

Minor moraine formation in the Schwarzensteinkees, Austria, alpine foreland since 1800

Cianna E. Wyshnytzky

Cianna E. Wyshnytzky, School of Geography, Queen Mary University of London,
c.e.wyshnytzky@qmul.ac.uk

Project summary

This study is aimed at elucidating the mechanisms of moraine formation responsible for creating groups of closely spaced minor moraines in the foreland of Schwarzensteinkees, Austria (Figure 1). This includes investigating the potential controls on minor moraine formation, in regards to where, when, why, and how these moraines form and how this compares to other studies that investigate similar landforms. Funding from the BSG Postgraduate Research Grant was used for fieldwork in July 2015. This particular funding went towards the costs of accommodation at the Berliner Hütte and travel from England to Austria. This grant was also instrumental in obtaining additional funding from other organization.

Methodology

Fieldwork focused on detailed geomorphological and sedimentological descriptions of minor moraines in the foreland. Geomorphological mapping of the foreland included a combination of field observations and aerial imagery. The geomorphology of minor moraines in the foreland as explore through basic measurement methods and included length of the entire moraine and width in representative locations (measured with a tape measurer), slope angles at representative locations (measured with a clinometer), and the orientation as a whole or in sections (measured with a compass). Additionally, two zones of the foreland were explored by collecting terrestrial laser scanning data, and these results are still pending. Historical imagery (photographs and maps) were also used to help unravel the geomorphological evolution of the valley. Five moraines were excavated perpendicular to ridge crests. This allowed for observations and measurements of sedimentological landform architecture, e.g. bed or facies thickness and contacts, geometry, and deformation structures. Sedimentological observations and measurements included sediment composition and size and clast roundness and form. Control samples from subglacial, supraglacial, fluvial, talus, and lateral moraine environments were measured to compare to exposure samples. Additionally, ground penetrating radar was used to investigate the subsurface architecture of one area of the foreland, and these results are still pending.

Results

The Schwarzensteinkees foreland contains numerous minor moraines that formed from approximately 1850 to 1930. These moraines are restricted to two zones of the foreland, separated by a broad, flat zone and a long, sloping zone. These moraines all formed through a standard pushing mechanism, which incorporated dominantly proglacial outwash, and till in one location, into moraines that mark the location of the ice front. The primary control on minor moraine formation and associated geomorphological evolution of the foreland appears to be the signature of a former proglacial lake that existed around 1817.

Figure 1 The Schwarzensteinkees study area. A) Glaciers of the upper Zemmgrund are labelled. The Berliner Hütte is labelled and indicated with a star. B) The Schwarzensteinkees foreland. Boxes indicated the extents of C and D. C) The down-valley cluster of terminal moraines. D) The up-valley cluster of terminal moraines. All imagery was collected from Google Earth.

