



Earth System Research Laboratory

SCIENCE, SERVICE & STEWARDSHIP

From the Present to the Future

Wouter Peters

NOAA Earth System Research Laboratory

ESRL Dedication and Open House

August 23-24, 2006





Overview

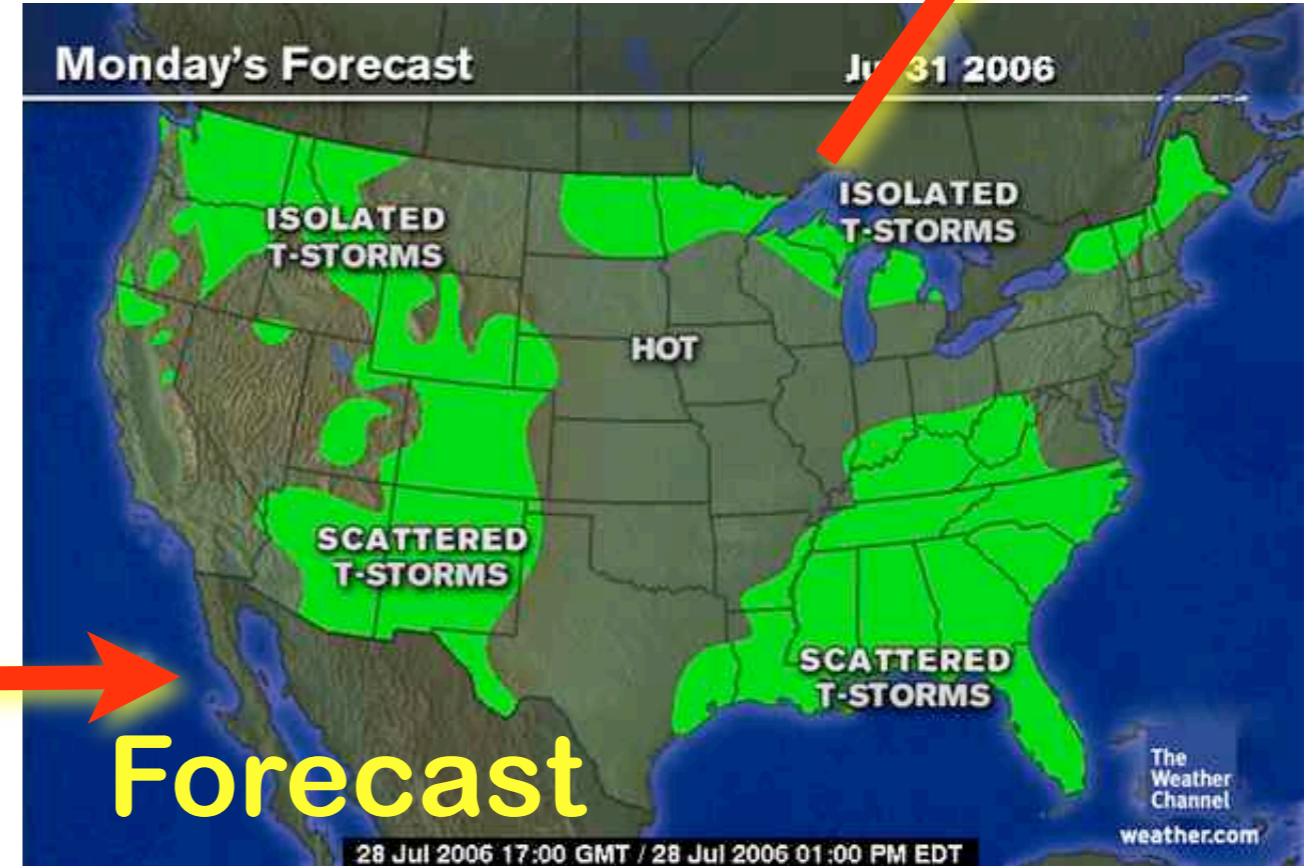
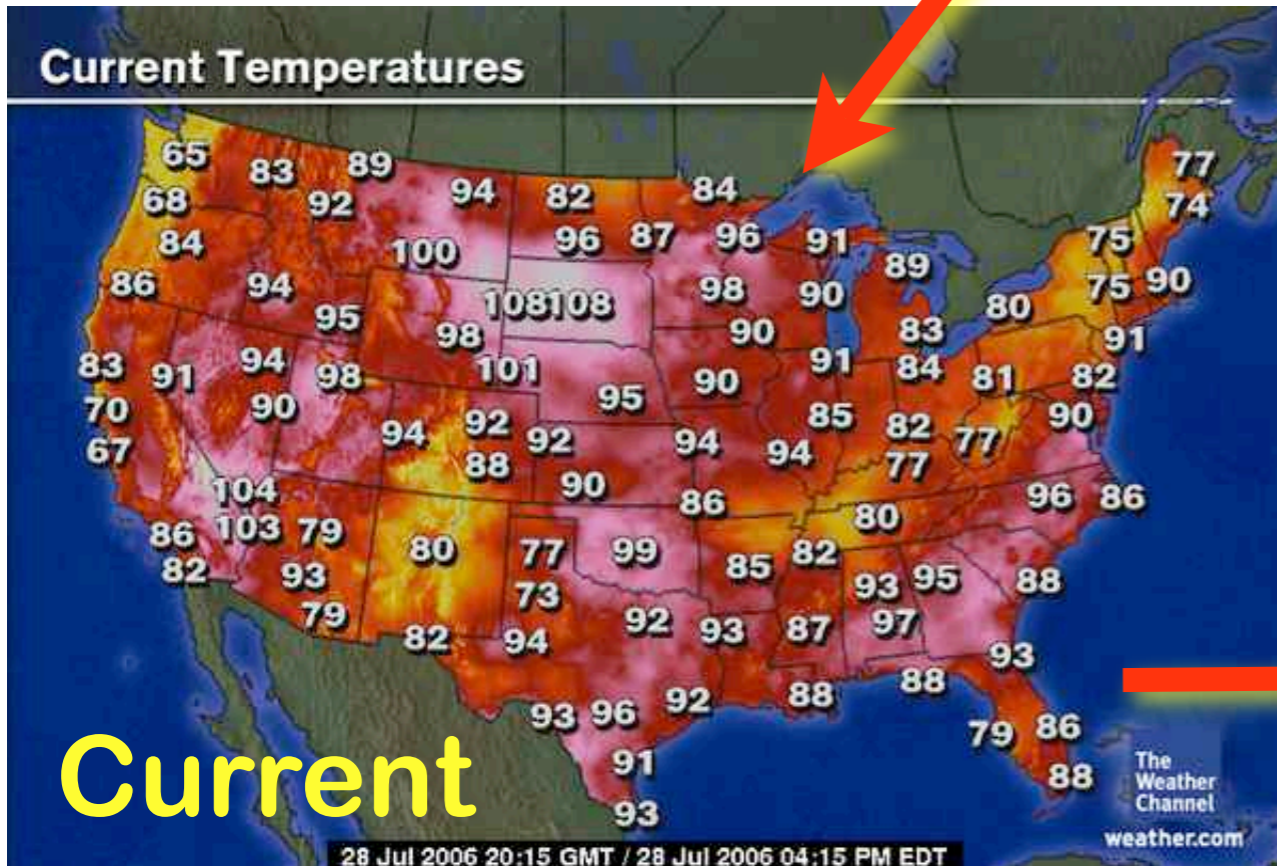
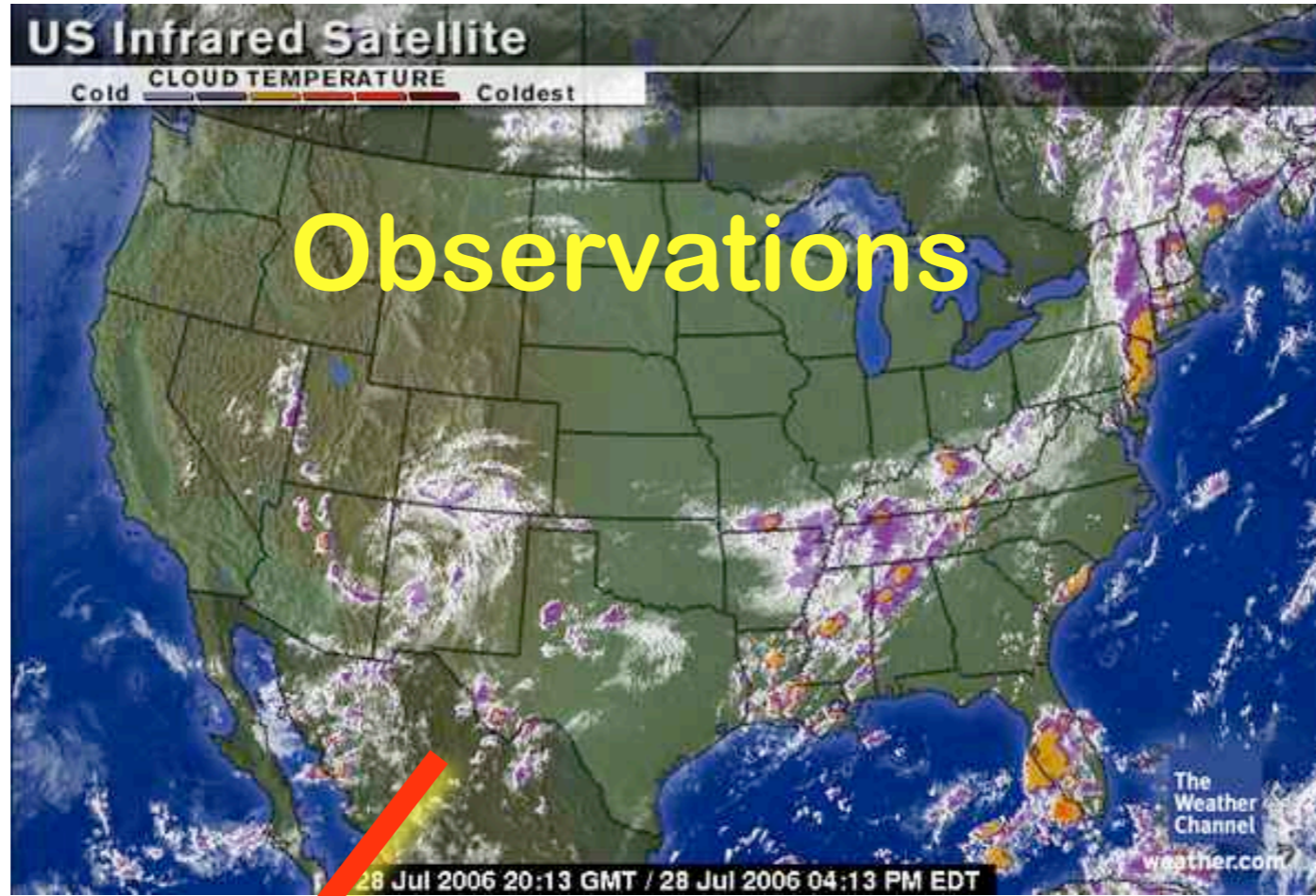
- **Why monitor carbon dioxide?**
- **How to find CO₂ uptake and emissions**
- **What do we see...?**
- **From Science to Product**

