

Climate Change: An Earth Science Perspective

ERTH 2402 (Winter 2024)

Instructor: Joanna Northover (She/They)
Department: Earth Sciences
Email: joanna.northover@carleton.ca - *please include EARTH 2402 in the subject line*
Office Hours: Thursdays 2:00pm-3:00pm, Rm 2115 HB (Hertzberg Laboratories),
or virtually by appointment on Zoom
Lectures: Mondays, 11:35am – 2:25pm
Location: Rm 4010 Nicol Building (Sprott School of Business)
Brightspace: <https://brightspace.carleton.ca/d2l/home/221794>
T.A.: Eleanor Spence (eleanorspence@carleton.ca) - Assignment coordinator

Course Description: An exploration of the, often dramatic, climate changes that have occurred through earth history from a geological perspective, emphasizing the history of earth climates, geological causes of climate change and impact that rapid climate change has had on the biosphere.

Prerequisite(s): None

Learning Outcomes:

- Understand the evolution of humans' awareness of climate change and describe the impact of rapid and slow climate change events on human civilizations.
- Recall the climate cycles and trends that are recognizable in the Holocene climate record.
- Understand how climate proxies are used to reconstruct past climate systems.
- Understand and describe geological process and concepts associated with interpreting paleoclimates (e.g. plate tectonics, sedimentary facies, radiometric dating, etc.)
- Understand and describe the links between atmosphere and oceanic circulation and how they are critical parts of the Earth climate system.
- Understand and describe the causes and impact that El Niño and other cyclic climate phenomena have on climate.
- Understand the impact of glaciation on climate and recall the major climatic events, and pattern of glacial and interglacial periods, of the Quaternary.
- Understand and describe the link between climate change and extremely rapid (often catastrophic) events (e.g. meteors, volcanoes, and nuclear weapons exchange)
- Understand the carbon cycle and how greenhouse gases effect global climate.
- Recall the wide variety of climates that have developed on other planets and moons in the solar system.

Tentative Course Schedule*:

WEEK	DATE	LECTURE TOPIC	Online Assignments
1	Jan 8	Introduction & Unit 1: Climate Change and Civilization	
2	Jan 15	Unit 1: Climate Change and Civilization (part 2)	Assignment 1
3	Jan 22	Unit 2: Reading the Rocks	
4	Jan 29	Unit 2: Reading the Rocks (part 2)	Assignment 2
5	Feb 5	Unit 3: Glaciers Come and Go	
6	Feb 12	Midterm Exam (in class)	
7	Feb 19	Family Day & Winter Break – NO CLASS	
8	Feb 26	Unit 4: Ocean and Atmosphere	Assignment 3
9	Mar 4	Unit 5: Weather and Climate Cycles	
10	Mar 11	Unit 6: Geologic Causes of Climate Change	Assignment 4
11	Mar 18	Unit 7: Celestial Causes of Climate Change	
12	Mar 26	Unit 8: Greenhouse Gases	Assignment 5
13	April 1	Unit 9: Extra Terrestrial Climates (<i>Easter Monday, University open</i>)	
14	April 8	Final Exam Review	

*Lecture topics may change or be adjusted during the term. See Brightspace for updated schedules, and weekly textbook readings.

Learning Materials:

Textbook: William F. Ruddiman (2014) *Earth's Climate Past and Present, 3rd Edition*

Physical copies are available for purchase at the Carleton Bookstore. A physical copy is available for 4 hour hold through the MacOdrum Library. An eBook copy of the textbook is also available through the Carleton MacOdrum Library. Please, refer to the eBook etiquette video linked on Brightspace before using the online resource.

