(RE)DISCOVERING CERAMIC STRUCTURE: A MULTI-SCALAR APPROACH TO UNDERSTANDING ANCIENT CERAMIC PRACTICES

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Over the last decade, many archaeologists and archaeometrists have moved away from studies of ceramic vessel form and decoration to post-structuralist inspired investigations of vessel technologies, and "ceramic practices" more generally. Technique development towards this end has focused mainly on the production of compositionally-oriented datasets that make use of techniques developed in the physical sciences, such as instrumental neutron activation (INA), particle induced x-ray emission (PIXE), inductively coupled plasma mass spectrometry (ICPMS), and x-ray fluorescence (XRF). These new instrumental approaches have all been dramatically incorporated into the repertoire of contemporary archaeological practice, often at the expense of older techniques such as scanning electron microscopy and petrography. In this paper we argue that while compositional data is certainly important to the delineation of ancient ceramic difference, potting community traditions, and clay resource domains, investigations of ceramic *structure* are also essential to developing systematic understandings of past ceramic assemblages that are committed to any practice-oriented analysis.

As a multi-scalar concept, structure ranges from the most macro-scale of perceptions, such as form and exterior vessel features, to meso-scale attributes such as paste characteristics and formational strategies, to micro-scale aspects such as elemental composition and sintering features. As such, structure must be examined from a) a multi-scalar perspective using b) multiple instrumental (multimodal) platforms over c) datasets derived from sets of artifacts at the assemblage level found in secure contexts. We are currently engaged in such an assemblage-based, multi-instrumental, multi-scalar investigation of ceramic assemblages from the southern Caucasus, the southern Urals, and north-central China. By applying scanning electron microscopy, x-ray diffraction, and radiographic techniques to this dataset we are developing protocols for a multi-scalar ceramic archaeometry that seeks intricate understandings of vessel structure based on assemblages of ancient sherds.

We focus here on radiographic techniques, in particular digital radiography and computed tomography, which are in and of themselves multi-scalar, and allow for the evaluation of ceramic vessels from the macro-scale of entire pots down to the 25 micrometer view. These techniques are also multimodal, producing 2-dimensional radiographs, and 3-dimensional, “sliceable” images. We outline how this sub-set of techniques can be marshaled to produce a multi-scalar analysis of structure based on our varied assemblages.