

# Predicting Future Carbon Storage

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~48 participants

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# Model circulation critical to prediction

- ◆ In next 30 years, carbon storage will be dominantly determined by circulation
- ◆ Predictions not being adequately filtered by comparison to data
  - ◆ Range would be smaller if filtered
- ◆ Common metrics needed

# Biogeochemistry could matter

- ◆ Solubility vs biological pump - do they off-set each other?
- ◆ Impact of other perturbations
  - ◆ Dust supply
  - ◆ Link between anthro N and P to C storage
- ◆ Coastal interactions
- ◆ Direct effect of CO<sub>2</sub> on biology
- ◆ Feedbacks in the climate system (e.g. aerosols)

# What is needed for progress?

- ◆ Common metrics for model assessment
  - ◆ e.g. CCSM's C-LAMP for terrestrial model
  - ◆ Consultation with appropriate expert
- ◆ Improvement to physical models
  - ◆ Focused multi-model projects
  - ◆ Data assimilation
- ◆ Improve biogeochemical models
  - ◆ Continue functional group approach
  - ◆ Rates from data
  - ◆ Use simple model to test potential impact of processes

# What is needed for progress?

- ◆ Observations of key rates
  - ◆ deep ocean respiration
  - ◆ primary production
  - ◆ particle abundance and flux
  - ◆ oxygen ....
- ◆ Temporal continuity
  - ◆ ocean color satellite
  - ◆ time-series stations
  - ◆ profiling floats with chemical sensors
  - ◆ sediment traps ...

# What should OCB do?

- ◆ Develop and promote metrics for models
- ◆ Promote international collaboration, data sharing (satellite and in-situ), model development work
- ◆ New data + maintaining existing datasets
  - ◆ “complete” sets are most useful for models
  - ◆ Ocean color satellite
- ◆ Improve strategy for community to develop large coordinated programs
  - ◆ Competition, but without too many exhausting attempts
  - ◆ Coordinate with international groups/efforts
  - ◆ Provide vehicle for initiation
- ◆ Promote translation of science to politics

# Policy Needs

- ◆ Metrics for models  $\Rightarrow$  clarify model predictions
- ◆ Specific work with models
  - ◆ Test CO<sub>2</sub> mitigation strategies with models
  - ◆ Consider gas hydrates with models
    - ◆ Initial test suggest release rates are slow
- ◆ Workshops with media, public
  - ◆ E.g. Fe fertilization at WHOI in fall 2007