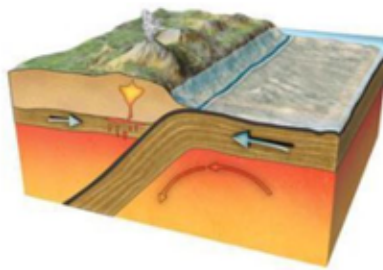
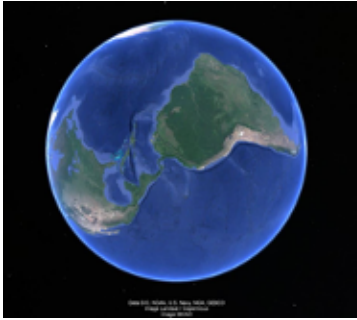


GEOG / ENVI 204: EARTH AND THE ENVIRONMENT: ELEMENTS OF PHYSICAL GEOGRAPHY



Planet Earth, tectonic plates, water cycle

Spring 2024

Hello and welcome!

I'm Dr. Xavier Haro-Carrión (he / him; you can call me Xavier if you wish), your course instructor, who is eager to help you understand some fundamental knowledge of Physical Geography!

Email me at xharocar@macalester.edu
Visit me in **CARN 104F**

Your TA will be Elizabeth Trevathan.
Email her at etrevath@macalester.edu.

Course learning outcomes

- Locate and analyze Earth's major geophysical features and processes.
- Relate Earth's geophysical configuration with Earth's surface processes, such as seasons and climate.
- Analyze how geophysical features and processes affect life on Earth.
- Explore interactions between Earth's systems and the human realm.
- Examine how (tools and lines of thought) geographers study these processes.

Course Description

This course introduces the student to an area of study that brings together and interrelates patterns and processes that drive Earth's physical environments, including human interactions with the physical environment. Among other topics, we will learn about the principles and mechanisms of climate and weather, water resources, landforms, earth surface processes, landscapes, vegetation, and ecosystems at global and regional scales. We will also learn how the spatial and temporal patterns of these processes are interpreted and understood using maps produced from Geographic Information Systems (GIS), Global Position System (GPS) and satellite imagery. Using selected studies we will also examine the social forces that shape many of these systems to gain a broader understanding of the socio-environmental interconnections of these physical environments.

Meeting times and office hours

Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:30-09:30		In CARN 109			
09:30-10:30					
10:50-11:50					
2:00 – 4:00					
4:00 - 5:00					

	Class times
	Instructor Office hours
	TA Office hours (second floor of library, Idea Lab)

Textbooks

This class has no required textbooks. The following books are valuable sources of information for the topics that will be covered (all available in my office). Copies of chapters will be provided for a limited time. Additional sources, such as peer-reviewed papers, news articles, podcasts, are outlined in the “Detailed Weekly Schedule” section of this syllabus and will be accessible in Moodle.

Lave, Biermann, S. N., & Lave, R. (Eds.). (2018). *The Palgrave Handbook of Critical Physical Geography* (1st ed. 2018). Springer International Publishing: Imprint: Palgrave Macmillan.
<https://doi.org/10.1007/978-3-319-71461-5>

Reynolds, S. J. (2021). *Exploring Physical Geography* (Third Edition). McGraw-Hill Education.

Lomolino, Mark V., Brett R. Riddle, and Robert J. Whittaker. *Biogeography: Biological Diversity across Space and Time*. Fifth edition. Sunderland, Massachusetts, U.S.A: Sinauer Associates, Inc., Publishers, 2017.

Course details

Structure

Throughout the semester, I will employ diverse teaching approaches. Some classes will adopt a "flipped-classroom model," requiring students to engage with the material before class, allowing for more in-depth exploration during our sessions. In certain instances, a "blended-learning model" will be utilized, combining pre-provided material with in-class lectures. Traditional lecture-style delivery will be employed in many classes, while others will focus entirely on discussion. As the semester progresses, I encourage you to provide feedback on the teaching techniques you find most beneficial and engaging!

