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Are ash layers the controlling factor on translational sliding?

Harders, R. (1), Brückmann, W. (1), Feeser, V. (2), Kutterolf, S. (1), Hensen, C. (1), Moerz, T. (3)

(1) SFB 574, Christian-Albrechts-Universitaet zu Kiel, Kiel, Germany, (2) Institut für Geowissenschaften, Germany, (3) MARUM, Zentrum fuer marine Umweltwissenschaften, Bremen, Germany (rharders@ifm-geomar.de / Phone: +49431-6002564)

The erosive convergent margin of Central America is dominated by a fast subduction (8,5 mm/year) of the rough Pacific Plate. Offshore Costa Rica the morphology of the oceanic plate is characterized by the thick Cocos Ridge and its northwestern adjacent seamount province. Seamount subdcuction offshore Costa Rica causes massive slumps and sediment collapses on the slope. Offshore Nicaragua instead of major seamounts, bend faults dominate the plate morphology. In both areas subduction of a rough relief results in erosion of the frontal prism, local slope uplift and subduction erosion at the base of the upper plate which oversteepens the continental slope, leading to slope failures. Our investigations focus on translational slides offshore Nicaragua with less influence of seamount subduction and therefore less local slope uplift than offshore Costa Rica. These translational slides with a typically low thickness to length ratio indicate that the failure occured along a week layer. Three translational slides of different scales were investigated by gravity coring during M66 expedition in autumn 2005. On board sediment property investigations of two slide locations revealed silty to sandy ash layers situated on top of older and over consolidated clayey sections, beneath much younger and less dense clay sections. This jump to higher densities below an ash layer led to the assumption, that the over consolidated material represents the basement of a slide, with an ash layer acting as the failure plane. The recovered cores showed, that numerous up to 5 cm thick and highly permeable ash layers are intercalated with sharp boundaries to marine clays in average of every 90 cm. Compared with the pelagic clays these ash layers have not only much higher intrinsic permeabilities, but they consist also of disc shaped glass shards which causes

high consolidation rates when they are sheared. This is proved by our first laboratory shear box tests, where ash matter compacted with much higher values than spherical grain shaped reference material. Both factors together could cause a peak pore pressure if ashes compacted rapidly, for instance in a seismic event. Peek pore pressures would effectively reduce the shear strength between the ash particles or the clay - ash boundary, facilitating translational failure. To test this hypothesis and to analyse the relation between pore water pressures and shear strengths under drained conditions, we will modify a shear box, to simultaneously measure pore water pressure and shear strength. We will present field observations from cruise M66 as well as first results from laboratory deformation experiments, supporting our model.