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# Structural dynamics and calving behaviour at Fjallsjökull, South-East Iceland

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Ice loss from outlet glaciers poses an increasing threat to society, through sea-level rise and glacial hazards, making it important to understand the complex set of factors which determine a glacier's response to current climate warming. Icelandic outlet glaciers and ice caps have demonstrated a high level of sensitivity to climate warming, and have shrunk rapidly since the 1980s. This project therefore combines multiple remote sensing and field-based techniques to investigate the controls on calving behaviour at Fjallsjökull; a major outlet glacier of the Vatnajokull ice cap, South-East Iceland, which terminates in a pro-glacial lake. A combination of satellite and aerial imagery has been used to map glacier structure in 1982, 1994 and 2011, and changes in fracture density and orientation at the snout will be assessed in the next phase of the project. Furthermore, changes in glacier retreat rates and lake area will be determined from remotely sensed imagery at a multi-annual resolution, between the years 1973 and 2016, contingent on data availability. This imagery will also be used to determine glacier velocities and their evolution over time, using the feature tracking software COSI-CORR. Results from remotely sensed data will be combined with field observations, in order to determine the dominant controls on calving and ice loss. Preliminary results reveal the structural architecture at the glacier terminus to be dominated by a number of dextral strike-slip shear zones. These shear zones offset the ogive banding within the ice, providing evidence of differential flow speeds across the glacier, with the individual flow sets being separated by major flow-parallel strike-slip faults. Furthermore, the relative intensity of crevassing increases towards the glacier snout, and these fractures exert a partial control on calving activity. The style of calving is thought to be analogous to rotational slope failure and block toppling mechanisms as described by engineering geologists. These preliminary results will supplement additional future research in order to further constrain the controls on calving behaviour at Fjallsjökull, thereby advancing our current understanding of mass loss events from lake-terminating outlet glaciers.