

1. Research project objectives

The objective of the research project is to define the sedimentary conditions that dominated the large outwash plains and valley sandurs, and compare them with smaller ones. Sandurs (or outwash plains) are large, flat plains built of sandy/gravelly sediments deposited outside retreated ice-sheet. These large, flat plains were deposited by unconfined fluvial systems, and formed and/or remodelled by events with exceptionally high meltwater discharge, called *jökulhlaups* (*megafloods, outburst floods*). **The cause of these extreme floods on large sandurs in Poland has not been determined yet with any certainty.** The high-discharge, high-energy floods are recorded in coarse-grained sediment packages within the 'normal' sandy/gravelly sandur deposits. They are frequently interpreted as deposits of hyperconcentrated flows. Proof of a genetic relationship between coarse-grained deposits and hyperconcentrated flow deposits during catastrophic floods **is crucial for the validation of the current sandur model.**

2. Research carried out in project

The study will be carried out of the large Drawa, Piława and Gwda sandurs in northwestern Poland. These are well developed, large-scale forms from the last stage of Pomeranian phase of Weichselian glaciation (~16-17 ka BP). The study will be conducted in sand and gravel pits, located in proximal parts of sandurs (i.e. close to front of ice-sheet) as well as in the middle and distal parts, located dozens kilometers from the former ice-sheet front. Sediments representing different stages of sandur development and different sedimentary subenvironments will thus be analysed. Field work will primarily consist of detailed lithological descriptions of the sandur sediments, aimed at sedimentological analysis. Detailed documentation of sandur features will allow to identify sedimentary subenvironments. Sedimentary bodies will be measured so as to determine the morphometry of the individual bedforms, and the palaeohydraulic parameters of the meltwater discharge conditions (i.e. depth, shear stress, velocity, current energy and flow regime) will be determined. In this way the fluctuations in the hydraulic parameters of the sandur environment, both in space and time, will be characterized. In addition, sediment samples will be collected for analysis of their heavy-mineral content and the presence of quartz-grain frosting. Photos made by drones and through LIDAR (*Light Detection and Ranging*) will be used to trace the location and to determine the morphometry of sandur paleochannels accurately.

3. Reasons for taking these research

Although sandurs covers a large part of the northwestern Poland, **their detailed lithological documentation are still lacking. The evolution of middle and distal parts of these sandurs has not been established.** Thanks to the research conducted, the general knowledge about north-western Poland sandurs will be developed and further elaborated. The research results will provide new data on the deglaciation processes taking place in northwestern Poland during the retreat of the Scandinavian ice sheet. Detailed sedimentological analyses, combined with palaeohydraulic analysis, will allow for verification of existing sedimentation models used for the interpretation of sandurs sedimentological subenvironments. The knowledge of floods and megafloods related to the melting of the ice sheet will also be deepened. Knowledge of the causes of extreme floods, their frequency and influence on the present morphology of the area of north-western Poland will be broadened.