

Annual reconstruction of East Asian summer monsoon variability using tree ring stable carbon isotope in Yakusugi cedar

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Understanding the paleoclimate based on the high-precision reconstruction of the best proxies is essential to predict future climate change. It has been known that stable carbon isotope in tree rings formed in high humidity area is a proxy for the actual sunshine duration during the tree ring formation. We reconstructed 1629 year record of the actual sunshine duration in Yakushima island in Summer from the stable carbon isotope of the annually resolved tree rings using the Yakusugi cedar (*Cryptomeria japonica*) grown in Ishizuka area where we identified that the humidity has been the highest at about 100% in Summer. As a result, it is found that the actual sunshine duration in summer is smaller than average in Medieval Warm Period (MWP), while it is higher than average in Little Ice Ages (LIA). Since the actual sunshine duration in Yakushima Island is sensitive to East Asian Summer Monsoon (EASM), it is indicated that EASM activity was stronger than average in MWP and is weaker than average in LIA. We will discuss the relationship between EASM and actual sunshine duration in Yakushima island.

Keywords: tree ring, stable isotope, East Asian summer monsoon