



GEOS811

Advanced Field Techniques in Geoscience

S3 External 2014

Earth and Planetary Sciences

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General Information

Unit convenor and teaching staff

Ed Saunders

ed.saunders@mq.edu.au

Richard Flood

richard.flood@mq.edu.au

Credit points

4

Prerequisites

12cp in GEOS units at 300 level

Corequisites

Co-badged status

Unit description

This is an advanced field-based unit with a strong emphasis on the observation and delineation of rock units using a range of different mapping techniques. The concepts of depositional environments, rock succession, rock deformation and geological histories will be enhanced during small-group tutorials. An initial report will include critical analysis of the literature covering depositional environment and provenance. A final report will include a discussion on the tectonic evolution of the area covered by the field mapping.

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:

1. Developed skills in inference of depositional environments from field observations.
2. Developed advanced skills in rock and fossil identification.
3. Developed skills in using a number of computer packages commonly used in industry (Microsoft Excel and Mapinfo).
4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
5. Developed skills in using and interpreting air photos for location, geomorphic and

geological purposes.

6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assessment Tasks

Name	Weighting	Due
Conglomerate field exercise	10%	11/12/2014
Conglomerate assignment	10%	5/12/2014
Participation mark	10%	12/12/2014
Exam	40%	11/12/2014
Regional context assignment	10%	22/12/2014
Depositional environment ex.	10%	8/12/2014
Geophysics exercise	5%	9/12/2014
Online quizzes	5%	5/12/2014

Conglomerate field exercise

Due: **11/12/2014**

Weighting: **10%**

Report on conglomerate clast composition and orientation of the clasts, and the inferences about source provenance and depositional environment of the conglomerate (individual)

On successful completion you will be able to:

- 1. Developed skills in inference of depositional environments from field observations.
- 2. Developed advanced skills in rock and fossil identification.
- 4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
- 5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.
- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Conglomerate assignment

Due: **5/12/2014**

Weighting: **10%**

Conglomerate depositional environment and clast provenance written assignment

On successful completion you will be able to:

- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Participation mark

Due: **12/12/2014**

Weighting: **10%**

Each student will be awarded a mark for their performance.

On successful completion you will be able to:

- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Exam

Due: **11/12/2014**

Weighting: **40%**

The final class test will cover skills and knowledge gained in the field and during evening activities.

On successful completion you will be able to:

- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Regional context assignment

Due: **22/12/2014**

Weighting: **10%**

Placing the Lake Keepit area into a regional plate tectonic context

On successful completion you will be able to:

- 5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.
- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Depositional environment ex.

Due: **8/12/2014**

Weighting: **10%**

Individual report on depositional environment, including section on fossils

On successful completion you will be able to:

- 1. Developed skills in inference of depositional environments from field observations.
- 2. Developed advanced skills in rock and fossil identification.
- 4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
- 5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.
- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Geophysics exercise

Due: **9/12/2014**

Weighting: **5%**

Graphs of magnetometer traverses, and Mapinfo map of position of dykes and other igneous bodies away from creeks (individual)

On successful completion you will be able to:

- 3. Developed skills in using a number of computer packages commonly used in industry (Microsoft Excel and Mapinfo).
- 4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Online quizzes

Due: **5/12/2014**

Weighting: **5%**

Two compulsory iLearn online quizzes will be done by you in your own time, prior to the field camp.

On successful completion you will be able to:

- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Delivery and Resources

This is a field based unit, and instruction will be given in the field.

