

Age Dating and Paleoenvironmental Changes of the Kunang Cave Paleolithic Site*

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ABSTRACT

The Kunang cave paleolithic site is located at Tanyang [N37°2', 128°21'E], Chungbuk Province, which is in the Central part of the Korean peninsula. The cave is developed at 312 amsl in a karstic mountainous area. The South Han River flows across this region and other caves can also be found near the river. The site was discovered in 1986 and excavated 3 times by the Chungbuk National University Museum until now. The cave was wellpreserved from modern human activities until the first discovery.

The full length of the cave is estimated to be ca. 140 m. However, a spacious part up to 11 m from the entrance has been excavated. Eight lithological units are divided over the vertical profile at a depth of 5 m. Each unit is deposited in ascending order as follow: mud layer (Unit 9), lower complex (Unit 8) which is composed of angular blocks and fragments with a muddy matrix, lower travertine layer (Unit 7; flowstone), middle complex (Unit 6; cultural layer) which is composed of fragments with a muddy matrix, middle travertine layer (Unit 5; flowstone), yellowish muddy layer (Unit 4), upper complex (Unit 3; cultural layer) which has a similar composition to Unit 8. the upper travertine layer (Unit 2: flowstone), and finally surface soil layer (Unit 1). The most abundant vestiges in the cultural layers are the animal bones. They are small fractured pieces and mostly less than 3 cm in length. About 3,800 bone pieces from 25 animal species have been collected so far, 90 percent of them belonging to young deers. Previous archaeological study of these bone pieces shows thatprehistoric people occupied the cavenot for permanent dwelling but for temporary shelter during their seasonal hunting activity. More extensive studies of these bones together with pollen analysis are in progress to reconstruct the paleoenvironment of this cave.

Only a single date (12,500 BP) obtained from a U-Th measurement of the upper travertine layer was previously available. In spite of the importance of the cave stratigraphy, there was no detail chronological investigation to establish the depositional process of the cultural layers and to understand the periodic structure of the cave strata, alternating travertine floor and complex layers. We have measured five 14C age dating (38900+/-1000, 36400+/-900, 40600+/-1600, more than 51000 and 52000 14C BP) using Seoul National University 14C AMS facility, conducted systematic process of the collagen extraction from bone fragments samples. From the result, we estimate that sedimentation rate of the cave earth is constant, and that the travertine layers, Unit 2 and Unit 3, was formed during MIS 5a(ca. 80 kBP) and MIS 5c (ca. 100 kBP) respectively.

The Kunang Cave site is located at Yochonli of the region of Danyang in the mid-eastern part of Korea. This region is compased of limestones in which many caves were found and the Nam-han river flows meanderingly. The excavations were carried out three times in 1986, 1988, and 1998.

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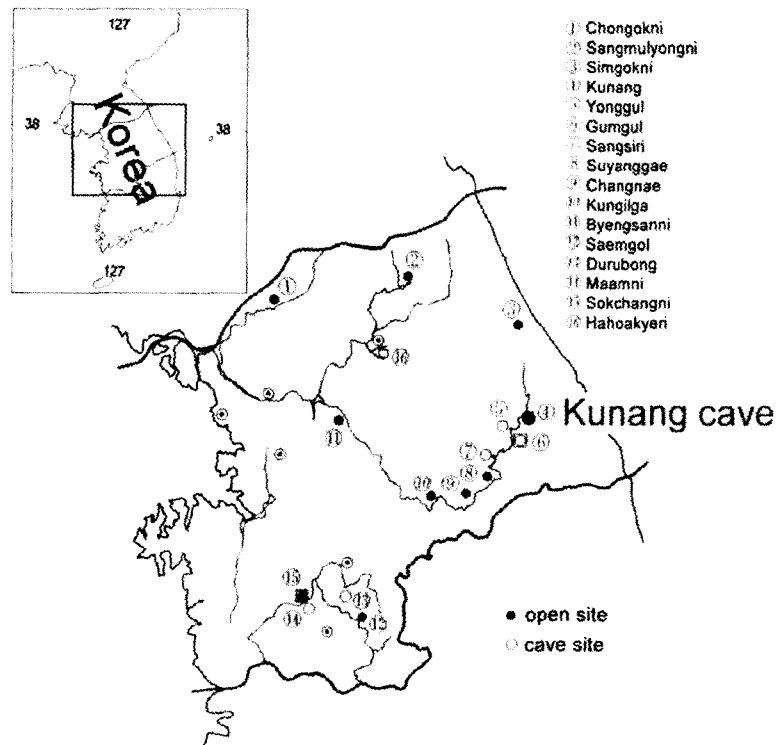