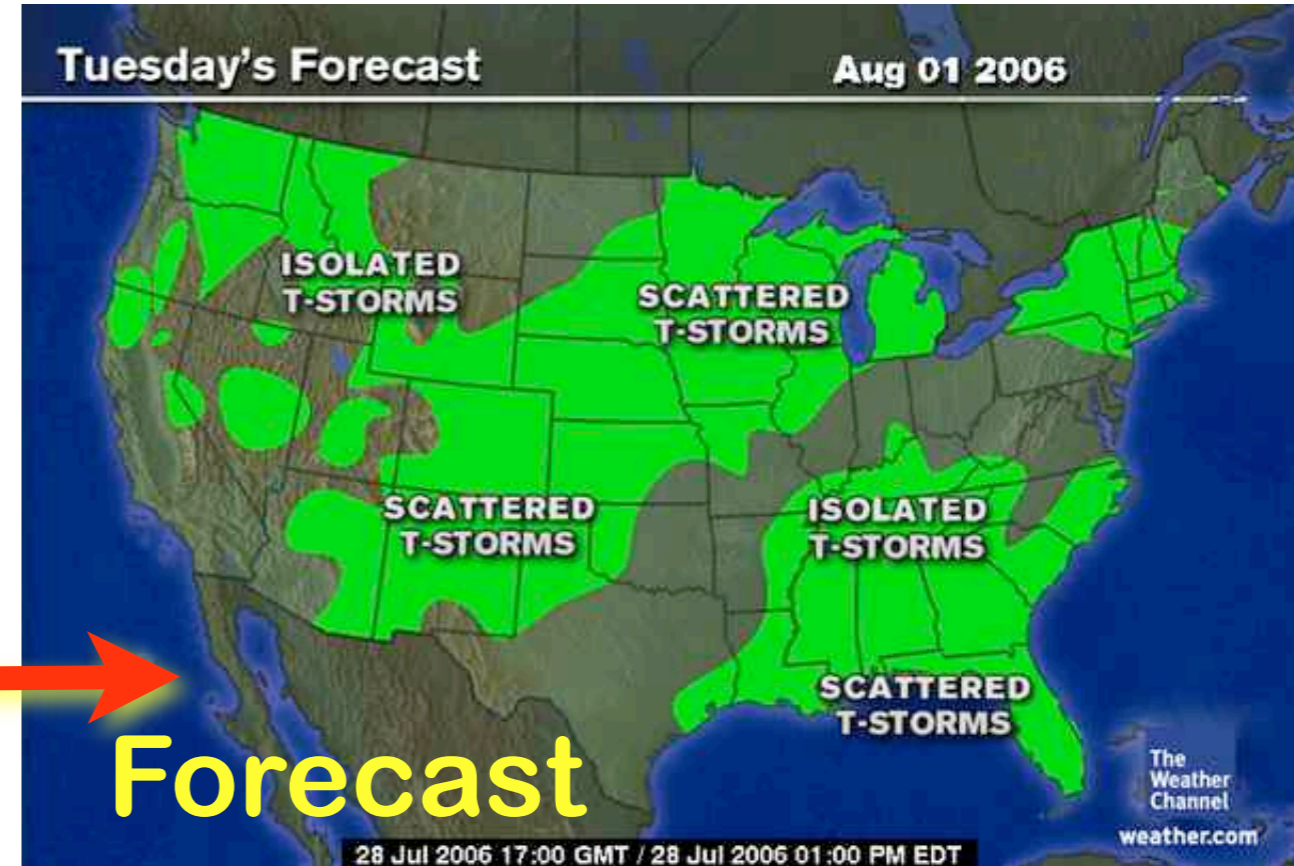
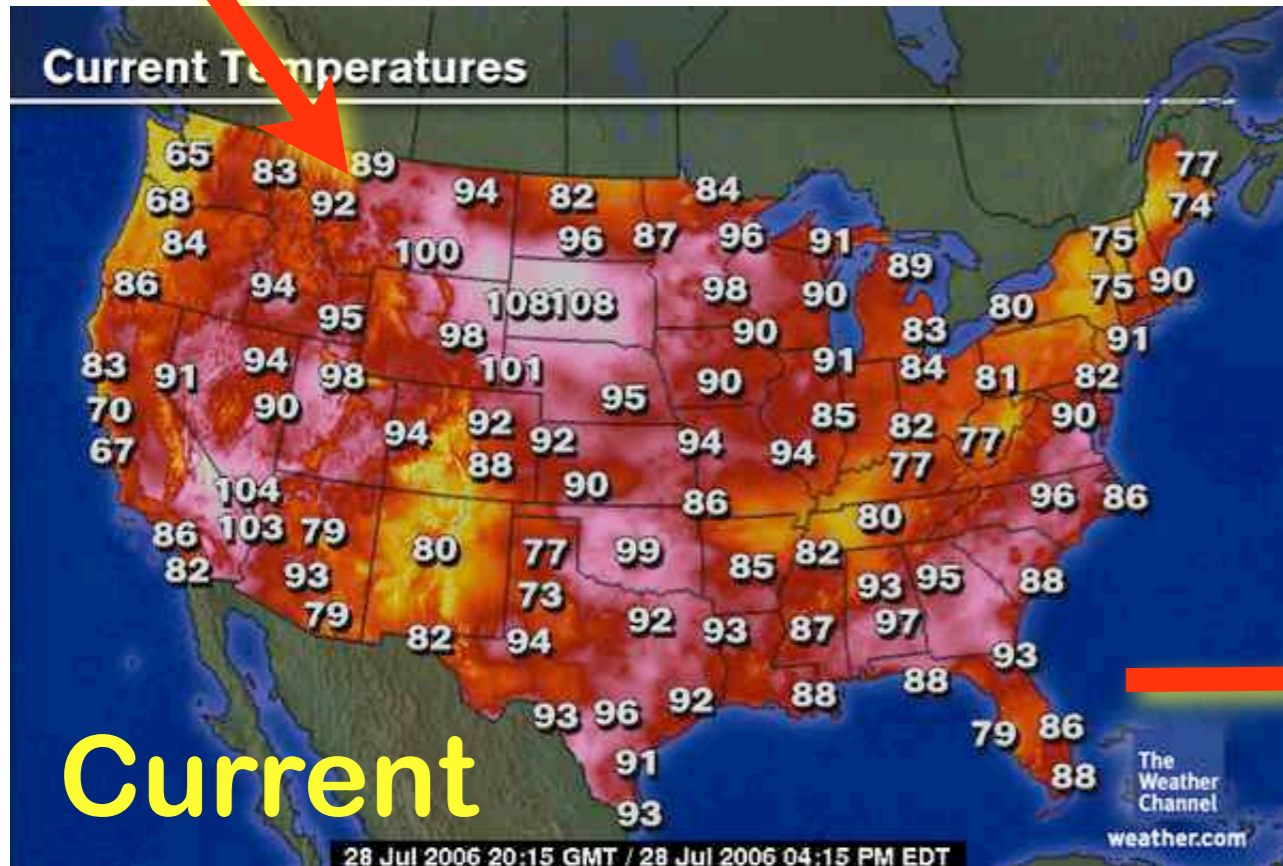
