

Radiocarbon and dendro-dates of buried woods excavated from lowland archeological sites in Japan

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There are many wetland archeological sites in Japan, because the land consisted of small islands with rather high precipitation. Such sites preserve wooden remains, and woods are one of the very important remains that provide the ages of the sites. In excavation of wetland sites has revealed a huge number of wooden substances used by ancient people as materials for the construction of residential houses, fences as well as wooden tools. To determine chronology of the sites, wood materials are normally analyzed by radiocarbon dating of the outermost part of tree rings, or in some cases a wiggle-matching analysis is applied. Another age estimation is tried by dendrochronology if disk samples can be collected from them. Even if precise age estimation of the woods is not possible by dendrochronology, cross-dating analysis of wood samples would be useful. In fact, more than 80 wooden poles excavated at the Aota site, Niigata Prefecture, were grouped temporally into two parts, and tree-ring age relations were established between the two groups by comparing the ring-width data for almost all wood poles collected. The age difference of the two groups was estimated to be 91 years by cross-dating the ring-width patterns of the two groups by connecting them to a ring-width pattern of one natural tree that seemed to cover the full age range extended by the two groups. Recently, by applying 18O/16O patterns of the cellulose fraction from annual rings, instead of ring width, the accurate age of the two groups was successfully determined.

These analyses suggested that radiocarbon dating, dendrochronology based on ring-width patterns as well as 18O/16O patterns of annual rings should be connected one another, to get a precise chronology of the woods excavated from the archeological sites.

Keywords: radiocarbon age, dendrochronology, calendar date, cross-dating, 18O/16O chronology, 14C wiggle matching