IGCP-640 – S4SLIDES- Significance of Modern and Ancient Subaqueous Slope LandSLIDEs

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Background

The S4SLIDE project (IGCP-640) builds upon the extremely successful E-MARSHAL and IGCP-511 projects also known as the Submarine Mass Movements and Their Consequences project. As with its predecessors, the IGCP-640 project focuses on facilitating the interaction of scientists, engineers, industry and government representatives, and other parties interested in submarine mass movements and their geohazard potential. It has been widely recognized that subaquatic landslides are of common occurrence in lacustrine and marine environments. These events have commonly been referred to as submarine landslides in the literature. They pose a risk to coastal communities and offshore infrastructure. During the past decades geoscientists have made important contributions towards the improved understanding of submarine landslides. Efforts by the geo-modelling community have helped filling the gap between submarine landslide occurrence, dynamics and tsunami genesis. However, our lack of understanding of the triggers and subsequent failure processes as well as the timing of submarine landslides has hampered progress in the prediction effort, which is essential to implement appropriate mitigation measures. Complex issues like these can only be addressed through a multidisciplinary approach. Interest in the study of submarine landslides spans a wide range of disciplines: engineers evaluating geotechnical risks, geologists studying the link with climate change and pre-conditioning factors, planetary geologists using submarine landslides as terrestrial analogs, and petroleum geologists evaluating the seal/reservoir capacity of ancient submarine landslides. This project seeks to create an international and multidisciplinary platform allowing geoscientists from academia and industry to sustain a dialogue conducive to the integration of findings from different fields into a more cohesive understanding of submarine landslides. More information about IGCP-640 scope and activities can be obtained visiting the S4SLIDE webpage (link).

Reporting on S4SLIDE Activities – 2015

The 7th International Symposium on Submarine Mass Movements and Their Consequences took place in Wellington, New Zealand, from November 1st-7th, 2015. Its objectives were to share the latest technical accomplishments and advancements in the topic of submarine landslides within the broader scientific community, to discuss as a community the nature of the technical challenges in the realm of submarine mass movement research, to define/discuss future directions and actions to address those challenges, to stimulate engagement of students and younger researchers from a wide range of technical, geographical and cultural backgrounds and to foster an environment of international cooperation conducive to the initiation of new projects and activities. In addition, the event included pre- and post-conference field trips. The pre-conference field trip visited a geologic transect through a section affected by Quaternary active faulting of the southern Hikurangi margin in New Zealand. The post-conference field trip concentrated in the spectacular outcrop exposures along the coastal areas of northern Taranaki where seismic scale

outcrops can be visited. Outcomes and accomplishments of this meeting included: (1) sixty-one peer-reviewed papers that were published as part of the Advances in Natural and Technological Hazards Research series by Springer, (2) attendance of ninety scientists and students that represented twenty-three countries and (3) discussions on the potential scope of future activities, as well as publication strategies to increase visibility among other geoscience disciplines. The local organizing committee, in conjunction with S4SLIDE (IGCP-640) offered eleven grants to students and young

Participants visiting ancient submarine landslide outcrops as part of the post-conference field trip in New Zealand. Picture by Greg Browne (GNS Science)

Conveners and Editorial Team: Joshu Mountjoy (NIWA), Geoffroy Lamarche (NIWA), Suzanne Bull (GNS), Tom Hubble (The University of Sydney), Sebastian Krastel (University of Kiel), Emily Lane (NIWA), Aaron Micallef (University of Malta), Lorena Moscardelli (UT@Austin, now at Statoil R&T), Christof Mueller (GNS), Ingo Pecher (The University of Auckland) and Susanne Woelz (NIWA)

Field trip organizers: Greg Browne (GNS Science), Malcolm Arnot (GNS Science), Lorna Strachan (University of Auckland), *Sebastian Cardona (Colorado School of Mines) *PhD Student

