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Geotechnical variability of permafrozen glaciomarine clays in Sdr. Strømfjord in Greenland

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This contribution presents the geotechnical properties of some permafrozen glaciomarine clays near to the Kangerlussuaq Airport at Sdr. Strømfjord in West Greenland. This fjord system was established by glacial erosion into the bedrock consisting of Nagssugtoqidian banded gneisses with amphibolitic and pegmatic veins. The deglaciation after 10000 y BC resulted in a number of noticeable terminal moraine systems and caused fluvial and glaciomarine sedimentation along the fjord. The interaction between isostatic depression of the bedrock and eustatic variations has resulted in changes of the relative sea level with Upper Marine Limit (UML) varying from +120 to +140m at the West Coast to +40 at Kangerlussuaq. This retreat is well documented through C14-dating in the local area near to Kangerlussuaq Airport related to Fjord Stages F2 (+60m/8300 y BC) and F3 (+40m/8100 y BC) and Mt. Keglen stage (+40m/7200 y BC) 5 km east of the Airport. Subformations found are; glaciomarine clay deposited in a coastal environment as very fine flocculated suspended matter ("rock flour"), deltaic sediments of silt and finesand and meltwater gravel and sand carried by the meltwater rivers. This sedimentation is still on-going in the area at Strømfjordshavn.

The C14 datings of marine shells collected on the marine clay terraces at level 300kPa. Clay minerals were weathered causing moderate to high activity and plasticity despite the formation age of only 7000 years.

(b) The "River Bank Erosion Cut" 2 km east of the Airport Terminal.

We studied a frozen marine clay deposit at +35 m with stratified ice layers under sandy gravel top layer. During laboratory analysis using fall cone testing a thawed clay sample was found to be quick ($S_t > 700$) due to dilution of pore water salts.

Multidisciplinary approach was necessary for this study.