

## **Dynamics of three outlet glaciers on the Vatnajökull ice cap reconstructed through landsystem analysis**

John Maclachlan (1), Rebecca Lee (2), and Carolyn Eyles (3)

(1) McMaster University, School of Geography and Earth Sciences, Hamilton, Canada (maclacjc@mcmaster.ca), (2)

McMaster University, School of Geography and Earth Sciences, Hamilton, Canada (leer37@mcmaster.ca@mcmaster.ca), (3)

McMaster University, School of Geography and Earth Sciences, Hamilton, Canada (eylesc@mcmaster.ca)

Landsystem analysis uses genetically related landform-sediment assemblages, known as landsystem tracts, as evidence in the reconstruction of the geomorphic evolution of a landscape and subsequently provides further insight into the morphogenetic record. When used in conjunction with sedimentological data, results from this methodology are used to inform models of the subglacial conditions through the movement characteristics of the overriding glacier. Ultimately landsystem analysis allows modern systems to be used as analogues for ancient systems, which in turn facilitates more accurate paleoenvironmental reconstruction of ancient glacial sediments.

The proglacial till plains, consisting of subglacial, proglacial and supraglacial sediments and landforms of three outlet glaciers of the Vatnajökull Ice Cap in southeast Iceland were explored using a combination of remote sensing techniques, geospatial analysis and field investigations. The three glaciers selected for study (Svínafellsjökull, Skaftafellsjökull and Morsárjökull) are separated by small mountain ridges but lie within close spatial proximity, limiting climatic variability on their behavior but allowing for variability in local influences such as variability in valley morphology. Although the three glaciers are sourced by the same ice cap and are within close proximity there are wide variations in the type, distribution and scale of landforms in the proglacial region including the presence of streamlined features, the relative relief of the landforms, and sediment types. Initial mapping of the proglacial region of each glacier was performed using geospatial software to explore and analyze LiDAR data and aerial imagery obtained from the Icelandic Meteorological Office. A high-resolution digital elevation model (DEM) of the proglacial region of each glacier was created from these remotely sensed data to illustrate the spatial distribution and scale of landforms. These features were ground-checked using a portable geographic information system unit and recorded with sketch maps and photographs. Sedimentological data were collected to identify sediment types associated with each landsystem tract and multiple sedimentological logs created to further constrain the models. The integration of remotely-sensed and field data has allowed detailed landsystem maps of the proglacial region of each glacier to be created and further exploration of morphogenetic record.