

## Composite chronology of Paleolithic sites in Jebel Qalkha revealed by pIRIR dating

Risako Kida<sup>1</sup>, \*Toru Tamura<sup>2</sup>, Seiji Kadowaki<sup>1</sup>

1. Nagoya University Museum, Nagoya University, 2. Institute of Geology and Geoinformation Geological Survey of Japan, AIST

Several Paleolithic archaeological sites occur in the Jebel Qalkha area, southern Jordan, providing valuable records of the cultural dynamics and palaeoenvironment during the dispersal of *Homo sapiens* out of Africa. We attempted optically-stimulated luminescence (OSL) dating for sediment samples taken from Epipaleolithic to Middle Paleolithic layers at multiple sites, including Tor Hamar, Tor Fawaz, Wadi Aghar and Tor Faraj. Test measurements revealed that the OSL characteristics of quartz grains are not suitable for dating; quartz OSL leads to variable equivalent dose depending on preheat temperature and does not result in an appropriate dose recovery. In contrast, post-IR IRSL (pIRIR) is characterized by a good dose recovery and its equivalent dose does not highly depend on preheat and measurement temperatures. pIRIR also shows modest fading rates. While quartz OSL is usually the first choice for dating sediments younger than 50,000 years, in this site K-feldspar pIRIR protocol is considered more appropriate. Thus we attempted the pIRIR<sub>50/150</sub> protocol of K-feldspar grains of 62–90  $\mu\text{m}$  diameter. We obtained dates of 11–46 ka at Tor Hamar, 14–45 ka at Tor Fawaz, 36–50 ka at Wadi Aghar, and 53–66 ka at Tor Faraj, being approximately concordant with ages inferred from stone tools. This indicates that further examination of the composite chronology of these sites may help clarify timings of lithic cultural changes and environmental background from the Middle Paleolithic to Epipaleolithic periods, corresponding to the human population change from *Neanderthals* to *Homo sapiens*.

Keywords: Archaeology, Late Pleistocene, *Homo sapiens*, *Neanderthalensis*, Climate change