# GEOS7710

## Palaeoenvironments and Biogeochemistry

Session 2, Weekday attendance, North Ryde 2021

*Archive (Pre-2022) - Department of Earth and Environmental Sciences*

## Contents





**Session 2 Learning and Teaching Update**

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

# General Information

Unit convenor and teaching staff
Convenor
Stefan Loehr
stefan.loehr@mq.edu.au

Lecturer
Simon George
simon.george@mq.edu.au

Credit points
10

Prerequisites
Admission to MRes

Corequisites

Co-badged status
8810

Unit description
This optional unit provides masters students with the foundations of palaeoenvironmental analysis as applied to some key geoscience problems. The unit will have a problem-based approach that focuses on understanding important processes from the Neoproterozoic, Cretaceous and the modern day. We will introduce the fundamentals of ocean circulation, nutrient supply and the carbon cycle. Students will assess the veracity of biogeochemical oceanographic signals, especially with respect to diagenetic overprinting. Box models will be introduced as a means for understanding geochemical and isotopic signals. The unit will cover co-evolution of life and its environment, the effect of bioturbation on sediments, especially across the Precambrian-Cambrian boundary, and the geochemical record of life as expressed through biomarkers. The unit will build knowledge about important techniques and methods such as stable and radiogenic isotopes, organic geochemistry and microscopic techniques for assessing sediments and sedimentary rocks. Assignments will build skills in practical and industry applications of this area, including in the energy industry. This unit is suitable for students outside of Earth and Environmental Sciences, particularly those developing research skills in Chemistry and Biomolecular Sciences.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

# Learning Outcomes

On successful completion of this unit, you will be able to:

**ULO1:** Demonstrate an advanced knowledge of the principles and concepts of biogeochemistry, basic modelling and element cycles

**ULO2:** Select and critically evaluate appropriate proxies to obtain information on past environments

**ULO3:** Demonstrate a knowledge of ocean state over geological time, and the impact of life on element cycles

**ULO4:** Apply an advanced knowledge of the principles and concepts of organic geochemistry for solving biogeochemical and palaeoenvironmental problems.

**ULO5:** Communicate the principles of biogeochemistry and palaeo-environments to a wider audience through masters level writing and oral presentation

# General Assessment Information

**Assignments in GEOS7710**

Assignments will be distributed in iLearn and discussed in class.

The 4 "last 15" assessments will be distributed and discussed in class.

Assessment at Macquarie University is standards-based, as outlined in the Assessment Policy. This means that your work will be assessed against clear criteria, and these criteria (e.g. in a rubric) will be made available when the assessment tasks are released to you on iLearn.

There are two assignments (see unit guide for titles and timing). The assignments will be released to you electronically (not in hard copy) on iLearn on the date shown and will be discussed during the next workshop. The assignments are heavily essay based, so skill at writing essays is important. Each assignment topic must be fully researched and the essay written in your own words. Cutting and pasting information from web pages is NOT acceptable. Information you obtain from other sources (brief quotes, images, ideas) must be fully referenced in the text (author, year), with references listed at the end of the essay (year, author, title, journal or link). See later in the handout for sections on **academic honesty** and **referencing**. Students who fail in these fundamental principles and basic skills may score zero for assignments.

Both assignments are to be submitted using **Turnitin**. Macquarie University promotes student awareness of information management and information ethics. As well as training and the provision of general information, the University tackles the issue of plagiarism through use of an online plagiarism detection tool (Turnitin). This software is used in conjunction with a set of procedures to ensure its use is equitable. You will need to submit the text of both assignments for GEOS7710 to Turnitin via the iLearn page.

The two major assignments will be due by **17:00 on Mondays**, by which time the assignment must be uploaded to **turnitin**.

Turnitin automatically compares your work to the work of your classmates, previous students from Macquarie and other universities, and with material available on the Internet, both freely available and in subscription-based electronic journals and books. The results will be sent only to your unit convenor and tutors, who will analyse these in reference to the University's standard Policy on Plagiarism.

