

OCB Coastal Carbon Synthesis Workshop

Gulf of Mexico

Primary Production Breakout Session

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Consider Regional Definitions

General Ideas:

- 1) Productivity rates along North Central region are non-uniform. Consider whether the North Central Region should be further subdivided.
- 2) Use satellite observations to define regions
- 3) Should model and satellite regions be fixed lines or feature/range defined?
- 4) Use river discharge influence to partition regions

North Central

- 1) Shift eastern boundary as coming off of De Soto canyon
- 2) Shift western boundary – Align with US/Mexico border; seasonal coastal eddy feature sets up here and effectively sets domain edge for freshwater plume

Mexican Shelf – Subdivide into 3 regions set by Mexican colleagues working in the region. See JGR preprint in press (MODIS-based delineation)

- 1) Yucatan – Prominently influenced by SGD; carbonate dominated shelf
- 2) Western – Associated with dry riverbeds (except under episodic precip)
- 3) Middle Section – North of Vera Cruz (wet region)

Global NEWS (Seitzinger et al.) model could aid in determining how Mexican coastal regions are prescribed. LOICZ approach is integrated into this.

Data Mining: Potential Targets

West Florida Shelf:

Water column PP on Florida shelf - Gabe Vargo and Kendra Daly?
Vargo also would potentially have benthic production (in future).
PP from ECOHAB measurements - Redalje and Lohrenz

MS Sound and AL Coastal Waters:

NGI cruise data (Gundersen et al.).
Ron Kiene (DISL) likely a source for WC PP in AL waters. (Data not published; gray literature?).
Hugh McIntyre is a potential source. There are data published from Weeks Bay (McIntyre ??)
Univ. West Florida researchers may have a collection of PP data.

Mexican Shelf:

Opportunity to connect with Mexican colleagues at workshop to obtain PP rate measurements and other data from Mexican waters.

PEMEX WC PP data exist. These data are proprietary.

- 1) Need to formally request the data
- 2) Make a use case argument
- 3) Collaborate with a Mexican academic partner

Data Mining: Potential Targets

Literature has more chlorophyll data than primary productivity. Would it be useful to apply optical production models to Chlorophyll and PAR to generate PP rates?

Uncertainty estimates - Critical to quantify PP rates determined through experiments, algorithms and coupled models. How do we address this? Data/model comparisons? Other?

Gray literature – This may be an important resource (MMS reports, other?)

Data Gap: Benthic Primary Production

Proposed Gulf-wide Estimation

With conditions of:

- 1) Bottom depths of < 50 m
- 2) Clear offshore waters

Could anticipate that notable Benthic PP is occurring:

Applying a typical light profile, you could obtain a Benthic PP estimate through application of published Benthic Production rates.

Seagrass Contribution:

For Seagrass Beds: Could apply similar procedure and identify spatial distribution of beds based on the Seagrass Atlas

Identification of clear offshore waters could be aided through optical remote sensing products (e.g., K490, PAR).

Strategies & Goals (Manuscripts)

Manuscript Possibilities:

- 1) Benthic productivity paper (Markus)
- 2) PP inter-comparison of Satellite, ship obs and BGC model.
Interest on part of modeling group to participate?
Satellite NPP algorithm may be subject to refinement (P_b^{OPT} adjustment, coastal Chl concentrations)

For in situ observations:

How to translate sparse observations into a C-budget value for a given region?

Is weighting needed, and how would this be applied?

- 3) Mangrove PP influence along Gulf terrestrial boundaries.
- 4) Methane hydrate inputs from benthic seeps.

Strategies & Goals

(Proposals & Collaborative Opportunities)

Proposal Ideas:

- 1) Data mining and synthesis. Explore the gray literature and bring it into the digital/available realm. Include a Gulf-specific NPP-algorithm refinement component here?
- 2) In May, Mexican Carbon Program will have workshop to develop recommendations for the Mexican Science Foundation.
Looking to establish joint projects with international collaborators.
Develop specific research questions with named researchers from international institutions.
Possible to get US agencies involved that would look to support joint research efforts?
- 3) Large scale (Gulf-wide) research program
Need a champion. Target NASA-OBB call. White paper development.
Broad Goal: Capability to have an ability to project Carbon flux response to event-scale impacts.
Interlink coastal, atmospheric and terrestrial components.
Gulf monitoring system (basic sensors with fundamental parameters) .