



40th Global Monitoring Annual Conference

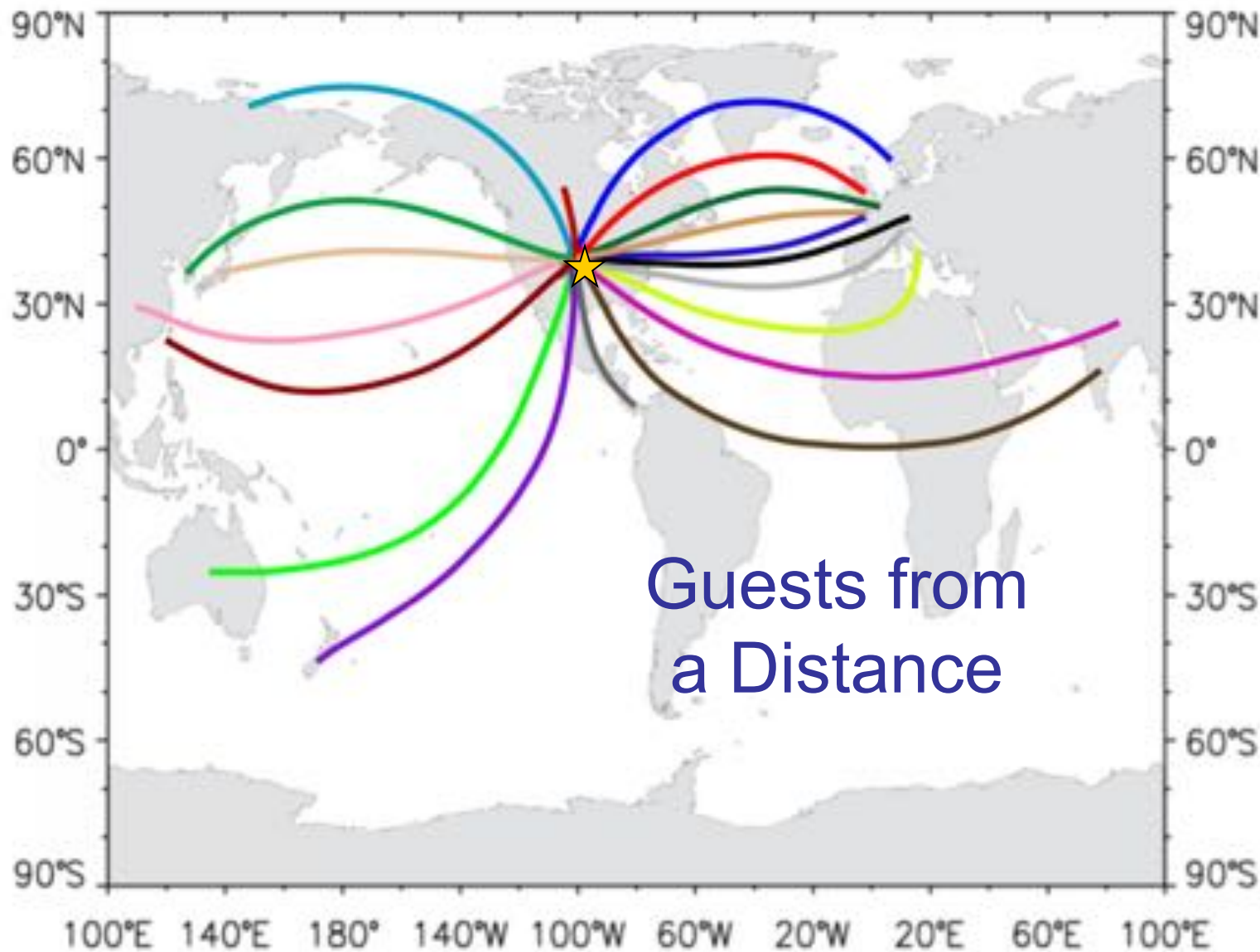
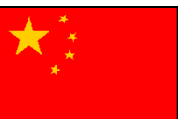
Boulder, Colorado
May 15-17, 2012

www.esrl.noaa.gov/gmd/annualconference

Purpose of the Conference

Looking forward to the next 55 years of monitoring . . .

- Goals:
 - to advance understanding of the research that drives, and derives from, long-term, global monitoring
 - to share information on the latest observing techniques, approaches, and systems
 - to enhance collaboration among national and international partners
- Side meetings this year
 - Observatory operations (2 meetings)
 - CarbonTracker workshop
 - Training workshop for Aerosol Federated Network
 - Observatory Safety Training
 - AGAGE meeting



Make-up of the 2012 GMAC

Attendees

- 250+ Attendees
 - 52 Foreign national
 - 86 GMD
 - 116 Other US
 - 18 Countries
 - 10 International agencies & organizations
 - 5 International universities
 - 12 Federal agencies
 - 12 US universities

Authors & Co-Authors

- 108 Presentations
 - 108 Lead authors
 - 320 “unique” co-authors
- Organizations
 - 10 NOAA laboratories
 - 15 “other” federal agencies/labs
 - 20 Countries
- Academics
 - 28 US universities
 - 36 International universities

