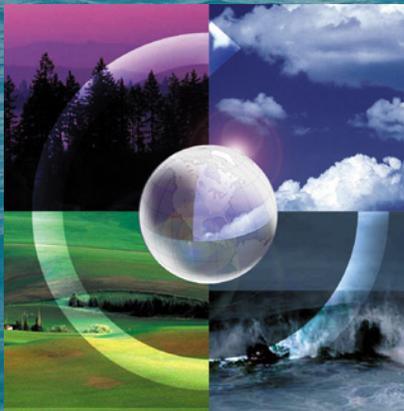


Overview of coastal synthesis activities

Simone Alin (NOAA PMEL)
Paula Coble (Univ. S. Florida)

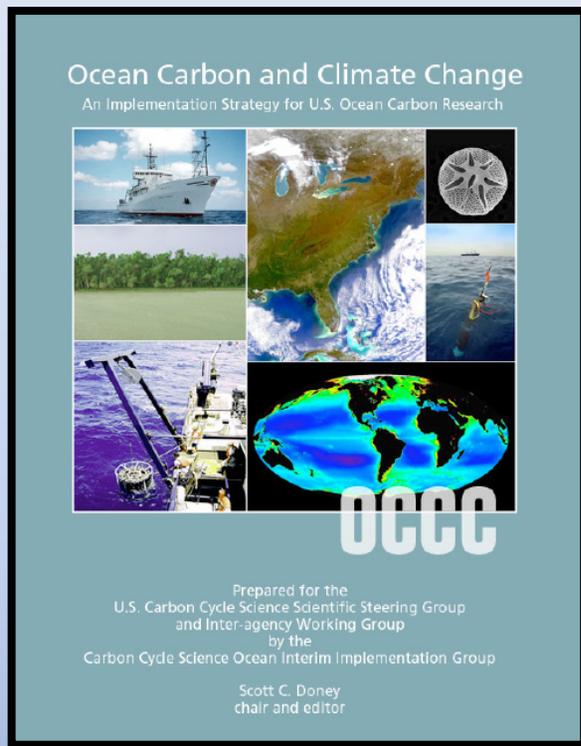
North American



Carbon Program

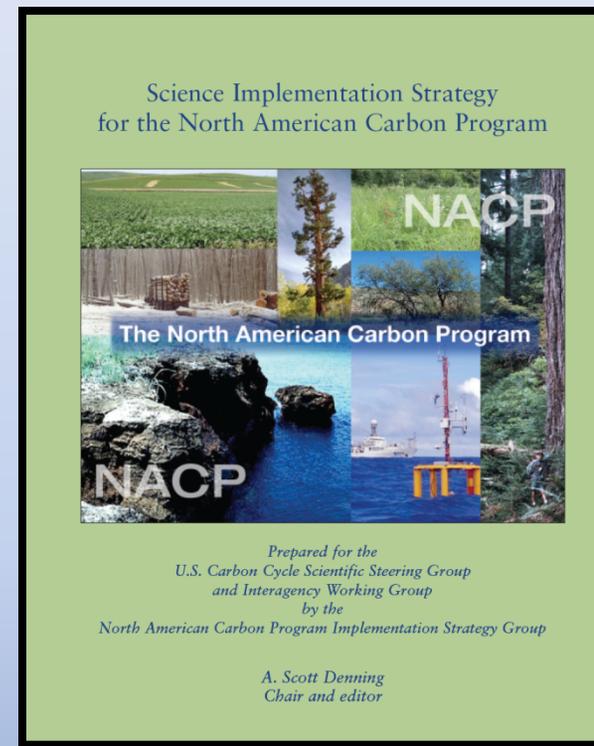


OCCC, NACP, and coastal carbon



Anticipated scientific product:

North American coastal ocean and continental margin air-sea CO₂ fluxes, land-ocean and coastal-open ocean carbon exchange, and biogeochemical cycling.



Science question 1 (diagnosis):

What is the carbon balance of North America and adjacent ocean basins? What are the geographic patterns of carbon fluxes? What are the sources and sinks, and how is the balance changing over time?

