



Course Title: **Earth System Science**
 Course Number: **ENV450**
 Term: **Fall 2025**
 Course Credits: **3**
 Class Meeting Times: **Tues & Thur 1:00-2:20**
 Class Location: **Eiben Hall 102**



Instructor Name: **Dr. Lupita Ruiz-Jones**
 You can call me Dr. Lupita or Professor Lupita
 Email: **guadalupe.ruiz-jones@chaminade.edu**
 Office Location: **Wesselkamper 104**
 Cell Phone (welcome to text, lmk who you are): **505.603.1985**
 Office Hours: **Tues 2:30-3:30 / Wed 12:30-3:30 / Thur 2:30-3:30** in-person or zoom
 (zoom link in Canvas - text me to lmk you want to zoom). **Also happy to schedule a meeting for a time that works better for you!**

*Images from NASA; figure from Steffen et al. 2020

Course description from University catalogue

Earth system science is a new and growing scientific sub-discipline that focuses on the causal connectedness and nature of the interactions between Earth's atmosphere, hydrosphere, lithosphere and biosphere. The course considers the particular interactions within Earth's natural system as well as anthropogenic alterations of it. Finally the course seeks solutions that synergize with or enhance the natural systems.

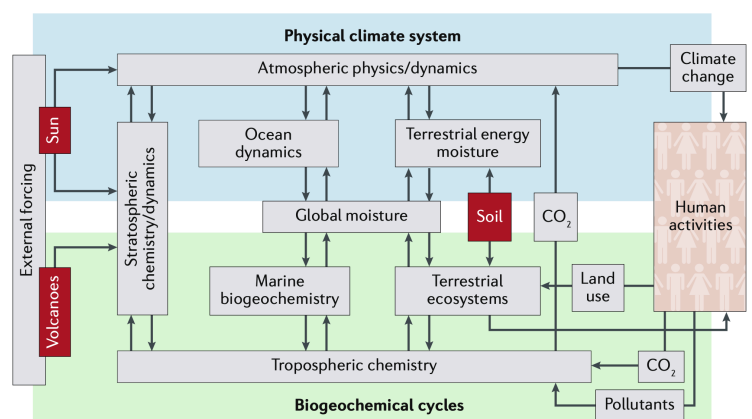


Fig. 2 | **The NASA Bretherton diagram of the Earth System.** The classical, simplified depiction of the Earth System and its interactions. The focus is on the interactions between the geosphere and the biosphere, with human forcings represented as an outside force affecting the geosphere–biosphere system.

Course overview

The learning goals of this class are two-fold. First to engage you in learning the foundational concepts of Earth System Science by reading the course texts and supplemental material focused on the geosphere, hydrosphere, atmosphere, biosphere, and anthroposphere. As you acquire



this knowledge you will develop and practice skills used in data analysis and critique of scientific concepts presented in different types of sources. You will also think critically about how humans are altering the Earth System.

My teaching philosophy is that we will have a more engaging, and fun time, together if you come prepared. That means get the books (either buy your own copies, use the copies in the library, or borrow the student loaners from me), read the assigned sections prior to class, and practice critical thinking, which requires energy and is active. You will not enjoy your experience if you just show up without a clue of the day's topic and sit there expecting to be entertained without making any contribution.

Service learning requirement

Through participation in organized service learning activities you will discover the many disciplines and techniques involved in ameliorating environmental challenges; and see how we put our skills and our Marianist and Pacific Island values into action for the good of the community.

Alignment of Natural Sciences Courses with Marianist and Hawaiian values

The Natural Sciences Division provides integrative course content taught by experienced, dedicated, and well-educated instructors. *We educate in the family spirit* – every classroom is an *Ohana* (family) and you can expect to be respected yet challenged in an environment that is supportive and inclusive by instructors who take the time to personally get to know and care for you. *We educate for service, justice and peace*, because many of the most pressing global issues (climate change, health inequity, poverty, justice) are those which science and technology investigate, establish ethical parameters for, and offer solutions to. *We educate for adaptation and change*. In science and technology, the only constant is change. Data, techniques, technologies, questions,

interpretations, and ethical landscapes are constantly evolving, and we teach students to thrive on this dynamic uncertainty.