**Turnitin procedure for the two assignments**

1. Two Turnitin links will be placed under “Assignments” on the iLearn page for GEOS7710. There are also links in the “Activities” box on the right hand side of the iLearn page.

2. For each assignment when it is due, click the corresponding link, then click “Submit Paper”.

3. Select submission type for your assignment as file upload. You then upload the file. We advise you to first convert the file into .pdf (but not as scanned .pdf), as formatting of diagrams and captions quite commonly change in word files during conversion on the iLearn system. Select your name, and write or paste in the assignment title.

4. Note: graphics are not checked and can be left in uploaded files. The reference list (bibliography) is also not checked. The unit convenor will see your plagiarism %, but this will not be available to you.

5. Resubmissions are set to not be allowed, so please make sure you submit the final version. The system is also set to not display to students the assignment’s originality rating.

6. You should always check that you have uploaded the correct file. If you have a problem, please email the Unit Convenor and ask for a resubmission. You must also keep a copy of your assessments until the end of semester in case there is a problem with your submission. It is your responsibility to ensure that you can provide a copy of your assessment if requested.

For help or more detailed instructions on turnitin:

http://turnitin.com/en_us/support/help-center

We will endeavour to return marked assignments to you within 14 days of submission. If at any time you have reason to query an assignment mark, please contact Stefan Loehr by phone or email to arrange a meeting.

**Illness and extensions**

If you want consideration for illness when submitting any assignments, you MUST submit a complete a Special Consideration form.

If you want to apply for an extension, you must **EMAIL Dr. Stefan Loehr BEFORE THE DUE DATE** of the assignment and state the reason you are seeking an extension. This will not be granted automatically, but will be considered on a case-by-case basis. You will be notified by return email as to when you will need to submit your assignment. Attach a copy of the email to the assignment and tick on the cover sheet that the extension has been granted. LATE PENALTIES (loss of marks) will apply for work that is late where no extension has been granted: it is a 5% per day penalty for late work (i.e. 1/20 of the marks allocated to the exercise will be

deducted for each day that the work is late).

### Academic honesty

Using ideas, images and small quantities of text (quotes) from other sources (books, web pages, other students or elsewhere) is allowable, but must be fully referenced as described below. Using excessively large amounts of text from other sources, even if properly referenced, should be avoided. You don't get marks for copying and pasting, you get marks for thinking about what you read, understanding it and being able to explain your understanding in your own words. Simply rearranging the key phrases from someone else's text is not the same thing as writing in your own words. Using material from other sources (including text, images or ideas) without full referencing is plagiarism. Some students in the last few years on similar units to this one have been given zero marks for assignments and have been automatically failed because of plagiarism, especially caused by purchase of assignments from various web sites.

The following is a link to the University's Academic Honesty Policy. You are required to read this policy at the start of this session. https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/academic-honesty

The University defines plagiarism in its rules: "Using the work or ideas of another person, whether intentionally or not, and presenting this as your own without clear acknowledgement of the source of the work or ideas". Plagiarism is a serious breach of the University's rules and carries significant penalties. The policy explains what plagiarism is, how to avoid it, the procedures that will be taken in cases of suspected plagiarism, and the penalties if you are found guilty. Penalties may include a deduction of marks, failure in the unit, and/or referral to the Faculty or University Discipline Committee. GEOS7710 uses turnitin to help monitor plagiarism.

### Referencing

It is important that you understand how to correctly reference the information you do use, as often you will want to legitimately quote material or ideas from other sources. Information obtained from any source, including the Internet, is covered by copyright law. You must acknowledge any source that you refer to in your assignment, both within the text of your assignment, and at the end of it (by including a list of references). Referencing your sources also enables the reader to view your sources and follow your essay. Academic conventions and copyright law require that you acknowledge when you use the ideas of others. In most cases, this means stating which book, journal article and website is the source of an idea or quotation.

