



Scientific ocean drilling behind the assessment of geo-hazards from submarine slides

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Submarine slope instabilities represent a geohazard for their destructive potential on nearshore structures and life and offshore seabed structures, as well as for their tsunamigenic potential, and for their capability of methane gas release into the sea-water and atmosphere. A recent workshop on “Scientific ocean drilling behind the assessment of geo-hazards from submarine slides” held in Barcelona in October 2005 reviewed the current state of knowledge on submarine slope failures and how could scientific drilling contribute to improve our knowledge of the process and help to mitigate the derived risks. The workshop gathered fifty scientists and representatives of private companies, mainly from the European area, representing a wide spectrum of disciplines such as geophysics, stratigraphy, sedimentology, paleoceanography, marine geotechnology, geotechnical engineering and tsunami modelling.

During the workshop, it was agreed that scientific drilling offers a possibility to answer a number of scientific questions amongst which: a) What is the frequency of submarine slides? b) Which was the tsunamigenic potential of past submarine slides and which is the tsunamigenic potential of un-failed submarine slopes? c) Do precursory phenomena of slope failure exist? d) Can we monitor seafloor gravitational movements such as creep? e) What makes up weak layers in mid latitude continental margins? And when and under which circumstances do weak layers form? Scientific drilling also offers the possibility to test at least two existing hypotheses on basic mechanisms of submarine slides generation and of massive releases of gas: a) Focussing of fluids and lateral transfer of stresses under variable overburden on permeable layers and b) Proof the link between methane emissions during rapid climatic changes and submarine slides.

Workshop participants agreed that both Mega slides and smaller size slides should be addressed by drilling where slope instability is recognized as a recurrent phenomenon in the stratigraphic succession. Not only sediments that have failed should be studied, but also sediments that are presently undergoing deformation and un-failed slopes should be addressed. The drilling strategies should include classical stratigraphic drilling, dedicated geotechnical drilling, and installation of borehole observatories as well as seafloor observatories.

An IODP pre-proposal will be submitted in April 2007 to address a suite of medium size submarine slides in different geological environments.