The study of science and technology is formative: exploring human creativity and potential in the development of technologies and scientific solutions; engaging in the stewardship of the natural world; and, promoting social justice. We provide opportunities to engage with the problems that face Hawai'i and the Pacific region through the Natural Sciences curriculum, in particular, those centered around severe



challenges in health, poverty, environmental resilience, and erosion of traditional culture. The Marianist Educational Values relate to Native Hawaiian ideas of *mana* (spiritual energy of power and strength), *na'auao* (wisdom, enlightenment), *ohana*, *aloha* (love, affection, generosity, speaking from the heart, patience, and listening) and *aina* (love for the land and its people). We intend for our Natural Sciences programs to be culturally-sustaining, rooted in our

Hawaiian place, and centered on core values of *Maiau*, be neat, prepared, careful in all we do; *Makawalu*, demonstrate foresight and planning; *`Ai*, sustain mind and body; *Pa`a Na`au*, learn deeply.

Environmental Science Program Learning Goals

This course is part of the Environmental Science program. These are the Program Learning Outcomes for the program.

Upon completion of the undergraduate B.S. program in Environmental Science, students will be able to:

1. Authenticate their commitment to service, justice and peace through experiential project-based activities that enhance the condition of the integral ecology, care for creation and value all voices.
2. Apply scientific reasoning and methodology to environmental problems.
3. Identify the major physical, chemical and biological components, interactions and cycles of earth systems and ecosystems.
4. Propose, design and participate in scientific research projects that document, describe and/or help solve environmental problems and foster sustainability.

5. Pursue throughout their education new scientific knowledge and techniques that prepare them for the adaptation and change essential to environmental problem solving.

Course Learning Outcomes and their evaluation

By the end of the course, you will be able to:

1. Describe the major concepts used to characterize the geosphere, hydrosphere, atmosphere, biosphere, cryosphere, and anthroposphere.
 - a. Satisfies Program Learning Outcome 3.
 - b. Evaluated via quizzes, midterms, in-class/online discussions, and Final Project.
2. Effectively read scientific literature with a critical and analytical mindset and evaluate how science is presented in secondary sources.
 - a. Evaluated via in-class/online discussions and Final Popular Project.
3. Communicate clearly and concisely the significance of a central Earth System topic.
 - a. Satisfies Program Learning Outcome 3 and 5.
 - b. Evaluated via your Final Project.
4. Authenticate [your] commitment to service, justice and peace through experiential project-based activities that enhance the condition of the integral ecology, care for creation and value all voices.
 - a. This is Program Learning Outcome 1
 - b. Accomplished via Class Community Service Project

Class Discussions & Regular Mini Quizzes

A goal of this course is to gain experience reflecting on and discussing scientific material with me and your peers. We will have **weekly** discussions based on the assigned reading (from two course books and supplemental articles). Discussions are a great opportunity to reflect on what you read, what new ideas/concepts you learned, and think about questions. Discussions are also great opportunities to practice speaking up in class and sharing your perspective.

Data Analysis in-class Workshops

As we read the course texts and articles we will also spend time looking closely at data graphs and databases. There will be times when I provide you with data visuals and you will be asked to interpret and ask questions of the data. Other times we will explore online databases and you will identify patterns and trends.

Student-led Book Chapter Discussion Project

You will work in small groups to facilitate class discussion for one of the assigned book chapters. This will involve finding related scientific and popular science articles, doing supplemental background research on the topic to increase understanding, and facilitating class discussion.

Make an earth system science video

Leading up to your Final Project you will create a short video presenting an earth system concept you observed in the environment. You will share with the class what you learned through keen observation (kilo). This activity is meant to inspire you for your final project subject area.

Final Earth System Science Data Project

The goal of the final project is practice data analysis, data interpretation, and science communication. You will investigate the peer-reviewed scientific literature of an Earth System Science concept you are curious about. Through identification of relevant scientific articles and data analysis, you will present your interpretation of data figures. Success of the presentation involves practicing skills gained in science communication during the course. As you read the two course books you will start to make observations on how to effectively communicate complex scientific information to an educated audience. There will be multiple checkpoints throughout the semester to update me on progress you are making and receive feedback from your peers.

See Canvas Modules for the tentative schedule

Grading breakdown

* The grade listed in Canvas is NOT accurate because it does not include all components of your final grade. If you are ever curious about your grade ASK ME :)

5% = Attendance (roll call in Canvas)

5% = Engaged participation with peers, me, and guests (requires arriving to class prepared)

- Includes participation in **class discussions**.
- To earn an A involves:
 - Regularly asking questions and responding to questions.
 - Being prepared to share your thoughts on the material assigned for class discussion.
 - Critical engagement during data analysis workshops
- To earn a D involves:

- Being present.
- Demonstration of lack of preparedness for discussions.
- Being distracted by phone/laptop.
- Lack of active listening.

