

# Quaternary Stratigraphy and Paleoenvironments

Anthropology 521-001, Boise State University  
Fall 2009, Monday, 1:00-4:00 P.M., ILC 405

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## Course Summary

This course provides a global to site specific review and evaluation of lithostratigraphic and biostratigraphic contexts, focusing on the last three million years of human prehistory. The course emphasizes integration of chronologic, biotic, geomorphic, and isotopic evidence of environmental change on various human-time scales.

## Methods of Evaluation

**Topic Presentations.** Use assigned and selected papers (journal articles or academic publications) as basis for ~½ hour Powerpoint presentation each week. Be prepared to lead class discussions on that topic.

**Topic Summaries.** Prepare a 3-page, double-spaced summary of the topic based on the presentations and readings.

**Research Project.** A research paper based on original or published data building on topics covered with presentations/summaries.

1) Examine an issue dealing with the paleoenvironments of a particular region on earth, and develop a research question.

2) Utilize paleoenvironmental data sets, compare synchronic and diachronic environmental indicators.

3) Demonstrate ability to conduct independent research, utilize library and internet resources, critically evaluate paleoenvironmental data-sets, apply analytical methods.

4) Communicate effectively with clear, correct grammar, spelling, and sentence structure. Use maps, figures, and charts to summarize data and conclusions.

**Research Presentation.** A 15-20 minute presentation based on your research paper.

	<b>Value Towards Final Score</b>
<b>Topic Presentations</b>	14 @ 2.5% each; total of 35%
<b>Topic Summaries</b>	14 @ 2.5% each; total of 35%
<b>Research Project</b>	20%
<b>Research Presentation</b>	10%
<b>TOTAL</b>	100%

## **Grading**

Grades for the course will be based on your total accumulated score from the papers, presentations, and exams. The following grading scale will be used:

100-96% = A  
95-90 = A-  
89-88% = B+  
87-82% = B  
81-80% = B-  
79-78% = C+  
77-72% = C  
71-70% = C-  
69-68% = D+  
67-62% = D  
61-60% = D-  
Below 60% = F

## **Required Course Text**

EQS = *Encyclopedia of Quaternary Science* (2007), S.A. Elias (ed.), Elsevier, Amsterdam, Netherlands.

<http://libproxy.boisestate.edu/login?url=http://www.sciencedirect.com/science/referenceworks/9780444527479>

## **Some Useful Texts**

*Geoarchaeology* (2006), G. Rapp and C.L. Hill, Yale University Press, New Haven.

*Late Quaternary Environmental Change: Physical and Human Perspectives* (2005), M. Bell and M.J.C. Walker, Pearson, England.

*Paleoclimatology, Reconstructing Climates of the Quaternary* (1999), R.S. Bradley, Academic Press, San Diego.

*Quaternary Environments* (1998/2003), M. Williams et al., Arnold, London.

*Reconstructing Quaternary Environments* (1997), J.J. Lowe and M.J.C. Walker, Prentice Hall, England.

*Natural Climate Variability and Global Warming: A Holocene Perspective* (2008), R.W. Battarbee and H.A. Binney, eds. Wiley-Blackwell, Hoboken, New Jersey.

**Other Useful Texts/Papers Will be Posted on BLACKBOARD.**

## Course Reading Schedule

\* Denotes papers to be read by everyone for discussion; others to be assigned/selected for presentations. Additional background papers will be available on BLACKBOARD.

### Week 1: Introduction to the Quaternary. History and Concepts

\*History, EQS [doi:10.1016/B0-444-52747-8/00003-X](https://doi.org/10.1016/B0-444-52747-8/00003-X)

### Week 2 Systematics and Glaciations (Climate Change)

\*Climate Change Timescales EQS [doi:10.1016/B0-444-52747-8/00010-7](https://doi.org/10.1016/B0-444-52747-8/00010-7)

\*Quaternary Stratigraphy, EQS [doi:10.1016/B0-444-52747-8/00391-4](https://doi.org/10.1016/B0-444-52747-8/00391-4)

Chronostratigraphy, EQS [doi:10.1016/B0-444-52747-8/00073-9](https://doi.org/10.1016/B0-444-52747-8/00073-9)

Climatostratigraphy, EQS [1016/B0-444-52747-8/00077-6](https://doi.org/10.1016/B0-444-52747-8/00077-6)

Early Glaciations, EQS [doi:10.1016/B0-444-52747-8/00125-3](https://doi.org/10.1016/B0-444-52747-8/00125-3)

Wisconsinan EQS [doi:10.1016/B0-444-52747-8/00128-9](https://doi.org/10.1016/B0-444-52747-8/00128-9)

Younger Dryas, EQS [doi:10.1016/B0-444-52747-8/00134-4](https://doi.org/10.1016/B0-444-52747-8/00134-4)

Greenland Ice Core Record, EQS [doi:10.1016/B0-444-52747-8/00345-8](https://doi.org/10.1016/B0-444-52747-8/00345-8)

