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Slope Stability in the Andøya Canyon of the Norwegian Margin

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The Andøya Canyon (AC) is located on the narrowest (50 km) and steepest part (3.5°) of the northern Norwegian margin. The area, characterized by several canyon systems, is bordered by two major slides, the Traenadjupet slide in the south and the Andøya slide in the north. The AC has a total length of ~50 km, and its morphology develops from a pronounced V-shape at the head (~1 km deep and 1 km width) to a U-shape in the intermediate part (depth about 600 m and 8 km width) and extends into a deep-sea channel. The dataset is composed of seismic reflection profiles recorded with 2 different sources: a 2x40 in3 sleeve gun array (perpendicular to the axis of the AC, ~100 km profiling) and a low frequency 32 gun array regional survey. We recently collected highly-detailed swath bathymetry data (EM 300) across the major part of the canyon system. Slope instabilities within the canyon can be divided into two regions: the eastern and the western flank. On the western flank a variety of features are observed. At the canyon head, submarine sliding is documented by the significant sediment accumulation in the canyon axis blocking the canyon pathway. Multi-beam data show evidence of several depressions like slides scars. The low-resolution seismic profiles (multiple guns array) provide evidence for the presence of several faults underneath this part of the canyon, both shallow and deep faults which are potentially weakened stability zones. The intermediate part of the canyon shows very asymmetric flanks: the western flank lies significantly deeper than its eastern counterpart. A major slide, having a head wall width of approx. 8 km and a height of approx. 500 m, has been identified on the MB bathymetric data. From a first interpretation, this slide resembles a retrogressive slope failure with axis parallel to the canyon axis. Seismic reflection data from the western flank indicate a hummocky seafloor and several sediment blocks suggesting frequent mass wasting events. On the low-resolution seismic

data, we found evidence for some faults located within the canyon area. Slide blocks also occur in the downslope area in the distal part of the canyon. No major mass wasting is observed on the eastern flank of the canyon, even though this flank is affected by a series of closely-spaced and parallel small erosional features like gullies. The ages of the slope failure of the AC are presently unknown.