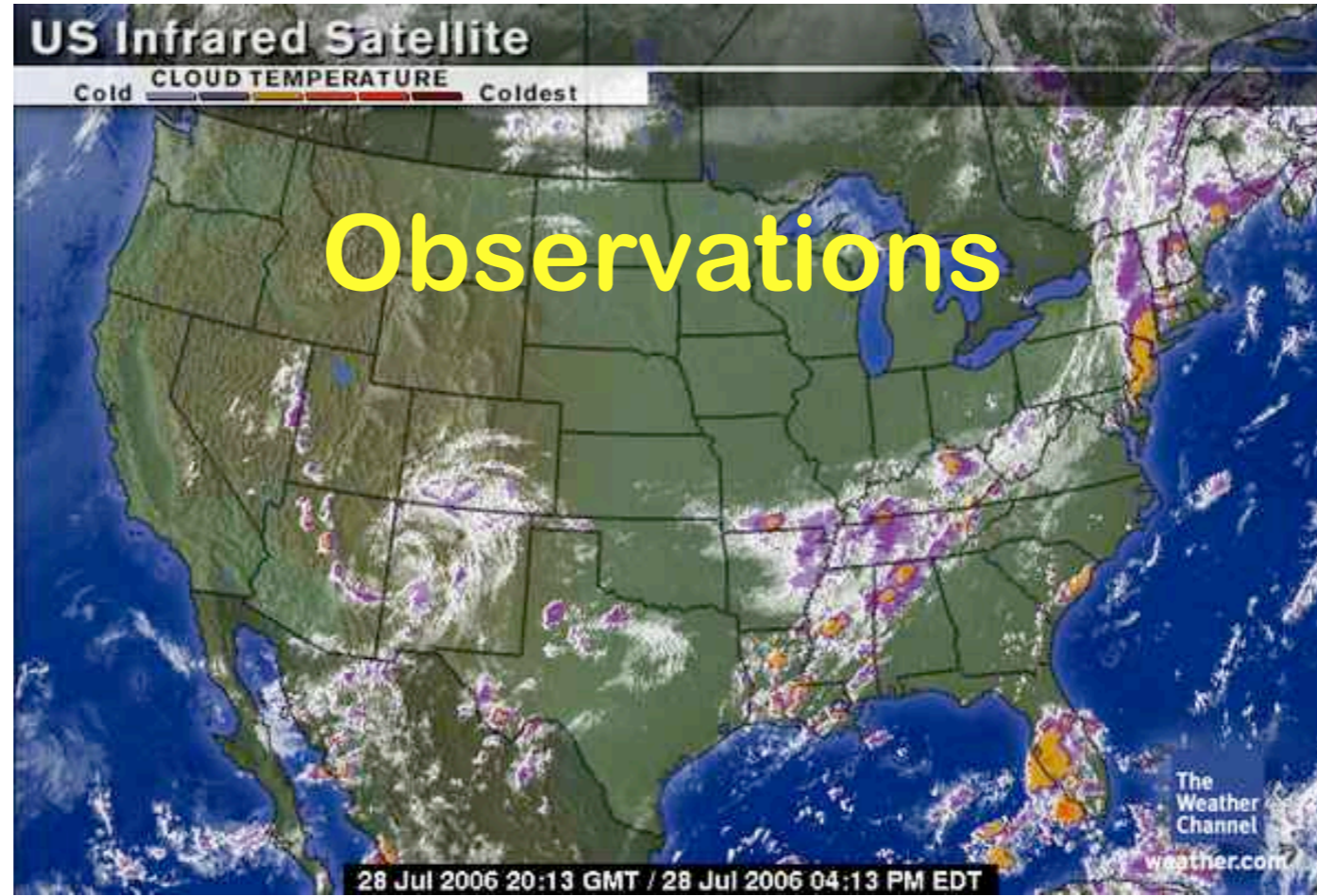
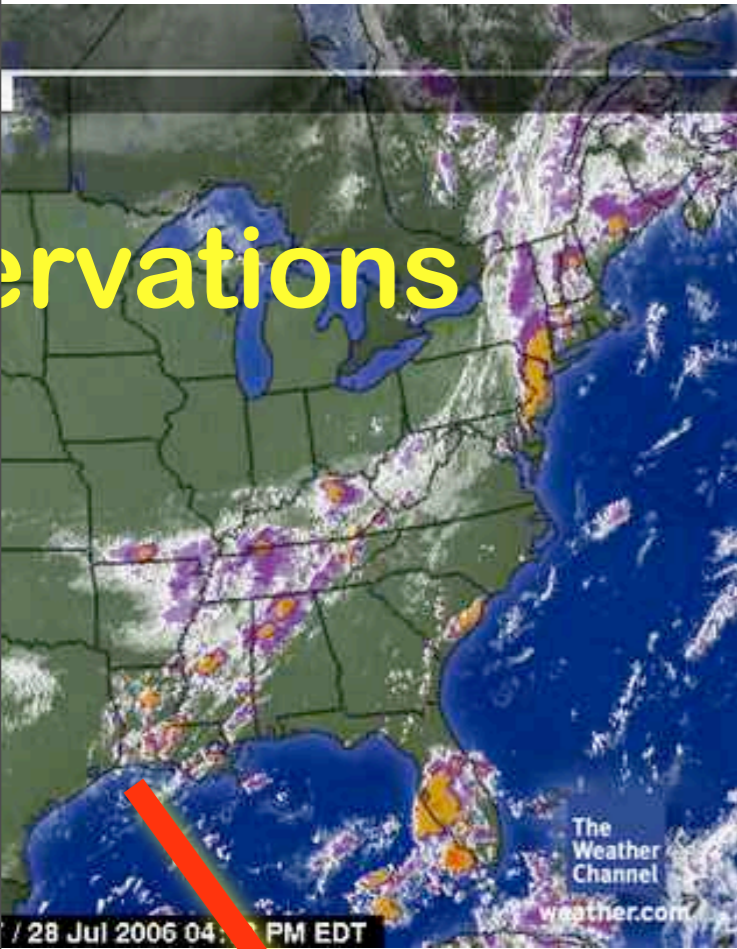


