

# **GEOLOGY 380N: SEQUENCE STRATIGRAPHY**

## **SPRING 2010**

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### **I. Lecture schedule**

#### **PRINCIPLES AND TERRIGENOUS CLASTIC DEPOSITIONAL SYSTEMS (Fisher)**

1. Sequence stratigraphy in the historical context; advances in stratigraphy and process sedimentology
2. Formation and architecture of sedimentary basins
3. Overview of process sedimentology and depositional systems
4. Basic principles of sequence stratigraphy: accommodation, chronostratigraphy, unconformities, scales of practice (outcrop, logs, cores and reflection seismic); introduction to stacking patterns and seismic reflection configurations and terminations
5. Sequence stratigraphy in the historical context; advances in stratigraphy and process sedimentology
6. Formation and architecture of sedimentary basins
7. Overview of process sedimentology and depositional systems
8. Basic principles of sequence stratigraphy: accommodation, chronostratigraphy, unconformities, scales of practice (outcrop, logs, cores and reflection seismic); introduction to stacking patterns and seismic reflection configurations and terminations
9. terminations; seismic surfaces
10. Systems tracts: principal and minor tracts
11. Sequence stratigraphy of systems not defined by shelfal accommodation: fluvial, alluvial, aeolian and slope (deep water)
12. Sequence stratigraphy models: depositional sequence model (original Exxon and subsequent modifications); genetic stratigraphy sequence model (Galloway); transgressive-regression sequences (Embry); plus model or system tracts based entirely on stacking patterns (Neal & Abreu) and descriptive geometry (Swift&Thorne)

#### **CARBONATE DEPOSITIONAL SYSTEMS (Kerans)**

1. Carbonate factories, the “organic” factor, and sequence stratigraphy
2. Characteristics of carbonate sequences and systems tracts
3. Depositional topography in carbonate systems
4. Carbonate cyclicity and stratigraphic hierarchies in carbonates
5. Icehouse carbonate sequences
6. Transitional carbonate sequences
7. Greenhouse carbonate sequences
8. Carbonate diagenesis within a sequence stratigraphic context
9. Paleokarst and sequence stratigraphy
10. Seismic imaging issues in carbonates

11. Applications of concepts to reservoir-scale problems in carbonates
12. Applications of concepts to exploration-scale problems in carbonates

## 2. Textbooks:

Catuneanu, O. (2006) Principles of Sequence Stratigraphy, Elsevier., 373 p.

Posamentier, H. W. and Allen G. P. (1999) Siliclastic Sequence Stratigraphy--Concepts and Applications: SEPM Concepts in Sedimentology and Paleontology #7, 204 p., Tulsa

Kerans, C. and Tinker, S. W. (1997) Sequence Stratigraphy and Characterization of Carbonate Reservoirs: SEPM Short Course No. 40. 130 p., Tulsa

### Supplemental Texts:

Emery, D. and Myers, K. J. (1996) Sequence Stratigraphy: Blackwell, 297 p.

Miall, A. D. (1996) The Geology of Stratigraphic Sequences: Springer.

**ONLINE MATERIALS:** <https://sepmstrata.org/index.html> An excellent compilation of sequence stratigraphic data by Professor Chris Kendall, Univ. South Carolina

Supplemental Class Handouts or CD files will be provided

## **Graphics Shown in Class Posted on BlackBoard**

3. Lab meets 2 hours per week: Exercises in sequence and cycle definition, interpretation, and mapping from outcrop sections, cores, logs, and reflection seismic

4. Field trip: Four day excursion during Spring Break

5. Student presentations: Required lab work, field trip participation, term papers or debates

6. Grade composition: Midterm (25%), Lab (30%) Presentations (20%), Final (25%)