On-line Agenda with Links (Presentations, Abstracts Available)



U.S. Department of Commerce | National Oceanic & Atmospheric Administration | NOAA Research

 Earth System Research Laboratory
Global Monitoring System Conferences

**May 15-17, 2012
Boulder, Colorado**

Home Registration **Agenda** Presentations Directions Lodging GMD Home

View presentation list sorted by author. [Printer Friendly](#)

Agenda (Revised 28-12-2012)

[Tuesday, May 15](#) [Wednesday, May 16](#) [Thursday, May 17](#) [Poster Session - Tuesday, May 15](#)

Tuesday, May 15, 2012 AGENDA
(Only presenter's name is given, please refer to abstract for complete author listing.)
(Click on presentation title to view abstract.)

- 07:00 Registration Opens in GC-402 – lunch orders and posters collected at registration table
- 07:30 - 08:10 Morning Snacks – Coffee, tea, fruit, bagels & donuts served

• Session 1	Introduction, Keynote Address, and Setting the Stage — Chaired by Russ Schnell	
08:10 - 08:30	Welcome Address James H. Butler & Alexander E. MacDonald (NOAA Earth System Research Laboratory, Boulder, CO)	
08:30 - 09:00	KEYNOTE: Atmospheric Chemical Composition, Climate, and Societal Implications Steven Wolfy (Biosphere-Atmosphere Exchange Group, Harvard University, Cambridge, MA)	
09:00 - 09:15	Global Atmospheric Distributions of Some Short-Lived Halocarbons Stephen A. Montzka (NOAA Earth System Research Laboratory, Boulder, CO)	
09:15 - 09:30	Partitioning of Terrestrial Carbon Sources Using $^{14}\text{CO}_2$: Observations and Modeling Scott Lehman (University of Colorado, Boulder, CO)	
09:30 - 09:45	Are Oceanic and Terrestrial Sinks of CO_2 Not Able to Keep Up with Emissions? Peter Tans (NOAA Earth System Research Laboratory, Boulder, CO)	

Meeting Organization

(GMD in a Nutshell)



