



Project acronym: GEOPRO

Project title: Combining near-surface geophysics and sedimentology to assess proglacial sediments at Midtdalsbreen, southern Norway

Project leader: Hannah Watts, Stockholm University, Sweden

Discipline: Finse Alpine Research Centre (Norway)

Station(s): Earth Sciences & Environment: Other - Earth Sciences

Near-surface geophysics offers considerable potential for non-destructive imaging of the subsurface within environmental science, but the use of multiple geophysical methods (i.e. ground penetrating radar (GPR) and seismic reflection) remains limited. One such area is glacial geology: the existing geophysical studies have mainly focused on landforms and sediments produced by ice sheets, often in marine settings. Few studies have applied near-surface geophysics to smaller landforms in terrestrial glacial environments. A multi-method geophysical approach would allow quantitative analysis of mechanical properties of glacial sediments and is likely the only way to image the architecture of complex, relatively shallow and small-scale glacial sedimentary sequences. Detailed knowledge of surface and subsurface glacial geology is required to provide empirical data on past glacier behaviour over different timescales. This study aims to establish a multi-disciplinary methodology including near surface geophysical techniques alongside sedimentary logging to better understand and derive crucial glaciological and climate data from glacial landforms on the foreland of Midtdalsbreen, southern Norway. The benefits and limitations of multiple geophysical techniques will be assessed. Successful methods will be applied to determine the impact of sediment volumes and mechanical properties on the geomorphology of features such as moraines and flutes on the glacier foreland. The geophysical methods used will be GPR with central frequencies of 30 MHz, 50 MHz and 100 MHz and seismic reflection; the results from these surveys will subsequently be ground-truthed using sedimentological logging. These methods will be deployed across prominent landforms, identified during a site visit in September 2018.