Class Activities

Nearly every class will feature a related activity, such as exit tickets, opening questions, summaries of previous class, paper discussions, and more. These activities have multiple functions: they ensure consistent review of class content, promote class engagement, foster a sense of community, and maintain the cohesion and commitment of our group. As these activities will be conducted almost daily, they will also contribute to tracking attendance. Generally, these activities are not subjected to make-up opportunities (but refer to Attendance policies below for exceptions).

I acknowledge that unavoidable circumstances may occasionally hinder your attendance and full participation. To accommodate such situations, the lowest grades of class activities will be disregarded and will not factor into the final calculation of your Class Activities grade.

Class Discussions and Google Earth Exercises

We will have about ten class discussions or Google Earth labs during the semesters. Discussions differentiate from activities in that they are typically longer, involving the entire class time and a deeper analysis of the assigned readings. These discussions are intended to be deeper and longer discussions about the application of physical geography to societal (broadly defined) issues. We will use various class discussion approaches including philosophical chairs, pinwheel discussions, Socratic seminars, etc. You might be asked to prepare something (e.g., a questionnaire) before class and then use that material in class. Details will be provided during the semester before each discussion. It will be difficult to make-up class discussions, so I encourage you to plan in advance if you need to be absent any of these days.

We will also have some longer activities or labs involving the use of [Google Earth](#). Students will be asked to bring their computers and have Google Earth installed. The software needs 200 MB of free hard-disk space and a RAM of at least 128 MB (very likely your computer will fulfill these requirements).

Exams

Two cumulative exams will be part of this course. One will be scheduled approximately midway through the semester, and the other will take place toward the end of the semester. These exams will encompass short-answer questions, brief essays, map interpretations and applied problem-solving questions. The midterm exam will cover all topics studied until that point in the semester and the final will cover 65% of topics covered in the last half of the semester and 35% of topics covered in the first half of the semester.

The purpose is to evaluate your knowledge and develop soft skills, such as the ability to work under time-limited and potentially stressful scenarios. People respond differently to these circumstances, and I am open to considering options to make the exam-taking experience as comfortable as possible, including scheduling exams outside of class in the Max Center or adjusting proposed exam dates to better accommodate other academic commitments.

Podcast

In this class, a significant portion of your final grade hinges on the creation of an individual podcast. Each student will choose a broad topic related to the class subjects, then narrow it down to a specific case study—such as a particular earthquake, hurricane, tornado, biosphere reserve, drought in a specific region, erosion processes in a particular landscape, or the impact of invasive species in an area. The objective is for every student to delve deeper into a specific case study within the broader themes explored in class. We will all listen and discuss your podcast to gain a more profound understanding of the topics analyzed during the entire semester.

We will work during the course of the semester to define your topic and work on this assignment and we will be supported by the Digital Resource Center (DRC) at Macalester. Here are some sources you will likely use during the entire semester that you should start exploring as soon as you can. How to [Listen to a Podcast for Class](#) provides some good tips on how to approach podcasts as a source of information in class. We'll have at least one podcast as bibliographic material, so be prepared!

[Mac Digital](#) is the general webpage of the Digital Liberal Arts (DLA) at Macalester, and [Podcasting](#) talks specifically about podcasts and lists all the resources that you'll have available at Macalester to do your podcast.

We will also do a short exercise to help prepare you to do your podcast. While probably time consuming, my intention is for this activity to be a fun learning experience.

Course policies and support

Resources

All course materials, including lecture slides, readings and book chapters, will be accessible on Moodle. We will utilize Moodle for submitting assignments that fall outside our regular class schedule, as well as for grade tracking purposes.

Artificial Intelligence (AI)

In this course, the use of Artificial Intelligence (AI) is permitted with certain guidelines. AI can be employed as a starting point for research and to simplify complex ideas, but it must be used cautiously. It is acceptable for checking grammar and proofreading, as long as the content reflects the student's own ideas and effort. AI can aid in understanding intricate readings and serve as a translation tool to facilitate comprehension and communication in English. However, students are prohibited from using AI to generate entire papers or assignments, and any information sourced from AI should be validated from reputable sources.

