VICTORIA UNIVERSITY OF WELLINGTON
CAREER VIEW
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GEOLOGY AND GEOPHYSICS; branches of Earth Science

At present, the Earth and its atmosphere are all that we humans have to live on. In order to make the most of it, we need to understand what we, as humans, have done to the Earth over millennia, and what we're doing to it today. We also need to understand what the Earth has done and is doing to itself, over some four billion years and today. Geology and geophysics are subjects that are fundamental to our understanding of the Earth's history, structure, resources, and processes, and together they underpin some of the major issues of our times. These include climate change, environmental management, the use of natural resources like minerals, wind, and water, and the prediction of natural hazards such as earthquakes, floods, and volcanoes. Geologists and geophysicists are scientists. They observe, measure and monitor; they calculate and predict; they hypothesise and maybe try again; they scrutinise the rocks beneath their feet and the air above their heads; they are both rigorous and creative. They do good work. It's possible our very existence may depend on it. What could be more important?

Geology is the study of the Earth, including such topics as plate tectonics; mountain building; the origin and evolution of life; the extinction of the dinosaurs; landscape evolution; climate and sea level change; and Earth's natural resources: minerals, fossil fuels, soils, and water.

Geophysics uses physics and mathematics to examine the structure, properties and processes of the Earth and its atmosphere. These include the Earth's gravity and magnetism; its heat flow processes and volcanoes, its oceanographic and atmospheric processes; its deformation and earthquakes. Many of these processes manifest in what we call weather, hence the connection between geophysics and meteorology. More generally, geophysics is central to understanding and predicting natural hazards and exploring for energy and mineral resources.

WHERE DO GEOLOGY AND GEOPHYSICS GRADUATES WORK?

Because the forces and resources of nature tend to be national and/or global in scale, many of the work opportunities for Geology and Geophysics graduates are within government-related organisations or companies with international operations, for example in oil and gas exploration, drilling services or environmental engineering.

GIS (Geographic Information Systems) skills in particular are relevant for a range of organisations, including central and local government, regional councils, research organisations, consultancies, utility companies, and forestry and agricultural companies.

Utility companies, such as the State-Owned Enterprise Meridian Energy, tend to contract out technical, structural and infrastructural work to consultants. These consultants may be Geology and Geophysics graduates with some work experience.

Research Institutions

Crown Research Institutes

In general, research institutions consider a Bachelors degree appropriate for technician and science roles, while BSc Hons, Masters and PhD degrees are required for research work. However there are many exceptions, for example, a science role does not always mean a research scientist, and technician roles are not necessarily lesser positions as they can be highly skilled and specialised jobs in their own right.

• *Institute of Geological and Nuclear Sciences (GNS Science)* specialises in the geosciences and related technologies, including geology, geophysics, geochemistry and geochronology. It is a large organisation with opportunities for Geology and Geophysics graduates scattered throughout, but centred particularly around two main Groups. The Natural Resources Group - geological time, hydrocarbons, geothermal, minerals, and ocean explora-

Topical coverage of career related issues brought to you by Victoria University Career Development and Employment.

Areas covered include how degrees and courses relate to employment opportunities, to life/work planning, graduate destination information and current issues or material relevant to the employment scene. Your comments and suggestions always welcomed.

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tion; and The Natural Hazards Group – earthquakes, volcanoes, tectonics, mapping, geohazard solutions, and monitoring, which includes the GeoNet Data Centre. Someone with a very good BSc could be appointed as a scientist, although most research staff have postgraduate qualifications; BSc Hons, MSc or PhD.

• ***National Institute of Water and Atmospheric Research (NIWA)*** is an environmental research organisation and a provider of atmospheric and marine sciences. NIWA Science is the 'engine' of the organisation and comprises seven National Centres with a range of employment niches for both Geology and Geophysics graduates.

- ***Coasts and Oceans*** is probably the most relevant Centre for Geology and Geophysics graduates. Those interested in this Centre should discuss their course structure and research interests with university staff as there is considerable collaboration between the Centre and Victoria University. For example, opportunities occasionally arise for graduate students to be employed on a contract basis.
- The ***Climate Centre*** is interested in those who have a hydrology component to their studies, as well as atmosphere, fluid motion and oceanography. Depending on how different programmes are funded, there may be opportunities for students to participate in short-term holiday work.
- ***Water Resources*** is also interested in those whose degrees have an emphasis on hydrology and 'watery topics'.

