

MACQUARIE  
UNIVERSITY



FACULTY OF  
SCIENCE

DEPARTMENT OF EARTH AND PLANETARY SCIENCES



GEOS373/GEOS814  
VOLCANIC GEOLOGY

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Cover photo: Ruapehu

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**Credit Points:** 3

**Pre-requisites:** GEOS207/GEOS230 or GEOS206/GEOS260; GEOS854 or GEOS900

## INTRODUCTION

The aim of the visit to the North Island is to see first hand both the structure of active volcanoes that range from basaltic to rhyolitic and to examine the products of these volcanoes. New Zealand provides a spectacular array of different types of volcanoes that have formed in tectonic environments that may be very similar to the environments that produced the older volcanic rocks of eastern Australia. Having read about the New Zealand volcanism and then visiting many of the major volcanoes you should be able to put into context many of the volcanic rocks you will encounter in eastern Australia.

One of the main points to be considered is how we might recognise similar volcanic environments if preserved in the Palaeozoic/Mesozoic of eastern Australia. While, for the most part, the position of the volcanic vents in NZ is self evident (except for distal air-fall tephras) the same is not true in the ancient equivalents in Australia so it is important to also consider what parts of the volcanic rocks are most/least likely to be preserved and what might be the best evidence for the position of the ancient vent(s).

The rhyolite-dominated central part of the Taupo Volcanic Zone (TVZ) provides one of the best modern analogues for the environments that may have generated the vast volumes of rhyolite and granite in the Lachlan and New England Fold Belts. We will try to keep all the aspects of the geology in mind but of most importance are the distinctive features of the different products of volcanism, the distribution relative to vent, the chance of preservation and the association with other tephras and lavas. As with most regions where the rocks are generally flat lying, most of the best observations will come from the examination of vertical exposures.

## KEY LEARNING OBJECTIVES

At the completion of this unit, you will have further developed:

1. understanding of the tools and methods that are used in the geosciences;
2. competence in applying geoscientific principles to understanding the world around you;
3. capacity to employ appropriate geoscientific tools to solve problems and to interpret the results;
4. understanding scientific methodology;
5. competence in accessing, using and synthesising appropriate information;
6. application of knowledge to solving problems and evaluating ideas and information;
7. public speaking skills;
8. team work skills; and
9. capacity to present ideas clearly with supporting evidence.

## 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.

## ASSESSMENT

The assessment consists of several components, listed below. A satisfactory standard is required in all components.

### Assessment tasks:

Task	Weight	Linked learning outcome	Linked graduate capability
Assignment 1	30%	1, 2, 3, 4, 5, 6, 9	1, 2, 3, 4, 5, 7, 8, 9
Field notebook, evening work and talk	15%	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9
Tutors mark for performance (interest, positive involvement and contribution to the day and evening work while in New Zealand)	15%	1, 2, 3, 4, 6, 8	1, 2, 5, 6, 7, 8, 9
Formal exam/assignment to be completed on the day prior to departure from Auckland	40%	1, 2, 3, 5, 6, 9	1, 2, 3, 5

This is the full assessment for GEOS373 but additional work is required for GEOS814.

In marking the assignment, we shall use three broad criteria:

- (1) competence in analysis and interpretation;
- (2) clear and concise expression of your thoughts; and
- (3) originality.

Each assignment will also have a number of specific marking criteria that will be listed with the project outline.

### Referencing:

All submitted work must include clear and correct referencing. The extent and quality of your referencing will be included within the communication portion of the marks awarded to each report.

Quotations should be used only if the point being made is vital to your argument and if you could not express it better yourself. If you paraphrase, you must acknowledge your authority as you would when quoting directly -- after the paraphrased section or quotation, i.e. (Dadd, 2010, p.132). Make sure you document this reference in your list of References. Remember, **plagiarism is cheating!**

All references must be clearly documented at the end of your report. For a book, the information expected is: Author(s), year of publication, title, edition (if not 1st), publisher, place of publication.

*e.g.* Dadd, K.A. and Flood, R.H., 2010. The Enjoyment of Fieldwork. Highly Respected Publishers, Sydney. (10th edition)

For a journal article, give: author(s), year of publication, title, name of journal, volume number, page numbers.

*e.g.* Flood, R.H., Turner, S., Rushmer, T. and Dadd, K.A., 2009. Mapping on a shoestring. Journal of Geological Teaching, 182, 223-235.

For a journal article on the WWW give: author, year, 'article title', name of journal, volume number, viewed Day Month Year, <URL>.

For a web document give: author/editor or compiler, year of the most recent version, title, version number (if applicable), description of document (if applicable), name and place of the sponsor of the source, viewed Day Month Year, <URL either full location details or just the main site details>.

For more details on referencing of material from the www see:  
< [http://www.usq.edu.au/library/help/ehelp/ref\\_guides/harvardonline.htm](http://www.usq.edu.au/library/help/ehelp/ref_guides/harvardonline.htm) >

### **Submission of Assignment:**

All assignments must be submitted to the appropriate submission box for GEOS373 in the reception area of the Science Centre (Room 101), which is on the ground floor at the western end of building E7A. The Centre opens from 8.30am to 5.30pm on Monday to Friday.

All reports are to be submitted by 9.00am on the date specified and must include a completed and signed coversheet stapled to the front cover. The Assignment Cover Sheet can be downloaded from the unit Blackboard site.

