



GEOS7900

Research Frontiers: Advances in Earth and Environmental Sciences

Session 1, Fully online/virtual 2021

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

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Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff

Simon Turner

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Contact via 98508363

Room 215, Level 2, 10 Sir Christopher Ondaatje Avenue

Credit points

10

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Unit description

This foundation unit deeply engages students with the broad topics, big questions, strategies, new directions of scientific thought and break-through methods currently dominating research in Earth and Environmental Sciences. Activities undertaken include tailored workshops and presentations by research groups and academics, seminar attendance, directed reading of research papers, and discussion and critiquing of wide-ranging research topics and trends. Students demonstrate their understanding of current research and develop their science communication skills through presentation of a seminar and written reports based on the research frontiers explored.

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 understanding of current scientific issues in earth and environmental sciences

ULO2: critically evaluate current scientific methodologies and organizations in this research field

ULO3: competently access, use and synthesize relevant scientific information

ULO4: present ideas and concepts clearly with supporting evidence

General Assessment Information

ASSIGNMENTS/ RESEARCH PAPER

The assignments will consist of a paper, which results from your reading on individually selected topics, related to the weekly discussions. The first short assignment will consist solely of a synopsis of two presented research papers, presented in the form of a *Nature News and Views* article. The second, larger, paper is an in-depth analysis of one of the discussion topics. The paper you submit should be in the form of a paper for submission to the journal; *Journal of Geophysical Research*. It should be typed, double spaced, and about 3000 words in length and adequately illustrated with appropriate figures.

Two seminars will be given during the course of unit, each on one paper up for discussion in a given week. The format should be as per a conference presentation. The seminars will be assessed, as is student participation in the critical discussion of each paper.

The minimum requirements needed to obtain a pass grade for the unit are a passing grade in all of the assignments.

EXTENSIONS AND PENALTIES

Whenever possible requests for an extension should be submitted prior to an assignment's due date. Late assignments will attract a penalty of 10% per day.

ACADEMIC HONESTY AND PLAGIARISM

Plagiarism involves using the work of another person and presenting it as one's own. If you use the work of another person without clearly stating or acknowledging the source, you are falsely claiming that material as your own work and committing an act of PLAGIARISM. This is a very serious violation of good practice and an offence for which you will be penalised. You should read the University's policies and procedures on plagiarism. These can be found at: http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

The policies and procedures explain what plagiarism is, how to avoid it, the procedures 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 University Discipline Committee.

Assessment Tasks

Name	Weighting	Hurdle	Due
News and Views style article	20%	No	Week 7
unit participation	10%	No	N/A
paper discussion	30%	No	N/A

Name	Weighting	Hurdle	Due
scientific letter	40%	No	Week 11

News and Views style article

Assessment Type ¹: Essay

Indicative Time on Task ²: 10 hours

Due: **Week 7**

Weighting: **20%**

a short synopsis of two presented research papers

On successful completion you will be able to:

- demonstrate an understanding of current scientific issues in earth and environmental sciences
- critically evaluate current scientific methodologies and organizations in this research field
- competently access, use and synthesize relevant scientific information
- present ideas and concepts clearly with supporting evidence

unit participation

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 30 hours

Due: **N/A**

Weighting: **10%**

engagement with discussions, peer assessment and seminar attendance

On successful completion you will be able to:

- competently access, use and synthesize relevant scientific information
- present ideas and concepts clearly with supporting evidence

paper discussion

Assessment Type ¹: Presentation

Indicative Time on Task ²: 20 hours

Due: **N/A**

Weighting: **30%**

two seminars will be given during the course of unit in the format of a conference presentation

On successful completion you will be able to:

- demonstrate an understanding of current scientific issues in earth and environmental

sciences

- critically evaluate current scientific methodologies and organizations in this research field
- competently access, use and synthesize relevant scientific information
- present ideas and concepts clearly with supporting evidence

scientific letter

Assessment Type ¹: Report

Indicative Time on Task ²: 30 hours

Due: **Week 11**

Weighting: **40%**

in-depth analysis of one of the discussion topics in the form of a paper for submission to a journal

On successful completion you will be able to:

- demonstrate an understanding of current scientific issues in earth and environmental sciences
- critically evaluate current scientific methodologies and organizations in this research field
- competently access, use and synthesize relevant scientific information
- present ideas and concepts clearly with supporting evidence

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

INTRODUCTION

This unit is a seminar-style unit, where students will present on some of the seminal papers in Geodynamics, Earth Science and Environmental Science.

The proposed schedule of topics covered are listed in the table below along with the staff member who will oversee the presentations and discussion.

Students will be required to make one critical presentations on two of the seminal papers on these topics, and read all papers and contribute to a critical discussion. Students will also write one short report, and one detailed report, on one topic of their choosing. Students are also expected to attend all departmental seminars.

PROPOSED SCHEDULE OF SEMINAR TOPICS 2021

Week	Topic
Week 1	Introduction Crafting a seminar. Topic selection.(Simon Turner)
Week 2	The Plate tectonic revolution (Simon Turner)
Week 3	The forces behind plate tectonics (Juan-Carlos Afonso)
Week 4	Biodiversity monitoring with remote sensing and GIS (Andrew Skidmore)
Week 5	Nature of the planetary cores and D" (Tracy Rushmer)
Week 6	The origin of life (Simon George)
Week 7	Evolution of man (Kira Westaway)
Week 8	Sea level rise, coastal wetlands and blue carbon (Neil Saintilan)
Week 9	Climate change (Paul Hesse)
Week 10	Environmental impact (Mark Taylor)
Week 11	Setting boundaries for a habitable planet (Steve Foley)
Week 12	Geophysics of sub-volcanic plumbing systems (Steve Hansen)
Week 13	Free week

SCHEDULED CLASSES

The seminar classes are 2 hours per week, online. This year, classes have been scheduled for Mondays 3-5 pm. Please check the university timetable (<https://timetables.mq.edu.au/2021/>) and unit iLearn page in case of last minute changes.