Technology Checklist:

- ☐ An internet-enabled computer (laptop/desktop)
- ☐ Access to reliable internet

Grading Breakdown:

Lecture Midterm	30%	(held in-class February 12, 2023)
Lecture Final Exam	40%	(held during the Final Exam period, date TBA)
Online assignments	25%	(5 Brightspace assignments, 5% each)
Participation	5%	(Poll Everywhere questions during lecture)

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Exams

The lecture midterm exam will be held in-person during scheduled lecture time on **Monday February 12, 2023**, and is closed book. The midterm will cover material from weeks 1-5. The final exam will cover material from weeks 6 – 14. The final lecture exam will be closed book and will be held in-person during the formally scheduled final exam period (date TBA).

Online assignments

The Brightspace quizzes and assignments will draw from, and supplement, material covered during lecture. They will be made available Mondays on Brightspace after scheduled lecture time, and you will have one week to complete the assignment before it closes the following Monday at 11:00am. Check the course schedule for assignment release dates. There will be 5 online assignments total, worth 5% each of the final grade. Questions regarding the online assignments, or accommodations due to missed assignments, should be directed to the online assignment coordinator (eleanorspence@cmail.carleton.ca).

Participation

Participation will be scored for lecture attendance using Poll Everywhere. Poll everywhere questions will be shown during each lecture, and responding to the poll will count towards your 5% participation grade – 80% of the participation grade will be awarded for submitting a response, and 20% for responding with the correct answer. The lowest 2 Poll Everywhere grades will be dropped, to account for unexpected absences during the term. Poll Everywhere questions will begin to officially count towards the final grade in week 3, to allow time for students to register for a Poll Everywhere account and any late registrations to the course. A link to Poll Everywhere for this course is located on the Brightspace page.

Academic Accommodation, Regulations, etc.

ACADEMIC ACCOMMODATIONS

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Informal accommodation due to short-term incapacitation

Conflicts with any course requirement (exam, assignments, etc.) due to illness or other circumstances **MUST** be reported to the instructor (or TA) **PRIOR** to the due date when possible. If this is not possible contact regarding a deferral/accommodation must be made within **24 hours of the missed deadline**.

Missed lectures

If you are sick, or have been exposed to COVID 19, please do not come to class in person! All lecture slides will be uploaded to Brightspace weekly and any questions about the material can be answered during office hours. You are **not** required to notify the Instructor if you missed a lecture, as 1 or 2 absences will not affect your participation grade. For a prolonged absence from lecture, it is recommended to contact the instructor for accommodation.

Note regarding COVID-19/respiratory illness

Carleton University has suspended the need for a doctor's note or medical certificate until further notice when requesting academic accommodation related to COVID-19. Students should complete the self-declaration form available on the Registrar's Office website to request academic accommodation (<https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>). Note that the timing for submitting a self-declaration to your instructor is the same as outlined in the "Informal accommodation due to short-term incapacitation" section above.

Exams

The policy for deferring an exam is the same as "Informal accommodation due to short-term incapacitation" requirements above. With the exception that, if you miss the **FINAL EXAM** you must follow the instructions on the Registrar's website for Deferred Exams which can be found here: <https://carleton.ca/registrar/deferral/>.

Pregnancy obligation

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form <https://carleton.ca/equity/contact/form-pregnancy-accommodation/>

Religious obligation

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details <https://carleton.ca/equity/focus/discrimination-harassment/religious-spiritual-observances/>

Academic Accommodations for Students with Disabilities

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, please request your accommodations for this course through the [Ventus Student Portal](#) at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). Requests made within two weeks will be reviewed on a case-by-case basis. For final exams, the deadlines to request accommodations are published in the [University Academic Calendars](#). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/equity/sexual-assault-support-services>

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation will be provided to students who compete or perform at the national or international level. Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

PLAGIARISM

The University Academic Integrity Policy defines plagiarism as “*presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own.*” This includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to: books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT);
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings without appropriate acknowledgement;
- failing to acknowledge sources through the use of proper citations when using another's work and/or failing to use quotations marks.

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of “F” for the course.

Assistance for Students

Statement on Student Mental Health

As a University student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. For a list of resources available to you visit (<https://carleton.ca/wellness/>)

Other Helpful Student Resources

Academic and Career Development Services: <http://carleton.ca/sacds/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>