Neoglaciation, EQS [doi:10.1016/B0-444-52747-8/00137-X](https://doi.org/10.1016/B0-444-52747-8/00137-X)

### Week 3 Dating Methods 1 (Overview and Radiocarbon)

\*History of dating methods, EQS [doi:10.1016/B0-444-52747-8/00004-1](https://doi.org/10.1016/B0-444-52747-8/00004-1)

\*Dating techniques, EQS [doi:10.1016/B0-444-52747-8/00039-9](https://doi.org/10.1016/B0-444-52747-8/00039-9)

Conventional, EQS [doi:10.1016/B0-444-52747-8/00040-5](https://doi.org/10.1016/B0-444-52747-8/00040-5)

AMS, EQS [doi:10.1016/B0-444-52747-8/00041-7](https://doi.org/10.1016/B0-444-52747-8/00041-7)

Calibration, EQS [doi:10.1016/B0-444-52747-8/00045-4](https://doi.org/10.1016/B0-444-52747-8/00045-4)

Temporal Variation, EQS [doi:10.1016/B0-444-52747-8/00044-2](https://doi.org/10.1016/B0-444-52747-8/00044-2)

Sources of Error, EQS [doi:10.1016/B0-444-52747-8/00042-9](https://doi.org/10.1016/B0-444-52747-8/00042-9)

### Week 4 Dating Methods 2

Tephrochronology, EQS [doi:10.1016/B0-444-52747-8/00075-2](https://doi.org/10.1016/B0-444-52747-8/00075-2)

K-Ar and Ar-Ar, EQS [doi:10.1016/B0-444-52747-8/00050-8](https://doi.org/10.1016/B0-444-52747-8/00050-8)

Cosmogenic, EQS [doi:10.1016/B0-444-52747-8/00069-7](https://doi.org/10.1016/B0-444-52747-8/00069-7)

Luminescence, EQS [doi:10.1016/B0-444-52747-8/00057-0](https://doi.org/10.1016/B0-444-52747-8/00057-0)

### Week 5 Regional Case Studies in Geochronology

Select in consultation with instructor.

### Week 6 Stratigraphy

Biostratigraphy, EQS [doi:10.1016/B0-444-52747-8/00072-7](https://doi.org/10.1016/B0-444-52747-8/00072-7)

Lithostratigraphy, EQS [doi:10.1016/B0-444-52747-8/00071-5](https://doi.org/10.1016/B0-444-52747-8/00071-5)

Allostratigraphy, EQS [doi:10.1016/B0-444-52747-8/00076-4](https://doi.org/10.1016/B0-444-52747-8/00076-4)

Pedostratigraphy, EQS [doi:10.1016/B0-444-52747-8/00074-0](https://doi.org/10.1016/B0-444-52747-8/00074-0)

### Week 7 Regional Case Studies in Stratigraphy

Select in consultation with instructor.

### Week 8 (October 8-12): Sediments and Soils

Fluvial Sedimentary Environments, EQS [doi:10.1016/B0-444-52747-8/00115-0](https://doi.org/10.1016/B0-444-52747-8/00115-0)

Fluvial Terraces, EQS [doi:10.1016/B0-444-52747-8/00116-2](https://doi.org/10.1016/B0-444-52747-8/00116-2)

Fluvial Glacial-Interglacial, EQS [doi:10.1016/B0-444-52747-8/00117-4](https://doi.org/10.1016/B0-444-52747-8/00117-4)

Loess, EQS [doi:10.1016/B0-444-52747-8/00163-0](https://doi.org/10.1016/B0-444-52747-8/00163-0)

Paleosols, EQS [doi:10.1016/B0-444-52747-8/00151-4](https://doi.org/10.1016/B0-444-52747-8/00151-4)

### Week 9 Regional Case Studies in Sediments and Soils

Select in consultation with instructor.

### Week 10 Stable Isotopes

Speleothems, EQS [doi:10.1016/B0-444-52747-8/00352-5](https://doi.org/10.1016/B0-444-52747-8/00352-5)  
Teeth and bones, EQS [doi:10.1016/B0-444-52747-8/00353-7](https://doi.org/10.1016/B0-444-52747-8/00353-7)  
Lake sediments, EQS [doi:10.1016/B0-444-52747-8/00384-7](https://doi.org/10.1016/B0-444-52747-8/00384-7)  
Trees and Pollen, EQS [doi:10.1016/B0-444-52747-8/00356-2](https://doi.org/10.1016/B0-444-52747-8/00356-2)

### Week 11 Regional Case Studies in Stable Isotopes

Select in consultation with instructor.