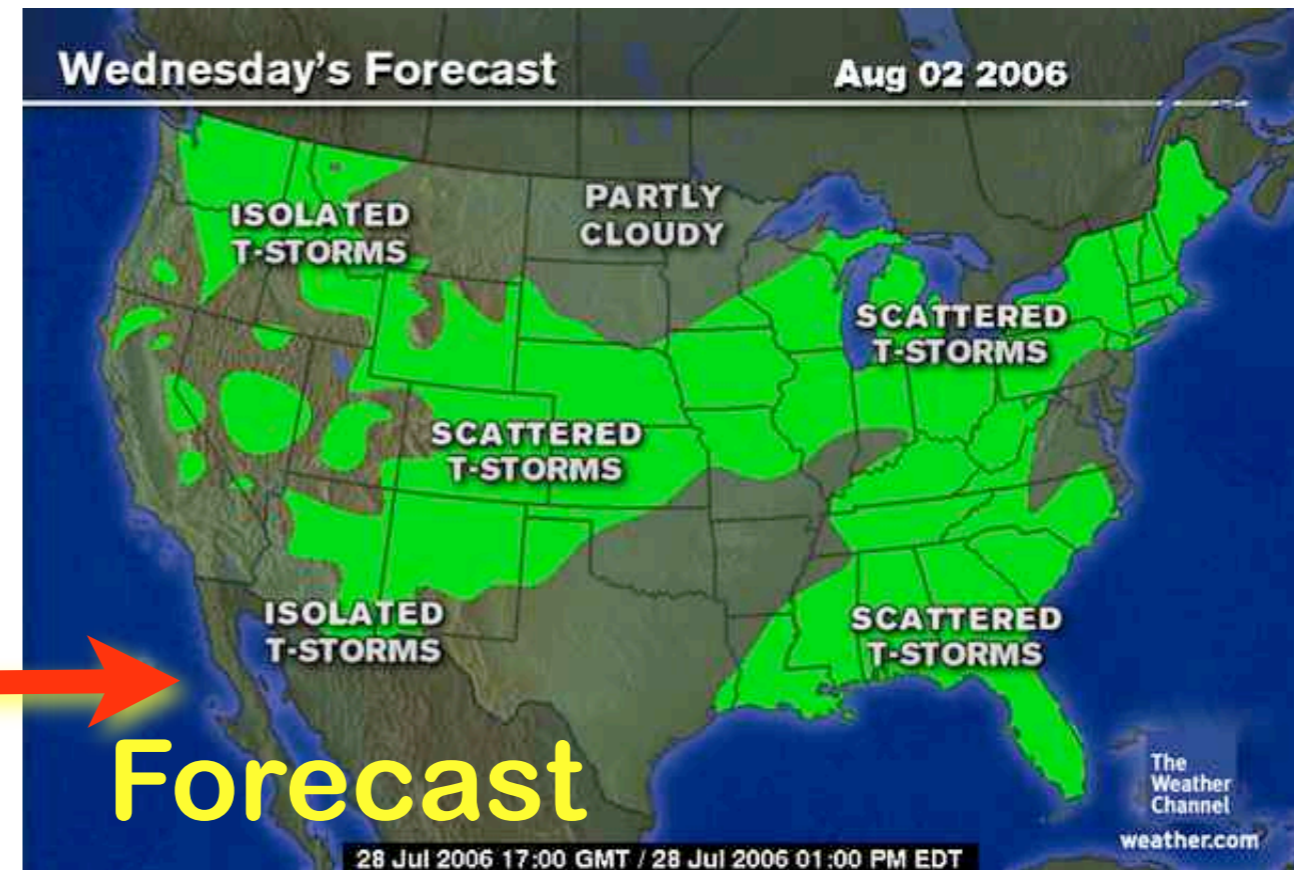
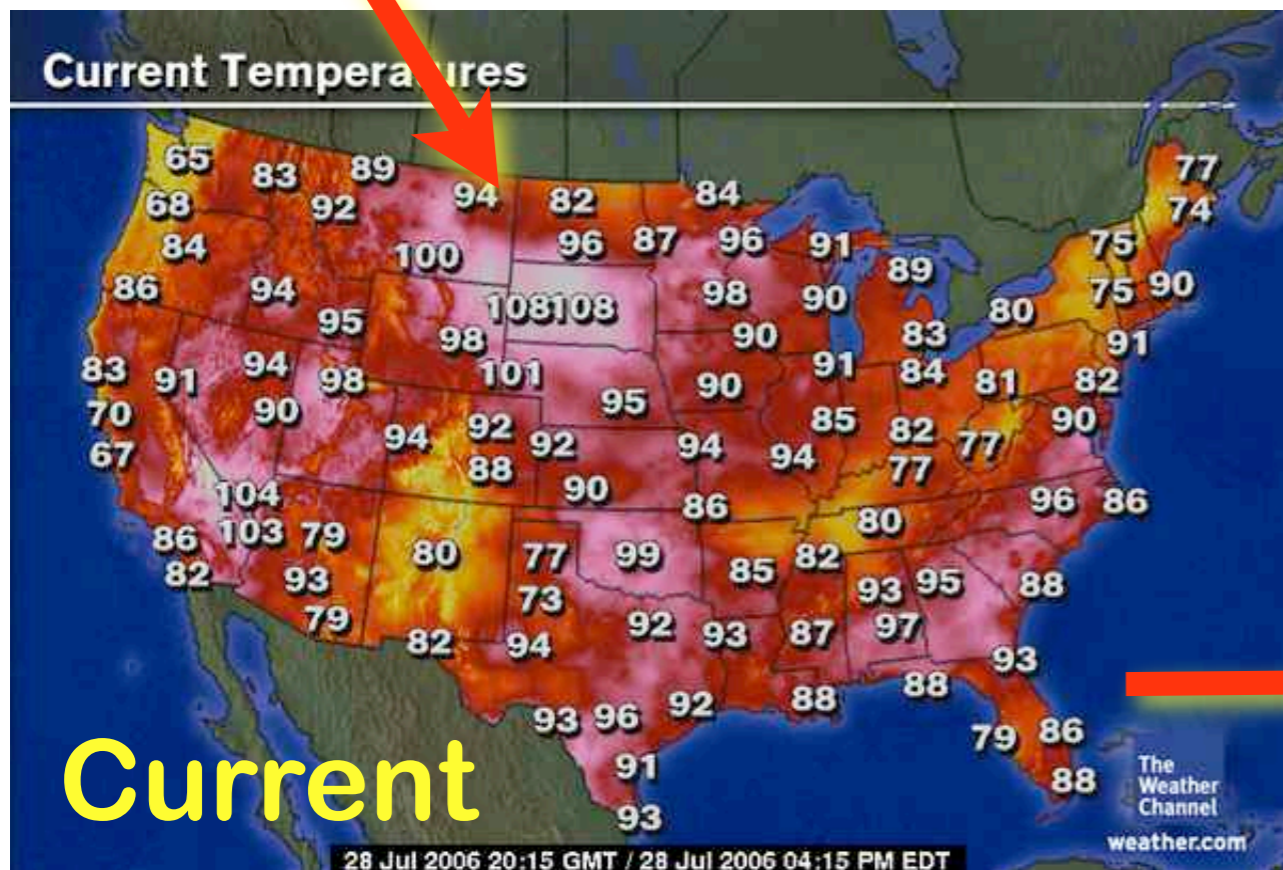
