

EGU21-2163

<https://doi.org/10.5194/egusphere-egu21-2163>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## The sediment-landform assemblage in the forefield of the Gepatsch Glacier, Tirol, Austria and its preservation potential

**Daniel Le Heron**<sup>1</sup>, Bethan Davies<sup>2</sup>, Lars Scharfenberg<sup>1</sup>, Christoph Kettler<sup>1</sup>, Michael Ketterman<sup>1</sup>, Gerit Griesmeier<sup>3</sup>, Rhiannon Quinn<sup>2</sup>, Lukas Eder<sup>1</sup>, Xiaoshuai Chen<sup>4</sup>, Thomas Vandyk<sup>2</sup>, and Marie Busfield<sup>5</sup>

<sup>1</sup>University of Vienna, Faculty for Geography, Earth Sciences and Astronomy, Department of Geology, Vienna, Austria (daniel.le-heron@univie.ac.at)

<sup>2</sup>Department of Geography, Royal Holloway University of London, Surrey TW20 0EX, UK

<sup>3</sup>Geological Survey, Neulinggasse 38, 1030 Vienna, Austria.

<sup>4</sup>Institute of Geology, Chinese Academy of Geological Sciences, No. 26 Baiwanzhuang Street, 100037 Beijing, China

<sup>5</sup>Department of Geography and Earth Sciences, Aberystwyth University, Llandinam Building, Penglais Campus, Aberystwyth SY23 3DB, UK

Ongoing monitoring of the Gepatsch Glacier, Tirol (Austria) consists of a multifaceted, interdisciplinary project which aims to characterise short term (diurnal in the summer melt season) and longer term (annual to decadal) changes to the glacier snout and forefield in the context of a rapid retreating valley glacier. The glacial valley and forefield comprises amphibolites, para- and orthogneisses that have been smoothed and striated into whalebacks, compound bedrock-sediment bedforms (crag and tail structures), flutes, and annual moraines. The glacial sediments and landforms are undergoing incision and terrace development by meltwater streams. As part of a long term goal to characterise the rates of erosion, sedimentation, and re-deposition, we return to the same site each year in mid-July to collect airborne data with an UAV (Mavic Pro drone) that allows us to produce orthophotos and digital elevation models. We compute the daily and annual elevation changes, allowing us determine zones of erosion and deposition. Measureable evidence for erosion of flutes in the immediate glacial forefield has occurred over a 12-month time period. Till deposited within the last 20 years has undergone substantial mass wasting and re-deposition as subaerial mass flows, or reworked into stream deposits. The lee side of many whaleback structures completely lacks subglacial sediment, and contains instead a sand and gravel deposit interpreted to result from waterlain deposition. Thus, this case study area offers insight into the rates of erosion and deposition in a complex, proglacial setting, allowing some of these processes to be quantified for the first time. This approach is expected to yield a better understanding of the preservation potential of proglacial sedimentary facies, and hence their preservation potential in Earth's sedimentary record.