

Biogeochemistry

Earth 317

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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Course details

Prerequisites: One quarter of chemistry plus one quarter of either geoscience, environmental science or biology.

Readings:

Text (on reserve): Biogeochemistry, an analysis of global change, Wm. Schlesinger (1998).

Individual readings from the scientific literature

Expected topic schedule:

Week 1- Chemistry of Stable Isotopes; 2-The Carbon Cycle: Global Fluxes and Pool Sizes, Autotrophic Metabolism and Isotopic Signatures; 3-Aerobic Heterotrophic Metabolism and Isotope Effects; 4-Anaerobic Microbial Processes and Biogeochemical Zonation, Intermediary Metabolism of Anoxic Environments; 5-Methanogenesis, Methane Oxidation, Atmospheric Implications of C_1 Metabolism; 6-Animal-sediment/soil Interactions - Particle Mixing, Irrigation and Organic Matter Degradation; 7- The Nitrogen Cycle: Global Fluxes and Pools, Nitrogen Fixation, Nitrification and Denitrification, The Biogeochemistry of N

isotopes, Atmospheric Chemistry of Nitrogen; 8-Metal Reactions, Fe and Mn cycling; 9-The Sulfur Cycle: Global Fluxes and Pools, Sulfate Reduction, Sulfur and Sulfide Oxidation: The Sulfuretum, S in the Atmosphere; 10-Project presentations

EVALUATION METHOD: 50% Problem sets, 15% Class project, 35% Research proposal