Attendance

You're warmly invited and encouraged to attend all classes, as attendance is key to our learning journey. Your participation in in-class activities is essential, and these are generally unalterable. Yet, exceptions for academic/sports commitments, illness, or special circumstances can be considered. If religious observances create conflicts, kindly reach out

within the first two weeks of class for possible solutions. Your engagement enriches our shared experience!

Late Assignments

Late assignments will be accepted, but there will be a 10% reduction in the final grade for each 24-hour period they are overdue. If you encounter any difficulties that might necessitate adjustments to this policy, please feel free to discuss them with me.

Office Hours

I will maintain regular office hours to delve into any questions, issues or concerns about the course or your experience as first-year students. If your schedule clashes with the posted office hours, we can coordinate an alternative meeting time. Beyond the designated office hours, feel free to contact me via email. I strive to respond promptly, mostly during work hours (8:00 am to 4:00 pm on weekdays).

Diversity

I recognize that the scientific content in this course has historically been shaped by a limited subset of privileged perspectives, potentially leading to both overt and covert biases. To achieve a more comprehensive understanding of science, I am committed to actively diversifying the range of voices and experiences integrated into the curriculum. Beyond course materials, I am dedicated to cultivating an inclusive learning environment that respects your unique identities, encompassing factors like race, gender, class, nationality, and religion. Your feedback is essential in this endeavor. Please don't hesitate to share suggestions for enriching course materials, promoting diversity, and enhancing inclusivity, either through direct communication or anonymous feedback.

Disabilities

I am dedicated to providing all students, including those with disabilities, equal access to course content. If you are facing obstacles that we can address, please let me know. I'm eager to collaborate with you to ensure your success in the course.

For students with documented disabilities, reasonable accommodations are available. To discuss your individual needs, please reach out to the Disability Services office via email at disabilityservices@macalester.edu or by calling 651-696-6874 to schedule an appointment to discuss your individual needs.

Well-Being

At Macalester, valuing your well-being is paramount. By dedicating time to self-care, you'll enrich your academic experience. Remember, you're more than a student – you carry your own experiences, emotions, and identities. Acknowledge any stressors you face, whether mental, emotional, physical, or financial, and understand their potential academic impact. Recognize your body's needs. During class, stay hydrated, take breaks as needed, and prioritize emotional well-being. Beyond class, prioritize sleep, movement, and connections with peers to foster resilience at Macalester. If well-being challenges arise, feel free to contact me or explore support resources [here](#).

Academic Support

You can access personalized tutoring, academic support, and study skills assistance through [Macalester Academic Excellence \(MAX\)](#). These resources are designed to aid you, and I strongly urge you to utilize them.

Academic Integrity

Students are required to independently complete and submit their own work, adhering to established academic conventions for appropriately using and citing external materials and ideas. Participating in cheating or plagiarism will lead to a failing grade for the course. Further details about Macalester's academic integrity can be accessed [here](#). I recommend thoroughly reviewing this information.

Public Health

If you do not feel well, please do not come to class. When we're on campus for class, we will be following the [Mac Stays Safer Community Commitment](#).

Title IX

Macalester prioritizes a secure and inclusive environment for all. Those experiencing sexual harassment, violence, or stalking are encouraged to seek help. As faculty, I must report such disclosures to the Title IX Office to ensure support. Rest assured, your privacy is respected, and the report is confidential. You can contact Macalester's Title IX Coordinator directly at titleixordinator@macalester.edu.

GRADING

Assignment	Points
Class Activities	10% (averaged)
Discussions and Google Earth labs	30% (averaged)
Podcast	30%
Exam I	15%
Exam II	15%

Scale Letter	Range
A	93.0% to 100 %
A-	90.0% to < 93.0 %
B+	87.0% to < 90.0 %
B	83.0% to < 87.0 %
B-	80.0% to < 83.0 %
C+	77.0% to < 80.0 %
C	73.0% to < 77.0 %

C-	70.0% to < 73.0 %
D+	67.0% to < 70.0 %
D	63.0% to < 67.0 %
D-	60.0% to < 63.0 %
F	0.0% to < 60.0 %

DETAILED WEEKLY SCHEDULE

Disclaimer: This schedule represents my current plan and objectives. Details about pre-class assignments, readings and specific dates might be added / adjusted as we progress in the semester with the goal of enhancing your learning experience.