Fig. 1. Location of the Kunang Cave with other paleolithic site in Central part of Korea

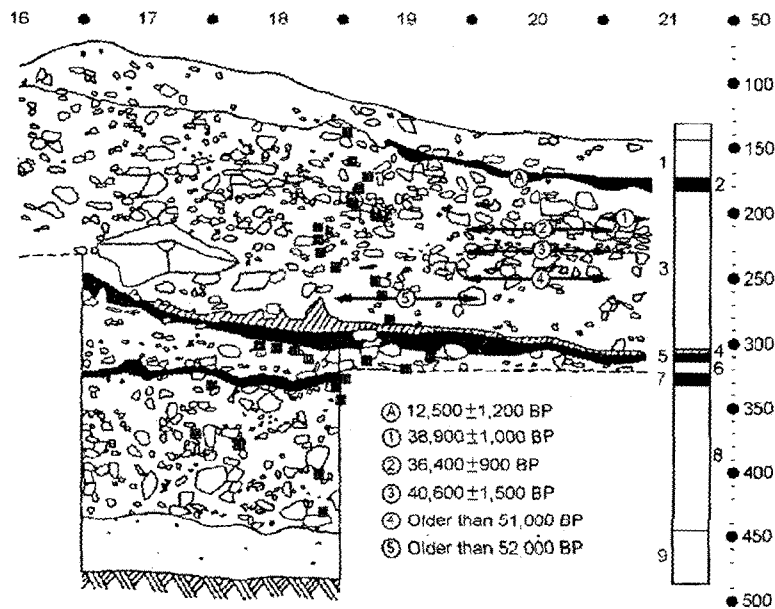


Fig. 2. Cross section and sample locations of the Kunang Cave (modified from Lee et al., 1999)

Table 1. Chronological data of the Kunang Cave deposits

Sample No.*	Depth**	Sample	Grid Square**	Stratigraphic Unit	14C age in yr BP	Lab. No.
	155 cm	Flowstone	Cha20	II	12500±1200**	
3Gu-3708	204 cm	Phalanx of Deer	Cha21	III	38900±1000	SNU02-726
3Gu-3713	213 cm	Metatarsi of Deer	Cha20	III	36400±900	SNU02-727
3Gu-3718	230 cm	Vertebra of Deer	Cha20	III	40600±1600	SNU02-728
3Gu-588	250 cm	Radius of Deer	Cha20	III	Older than 51000	SNU02-731
3Gu-2336	265 cm	Femur of Deer	Cha19	III	Older than 52000	SNU02-729

