

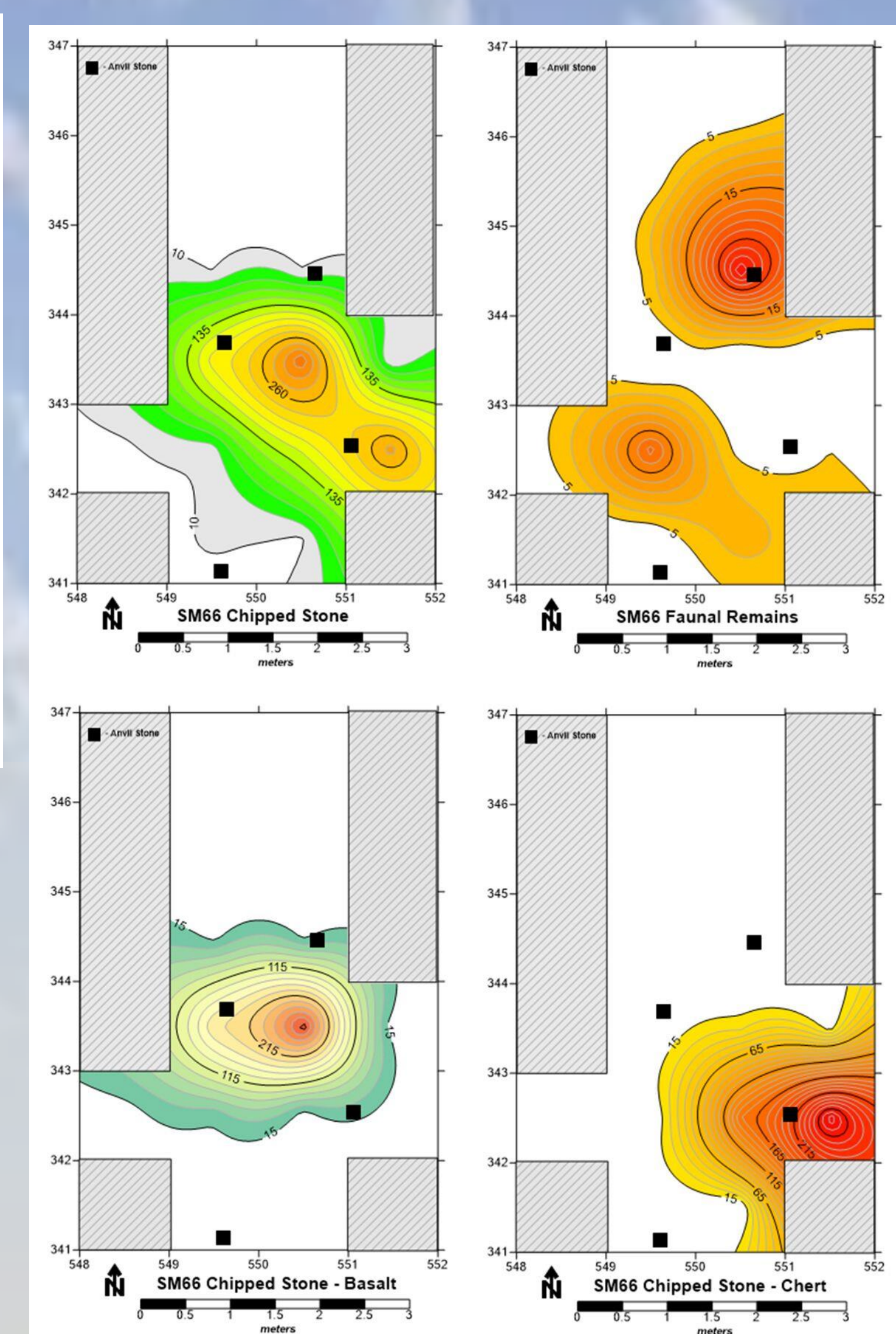
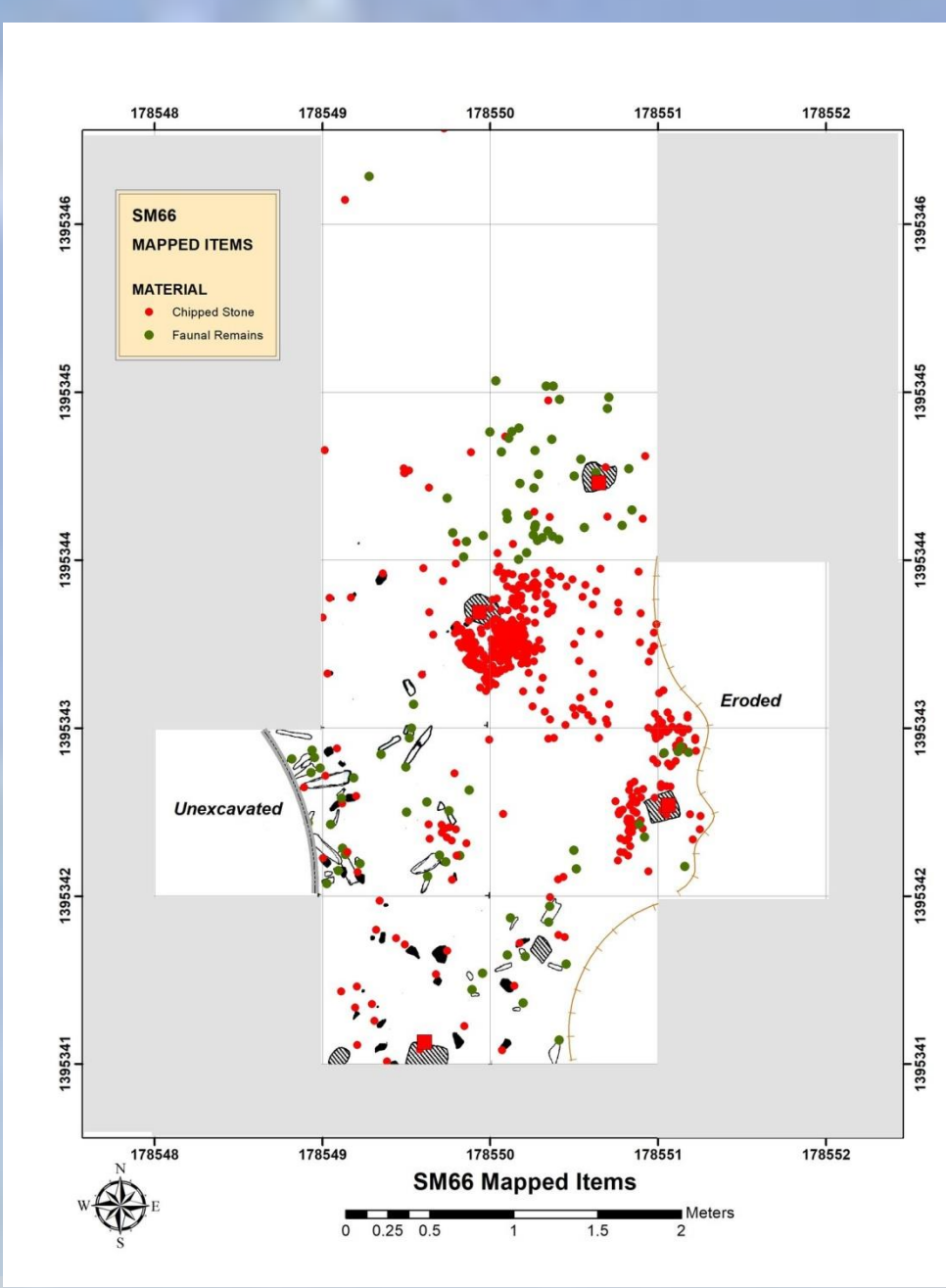
