Dendrochronology of a fossil log from the dammed lake deposit by Dondokosawa rock avalanche, the Southern Japanese Alps

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Large-scale rock avalanche deposits (Dondokosawa rock avalanche deposits; DRAD, V=1.9×10^7 m^3) are present in the east side of Mount Jizo, the Akaishi Range. The age of DRAD has been determined by a ^14C-method as AD780-870 or as AD778-793 (with help of wiggle matching). However, precise age determination of DRAD is further required as the some uncertainties remain in the previous age data. Therefore, we performed dendrochronology of a fossil wood log of Japanese cypress (Chamaecyparis obtusa) with 226 tree rings and bark obtained from the dammed lake deposits formed by DRAD. As a result, the fluctuation pattern of tree ring width of the sample log (DDK-A) clearly coincided with the pattern during a period from AD662 to AD887 of the 2705-year-long standard curve (705BC-AD2000) established from some tree ring samples of Japanese cypress. Statistical analysis showed that a degree of agreement between DDK-A’s tree ring curve and the standard curve (t) is 7.9. Generally, it can be judged that there is high agreement between two tree ring patterns when t-value is more than 3.5. We also observed cell structures of the outermost tree ring for determining the kill season of DDK-A. The early wood ring was completely formed and the late wood ring was almost invisible. Therefore we concluded that DDK-A was dead in the late summer of AD887.

The old Japanese documents Nihon-Sandai-Jitsuroku and Fuso-Ryakki described the mega earthquake(M 8-8.5), the Goki-Shichido earthquake, in AD887 August. This earthquake was considered to occur along the Suruga and Nankai Troughs off central Japan. Slope movement related to DRAD would be caused by this historical earthquake.

Keywords: dendrochronology, large landslide, Gokishichido earthquake, Akaishi Range