OCEA 213/EART 213 Biogeochemical Cycles **Fall 2019**
TuTh 1:30-3:00
Porter Acad 241

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Office Hours: Tu 3:00-5:00, or anytime by appointment

Course Description:
OCEA/EART 213 is a graduate-level course covering the aspects of global- and smaller-scale biogeochemical cycles of major elements. The main class material uses the carbon cycle as a central framework, and then branches out into other elements whose cycling is intimately tied to carbon (e.g., N, S, O), in both marine and terrestrial environments. Specific course elements include:

- Overview lectures on main topics
- Readings from the scientific primary literature coupled with weekly student-led class discussions.
- Manipulation of simple box models.
- Final research presentation on a topic of your choice (format and details will be given later in course).

Course Learning Goals:

- **Graduate Level understanding** of biogeochemical cycles of major elements (C, N, P, S, Si, Fe, O).
- **Understanding of interlinkages** between cycles, and connection to water/ tectonic cycles.
- **Scientific Reviews:** understand and practice elements of a good review, develop ability to write professional- quality review of primary journal articles.
- **Scientific Presentation Skills:** Practice underlying elements of giving effective both short and longer scientific presentations, leading discussions.
- **Primary Literature Research**: Facility/familiarity with basic literature search. Ability to find key new work on specific topics.
- **In depth understanding**: one topic of your choice, related to your own research specialty.

Class Work and Evaluation:

Article Discussion Assignments

Starting week 3, students will be assigned to lead discussions on 2 papers related to that week's topic. This will include a short presentation summary of the papers followed by group discussion.

Student Topic Reports

In the last few weeks (depending on number of students in class), students will present a more formal summary of knowledge regarding the biogeochemistry of a topic of their own choosing (can be related to their research). Students will provide class with a reading list at least one week prior to their presentation.

Box modeling

Over the course of the quarter, we will be exploring…in increasing complexity…simple box models representing key biogeochemical processes, with the culmination being solution of a "Superproblem" from Tracers in the Sea (Broecker and Peng).

Nominal Schedule

Week	Topic
1	Box models, reservoirs, fluxes, hydrologic cycle
2	Earth History from a chemical point of view
3	Carbon cycle
4	Nitrogen cycle
5	Phosphorus & silica cycle
6	Sulfur & iron cycle
7	The Anthropocene
8	Student reports
9	Student reports
10	Student reports

Readings:

The Treatise on Geochemistry, Chapters 8.10, 8.11, 8.12, 8.13, 8.14 plus primary literature to be assigned.

Software:

Install one of either Python, Matlab, or spreadsheet-of-your-choice on your computer if you don't have it already.