Week 1: Welcome

January 19

Learning outcome. This week, we'll outline the scope of the course.

- **Friday.** Come to class having read the following:
Haro-Carrión, X. 2024. Neotropical Landscapes Syllabus Spring 2024

Week 2: What's Physical Geography and Critical Physical Geography?

January 22, 24 and 25

Learning outcome. This week, we'll Learn what the fields of Physical Geography and Critical Physical Geography study and Introduce Google Earth.

- **Monday.** Come to class having read the following:
Introducing Critical Physical Geography. In: Lave et al. (Eds.). (2018). The Palgrave Handbook of Critical Physical Geography and Reynolds et al. 2021).
Reynolds et al. (2021). Chapter One Topics 1.1 to 1.2.
- **Wednesday.** Lecture: The Nature of Physical Geography. Come to class having read the following:
Reynolds et al. (2021). Chapter One: The Nature of Physical Geography. Topics 1.3 to 1.14.
Tadaki, Marc, Gary Brierley, Mark Dickson, Richard Le Heron, and Jennifer Salmond. "Cultivating Critical Practices in Physical Geography." *The Geographical Journal* 181, no. 2 (June 2015): 160–71. <https://doi.org/10.1111/geoj.12082>.
- **Friday.** Google Earth lab: Introduction to Google Earth. Bring your computer for a Google Earth exercise.

Week 3: Atmosphere – Solar Energy and Balance

January 29, 31 and February 2

Learning outcome. This week our goal is to understand how solar energy drives virtually all major global processes.

- **Monday.** Lecture: Energy and Matter in the Atmosphere. Come to class having read the following:

Reynolds et al. (2021). Chapter Two: Atmospheric Energy and Matter.

- **Wednesday.** Lecture: Energy and Matter in the Atmosphere Part II.

- **Friday.** Class Discussion. Come to class having read the following:

Zhong, Raymond. "Earth Was Due for Another Year of Record Warmth. But This Warm?" *The New York Times*, December 26, 2023, sec. Climate.

<https://www.nytimes.com/2023/12/26/climate/global-warming-accelerating.html>.

Week 4: Atmosphere – Atmospheric motion and moisture

February 5, 7, and 9

Learning outcome. This week we will examine how global processes change as a function of Earth's atmosphere motion and analyze how water in the atmosphere control weather and climate.

- **Monday.** Exercise: The Coriolis Effect. Come to class having read the following:

Reynolds et al. (2021). Chapter Three: Atmospheric Motion

- **Wednesday.** Lecture: Atmospheric Motion and Moisture. Come to class having read the following:

Reynolds et al. (2021). Chapter Four: Atmospheric Moisture.

- **Friday.** Critical Physical Geography Class Discussion. Come to class having read the following:

Colucci, Alex R, Daniel J Vecellio, and Michael J Allen. "Critical Physical Geographies of Air, Atmosphere, and Climate." *Progress in Environmental Geography* 2, no. 4 (December 2023): 225–39. <https://doi.org/10.1177/27539687231204639>.

Barlow, Mathew. "Extreme Cold Still Happens in a Warming World – in Fact Climate Instability May Be Disrupting the Polar Vortex." *The Conversation*, January 17, 2024.

<http://theconversation.com/extreme-cold-still-happens-in-a-warming-world-in-fact-climate-in-stability-may-be-disrupting-the-polar-vortex-221276>.

Week 5: Atmosphere – Atmosphere and Hydrosphere – Weather and Climate

February 12, 14, and 16

Learning outcome. This week we will study the interactions between the ocean and the atmosphere and learn about climate around the world.

- **Monday.** Lecture: Atmosphere-Ocean-Cryosphere & Climates around the World. Come to class having read the following:

Reynolds et al. (2021). Chapter Six: Atmospheric-Cryosphere Interactions. Topics 6.1 to 6.8.