### Week 12 Faunal Records

Mid-Pleistocene, EQS [doi:10.1016/B0-444-52747-8/00254-4](https://doi.org/10.1016/B0-444-52747-8/00254-4)  
Late-Pleistocene, EQS [doi:10.1016/B0-444-52747-8/00260-X](https://doi.org/10.1016/B0-444-52747-8/00260-X)  
Mummies, EQS [doi:10.1016/B0-444-52747-8/00267-2](https://doi.org/10.1016/B0-444-52747-8/00267-2)  
Extinctions, EQS [doi:10.1016/B0-444-52747-8/00266-0](https://doi.org/10.1016/B0-444-52747-8/00266-0)  
Pleistocene Insects, EQS [doi:10.1016/B0-444-52747-8/00274-X](https://doi.org/10.1016/B0-444-52747-8/00274-X)  
Late Pleistocene and post-glacial beetles, EQS [doi:10.1016/B0-444-52747-8/00281-7](https://doi.org/10.1016/B0-444-52747-8/00281-7)

### Week 13 Regional Case Studies in Faunal Records

Select in consultation with instructor.

### Week 15 Botanical Records

Dendroclimatology, EQS [doi:10.1016/B0-444-52747-8/00016-8](https://doi.org/10.1016/B0-444-52747-8/00016-8)  
Charred Particles, EQS [doi:10.1016/B0-444-52747-8/00187-3](https://doi.org/10.1016/B0-444-52747-8/00187-3)  
Others available in EQS, select in consultation with instructor.

### Week 16 Regional Case Studies in Botanical Records

Select in consultation with instructor.

## **Checklist for Powerpoint Presentations: Quaternary Stratigraphy and Paleoenvironments**

1. Title slide and outline slide.
2. List/indicate resources used for information.
  - a. Titles, authors, book/journal article?
3. Summarize the main points.
4. Provide details.
4. Use images (figures, charts, photographs, maps)
5. Provide a critique.
  - a. It is not enough to review the publications. What are the strengths and weaknesses of the papers or the methods and concepts that are applied?
6. Have a review/conclusion slide.
7. Be prepared to lead the class discussion and answer questions regarding your topic.
8. Have detailed information on the resources you used as your last slide and have the file ready for up-loading to BLACKBOARD.
  - a. The file must be available for use in creating the topic summaries.

## **Checklist for Topic Summaries: Quaternary Stratigraphy and Paleoenvironments**

### **1. Title Page.**

- a. Title (topic of paper).
- b. Author (your name) (no name, no credit!).
- c. Class.
- d. Date.

### **2. Text: Must be Only 3 pages (Double-spaced, 11 pt).**

- a. Pages do not include maps, charts, figures, or title page.
- b. 3 pages of text (does not include title page or bibliography/references cited).
- c. Provide details based on published papers and journal articles and in-class discussions (based on Powerpoint presentations).
- d. Make certain that it is possible for someone reviewing your paper to know where you obtained all the information. Cite your sources within your text.

### **3. Bibliography (Publications or References Cited)**

- a. Must include name of author, date of publication, title of article, journal or book published in, editor if applicable, publisher, place of publication.

### **4. Papers will be partially evaluated based on the use of proper grammar, sentence structure, and spelling.**

### **5. No credit for papers handed in after the deadline.**

<b>Quaternary Stratigraphy and Paleoenvironments: Schedule for Fall 2009</b>	
Week 1: Aug 24	Introduction to the Quaternary. History and Concepts.
Week 2: Aug 31	Systematics and Glaciations. Powerpoint Presentation 1
Week 3: Sept. 9	Dating Methods 1 (Overview and Radiocarbon). Systematics-Glaciations Summary; Powerpoint Presentation 2
Week 4: Sept. 14	Dating Methods 2. Dating Methods 1 Summary; Powerpoint Presentation 3
Week 5: Sept. 21	Regional Case Studies in Geochronology. Dating Methods 2 Summary; Powerpoint Presentation 4
Week 6: Sept. 28	Stratigraphy (Bio-, Litho-, Allo-, Pedo-). Geochronology Case Study Summary; Powerpoint Presentation 5
Week 7: Oct. 5	Regional Case Studies in Stratigraphy. Stratigraphy Summary; Powerpoint Presentation 6
Week 8: Oct. 12 ILC 216	Sediments and Soils (Fluvial, Loess, Paleosols). Stratigraphy Case Study Summary; Powerpoint Presentation 7
Week 9: Oct. 19	Regional Case Studies in Sediments and Soils. Sediments and Soils Summary; Powerpoint Presentation 8
Week 10: Oct. 26	Stable Isotopes. Sediments and Soils Case Study Summary; Powerpoint Presentation 9
Week 11: Nov. 2	Regional Case Studies in Stable Isotopes. Stable Isotopes Summary; Powerpoint Presentation 10
Week 12: Nov. 9	Faunal Records. Stable Isotopes Case Study Summary; Powerpoint Presentation 11
Week 13: Nov. 16	Regional Case Studies in Faunal Records. Faunal Records Summary; Powerpoint Presentation 12
Week 14: Nov. 23-27	Thanksgiving Break
Week 15: Nov. 30	Botanical Records. Faunal Records Case Study Summary; Powerpoint Presentation 13
Week 16: Dec. 7	Regional Case Studies in Botanical Records. Botanical Records Summary; Powerpoint Presentation 14
Week 17 Dec. 14-17	Botanical Records Case Study Summary; <b>Research Presentations (10%) and Paper (20%)</b>