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Single-year radiocarbon measurement of Japanese tree rings of the first millennium BCE.

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The chronology from the 10th century BCE is of great importance for the archaeology of the Japanese archipelago and East Asia. We have continued AMS radiocarbon dating of Japanese trees with tree ring ages, and some of the results have been included in a calibration curve IntCal20. As a result, the shape of the calibration curve was revised from the 1st to the 3rd century CE. However, the data employed were measured in the 2000s with uncertainties, and most of the measurements were based on a sample of five rings.

Since the Miyake Event of 775CE was detected, the radiocarbon dating of tree rings has become based on single years. In the Japanese archipelago, conventional dendrochronology has been possible only for cypress and cedar trees, and the range has been about 3,000 years in the past. However, the oxygen isotopic dendrochronology put to practical use in the 2010s changed the situation completely. Oxygen isotope ratios of cellulose in tree rings reflect the amount of precipitation. They are highly synchronous regardless of tree species in the Japanese archipelago under the influence of the Asian monsoon. A master chronology of the past 5,000 years has already been completed for the Japanese archipelago, and many tree rings can now be dated in various regions.

Again, we have decided to conduct AMS radiocarbon measurements of single-year Japanese tree rings from the first millennium BCE. Some have already been reported (e.g., Sakamoto et al. 2023), and the presenting samples filled in the gaps, consisting of tree rings from the 9th century BCE and the 5th to the 6th century BCE. In addition, we have attempted to detect 660 BCE events using two new samples to verify the dating by oxygen isotope ratio dendrochronology.

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Student Submission

No

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