15% = Canvas discussion posts and regular quizzes before class discussions

- How I will assess your reading comprehension.
- The discussion posts are a great way to prepare to engage in class discussions and also are helpful for preparing for quizzes. These are not accepted late because they are meant to prepare you for class discussion.
- Reflections on class presentations and guest visits.

10% = Student-led Book Chapter Discussion Project: facilitate critical review of book chapter

30% = 3 Midterms

5% = Make an earth system science video

25% = Final Earth System Science Data Project

- Breakdown:
 - 5% = Outline of Final Project
 - 2% = submit presentation 1 notes to share with class
 - 5% = Part 1 data presentation
 - 3% = submit final presentation notes to share with class
 - 10% = Final data presentation

5% = Community service project: attend 1 Saturday morning event with Kuilei Cliffs (8am-11am, lunch provided) or if you find another event that is run by a community organization off campus that meets at least twice per month to work on a project, **Imk and you can get approval.** Can not double dip.

Late work policy

This policy applies to components of the major assignments. If something happens and you know you need an extension on an assignment, contact me. If we do not make a prior arrangement, 10% of the assignment points will be deducted for each day after the assignment due date. As stated above canvas discussion posts are not accepted late.

A = Outstanding scholarship and an unusual degree of intellectual initiative

B = Superior work done in a consistent and intellectual manner

C = Average grade indicating a competent grasp of subject matter

D = Inferior work of the lowest passing grade

F = Failed to grasp the minimum subject matter; no credit given

Extra credit opportunities

Throughout the course I will notify you of opportunities to engage with ideas and scholars outside of Chaminade. Be sure to get pre-approve from me if it is not something I share with the class.

If looking for extra credit, a place to look for community service opportunities: <http://www.conservationconnections.org/>

To receive credit for extra credit you will need to submit a reflection on Canvas for each activity you participate in. Find the assignment on canvas, in the top module, called Extra Credit. **Max accepted will be 3 extra credit opportunities.** The points can be used towards a mid-term or missed discussion post.

Attendance and your grade

As an enrolled student in the course, I expect that you will attend every class unless you are sick. **If you have more than two unexcused absences your grade will be negatively impacted.** An important aspect of learning is active engagement. There is no substitute for being in class when it comes to understanding and thinking critically about the material. Unexcused absences occur when playing hooky to go surfing, to sleep, to cram for an exam in another class, etc.

Workload Expectations ~ Credit Hour Policy

- ENV450 is a 3 credit class requiring a MINIMUM of 135 clock hours of student engagement, per the official CUH Credit Hour Policy.
- We will meet twice a week: 2h 40min each week = ~40h for 15 weeks
- You will have reading and short writing assignments that are expected to take you ~2.5h per week (37.5h).
- Preparing for your Student-led Book Chapter Discussion Project is expected to take you ~10h.
- You will have 3 midterms that will each take you ~8h to study for = 24h.
- For your Final Earth System Science Data Project you will spend time researching, analyzing, interpreting, giving feedback, revising, and preparing for presentations. This is expected to take you ~27h.
- It is expected that completing the class service learning project will take you ~4h.

The unit of semester credit is defined as university-level credit that is awarded for the completion of coursework. One credit hour reflects the amount of work represented in the intended learning outcomes and verified by evidence of student achievement for

those learning outcomes. Each credit hour earned at Chaminade University should result in a minimum of 45 hours of engagement, regardless of varying credits, duration, modality, or degree level. This equates to one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester. Terms that have alternative lengths, such as 10 week terms, should have an equivalent amount of faculty instruction and out-of-class student work to meet each credit hour. Direct instructor engagement and out-of-class work result in total student engagement time of 45 hours for one credit. The number of engagement hours may be higher, as needed to meet specific learning outcomes.

Specific Credit Situations

The minimum 45 hours of engagement per credit hour can be satisfied in fully online, internship, or other specialized courses through several means, including (a) regular online instruction or interaction with the faculty member and fellow students and (b) academic engagement through extensive reading, research, online discussion, online quizzes or exams; instruction, collaborative group work, internships, laboratory work, practica, studio work, and preparation of papers, presentations, or other forms of assessment. This policy is in accordance with federal regulations and regional accrediting agencies.

Course website

We will use Canvas and google drive.