• ***Landcare Research*** specialises in sustainable management of natural resources including environmental monitoring, climate change, and soil and water resources. Geology is particularly relevant for the Soils and Water area. It would be possible for someone with a BSc to take up a science role, but postgraduate qualifications are more desirable. The Climate Change area focuses on how changes in the use of land affect soil and geological processes. They are very interested in graduates with Geology and Geophysics backgrounds who also have a Biology component to their studies. There is preference for PhDs but technical roles are possibilities for those with a Bachelors or Masters degree.

• ***ESR (Institute of Environmental Science and Research Ltd)*** provides specialist science solutions related to public and environmental health (also forensic science). Within the organisation's structure, *Water Management*, in particular ground water, is an area for which Geophysics graduates would be suitable. Basic technician tasks include laboratory work and also field work which involves taking samples and organising field sampling equipment.

Universities

Universities are research institutions in their own right and have strong collaborative relationships with other research institutions, such as Crown Research Institutes. For example, GNS Science and Victoria University have recently established the Joint Antarctic Research Centre. Students benefit from this sort of joint venture not only because the Antarctic can offer unique opportunities for applied research projects, but also because they are developing working relationships with established science teams and these connections can lead to employment possibilities later on.

If you're considering an academic career, which will involve both research and teaching, you would need a PhD and a record of publication to be competitive for junior positions.

Other educational institutions: Teaching is also very viable, particularly as the range of disciplines that underpin Geology and Geophysics transfer well into the science curriculum of secondary, intermediate and even primary schools. Teacher training is also required.

State-Owned Enterprises

• ***MetService*** gathers, analyses and provides weather information. A BSc, BSc Hons, or MSc in Geophysics (with strong maths and physics) is suitable to be considered for meteorologist training. At the same time as working with MetService, trainees are required to complete either a Postgraduate Diploma or Postgraduate Certificate in Meteorology at Victoria University.

• ***Solid Energy*** is a producer, distributor and exporter of top-quality coal with a particular interest in Geology, and related geotech, graduates. It offers a three-year Graduate Programme. A geologist's role could include working on drilling and exploration projects, coal quality assessment, mine planning, and computer modelling.

Ministry of Economic Development

Crown Minerals manages the allocation of permits for prospecting, exploration and mining of all Crown owned minerals, and is responsible for monitoring the 'best practice' standards of petroleum and minerals exploration companies. They employ Geology and Geophysics graduates to manage technical databases, evaluate new permit applications, monitor and assess permit perfor-

mance and provide technical advice to Crown Minerals management.

Local Authorities

• ***City Councils*** vary in the way they structure their operations, but Geology and Geophysics graduates typically have useful skills for a range of areas. For example, *Auckland City* is interested in Masters level Geophysics graduates for data modelling and the quality assessment of data for the GIS Data Team. *Wellington City Council Emergency Management Office* is interested in both Geology and Geophysics graduates with a postgraduate degree and some practical experience for project management roles. Most of their technical and science work is contracted out to GNS Science.

• ***Regional and District Councils*** typically cover a wider catchment area and deal with larger scale environmental and land management issues. Within the Greater Wellington Regional Council Geology and Geophysics degrees are relevant for a variety of operational areas. These include:

- ***Emergency Management***: Hazard analysts bring together data on a variety of natural hazards. Emergency management officers are involved in risk reduction and work on establishing response plans for a variety of contingencies. A BSc is usual for both these positions as the roles are now seen as professional careers.
- ***Resource Investigations*** is another area suitable for both Geology and Geophysics graduates, primarily for ground water management. A BSc graduate could become a ground water scientist.
- ***Consents*** is also suitable for both subject areas, with some emphasis on Geology over Geophysics. In general, a BSc is fine for a scientist role in such areas as hydrology, surface water and fresh water research. Job roles include resource advisers and environmental monitoring officers.

Consultancies and Private Companies

These include multidisciplinary consultancies, geological services companies, and mining and drilling operations. Those listed below are a sample, not a complete list.

• ***URS Corporation*** is an international environmental and engineering consulting firm. It recruits Geology and also Geophysics graduates. Their work is in the area of environmental management and is mostly geological in focus, dealing typically with contaminated land and ground water resources. A BSc is acceptable for an environmental scientist role, although a Masters degree is preferred as it demonstrates the ability to work independently. There are also technician level positions.

