Biogeochemistry 2016

CIV-ENV 317/EARTH 317, Winter quarter, Tu-Th 9:30-10:50

Tech F285

The cycling of biogenic elements (C, N, S, Fe, Mn) in surficial environments is the focus of this course. Emphasis will be placed on microbial processes and isotopic signatures.

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Office: Tech A228
Office hours: Arranged upon request

Readings:

Individual readings from the scientific literature to be provided.

Expected topic schedule:

Date	Topic
1/5	Course Introduction
1/7 – 1/12	Global fluxes and pools, Chemistry of Stable isotopes
1/14 - 1/19	Autotrophic Metabolism and Isotopic Signatures
1/21 – 1/26	Aerobic Heterotrophic Metabolism and Isotope Effects
1/28 -2/2	Anaerobic Microbial Processes and Biogeochemical Zonation, Intermediary Metabolism of Anoxic Environments
2/4 – 2/9	Animal-sediment/soil Interactions - Particle Mixing, Irrigation and Organic Matter Degradation
2/11 – 2/16	Nitrogen Cycling Processes
2/18	Manganese and Iron cycling
2/23	The Sulfur Cycle: Global Fluxes and Pools, Sulfate Reduction
2/25	Sulfur and Sulfide Oxidation: The Sulfuretum, S in the Atmosphere

3/1	Methanogenesis
3/3	Undergraduate student presentations and reports due
3/8	Reading Week/Graduate Student presentations and proposals due

Course Requirements

Progress in the course will be monitored by a series of problem sets/reports (4) and a final writing assignment. The final writing assignment will be a research proposal for graduate students and a review paper for undergraduates. The grades will be weighted in the following manner:

Problem sets: 60%
Proposal/review paper: 40%

Late submittals of assignments will result in grade penalties.

Problem sets/reports

The problem sets/reports primarily will involve the interpretation of published scientific reports.

Research Proposal (graduate students)

The research proposal is on a topic of your choice in biogeochemistry but cannot be on research with which you are involved. All topics should be cleared with me in advance.

The proposal should include:

1. Title page
2. Abstract
3. Introduction, Background
4. Proposed research
5. Methods
6. Significance of proposed research
7. References

Grades will be based on:

1. Originality of thought

2. Significance of proposed research
3. Feasibility of the experimental design
4. Clarity of writing

Proposal length should not be in excess of 5 single-spaced typed pages. The written proposal is due **3/8**.

Final Literature review report (undergraduates)

The literature report will consist of a 5 page (single space maximum) paper. The topic of the report should be concerned with some aspect of biogeochemistry. **Information and citations must be obtained from the refereed scientific literature.** It is best to focus on a specific example. Avoid general topics. For instance, the topic "the use of N-isotopes to study paleo-nutrient cycling" would be acceptable. The topic "N-isotopes" would not.

The *report* should contain the following sections:

Introduction (Why do we care? How does this issue or problem impact the bigger picture?)
Background (What do we need to know to understand the issue?)
Discussion (What's going on?)
Conclusions (What do we know and where do we go from here?).
Citations

Report grades will be based on the following:

Written presentation
Appearance
Clarity
Content (see description above of required sections)

The final literature review paper is due **3/3.**

Final letter grade assignments for course

A = 93-100, A^- = 90-93
B^+ = 87-89, B = 83-87, B^- = 80-83
C^+ = 73-79, C = 67-73; C^- = 60-67
D = 50-59
F < 50

Note about literature citations: Information cited in all homeworks and the final assignment is to be from the refereed literature. Websites are to be avoided except for databases maintained by acceptable agencies. If in doubt about the suitability of a source, ask!

Sources should be cited in acceptable formats. Formats can be found in all acceptable journals. Examples of acceptable citations and formats are provided in the AGU Authors Guide (uploaded to Blackboard under documents).

Failure to adhere to citation standards will result in loss of points.

Collaborations and Academic Ethics

Discussion is encouraged between class participants however assignments turned in for grades should be the work of the individual. Sources of information for all work should be carefully cited.

Disability Accommodations

Any student with a documented disability needing accommodations is requested to speak directly to the Office of Services for Students with Disabilities (SSD) (847-467-5530) and the instructor as early as possible in the quarter (preferably within the first two weeks of class). All discussions will remain confidential.