Carbon dioxide, methane, and climate forcing

James Butler
Pieter Tans
Ed Dlugokencky
Arlyn Andrews
Andy Jacobson

ESRL Atmospheric Chemistry Review

January 29-31, 2008 ~ Boulder, Colorado
Overview

• Why this is an important area for long-term research
• How our efforts fit in to the big picture
• How we get data – observations and networks
• What we produce from these data
Why this is an important area for long-term research
Annual Greenhouse Gas Index (AGGI)  
2nd and 3rd Updates  

AGGI (2006) = 1.23
How our efforts fit in to the big picture
Understanding the Carbon Cycle

Atmosphere

NOAA/ESRL → GAW

Terrestrial Biosphere

NACP Partners

Ocean

NOAA/PMEL, AOML

Others (OCCC)

Fossil Fuel Emissions

DOE, EPA

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National Linkages

• NOAA Strategic Plan – Climate Mission Goal
  ➢ Desired Outcomes
    o A predictive understanding of climate
    o A climate literate society
    o GPRA Performance Measure: *Reduce uncertainty in estimates of the North American Carbon Sink*

• US Climate Change Science Program
  ➢ Goal 2: *Improve quantification of the forces bringing about changes in the Earth’s climate and related systems.*
    o Carbon Cycle Interagency Working Group
      • North American Carbon Program
      • Ocean Carbon and Climate Change
      • Scientific Steering Groups

• Carbon Dioxide Information Analysis Center
International Linkages

• World Meteorological Organization
  ➢ Global Atmospheric Watch
    • ~2/3 of global sites and measurements for carbon & GHGs
    • World Central Calibration Laboratory & Calibration Centre
    • Leader in technique development and training
    • World Data Centre for Greenhouse Gases
    • Scientific Advisory Committee (GHGs) & Experts Committee

• Global Earth System of Systems
  ➢ Global Climate Observation System
    • Atmospheric Observation Panel for Climate

• Data and Information relevant to several international programs, e.g., IPCC, UNEP
How we get data – Observations and networks
2008 Measurement Programs
Sampling, Analysis, Calibration

Tall Towers

In situ sampling

World calibration scale

Automated flask analysis

Cooperative sampling

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Light Aircraft

Portable flask packages
What we produce from these data
Other products and services that depend upon our CO₂, CH₄, and related data

• > 50 Publications in refereed literature (2004-2007)

• Cooperative Products
  ➢ IPCC Assessments and Reports (AR 1, 2, 3, 4)
  ➢ CCSP Synthesis and Assessment Products (SAP 2.2)

• Cooperative Services
  ➢ World Data Centre for Greenhouse Gases
  ➢ Carbon Dioxide Information Analysis Center
  ➢ WMO Central Calibration Lab and World Calibration Centre
Summary

• We are committed to developing and maintaining, long-term, widespread networks for CO₂, CH₄, and related gases.

• We are dedicated to making the highest quality measurements, by maintaining calibration scales and leading intercomparison efforts.

• Our fully accessible data inform a global understanding of the carbon cycle through numerous publications, assessments, and cooperative efforts.

• Our products reach out to a broad spectrum of society, including scientists, educators, bureaucrats and even policy-makers.
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Global Monitoring: Trends and Distributions (Dlugokencky)

Tall Towers and Vertical Profiles (Andrews)

CarbonTracker (Jacobson)

Future Plans and Directions (Tans)