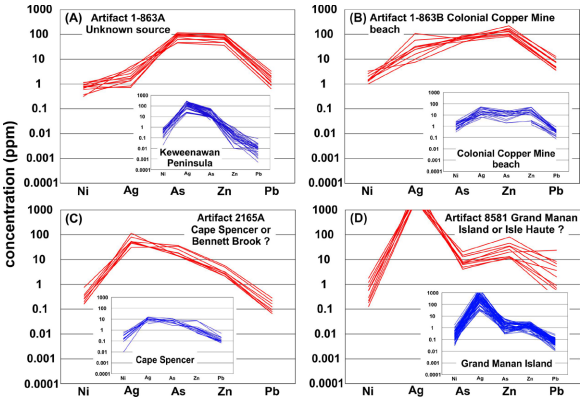
Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.35472

The application of laser ablation ICP-MS in geochemical provenance studies of copper in pre-contact artifacts from the Maritimes Basin, Canada

JACOB HANLEY[1], DELANEY CARTER[1], ANNA TEREKHOVA[1], PAIGE DRAKE[2], CATHERINE COTTREAU-ROBINS[3], ROGER LEWIS[4], BRENT SUTTIE[5] AND BRANDON BOUCHER[6]

[1]Saint Mary's University
[2]Mount Saint Vincent University
[3]Nova Scotia Museum
[4]Sipekne'katik Governance Initiative
[5]New Brunswick Museum
[6]University of New Brunswick



Copper was procured over thousands of years by the Wabanaki peoples of the Maritime Peninsula and utilized for personal adornment, tool making, ceremony, and trade. This study provides insight regarding the procurement, movement and trade of this significant natural metal. In this study, virtually non-destructive, in-situ laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS) was used to characterize the trace element chemistry of Pre-contact artifacts from Mu Awsami Sagiwe'k (5000-2500 BP) to Kejikawek L'nuk (1700-450 BP) Period archaeology sites in NS, NB, PEI, and Maine. Artifacts for study came from collections of the Nova Scotia Museum, and other partner organizations. Through a robust analytical protocol, comparison of artifact chemistry to that of ~90 source samples from the Lake Superior region (Michigan, Ontario) and the Appalachians (Nova Scotia, New Brunswick, Newfoundland-Labrador, Pennsylvania, New Jersey, and North Carolina) shows that provenance can be determined from the relative concentrations of nickel, lead, zinc, arsenic, silver, indium and bismuth. Source copper samples and artifacts are compositionally homogeneous with respect to the relative abundance of these diagnostic trace elements. However, this can only be demonstrated if contaminating surface patina layers and mineral inclusions can be avoided during ablation and subsequent data processing of time-resolved measurements. For these reasons, the LA-ICPMS analytical method is superior to conventional bulk analytical methods in archeometry (e.g., XRF, INAA, solution ICP-MS). Contrary to the historically emphasized Lake Superior model, no artifacts analyzed from the Maritimes Peninsula have compositions consistent with copper from the Lake Superior region. Of those artifacts to which provenance can be assigned (~85%), all have compositions consistent with sources in the Bay of Fundy region, underscoring the importance of this copper source to the Wabanaki peoples.