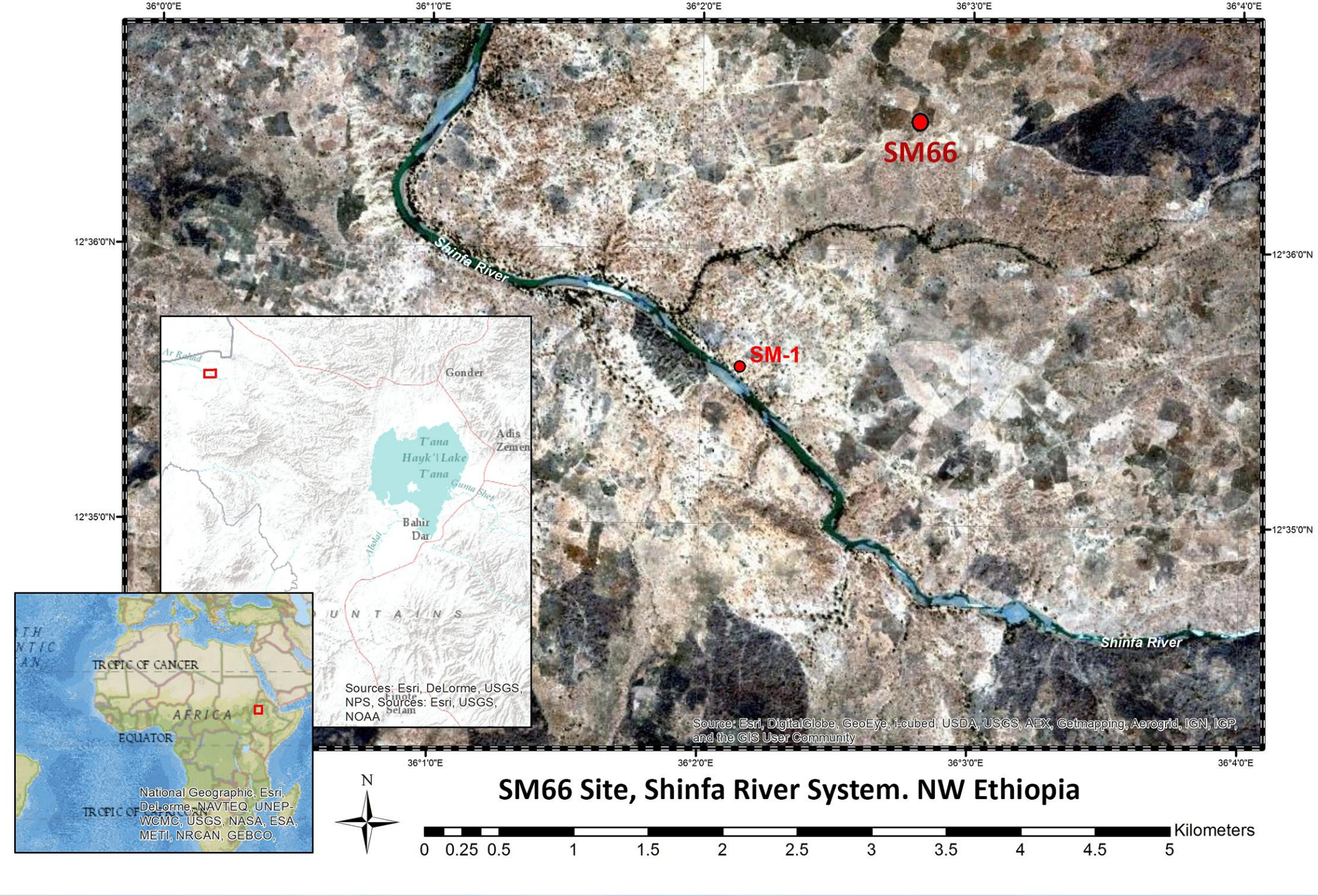
A single-event Middle Stone Age occupation site in the lowlands of northwestern Ethiopia