There are two aspects to learn: in-text references and a list of references cited. Please note that for the GEOS7710 assignments, we insist that you reference using in-text references, with a reference list at the end (i.e. **not** with footnotes). This is a common way to do it in many areas of science (but not all!), and it reminds you and indicates to the reader what the source is and how old it is. For GEOS7710, please use the APA Style of referencing. There is much information on in-text references and referencing of print and non-print sources available at: APA Style of referencing (7th edition) (see quick reference guide).

*How to cite references within the text of an assignment:*

These are also called in-text references. When you use another's ideas you should immediately acknowledge your sources. Always give the surname of the author and the date of publication. Use the author-date method of citation for quotations and paraphrasing. Note spelling of *et al.* (used when 3 or more authors). Note that the in-text refs don't have author initials.

**Direct quote:** Brown *et al.* (1990, p. 12) conclude that 'the depth to the Moho under the oceans is less than under the continents'. Note that for a direct quote the page must be cited.

**General acknowledgement of the source of information:** "As explained by George and Osborne (2010), biomarkers in fluid inclusions….."

**More specific reference but not a direct quote:** "The distribution of Martian volcanism in the highlands (Johnson, 2011) can be used to infer… etc."

**More general reference to sources:** "Most older textbooks in geology (e.g. Peters *et al.*, 1941; Stamp 1938) either ignored the deep ocean basin deposition or……"

**Website in text: "**Details about PhD scholarships are available from the Macquarie University web site <http://www.hdr.mq.edu.au/>."

*How to create a list of references:*

At the end of your assignment, create a list of the references you have cited in the text. Arrange this in alphabetical order of author's surnames. The author's surname is placed first, followed by initials or first name, then other authors the same way, and then the year of publication is given. Where an item doesn't have an author, arrange it by its title.

Then the reference needs the paper or book title, journal (if it is a journal article), publisher (if it is a book) or URL and date accessed (if it is a web page). The format should follow the Harvard style as described in these links: it is a good guide, and your references should contain the same information.

Please be very careful (a) to put in the reference list every citation from the text (including web sites) and any figure/table captions, and (b) to not put in the list references that you have not cited in the text or figure/table captions.

**Reference examples: journal**

George, S.C., Volk, H., Dutkiewicz, A., Ridley, J. and Buick, R. (2008) Preservation of hydrocarbons and biomarkers in oil trapped inside fluid inclusions for >2 billion years. *Geochimica Cosmochimica Acta* **72**, 844-870.

French, K.L., Hallmann, C., Hope, J.M., Schoon, P.L., Zumberge, J.A., Hoshino, Y., Peters, C.A., George, S.C., Love, G.D., Brocks, J.J., Buick, R., Summons, R.E. (2015) Reappraisal of hydrocarbon biomarkers in Archean rocks. *Proceedings of the National Academy of Sciences USA* **112**, 5915–5710.

**Reference example: book**

Peters, K. E., Walters, C. C. and Moldowan, J. M. (2005) The Biomarker Guide, 2nd Edition. Cambridge University Press, Cambridge, 1155 pp.

**Reference example: chapters in edited books**

George, S.C., Volk, H., Dutkiewicz, A., 2012. Mass spectrometry techniques for analysis of oil and gas trapped in fluid inclusions. In: *Handbook of Mass Spectrometry* (Edited by Lee, M.S.), Wiley, pp. 647-673.

**Reference example (web site, author and date known):**

Wright, S. 2004, *Open area test site (OATS) development*, undergraduate project, University of Southern Queensland, Toowoomba, viewed 27 March 2011, <http://eprints.usq.edu.au/archive/00000047>.

