



Fig. 1. A view of Ain Difla rock shelter in Wadi Ali from the southeast. The remaining archaeological deposits are in the form of a talus slope under the limestone overhang. The inset photo shows the exposed profile and part of the excavation area during the 2019 field season. These deposits are in the upper part of the archaeological sequence of this site.

## Ain Difla

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Ain Difla is a collapsed rock shelter located in Wadi Ali, one of the southern tributaries to Wadi Hasa, in the Governorate of Tafila. It was numbered as Wadi Hasa Survey 634 during Burton MacDonald's survey and was excavated by Geoffrey A. Clark of Arizona State University in the period from 1984 to 1993 (Clark et al. 1997). The archaeological deposits are positioned at an elevation of 790 masl, and they include a Middle and arguably Initial Upper Paleolithic record.

In 2010–2012, we examined the geomorphology and the present condition of the site and identified Clark's excavation units. We removed surface colluvium over 12 m<sup>2</sup> between Clark's excavation units A and B and excavated the two uppermost Pleistocene layers. Since the goal of 2010–2012 project was assessing the potential for dating the deposits by the optically stimulated luminescence (OSL) method, we excavated those layers just enough to read the gamma dosimetry from their sediments and to obtain several OSL samples (Z. Jacobs) for preliminary analysis. After the

fieldwork, these samples were processed in OSL labs at the University of Wollongong in Australia and the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, where they showed high amounts of quartz and feldspar grains.

We resumed excavations in the fall of 2019. The excavation team numbered nine students and archaeologists from Jordan and the Max Planck Institute and two geologists/dating specialists from the Max Planck Institute (M. Stahlschmidt and T. Lauer) and Royal Holloway University London (D. White). This project has three main objectives: 1) dating the upper sequence of Ain Difla with OSL and tephra analysis; 2) identifying the hominin species that used the rock shelter by applying recently developed methods for the extraction of ancient DNA (if preserved) from sediments and protein characterization in non-diagnostic, but possibly hominin, bone fragments; and 3) reconstructing place-use during the times of the formation of the upper sequence.

We excavated over an area of 10 square meters to about 1.5 meters in depth. The exposed stratigraphy and excavated sediments differ little in terms of their color, texture, and content. Excluding the surface layer, this seems to be a single geological unit and part of Clark's sequence of arbitrary levels 1-5 (Clark et al. 1997). We recovered 1,427 individual lithic artifacts and pieces of unworked flint, and 162 individual bone fragments (with 2.5 cm as the cutoff for all individual finds). Lithic and bone remains smaller than 2.5 cm were aggregate-recorded in 7-liter buckets. We also obtained sediment samples for OSL, tephra-chronology, DNA extraction, and micromorphology for the analysis of site formation. Bones are rare and poorly preserved. We exported all individual bone fragments to the Max Planck Institute to be analyzed for species identification, and, since they are highly fragmented, for animal and potentially human identification through zooarchaeology-by-mass-spectrometry collagen (if preserved) fingerprinting. From preliminary observations of their technological features, and as shown by Clark and his colleagues, lithic artifacts from this upper sequence can most closely be ascribed to the regional Initial Upper Paleolithic. The analysis of recovered artifacts, bone fragments, and all samples is in progress.

### Reference

- Clark, G. A., J. Schulderein, M. L. Donaldson, H. P. Schwarcz, W. J. Rink, and S. K. Fish. 1997. "Chronostratigraphic Contexts of Middle Palaeolithic Horizons at the Ain Difla Rockshelter (WHS 634), West-Central Jordan." In H.-G. Gebel, Z. Kafafi, and G. O. Rollefson (eds.), *The Prehistory of Jordan II: Perspectives from 1997*, 77-100. Studies in Near Eastern Production Subsistence and Environment 4. Berlin: Ex Oriente.