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Use of glaciogene marine clays for brick production in the Arctic

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Large occurrences of fine-grained glaciogene marine sediments (clays and silts) were deposited after the last glaciation and some later uplifted above sea level due to isostatic movements. Today, they are found all over the formerly glaciated regions of the northern hemisphere, such as Canada, northern Scandinavia and Greenland (Belmonte et al., in prep.; Foged, 1979; Gillott, 1979; Locat et al., 1984; Ramesh and d'Angeljan, 1995; Roaldset, 1972). Research world-wide has established that marine sediments can be suitable as primary and secondary resources in the production of clay ceramics, such as bricks (Baruzzo et al., 2006; Hamer and Karius, 2002; Mezencevova et al., 2012).

Today, bricks are not commonly used nor produced in Greenland, where building materials such as wood and concrete are favoured (Bjarløv and Vladykova, 2011; Garcia; 2012). However, as most of the construction materials used in the country, are imported, it is of great importance to investigate the potential for local production.

In this study, a representative clay occurrence from Ilulissat, West Greenland was investigated as a potential resource for local brick production. The study comprised of three parts: 1) raw material characterisation based on grain size distribution, major element chemistry including total carbon, sulphur and chloride concentrations, mineralogy, morphology and Atterberg limits 2) production of test bricks and 3) testing of the bricks based on total shrinkage, water absorption, hygroscopic adsorption, open porosity, bulk density, compression strength, freeze-thaw resistance and mineralogy. The bricks produced proved to have excellent compression strengths, low open porosity and low water absorption. In conjunction with some of the other investigated properties, this indicates that this type of clay is highly suitable as a resource for bricks, which could be used in the arctic climate.

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