



Subglacial conditions under the Weichselian Ice Sheet (Central-WesternPoland)

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The bed underlying the last Scandinavian Ice Sheet in Poland consisted of an unlithified material susceptible under appropriate subglacial conditions to active deformations under the normal and the driving stress. The thermodynamics at the ice-sediment contact zone had a significant influence for the ice movement character, especially velocity and the ice cap longitudinal profile. Clues of those paleoglaciological processes are recorded in structures and textures of subglacial sediments and the deformation structures are one of the most useful indicator for processes interpretation in basal environment

The research area is placed in the Great Poland Lowland in the central-western part of Poland. Detailed investigations were carried out in several outcrops situated within the range of maximal Leszno (Brandenburger) phase extent and recessional Poznan phase (Frankfurter) of the Weichselian Ice Sheet. Those glacial events are not sufficiently dated however, it is known, that they probably took place between 20 000 and 16 000 BP in this region.

The purpose of this study is to propose a model of subglacial conditions during till deposition under advancing Weichselian Ice Sheet using the lithofacies analysis as a main tool.

Sedimentological analysis in each of the places of investigation was carried out by the means of a macroscopic evidence of deposits texture and structure together with the detailed identification of contact boundaries between individual lithofacies, till fabric measurements on the basis of at least 30 elongated clasts, the calculation of eigenvectors and eigenvalues and laboratory analysis of grain-size distribution using wet and dry (mechanical) sieving techniques.

Results show that the fabric characteristics of subglacial tills and underlying sediments are significantly diversified. In general three types of subglacial tills were recognized – lodgement, deformation and melt-out till. Some of vertical profiles showed complexes of lithofacies, and the others individual lithofacies. The internal structure of tills was massive and disturbed to bedded. In some of the till stratas there were clearly visible interbedded clays, sands lenses, structures of intraclasts flowage, subglacial canals filled by sands and gravels. Underlying sediments present variable structure as well ranging from ductile to brittle. Some of them are showing traces of dilatancy processes, faults, flame structures, while there are also deposits without any disturbances. In a few sites glacimylonitization zones were visible at the till-underlying sediments contact border. Deposits of this belt own feature of till as well as the sediments lying below, but could not be classified as a one of them.

This facts suggests dynamically changing conditions of the ice-sediments interference, caused mostly by the changes in lithology bringing variety of substratum permeability, porewater pressure, deformation styles and a cumulation of stress in some areas, resulting in a zonality of coupling and decoupling ice and sediments.