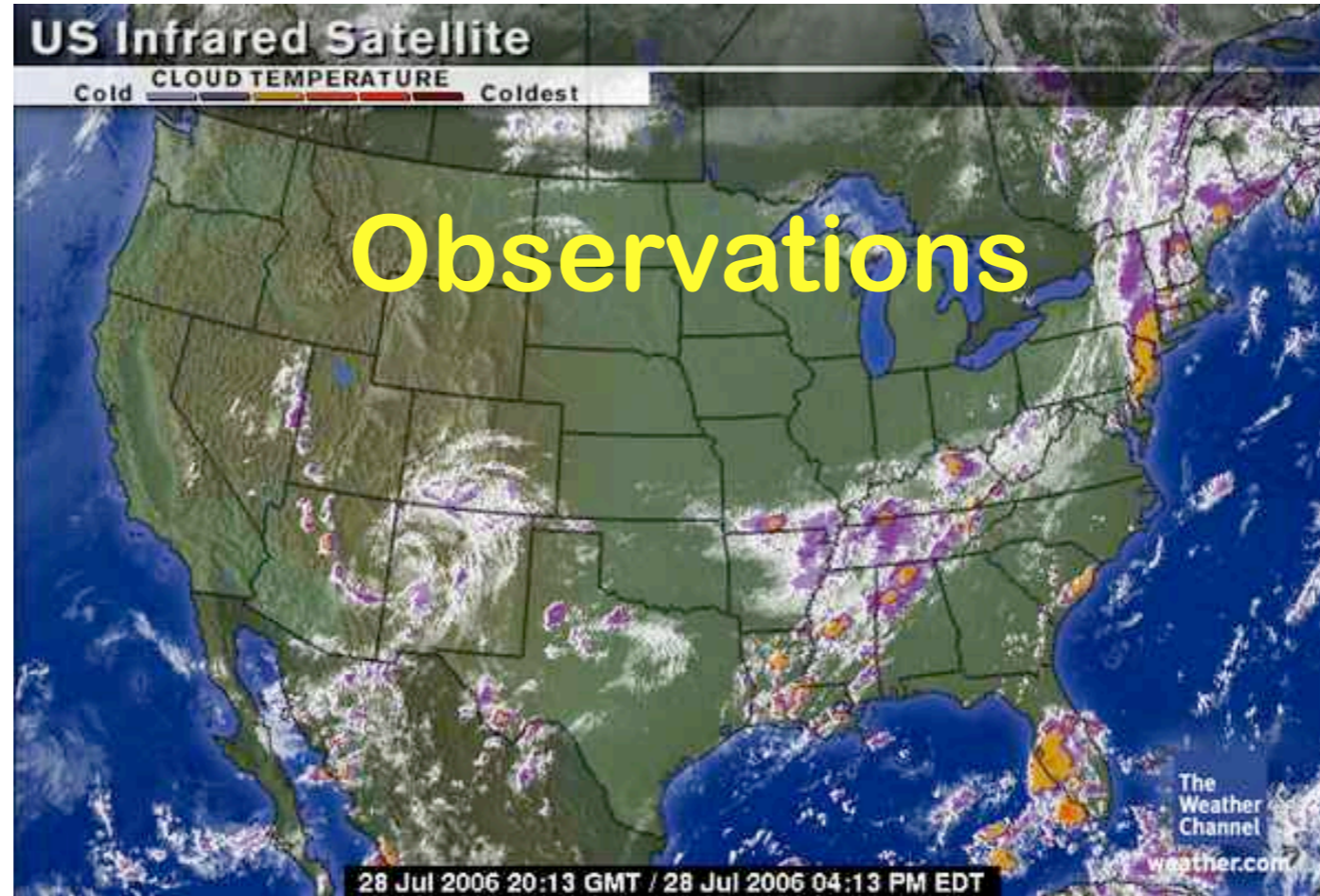
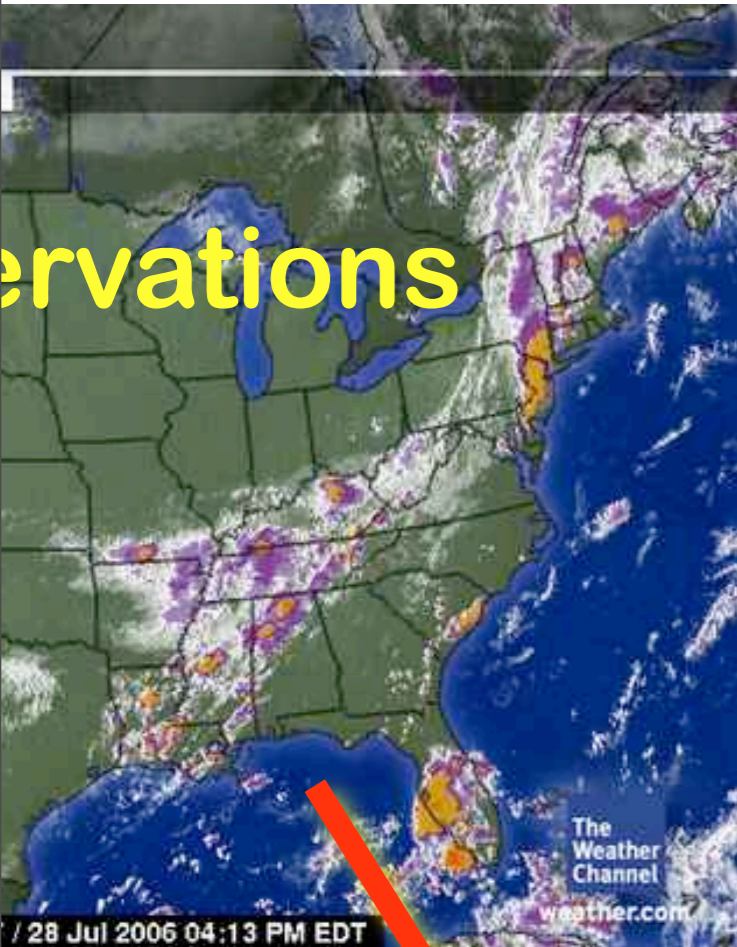
Finding uptake and emissions

