Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.36512

# Freshwater Shell Geochemistry and the Provenance of Ancient Ceramics in the Eastern United States

**VIRGINIE RENSON**[1], BEN BARNES[2], SIMON P. SHERMAN III[3], EVAN PEACOCK[4], DAVID POLLACK[5], A. GWYNN HENDERSON[5], BRENDA KIRKLAND[4], BRIAN BYRD[6] AND STEPHEN WARREN[7]

[1]University of Missouri Research Reactor
[2]Shawnee Tribe
[3]Washington University in St. Louis
[4]Mississippi State University
[5]Western Kentucky University
[6]University of California Davis
[7]University of Iowa

Freshwater shells were widely incorporated as temper in ceramic production by prehistoric communities from diverse time periods and cultures across the eastern US. This study investigates whether the geochemistry of freshwater shells—combining elemental composition with strontium isotopes—can serve as a reliable tracer for reconstructing the exchange and circulation of shell-tempered ceramics. This approach rests on the premise that freshwater mollusks, as sessile filter feeders, incorporate the geochemical signature of local waters into their shells, thereby reflecting the environments in which they grew. This research builds on pilot studies demonstrating that shells recovered from archaeological contexts located in different drainages exhibit different elemental compositions. These studies sought an alternative to bulk elemental chemistry of ceramics, which is commonly used for sourcing ceramics but proves problematic for shell-tempered wares because shell fragments alter the chemical signature of the clay matrix. To evaluate the viability of the approach, a combination of elemental and strontium isotopic analyses has been applied to whole freshwater shells and shell temper fragments extracted from shell-tempered ceramics. The samples were selected from 27 archaeological sites from two main drainage basins—the Yazoo Basin and the Ohio River Valley— allowing evaluation of the method both within and between basins. Site occupations are attributed to the Late Woodland (AD 500-1000) and Mississippian (AD 1000-1600) periods within the Yazoo Basin and Fort Ancient period (AD 1000-1750) within the Ohio River Valley. The whole shells represent more than twenty species and the ceramic types represent both local productions and potential imports. We discuss methodological considerations and results with particular attention to the impacts of modern contamination of archaeological material, identification of discriminant elements, intra- and inter-basin geochemical variability, strontium isotopic variation among Yazoo Basin drainages, comparison of elemental composition of shell temper and whole shells, and potential geochemical exchanges between clay and shell.