Unit Schedule

Before 5/12/2014: Complete 2 online quizzes and Assignment 1 (Conglomerate depositional environment and clast provenance written assignment)

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Day	Daylight	Evening
Saturday	Drive to Keepit. Buses will stop at Singleton for lunch and Tamworth for supplies.	Welcome and an introduction to the unit. Field survival: water, hats, sunscreen. Short lecture on Sediments and Sedimentary rocks. Hand out materials. Air photo exercise.
Sunday	Walk through whole Hayshed Creek section. Carry out detailed sedimentary log in the stratigraphically highest mudstone, to infer variation in depositional environment. Tutor: Ed Saunders	Short lecture on palaeo (fossils) by Marissa. Conversion of magnetic to true north. Draw up sedimentary log as a group. Start individual report on the depositional environment of stratigraphically highest mudstone. Hand-in sedimentary log (group). Talks.
Monday	Fieldwork to find and in some places collect fossils representative of different rock units. Tutor: Marissa Betts.	Short lecture on igneous rock classification. True width calculation and stratigraphic columns. Identify fossils using microscope and books/literature, and infer depositional environment of the rocks containing the fossils. Finalise individual report on depositional environment, including section on fossils observed today, and hand-in. Talks
Tuesday	Trace dykes and other igneous bodies across paddocks away from creeks, using magnetometer. Tutor: Simon Clark.	Short lecture on the post depositional history of the rocks at Keepit (lecturer to be announced). Plot magnetometer traverses graphs across dykes (individual). Use mapinfo to plot the position of dykes and other igneous bodies away from creeks (individual). Hand-in magnetometer traverse graphs, and Mapinfo plot of dykes. Talks.

Wednesday	y Fabric analysis of conglomerates in Hayshed Creek. Tutor: TBA	Short lecture on cross sections and geological histories. Plot orientation of clasts using stereonet (group). Start aerial photo interpretation to infer the position of the conglomerate unit away from the area that you have visited (group). Commence individual report on conglomerate clast composition and orientation of the clasts, and the inferences about source provenance and depositional environment of the conglomerate. Hand-in orientation of clasts using stereonet and group aerial photo interpretation. Talks.
Thursday	Fabric analysis of conglomerates in second location, maybe near dam wall. Finish by 12 noon. Tutor: TBA Hand in completed individual report on conglomerates. Hand in equipment. Exam	Check all equipment is in. Relax.
Friday	Clean up camp; drive home. Buses will stop at Singleton for lunch.	

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.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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/

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://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use 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

- 1. Developed skills in inference of depositional environments from field observations.
- 2. Developed advanced skills in rock and fossil identification.

- 3. Developed skills in using a number of computer packages commonly used in industry (Microsoft Excel and Mapinfo).
- 4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
- 5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.

Assessment tasks

- Conglomerate field exercise
- Conglomerate assignment
- Exam
- Regional context assignment
- Depositional environment ex.
- Geophysics exercise
- Online quizzes

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

- 1. Developed skills in inference of depositional environments from field observations.
- 2. Developed advanced skills in rock and fossil identification.
- 3. Developed skills in using a number of computer packages commonly used in industry (Microsoft Excel and Mapinfo).
- 4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
- 5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.

Assessment tasks

- Conglomerate field exercise
- Conglomerate assignment
- Exam

- Regional context assignment
- Depositional environment ex.
- Geophysics exercise

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

1. Developed skills in inference of depositional environments from field observations.
2. Developed advanced skills in rock and fossil identification.
3. Developed skills in using a number of computer packages commonly used in industry (Microsoft Excel and Mapinfo).
4. Developed advanced skills in using a number of field instruments including a compass and clinometer, GPS, tape, hand lens and magnetometer.
5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.

Assessment tasks

- Conglomerate field exercise
- Conglomerate assignment
- Exam
- Regional context assignment
- Depositional environment ex.
- Geophysics exercise

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 outcome

6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assessment tasks

- Conglomerate field exercise
- Conglomerate assignment
- Participation mark
- Exam
- Regional context assignment
- Depositional environment ex.
- Geophysics exercise
- Online quizzes

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcome

- 6. Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assessment tasks

- Participation mark
- Online quizzes

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- 1. Developed skills in inference of depositional environments from field observations.
- 2. Developed advanced skills in rock and fossil identification.
- 3. Developed skills in using a number of computer packages commonly used in industry (Microsoft Excel and Mapinfo).
- 4. Developed advanced skills in using a number of field instruments including a compass

and clinometer, GPS, tape, hand lens and magnetometer.

- 5. Developed skills in using and interpreting air photos for location, geomorphic and geological purposes.

Assessment task

- Participation mark