



GEOS8812

Advanced Geochemical Applications and Techniques

Session 1, Weekday attendance, North Ryde 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

Olivier Alard

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Credit points

10

Prerequisites

Permission by special approval

Corequisites

Co-badged status

GEOS7712

Unit description

This unit describes and explores the underpinnings of the tools employed in geochronology and inorganic geochemistry in order to unravel the timing and duration of geological phenomena. Primarily (but not only) focused on high temperature geochemistry, this course will employ applications spanning from diffusion modelling in magma chambers, through zircon geochronology to model ages in addition to tracing the passage of materials through the solid Earth. A background in the analytical techniques used to attain such data is also included. Negotiation between staff and students develops a number of case studies to allow students to acquire practical skills applicable to a wide range of research areas. Case studies may include: (i) understanding trace element partitioning and behaviour, (ii) investigating the effect of volatiles on the physics and chemistry of rock properties and melt, (iii) modelling the mineralogy of planetary interiors and (iv) geothermobarometry. 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 understanding of the advanced principles and techniques of modern geochemistry, to gain insights and perspectives on Earth evolution.

ULO2: Select an appropriate technique and/or set up an analytical protocol to solve a given petrological or geological problem/questions.

ULO3: Demonstrate a detailed understanding of analytical techniques to evaluate the quality of geochemical results.

ULO4: Communicate scientific information and concepts through oral, visual and written formats.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Unsolved case in geochemistry</u>	40%	No	Week5
<u>Assessing analytical techniques</u>	20%	No	Week10
<u>Class Participation</u>	15%	No	Week 13
<u>Geochemistry throughout the Periodic table</u>	25%	No	Week 13

Unsolved case in geochemistry

Assessment Type ¹: Presentation

Indicative Time on Task ²: 50 hours

Due: **Week5**

Weighting: **40%**

Oral presentation (15 min) on debated topics and issues in geochemistry. Assessing the pros and cons of opposed interpretations of the same data.

On successful completion you will be able to:

- Demonstrate an understanding of the advanced principles and techniques of modern geochemistry, to gain insights and perspectives on Earth evolution.
- Select an appropriate technique and/or set up an analytical protocol to solve a given petrological or geological problem/questions.
- Demonstrate a detailed understanding of analytical techniques to evaluate the quality of geochemical results.
- Communicate scientific information and concepts through oral, visual and written formats.

Assessing analytical techniques

Assessment Type ¹: Problem set

Indicative Time on Task ²: 20 hours

Due: **Week10**

Weighting: **20%**

Assessing analytical techniques

On successful completion you will be able to:

- Select an appropriate technique and/or set up an analytical protocol to solve a given petrological or geological problem/questions.
- Communicate scientific information and concepts through oral, visual and written formats.

Class Participation

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **Week 13**

Weighting: **15%**

Class Participation, asking questions, answering questions, debating

On successful completion you will be able to:

- Demonstrate an understanding of the advanced principles and techniques of modern geochemistry, to gain insights and perspectives on Earth evolution.
- Select an appropriate technique and/or set up an analytical protocol to solve a given petrological or geological problem/questions.
- Demonstrate a detailed understanding of analytical techniques to evaluate the quality of geochemical results.

Geochemistry throughout the Periodic table

Assessment Type ¹: Problem set

Indicative Time on Task ²: 20 hours

Due: **Week 13**

Weighting: **25%**

number of questions and exercise on the geochemical and cosmochemical properties of the elements

On successful completion you will be able to:

- Demonstrate an understanding of the advanced principles and techniques of modern geochemistry, to gain insights and perspectives on Earth evolution.

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

Face-to-face and on-line, simultaneously. Practice works using state of the art facilities at MQGA or literature review

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.