The link between stress, fluid flow, and subduction dynamics: Implications for offshore geohazards and resource development

Project Description

The Hikurangi subduction margin along the east coast of the North Island of New Zealand is geologically rare in that it is one of the few places in the World where shallow slow slip earthquakes have been documented. This project will utilise newly acquired data from International Ocean Discovery Program expeditions 372 and 375, together with onshore and offshore industry well datasets along the east coast to constrain, for the first time, the interrelationships between structure, stress, and fluid flow in this region. Such work will provide excellent insights into the variable seismic behaviour of this subduction margin.

The successful student will work with borehole data including core, wireline logging, and borehole image logs to characterise the stress state, pore pressure, and structural geology variation along and across the Hikurangi subduction margin. This characterisation will allow the student to produce a geomechanical understanding that relates their quantitative findings to observed seismic and subduction behaviour variation. Such research is crucial to hazard modelling and management, and petroleum resource development in his region of New Zealand.

Person Specification

- Strong background and interest in structural geology.
- Strong numeracy and mathematical skills.
- Good 3D visualisation skills.
- Ability to work with programming software (e.g. Matlab, R, Python) is beneficial.

NUI Galway Earth and Ocean Sciences

NUI Galway Earth and Ocean Sciences (EOS) is Ireland's only combined geology and oceanography department, and encourages students and researchers to think about the Earth and its oceans with a holistic approach. The successful student will join a dynamic and growing cohort of earth science graduate students, and will contribute to the passionate and exciting research environment of the EOS department. This PhD project is hosted within the Geofluids Research Group, headed by Dr David McNamara, which has a well-developed national and international reputation for research into the role of fluids in the crust. From the study of fluid reservoirs such as geothermal and petroleum, the effects of fluid on stress and tectonics, to complex fluid-rock physical and chemical interactions, the successful candidate will be joining a research group that is performing cutting edge geological science around the World.

You can find out more about NUI Galway EOS, the Geofluids Research Group.

Contact information

Information queries are welcome.

Dr David McNamara

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