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Estimating Storage Capacity of Late Minoan Pithoi Using 3D Computer Modeling: A Case Study from Kavousi Vronda

Accurate calculation of the storage capacity of ceramic assemblages offers insights relevant to many types of archaeological analyses, including function and design variability, craft specialization, the establishment of standard units of measurement, and economic organization at household and supra-household levels. Traditional methods of calculation based on fluid or dry volume have been limited to intact or completely reconstructed vessels. For fragmentary vessels, where only a profile drawing may be available, capacity has been estimated using standard volumetric formulas, "stacked cylinders," computerized algorithms, or, more recently, three-dimensional modeling software. This study discusses the use of three-dimensional models to estimate the storage capacity of large ceramic storage jars (pithoi) from the Late Minoan IIIIC settlement at Kavousi Vronda in eastern Crete. While pithoi are a common type of vessel at the site, none was found intact and only a few examples were complete enough to be restored physically. Based on standard profile drawings, three-dimensional models of the best-preserved vessels enable us to calculate both the storage capacity and the amount of clay used in construction. Pithoi from domestic contexts generally have storage capacities of approximately 100–125 liters, although vessels with both smaller and larger interior volumes are attested. Extremely large pithoi, with capacities of approximately 300–890 liters, are found in only one building, highlighting that structure's special status. The application of this method also allows for instructive comparisons with vessels from other sites, shedding light on local and regional traditions of production and consumption in Late Bronze/Early Iron Age Crete.