

OSL Dates from Pre-Pottery Neolithic El Hemmeh, Jordan

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The site of el-Hemmeh in the Wadi el-Hasa, Jordan was excavated during the summers of 2004 to 2007. One of the primary research goals at el-Hemmeh focuses on refining our knowledge of the transition from hunter-gatherer societies to complex agricultural societies. Our research focuses on establishing a solid chronological framework through a combination of luminescence and radiocarbon determinations.

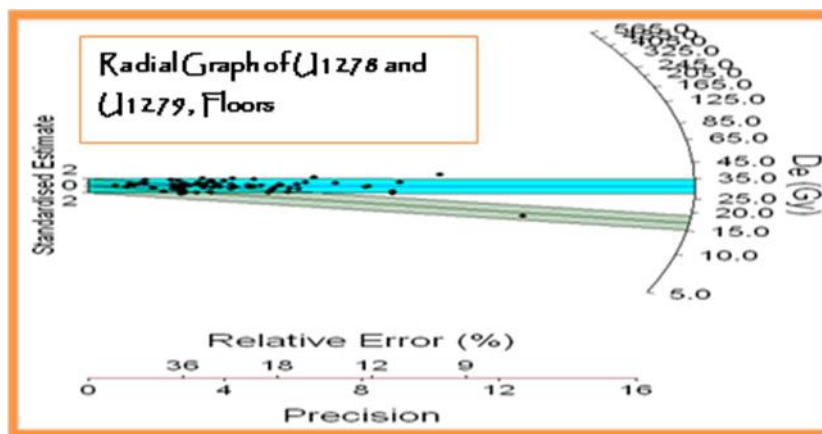
Lithic-techno types, specifically Hagdud truncations, and a single radiocarbon determination of 9450 +/- Uncal BP recovered from primary contexts confirm a PPNA occupation at el-Hemmeh. Using these more conventional measures as a comparative chronometric data set, we evaluate the power of luminescence analysis in this context.



Sediment samples for luminescence dating were taken from a series of hard-packed floors and from ash layers above the floors from a hypothesized Pre-Pottery Neolithic A (PPNA) structure, see below. Twin vertical columns were driven through the floors (at least four discernible, discrete layers) covering 20 cm. All samples were subsequently analyzed using Optically Stimulated Luminescence (OSL).

	Context	Equivalent Dose	Age (ka)	Age (BC)
U1212	Ash Above Floors	26.5 ± 1.8 Gy	12.4 ± 1.0	$10,389 \pm 974$
U1213	Ash Above U1212	24.9 ± 2.3 Gy	10.1 ± 1.0	8067 ± 986
U1278/ U1279	Vertical Column through Floors	29.7 ± 1.2 Gy	11.7 ± 0.6 ka	9674 ± 590
Radiocarbon Age of sample from hearth within floor: 9150-8550 cal BC				

Note that the ash layer directly above the floors is contemporaneous with the floors themselves, and that the upper ash layer has an age that is stratigraphically correct.



Our goal was to resolve discrete ages for each floor, by using Single Aliquot Regeneration (SAR) on single grains of quartz (90-125 microns) taken from 5 cm increments of each sample column. This proved unrealistic, as ages for each increment were either statistically indistinguishable or showed high levels of mixing. The data presented here derive from adjacent 5cm samples (U1278 and U1279) with statistically identical equivalent dose values derived from a single component with very low mixing.

Results are shown in the table above. These data place the construction of the floors in the Pre Pottery Neolithic A, making this the oldest excavated portion of El HemmeH thus far. These data are in agreement with the radiocarbon analysis performed on associated polyaromatic hydrocarbons from an associated hearth. The ash layer directly above the floors is contemporaneous with the floors themselves and the upper ash layer has an age that is stratigraphically consistent.