GRADUATE CAPABILITIES

Students will enter a globalizing world of major environmental change and resource constraints, of scientific and technological advance and ethical challenge, of continuing political instability and possible international conflicts, of unlimited creativity and increasing social surveillance. To prepare students for life after university, various graduate capabilities are developed through the curriculum. These capabilities are described below.

No.	Capability	Brief Description
1	<i>Discipline Specific Knowledge and Skills</i>	Graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession.
2	<i>Critical, Analytical and Integrative Thinking</i>	Graduates are to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments.
3	<i>Problem Solving and Research Capability</i>	Graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge.
4	<i>Creative and Innovative</i>	Graduates will be capable of creative thinking and of creating knowledge.
5	<i>Effective Communication</i>	Students develop the ability to communicate and convey their views in forms effective with different audiences.
6	<i>Engaged and Ethical Local and Global citizens</i>	Graduates will have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy.
7	<i>Socially and Environmentally Active and Responsible</i>	Graduates to be aware of and have respect for self and others.
8	<i>Capable of Professional and Personal Judgement and Initiative</i>	Graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement.
9	<i>Commitment to Continuous Learning</i>	Graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake.

TEXTBOOK AND TECHNOLOGY USED

There is no set textbook for this unit, but a number of reference texts worth considering are:

- QE509.4.D38/1999 Davies G.F., Dynamic Earth, Plates, Plumes and Mantle Convection, 1999
- QC806.F625 Fowler C.M.R., The Solid Earth, 1990
- QE501.T83 Turcotte D.L. & Schubert G., Geodynamics, 1982
- QE509.4 .S38
and Planets, Schubert G., Turcotte D.L., Olson, P., Mantle Convection in the Earth
2001

ILEARN

The unit has an iLearn site, which contains information such as the papers to be discussed in class.

Please note that some sections within the iLearn site require an internal username and password; the username is **geos700** and please see, or call me to obtain the password. Information for students about access to online units is available at

<https://learn.mq.edu.au/webct/RelativeResourceManager/25994001/Public%20Files/uw/software.html>

Below is a list of references that may be helpful in expanding certain aspects of the unit.

REFERENCES

- QC806.A515 Anderson D.L., Theory of the Earth, 1989
- QE501.A7513/1984 Artyushkov E.V., Geodynamics
- QB501.N47 Beatty J.K. & Chaikin A. (Eds), The New Solar System (3rd ed.), 1990
- QE509.B75 Bott M.P., The interior of the Earth (2nd ed.), 1982
- QE501.4.P35.B88 Butler R.F., Paleomagnetism, 1991
- QE527.7 .C66/2001 Candie K.C., Mantle Plumes and their record in Earth History, 2001
- QC806.C65 Cook A.H., Physics of the Earth and Planets, 1973
- QE511.4.C683/1986 Cox A. & Hart R.B., Plate tectonics: how it works, 1986
- QC806.D39 De Bremaecker J-C, Geophysics: The earth's Interior, 1985
- QB501.N18 Dermott S.F. (Ed), The origin of the Solar System, 1977
- QE501.E67/1990 Ernst W.G., The Dynamic Planet
- QC827.I7 Irving E., Paleomagnetism, 1964
- QE509.E234/1998 Jackson I, The Earth's Mantle, 1998
- QE509.J27/1992 Jacobs J.A. Deep Interior of the Earth, 1992
- QE509.E232/2000 Karato S. et al, Earth's Deep Interior, 2000
- QE511.4.K43/1996 Kearey P. & Vine F.J., Global Tectonics (2nd Ed), 1996
- QE35.E18 McElhinny M.W., The Earth, its Origin, Structure and Evolution, 1979
- QE501.4.P35.M35/2000 McElhinny M.W. & McFadden, Paleomagnetism: continents and oceans, 2000
- QC816.M4 Merrill R.T. & McElhinny M.W., The Earth's Magnetic Field, 1983

QC816.M47/1996	Merrill R.T., McElhinny M.W. & McFadden P.L. The magnetic field of the Earth: palaeomagnetism, the core, and the deep mantle, 1996
QE511.4.H57/2000	Richards et al, The History and Dynamics of Global Plate Motions, 2000
QE501.S3/1982	Scheidegger A.E., Principles of Geodynamics
QC806.S54/1997	Sleep N.H. & Fujita K., Principles of Geophysics, 1997
QE26.2.C35	Smith D.G. (Ed), The Cambridge Encyclopaedia of Earth Sciences
QC806.S65	Stacey F.D., Physics of the Earth (2nd & 3rd eds.), 1977 & 1992
QE511.44.G46	Summerfield M.A., Geomorphology and Global Tectonics, 2000
QE340.B55	Veevers J. J., Billion-year earth history of Australia and neighbours in Gondwanaland, 2000
QE340.B552	Veevers J.J., ATLAS of Billion-year earth history of Australia and neighbours in Gondwanaland, 2001

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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 \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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.