NACP/OCB Coastal Interim Synthesis Activity

- Initiated at July 2008 OCB
- Five regions established & coordinators volunteered:
 - **East Coast (incl. Gulf of Maine)** – Wei-Jun Cai and Cindy Pilskaln
 - **Gulf of Mexico** – Paula Coble
 - **West Coast (incl. Gulf of Alaska)** – Simone Alin
 - **Arctic (incl. marginal seas)** – Jeremy Mathis
 - **Great Lakes** – Galen McKinley

Progress to Date

- ✓ **Initiated Wiki on NACP web site**
- ✓ **65 registered participants**
- ✓ **Coastal carbon cycling sessions at Fall 2008 AGU, NACP 2009, OCB 2009 meetings**
- ✓ **Planning breakout session at Feb. 2009 NACP meeting**
- ✓ **Submitted mini-proposal to fund coastal C synthesis workshops**

Outcome of NACP breakout session:

Two preliminary goals

- 1. Preliminary coastal C budgets for all regions— literature and model based (Ray Najjar and Jeremy Mathis talks in this session)**
 - Critical boundaries: land-ocean, air-sea, shelf break-open ocean, sediment-water**
 - Focus on fluxes among boxes, and where possible, quantify transformations within boxes (production, respiration)**
 - Still need to discuss units and definition of coastal zone**
 - *Outcomes:* Identify gaps in knowledge and available data resources**

**Outcome of NACP breakout session:
Two preliminary goals**

2. Build community database

- **Support requested to assist with data mining/recovery**
- **Work toward model-data comparison activities**

Coastal C synthesis time line

- Spring 2009** Submitted prospectus for future coastal carbon workshop funding
- Summer 2009** Work with CCIWG to refine goals of coastal C synthesis activity
- Fall 2009** Attend NACP interim synthesis meeting (Mid-Continent Intensive, Regional-Continental, Inverse Modelers, Site-level, Non-CO₂ greenhouse, Disturbance)
- Winter 2010** Ocean Sciences – First coastal C synthesis workshop, coastal carbon session
- Fall 2010** AGU? – Second coastal C synthesis workshop
- Summer 2011** Publication of papers

Coastal C synthesis: Challenges and opportunities

- 1. Significant observational gaps remain.**
- 2. Discussion needed to define coastal zone and units of outputs before model-data comparisons will be possible.**
- 3. Define specific questions and products.**
- 4. Take advantage of synergistic observational efforts (e.g. need better coupling between coastal C/OA and IOOS/GOOS, glider communities, etc.).**

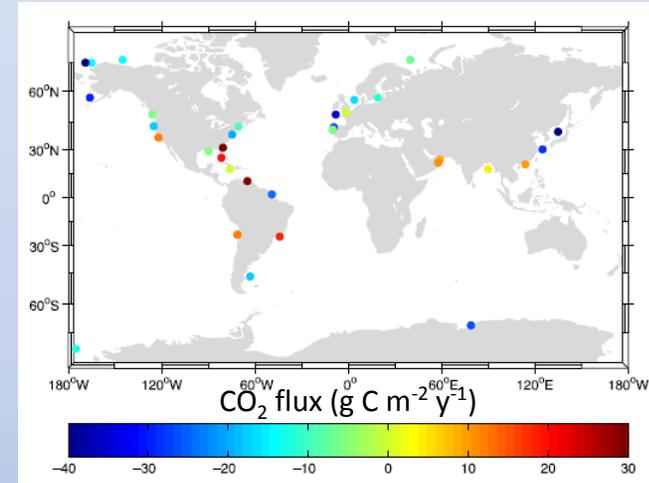
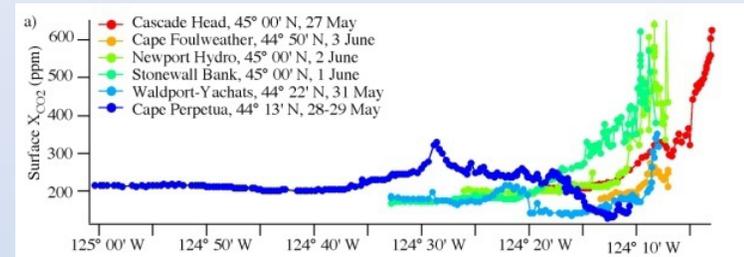
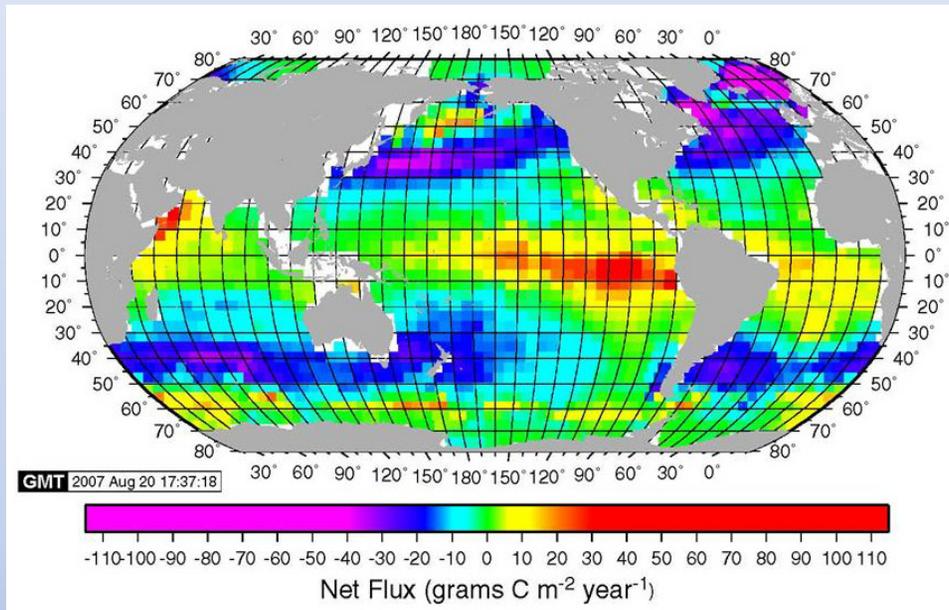
Open discussion topics

