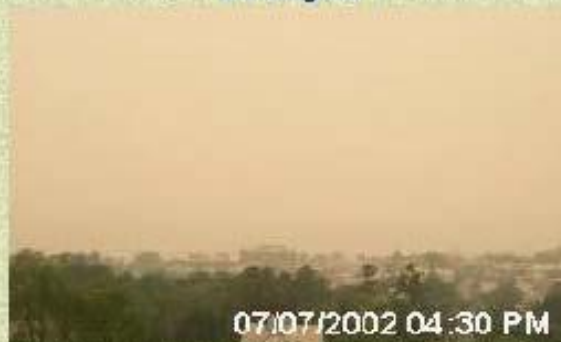
Acadia



Boston



Burlington



Hartford

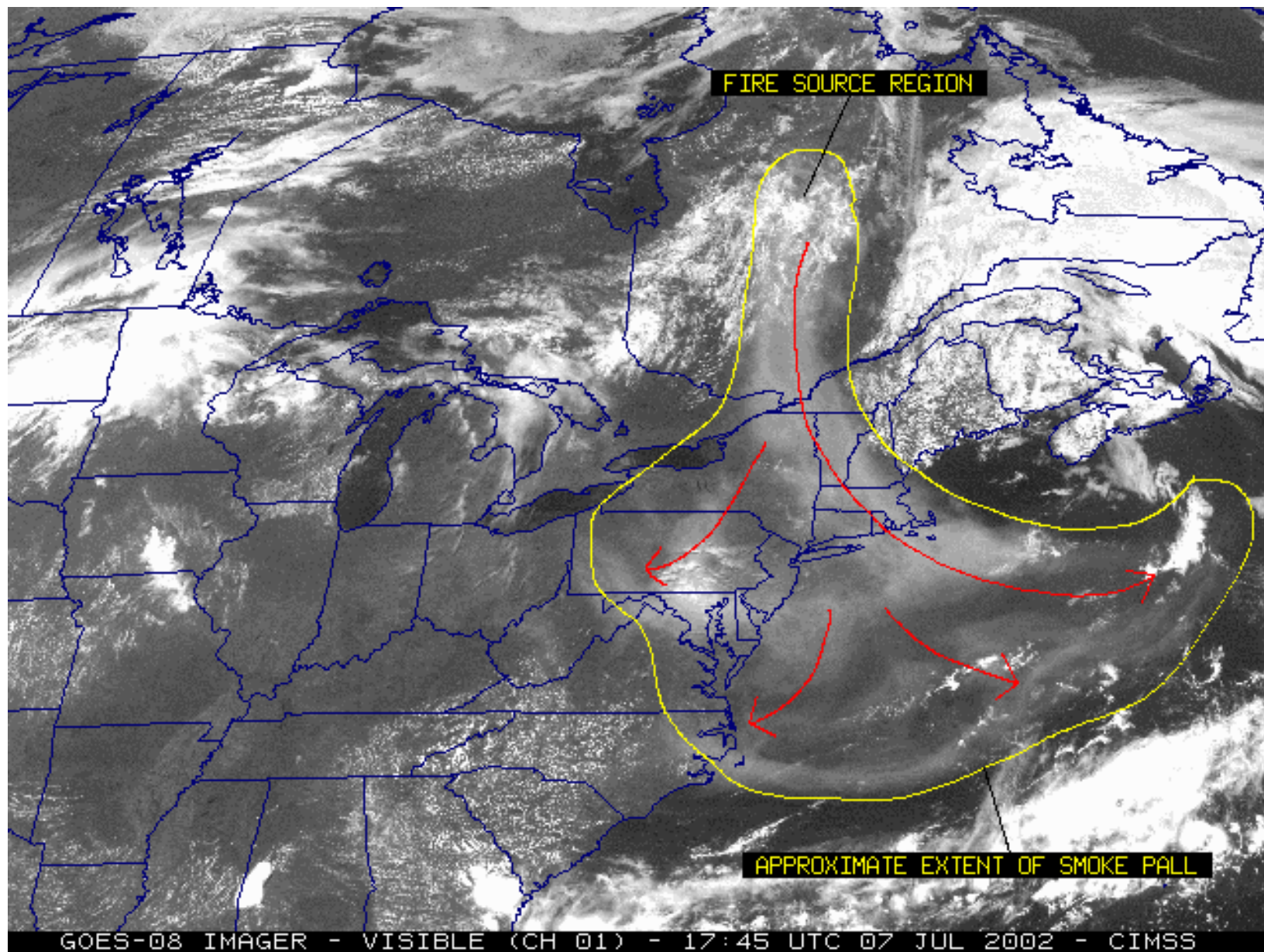


Mt. Washington



Newark/NYC



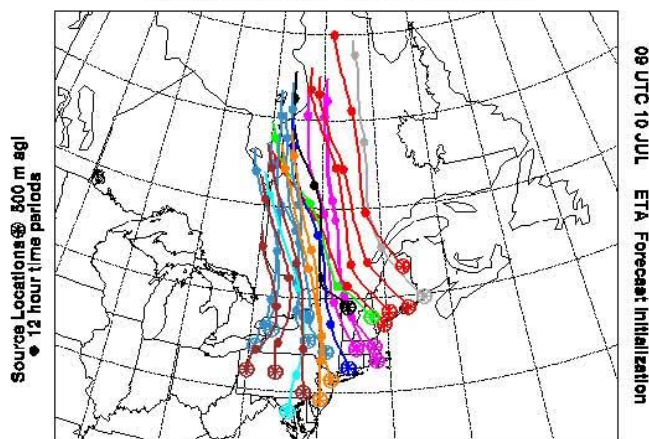


Concerns over More Smoke on 7/11/02 Proved Incorrect

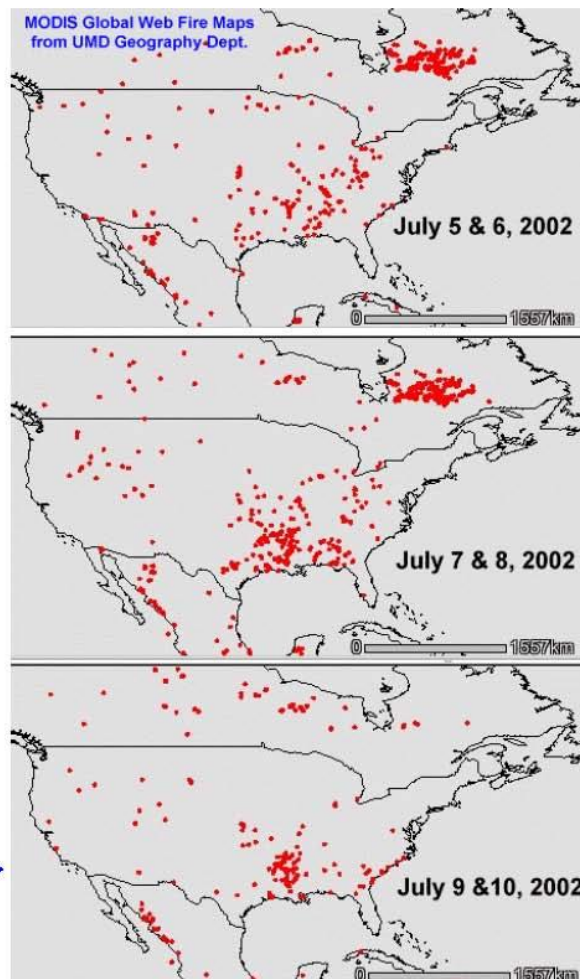


NOAA Air Resources Laboratory

U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Air Resources Laboratory
Trajectory Forecasts
Backward Trajectories Ending 21 UTC 11 JUL 02



It appears the Fires had largely been extinguished by July 9th or 10th



Forest fire impacts

Forest fire impacts

- tropospheric ozone
- particulate matter
- aviation hazard
- human health

View of the Boston Skyline by automated CAMNET on 7/16/99

6/16/99 at 7 PM

7/16/99 at 6 PM

(a few hours before JFK Jr's plane went Down near Martha's Vineyard)

Ozone injury



Ozone injury to milkweed.



Ozone injury to yellow-poplar.

