

Paleolimnology

Fall 2023

Special Topics
GLY 6932/4930

Williamson Hall 218

Times: Monday Period 5 (11:45 am-12:35 pm)

Wednesday: Periods 5-6 (11:45 am-1:40 pm)

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Office Hours: Tuesday 11:00 AM-1:00 PM

This course explores how lake and wetland sediment cores are used to understand Earth System processes. Paleolimnology is interdisciplinary and incorporates aspects of geology, pedology, hydrology, climatology, chemistry, physics, and biology. Its temporal component provides an historical perspective on natural and anthropogenic changes in watersheds and lakes, including climate change, erosion and deposition, deforestation, lake acidification, eutrophication, and contaminant pollution.

1) What is paleolimnology?

- a) questions that can be addressed (paleoclimate/paleoenvironment)
- b) applied and theoretical issues
- c) the "watershed concept"
- d) autochthonous versus allochthonous materials

2) Designing paleolimnological investigations

- a) selecting core sites
- b) coring devices
- c) sample handling in the field and lab
- d) subsampling

3) Sediment chronology

- a) ^{210}Pb dating
- b) ^{14}C dating
- c) ^{137}Cs marker
- d) pollen zones
- e) volcanic ash
- f) varve counting
- g) other stratigraphic markers (natural and anthropogenic)
- h) sedimentation rates

4) Physical characteristics

- a) density
- b) laminations (varves)
- c) lithology (organic/inorganic)
- d) erosion/transport/deposition

5) Biogeochemistry

- a) nutrients
- b) metals
- c) biogenic silica
- d) pigments
- e) organic molecules

6) Diagenesis

- a) oxidation/reduction
- b) bioturbation
- c) resuspension/redeposition

7) Stable isotopes

- a) carbon, nitrogen, oxygen
- b) applications to eutrophication, climate, hydrology studies

8) Microfossils

- a) pollen, spores
- b) diatoms
- c) animal microfossils
- d) pH, productivity, climate inferences

9) Pollutants

- a) heavy metals
- b) pesticides
- c) radioisotopes

10) Case studies

- a) trophic state changes (cultural eutrophication)
- b) climate change
- c) anthropogenic impacts on vegetation
- d) lake acidification
- e) heavy metals (Pb, Hg)

11) Lake management and restoration

Required Course materials: There is no textbook for the course. Students may want to refer to Cohen, Andrew S. (2003). Paleolimnology: The History and Evolution of Lake Systems. Oxford University Press. 528 p.

Materials and Supplies Fees: There are no material and supply fees for this course.

Additional Resources: Outside readings on weekly topics will be made available to students as PDFs and will sometimes be the subject of class discussions

Course Description: This course explores how lake and wetland sediment cores are used to understand Earth System processes. Paleolimnology is interdisciplinary and incorporates aspects of geology, pedology, hydrology, climatology, chemistry, physics, and biology. Its temporal component provides an historical perspective on natural and anthropogenic changes in watersheds and lakes, including climate change, erosion and deposition, deforestation, lake acidification, eutrophication, and contaminant pollution. Students are expected to attend class and participate in discussions. Students will write a term paper (~10 pages) on some aspect of Paleolimnology and give a ~15-minute Powerpoint presentation on the topic during the last week(s) of classes.

Course Goals and/or Objectives: When you complete this course you will:

- Have a solid understanding of the ways in which Earth Scientists use natural archives (i.e., lake and wetland sediments) as recorders of past climate and environmental changes.
- Appreciate the benefits of an historical perspective for evaluating contemporary climate and environmental conditions.
- Understand how proxy variables are utilized to infer past conditions and be able to communicate to others how the paleoclimate/paleoenvironment record is used, in both theoretical and applied contexts.
- See how collaborative, multidisciplinary research provides insights into historical ecology
- Be aware of how the geological record preserved in lake and wetland deposits has been applied to manage ecosystems in Florida and beyond.

Attendance Policy: Students are expected to attend class and participate in class discussions. Attendance and participation comprise 25% of the course grade.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Requirements and grades: Students are expected to:

- Actively participate in all class activities (25%)
- Complete the course paper (50%)
- Give a final in-class presentation (25%)

Course Paper: Each student will select a theme under the broad heading of Paleolimnology and write a term research paper, to be submitted during the last week of classes. The paper should be double-spaced and about 10 pages of text in length. Figures, Tables and References should follow the body of the paper. Students will share their findings with the rest of the class through a 15-minute Powerpoint presentation. Presentations will be scheduled during the last week(s) of classes.

COURSE AND UNIVERSITY POLICIES

Academic accommodations for students with disabilities

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. Students can copy and paste the following link to obtain information about accommodations (<https://disability.ufl.edu/get-started/>). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course evaluation process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Academic Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Go here to read the Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>). If you have any questions or concerns, please consult with the instructor or TAs in this class.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Campus Resources

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit the We Care website (<https://umatter.ufl.edu>) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website (<https://counseling.ufl.edu>) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website (<https://shcc.ufl.edu>).

University Police Department: Visit UF Police Department website (<https://police.ufl.edu>) or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website (<https://ufhealth.org/emergency-room-trauma-center>).

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at <https://helpdesk.ufl.edu>, 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services, <https://career.ufl.edu>.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources (<https://uflib.ufl.edu/find/ask/>).

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring (<https://teachingcenter.ufl.edu>).

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers (<https://writing.ufl.edu/writing-studio/>).

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information (<https://sccr.dso.ufl.edu/policies/student-honor-%20code-student-conduct-code/>).

On-Line Students Complaints: View the Distance Learning Student Complaint Process (<https://distance.ufl.edu/getting-help/student-complaint-process/>).