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Field trips

Kashubian Lakeland and Kashubian Coast are natural regions located in the northern Poland. The landscape of these regions was shaped in the Quaternary period, during the past 2.5 mln years. Subsequent glaciations in the Northern Hemisphere resulted in the expansion of large continental ice sheets, including the Fennoscandian Ice Sheet (FIS) in Europe. Consequently, the area located within the extents of the FIS was covered with tens to over a hundred meters thick sequence of siliciclastic deposits. The Last Glaciation (Weichselian) contributed to the formation of the contemporary landscape, abundant in, e.g., moraines, sandur, and glacial channels (tunnel channels/valleys or marginal channels) occupied by lakes. The decay of the FIS at the turn of the Pleistocene and the Holocene resulted in the formation of lakes and peatlands, as well as the Baltic Sea and coastal environments. The geological history of the Kashubian regions makes them unique in terms of diversity and abundance of Quaternary landforms and related deposits.

Glaciogenic landscapes at Borucino

Borucino village (54.25°N, 17.98°E) is located within the Kashubian Lakeland natural region, which was formed as a result of cyclic transgressions and recessions of ice sheet during the Quaternary. The



thickness of Quaternary deposits is very diversified and rather high there, ranging from 80 to 308 m. Present-day morphology was shaped at approximately 17–15 ka BP during the Pomeranian phase of the Weichselian glaciation. The landscape comprises moraines, sandurs, tunnel-valley lakes, peatlands, and deeply-incised river valleys. The highest absolute elevation point reaches 329 m a.s.l., while the lowest is at 123 m a.s.l. Such a huge contrast appears between morainic plateaus and deeply incised glacial channels that are contemporary occupied by lakes or are part of a river drainage network. The genesis of deeply incised valleys might probably be related to Pleistocene vertical crust movements along pre-Quaternary thrusts planes, sub-glacial erosion during subsequent glaciations and fluvial erosion during drainage network evolution after deglaciation. Deposits that form contemporary landscape may be studied at several exposures, including, e.g., Łączyno or Puzdrowo gravel pits.

Storm deposits at Mechelinki

Mechelinki site (54.62°N, 18.51°E) is located approximately 30 km NW from Gdańsk at the coastal area of the Puck Lagoon (western part of the Gulf of Gdańsk). The coast comprises a shallow clastic bay, gravelly sand beach, low foredunes with small washovers, and wide peatland. The back-barrier environment is an archive of coastal evolution, extreme storm events and related coastal flooding that occurred in the past. Storm deposits are characterised by sharp erosive bottom boundary, increased grain size diameters, and distinguishable heavy mineral assemblage. A high frequency of coastal flooding was present ca. 3600–2900 BP and has been present currently for approximately 700 years. Coastal geomorphology, the resilience of the coastal dunes after storm activity, and climate change are the main factors that influence coastal flooding at the Mechelinki site.

Subglacial deposits at Dmuchowo

Dmuchowo site (54.799°N, 18.078°E) is located approximately 75 km NW from Gdańsk, in the steep edge zone of the moraine plateau near Żarnowieckie Lake. The outcrop shows several till layers intercalated with fluvio-glacial deposits. A significant part of them shows various deformation structures. The upper, Late Weichselian till is 3 m thick and heterogeneous. The lower and upper part of the till layer differs in till fabric and petrographic composition. The upper part of the profile

also shows marks of weathering expressed in vertically decreased content of low-resistant rocks and minerals. Additionally, a massive erratic boulder is embedded in the till. The boulder is intact and partially uncovered, its estimated height is 2 m, and the perimeter is around 20 m.

Debris in glaciolacustrine deposits at Rzucewo

The study site (54.681°N, 18.466°E) is located at the cliff coast south of the Rzucewo village. Glaciolacustrine deposits are up to 15 m thick and are exposed in natural outcrops along the Puck Lagoon coast. Most of the deposits comprise fine-grained lithofacies. However, they are multiply intercalated with diamictons (debris), resulting from debris flows on the subaqueous slope. The thickness and frequency of debris decrease from the proximal to the distal part of the glaciolacustrine subaqueous fan. Their inner composition also changes, indicating selective sorting and erosion of lithic and soft-sediment clasts. The top of glaciolacustrine succession is covered by Late Weichselian till.

Early Neolithic settlement at Rzucewo

Rzucewo settlement site (54.695°N, 18.467°E) is located several hundred meters north of the Rzucewo cliffs. It is a well-known archaeological site which contains remnants of past settlements from around 6500 years. The development of the first human activities was highly supported by the unique geomorphological features of the surrounding area. For several thousand years, rivers in incised valleys and lakes developed on the post-glacial landscape were the primary source of fresh waters for early communities. The site was also very close to the Puck Lagoon, which increased its area in the Holocene – a place for seal hunting and fishing. Glaciolacustrine fine-grained deposits exposed in the neighbourhood were used to craft ceramics. Gravels and boulders from glaciogenic and fluvio-glacial deposits were used to rise constructions and manufacture stone tools, including axes, chisels, polishing slabs and grinding tools. Some of them were used to regularly process different materials, like wood for dugout canoes.