Themes

Climate
Forcing

Ozone
Depletion

Baseline Air
Quality

Research Groups and Networks

Carbon Cycle
& Greenhouse
Gases

Halocarbons
and Trace
Gases

Ozone and
Water Vapor

Aerosols

Surface
Radiation

Baseline Observatories

Summit
Greenland

Barrow,
Alaska

Mauna
Loa,
Hawaii

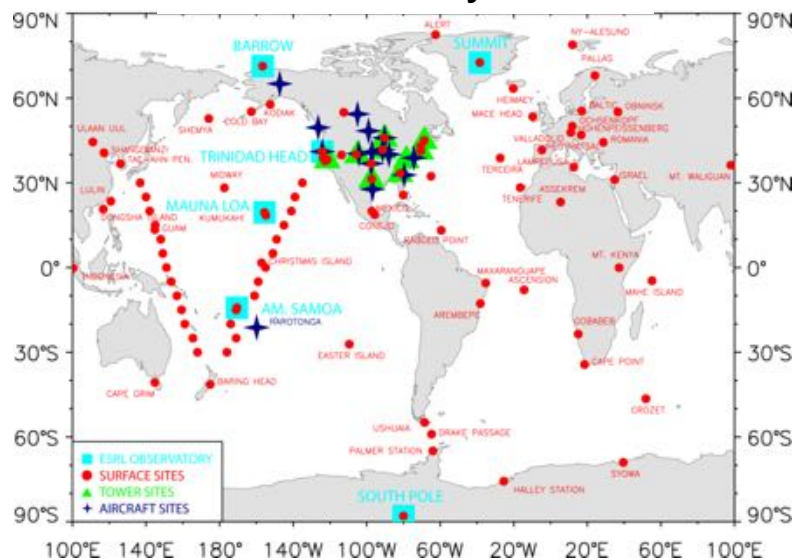
Trinidad
Head,
California

American
Samoa

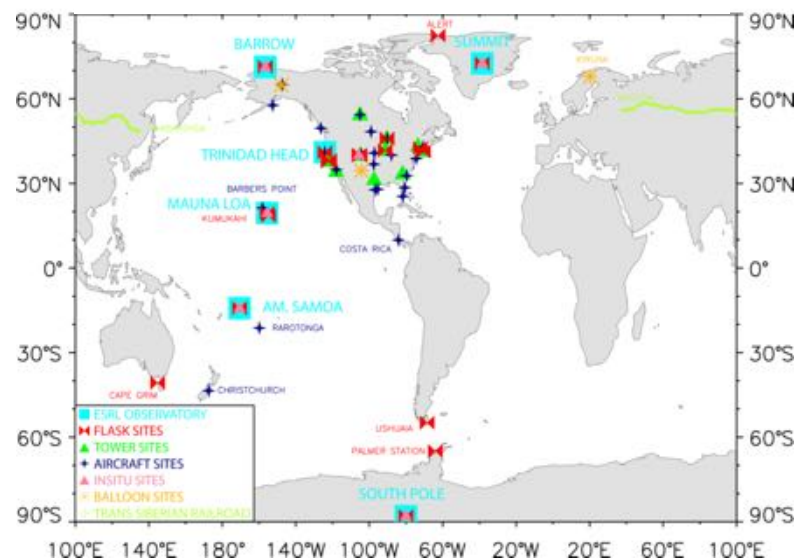
South
Pole,
Antarctica

GMD Observing Networks

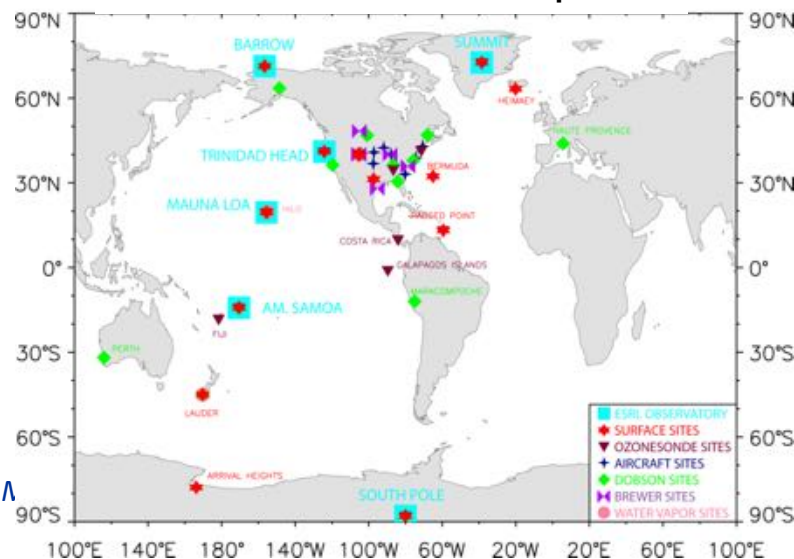
Carbon Cycle



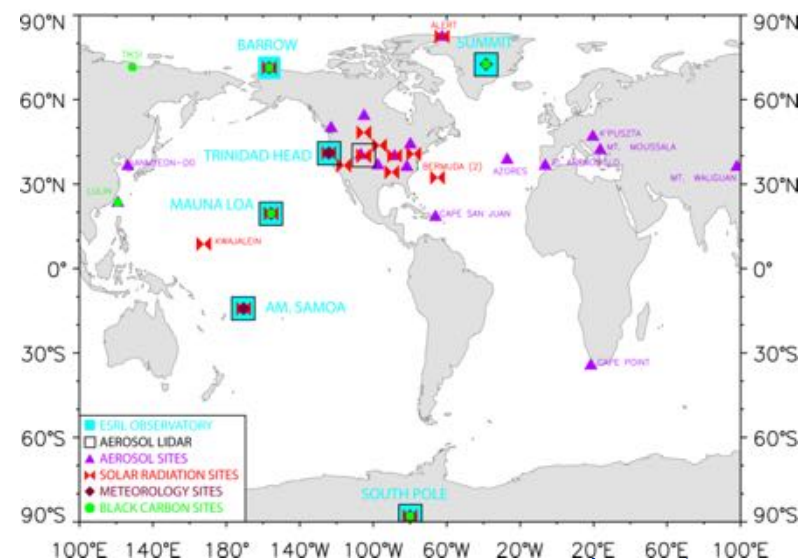
Halocarbons



Ozone & Water Vapor



Aerosols & Radiation



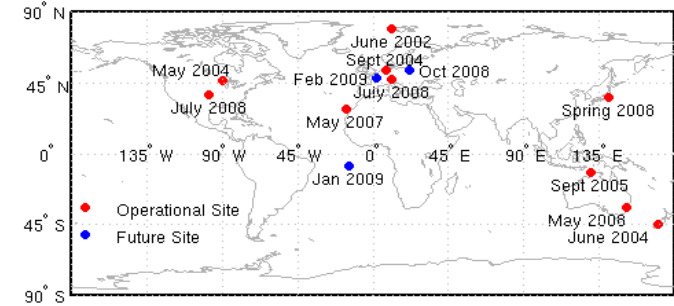
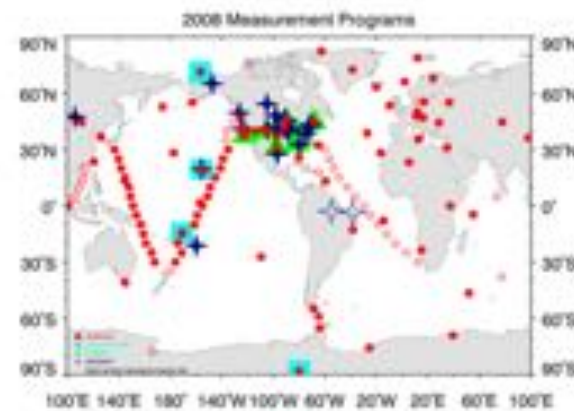
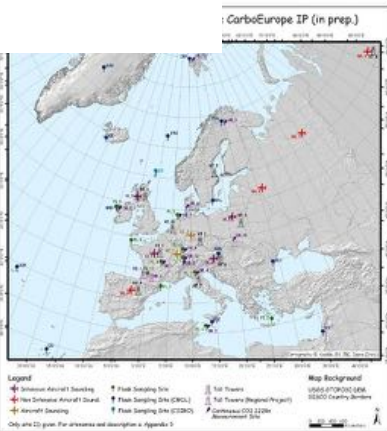
Surface-based Networks – Carbon Cycle



