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Revisiting the Andøya Slide offshore northern Norway

Daniel Hesjedal Wiberg (1), Jan Sverre Laberg (1), Tom Arne Rydningen (1), Matthias Forwick (1), and Lukas Wacker (2)

(1) Department of Geosciences, UiT The Arctic University of Norway in Tromsø, Tromsø, Norway (daniel.h.wiberg@uit.no), (2) ETH Laboratory of Ion Beam Physics, Zürich, Switzerland

The extent of the Andøya Slide on the northern Norwegian continental slope was originally estimated to about 9700 km2, with a run-out distance of about 190 km, based on GLORIA side-scan sonar imagery and echo sounder profiles (Dowdeswell et al., 1996; Laberg et al., 2000). By these estimates, the Andøya Slide is the third largest submarine landslide along the Norwegian continental margin, after the Storegga and Trænadjupet slides. However, more recently Rydningen et al. (2015) showed that the upper slide scar is restricted to the Andfjorden Trough Mouth Fan and therefore smaller in extent than previously though. The slide have also been interpreted to be of Holocene age, mainly based on the rugged morphology and exposed pre-Holocene interglacial sediments within the slide scar (Laberg et al., 2000).

New data from the distal part of the Andøya Slide collected in 2014 and 2016 include swath-bathymetry, high-resolution 2D seismic (Chirp) profiles and 9 sediment cores. The new bathymetry data extends further downslope than previous maps of the Andøya Slide, thus allowing for a more comprehensive mapping of the lower slope morphology. The new map confirms the findings that the Andøya Slide is smaller than previously estimated, mostly due to the exaggerated extent of its presence on the upper slope, making it appear larger towards the north in the GLORIA data. The slide covers ∼2200 km2, which can be considered a minimum estimate as the slide continues downslope beyond the surveyed area.

The most prominent feature in the distal area of the slide is a 15 to 20 m deep meandering channel, which forms the continuation of a “braided” network of channels further upslope. The channel broadens downslope from ∼300 m to ∼2.2km, and continues for ∼50 km on the lower slope out of the surveyed area. The channel system is most likely formed by erosion from turbidity currents, and deposits from these are observed in sediment cores collected in the lower part of the slide. The failed sediments are inferred to have transformed into turbidity currents, which were erosive also in the distal part of the slide. Similar channel systems have not been identified in distal parts of other giant submarine landslides offshore Norway. We present the general morphology of the Andøya Slide, the upper stratigraphy and ages of the turbidity currents, and discuss factors leading to the formation of the channels.