Ice-marginal processes and retreat dynamics of the plateau icefield Hardangerjøkulen in southern Norway

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Plateau icefields are particularly susceptible to climate change because a small rise in equilibrium line altitude (ELA) can lead to a significant expansion of the ablation area, triggering rapid icefield recession (cf. *1*). However, the degree to which icefield recession dynamics are influenced by local, non-climatic factors has been underexplored. This gap was addressed at the southern Norwegian plateau icefield Hardangerjøkulen, which has undergone significant retreat since the Little Ice Age (LIA; ca. AD 1750) (*2, 3, 4*).

The aims of this project were to use the glacial landform record produced at the LIA glacier maximum extent and subsequent recession to **(1)** assess the response of Hardangerjøkulen to climate change since the LIA, and **(2)** explore the extent to which this response has been influenced by local topographic and hypsometric factors. This was achieved through a combination of geomorphological mapping and sedimentological fieldwork.

The project identified the LIA limit of Hardangerjøkulen and documented the retreat pattern of Hardangerjøkulen's southern outlet glaciers from the LIA maximum to present (Fig. 1). Mapping indicates that the southern outlets Rembesdalskåka, Vestra and Austra Leirebottsskåka have each lost an area of between ca. 1.4 and 2.4 km^2 since the LIA. A geomorphological map of the LIA maximum extent and subsequent retreat of the icefield is currently in preparation. This will be the first-ever map showing the LIA landform record of the entire icefield. The LIA limit and post-LIA recession had previously been mapped in detail only at two of Hardangerjøkulen's northern outlet glaciers, Midtdalsbreen and Blåisen (*2, 5*).

Field data concerning how the response of Hardangerjøkulen to changes in climate is influenced by factors such as topography and glacier hypsometry is currently being analysed, and results are pending.

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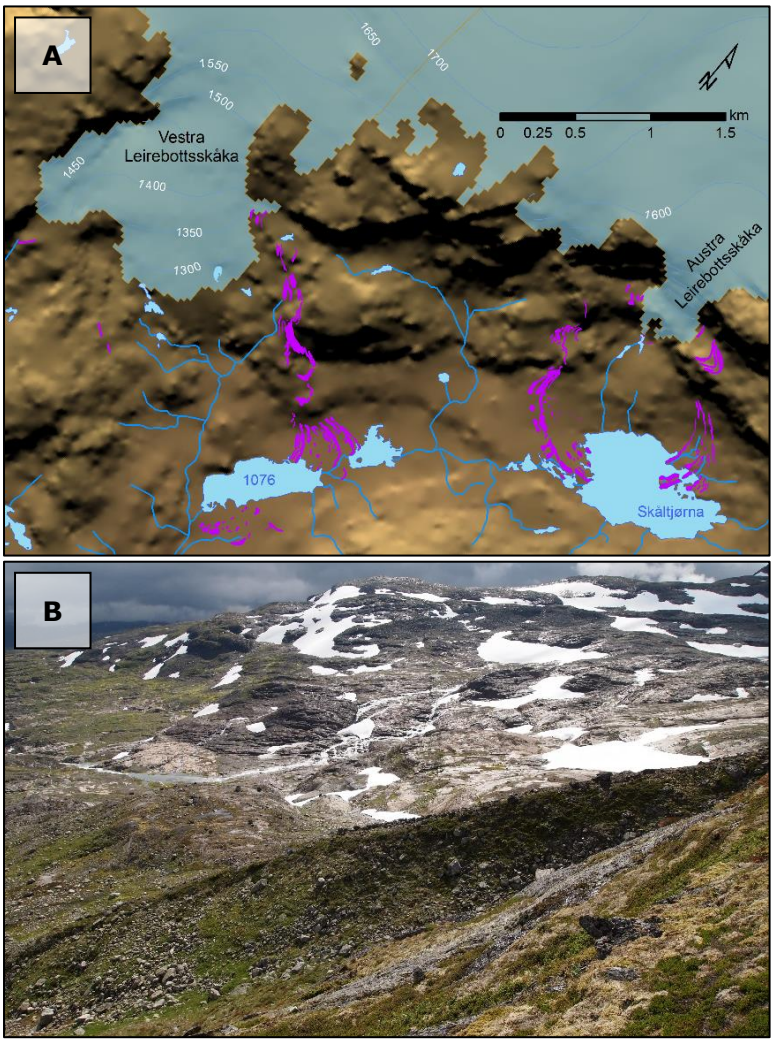

Figure 1 Glacial landforms around the southeastern side of Hardangerjøkulen. **A.** Spatial distribution of ice-marginal moraines (in purple) around the southeastern outlet glaciers Vestra and Austra Leirebottsskåka. **B.** Highest (LIA) lateral moraine (foreground) on the northeastern valley side at Vestra Leirebottsskåka. The extensive, glacially-scoured bedrock basin beyond the lateral moraine was covered by ice during the LIA and indicates the magnitude of glacier retreat since then. View towards the south. Glacier retreat was from the left to the right of the picture (up-valley).

References

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