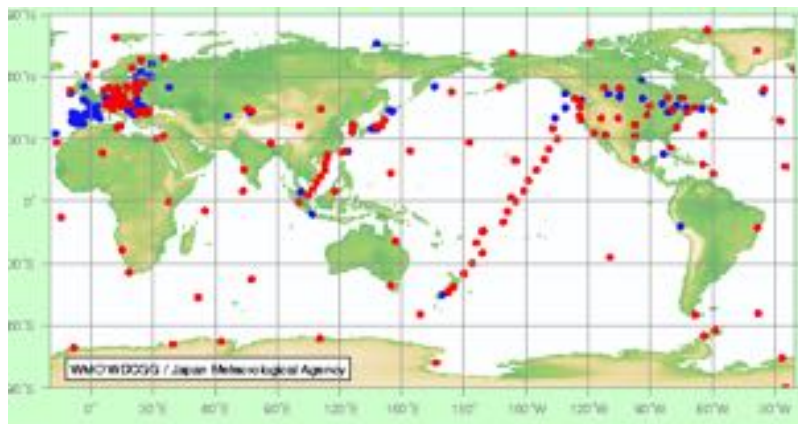
ICOS

NOAA

TCCON



WMO Global Atmospheric Watch



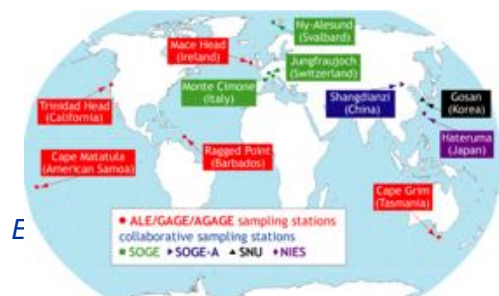
Earth Networks



FluxNet (not WMO)



AGAGE



NOAA Climate Working Group
July 30-31, 2012



Keynote Presentations

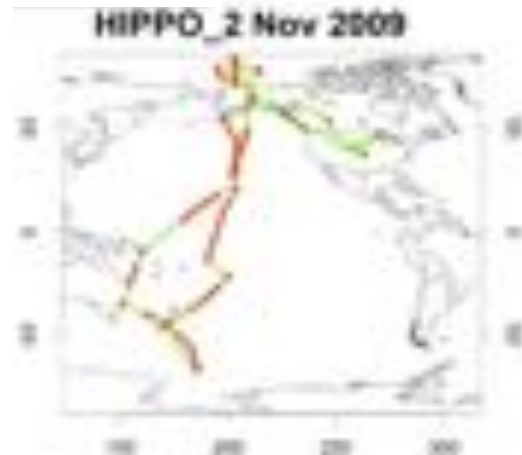


- Dr. Stephen Wofsy
 - Abbott Lawrence Rotch Professor of Atmospheric and Environmental Science at the Harvard School of Engineering and Applied Sciences (SEAS)
- Dr. Ron Prinn
 - TEPCO Professor of Atmospheric Science, Director of Global Change Science, Co-Director of the Joint Program on the Science and Policy of Global Change

Wofsy: Atmospheric Chemical Composition, Climate, and Societal Implications



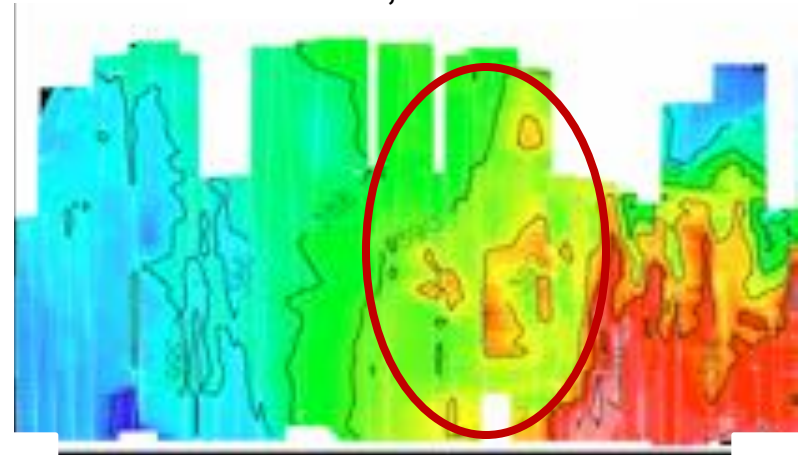
- Focus on CO₂, CH₄, N₂O
- Analyzed data from four HIPPO missions, the CalNEX studies, and NOAA's Atmospheric Baseline Observatories
- Demonstrated the need to coordinate land-based and in-situ measurements to get the best results



