

NACP Organizing Questions

- What is the current carbon balance of North America (including CO₂, CH₄, and CO)?
- What are the major mechanisms regulating the carbon balance in North America?
- How vulnerable is the carbon balance to shifts in land management practices, other human activities, and environmental factors (climate, atmospheric CO₂)?
- What are the costs, benefits, and potential of enhancing carbon sinks and avoiding methane emissions in managed ecosystems?

Breakout groups

1) Long-term measurements (integrated atmosphere/ocean)

What are the criteria for selecting complementary networks of observations? What are the likely elements of remote sensing for the NACP (*Schoeberl*). What needs to be measured? What are the needs for instrument development, data integration? Peter Bakwin, Christoph Gerbig, Dave Schimel, Dick Feely, Francisco Chavez.

2) Process studies and biogeochemical modeling (land)

What are the criteria for prioritizing and selecting the process studies to be included in the NACP? What needs to be measured (long term, short term, manipulations)? How will this information be incorporated into the integrated analysis? Rich Birdsey, Chris Field, Dennis Ojima, Eric Sundquist.

3) Data assimilation, management and diagnostics. How can transport representations be improved? How will this activity interface with, and guide, development of the observations? What should be the development path relative to operational centers? Scott Denning, Niki Gruber, Steve Running, Scott Doney, Steve Pawson.

Interface issues: land/atmosphere observations such as towers (tall and flux), process information input for selection of network stations (plus network input for selection of process studies).

High Priority Enabling Developments

- Development of *in situ* sensors for aircraft, ocean, tower, resp. observations of CO₂, CO and CH₄: robust, accurate, operable.
- Model studies of network design (summer study, other); initiate science team for model-network design issues.
- Fill gaps in FIA and NRI (geographic, Federal non-forest; full carbon accounting, return sampling rate, uniformity US/Canada/Mexico, data availability).
- Spatially and temporally resolved data bases: fossil-fuel emissions of CO₂, sources of CH₄ and CO, historical land use and land cover (includes Canada and Mexico).
- Remote sensing: technology development: airborne simulators for *in situ* profiles/columns.
- Initiate: *Flux network integration, virtual tall towers, movables.*
- Initiate: *20-yr tailored re-analysis, 10-km nested.*

Writing assignments (edit text, edit/write appendices, max 2pg!)

- Atmospheric observations: P. Bakwin, P. Tans, C. Gerbig.
- Ocean observations: C. Sabine, R. Feely, F. Chavez.
- Data assimilation and diagnostic/prognostic models: S. Denning, N. Gruber, S. Running, S. Doney, S. Pawson.
- Land processes: R. Birdsey, D. Ojima, R. Follette, D. Price, C. Field.
- Remote sensing: M. Schoeberl, C. McClain, S. Running.
- Human influences: G. Marland, R. Harriss.
- Methane, "other gases (N₂O)" : P. Crill, M. Keller.
- Atmospheric chemistry connections: Jacob, Chatfield.
- Executive summary: S. Wofsy, J. Sarmiento, R. Harriss, et al.
- **Cost framework:** Committee with help from the IWG

Other Action items

Presentations (initial, breakout) (**right now!**) in electronic form, to be posted on the web, to nacp@io.harvard.edu.

Feedback (**two weeks**): Email to nacp@io.harvard.edu. **Provide and index of topics, text only.** View comments at <http://www.carboncyclescience.gov> (arrange NCAR intermediate).

Agency visits: TBD (level= Patrinos, Leinen, Asrar, Evans, ARS/USFS/NRCS)

International follow-up with Mexico and Canada (calls, visits).

SBIR specifications for sensors (check status of CO₂).