**Students must keep a photocopy of their reports.**

**Academic Honesty – see unit Blackboard site**

### **Desired Standards**

<b>Grade</b>	<b>Standard Required</b>
High Distinction	Demonstrates an extensive knowledge and understanding of the concepts of the course.
Distinction	Demonstrates a thorough knowledge and understanding of the concepts of the course.
Credit	Demonstrates a sound knowledge and understanding of the concepts of the course.
Pass	Demonstrates a basic knowledge and understanding of the concepts of the course.
Conceded Pass	Demonstrates a limited knowledge and understanding of the concepts of the course.
Fail	Demonstrates a poor knowledge and understanding of the concepts of the course.

### **Feedback on assessment tasks:**

Feedback on assessment tasks is given in this unit in the following ways:

1. Our primary mode of assessment feedback: the assessment marker will present overall feedback to the class on what aspects of the assessment task were done best and where improvement is needed in general.
2. Students are strongly encouraged to seek further feedback (at the time it is given or by making an appointment with the assessment marker) if they are unsure of any aspect of the feedback or if they want further feedback.
3. We provide you with a checklist of what is asked in the assessment task and a breakdown of the marks awarded for each component. Scoring full marks for a given component indicates that you did exceptionally well. Alternatively, scoring poorly in a component strongly suggests it required further work.
4. In the instance of scoring very poorly overall, you will be provided with written feedback on the assessment task indicating where you could improve.

**Suggested Reading:** A number of references are available on the unit web site.

### Queries and appeals

In the first instance, contact the unit convenor if there are any questions about the assessment tasks themselves, or about the comments and grades that you receive for your reports. You are permitted to appeal against your final grade in any of your units. Before initiating an appeal, discuss your unit grade fully with the Unit convenor. More details of the appeals procedures are available in the Science Centre (phone: 9850 8418).

### ITINERARY

(Note: this can and will vary if the weather or other factors demand).

From the time of arrival in Auckland (either at the airport or the accommodation) until the time of departure at Auckland the whole party will stay together.

Date	Itinerary	Staying at
5/02/11	Arrive in Auckland	Avondale Motor Park, 46 Bollard Av Avondale, Auckland. Ph 0011-64-9-8287228
6/02/11	Auckland volcanic field	
7/02/11	Travel to Rotorua with stops at Mercer, Hamilton and Ngongotaha	Holdens Bay Holiday Park, 21 Robinson Av, Rotorua. Ph 7-345-9925
8/02/11	White Island	
9/02/11	Rotorua, Taupo to Ruapehu	Taumarunui High School Lodge in the Tongariro National Park
10/02/11	Ruapehu/ Tongariro/ Ngauruhoe (Ruapehu is a steep climb)	
11/02/11	Ruapehu/ Tongariro/ Ngauruhoe (Tongariro is a long hike but part way would be OK)	
13/02/11	Ruapehu/ Tongariro/ Ngauruhoe (there may not be time to climb Ngauruhoe)	Avondale Motor Park in Auckland
13/02/11	Travel back to Auckland along the Waikato River	
14/02/11	Tour of the IODP drill ship Joides Resolution; Miocene Volcanoes west of Auckland	
15/02/11	Return to Sydney	

### COSTS

There are a number of costs that need to be covered. Some of these will be paid prior to leaving and I will provide a form to facilitate this. The form needs to be completed and returned to the Macquarie University cashier. The cashier will provide a tax invoice/receipt. Food and a few incidental costs will be paid for in New Zealand. **Upfront costs are \$405**, which includes \$25 for a ferry trip to Rangitoto Island in Auckland Harbour, \$150 for the day tour to White Island, \$25 per night for 6 nights accommodation and \$20 per night for 4 nights accommodation. Few if any cabins will provide bedding - remember to bring a sleeping bag and a small pillow. The places we stay at have meal preparation facilities but on the last night we will all try to have dinner at a restaurant. Although the trip is not "dry", no alcohol will be carried on the buses so do not buy duty free bottles except on the way back to Australia.

Please complete the form for the university cashier and either bring this to the cashier in the Lincoln Building on campus (open Mon-Fri 9.00 am to 5.00 pm) or mail to:

Cashier, Macquarie University  
Sydney, NSW 2109

**After payment has been made, please return the participant form to Kelsie or the EPS office (E7A507) by January 5, 2011.**

## **WHAT TO BRING**

Camera, sleeping bag, hat, a few pencils and pens, any handouts you need for your talk (the assignment has one section that requires you to become the group expert on one topic and to both deliver a short lecture on the topic with a one page hand out, you need about 45 copies), wet weather gear, a water bottle and/or thermos and lunch box (most days we will be away from the vehicles at lunch time). We will supply a field notebook but bring a spare if you have large writing. Some places we stay have limited kitchen utensils so I recommend bringing a plastic plate, bowl, and cup and cutlery (remember to have these in your luggage and not your carry on bag). Because of space limitations keep all your gear down to one medium sized case. You also need a day pack to carry rain gear, food, drink, camera etc. You will be much more comfortable if you have good stout walking boots and although the weather is generally kind at that time of year the top of Ruapehu has permanent ice so bring some warm clothes (including a jacket that protects from the wind, a beanie, scarf and gloves) to avoid that rare tropical disease - frostbite (a Spike Milligan joke).

I EXPECT WE WILL VISIT A QUARRY SO **EVERYONE NEEDS TO TAKE A HARD HAT, GLASSES AND REFLECTIVE VEST**. The Department has them and will sign one out for you to take. Cross-institutional students should organize to collect these from their university. A hammer or two would also be useful but much of the time we are in National Parks so a couple will be enough.

### **Some further information on the trip**

It is strongly recommended that you take out insurance to cover medical costs should you become ill in New Zealand. The insurance also covers loss of luggage etc.

### **REMEMBER you do need a passport!**

My email address is kelsie.dadd@mq.edu.au and my phone number are 02 9850 7763 or 0414 783 079.

If you find that you can no longer make the trip please let me know as soon as you get this outline.