• ***Beca*** is a large consultancy comprising a range of companies. Opportunities vary from company to company. As examples, hydrogeologist and engineering geologist positions exist for those with a postgraduate degree in Geology or possibly Geophysics. In either discipline a thesis topic that had some relevance to Beca's operations would be an advantage. A BSc graduate would be suitable for laboratory positions. GIS skills are also very useful.

• ***Opus International Consultants*** are a global company whose consultancy services encompass building design and construction, the development and management of infrastructure, and highway, road and water assets. They would be interested in BSc Geology graduates for their environmental engineering area. For graduates, entry to the company is through the Graduate Recruitment Programme.

• ***Holcim*** is a Swiss-owned company involved in cement manufacture. They produce cement, lime, aggregates and concrete. They employ Geology and Geophysics graduates (preferably Masters) for their quarry operations. Tasks include resource development and exploration work, ongoing monitoring and quarry operations.

• ***GeoSphere*** is a geological services consultancy specialising in oil and gas prospects. They employ people with a strong general geoscience degree (Geophysics is particularly valued) preferably at Masters level, but Honours is considered.

• ***Todd Petroleum Mining*** employs both Geology and Geophysics graduates with BSc Hons or a Masters degree. In Wellington they work as exploration geologists. In New Plymouth production geologists plan the development of resources.

• ***Shell Petroleum Mining (NZ)*** is part of ***Shell***, a global group of energy and petrochemicals companies. Geology and Geophysics graduates are recruited for the Exploration and Development, and Production areas. A BSc in either discipline is fine, but postgraduate degrees are appreciated. The company recruits at the graduate level through its annual Graduate Recruitment Programme.

• ***Boart Longyear*** is a drilling services company with operations in Asia and the Pacific. They employ Geology and Geophysics graduates, preferably with a postgraduate degree. Drilling work is hands-on and involves a

range of technical challenges.

• ***Webster Drilling and Exploration Ltd*** is a seismic drilling contracting company based in Wellington but conducting seismic surveys in a range of countries, including the Antarctic. Their client base includes many of the larger engineering and construction consultancies. They are interested in Geology graduates.

SKILLS

Geology and Geophysics are multidisciplinary areas of study and their graduates are typically multi-skilled.Almost certainly, more skills mean better opportunities to grow your career. Skills are not stand-alone outputs, rather they are interactive and synergistic processes. For the purposes of description, Geology and Geophysics graduates can claim:

Analytical and abstract reasoning skills consistent with the study of maths and physics, both of which require an intellectual grasp of first principles and their consequent application to practical problems. The ability to swing mentally from theory to practice and back again underpins intellectual processes which are engaged by the 'what if …' proposition. These include problem solving, innovation, and creativity; qualities which are fundamental to science in particular, progress in general, and valuable to employers everywhere.

Intellectual clarity and logical thinking skills due largely to the multidisciplinary nature of the courses of study. Graduates will have become experienced at synthesising concepts from a range of disciplines including chemistry, biological sciences and computer technology, and integrating this information into a logical, constructive whole. The ability to bring together ideas consistently and effectively is vital to communication, particularly when this involves providing specialised (scientific) knowledge to naïve user groups. Leadership roles also draw deeply on clear thinking and communication skills, while management activities such as strategic planning and performance appraisal likewise require a clear head and fairly determined thinking.

Observation skills are developed and honed during a range of course activities. These include field trips where natural structures and phenomena are studied in detail, and laboratory work involving the use of specialised equipment such as recording and measuring instruments. Skilled observation develops the faculties of judgement and discrimination, and the ability to separate out what is significant from what is not. Trained observers are valuable, not only in scientific activities, but also in a range of job areas including law and its enforcement, psychology, health professionals, insurance investigation, film-making, and so on.

Communication skills are consistently high-priority for most employers. Geology and Geophysics graduates have pretty comprehensive communication training. They write laboratory and field work reports, assignments and postgrad research papers, all of which emphasise writing style and structure. The combination of lectures, laboratory work and field trips develop clear and specific verbal communication skills. These skills are important for any work that involves giving specialised information to clients, consumers, or readers. They allow people to present themselves confidently to others and groups, and generally enhance an individual's overall credibility whatever their job role.

Relationship management skills are increasingly recognised as a specific skill set. Geology and Geophysics graduates have participated in a range of field trips which can mean getting on with people in a democratic sort of way under pretty basic conditions. Team work is essential and a general sense of camaraderie and shared purpose often prevails. Modern business and organisational practice emphasises co-operation and collaboration, shared interests, and networking. Those who progress to greater things tend to be those who manage relationships successfully.

