Geophysical Research Abstracts
Vol. 21, EGU2019-5534, 2019
EGU General Assembly 2019

Revisiting the giant Ruatoria Debris Flow on the Hikurangi Margin, New Zealand: results from IODP Expeditions 372 and 375, Site U1520

Davide Gamboa (1), Phil Barnes (2), Rebecca Bell (3), Greg Moore (4), Joshu Mountjoy (2), Matteo Paganoni (5), Michael Clennel (6), Ann Cook (7), David McNamara (8), Michael Underwood (9), Hannah Rabinowitz (10), Atsushi Noda (11), Francesca Meneghini (12), Steffen Kutterolf (13), Yoshitaka Hashimoto (14), Christie de Oliveira (15), Ingo Pecher (16), Laura Wallace (17), and Damian Saffer (18)

(1) British Geological Survey, Cardiff, United Kingdom (davide@bgs.ac.uk), (2) National Institute of Water and Atmospheric Research (NIWA), Wellington, New Zealand, (3) Imperial College, London, United Kingdom, (4) SOEST, University of Hawaii at Manoa, USA, (5) Oxford University, Oxford, United Kingdom, (6) CSIRO, Perth, Australia, (7) Ohio State University, Columbus, USA, (8) National University of Ireland, Galway, Ireland, (9) New Mexico Institute of Mining and Technology, Socorro, USA, (10) Lamont-Doherty Earth Observatory, Columbia University, New York, USA, (11) Research Institute of Geology and Geoinformation, National Institute of Advanced Industrial Science and Technology (AIST), Geological Survey of Japan, Japan, (12) Università degli Studi di Pisa, Pisa, Italy, (13) GEOMAR, Christian-Albrechts-Universitat zu Kiel, Kiel, Germany, (14) Kochi University, Kochi, Japan, (15) Universidade do Vale do Rio dos Sinos, São Leopoldo, Brazil, (16) University of Auckland, Auckland, New Zealand, (17) GNS Science, Lower Hutt, New Zealand, (18) The Pennsylvania State University, State College, USA

Submarine landslides are recurrent features along the Hikurangi Subduction Margin, offshore New Zealand, occurring in high numbers within depositional forearc basins and the subduction trough. The sedimentary sequences of the Hikurangi Trough located between the deformation front and Tūranganui Knoll were drilled for the first time at Site U1520 during IODP Expeditions 372 and 375. This drill site intersected the toe domain of the giant Ruatoria Debris Flow (RDF). Despite being one of the largest submarine avalanches yet identified on Earth, the RDF is drastically understudied and many outstanding questions regarding its morphology, internal composition and complexity, and emplacement mechanisms are still unanswered.

Here we integrate observations from 2D seismic profiles, Logging-while-drilling (LWD) data acquired during Expedition 372 and sediment cores retrieved during Expedition 375 for a preliminary characterisation of the RDF. The RDF is seismically distinct from the bounding seismic units at Site U1520, showing low to moderate amplitudes. Internal reflections vary from chaotic to stratified in places. Intra-RDF imbricated thrusts are observed on seismic data, especially on the western edge. Synthetic logs show a good correlation between seismic and logging units. LWD data indicates that the top of the RDF is at 107 mbsf and the base at 225 mbsf. Sediment cores retrieved from Site U1520 indicate approximate values for the top of the RDF, intersecting it at 110 mbsf, but the base was not sampled. Although the RDF log signature is well delimited and distinct from the adjacent logging units, lithofacies analysis from cores do not show marked changes from overlying turbidite units. This suggests Site U1520 intersected the RDF at a rafted block with no deformation. Future work aims to characterise the dynamics and local vs distant sources of sediment remobilised by the Ruatoria Debris Flow.