

Tree rings: do we find record of economic growth?

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In order to improve our knowledge of the past climate, it is important to have methods that allow for investigation, providing better correlations of significant climatic events. Hinoki trees having a wide distribution ranging from north to the south of our country are an ideal substrate to develop such records that can potentially be further extended to explore the climate down to Asuka period by analyzing the wood used in Horyu-ji temple. Recently, by taking advantage of properties at Xylarium at RISH, we started tree ring analysis of Hinoki, and here we introduce a preliminary result of an carbon isotopic investigation from the species grown in Kiso area.

The Japanese forest was exposed to high levels of sulfur and nitrogen deposition during the economic growth period in 1960s to 1970s. The change in growth of Hinoki tree caused by such pollution has been studied using the ^{13}C isotopic chemistry of the tree rings. Tree rings were sectioned by years, and whole wood was analyzed for isotopic composition ($\delta^{13}\text{C}$) and annual ring width. Only those rings that formed after the juvenile effect in early rings were used and trends from the beginning of 20th century were evaluated. The mean $\delta^{13}\text{C}$ of the Hinoki tree rings was ca. -20‰. The $\delta^{13}\text{C}$ did not follow climate parameters, such as relative humidity, temperature, precipitation, but showed a rapid change during 1960s-1970s, implying a negative effect of pollution on tree physiology.

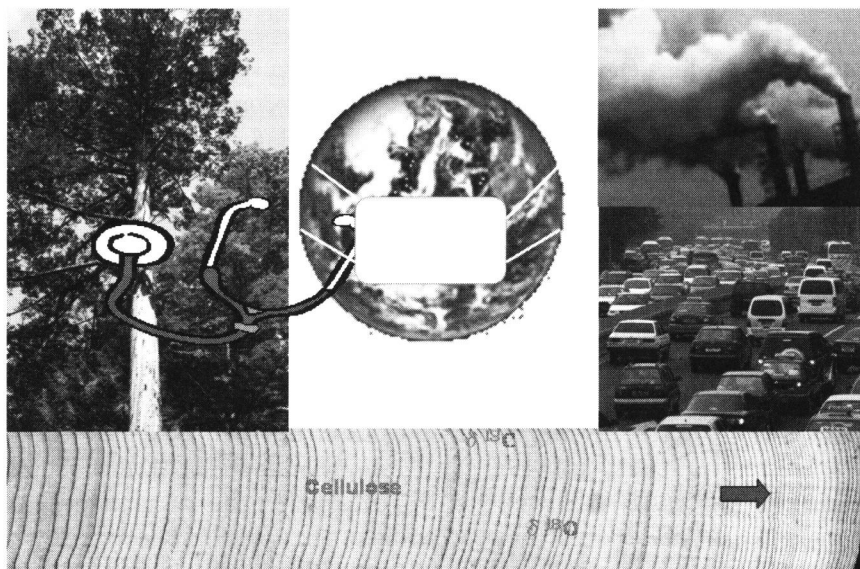


Figure 1 Tree ring information will be explored from a wealth of Xylarium wood database.