

# Changing perspectives – Thin section and ICP-MA/ES analyses of Neolithic pottery from the Åland Islands, Finland

## INTRODUCTION

The research project **“POTTERY, CHEMISTRY AND PETROGRAPHY. Neolithic figurines and vessels from Åland and the Baltic”** investigates the composition of pottery and its change over time, as well as the provenance of the clays used in Neolithic ceramics from the northern Baltic with emphasis on the Åland Islands. The methods used are thin section and ICP-MA/ES analysis. The results of the analyses are compared to contemporary materials from Sweden and the coastal areas of the Finnish mainland, utilizing the extensive data provided by the CS-database. The aim of the research is to investigate the succession of the Neolithic traditions on the Åland Islands and the interactions of people and distribution of ideas and innovation in the Baltic Sea region. The studied materials consist of vessels and figurines of Comb ceramics, Pitted ware, Kiukainen ware and Jäkärilä ware, dating from 5500-4790 cal BC (Hallgren 2008: 63) to 901-806 cal BC (Ua 670229). The studied material is from the collections at Ålands museum and the University of Turku (TYA).

## METHODS

**Thin sections analysis** of the ware reveals what type of raw material that have been used in the studied samples. The microscopy of the thin sections is made using a polarising microscope, and minerals in the silt and sand fractions are identified. Microscopy offers not only a petrographic study; it also reveals other aspects of the pottery craft, such as ware structures, vessel forming techniques, clay type, added or natural temper, amount and grain size of the temper and organic matter, e.g., plant matter and diatoms.

**ICP (Inductively Coupled Plasma) analysis** determines the sherds' chemical identity, and the analysis can be used to identify the geographical origin of the raw materials used. The selected sample (minimum 0.3g) is grinded to a fine powder and dissolved in a 4-acid solution. The solutions are injected into argon plasma and analysed in masspectrometry. When atoms are exposed to energy the electrons change and recharge orbits, causing a coloured light (emission spectra) that can be measured by AES-Atomic Emission Spectrometry. In the study, 12 minerals and trace elements are studied, and the frequency is used to identify different groups. These chemical groups are then compared with samples in the **CS-database** – provided by Dr Rer Nat Torbjörn Brorsson at Ceramic Studies. The CS-database contains of data from more than 10 000 prehistoric and medieval samples of pottery, figurines, and clay etc. from different parts of Europe.

## RESULTS

The research project has so far analysed samples representing 32 vessels and 13 figurines from 9 sites dating to the Neolithic period on Åland.

The initial results published by the research project can be summarised as follows:

- Analysis of Early and Late Comb ceramics, Pitted Ware and Kiukais ceramics from the Åland Islands suggests continuity in the pottery craft and in the choice of clay during the entire Neolithic period. There is a local pottery craft despite changing typologies and traditions on the Islands.
- The introduction of limestone and seashells used as temper in the Late Comb ceramic ware arrived from the east and continued to be used in the succeeding Pitted ware tradition on the Åland Islands. The tradition of calcareous tempering is probably introduced earlier on the Åland Islands than on the Swedish mainland, where limestone as temper appears later within the Pitted ware tradition.
- The change in preference of temper added to the vessels does not occur at the same time as the typological shift between ceramic traditions. The Early Comb ceramic vessels on Åland have a temper of rock and quartz which already in the Late Comb ceramic parallels with the introduced limestone and seashell tempering. There are also vessels of the succeeding tradition of Pitted ware containing grog originating from late comb ceramic vessels.
- Besides locally made pottery there are artefacts that have been transported to and from the Islands. Three fragments of figurines from Pitted ware Åsgårda and a few fragments of figurines and sherds from Pitted ware Glamilders and comb ceramic Stockmyra are most likely not manufactured locally. Two of the anthropomorphic figurines found at the Pitted ware settlement at Tråsättra north of Stockholm, are most likely made from clays collected on the Åland Islands.

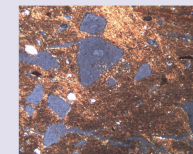
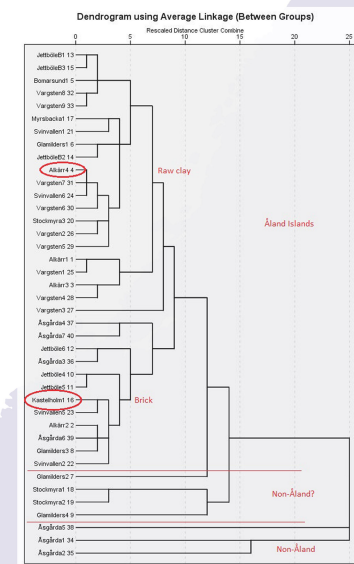
## List of Publications

Hallgren, F. 2008. Identitet i praktik. Lokala, regionala och överregionala sociala sammanhang inom nordlig trättbäckarkultur. Coast to coast-book 17. Uppsala University.  
 Brorsson, T. 2019. Godsanalyser och ICP analys av gropkeramik från Tråsättra, Åkersberga, Österåkers sn., Uppland. Kontoret för Keramiska Studier. Rapport 129 2019.  
 Brorsson, T, Lucenius, J, Stenbäck, N. 2019. Changing perspectives. Thin section and ICP analysis of Neolithic pottery from the Åland Islands. In: Mannerman, K, Manninen, MA, Pesonen, PAP & Seppänen, L (eds) *HELSINKI HARVEST: Proceedings of the 11th Nordic Conference on the Application of Scientific Methods in Archaeology*. Monographs of the Archaeological Society of Finland, vol. 7, Suomen arkeologinen seura, Helsinki.  
 Brorsson, T, Lucenius J, Stenbäck, N. 2018. Kulturella influenser på Åland under stenåldern - exemplet kalkmagring i keramiken. I: *Åländsk odling 2018 – Bottnisk kontakt XIX*. 69:e årgången. Kulturbyrån, Mariehamn.

## Acknowledgements

The project has been funded by Svenska Litteratursällskapet i Finland and Berit Wallenbergs Stiftelse.

Dr Rer Nat Torbjörn Brorsson, Ceramic Studies, Sweden. torbjorn.brorsson@ceramicstudies.se  
 MA, PhD student Jenni Lucenius, University of Turku. jenni.k.lucenius@utu.fi  
 Dr Niklas Stenbäck, Ålands museum, Ålands landskapsregering. niklas.stenback@regeringen.ax



Thin section



Figurine



Kiukais ceramic



Early Comb ceramic



Pitted Ware