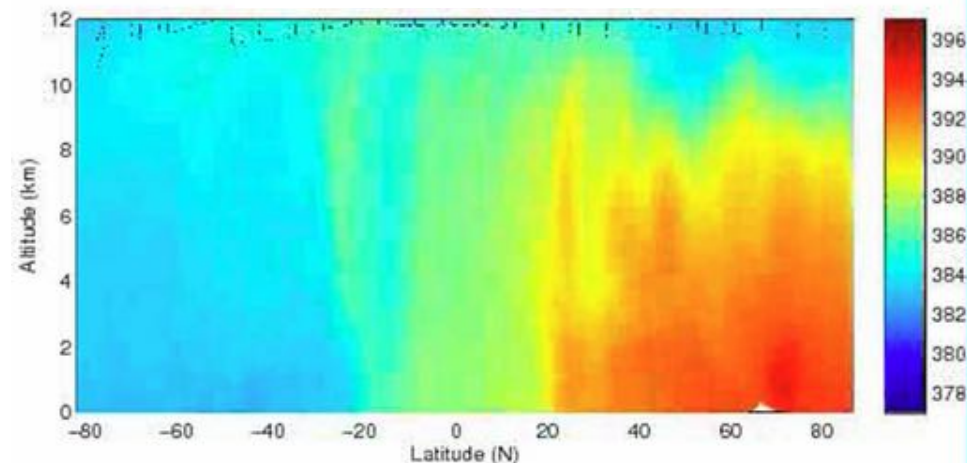
Wofsy (cont'd): Evaluating Models

- CarbonTracker does pretty well for free troposphere, high altitudes
- Not so well for the sub-tropics
- Differences depend upon season

HIAPER, Mar 2009



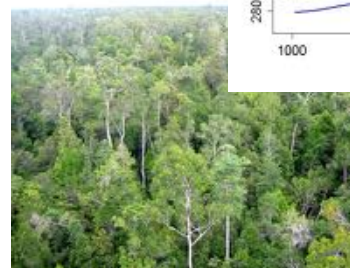
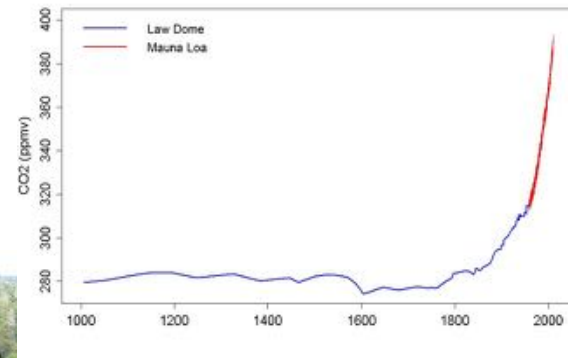
CarbonTracker, Mar 2009



Prinn: Merging Earth System Measurements, Global Social Data and Earth System Models

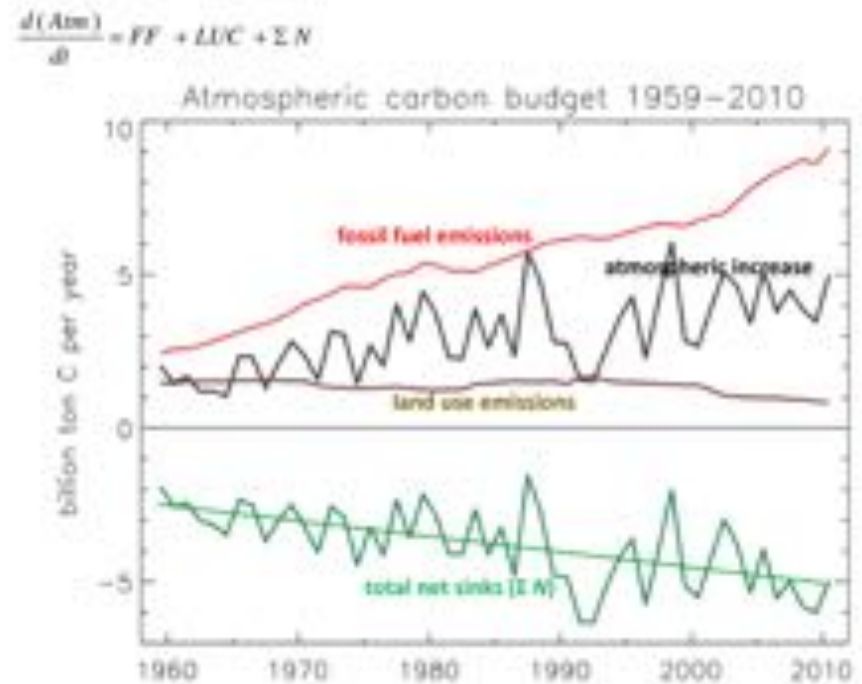


- Evaluated need for coordinated observations and modeling
- Introduced the human element
 - Economics
 - Social Systems
- Showed relevance of key scientific questions
 - Where are we going?
 - How does research help us change that?