Required course texts (both available in the bookstore; a copy of each is in the Library on reserve)

The story of earth: the first 4.5 billion years, from stardust to living planet by Robert Hazen (2013) - PAPERBACK

https://www.amazon.com/Story-Earth-Billion-Stardust-Living/dp/0143123645/ref=asc_df_0143123645/?tag=hyprod-20&linkCode=df0&hvadid=312091458201&hvpos=&hvnetw=g&hvrand=3289969889870508636&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9022865&hvtargid=pla-470469081521&psc=1&tag=&ref=&adgrpid=63669393113&hvpone=&hvptwo=&hvadid=312091458201&hvpos=&hvnetw=g&hvrnd=3289969889870508636&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9022865&hvtargid=pla-470469081521

- ISBN-10 : 0143123645
- ISBN-13 : 978-0143123644

Fire Weather: A True Story from a Hotter World by John Vaillant (2023) PAPERBACK
https://www.amazon.com/Fire-Weather-Front-Lines-Burning/dp/0525434240/ref=tmm_pap_swatch_0

- ISBN-10 : 0525434240
- ISBN-13 : 978-0525434245

Classroom atmosphere

Learning through discussion

In class and online discussions provide an excellent opportunity to learn from classmates; to formulate and rethink your own understanding of the material; to practice thinking on your feet; and to critically evaluate evidence.

Over the semester, you will develop your skills in:

- ❖ Engaging substantively with different types of sources in critical and productive ways
- ❖ Posing thought provoking questions and collaborating with peers
- ❖ Effectively communicating your ideas, both orally and in writing

Expectations of students in class

You have the responsibility to commit yourself to your academic work in ways that will increase your learning. In this course, following the guidelines below will give you the best chance of growing as a critical thinking learner:

Arrive to every class on time, which means settled in your seat by the start time.

Approach the work of the course with the habits of mind critical for success at the university level: intellectual curiosity, critical engagement, and creativity.

Prepare by doing all the required reading and assignments before class. Feel free to bring printed copies of articles or notes you took while reading to guide you during discussions.

Listen actively and with respect to your peers. We listen to each other with dignity by thoughtfully grappling with the ideas of others and using non-verbal cues to show we are paying attention to them. Active listening is essential to engaged participation.

Speak up and challenge yourself to share your thoughts and ideas with your classmates in skillful and respectful ways. Being critical of your peers is essential for proper academic discourse, but we strive to do so respectfully. Since you are thinking on your feet, you are not expected to speak with perfect clarity. Class discussion is a cooperative enterprise, not a competition. A quality contribution is one that helps stimulate our learning. A thoughtful response to another student's comment leads to a much richer learning experience than a long and well-researched but disconnected comment.

Inquire by asking questions—this is a key aspect of learning. Ask yourself questions as you engage with the course material. Engage with your peers by asking questions. Often there is not a single “right” answer.

Expectations you can have of me

I will continually strive to be an engaging, thoughtful, and critical teacher. One of my primary goals is to create a learning environment where everyone feels included. You can expect me to make space for you to share your thoughts and questions. You can also expect me to listen to your feedback on how the class is going -- please share your observations and ideas with me.

Technical Assistance for Canvas

- ❖ Search for help on specific topics or get tips in [Canvas Students](#)
- ❖ [Live chat with Canvas Support for students](#)
- ❖ Canvas Support Hotline for students: +1-833-209-6111
- ❖ Watch this [video to get you started](#)
- ❖ [Online tutorials](#): click on “Students” role to access tutorials
- ❖ Contact the Chaminade IT Helpdesk for technical issues: helpdesk@chaminade.edu or call (808) 735-4855

Course Policies

Communication with me

I'm always happy to address your questions. I generally answer emails within 24 hours on weekdays and by the following weekday if sent on a weekend or holiday. Please do not wait until the last minute to ask questions. I expect you to communicate with me about any issues related to the course. Clear and timely communication can anticipate many standard problems that arise during a course. I am also super happy to just chat with you about topics you find interesting or you are curious about.

Grades of "Incomplete"

You may negotiate an incomplete grade with me when there are specific justifying circumstances, but it is necessary that you have at least completed 70% of the required assignments. When submitting a grade the “I” will be accompanied by the alternative grade that will automatically be assigned after 90 days. These include IB, IC, ID, and IF. If only an “I” is submitted the default grade is F. The completion of the work, evaluation, and reporting of the final grade is due within 90 days after the end of the semester or term; this may not be extended.

Cell phones, tablets, and laptops

Out of consideration for your classmates, please set your cell phone to silent mode during class. Students are encouraged to bring laptops or tablets to class as I will at times assign online activities and readings that will require the use of a laptop or tablet. It is well known that these devices can be extremely distracting to your learning as well as the learning experience of your peers. When you are in class I expect that you are focused on the material and not multitasking by checking email, social media, or unrelated material on your device.