**Reference example (web site, author and date not known):**

Macquarie University, NSW, viewed 12 January 2012, <http://www.hdr.mq.edu.au/>

# Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|---|---|---|
| Research report | 30% | No | Week 5 |
| Paper review | 30% | No | Week 8 |
| Oral presentation | 20% | No | Week 13 |
| Workshop questions | 20% | No | Various |

## Research report

Assessment Type [1]: Report
Indicative Time on Task [2]: 30 hours
Due: **Week 5**
Weighting: **30%**

Research report on a palaeoenvironment or biogeochemistry topic

On successful completion you will be able to:

- Demonstrate an advanced knowledge of the principles and concepts of biogeochemistry, basic modelling and element cycles
- Select and critically evaluate appropriate proxies to obtain information on past environments
- Demonstrate a knowledge of ocean state over geological time, and the impact of life on element cycles

- Apply an advanced knowledge of the principles and concepts of organic geochemistry for solving biogeochemical and palaeoenvironmental problems.
- Communicate the principles of biogeochemistry and palaeo-environments to a wider audience through masters level writing and oral presentation

## Paper review

Assessment Type [1]: Literature review
Indicative Time on Task [2]: 30 hours
Due: **Week 8**
Weighting: **30%**

Paper review on understanding past Earth events

On successful completion you will be able to:

- Demonstrate an advanced knowledge of the principles and concepts of biogeochemistry, basic modelling and element cycles
- Communicate the principles of biogeochemistry and palaeo-environments to a wider audience through masters level writing and oral presentation

## Oral presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 20 hours
Due: **Week 13**
Weighting: **20%**

Oral Presentations by everyone in the unit on individually allocated topics

On successful completion you will be able to:

- Demonstrate an advanced knowledge of the principles and concepts of biogeochemistry, basic modelling and element cycles
- Select and critically evaluate appropriate proxies to obtain information on past environments
- Demonstrate a knowledge of ocean state over geological time, and the impact of life on element cycles
- Apply an advanced knowledge of the principles and concepts of organic geochemistry

for solving biogeochemical and palaeoenvironmental problems.
- Communicate the principles of biogeochemistry and palaeo-environments to a wider audience through masters level writing and oral presentation

## Workshop questions

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 15 hours
Due: **Various**
Weighting: **20%**

Short tests on four of the workshops, to be done in the student's own time

On successful completion you will be able to:

- Demonstrate an advanced knowledge of the principles and concepts of biogeochemistry, basic modelling and element cycles
- Select and critically evaluate appropriate proxies to obtain information on past environments

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

# Delivery and Resources

DELIVERY AND RESOURCES, GEOS7710

Unit iLearn

This unit has an iLearn page that can be accessed through ilearn.mq.edu.au. It contains important information and other materials relating to the unit, including details and links for assessments.

Communication

The unit iLearn is the primary way that we communicate with you. Please check it regularly for announcements and posts. You are encouraged to use the Discussion Board on iLearn to post questions and generate discussion with other students. Please only email the convenor with

private matters – all other questions should be posted on iLearn.

## Unit Organisation

This unit is delivered in weekly workshops. The organisation of these is outlined in a detailed unit schedule which is available on iLearn.

## Workload

The expected workload for this 10-credit point unit is 150 hours of activity, comprising 26 hours of workshops, 95 hours on assessments, and 29 hours of review of workshops and weekly readings.

Requirements to complete this unit satisfactorily

To complete this unit satisfactorily, you must:

1. Participate in all scheduled classes;

2. Complete all assessments; and

3. Achieve a pass grade or higher.

The descriptions for grades common to all coursework units offered by Macquarie University are outlined in Schedule 1 of the Assessment Policy.

## Recommended Texts and/or Materials

These will be notified weekly on iLearn

## Technology Used and Required

This unit will use iLearn and Echo360. See the Instructions on how to log in to iLearn and the iLearn quick guides for students which will help you:

- Getting started - Find out how to navigate and familiarise yourself with the iLearn environment
- Activities - Learn how to effectively complete the activities required of you in iLearn
- Assignments and Gradebook - Find out how to submit assessments and view your grades using iLearn
- Online study tips - Studying online is a unique experience, learn how to navigate it here
- Discussion forums - Explore the different types, and features of discussion forums in iLearn
- Lecture recordings - Find out how to access lectures online, as well as the features available to you

# Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

## Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

# Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

## Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise

- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

## Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

## IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.