Research skills are developed in a specialised way by those who do postgraduate work, but an undergraduate understanding of research methods and techniques is not to be underestimated. Geology and Geophysics are science subjects and are underpinned by scientific methodologies. Research skills are useful in many job roles including policy development, library work, and higher education.

Computer skills are basic to most jobs, and Geology and Geophysics graduates are pretty computer-savvy. Typically they know how to manage and interrogate sophisticated data bases, use technical software, and undertake computer modelling. They are also familiar with operating systems such as UNIX. From this they will generally be able to find their way around other systems and data sets. Being confident and capable in an IT environment is very useful at every level of management and many other roles from bank officer to museum curator to architect. It's excellent for geologists and geophysicists too.

GRADUATE PROFILES

Hilary Todd

Interpretation Geoscientist
ORION Operations
BHP Minerals Asia Inc

I am currently working as a geophysicist for BHP Billiton. My job involves looking for mineral deposits including diamonds, base metals and iron ore all over the globe. In two years of working with BHP Billiton, I have travelled throughout Australia, South Africa and China. Although usually based in Melbourne, Australia I am currently on a six month posting in Ulaanbaatar, Mongolia. This secondment involves looking for copper and coal in the Gobi Desert. My short career so far has provided me with many wonderful experiences that I will never forget.

A career in geophysics takes you all over the world – quite often to places most people would never get to go. On the way you get to experience and learn about many different cultures and meet countless different and interesting people. The work is highly varied – one day you may be in the comfort of your office in Melbourne analysing data, the next carrying out geophysical surveys in the expansive plains and sand dunes of the Gobi Desert or driving through a game park in Southern Africa.

I decided to study geophysics because I always had an interest in the earth and the geological processes that define it. The thought of being able to work in the outdoors also drew me into this field.

I gained a wide range of skills from my degree in geophysics. The great thing is that the degree combines mathematics, physics and geology courses and, therefore, you develop a broad base of skills – many of which are transferable to other fields outside of geophysics. For example, my first job out of university was in an immunology laboratory in Melbourne, Australia. As part of this job, I created computer models that predicted the human immune response to different stimuli. Although I currently work in the field of minerals exploration, there is also a lot of choice for career paths solely within the Geophysics arena such as seismology, volcanology, and petroleum exploration to name a few.

I enjoyed the diversity and variety of subject matter in the geophysics degree. It was great working across multiple departments in the university as it meant I was able to make friends from many different areas. A big bonus of the degree was the field trips to geologically interesting areas in New Zealand and learning from some of the best in the business. Practical exercises such as conducting geophysical surveys around the Wellington region also provided a nice balance to the theoretical book work component of the degree – something that not many other degrees can offer.

I would definitely recommend a degree in geophysics to anyone who has curiosity about the processes that shape our planet, who has a desire to travel, have a highly varied working life, and meet people from a diverse cross section of cultures.

Dougal Mason

Engineering Geologist
Opus International Consultants

Whilst I was at secondary school I was set on a degree in science. Perhaps the key element of geology that distinguished it from other science subjects was the amount of fieldwork involved. I have always been keen on outdoor activities such as tramping and rock-climbing, and my university courses all stressed the importance of fieldwork. All of our understanding of rocks, landforms, earth processes, and natural hazards come from observing these in the field. The requisite field trips were great fun, and I would recommend them to anyone! Whilst I was studying, I was also fortunate enough to be selected as a field assistant for a drilling project in Antarctica. I spent six weeks in Antarctica in 2003, helping drill several holes through the Ross Ice Shelf to sample the sea water beneath the ice and measure the ocean currents.

After completing a Bachelor of Science in 2001 I started a Master of Science. My thesis was a study of the earthquake history of the Awatere Fault, a major faultline in Marlborough. This project was sponsored by the Earthquake Commission, whose contribution paid for fieldwork and lab expenses. I spent a total of eight weeks in the upper Awatere Valley mapping the fault scarps and landforms, surveying the fault with high-resolution GPS, excavating deep trenches across the fault,

and four-wheel driving. Of course, geology is not all fieldwork, and there was a considerable amount of data analysis and lab work required once the fieldwork was completed. This part of my research involved studying aerial photographs, processing the GPS data and producing high-resolution topographical maps, and drawing cross sections of the trench exposures and assessing how many earthquakes had occurred at a particular site.

