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The quantitative description of the long-term modification of landscapes by ice sheet erosion.

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The aim is to develop a simple landscape metric that will indicate whether glacial processes over ice sheet scales have been active upon a particular topography. This is important for our understanding of long-term landscape evolution because few direct quantitative comparisons between fluvial and glacial systems as agents of landscape development exist. Identification of glacial or fluvial landscapes can be straightforward in the field, but is less simple when analysing digital elevation models and triangular irregular networks (DEMs and TINs). Key signatures of glacial and fluvial landscapes are identified and generalised into metrics that can be employed when analysing a topography. A number of landscape shape descriptors are tested including assessment of dominant and repetitive wavelengths of topography, power relationships, and quantitative analysis of TIN facet statistics. These metrics are derived for a range of glacial and fluvial datasets, both real and modelled. Results show that these methods of landscape analysis can be employed in the calibration of the new generation of ice sheet models that incorporate erosion components to evaluate the realism of model output.