

Development of the ultra-high resolution photography for detecting the abnormal tree-rings

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Dendrochronology is a scientific dating method that can determine the calendar year of timber materials without error, and is useful for grasping the ages of archeological sites and old buildings with high accuracy. Premise of tree-ring dating is accurate tree ring discrimination. However, the tree-rings may include abnormal rings such as discontinuous rings and false rings. If they cannot be identified, there is a risk of dating failure or reporting the wrong date.

Abnormal rings can be detected by precise observation of cell size and cell wall thickness. However, observation at the cell level requires use the optical microscope or a digital microscope, which is troublesome and costly. Therefore, in this study, we developed a method to easily take ultra-high resolution images that can observe cells with a commercially available digital camera.

Our method can also be applied to the construction of cell tree-ring chronologies and the study of climate reconstruction based on it. Although it is known that cell chronology can be applied to high resolution reconstruction of summer temperature and precipitation, little research has been conducted in Japan. If climate information can be obtained on a monthly or weekly basis, comparisons with historical events can be made easier, and this can lead to thinking about causal relationships.

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