



GEOS922

Microstructures to Large Scale Processes: Rheology, Metamorphism and Fluids

S1 Day 2017

Dept of Earth and Planetary Sciences

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General Information

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Credit points

4

Prerequisites

Admission to MGeoSc and GEOS207

Corequisites

Co-badged status

GEOS922

Unit description

This unit aims to give the student an in-depth knowledge of how to document, analyse and interpret microstructures in thin section with special emphasis on deformation and reaction microstructures. Importantly it additionally gives an overview over the rheological behaviour of different minerals at variable conditions and provides the link between microstructure, metamorphism, fluids and rheology. This knowledge is essential in order to link small-scale behaviour to large-scale behaviour in the earth crust and mantle. The course comprises lectures, practicals, and directed reading, which form the basis for an individual project that focus on two of the tools introduced. Individual projects will involve an oral presentation and submission of a report.

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:

Recognise and interpret a range of igneous, metamorphic and deformation microstructures.

Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.

Understand and describe the basic principles of structural analysis at the outcrop- and map-scale.

Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Assessment Tasks

Name	Weighting	Hurdle	Due
Mind map participation	10%	No	Week 2
Structural Geology Assignment	45%	No	Week 5
Oral Presentation	45%	No	Week 9

Mind map participation

Due: **Week 2**

Weighting: **10%**

We will assess your participation in a "mind map" tutorial discussion on a selected igneous and/or metamorphic topic during our first class.

On successful completion you will be able to:

- Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.
- Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Structural Geology Assignment

Due: **Week 5**

Weighting: **45%**

Written questions and practical problems.

On successful completion you will be able to:

- Recognise and interpret a range of igneous, metamorphic and deformation microstructures.
- Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.
- Understand and describe the basic principles of structural analysis at the outcrop- and map-scale.

Oral Presentation

Due: **Week 9**

Weighting: **45%**

Short presentations (5-10 minutes) on selected topics.

On successful completion you will be able to:

- Recognise and interpret a range of igneous, metamorphic and deformation microstructures.
- Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.
- Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Delivery and Resources

Suggested reference textbooks for the unit are:

A Practical Guide to Rock Microstructure. Vernon, R.H. 2004.

Microtectonics. Passchier & Trouw, 2005.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public <http://www.mq.edu.a>

[u/policy/docs/complaint_management/procedure.html](http://www.mq.edu.au/policy/docs/complaint_management/procedure.html)

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, 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.

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 improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

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

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.

Graduate Capabilities

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Recognise and interpret a range of igneous, metamorphic and deformation microstructures.
- Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.
- Understand and describe the basic principles of structural analysis at the outcrop- and map-scale.
- Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Assessment tasks

- Mind map participation
- Structural Geology Assignment
- Oral Presentation

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Recognise and interpret a range of igneous, metamorphic and deformation microstructures.
- Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.
- Understand and describe the basic principles of structural analysis at the outcrop- and

map-scale.

- Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Assessment tasks

- Mind map participation
- Structural Geology Assignment
- Oral Presentation

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Recognise and interpret a range of igneous, metamorphic and deformation microstructures.
- Relate microstructures to the history of the specimen analysed and/or possible geodynamic settings.
- Understand and describe the basic principles of structural analysis at the outcrop- and map-scale.
- Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Assessment tasks

- Mind map participation
- Structural Geology Assignment
- Oral Presentation

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Understand and describe the basic principles of structural analysis at the outcrop- and map-scale.
- Understand and describe common geodynamic settings in terms of igneous and metamorphic processes.

Assessment tasks

- Mind map participation
- Structural Geology Assignment
- Oral Presentation