- **Example: weather forecasts and analyses**

Example: the weather

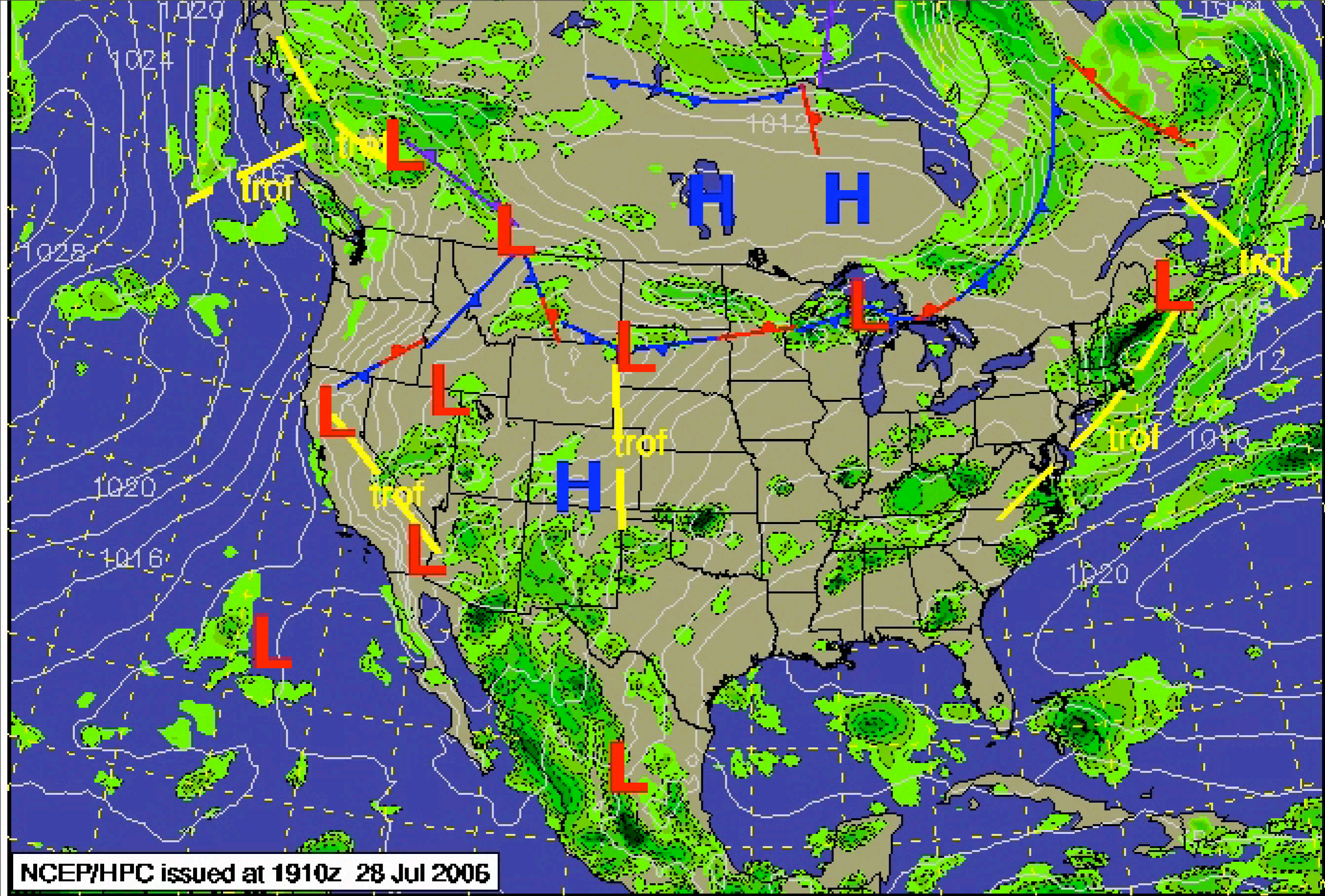






Current

Forecast



Rain



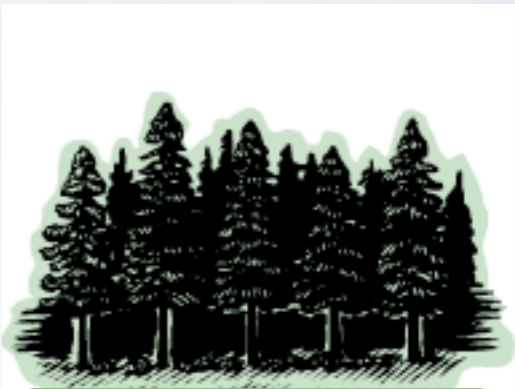
Wintry mix



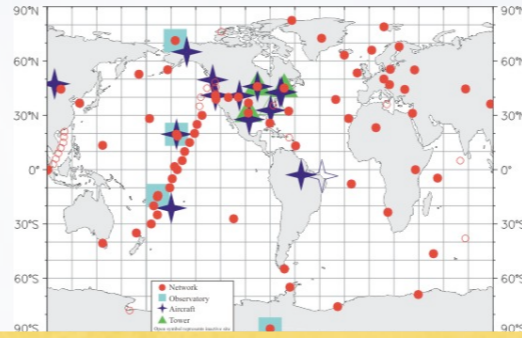
Our Carbon Model



Oceans



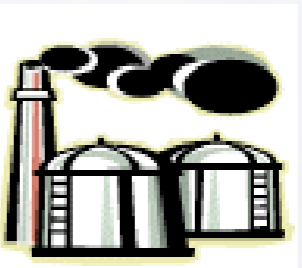
Biosphere



Observations



Fires



Fossil Fuels

Atmospheric transport

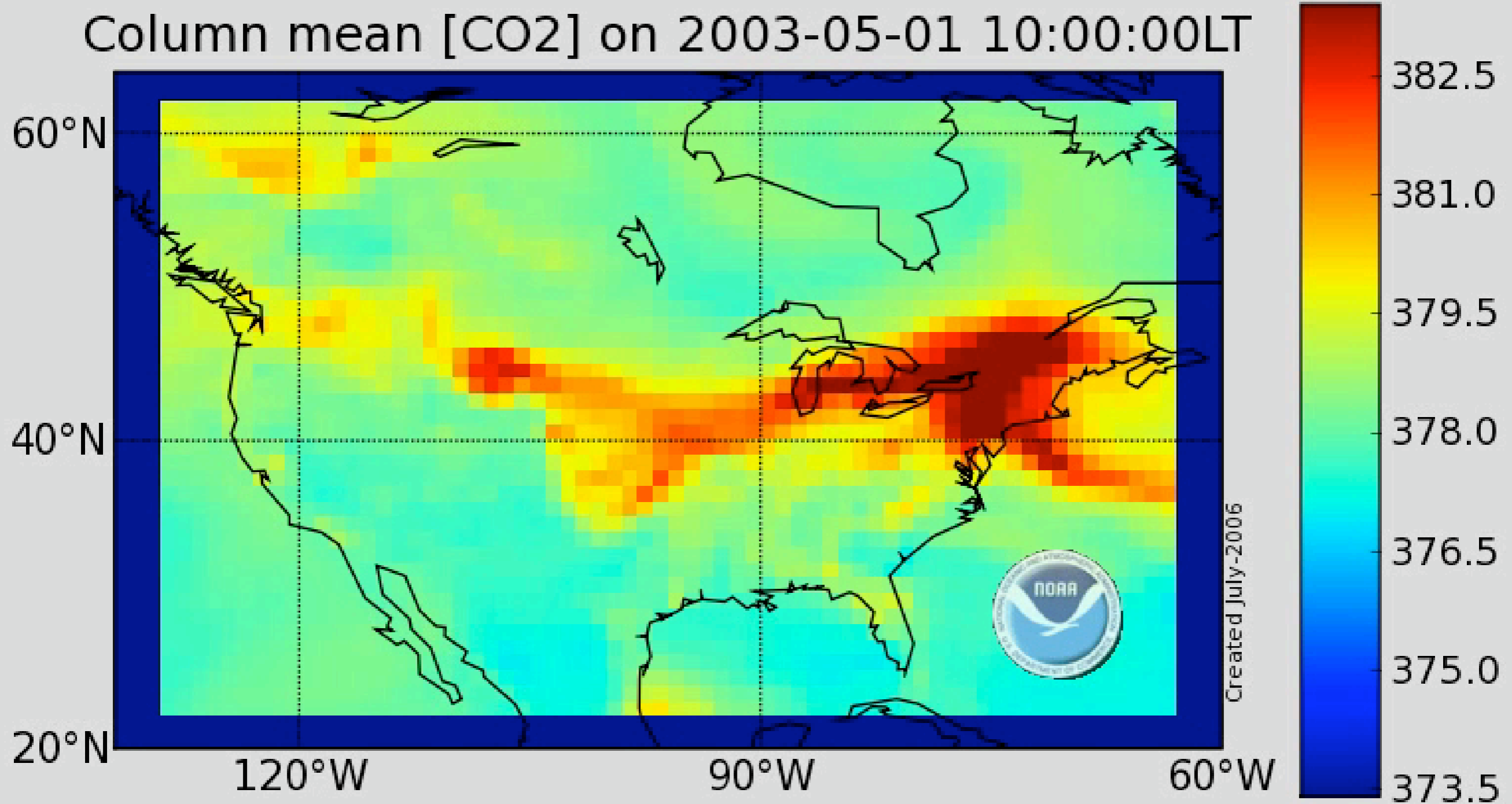
Assimilation





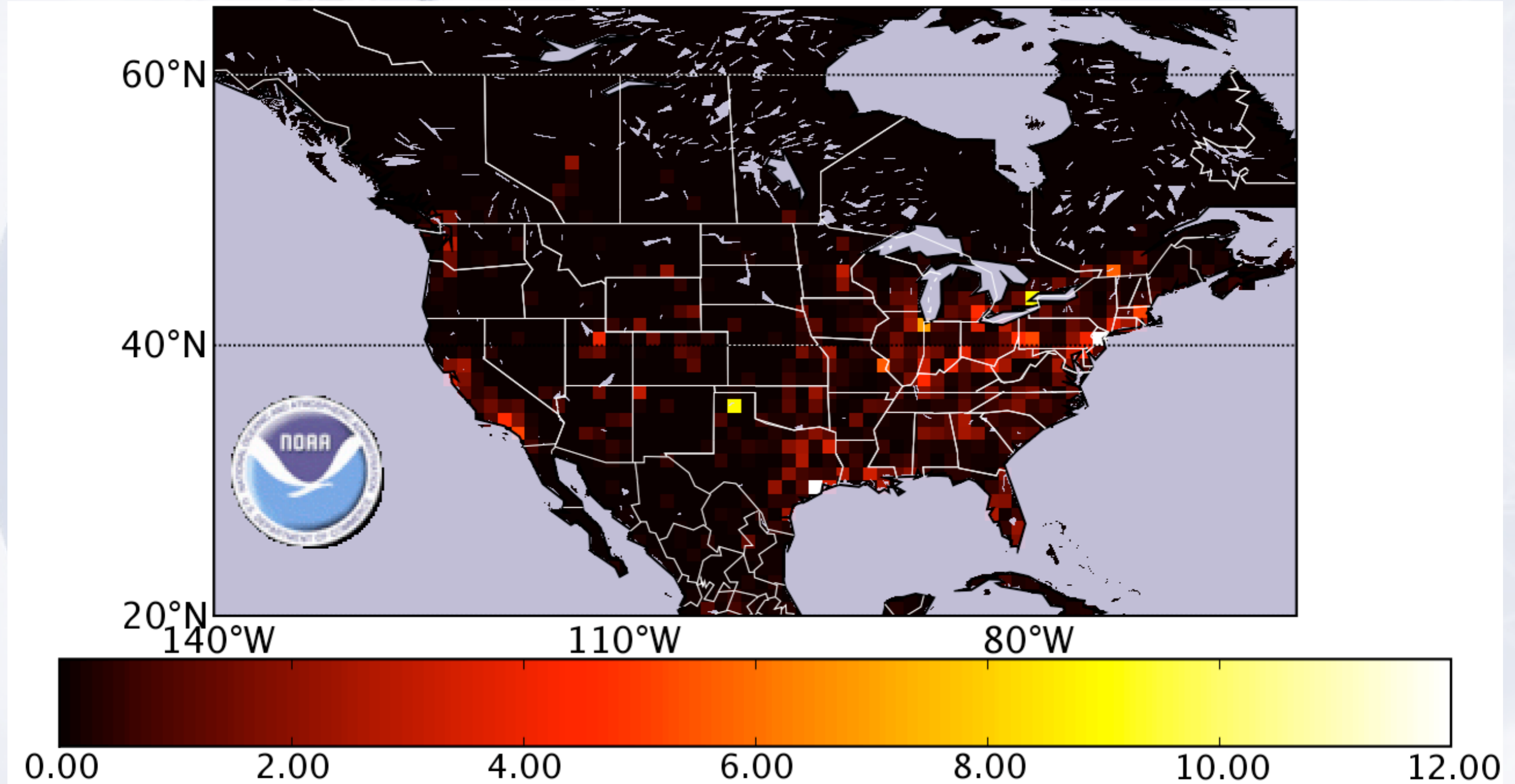
'Carbon' weather

Column mean [CO₂] on 2003-05-01 10:00:00LT





