

Climate Reconstruction from the Species of Charcoals at Gunanggul, a Late Paleolithic Cave in Central Korea

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Charcoals excavated at archeological sites provide important information about environmental condition as well as cooking or fire evidences. The species of charcoals can be identified by examining their micro-structures of wood tissues because charcoals retain most of cell structures of woods prior to the carbonization. Through the species identification, we can compare forest composition of the present with the past one, and consequently obtain the information about the climate and environments at the sites and layers.

We examined the species of 280 charcoal segments excavated at the paleolithic site of Gunang cave, Danyang, central east Korea. The charcoals were broken to reveal the three dimensional structures and they were mounted on the stub surface using double sided tapes. The charcoals

mounted on the stub were placed in weighing bottles and were dried at 105 °C using an ordinary drying oven for 24 hours. After drying, the charcoals were cooled down in the bottle covered to prevent heated charcoals from absorbing moistures in the air. The dried and cooled charcoals were gold-coated, then examined the structures using a Hitachi scanning electron microscope.

Total of 218 segments in the layers were identified. They were *Pinus spp.* (diploxylon), *Picea*, *Ulmus*, *Celtis*, *Hemiptelea*, *Moraceae Prunus*, *Rosa*, *Prunus mandshurica*, *Acer*, and *Quercus spp.* The results suggest that most periods in Gunang cave were warm except a few short epoch of cold climate, which were indicated by *Picea* occurrence.



Fig. 1 *Quercus spp.*

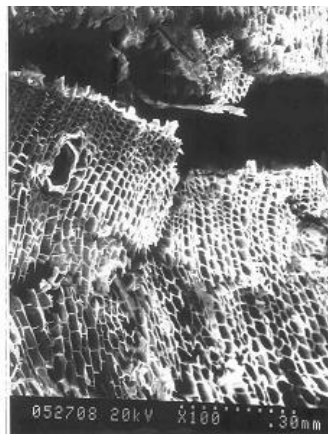


Fig. 2 *Pinus spp.*

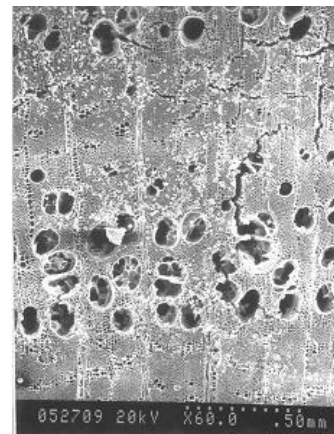


Fig. 3 *Morus spp.*

Fig. 4 Prunus spp.

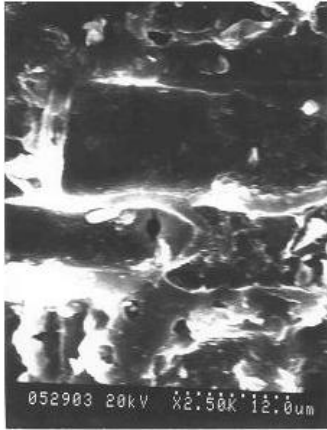


Fig. 5 Hemiptelea spp.

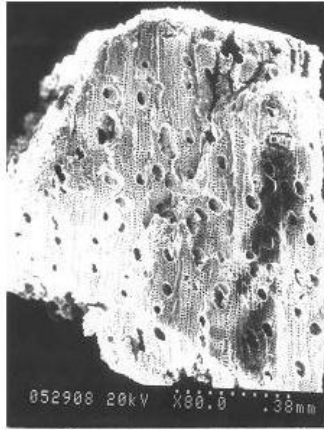


Fig. 6 Celtis spp.

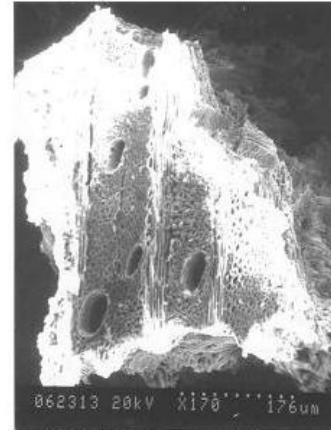


Fig. 7 Picea spp.

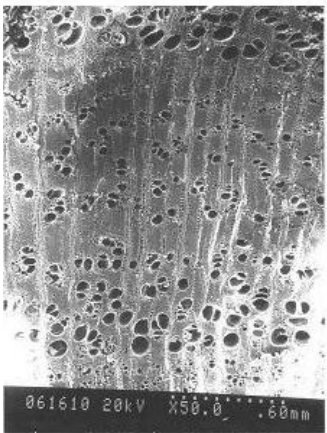


Fig. 8 Acer spp.

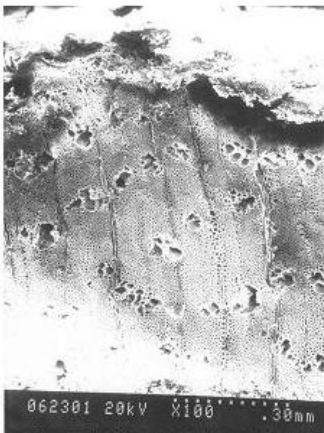


Fig. 9 Rosa spp.

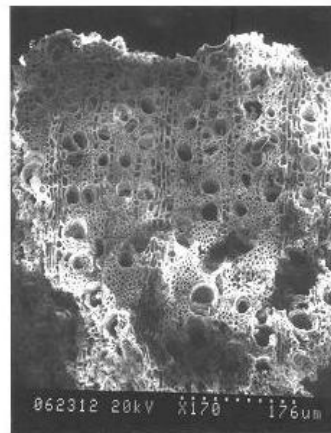


Fig. 10. Celtis spp.

Fig. 11 Ulmus spp.

Fig. 12 Prunus spp.