



GEOS206

Marine Depositional Environments

S1 External 2017

Dept of Earth and Planetary Sciences

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General Information

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Credit points

3

Prerequisites

GEOS125 or GEOS126

Corequisites

Co-badged status

Unit description

This unit builds the knowledge and skills needed to understand geological processes and products in modern and ancient marine environments. The unit examines sedimentary and volcanic processes and their products; evidence of present day hydrothermal alteration and metamorphism of the oceanic lithosphere; and the formation of ore deposits in marine rocks. Emphasis is placed on reconstruction of ancient environments. There is a five-day field trip to the New South Wales south coast.

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:

Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features

Understand basic controls on ocean and atmospheric circulation.

Understand the fundamental fluid dynamics governing sediment transport

Demonstrate ability to observe and record information in the field

Distinguish primary, secondary, and biogenic sedimentary structures.

Make a stratigraphic column

Explain the difference between permeability and porosity and their influence on fluid flow.

Interpret the depositional history of a stratigraphic sequence

Predict the location of a sediment type based on knowledge of sedimentary environments

Apply chronostratigraphic knowledge to interpret a sedimentary sequence.

Evaluate scientific evidence to formulate and justify an interpretation

Evaluate the potential of changes in ocean and atmospheric circulation to impact sedimentary environments through time.

Explain the connections between depositional environments, tectonics, climate, and weathering

Develop an internally consistent hypothesis to explain observations

Investigate another place or time by synthesising knowledge of modern depositional environments

Effectively and accurately communicate scientific information in verbal and written formats

General Assessment Information

Field work

During this unit of study you will be required to participate in an extended field trip to the NSW South Coast. This field work will occur April 24th through April 28th. As a vital part of the unit, attendance for the field trip is compulsory. A range of marine depositional environments, both modern and ancient will be studied in the field. To participate, you will need to have a field friendly account set up. I encourage you to set this up as soon as possible at <https://mq.fieldfriendly.com/> to allow time to work through any issues before the trip. Each student will be required to pay with an accommodation form to the Cashier by Tuesday 21 March, as a non-returnable deposit that covers the full amount of accommodation (excluding food). Details of the trip and cost will be given out separately.

Quizzes

A quiz will be posted weekly (except in week 13) to be completed between 5 pm Wednesday and 8 am Monday. Quizzes will cover material from lecture, readings, and practicals. Your two

lowest marks will be dropped, each of the remaining 10 quizzes will count for 2% of your final mark.

Practicals

Practicals are an essential part of this unit. Several of the practicals will be available to you on iLearn and should be completed the week they are assigned. Additionally, you are expected to attend the weekend session scheduled for May 6 and May 7 (both days!) to complete the remaining practicals that require on campus facilities.

Late Submissions

Any work received after the deadline will be marked down 10%, with an additional 5% each day (24 hrs) past the deadline. Extensions are only possible with instructor permission and requests must be made more than 48 hrs *prior* to the assignment deadline.

Final Exam

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Weekly Quizzes</u>	20%	No	one per week
<u>Field Trip Report</u>	20%	No	week 9
<u>Field Notebook</u>	10%	No	28 April 2017
<u>Research Project Poster</u>	20%	No	week 13
<u>Final Exam</u>	30%	No	finals

Weekly Quizzes

Due: **one per week**

Weighting: **20%**

Weekly quizzes are to be completed between 5 pm Wednesday and 8 am Monday.

On successful completion you will be able to:

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
- Understand basic controls on ocean and atmospheric circulation.

- Understand the fundamental fluid dynamics governing sediment transport
- Explain the difference between permeability and porosity and their influence on fluid flow.
- Predict the location of a sediment type based on knowledge of sedimentary environments
- Apply chronostratigraphic knowledge to interpret a sedimentary sequence.
- Evaluate the potential of changes in ocean and atmospheric circulation to impact sedimentary environments through time.
- Explain the connections between depositional environments, tectonics, climate, and weathering
- Investigate another place or time by synthesising knowledge of modern depositional environments

Field Trip Report

Due: **week 9**

Weighting: **20%**

Your report for the South Coast Trip is due by beginning of lecture during week 10 (9:00am). This report must be submitted electronically via the provided TurnItIn link on iLearn. Report requirements and marking scheme will be provided before the field trip.

