

Geomorphological map and event stratigraphy of Lake Hallstatt

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Lake-floor morphology can reveal detailed information about mass movement activity and sedimentary processes in a lake as reported from recent studies in alpine lakes. For Austrian lakes however, state-of-the-art high-resolution multibeam bathymetry data for Earth Science applications is sparse. Here, we present results of a recent bathymetric survey with the Kongsberg EM2040 multibeam system in Lake Hallstatt, providing a high-resolution digital terrain model of the lake floor (1m raster resolution, dm-scale vertical resolution). Data acquisition and analysis were carried out as part of the Facealps project, which is funded by the Austrian Academy of Sciences.

Several geomorphological features were characterised and distinguished to create a geomorphological map of the lake floor. Deposits of numerous mass movements can be observed in the lake-floor morphology and have been mapped to gain a better understanding of the spatial distribution of mass-movements in the lake. Headwalls on steep, sediment-covered subaquatic slopes show source areas of mass movement deposits on the lake floor, while other deposits can be linked to terrestrial mass-movement activity on the steep slopes above the lake.

The event chronology of Lake Hallstatt was established by combining the bathymetry with information from sediment cores, reflection seismic profiles and historic reports. Some deposits of mass movements in the southern lake basin correlate well with historic reports of earthquakes in 1895, 1892 and 1890 and can be interpreted as earthquake-triggered mass movements.