Geophysical Research Abstracts
Vol. 21, EGU2019-1367, 2019
EGU General Assembly 2019

The impact of geothermal heat [U+FB02]ux on the last Scandinavian ice sheet over W Poland and E Germany

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Geothermal heat flux plays an important role in controlling ice sheet stability and affects basal temperatures, melting, and ice flow velocities. The high geothermal heat flux, might have been one of the factors influencing the last Scandinavian Ice Sheet behavior over W Poland and E Germany. In this area the geothermal heat flux ranges from 40 to over 100 mW m^{-2}. The study area was occupied by the B2 palaeo-ice stream that left in morphology distinct sets of mega-scale glacial lineations. Here we presume, that for the analysed case, the high geothermal heat flux facilitated intense meltwater production and fast ice streaming. The difference of 3-4˚C in basal temperatures, between areas with higher and lower geothermal heat flux, due to ice insulation could lead to either increase the basal melting or enable reaching pressure melting point. The minimum heat flow needed to reach pressure melting point for the last Scandinavian Ice Sheet beneath the ice streams in central west Poland was about 60 mW m^{-2}. The subglacial meltwater was at least partly stored subglacially due to the low permeable bed and lack of channelised drainage traces, and maintained a fast ice streaming. The fast ice flow over central west Poland is confirmed by sedimentary and geomorphological evidence (e.g. mega-scale glacial lineations). The geothermal heat flux becomes dominant heat source for area occupied by B2 Ice Stream as the shear heat transmitted to the bed was relatively small, estimated below 15 mW m^{-2}.

This work was supported by Polish National Science Centre (NCN) [grant number 2015/17/D/ST10/01975].