Reynolds et al. (2021). Chapter Seven: Climates Around the World.

- **Wednesday.** Class discussion: ENSO and the Thermohaline Circulation. Come to class having read the following:

Adamson, George. "Situating El Niño: Toward a Critical (Physical) Geography of ENSO Research Practice." *Annals of the American Association of Geographers* 112, no. 4 (May 19, 2022): 877–92. <https://doi.org/10.1080/24694452.2021.1945910>.

Reynolds et al. (2021). Chapter Six: Atmospheric-Cryosphere Interactions. Topics 6.8 to 6.13.

"RealClimate: What Is Happening in the Atlantic Ocean to the AMOC?," July 24, 2023. <https://www.realclimate.org/index.php/archives/2023/07/what-is-happening-in-the-atlantic-ocean-to-the-amoc/>.

- **Friday.** Google Earth exercise: The Northwest Passage. Bring your computer for a Google Earth exercise.

Week 6: Hydrosphere – Water resources

February 19, 21, and 23

Learning outcome. Analyze how surface and groundwater interact and how it impacts people.

- **Monday.** Lecture: Water Resources. Come to class having read the following:

Reynolds et al. (2021). Chapter Eight: Water Resources.

- **Wednesday.** Class discussion: Water Resources in the US. Come to class having read or listened to the following:

All class:

The California Floods, 2023. <https://open.spotify.com/episode/3VBbLagNwgWmonBori4Cqp>.

Groups will be made for the following:

Rojanasakul, Mira, Christopher Flavelle, Blacki Migliozi, and Eli Murray. "America Is Using Up Its Groundwater Like There's No Tomorrow." *The New York Times*, August 28, 2023, sec. Climate.

<https://www.nytimes.com/interactive/2023/08/28/climate/groundwater-drying-climate-change.html>.

Searcey, Dionne, and Mira Rojanasakul. "Big Farms and Flawless Fries Are Gulping Water in the Land of 10,000 Lakes." *The New York Times*, September 3, 2023, sec. Climate.

<https://www.nytimes.com/interactive/2023/09/03/climate/minnesota-drought-potatoes.html>.

Sengupta, Somini. "Here's a Look at the Water Crises That Might Be Coming to You Soon." *The New York Times*, June 25, 2023, sec. Climate.

<https://www.nytimes.com/2023/06/25/climate/bangladesh-water-floods.html>.

Shao, Elena. "The Colorado River Is Shrinking. See What's Using All the Water." *The New York Times*, May 22, 2023, sec. Climate.

<https://www.nytimes.com/interactive/2023/05/22/climate/colorado-river-water.html>.

Flavelle, Christopher, Somini Sengupta, and Mira Rojanasakul. "How America's Diet Is Feeding the Groundwater Crisis." *The New York Times*, December 25, 2023, sec. Climate.

<https://www.nytimes.com/interactive/2023/12/24/climate/groundwater-crisis-chicken-cheese.html>.

- **Friday.** Critical Physical Geography Class Discussion. Come to class having read the following:

Lave, R. et al. Commodifying Streams: A Critical Physical Geography Approach to Stream Mitigation Banking in the USA. In: Lave et al. (Eds.). (2018). The Palgrave Handbook of Critical Physical Geography

Week 7: Hydrosphere – Water resources

February 26, 28, and March 1

Learning outcome. Analyze how surface and groundwater interact and how it impacts people.

- **Monday:** Class discussion: Water Resources outside the US. Come to class having read the following:

Held, Isaac. "Sahel Drought: Understanding the Past and Projecting into the Future." Text. World. Accessed January 15, 2024. <https://www.gfdl.noaa.gov/sahel-drought/>.

- **Wednesday.** Invited speaker Bill Moseley.
- **Friday.** Class Discussion. Come to class having read the following:

"How Climate Change Alters the Water Cycle." *Nature Water* 1, no. 6 (June 21, 2023): 485–485. <https://doi.org/10.1038/s44221-023-00104-6>.