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ABSTRACT

Investigations of late MSA sites in the Horn of Africa can offer important insights into the behaviors of modern humans around the time when our species left the continent to populate the rest of the world. The majority of both cave and open air sites consist of stratified sediments that, depending upon post-depositional processes, are often time-averaged, thus potentially obscuring evidence of discrete activities. We here describe SM66, an MSA site that appears to represent a single-event open air occupation surface. Limited testing in 2015 was followed in 2016 by an ~10 m² controlled excavation. SM66 occurs on the upper surface of an overbank flood deposit, and all mapped items were found encased within the uppermost 1-2 cm of this finely-bedded siltstone unit. Although the bone was highly deteriorated, most fragments appear to be from large mammals only, a finding in contrast to the much higher faunal diversity seen at other nearby MSA sites. Of note are three discrete, perhaps near-synchronous activity loci concentrated around probable anvil stones, each with very different associated debris. Materials adjacent to the first anvil are predominately cryptocrystalline quartz, most of which seems to have originated from a single nodule or identical source. Chipped stone also predominates near the second anvil but is primarily basalt. The third anvil has far less chipped stone and instead is surrounded by the highest density of bone. We suggest that three or more task-focused activity types are represented. Three basalt blocks were transported nearly 2 km to the site for use as anvils; two discrete knapping episodes occurred, each using different raw materials; and faunal remains were processed. SM66 appears to preserve evidence for coordinated behavior in the MSA. The occupation surface continues into overlying terrace deposits and will be the focus of future excavations.