* Sample Number of Chungbuk National University Museum

** The relative elevation from the excavation report of Lee et al., 1999

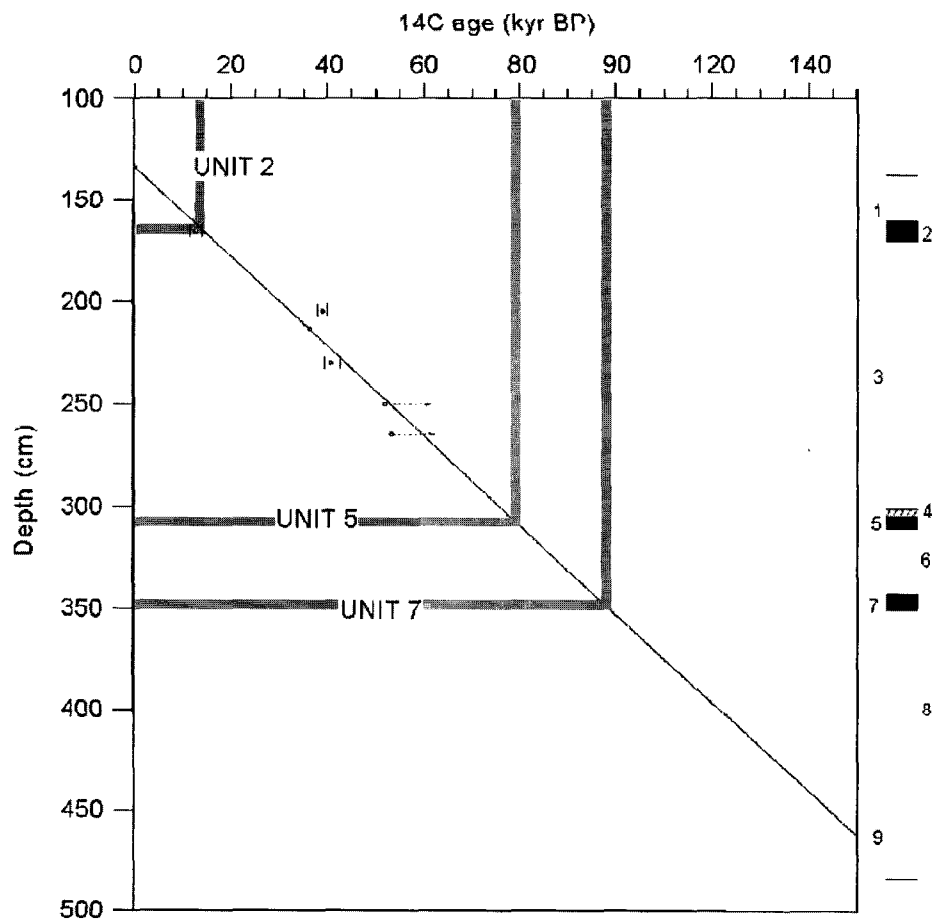


Fig. 3. Estimated sedimentation rate and ^{14}C ages of travertine layers in the Kunang Cave

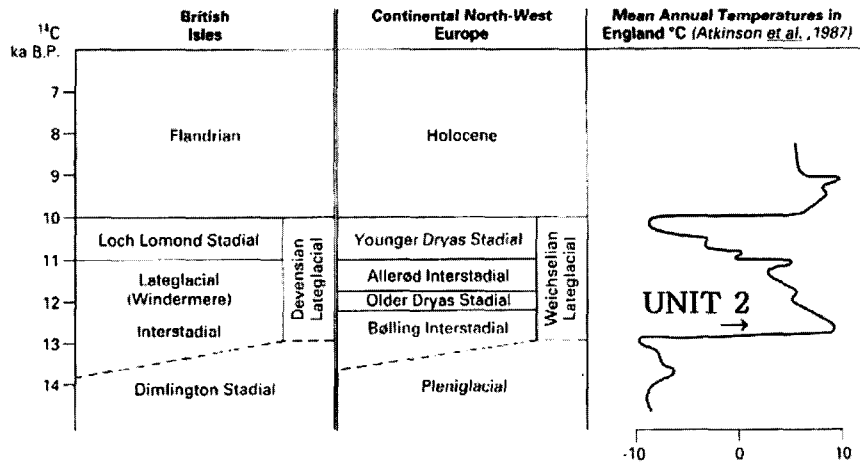


Fig. 4. The Late-glacial period (ca. 14-10 14C kBP) in northwest Europe (Lowe and Walker, 1997)

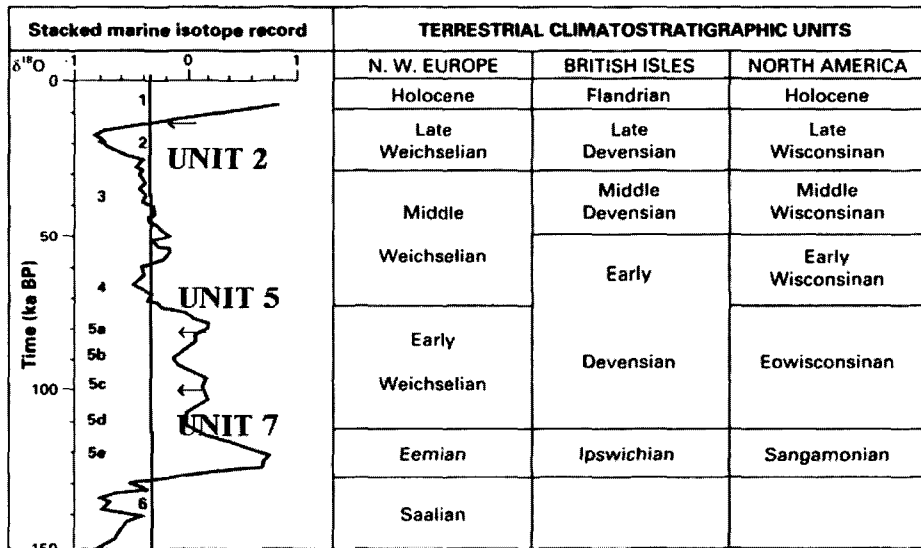


Fig. 5. The stacked marine oxygen isotope record for the last 130 ka (Martinson et al., 1987) and Estimating warm periods when the travertine layers were precipitated

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