S4SLIDE grantee Kamaldeen Omosanya and colleague Dicky Harishidayat presenting their poster at AGU 2015, on Recurrent Mass-Wasting Deposits in the SW Barents Sea

Conveners of the AGU S4SLIDE session: Derek Sawyer (Ohio State University), Lorena Moscardelli (UT@Austin, now at Statoil R&T), Joshu Mountjoy (NIWA) and Jean-Sebastien L'Heureux (NGI).

researchers with a variety of technical, geographical and cultural backgrounds. The conference was hosted by the National Institute of Water and Atmospheric Research in New Zealand (NIWA) and the leader of the local organizing committee was Dr. Joshu Mountjoy (NIWA).

A special S4SLIDE sponsored session on “Submarine Landslides and Their Consequences – A multidisciplinary Approach” was also hosted as part of the 2015 AGU Fall Meeting in San Francisco. Eleven oral presentations and eleven posters were part of this special session (Links to oral <https://agu.confex.com/agu/fm15/meetingapp.cgi/Session/8848> and poster <https://agu.confex.com/agu/fm15/meetingapp.cgi/Session/11087> programs). In addition Dr. Kamaldeen Olakunle Omosanya, who holds a postdoc position with the Norwegian University of Science and Technology, was awarded an IGCP-640 grant. S4SLIDE co-chairs were also invited to deliver a talk on the “Advancements in Understanding of Deep-Sea Clastic Sedimentary Processes” session (link to abstract <https://agu.confex.com/agu/fm15/meetingapp.cgi/Paper/60581>); during this talk the scope and objectives of the IGCP-640 project were presented to a broader audience of geoscientists working on deepwater marine environments.

Future S4SLIDE Engagement and Activities– 2016

Monitoring of active submarine landslides has been elusive, but the aftermath is clear; destruction of seafloor infrastructure, disruption of biota, and coastal inundation caused by landslide-generated tsunamis. The submarine mass movement community has spent many

years characterizing submarine landslides using marine and outcrop data; however, our ability to predict the occurrence of these events or to identify their causal mechanisms (pre-conditioning and triggers) still remains limited. This realization has encouraged researchers working on these issues to broaden the search for natural laboratories where active submarine landslides can be monitored. A series of special sessions tackling these issues have been planned for the 2016 calendar year where contributions from researchers monitoring and characterizing active subaqueous landslides in lakes and fjords have been solicited. Case studies involving the study of subaerial landslides that transition into coastal environments are also of interest to these sessions. Discussions regarding similarities, differences and implications related to the cross-pollination of knowledge between the subaerial and subaqueous landslide communities are encouraged, as well as the definition of new challenges and research directions regarding the study of mass wasting deposits in general.

“Subaerial and Submarine Landslide Processes and Hazards” as part of the 35th International Geological Congress in Cape Town, South Africa, 27th August to 4th September. Session chairs: Aaron Micallef (University of Malta), Claudio Lo Iacono (National Oceanography Centre), Stefan Grab (University of the Witwatersrand), and Mauro Soldati (Università di Modena e Reggio Emilia)

“Comparing and Bridging Subaerial and Subaqueous Mass Movement Processes and Concepts” as part of the 12th International Symposium on Landslides in Naples, Italy, 12-19th June. Session co-chairs: Aggeliki Georgiopolou (UCD), Jaques Locat (Université Laval), Aaron Micallef (University of Malta), Francesca Budillon (Istituto per l'Ambiente Marino Costiero)

“Bridging the Gaps on Subaerial, Lacustrine and Submarine Landslide Research” as part of the GSA Annual Meeting in Denver, USA, 25-28th September. Session co-chairs: Lorena Moscardelli (UT@Austin, now at Statoil R&T) and Lesli Wood (Colorado School of Mines)

The S4SLIDE project also would like to announce that the 8th International Symposium on Submarine Mass Movements and their Consequences (2018) will be hosted by the Institute of Ocean Sciences in British Columbia.