- 1. How do we push coastal synthesis activities forward from here?**
- 2. Does the new Carbon Cycle Science Plan adequately address coastal carbon questions?**
- 3. How can coastal carbon cycle activities be better integrated into global ocean (OCB) and continental scale carbon (NACP) synthesis activities?**

New CCSP overarching questions

- 1. How do natural processes and human actions affect the carbon cycle, on land, in the atmosphere, and in the oceans?**
- 2. How do policy and management decisions affect the levels of atmospheric carbon dioxide and methane?**
- 3. How are ecosystems, species, and resources impacted by increasing greenhouse gas concentrations, the associated changes in climate, and carbon management decisions?**

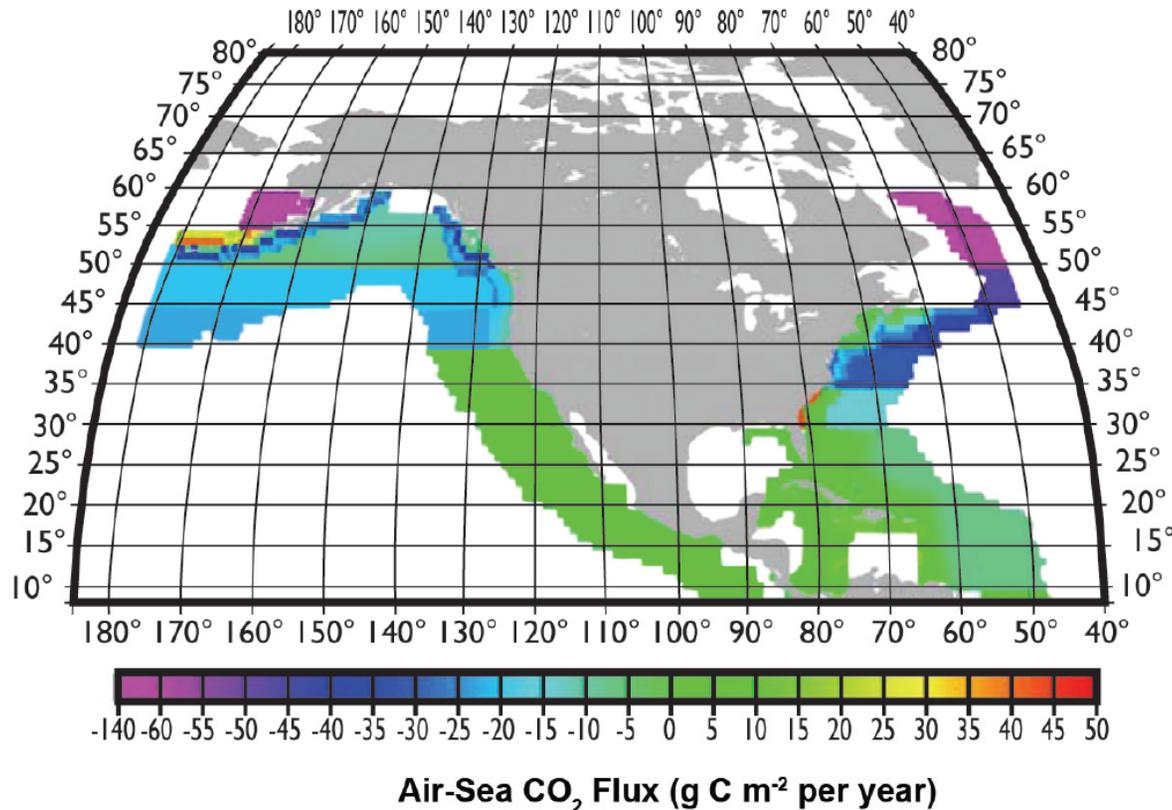
Why study coastal carbon?