Tans: Are Oceanic and Terrestrial Sinks of CO₂ not Able to Keep up with Emissions?

- “The reporting of my death was an exaggeration . . . ”
➤ *Mark Twain, May, 1897*
- Analyzed the 2 most certain data sets available – global trends and global fossil fuel emissions
- Inclusion of land use emissions does not change conclusions but increases statistical uncertainty
- Large “missing” CO₂ sinks are alive and well.
- Fossil fuel emissions are an ever more dominant factor in the carbon cycle
- Actual uptake by the lands and ocean has doubled over the past 50 years



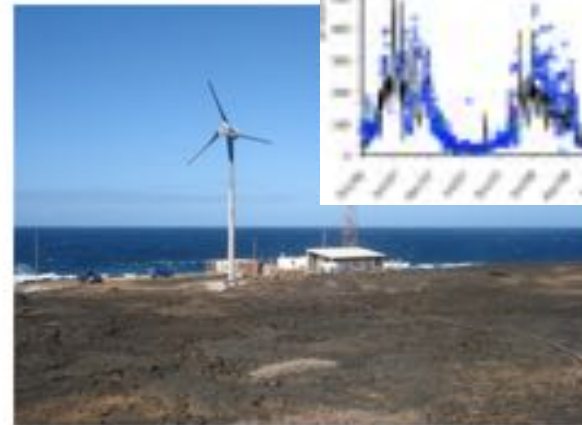
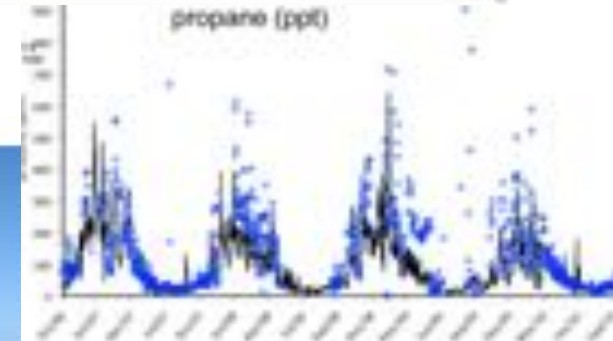
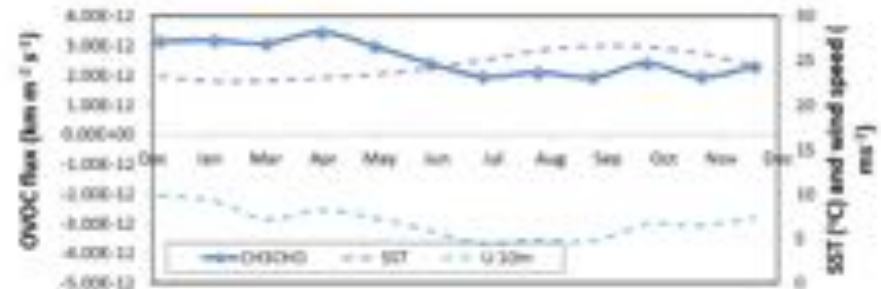
“You heard it here first”

Carpenter (York Univ.): Marine Influence on Oxygenated VOCs



- Cape Verde Atmospheric Observatory launched in 2005
- Purpose is to advance understanding of climatically-significant interactions between the atmosphere and ocean
- Cooperative Initiative between German and UK Research Programs
- The ocean strongly modulates acetaldehyde and methanol in the boundary layer

Acetaldehyde modification by oceans

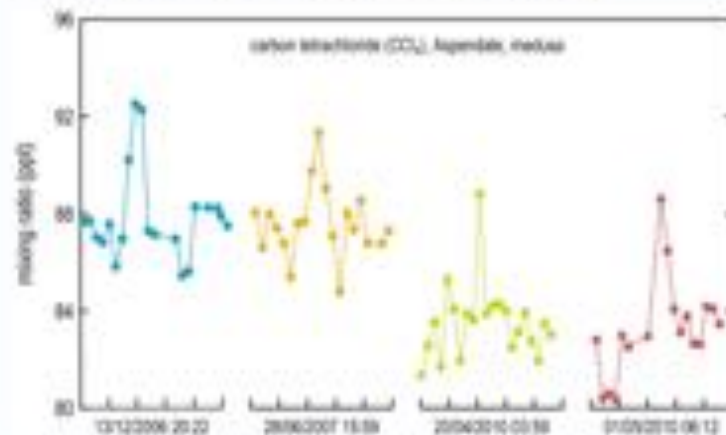


“You heard it here first”

