

# EAOS111: Earth and Ocean Science

2023

Welcome to Earth and Ocean Science: your introduction to planet Earth, inside and out. In this multidisciplinary paper you will gain an understanding of the origin of our universe, oceans, mountains, climate change, and mass extinctions: it's all connected.

EAOS111 commences with an overview of our place on planet Earth, the solar system, and deep space. The course then covers a vast number of topics by way of the unifying theme of Earth's "spheres": Atmosphere, Geosphere, Hydrosphere, and Biosphere. Topics include climate and atmospheric/oceanic circulation, plate tectonics and associated hazards, weathering and erosion/deposition, global biogeochemical cycles, glaciers and ice sheets, and the impact of humans on the planet. You will finish the course with a holistic understanding of planet Earth, and a good feel for topics worth pursuing at more advanced levels.

## COURSE LEARNING OUTCOMES

- Understand and describe the processes that shape Earth's surface, interior and oceans
- Draw connections between the various components of the Earth system
- Apply concepts introduced in lectures and laboratories to field settings
- Understand the concept of geologic time in relation to physical and biological systems
- Understand the physical and biological controls on the distribution of Earth materials and make predictions based on this understanding

## PRIMARY CONTACTS

These are your first points of contact for matters related to this paper:



Christian Ohneiser  
Course Coordinator  
Email: [christian.ohneiser@otago.ac.nz](mailto:christian.ohneiser@otago.ac.nz)  
Office: 2n3, Geology Building



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Kaiāwhina  
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Email: [sophie.briggs@otago.ac.nz](mailto:sophie.briggs@otago.ac.nz)  
Office: Gn4, Geology Building



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Client Services Administrator  
(Shared Services)  
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Christina Riesselman  
Course Coordinator (from April)  
Email: [christina.riesselman@otago.ac.nz](mailto:christina.riesselman@otago.ac.nz)  
Office: Gn2, Geology Building

## GEOLOGY TEACHING STAFF

- CO Dr Christian Ohneiser (Course Coordinator) (2n3)  
[christian.ohneiser@otago.ac.nz](mailto:christian.ohneiser@otago.ac.nz)
- CRR Dr Christina Riesselman (Course Coordinator) (Gn2)  
[christina.riesselman@otago.ac.nz](mailto:christina.riesselman@otago.ac.nz)
- CEM Dr Candace Martin (1s10) [candace.martin@otago.ac.nz](mailto:candace.martin@otago.ac.nz)
- ARG Associate Professor Andrew Gorman (undergrad course advisor)  
[andrew.gorman@otago.ac.nz](mailto:andrew.gorman@otago.ac.nz) (2s2a)
- SB Dr Sophie Briggs (Teaching Fellow, Kaiāwhina) (Gn4)  
[sophie.briggs@otago.ac.nz](mailto:sophie.briggs@otago.ac.nz)

## MARINE SCIENCE TEACHING STAFF

- CL Dr Cliff Law [cliff.law@otago.ac.nz](mailto:cliff.law@otago.ac.nz)
- AS Professor Abby Smith [abby.smith@otago.ac.nz](mailto:abby.smith@otago.ac.nz)
- RS Rob Smith [robert.smith@otago.ac.nz](mailto:robert.smith@otago.ac.nz)
- CRR Dr Christina Riesselman [christina.riesselman@otago.ac.nz](mailto:christina.riesselman@otago.ac.nz)

## COURSE COMMUNICATION

- **Course-related questions:** if you have any questions about this course, post them to the [EAOS111 Discussion Board](#) and we will do our best to answer them as soon as we can.
- **Blackboard:** go to <http://blackboard.otago.ac.nz> to access the timetable, lecture slides, Echo360 recordings, quizzes, grades, and other resources.
- **Course announcements:** Important information will be posted to the 'Announcements' tab on Blackboard and sent to your student email account. If you prefer to use a different email account, follow the instructions at the ITS link: <https://www.otago.ac.nz/its/otago683219.pdf>

## DEPARTMENT OF GEOLOGY

Welcome to our building! The map on the next page shows where lectures and labs are held, as well as Louise Schumacher's office (Client Services Administrator).

