Breaking the trend: why do New Zealand turbidity currents run so far?  
Evolution of a colossal turbidite channel at a convergent plate margin

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Continent-derived sand, mud, and gravel is transported to the deepest ocean basins by deep-sea river-like conduits – known as turbidite channels. The Hikurangi Channel east of New Zealand is an immense example; its length measuring some 1700 km is more than four times longer than any other located at an active continental margin. Since the discovery of turbidite channels as geomorphic features of the ocean floor, there has been rigorous debate as to what processes control their length, width, depth, and gradient. Recent research¹ shows that Earth’s longest deep-water channels correspond with mature, passive continental margins and voluminous mud-rich sediment supplies. Interestingly, these findings are inconsistent with preliminary observations of the Hikurangi Channel that today transports relatively small sediment loads of sand and gravel² across a narrow, active continental margin.

Today the Hikurangi Channel has its headwaters in the Kaikoura Canyon located off the South Island of New Zealand, where in shallow water sediment sporadically collapses into the deep abyss, spawning turbidity currents. Hikurangi Channel turbidity currents have scoured a 500 m deep and 1-10 km wide channel that travels north and east, past the North Island of New Zealand, across the Hikurangi oceanic plateau, and ultimately plunging to water depths in excess of 5600m.

Using integrated sediment core, seismic reflection, multibeam, and sidescan sonar data from NIWA's world-class repository, this project will focus on Hikurangi Channel evolution and address the following questions:

- How old is the channel and what processes led to its formation?
- What are the range, frequency and size of flows within the channel?
- How have variable sediment flux (associated with uplift of the Southern Alps and glacio-eustasy) and changing seafloor relief (linked to Hikurangi subduction) influenced the evolution of the channel?

The project will involve a range of sedimentological, geomorphological and geophysical techniques used to decipher the short-term modern flow processes (e.g. sediment core analysis, granulometric and provenance analyses, geomorphological analysis, GIS manipulation) and long-term geologic controls of channel evolution (e.g. seismic stratigraphy, sediment dating, depositional element mapping). The student will have access to analytical facilities at Auckland University, NIWA (Wellington) and Virginia Polytechnic Institute and State University.

The student will join the Process Sedimentology research Group at Auckland (Dr Strachan) and the Ocean Geology NIWA group based in Wellington. They will thus join a larger team of researchers investigating a range of marine problems. The studentship will be based in Auckland but it is anticipated
that up to 1 year will be spent at NIWA (Wellington), where the student may have the opportunity to participate on a research cruise using NIWAs deepwater research vessel the RV Tangaroa.

Training will be provided in state-of-the-art techniques including advanced process sedimentology, seismic stratigraphy, and seafloor geomorphological analyses. This combination of advanced training will provide a broad portfolio of skills which could facilitate career development in the academic, environmental or industrial sectors.

**Eligibility**

We seek a motivated and able graduate committed to becoming an independent researcher. The studentship is open to New Zealand, Australian and international candidates. We seek a graduate with a minimum upper second class BSc (Hons) degree (or equivalent) in Geological Sciences, Geology and Earth Sciences. Due to the multidisciplinary nature of this project candidates must also demonstrate a strong background or interest in sedimentology, seafloor geomorphology, or seismic stratigraphy research.

**General information**

The “Beate Schuler Doctoral Scholarship in Marine Science” at the University of Auckland is available to support this project and consists of a 3-year stipend of NZ $25,000 per annum (tax free) and university fees. Applications for the Scholarship must be made on the application form available from the Scholarships Office website: [http://www.auckland.ac.nz/uoa/cs-search-for-scholarships-and-awards?form=details&detailCode=500634](http://www.auckland.ac.nz/uoa/cs-search-for-scholarships-and-awards?form=details&detailCode=500634). Please specify THIS project when applying.

Further details are available from Dr Lorna Strachan, e-mail: l.strachan@auckland.ac.nz.

Closing date: 1st November 2012

**References**