

Age determination of Dondokosawa Debris Avalanche Deposits in Southern Japanese Alps using dendro wiggle matching

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Dondokosawa Debris Avalanche Deposit (DDAD, 1.9×10^7 m³) is found in east foot of Mount Houou (2764m ASL), Southern Japanese Alps. The initial failure of DDAD occurred on slopes ca. 2300 m ASL. Then DDAD travelled 3.6 km and was deposited around the valley floor ca. 1100 m ASL. Based on previously obtained ¹⁴C ages, DDAD was considered to occur during the period from 780-890 cal AD, and the trigger of failure was assumed to be historical earthquakes or heavy rain. However, conventional single age calibration to calendar time scale usually causes certain errors around 100 years. This prevents us from more accurate correlation between a sudden geologic event like debris avalanche and historical records. To overcome this problem, dendro wiggle matching (WM) is valuable when an appropriate dating material such as fossil log with many tree rings more than several decades can be obtained. In this presentation, I describe a precise age determination of DDAD by WM with OxCal4 and IntCal09. New estimation is 778-792 AD. No large earthquakes were written in any historical document during this period. Meanwhile, a description regarding major losses resulting from floods in ancient Shizuoka Prefecture south of the study area in September 779 AD (Julian calendar scale) is found in an old document SHOKU-NIHONGI. Heavy rain in this time was a possible trigger of the debris avalanche.

Keywords: debris avalanche, wiggle matching, ¹⁴C age, high precision dating, tree ring