USFS

Smoke Produces Particulate Matter that Adversely Affects Human Health

- increased premature deaths
- aggravation of respiratory or cardiovascular illness
- lung function decrements
- increased work loss
- changes in lung function/structure/natural defense

National Air Quality Standards

Criteria Pollutants

● Carbon Monoxide

● Particulate Matter


● Ozone

● Nitrogen Oxide

● Lead

● Sulfur Dioxide

Key criteria
pollutants
generated by
fire



Hourly AQI (Combined PM_{2.5} and O₃)

Monday, May 31, 2010 12:00 AM EDT

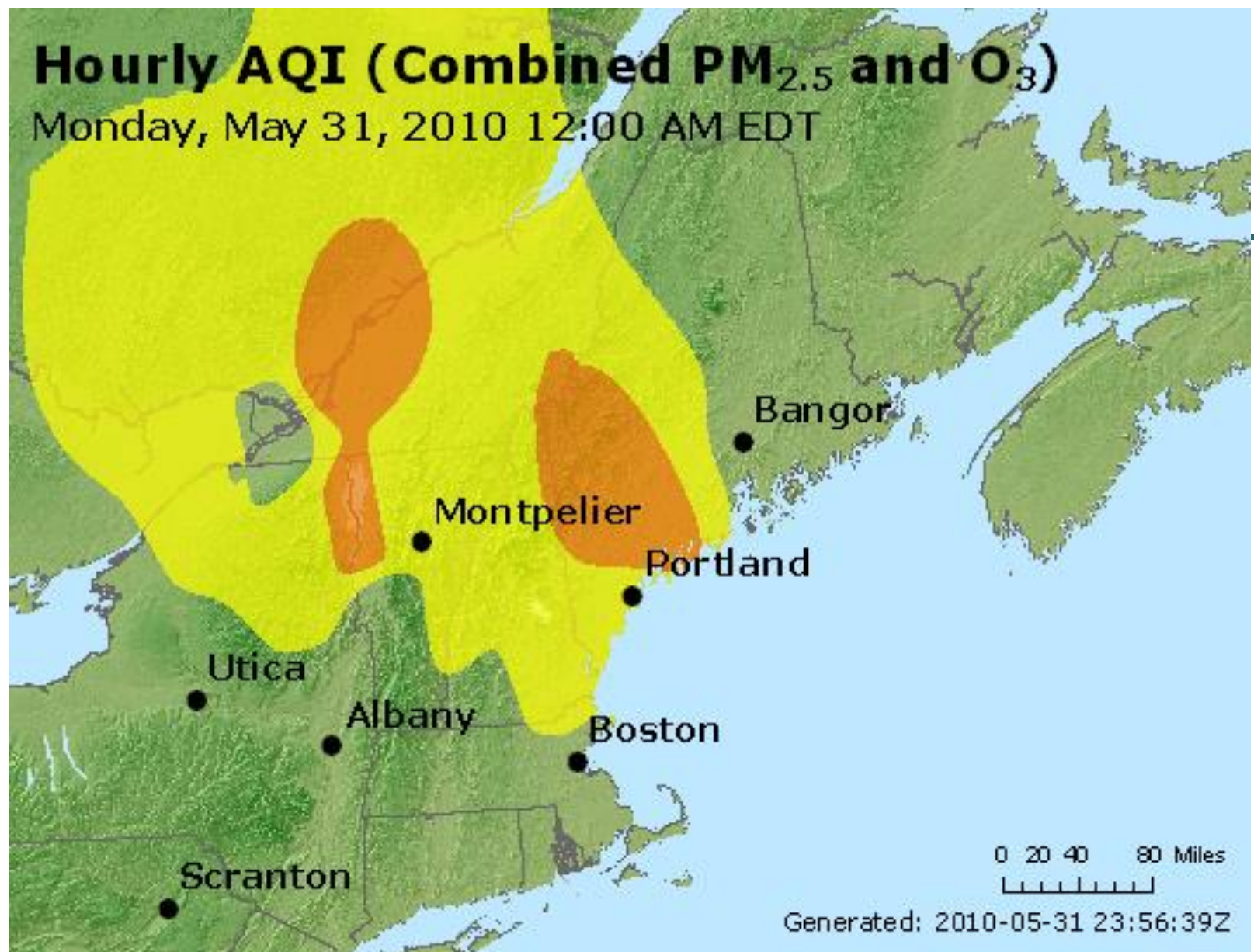


Image (or graphic) obtained from the U.S. Air Quality Smog Blog (<http://alg.umbc.edu/usag>).