A decade's field research along several major tributaries of the Blue Nile by teams headed by the University of Texas has documented a rich and diverse Middle Stone Age (MSA) land use record, including evidence of an emphasis on riverine resources (Kappelman et al. 2014). Excavations conducted as part of an NSF supported Research Experience for Undergraduates (REU) are expanding this record to include a series of upland sites that provide glimpses into a wider range of resource use patterns. One of these locations, SM66, is providing a fine-grained record of hunting and processing activities that are highly distinctive from other recorded sites in the area, like SM1.

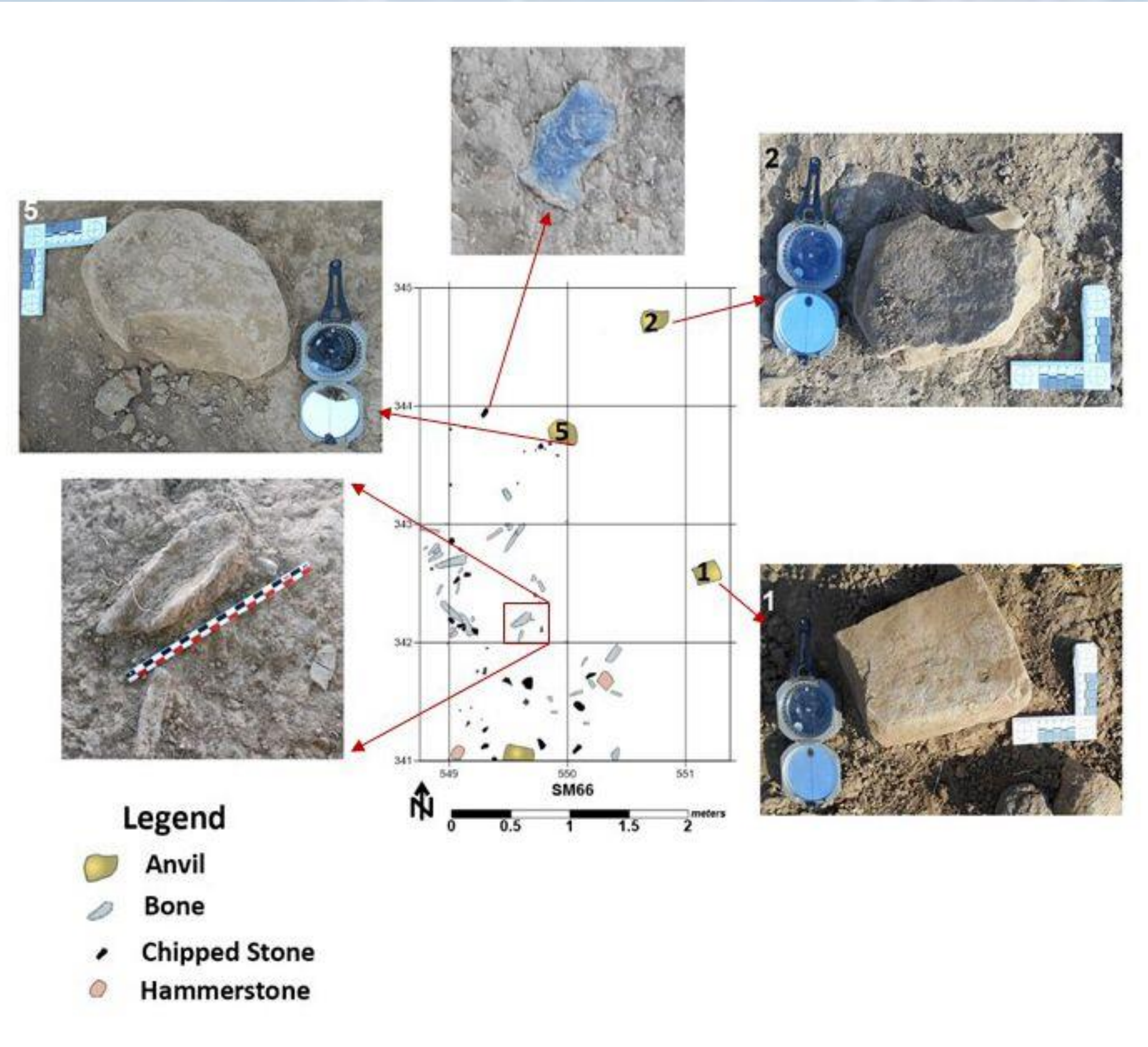


During the dry season, the Shinfa River is reduced to disconnecting waterholes (Kappelman et al. 2014)

SM1 is one of the richest and most diverse of the sites located along the trunk tributaries of the Blue Nile river. The site is proximate to the Shinfa River and MSA foragers took advantage of the riverine-based resources made available to them during the dry seasons (Kappelman et al. 2014). SM1 faunal remains are diverse including mollusks, fish, reptiles, ostrich egg shells, birds, and mammals of various size, and excavations has shown multiple occupation levels that date to > 50 ka.