Week 8: Exam I and mid-course evaluations

March 4, 6 and 8

Learning outcome. We will test our knowledge of the topics studied in class until this point.

- **Monday.** Review for Exam I or invited speaker and Critical Physical Geography Class Discussion. Come to class having read the following:

Knitter et al. Critical Physical Geography in Practice: Landscape Archeology. In: Lave et al. (Eds.). (2018). The Palgrave Handbook of Critical Physical Geography.

- **Wednesday.** Exam I
- **Friday.** MCI

Week 9: Spring Break

March 11, 13 and 15

Learning outcome: Appreciate the importance of taking a break, enjoying doing things outside of academic commitments and taking care of yourself. Enjoy the break!

Week 10: Lithosphere

March 18, 20, and 22

Learning outcome. Introduce basic concepts of geomorphology - theory of plate tectonics, processes related to the breakdown of surface material, and the production of soils.

- **Monday.** Lecture: Plate tectonics and the surface of Earth. Come to class having read the following:
Reynolds et al. (2021). Chapter Nine: Understanding Landscapes
Reynolds et al. (2021). Chapter Ten: Plate Tectonics
- **Wednesday.** Lecture: Soils. Come to class having read the following:
Reynolds et al. (2021). Chapter Sixteen: Soils.
- **Friday.** Google Earth exercise: investigating Plate Tectonics. Bring your computer for a Google Earth exercise.

Week 11: Biosphere - Biogeography

March 25, 27, and 29

Learning outcome. Understand key aspects that define the Biosphere and the geographic distribution of life on the planet.

- **Monday.** Lecture: Foundations of Biogeography. Come to class having read the following:
Lomolino et al. (2017). Unit 2: The Geographic and Ecological Foundations of Biogeography. Chapter 3: The Geographic Template, pages 41-59.
Lomolino et al. (2017). Unit 2: The Geographic and Ecological Foundations of Biogeography. Chapter 4: Distributions of Species.
- **Wednesday.** Lecture: Biomes and Ecosystems. Come to class having read the following:
Lomolino et al. (2017). Unit 2: The Geographic and Ecological Foundations of Biogeography. Chapter 4: Distributions of Species.
Lomolino et al. (2017). Unit 2: The Geographic and Ecological Foundations of Biogeography. Chapter 5: The Distribution and Dynamics of Communities, Biomes, and Ecosystems.
- **Friday.** Lecture: Island Biogeography. Come to class having read the following:
Lomolino et al. (2017). Unit 5: Ecological Biogeography. Chapter 13: Island Biogeography, pages 445-458.

Week 12: Biosphere – Biogeography

April 1, 3 and 5

Learning outcome. Grasp some basic concepts of island biogeography and a

- **Monday.** Biogeography activity: Exploring Island Biogeography through Data.
- **Wednesday.** Lecture: The Biodiversity Crisis and Conservation Biogeography. Come to class having read the following:

Lomolino et al. (2017). Unit 6: Conservation and the Frontiers of Biogeography. Chapter 15: Biogeography of Humanity, Biological Diversity, and Conservation Biogeography, pages 605-625.

- **Friday.** Invited speaker: Eric Carter – Environmental Hazards

Week 13: Review

April 8, 10 and 12

Learning outcome.

- **Monday.** Course content review ahead of the final and field exercise
- **Wednesday.** Field exercise – Ordway Station
- **Friday.** Exam II

Week 14: Podcast preparation

April 15, 17 and 19

Learning outcome. We will dedicate all this week to prepare our podcasts

- **Monday.** DRC
- **Wednesday.** Podcast work
- **Friday.** Podcast work

Week 15: Podcast Presentation and Discussion

April 22, 24 and 26

Learning outcome. This week we will deepen our understanding of Physical Geography by listening to each other's podcasts and discussing them in class.

- **Monday.** Podcast presentations and discussion
- **Wednesday.** Podcast presentations and discussion
- **Friday.** Podcast presentations and discussion

Week 16: Course Evaluations

April 29

- **Monday:** Course Evaluations