Hourly PM_{2.5} AQI

Monday, May 31, 2010 12:00 AM EDT

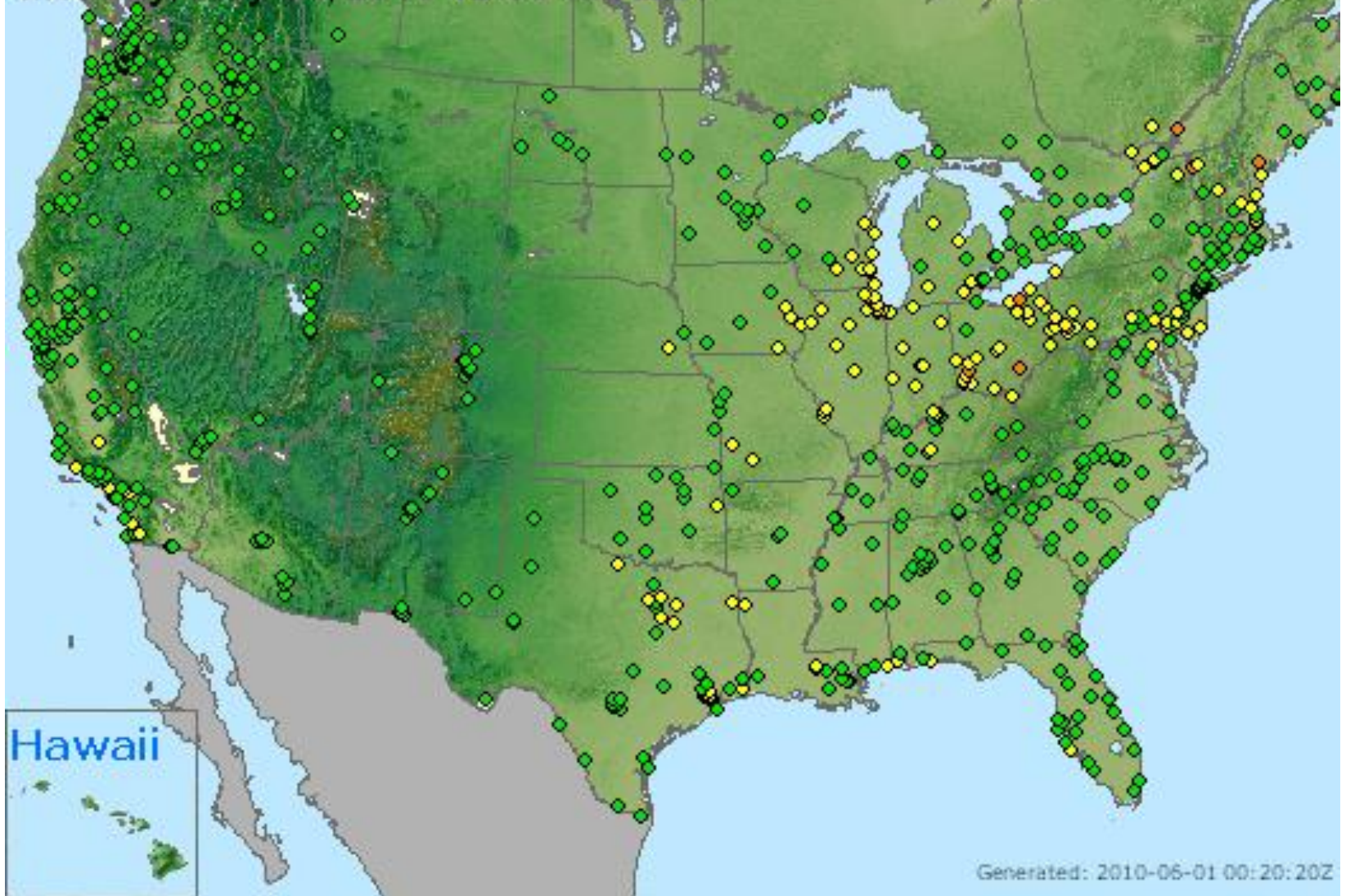


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