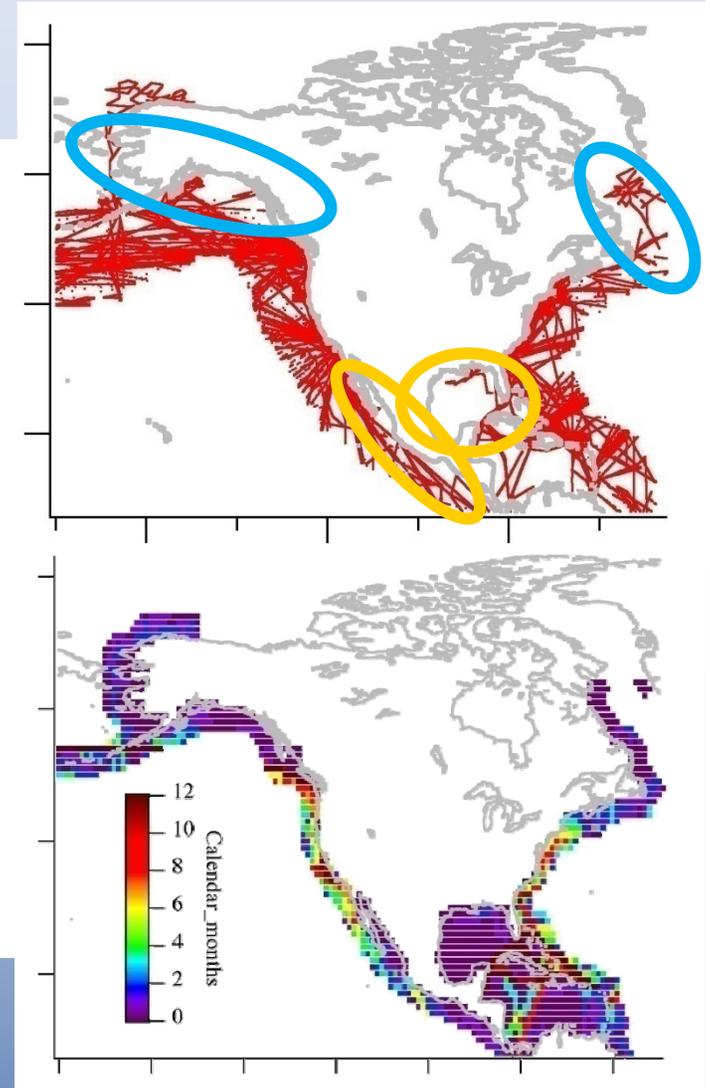
- Coastal oceans are very biogeochemically active, with disproportionately large air-sea fluxes, primary production, organic carbon burial, and CaCO₃ production/stock/deposition.
- Majority of world's population lives near the ocean, making them a critical resource and also putting them in proximity to anthropogenic impacts.
- Coastal oceans have not historically been included in many global ocean carbon climatologies or continent-scale carbon budgets.

Sources: Hales et al. (2005), Cai et al. (2006), Takahashi et al. (2009)

Coastal CO₂ Flux Estimates in *The First State of Carbon Cycle Report*



Net flux in North American coastal oceans: $+1.6 \pm 35.6 \text{ Tg C y}^{-1}$



Chavez et al. (2007)