Important Information

Academic Honesty

Academic honesty is an essential aspect of all learning, scholarship, and research. It is one of the values regarded most highly by academic communities throughout the world. Violations of the principle of academic honesty are extremely serious and will not be tolerated.

Students are responsible for promoting academic honesty at Chaminade by not participating in any act of dishonesty and by reporting any incidence of academic dishonesty to an instructor or to a University official. Academic dishonesty may include theft of records or examinations, alteration of grades, and plagiarism, in addition to more obvious dishonesty.

Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Dean of the Academic Division. Punishment for academic dishonesty will be determined by the instructor and the Dean of Academic Division and may include an “F” grade for the work in question, an “F” grade for the course, suspension, or dismissal from the University.

For the most up to date information, please refer to the [Academic Honesty Policy](#) on the Chaminade University Catalog website.

Title IX and Nondiscrimination Statement

Chaminade University of Honolulu is committed to providing a learning, working and living environment that promotes the dignity of all people, inclusivity and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator.

Nondiscrimination Policy & Notice of Nondiscrimination

Chaminade University of Honolulu does not discriminate on the basis of sex and prohibits sex discrimination in any education program or activity that it operates, as required by Title IX and its regulations, including in admission and employment. Inquiries about Title IX may be referred to the University's Title IX Coordinator, the U.S. Department of Education's Office for Civil Rights, or both and contact information may be found at the [Chaminade University Title IX Office Contact Information and Confidential Resources website](#). On-campus Confidential Resources may also be found here at [CAMPUS CONFIDENTIAL RESOURCES](#).

The University's Nondiscrimination Policy and Grievance Procedures can be located on the University webpage at:

<https://chaminade.edu/compliance/title-ix-nondiscrimination-policies-procedures/>.

To report information about conduct that may constitute sex discrimination or make a complaint of sex discrimination under Title IX, please refer to the [Campus Incident Report form](#). Chaminade University of Honolulu prohibits sex discrimination in any education program or activity that it operates. The NOTICE of NONDISCRIMINATION can be found here: [Notice of Nondiscrimination](#).

CUH Alert Emergency Notification

To get the latest emergency communication from Chaminade University, students' cell numbers will be connected to Chaminade's emergency notification text system. When you log in to the Chaminade portal, you will be asked to provide some emergency contact information. If you provide a cellphone number, you will receive a text from our emergency notification system asking you to confirm your number. You must respond to that message to complete your registration and get emergency notifications on your phone.

Assessment for Student Work

With the goal of continuing to improve the quality of educational services offered to students, Chaminade University conducts assessments of student achievement of course, program, and institutional learning outcomes. Student work is used anonymously as the basis of these assessments, and the work you do in this course may be used in these assessment efforts.

Student with Disabilities Statement

Chaminade University of Honolulu offers accommodations for all actively enrolled students with disabilities in compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act (2008).

Students are responsible for contacting Kokua Ike: Center for Student Learning to schedule an appointment. Verification of their disability will be requested through appropriate documentation and once received it will take up to approximately 2–3 weeks to review them. Appropriate paperwork will be completed by the student before notification will be sent out to their instructors. Accommodation paperwork will not be automatically sent out to instructors each semester, as the student is responsible to notify Kokua Ike via email at ada@chaminade.edu each semester if changes or notifications are needed.

Kōkua 'Ike: Tutoring & Learning Services

Chaminade is proud to offer free, one-on-one tutoring and writing assistance to all students. Tutoring and writing help is available on campus at Kōkua 'Ike: Center for Student Learning in a variety of subjects (including, but are not limited to biology, chemistry, math, nursing, English, etc.) from trained Peer and Professional Tutors. Please check [Kōkua 'Ike's](#) website for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via TutorMe. Tutor Me can be accessed 24/7 from your Canvas account. Simply click on Account > TutorMe. For more information, please contact Kōkua 'Ike at tutoring@chaminade.edu or 808-739-8305.

This syllabus and course schedule are living documents: they are free to change. I try to adhere as closely as possible, but there will be times in which we will take longer on a particular topic or add or delete a topic to enhance the course. I like to be able to react to you as the course proceeds and go with the flow a bit in order to make the course experience sort of custom fit to you!

You are responsible for all of the information in this document: not reading it does not make you exempt from knowing what's in it!

Use this syllabus to keep you organized and aware of important dates and how your grade is determined.