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# Insights from new high-resolution data from the Traenadjupet Slide on the Norwegian margin

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Submarine landslides are among the largest mass flows on Earth and can be far larger than landslides on land. They can generate tsunami and therefore represent a significant geohazard. A series of large submarine landslides have been studied previously in unusual detail along the Norwegian continental margin, including the Storegga and Traenadjupet Slides. The most closely studied is the Storegga slide(1,2) which occurred 8.2k BP and moved >3,000 km3 of sediment(2). A tsunami with run up heights sometimes reaching 20m high has been identified from deposits mapped along the Norwegian, Shetland and mainland Scottish coasts (1).

The Traenadjupet Slide is the second largest slide on the Norwegian margin with a volume of about 900km3. It has been dated to ∼4k BP(3,4). The volume is comparable to that of the Storegga Slide. However, no major tsunami deposit at 4ka has yet been mapped that links to the Traenadjupet Slide (Stein Bondevik, pers. comm.).

The purpose of this study is to obtain new insights into how the Traenadjupet Slide was emplaced. In particular, why did movement of 900km3 of sediment during the Traenadjupet Slide fail to produce a major tsunami at 4ka? We present a new field dataset for the Traendajupet Slide including MBES bathymetry, sub-bottom profiles, and piston cores acquired during the 64PE391 research expedition in July 2014, together with data acquired previously during the JCR51 cruise. These datasets cover a large part of Traenadjupet slide and give new insights into the mechanism of the slide failure. The Traenadjupet Slide morphology is very different to that of the Storegga Slide. The Storegga Slide disintegrated generating debris flows and turbidity currents that propagated for hundreds of kilometres. The Traenadjupet Slide, on the other hand, appears not to have disintegrated in a similar manner, but rather left thick mounded deposits at the foot of the slope(5). Several distinct lobes covered with 500m-scale sediment blocks are visible from the new multibeam data at the foot of the slide, indicating minimal sediment disaggregation. The upper part of the slide has several distinct scars and internal headwalls. In particular, a 150 m high headscarp is visible from the bathymetry at water depths of ∼2 km. It is possible (but unproven) that this headscarp could record a separate event from the main Traenadjupet failure, whose headscarp is located in shallower water. Dating work is ongoing to establish a robust chronology. Both a lack of disintegration and (more speculatively) multistage failure may help to explain the lack of a major associated tsunami. Together with international collaborators, we now aim to test different landslide emplacement scenarios using simple models to assess the tsunamigenic potential .

1.Bondevik et al. The Storegga tsunami along the Norwegian coast, its age and runup. Boreas(1997).
2.Haflidason et al. The Storegga Slide: architecture, geometry and slide development. Mar.Geol.(2004).
3.Laberg et al. The Trænadjupet Slide: a large slope failure affecting the continental margin of Norway 4,000 years ago. Geo-MarineLett.(2002).
4.Haflidason et al. Holocene sedimentary processes in the Andøya Canyon system, north Norway. Mar.Geol.(2007).
5.Laberg et al. Frequency and triggering mechanisms of submarine landslides of the North Norwegian continental margin. Nor.J.Geol.(2006).