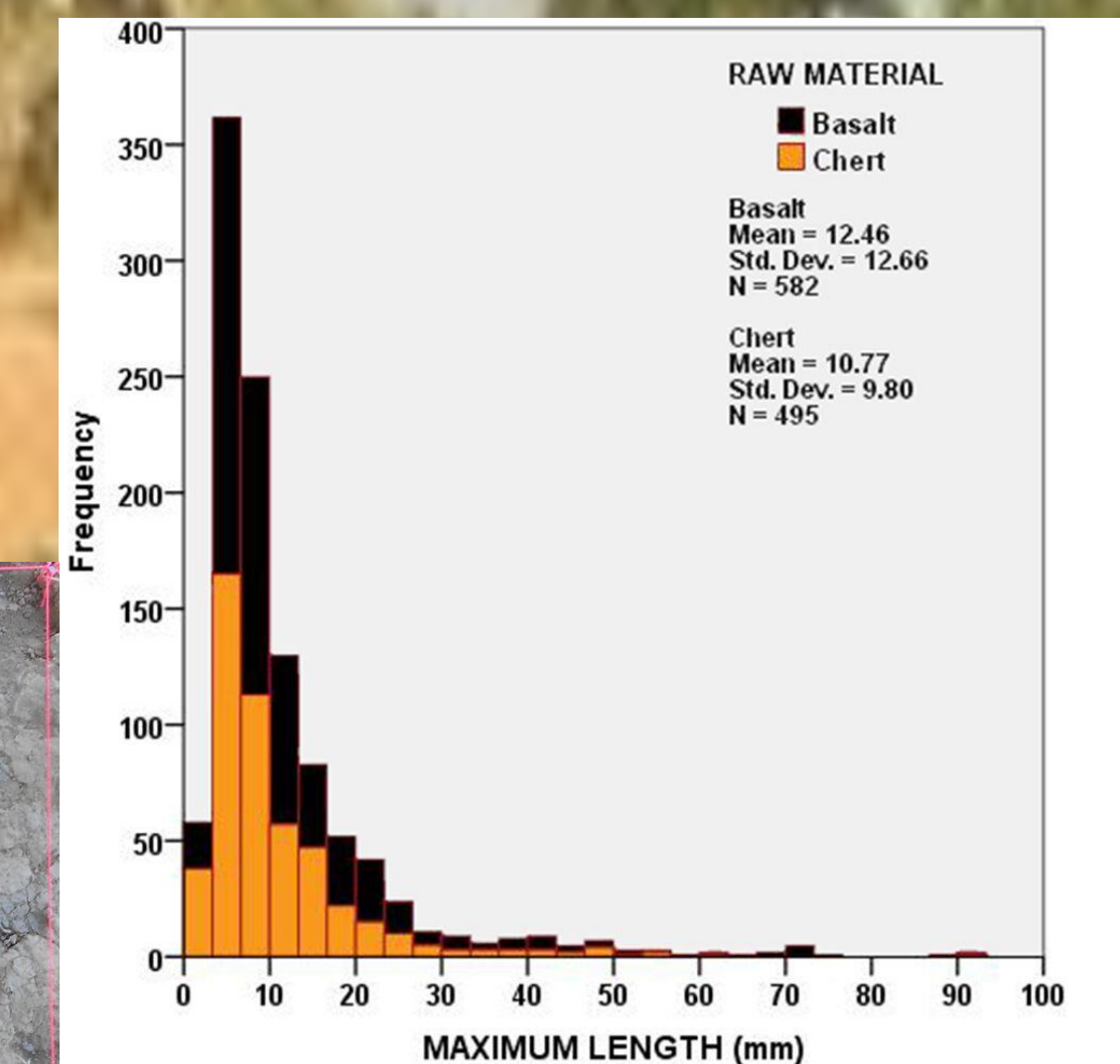
SM1 excavation



- Legend**
- Anvil
 - Bone
 - Chipped Stone
 - Hammerstone

SM66 consists of 4 large basalt blocks, all probably anvil-stones, each with a distinct activity and debris concentration around them. Anvil one was predominately surrounded by flakes of cryptocrystalline quartz, all likely coming from a single source. Similar to the first anvil, anvil three (labeled rock 5) was surrounded by a reduction of basalt flakes. In terms of raw materials, it is worth noting that the closest basalt locality is about 2 km from SM66. Anvil two differs from the others by being surrounded by heavily weathered and processed mammal bones. Although the weathering of this bone makes identification challenging, the bone fragments appear to be from large mammals only, and several are likely from limb bones. SM66 lacks the faunal diversity found at many nearby sites, like SM1. Although most of the faunal remains appear to be clustered near the second anvil, another smaller cluster of bones is located slightly south of both anvil one and three. Positioning activities relating to a fourth anvil, excavated in 2018, are less straight-forward. Being only partially excavated, a very limited area in proximity to the potential focal point is visible and we do not have a complete picture of associated materials.

The differing raw materials and faunal remains show concentration near anvil stones.



SM66 is located on the high and older terraces along the margins of the Shinfa River drainage system.