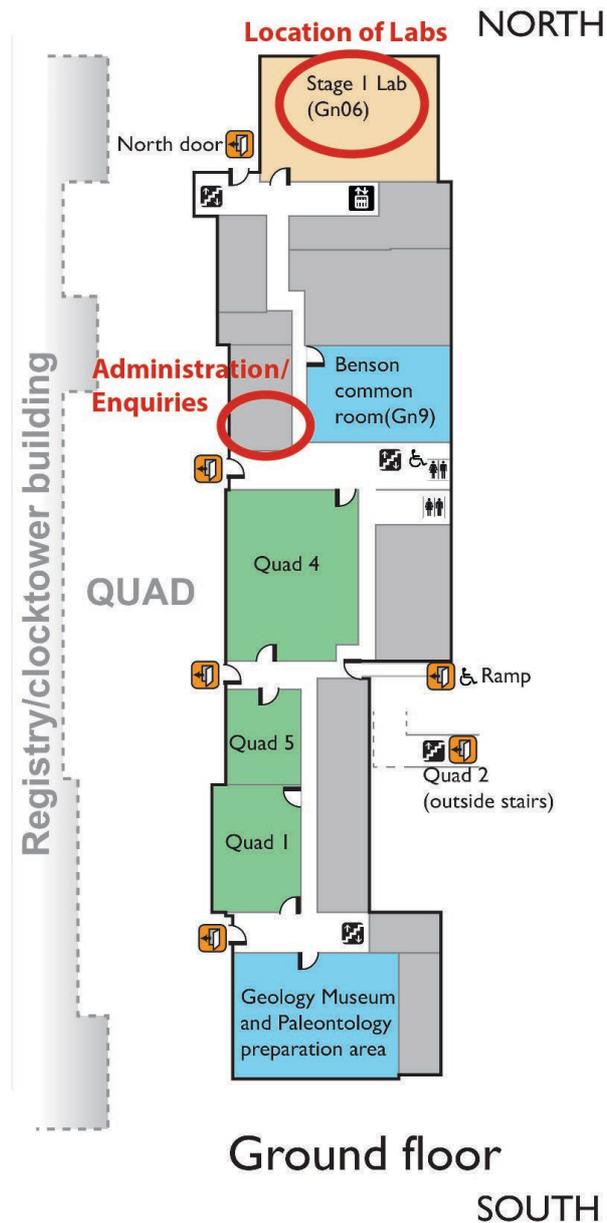
More information about the EAOS111 and other Geology and Marine Science courses is available on the Geology Department and Marine Science Department websites:

Geology: <http://www.otago.ac.nz/Geology/>

Marine Science: <http://www.otago.ac.nz/marinescience/>

### Geology Museum:

Mineral, rock and fossil specimens are on display in the Geology Museum at the south end of the Geology building. The Museum is open to students and the public from 9.00 am - until 5.30 pm during weekdays.



*Map of Geology Building*

**OFFICE HOURS**

Teaching Fellow Sophie Briggs holds regular office hours during which she is available to chat about lecture/lab content, assessments, or the course in general. If you are not available to meet during these times, post your questions to the [EAOS111 Discussion Board](#).

**Sophie Briggs - Room Gn4 or the Stage 1 Lab, Geology Building**

**Wednesday: 11:00-11:50am**

**Thursday: 10:00-10:50am**

## ASSESSMENT

Your final grade for EAOS111 is made up of the following assessments:

Assessment	Content	Format	Date/Time	Location	Weight
<b>Field Trips</b>	Observation and interpretation from the field	Field trip handout and any associated homework	1) North Otago March 11/12 2) Taieri April 1/2 3) Polaris April 17-22	Turn in to Assignment Box	<b>30%</b> (10% each)
<b>Mid-term Exam</b>	Lecture, lab and field trip content (weeks 1-6)	Written, in-person. Answer 5 of 8 short answer questions	50-minute exam during lecture Thursday April 6, 12pm	BURN1	<b>15%</b>
<b>Final Exam</b>	All content	Written, in-person. Answer 18 of 24 short answer questions	Check eVision for date, time & location		<b>55%</b>
<b>TOTAL</b>					<b>100%</b>

**\*Extra Credit Opportunity:** Essential Library Skills Quiz on Blackboard under the Library Resources tab (worth an extra 2% of 'extra credit') due Monday March 20<sup>th</sup> at 11:59pm.

