



ABSTRACT SUBMISSION

Thats Hot! Heat Transfer Between Kilns in Late Chalcolithic and Early Bronze Age Ceramic Production

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Abstract

Recent archaeological excavations in Southwest Asia, primarily in northern Iraq, have uncovered evidence of an innovative knowledge in ceramic pyrotechnology. In several firing areas, pottery kilns were structurally interconnected through underground ducts, or channels built between their walls. The interior walls of the ducts were reddened, hardened and often filled with ash, suggesting the circulation of intense heat. The earliest example of kiln network, dating to the Late Chalcolithic 2 period, displayed three connected kilns and was excavated at Girdi Qala. By the end of the 3rd millennium BCE, this firing technique was being used on the large scale at Logardan.

To investigate the functioning of these interconnected kilns, we employed an experimental approach. We reconstructed two connected kilns, based on archaeological findings from Logardan, and conducted several firing tests. We suppose that the connections, carefully planned before the construction of the firing structures, channeled the draught and facilitated heat transfer from the hotter to the cooler kiln. This system likely enabled a part of the heat produced in the first ignited kiln to preheat the second kiln before its ignition, optimizing energy efficiency. This study provides new insights into the technical sophistication of ancient ceramic production methods.

Keywords

kiln, firing innovation, connection, Southwest Asia, Chalcolithic

Session

1. Advances in Near Eastern Archaeology

Type of paper

Poster session