Fraser (CSIRO, Australia): Australian Trends and “Missing” CCl_4 Sources

- Evaluated trends and variability of atmospheric CCl_4 at Cape Grim, Tasmania
- Sinks identified included contaminated soils, landfills, toxic waste dumps
- Chlorination of swimming pools postulated as a possible significant source
- *“You heard it here first . . .?”*

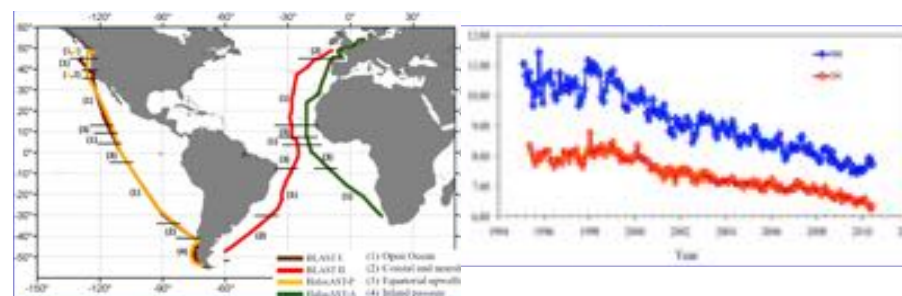
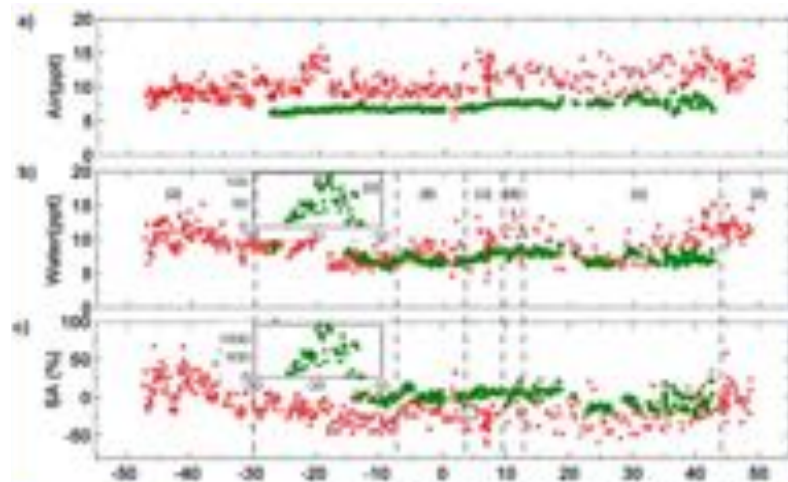
Aspendale CCl_4 pollution episodes



Yvon-Lewis (Texas A&M): CH₃Br in the Ocean in Near-Equilibrium with the Atmosphere

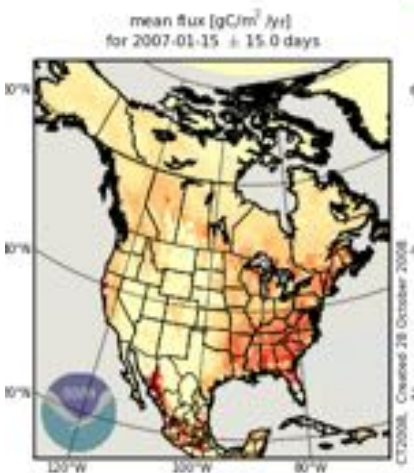


- 1994 postulation that net ocean flux of CH₃Br would decrease permanently as anthropogenic, atmospheric emissions decreased
- Three mid-90's cruises repeated in 2010-2011
- Results showed that ocean is no longer a net sink of atmospheric CH₃Br
 - Now a small net source
- Degradation rate constants remain consistent with earlier work

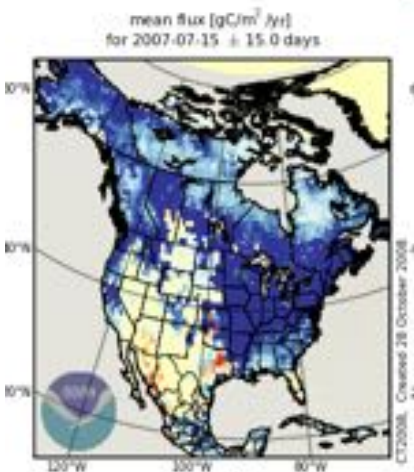


“You heard it here first”

What we do now . . .