Following the submission of my thesis, I began full-time work at the Institute of Geological and Nuclear Sciences (IGNS) on their Active Faults Database, researching and cataloguing information on the most active faultlines in New Zealand. In 2004 I began work as a hydrologist at Opus International Consultants. My core roles as a hydrologist included flood and drought analysis, and rainfall-runoff modelling. In October 2005 I transferred within Opus to become an engineering geologist within the geotechnical engineering group. The work I have undertaken since then has been varied, such as geological mapping, borehole logging, managing site investigations, earthquake liquefaction analysis, and GIS work. I would say the key to my success so far is doing something I find interesting and fun, and not being afraid to take on new challenges. I believe that as earth science involves a multi-disciplinary approach (incorporating elements of chemistry, physics, biology, maths etc), earth science graduates are well set up for any number of careers – such as scientific research, oil & gas exploration, mining, civil engineering, environmental and resource management. There's certainly no shortage of options!

Peter Little

Meteorologist
MetService

I decided that I wanted to become a weather forecaster after studying the weather in Form One. After completing my undergraduate degree at Victoria in mathematics, I decided to do some weather related research with Jim McGregor in the Geophysics Department. While completing my Masters thesis I was lucky enough to meet some very interesting postgraduate students from the department who were studying other earth sciences.

In 2001, after completing my Masters thesis, I accepted a position as a trainee forecaster with MetService. This involved nine months of training in a classroom-like environment, followed by a period of on-the-job training.

Being a Meteorologist involves studying and interpreting global, regional and local weather information from radar and satellites, weather stations, ships and aircraft, meteorological balloons and drifting buoys. Computer models provide pretty reliable forecasts of weather features, like highs and lows, over forecast periods of several days. However, they are less effective at predicting small-scale weather features like fog, sea breezes and localised showers. This is where I come in.

At MetService we have three specialised types of forecaster. These are public, marine and aviation. I spent my first three years as an aviation forecaster. For the past eighteen months I've been in the public section, which has mainly involved writing forecasts for television and radio. At times I'm also responsible for the weather graphics that appear on both TV ONE and TV3.

We work in a team and a lead forecaster oversees everything. Although there is a lot of responsibility on each individual there is also support. It's great being in a workplace around people who share a similar interest in science.

One of the most important skills I've gained from studying science is an eye for detail. In my job it is necessary to sift through vast amounts of information and be able to pick out the important things. Science subjects also teach you a lot about speed and accuracy. Throughout my University career I was required to work to deadlines yet still produce quality work. This has put me in good stead as a weather forecaster, as I am constantly working to deadlines and must produce a quality forecast.

Michael Lowry

Senior Mine Geologist
Perseverance Underground,
Leinster Nickel Operation, WMC Resources Ltd

When I first chose to take some geology papers at Victoria University I did it purely for interest's sake. I never intended to be a geologist; in fact at the time I was studying to be an engineer. However by the time I'd finished my first year courses I'd been bitten by the bug and there was no

turning back. The next year I transferred my major to geology.

Over the next three years I learnt a lot more about what makes our planet tick. From glaciers to volcanoes, dinosaurs to microscopic minerals every lesson was interesting. The other great bonus was I was never restricted to just the inside of a classroom. A lot of the time we got to work in spectacular locations such as Northwest Nelson, the Kaikouras, the Wairarapa and the Central Volcanic plateau.

After I finished my Honours degree I was faced with a difficult decision. Did I stay on and do a PhD or did I try for a job in industry? The career options are almost endless in geology. There are so many disciplines that you can become anything from a palaeontologist to a climatologist.

I chose to join the mining industry. That way I didn't have to slot into any one discipline but I could rather draw on the ones I was most interested in like structural geology, geochemistry, igneous petrology and vulcanology. It also meant I could start a career where I could travel. So I booked a one way ticket to Western Australia and within a week I had three job offers.

Over the intervening years I have gained experience in exploration geology, open pit mining and underground mining throughout Western Australia. It was with underground mining however that I found my preferred career. Being able to work with full 3D rock exposure each day is exhilarating. You really get to feel how the deposit was formed and subsequently deformed into what we see today. It's also a fantastic challenge using all of your geological skills to hunt down new orebodies.