Fossil only

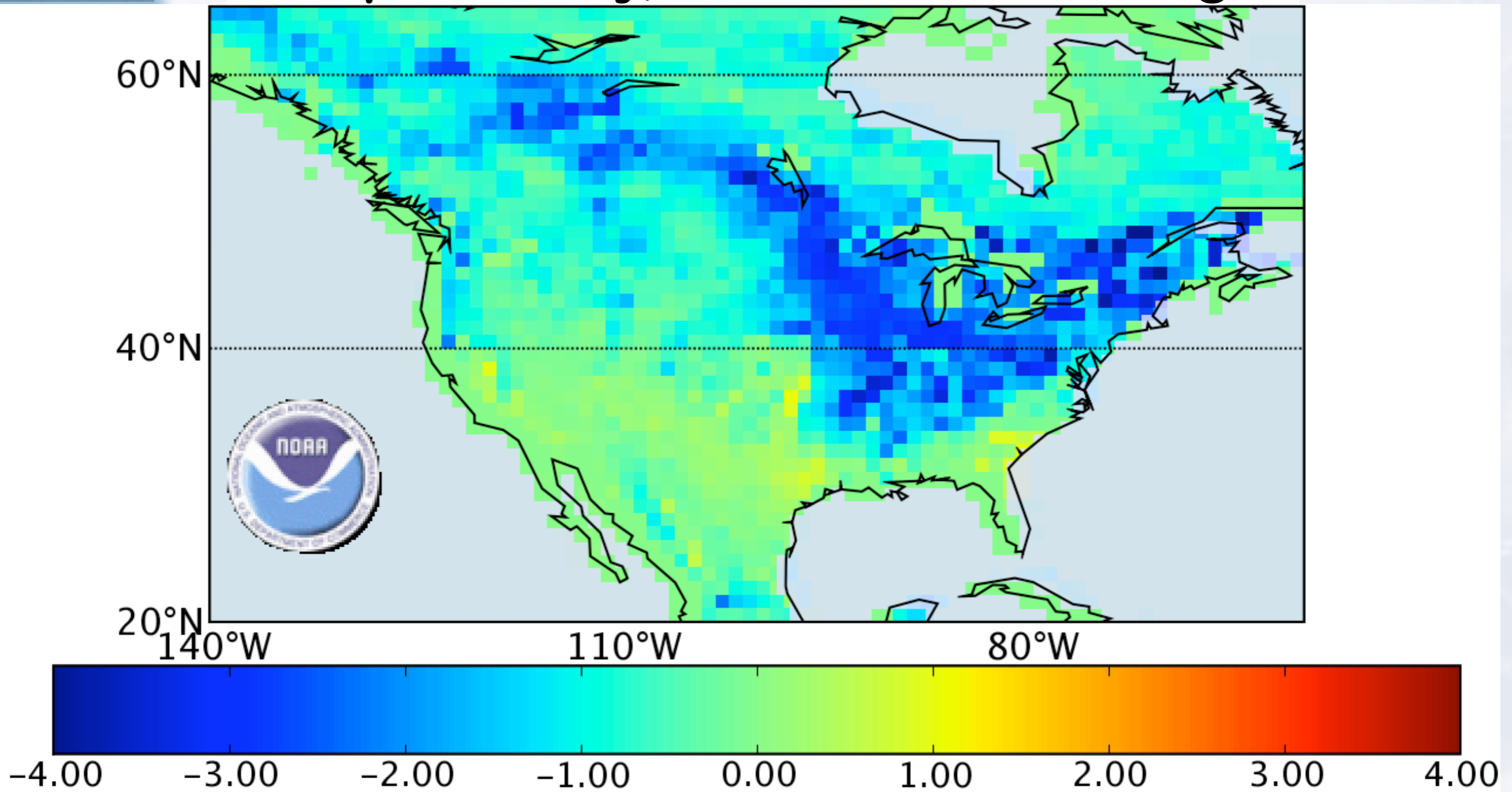


Emissions





Biosphere only, no fossil fuel burning



Uptake

Neutral

Emissions

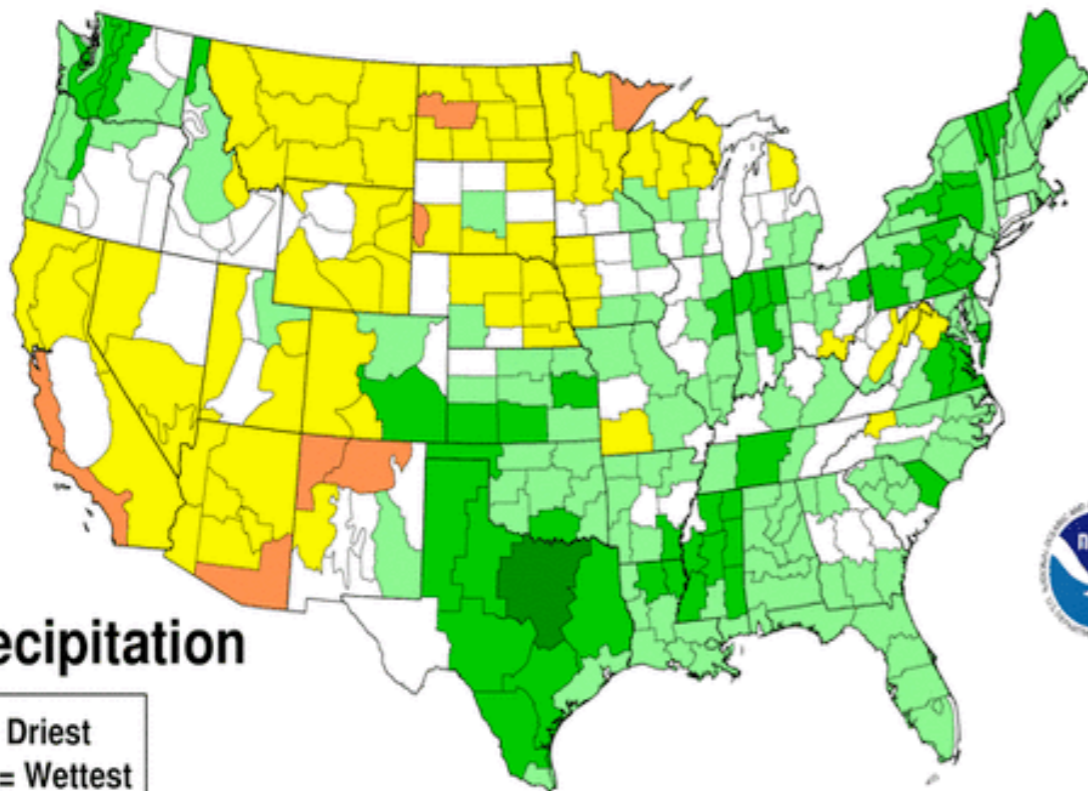




Unusual weather

Jun - Aug 2004

National Climatic Data Center/NESDIS/NOAA



Precipitation

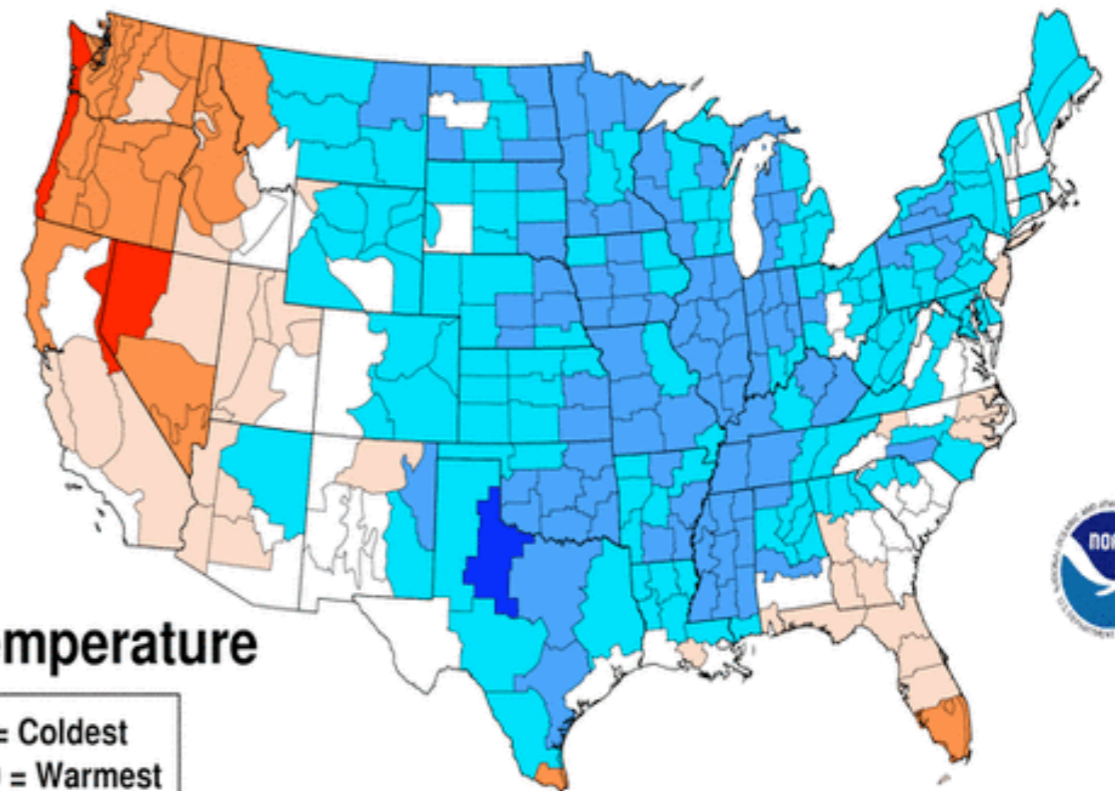
1 = Driest
110 = Wettest



Much above normal

Jun - Aug 2004

National Climatic Data Center/NESDIS/NOAA



Temperature

1 = Coldest
110 = Warmest

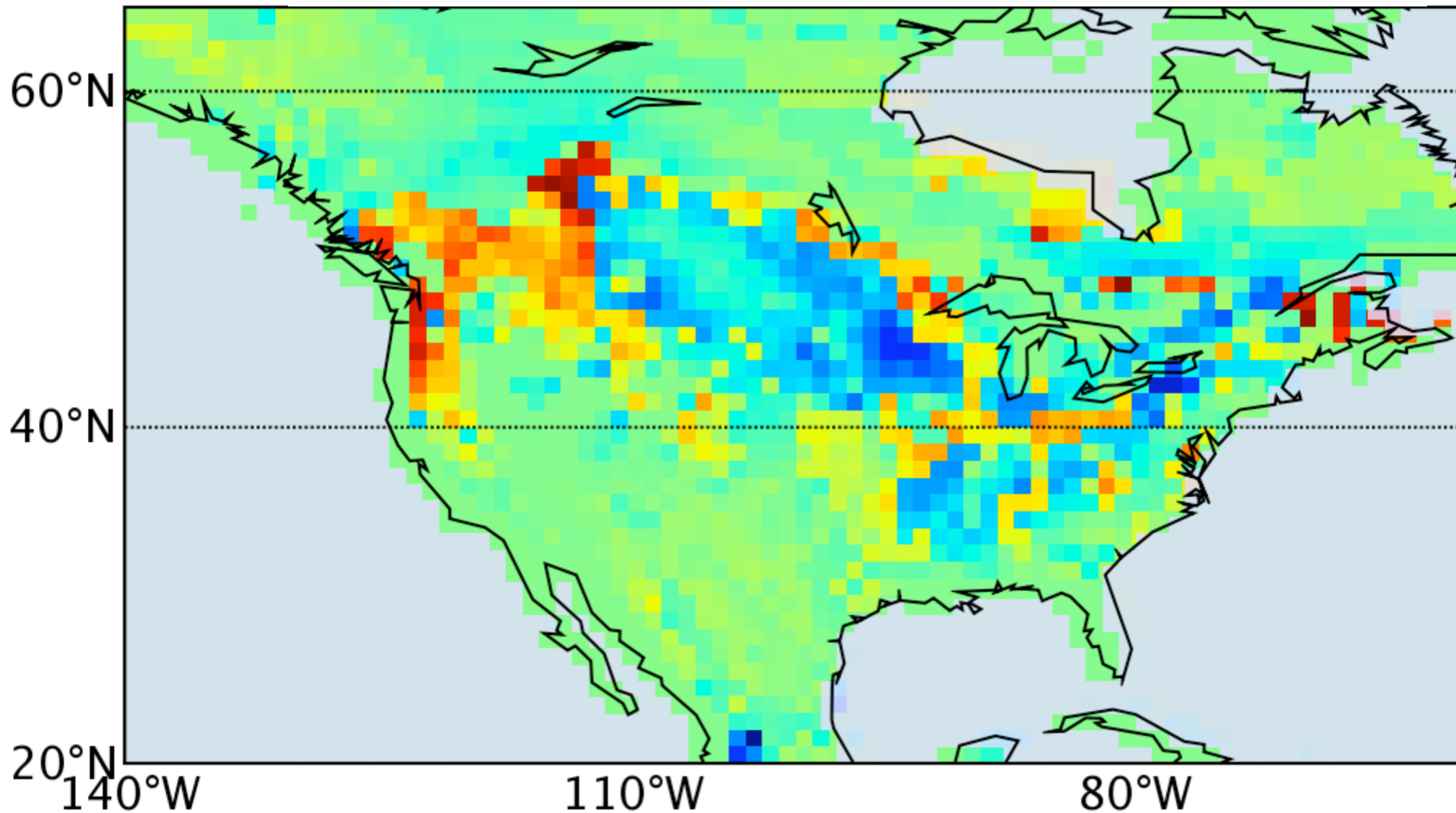


Much below normal





North America deviations from Normal in Summer 2004



-1.50 -1.00 -0.50 0.00 0.50 1.00 1.50

Extra Uptake

Neutral

Less Uptake





North America deviations from Normal in Summer 2004

60°N

40°N

20°N

140°W

110°W

80°W

-1.50 -1.00 -0.50 0.00 0.50 1.00 1.50

Extra Uptake

Neutral

Less Uptake

Extra uptake in 2004:
-0.16 PgC/yr (+30%)
(~11.5 billion dollars)





Products

- Website Prototype





Take Home Message

- Monitoring carbon cycle crucial
- Large role for advanced modeling
- **Nothing can be learned without observations!**