



GIS enhanced assessment of numerical ice sheet model performance against geomorphological data

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A major difficulty in integrating ice sheet models and geomorphological data is the lack of consistent quantitative approaches to systematically compare model output and field data. Automated Proximity and Conformity Analysis (APCA) and flow orientation analysis (FLOrA) provide quantitative methods by which to assess the level of correspondence between modelled ice extent and ice marginal features such as end moraines, and between modelled basal flow directions and palaeo-flow orientation indicators such as glacial lineations. An ensemble suite of 40 model simulations of the Fennoscandian Ice Sheet were compared to end moraines of the Last Glacial Maximum (LGM) and the Younger Dryas (YD) and to glacial lineations using APCA and FLOrA. The model reproduced the LGM and YD moraines off the coast of Norway with a high level of conformity and proximity, but was unable to achieve high levels of correspondence with some southern and eastern moraines. Model runs were subsequently ranked according to level of correspondence enabling particular climate and key parameter suites to be evaluated. This approach holds considerable promise for use with ice sheet models where automated, quantitative assessment of multiple model simulations against a large database of geological evidence is required.