I've found over the years that the geology degree I earned at Victoria was something extra special. I've worked with a lot of geologists in the mining industry who have come from a lot of different universities and I've learned that my studies were a lot more diverse and extensive than theirs. This has helped me no end in my professional career. Now, after just nine years, I am in charge of one of the largest and most complex underground orebodies in Australia.

Rick Henderson

Geophysicist
Swift Energy New Zealand Ltd

As a Geophysicist for Swift Energy New Zealand, the most active explorer in the Taranaki Basin, my work involves the planning and overseeing of 2D and 3D seismic data acquisition. This includes working with processing contractors to get the best out of the data before interpreting it and constructing maps of the subsurface. Mapping from these data is used to delineate oil and gas prospects, and forms a large portion of the basis for gaining funds to drill them. I also supervise geological and data acquisition aspects in these wells with the aim of building a dataset that allows a comprehensive picture of the subsurface to be built up.

As a postgraduate student, and having incorporated geophysics into my studies in geology, I had the opportunity to work as a field hand on the NIGHT (North Island GeopHysical Transect) project in 2000/2001. Later in 2001 the opportunity to spend six weeks in Antarctica beckoned. Seismic data was required in McMurdo Sound for the preparation of the approaching ANDRILL project and I was one of the lucky few chosen to go. That was an unforgettable experience.

Following the work in Antarctica I returned to Wellington to finish my MSc, and was soon offered a "one-off" chance to work for a month in Oman for Veritas as a Quality Control Seismologist. This subsequently became a permanent position. After spending a little over two years there, working with a number of other Victoria University geoscience graduates, the time came for a change and I managed to secure my current position at Swift Energy New Zealand Ltd.

A degree in earth sciences from Victoria University can open up a multitude of opportunities. High oil prices and an ageing employee base of earth scientists world wide has created job opportunities, both in and outside of New Zealand. The time I spent in Oman was a great alternative to the typical Kiwi "London" OE, and further opportunities have opened up since gaining work experience there - the key to gaining that experience was to get the degree.

GEOLOGY AND GEOPHYSICS AT VICTORIA

The School of Geography, Environment and Earth Sciences offers a full range of undergraduate and postgraduate courses in Earth Science, Geology and Geophysics. The school includes Victoria's Institute of Geophysics and the Antarctic Research Centre, and maintains close links with the Schools of Chemical and Physical Sciences and of Mathematics and Computer Science, MetService NZ, the Crown Research Institutes and several companies in the Wellington region.

For BSc degrees, students can do majors in Geology or in Geophysics; the Geophysics major can be done as a stream in solid earth or meteorology. Postgraduate courses include Honours, Graduate Diploma of Science, MSc and PhD degrees in Geology or Geophysics, a Postgraduate Diploma of Meteorology and an MSc in Petroleum Geoscience. Postgraduate studies in Geology generally require a BSc in Geology. Postgraduate Geophysics study can be carried out with degrees in either Geophysics, Maths, Physics, or Geology if a strong component of Maths is included in the Geology major.

To get detailed information on what undergraduate courses are available, and to plan your degree, you should see a prospectus, which is available online on the School's web site.

Geology and Geophysics research at VUW is broad-based, and includes tectonics, Earth structure, earthquake and volcano seismology, geochemistry, paleontology and micropaleontology, climate change studies, Antarctic geoscience, and meteorology. Many programmes involve close collaboration with MetService NZ, and Crown Research Institutes such as GNS Science and NIWA. Sample programmes are:

- climate and sea level changes during the past several million years
- the deformation of New Zealand and its plate boundary zone over the last few million years
- Neotectonics, the study of active faulting, and related landscape processes
- the history of glaciations in New Zealand and Antarctica
- History of sedimentation onshore and offshore of New Zealand and Antarctica, and its relationship to plate tectonics, climate change, and petroleum generation
- Pacific Island sediment and resource studies
- Paleontology and micropaleontology
- Earthquake seismology, seismogenesis, and seismic hazard
- Physical meteorology, including the use of mesoscale models satellite imagery and animation techniques
- Palaeomagnetism and geomagnetism; including the determination of the historical geomagnetic field from lake sediment cores
- Structural and tectonic studies, including the use of earthquakes, deep seismics, magneto-tellurics, gravity, resistivity and heat flow

Research seminars, arranged jointly with the Institute of Geological and Nuclear Sciences, Gracefield, Lower Hutt, are held regularly and lunch-time colloquia provide an opportunity for less formal discussions.

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