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Geochemical signature of glacial deposits on Öland island, Sweden

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A total of 176 samples of till were collected on island of Öland. Till samples were collected from the C-horizon of hand-dug pits, at a variable depth due to thin soil cover. After vacuum-drying, the samples are sieved stepwise to fraction <0.063 mm and analysed for major and trace elements at the SGU laboratory. Partial leach in Aqua Regia (a mixture of HCl and HNO_3) and nitric acid (7M HNO_3) was applied and followed by ICP-MS analysis.

The lithology of parent material is the main controlling factor of till chemical composition. On Öland, the bedrock consists entirely of sedimentary rocks of early Palaeozoic age deposited from lower Cambrian to middle Ordovician. Thin moraines and weathering soils are most common types on Öland. The moraine is more sandy in the north and clayey in the south. The till geochemistry on Öland reflects well underlying bedrock, dominated by limestone, with minor sandstone and shale (alum shale) occurrences. In southern Öland, till geochemistry is strongly influenced by black shale and enrichment in the following elements can be observed: Ag, Al, As, Cd, Co, Cu, Mo, Ni, Rb, Sb, Sc, Sn, Th, Tl, U, Zn and REE. The most pronounced anomalies occur in the vicinity of the historical alum shale works at Degerhamn. In northern part of the island, north of Borgholm, enrichment in La, Pb, Sn, Y and Zn can be explained by till transported from the continent (following west-east ice transport directions).

The main goal of the geochemical mapping programme at SGU is to provide high quality, consistently sampled and analysed data. The till geochemical data from Öland reflect regional natural geochemical variations in glacial till. The results can be further used for planning purposes, environmental monitoring, agriculture, forestry, veterinary and environmental medicine.