On successful completion you will be able to:

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
- Demonstrate ability to observe and record information in the field
- Distinguish primary, secondary, and biogenic sedimentary structures.
- Make a stratigraphic column
- Interpret the depositional history of a stratigraphic sequence
- Apply chronostratigraphic knowledge to interpret a sedimentary sequence.
- Evaluate scientific evidence to formulate and justify an interpretation
- Develop an internally consistent hypothesis to explain observations
- Effectively and accurately communicate scientific information in verbal and written formats

Field Notebook

Due: **28 April 2017**

Weighting: **10%**

Your field notebook from the South Coast trip is due at the completion of the trip (when we load buses at the last stop)

On successful completion you will be able to:

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
- Demonstrate ability to observe and record information in the field
- Distinguish primary, secondary, and biogenic sedimentary structures.
- Make a stratigraphic column
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- Effectively and accurately communicate scientific information in verbal and written formats

Research Project Poster

Due: **week 13**

Weighting: **20%**

Research project assignments will be handed out week 8. All posters need to be uploaded for a virtual poster session during week 13. Details on the research question, required content for the poster, required discussion, and marking will be included in the week 8 handout on iLearn.

On successful completion you will be able to:

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
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- Make a stratigraphic column
- Interpret the depositional history of a stratigraphic sequence
- Apply chronostratigraphic knowledge to interpret a sedimentary sequence.
- Evaluate scientific evidence to formulate and justify an interpretation
- Evaluate the potential of changes in ocean and atmospheric circulation to impact sedimentary environments through time.
- Develop an internally consistent hypothesis to explain observations
- Investigate another place or time by synthesising knowledge of modern depositional environments
- Effectively and accurately communicate scientific information in verbal and written formats

Final Exam

Due: **finals**

Weighting: **30%**

Cumulative examination of material covered throughout the term.

On successful completion you will be able to:

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
- Understand basic controls on ocean and atmospheric circulation.
- Understand the fundamental fluid dynamics governing sediment transport
- Distinguish primary, secondary, and biogenic sedimentary structures.
- Explain the difference between permeability and porosity and their influence on fluid flow.
- Interpret the depositional history of a stratigraphic sequence
- Predict the location of a sediment type based on knowledge of sedimentary environments
- Apply chronostratigraphic knowledge to interpret a sedimentary sequence.
- Evaluate the potential of changes in ocean and atmospheric circulation to impact sedimentary environments through time.
- Explain the connections between depositional environments, tectonics, climate, and weathering
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Delivery and Resources

For a text book we will be using: Sedimentology and Stratigraphy (2nd Edition, Gary Nichols)

Other required and recommended readings will be provided throughout the term via iLearn.

Unit Schedule

The material for this unit will be grouped into 3 sections

Week 1-4: Getting to the Ocean

In order to have deposition in marine environments, we need a supply of sediments. During this section we will cover the rock cycling, weathering, basic sedimentology, boundary environments, and basic fluid dynamics.

Week 5-10: Sedimentation in the Ocean

During this section we focus our attention to marine environments including what controls them, how we define them, and what we may expect to find at each.

Week 11-13: Interpreting the Rock Record

To end the unit, we will combine what we've learned so far (mainly from modern systems) and

apply it so we can learn about systems long ago or far away.

Other Important dates:

April 24-28: Mandatory south coast field trip

May 6 -7: Mandatory on campus practicals

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.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

Discipline Specific Knowledge and Skills

Our 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. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
- Understand basic controls on ocean and atmospheric circulation.
- Understand the fundamental fluid dynamics governing sediment transport
- Demonstrate ability to observe and record information in the field
- Distinguish primary, secondary, and biogenic sedimentary structures.
- Make a stratigraphic column
- Explain the difference between permeability and porosity and their influence on fluid flow.
- Interpret the depositional history of a stratigraphic sequence
- Predict the location of a sediment type based on knowledge of sedimentary

environments

- Apply chronostratigraphic knowledge to interpret a sedimentary sequence.
- Evaluate scientific evidence to formulate and justify an interpretation
- Evaluate the potential of changes in ocean and atmospheric circulation to impact sedimentary environments through time.
- Explain the connections between depositional environments, tectonics, climate, and weathering
- Investigate another place or time by synthesising knowledge of modern depositional environments
- Effectively and accurately communicate scientific information in verbal and written formats

Assessment tasks

- Weekly Quizzes
- Field Trip Report
- Field Notebook
- Research Project Poster
- Final Exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Identify basic marine sediments, sediment characteristics, as well as common sedimentological and stratigraphic features
- Demonstrate ability to observe and record information in the field
- Distinguish primary, secondary, and biogenic sedimentary structures.
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- Final Exam

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Demonstrate ability to observe and record information in the field
- Explain the difference between permeability and porosity and their influence on fluid flow.
- Evaluate scientific evidence to formulate and justify an interpretation
- Explain the connections between depositional environments, tectonics, climate, and weathering
- Develop an internally consistent hypothesis to explain observations
- Effectively and accurately communicate scientific information in verbal and written formats

Assessment tasks

- Weekly Quizzes
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- Final Exam

Changes from Previous Offering

The unit description has been updated.