

Traces of major landslides in marine clay and a possible Mid Holocene tsunami at Alta, northern Norway

Louise Hansen^a, Anders Romundset^a, Georgios Tassis^a, Daniel Wiberg^a, Malin Andersson^a, Lina Gislefoss^a and Sigrid Elvenes^a

^aGeological Survey of Norway (NGU), Leiv Eirikssonsvei 39, 7491 Trondheim, Norway, louise.hansen@ngu.no

A combined morphological and sedimentological study of the Alta area reveals a fjord-valley landscape affected by several landslide events and a possible tsunami. The investigations presented here are part of an ongoing Quaternary mapping project, combined with a research project on acid sulfate soils. The work involves the study of landforms from fieldwork and LiDAR data, and of sediments through logging of sections and cores, and the collection of samples for radiocarbon dating. Subsurface structures are studied through geophysical techniques, including GPR and marine seismics (TOPAS). Large landslide pits in fjord-marine clays (possibly up to more than 25 million m³) and associated landslide deposits testify to dramatic, pre-historic failures along the Altaelva and Tverrelva rivers. Radiocarbon dating of organic material from one major pit at Alta prestegård gave a minimum age for the landslide event of around 2000 cal. years BP. A landslide scar in fjord-marine deposits with a backscarp up to 15 m high and a volume of at least 250.000 m³ is also present along the shoreline at the UNESCO World Heritage rock art site at Hjemmeluft. In addition, a few landslide-like pits with smooth and gently curved backscarps facing Altafjorden have been identified at Bossekop. The associated debris have been mapped on the adjacent sea floor at both locations. Considering the widespread landslide activity and estimated ages of the landslide events, they must have affected people living in the area during the Holocene. In addition, sedimentological and morphological evidence of a possible Mid Holocene tsunami has been discovered. Radiocarbon dating of wood fragments in sandy deposits suggest that the event occurred close to 5 ka cal. years BP.