
GEOLOGY 340 — SEDIMENTATION AND STRATIGRAPHY

UNIVERSITY OF TENNESSEE — SPRING 2001

OVERVIEW AND OBJECTIVES

The investigation of sedimentary rocks differs significantly from that of either igneous or metamorphic rocks, and is, in many respects, unmatched in terms of the information that can be amassed regarding the history of the Earth's surface. The composition, texture, structure, packaging, and chemistry of sedimentary rocks provide unique insights into everything from the evolution of the biosphere to plate tectonic configuration.

This course aims to provide you with the tools necessary to:

- understand the origin and behavior sedimentary grains
- describe and classify the major types of sedimentary rocks
- decipher environments of deposition
- appreciate the role of the sedimentary record in “telling time”
- interpret sedimentation patterns in terms of tectonic processes

A word of warning: along the way we will undoubtedly encounter some of the pitfalls of scientific theorizing — hidden assumptions, unknown factors, inevitable oversimplifications, and the possibility of nonunique explanations. Although at times this can be both confusing and frustrating, these are the “facts of life” in science; caveats of which we must continually remain aware.

LECTURES

- Location → MW 9:05a-9:55a, G&G Building, Rm. 223
- Instructor → Dr. Linda C. Kah
- Contact Information → G&G Building, Rm. 317A, Ph. 974-6399, lckah@utk.edu
- Office Hours → F 12:30p-2:00, or by appointment

LABS

- Location → M 12:20p-2:15p or F 2:30p-4:25p G&G Building, Rm. 113
 - Instructor → Patrick Schuneman
 - Contact Information → G&G Building, Rm. 118, pschunem@utk.edu
 - Office Hours → to be announced
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GRADING AND ASSESSMENT

- Lab Sections → 30%
 - Field Trip Report → 5%
 - First Midterm Exam → 20%
 - Second Midterm Exam → 20%
 - Final Exam → 25%
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RESOURCES

- Textbook → Boggs, S., Jr., 2000, Principles of Sedimentology and Stratigraphy (3rd addition)
 - Supplementary Readings (to be announced) → on reserve in G&G Rm. 306
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Wherein are related a thousand trifling matters,
as trivial as they are necessary
to the right understanding of this great history.

Cervantes, Don Quixote of La Mancha, 1615

SYLLABUS OF LECTURE TOPICS — SEDIMENTATION AND STRATIGRAPHY

• *BEHAVIOR OF SEDIMENTARY PARTICLES*

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|---|-------------------|
| Jan. 10 – Introduction to sedimentary geology | |
| Jan. 15 – HOLIDAY | |
| Jan. 17 – Origin of sedimentary grains | Boggs, p. 3-12 |
| Jan. 22 – Analysis of grain size | Boggs, p. 60-74 |
| Jan. 24 – Grain shape and texture | Boggs, p. 74-87 |
| Jan. 29 – Dynamics of fluid movement | Boggs, p. 25-32 |
| Jan. 31 – Sediment transport | Boggs, p. 32-56 |
| Feb. 5 – Interpretation of sedimentary structures | Boggs, p. 88-114 |
| Feb. 7 – Other sedimentary features | Boggs, p. 114-130 |

• *FIRST MIDTERM EXAM* – February 12

• *SEDIMENTARY PETROLOGY AND DIAGENESIS*

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| Feb. 14 – Sandstone, shale, silt, and clay | Boggs, p. 133-161; 243-254 |
| Feb. 19 – Siliciclastic diagenesis | Boggs, p. 161-169 |
| Feb. 21 – Chemical sedimentation, part 1 | Boggs, p. 170-195 |
| Feb. 26 – Carbonate diagenesis | Boggs, p. 195-208 |
| Feb. 28 – Chemical sedimentation, part 2 | Boggs, p. 209-243 |

• *FACIES MODELS*

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| Mar. 5 – The nature of sedimentary strata | Boggs, p. 257-266 |
| Mar. 7 – Continental sedimentation: cold, wet, and dry | Boggs, p. 285-320 |
| Mar. 12 – Fluvial-deltaic environments | Boggs, p. 267-284; 321-343 |
| Mar. 14 – Shoreline, shelf, and slope | Boggs, p. 343-416 |

• *SPRING BREAK – MARCH 19 THROUGH MARCH 23*

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| Mar. 26 – Shallow marine carbonates | Boggs, p. 417-432; 442-448 |
| Mar. 28 – Bioherms and buildups | Boggs, p. 432-441 |

• *SECOND MIDTERM EXAM* – April 2

• *STRATIGRAPHIC PRINCIPLES AND PROCESSES*

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| Apr. 4 – Stratal Packaging | Boggs, p. 451-473 |
| Apr. 9 – Stratigraphic correlation | Boggs, p. 473-484; 547-580 |
| Apr. 11 – Calibrating the geologic time scale | Boggs, p. 525-546; 581-618 |
| Apr. 16 – From cycles to seismic | Boggs, p. 485-509 |
| Apr. 18 – Sequence stratigraphy | Boggs, p. 510-524 |
| Apr. 21 – FIELD TRIP (TBA) | * Paper due Friday, May 4 |
| Apr. 23 – Tectonics and sedimentation | Boggs, p. 632-646 |
| Apr. 25 – Basin development | Boggs, p. 619-632 |
| April 30 – Basin development, cont. | |

• *FINAL EXAM* – May 5 (8:00a-10:00a)