## LABS

**Location:** Labs are held in the Stage 1 Lab (Gn6), at the north end of the Geology Building, ground floor (see map on page iii).

**Time:** You will be assigned to one of 7 lab streams, which meet once per week throughout the semester (see timetable below).

- ➔ For permanent lab stream changes, email Louise at [geology@otago.ac.nz](mailto:geology@otago.ac.nz) with your current stream, student ID number, and the stream you wish to change to.
- ➔ For temporary lab stream changes, email Sophie Briggs [sophie.briggs@otago.ac.nz](mailto:sophie.briggs@otago.ac.nz).

**Lab Manual:** Your EAOS111 lab manual will be distributed in week 1. Write your name on it and keep it up-to-date.

**Missed Labs:** Attendance is expected at all labs where possible, but do not come to campus if you are unwell or have symptoms of sickness.

- ➔ If you miss your lab session but can attend an alternative lab stream in the same week, please do so AND email the instructor to let them know.
- ➔ If you cannot attend a lab in the same week, you should attend one of the periodic catch-up sessions announced on Blackboard. You are also welcome to access lab resources in Stage 1 from 8:30am – 6pm every day (expect during lab times).

### Lab Timetable:

	Monday	Tuesday	Wednesday	Thursday
<b>9 am-12 pm</b>		P2	P4	P6
<b>2-5 pm</b>	P1	P3	P5	P7

## FIELD TRIPS

Applying concepts introduced in lectures and laboratories to field settings is one of the core learning outcomes of EAOS111. The course provides lots of opportunities to get into the field:

- **North Otago field trip, March 11/12:** one-day weekend field trip to explore the geology of North Otago and apply geological principles in the field.
- **Taieri field trip, April 1-2:** one-day weekend field trip to explore the geology and geomorphology of the Taieri River and collect data in the field.
- **Polaris field trip, April 17-22:** a short cruise on the University's research vessel *Polaris II* to learn about marine geology and geophysics in Otago Harbour and around Tairoa Head. Most cruises held during lab time, with additional Saturday trips available.
  - ➔ Online field trip sign-up will open the week before each trip
  - ➔ Participation in all field trips is expected. You will record observations in the field handout and submit it for assessment (each trip is worth 10%). Field trips run - rain or shine.
  - ➔ If you miss a field trip due to sickness you should email Teaching Fellow Sophie Briggs ([sophie.briggs@otago.ac.nz](mailto:sophie.briggs@otago.ac.nz)).

## READINGS

The role of reading (assigned and curiosity driven) outside of timetabled lectures and labs is to gain a broader range of knowledge than is possible in a lecture, and to test your understanding.

The rule of thumb is that you should spend about the same amount of time in private study as you do in lectures. For EAOS111, this equates to about 4-5 hours per week, averaged over 15 weeks.

## TEXTBOOK

***The Blue Planet: An Introduction to Earth System Science 3<sup>rd</sup> Edition*** by Brian J. Skinner & Barbara W. Murck (2011), J. Wiley & Sons Inc.

- ➔ Hard copies available from the University Bookshop
- ➔ ebook version available through the library website (see "How to find the ebook of The Blue Planet" video on Echo360)

## ADDITIONAL READING

***Seismicity of the Earth 1900-2010: Eastern Margin of the Australia Plate***, USGS Poster (2011). <https://pubs.usgs.gov/of/2010/1083/i/>

***A Continent on the Move: New Zealand Geoscience into the 21<sup>st</sup> Century***. Graham, I. 2008 (Chief Editor). Geological Society of New Zealand and GNS Science, Wellington. 388pp. (Science Library)

***Oceanography: an invitation to Marine Science***. Garrison, T. 2007. Brooks & cole, 582 pp. (Science Library)

***Photographic guide to Rocks and Minerals of New Zealand***. Mortimer, N. et al. 2011, GNS Science Publications (Science Library)

## RESOURCES

### Lab Book:

Your EAOS111 lab book is yours to keep. Write your name on it and keep it up-to-date.

