

Constraints on the geochemical provenance of refined copper and brass artifacts from Nova Scotia, Canada: insights into the metallurgical and trace element systematics of European contact-era trade alloys brought to Atlantic Canada

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Trace element concentration data for copper artifacts of suspected European origin were analyzed using laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS). The raw data for 21 trace elements was organized into Excel spreadsheets, where raw data values below the limit of detection were replaced with the limit of detection value. Average trace element concentrations in parts per million were calculated from 5–15 analyses of the same object. Standard deviation values for each average were used to identify significant outliers outside the range of 2 sigma values, which were removed from subsequent plots. Average and standard deviation values were used to plot comparisons of first to last 9 seconds of data collection for all elements in a given object, series of direct ratios of elements, and series of two-element ratio comparisons as well. In particular, ratios of Au/Ag against As/Sb were used to distinguish groups of European copper objects that differed in the quantities of these diagnostic trace elements. Despite originating from the same archeological sites, many objects plot in close proximity to one another, as expected. For instance, spread in the range of two orders of magnitude with respect to the As/Sb ratio and one order of magnitude for the Au/Ag ratio was observed between 15 objects found in Pictou, NS. Trace element data for copper coinage of various years from French, Swedish, Spanish, Netherlands, English, and Hungarian origins were also analyzed via laser ablation. The concentration data of 17 elements for the copper coinage was compared to that of copper objects in order to start dating, determining provenance, and grouping objects based on similarities between their compositions. Preliminary results suggest that the diversity of alloy trace element compositions show affinities to French, English, and Swedish coinage from the 17th Century. [Poster]