GEO517 - Sedimentary Geochemistry

Instructor:
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Course Description:

This is a course concerning the factors and processes that impact sediment chemistry. This course requires a solid understanding of general chemistry (acid/base chemistry, redox chemistry, thermodynamics and chemical equilibria), as well as sufficient mathematics skills for general problem solving. Additionally, familiarity with the central tenets of physical geology and sedimentology is recommended.

The course includes a LECTURE that meets 3x/week, and a LABORATORY section that meets once a week. **LABS will begin the third week of the semester, on Thursday, September 20.**

LECTURE	MWF 9:05-9:55 AM, 161 Morrill 4S
LAB	Thurs 2:30-4:30 PM, 161 Morrill 4S
GRADING	two problem sets (20% each); mid-term exam (20%); final exam (20%); final lab report (20%).

Text: **Burdige, David (2006)** ***The Geochemistry of Marine Sediments (required)***

Syllabus

week 1 (9/5-9/7)	Seawater; Components of marine sediments	Ch. 1-2, p. 1-26
week 2 (9/10-9/14)	Isotope Geochemistry: stable isotopes	Ch. 3, p. 27-40
week 3 (9/17-9/20)	Radioactive isotopes; Physical properties of sediments	Ch. 3, p.40-43, Ch. 4, p. 46-58
	FIRST LAB: Preparation for Long Island Sound Cruise	
	SATURDAY, 9/22: Required cruise on Long Island Sound (all day)	
week 4 (9/24-9/28)	Carbonates and acid-base chemistry	hand outs
	LAB: recovery of sediment pore-water; describing the core	
week 5 (10/1-10/5)	Oxygen and redox chemistry	hand outs
	LAB: Porewater alkalinity titrations	
week 6 (10/8-10/12)	Transport processes; Sediment diagenesis	Ch. 5, p. 59-70
	LAB: Ion Chromatography	
week 7 (10/15-10/19)	Models of sediment diagenesis; Bacterial metabolism	Ch. 6-7, p. 72-104
	LAB: Grain size analysis	
week 8 (10/22-10/26)	Biogeochemical processes in sediments	Ch. 7, p. 105-141
	LAB: Sample preparation for elemental analysis	
week 9 (10/29-11/2)	NO CLASSES	
week 10 (11/5-11/9)	NO CLASSES	
week 11 (11/12-11/16)	Carbon and nutrient remineralization	Ch. 8, p. 142-170
	LAB: Data discussion	
week 12 (11/19-11/21)	Diagenesis and sediment organic geochemistry	Ch. 9-11, p. 171-270
week 13 (11/26-11/30)	Processes at the sediment-water interface	Ch. 12-13, p. 271-372
	LAB: Stable carbon isotope analysis	
week 14 (12/3-12/7)	Geochemical indicators of environmental change	hand outs
week 15 (12/10-12/14)	Global cycles of carbon and sulfur	hand outs