### Lecture slides:

Lecturers will upload PDFs of lecture slides to Blackboard either before or immediately after lecture. These will remain available on Blackboard for the entire semester, allowing you to access slides at higher resolution and in colour. **Some of your lecturers will not provide slides for everything, and many draw diagrams on the whiteboard: always bring a pen and paper to class so you can include sketches in your notes.**

### Blackboard:

Blackboard (<https://blackboard.otago.ac.nz/>) will be used extensively for this paper:

- Announcements will be posted on Blackboard and/or sent to your **student email address** via the Blackboard email facility.
- You can easily contact individual instructors via email.
- Internal assessment marks will be uploaded to Blackboard as they are completed during the semester.
- Lecture slides and Otago Capture recordings for most lectures can be downloaded from Blackboard (see Echo360 Recordings tab).
- Additional lab resources are available on Blackboard, including non-graded quizzes to test your understanding.

## POLICIES AND EXPECTATIONS

### Late work policy:

If you are unable to meet an internal assessment deadline (field trip handouts, midterm exam) due to health or personal reasons, you must contact Teaching Fellow Sophie Briggs as soon as possible. Do not come to campus if you are unwell or have symptoms of sickness. Make-up exams will only be provided in cases of illness or other emergencies.

It is recommended that you complete assessments by the due dates provided in order to distribute your workload throughout the semester.

No late penalties will be applied the first time you submit an assessment after the due date. Unless an extension has been granted, each subsequent late submission will incur the following deductions:

1 day late: -10%

2 days late: -20%

3 days late: -40%

4 days late: -50%

5 or more days late : -100%

The late penalty is applied to available marks, not given marks.

### **Academic Integrity:**

Academic integrity means being honest in your studying and assessments. It is the basis for ethical decision-making and behaviour in an academic context. Academic integrity is informed by the values of honesty, trust, responsibility, fairness, respect and courage. Students are expected to be aware of, and act in accordance with, the University's Academic Integrity Policy.

Academic Misconduct, such as plagiarism or cheating, is a breach of Academic Integrity and is taken very seriously by the University. Types of misconduct include plagiarism, copying, unauthorised collaboration, taking unauthorised material into a test or exam, impersonation, and assisting someone else's misconduct. A more extensive list of the types of academic misconduct and associated processes and penalties is available in the University's Student Academic Misconduct Procedures.

It is your responsibility to be aware of and use acceptable academic practices when completing your assessments. To access the information in the Academic Integrity Policy and learn more, please visit the University's Academic Integrity website at [www.otago.ac.nz/study/academicintegrity](http://www.otago.ac.nz/study/academicintegrity) or ask at the Student Learning Centre or Library. If you have any questions, ask your lecturer.

### **STUDY HELP**

The HEDC Student Learning Development (SLD) at Otago has lots of great resources to help you with your studies. If they can't answer your question, they'll know who can! Visit them on the ground floor of the Information Services Building (central library building) in the southwest corner (near where you pick up your student ID card), or browse their offerings online at <https://www.otago.ac.nz/hedc/students/index.html>.

In addition:

- If you live in a hall of residence, inquire with your RA or Master to see if your college offers a tutorial for GEOL112.
- If you do not live in a hall of residence, you may be eligible to participate in the SLC's EAOS111 Peer Assisted Study Sessions (PASS). Learn more about PASS at <https://www.otago.ac.nz/hedc/students/pass/index.html>

New to Otago? If so, the University has heaps of resources just for you. Check them out at <https://www.otago.ac.nz/first-year-students/study/>

## STUDENT SUPPORT

### Disabilities and Impairments:

If you have an existing disability or get injured, sick or experience other forms of impairments during the semester, please let us know and take advantage of the support services you've already paid for in your course fees. **Contact either:**