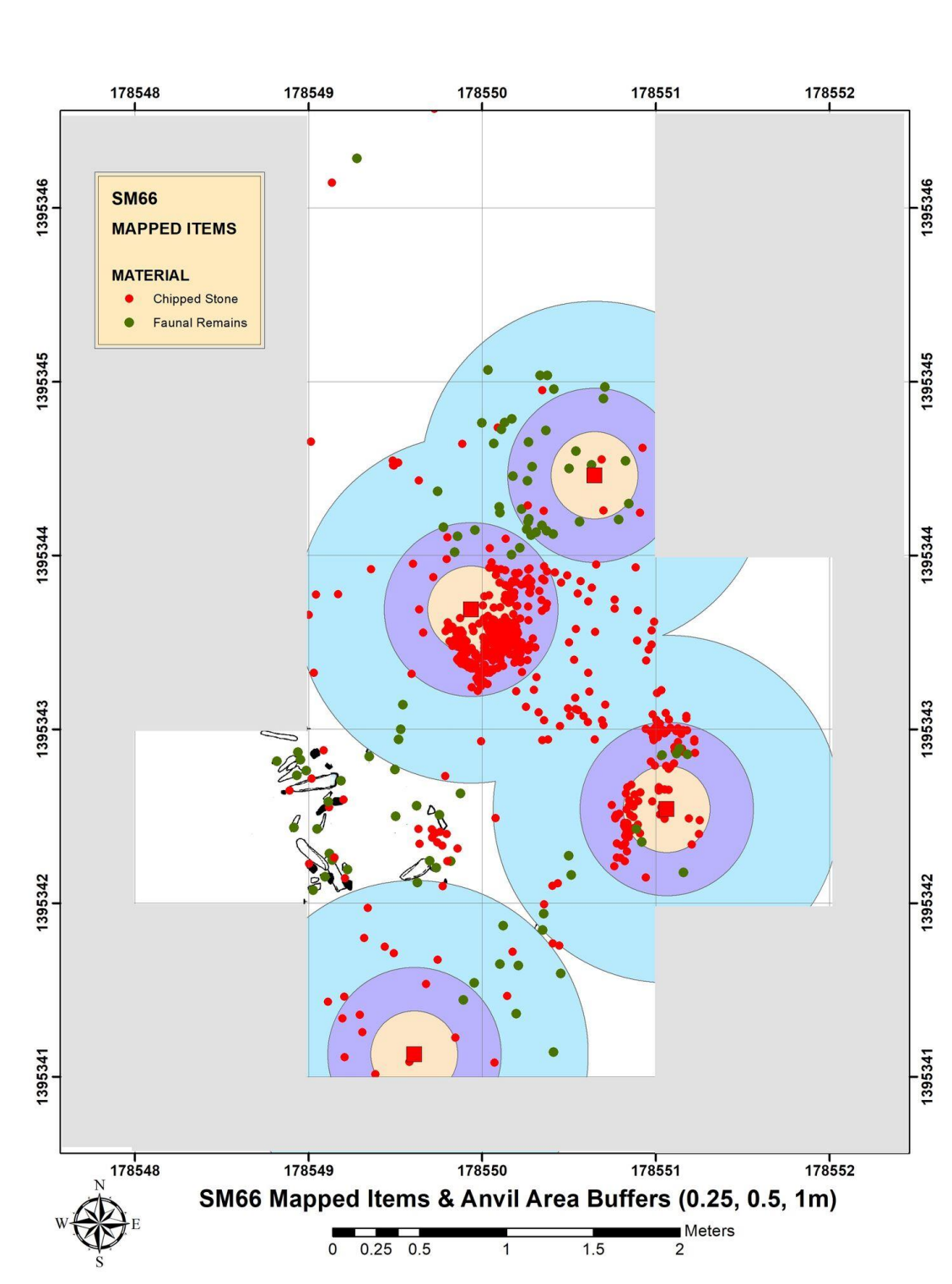


Excavations from 2016 and 2018 have involved many US students from the MSA NSF Research Experience for Undergraduates and students from several Ethiopian universities.



Excavations have uncovered the "floor" of SM66. A variety of potential anvils, debitage, and faunal remains have been recorded.

From this site, the occurrence of three distinct activities can be interpreted. The first activity that can be seen is the movement of the three large basalts over 2 km for use at SM66 as anvils. The second activity is represented by two distinct knapping events of chert and basalt. As seen above, chipped stone from this site is concentrated around anvils one and three, with each anvil marking a distinct concentration of differing raw materials. Similarly, the concentration of faunal remains around the second anvil suggests that it was specifically used in processing bone, and therefore a distinct third activity. The activities that occurred at the site are evidence for coordination in the MSA. The three anvils represent two important, yet separate activities. If the site was used for the butchering of large mammals, these separation of activities suggest a division of labor and a shared responsibility during the processing of the mammal remains.



The buffered areas show a hearth-like distribution of artifacts around each anvil.

Differing from SM1, SM66 is located along the margins of the drainage system of the Shinfa River, one of the major trunk tributaries of the Blue Nile River, within the high terraces of the area. The occupation floor occurs on the surface of thin, horizontally-bedded siltstones, which is the upper surface of an overbank flood deposit. The single-event represented at this site was followed by a matrix-supported pebble-cobble conglomerate from a later flood event, which likely sealed the occupation level and preserved the site. SM66 was originally discovered and recorded in 2010 with limited test excavations occurring in 2015. In 2016, a controlled excavation of approximately 10 m² was performed down to a fine-grained, heavily compacted siltstone level in which artifacts were found in the uppermost 1-2 cm. This was followed by another excavation in 2018. Bones occurring in this level showed heavy signs of weathering, and a PVA preservative was applied before removal. All artifacts were recorded in-situ with an EDM.

Reference
Kappelman, J., Tewabe, D., Todd, L., Feseha, M., Kay, M., Kocurek, G., Nachman, B., Tabor, N., Yaceta, M. 2014. Another unique river: A consideration of some of the characteristics of the trunk tributaries of the Nile River in northwestern Ethiopia in relationship to their aquatic food resources. *Journal of Human Evolution*. 77:117-131.

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