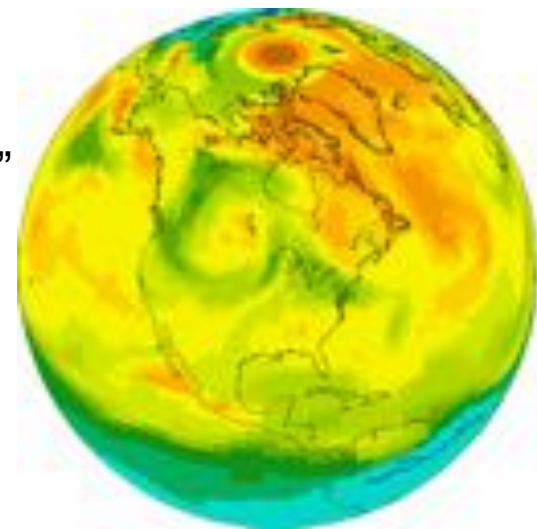
January
(net CO₂ emission)



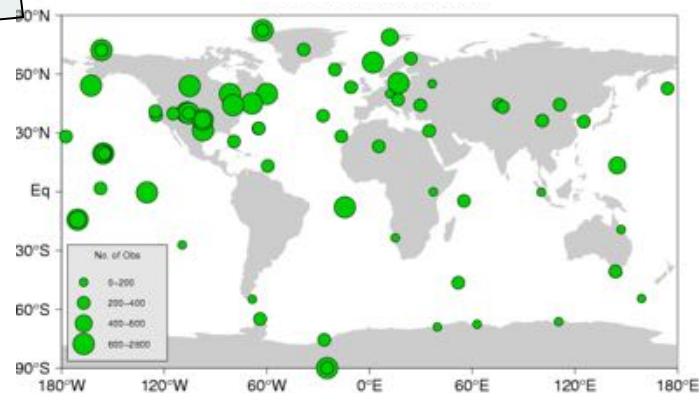
July
(net CO₂ uptake)

CarbonTracker™

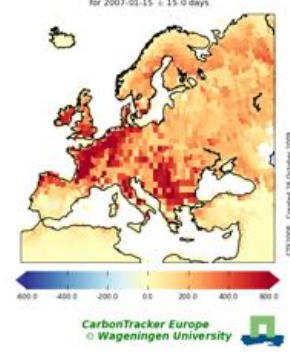
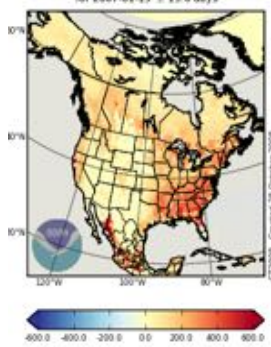
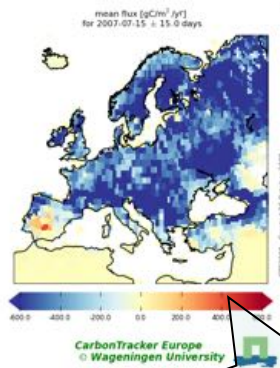
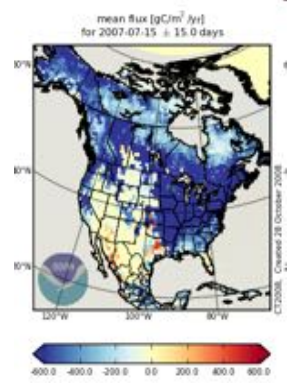
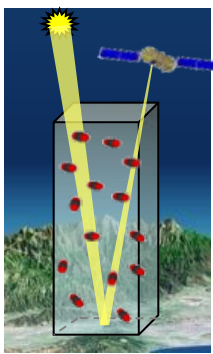
“Carbon
Weather”



Long-term
Observations

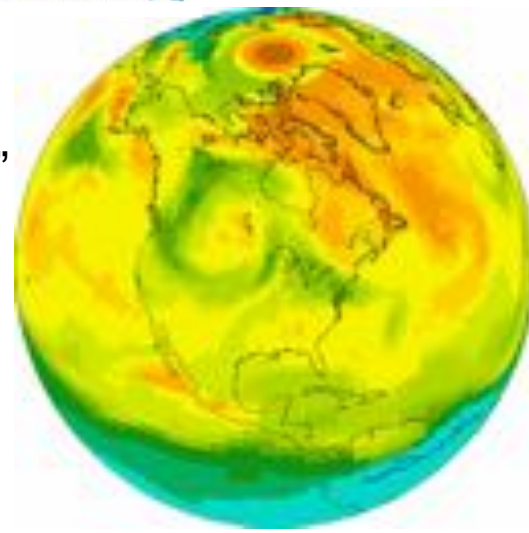


Satellites



Where we need to go

“Carbon Weather”



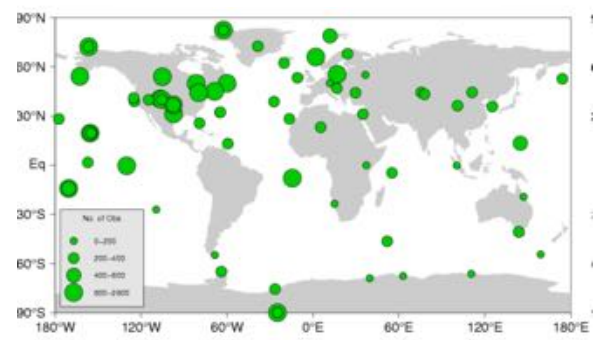
TCCON



Earth Networks



Current Network





Questions?

www.esrl.noaa.gov/gmd/annualconference