*Professor Mark Stirling*  
*Room 1s12, first floor, Geology*  
*Department*  
*phone 470-3539*  
*email: [mark.stirling@otago.ac.nz](mailto:mark.stirling@otago.ac.nz)*

OR *Disability Information and Support*  
*Phone: 479 8235*  
*Email: [disabilities@otago.ac.nz](mailto:disabilities@otago.ac.nz)*  
*Website: <http://www.otago.ac.nz/disabilities>*

### Kaiāwhina:

The role of Kaiawhina is to support Māori students in Geology to achieve and guide towards extra academic, pastoral or other support. **Contact:**

*Sophie Briggs*  
*Geology Department Kaiāwhina*  
*Room Gn04, Ground floor, Geology*  
*Department*  
*Phone: 479-7567*  
*email: [sophie.briggs@otago.ac.nz](mailto:sophie.briggs@otago.ac.nz)*

### Pacific Island Student Liaisons:

The Pacific Island Student Liaisons help Pacific Island students in Geology find extra academic, pastoral or other support. **Contact:**

*Sonya Xavier*  
*Pacific Islands Student Support Facilitator (part-time)*  
*3rd Floor, Science Library*  
*Science III Building*  
*730 Cumberland Street*  
*Dunedin*  
*Tel +64 3 244 8489*  
*Email [divscipi@otago.ac.nz](mailto:divscipi@otago.ac.nz)*  
*Office hours: Mon–Fri 8:30am to 5:00pm*

### Queer\* Support

The University of Otago is dedicated to being the most inclusive campus in New Zealand, including a Queer\* Friendly Staff Network and support through OUSA. **Contact OUSA:**

[kelli-anne@ousa.org.nz](mailto:kelli-anne@ousa.org.nz)

[sage@ousa.org.nz](mailto:sage@ousa.org.nz)

## 2023 schedule EAOS111 Earth and Ocean Science

WEEK	MONDAY 12 - 12:50 pm	TUESDAY 12 - 12:50 pm	THURSDAY 12 - 12:50 pm	FRIDAY 12 - 12:50 pm	M, Tu, W, Th LAB	SAT / SUN FIELD TRIP
1 27-Feb 3-Mar	EAOS 111: Your place on planet Earth CRR	The Earth system S&M: Ch 1 CRR watch "Men of Rock: Deep Time" on YouTube	The journey to modern geology S&M: CH 7 CRR	Deep time S&M: pp 101-105 CRR	Lab 1 Your Place on Planet Earth	
2 6-Mar 10-Mar	Origin of the Universe, our solar system S&M: pp 81-90, 94-100 CO	The chaotic solar system and our planet friends S&M: pp 85-92 CO	Gravity and Earth S&M: pp 40-42 CO	Earths magnetic field S&M: pp 116-120 CO	Lab 2 Deep Time and the Geologic	North Otago field trip
3 13-Mar 17-Mar	Continental Drift S&M: pp 111-115 SB	Plate Boundaries S&M: pp 23-26, 116-125 SB	What Lies Beneath S&M: pp 61-63, 125-131 SB	New Zealand's plate boundary S&M: pp 143-183 SB	Lab 3 Plate Tectonics	
4 20-Mar 24-Mar	The Shakey Isles S&M: pp 144-158 JW	Our Hot Volcanoes S&M: pp 161-176 RB	Weathering S&M: pp 146-150 CEM Class Reps meeting 1 pm	Weathering and soils II S&M: pp 74-75, 186-187, 467-472 CEM	Lab 4 NZ's Plate Boundary and Seismology	
5 27-Mar 31-Mar	Global biogeochemical cycles S&M: pp 450-470 CEM	Global biogeochemical cycles II CEM	Hydrologic cycle S&M: pp 228-238 CO	Fluvial systems S&M: pp 238-241 CO	Lab 5 Discovering Zealandia	Taieri field trip
6 3-Apr 7-Apr	Landforms Deltas S&M: pp 212-215, 234 - 238 CO	Field methods in marine geology and geophysics ARG	Midterm Exam	<b>HOLIDAY</b>	Lab 6 Fluvial Processes	

