

Initiation of a project in the International Lithosphere Program (ILP): Upper mantle dynamics and quaternary climate in cratonic areas

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Preparations are underway for a new ILP project to improve understanding of solid Earth structure and dynamics as well as long-term climatic variations in previously glaciated cratonic areas. We believe that important new insights can be obtained by integrating data and modelling constraints related to a variety of processes and topics. These include glacial isostatic adjustment, heat flow, rheology and composition of crust and mantle, data and models of ice sheet extent and thickness, and field evidence and modelling constraints of palaeoclimate variations. Long and accurate time series and extensive data sets are available. For instance, in the Fennoscandian area there are systematic geodetic observations extending more than 100 years based on repeated precise levelling, as well as more recent observations of surface motion and gravity change during the past few decades. In addition, the longer time series of the dynamic history of this region are available via reconstructions of sea-level changes from the geological record. Recent geological studies have much improved the data base on duration of ice cover during the Weichselian glaciation, also supported by ice sheet modelling. Deep borehole temperatures allow inversion for past ground temperature histories at a variety of times, including the LGM and the Holocene. There are a number of outstanding questions and problems relating to the dynamics, chemical and physical structure and climate history of cratonic areas. We will review some of these and outline a plan for a future multi-disciplinary research program to address them.

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