**MID-SEMESTER BREAK 7 - 16 April**

WEEK	MONDAY 12 - 12:50 pm	TUESDAY 12 - 12:50 pm	THURSDAY 12 - 12:50 pm	FRIDAY 12 - 12:50 pm	M, Tu, W, Th LAB	SAT / SUN FIELD TRIP
7 17-Apr 21-Apr	Marine sediment classification and transport S&M: pp 293-294, 302-	Marine sedimentation distribution CRR	Glaciers and ice sheets S&M: pp 258-276 CRR	Ice in the Earth system S&M: pp 275-284 CRR	Marine Geology & Oceanography I (Polaris cruise)	Marine Geology & Oceanography I (Polaris cruise)
8 24-April 28-April	No Lecture	ANZAC day	Water S&M: pp 10-16; Ch 8 AS	Seawater S&M: pp 287-293 AS	No lab	
9 1-May 5-May	Marine Carbon and Ocean Acidification S&M: Ch 10 CL	Marine Nutrients S&M: Ch 10 CL	Dissolved Gases in the Ocean S&M: Ch 10 CL <b>Class reps meeting 1 pm</b>	Iron, Carbon and Climate CL	Lab 8 Marine Geology & Oceanography II	
10 8-May 12-May	Light and Sound in the Sea S&M: Ch 10 AS	Presenting Marine Data AS	Atmosphere Circulation I S&M: Ch 11 RS	Atmospheric Circulation II S&M: Ch 11 RS	Lab 9 Seafloor Sediments	
11 15-May 19-May	Wind-drive Ocen Currents I RS	Wind-drive Ocen Currents II RS	El Nino-Southern Oscillation (ENSO) S&M: Ch 10 RS	Thermohaline Circulation S&M: Ch 10 RS	Lab 10 pH & Ocean Acidification, Stratified Ocean	
12 22-May 26-Jun	Waves RS S&M: Ch 10	Tides S&M: Ch 10 RS	Paleoceanography - linking the past to the present S&M: Ch 17 & 18	Paleoceanography - linking the past to the present II S&M: Ch 19 CRR	Lab 11 Tsunami Simulation & Prediction	
13 29-May 2-Jun	Humans shaping the earth; Earth shaping humanity CRR S&M: Ch 17 & 18	The Anthropocene debate: Are humans responsible for a new geologic epoch? S&M: Ch 19	Exam Q and A - Last Day of lectures	NO Lecture	No lab	
<b>EXAMINATIONS 7-21 June</b>						

**STAFF:**

CO	Dr Christian Ohneiser(co-ordinator, christian.ohneiser@otago.ac.nz)	JW	Dr Jack Williams
SB	Dr Sophie Briggs (teaching fellow, sophie.briggs@otago.ac.nz)	RB	Rachael Baxter
ARG	Assoc Prof Andrew Gorman	CRR	Dr Christina Riesselman
CL	Dr Cliff Law	AS	Prof Abby Smith
CEM	Dr Candace Martin	RS	Dr Robert Smith

**TEXTBOOK (recommended):**

S&M: The Blue Planet: An Introduction to Earth System Science, Brian Skinner & Barbara Murck, 3rd ed. (2011). There are a limited number of copies available on reserve and online ([https://ebookcentral-proquest-com.ezproxy.otago.ac.nz/lib/otago/detail.action?docID=4868967#goto\\_toc](https://ebookcentral-proquest-com.ezproxy.otago.ac.nz/lib/otago/detail.action?docID=4868967#goto_toc)) at Science Library.

**FIELD TRIPS:**

Field trips are an essential learning activity in EAOS111. Attendance is mandatory. Field trips run - rain or shine - usually on Saturday or Sunday (refer to schedule above).

**ASSESSMENT:**

The final mark for EAOS111 is made up of the following:

Fieldtrip assessments (3 x 10%)	30%
Class Exam (50 mins, 6-Apr)	15%
Final exam (TBA)	55%
	<hr/>
	100%