

In year 2012 appeared in the *Nature* article showing a rapid increase in the concentration of radiocarbon in the atmosphere caused by the activity of our star. Recorded increase of radiocarbon concentration in samples of annual tree rings of Japanese cedar (*Cryptomeria japonica*) at the turn of years 774 and 775 A.D. was 12 ‰. A similar increase (11.3‰) was recorded at the turn of years 993 and 994 A.D. In literature this effect is called the effect Miyake from the name of the discoverer.

This effect is of great importance for radiocarbon dating. This method based on the decay of the isotope of carbon of mass 14 (radiocarbon), and is very important to know how the radiocarbon concentration has changed in the past, and what is the present concentration in the sample. Radiocarbon concentration in the atmosphere is not constant in time and therefore to obtain a calendar age of the sample it is necessary to use the calibration curve. It allows the determination of the interval in calendar years, which corresponds to the appropriate concentration of radiocarbon (radiocarbon age). This curve in the youngest period was built on the basis of radiocarbon concentrations in tree rings from trees which were previously dated dendrochronologically. Each point on the curve represents mean average of 10 years, which means that the amplitude of changes (rapid increase or decrease of the concentration of radiocarbon in the atmosphere) is shallower. Many archaeological samples come from the period, in which occur rapid changes of radiocarbon due to the Miyake's effect. Calendar age of such samples appear younger due to calibration with such constructed curve. It is therefore necessary to take into account these rapid changes in the curve used for the calibration of radiocarbon dates.

The aim of this project is, in addition to archive these rapid changes in the radiocarbon concentrations in annual tree rings, to use these changes to precise dating part of the floating chronology for pine in central Poland, which has 227 years. By using AMS technique (Accelerator Mass Spectrometry), it is possible to make precise measurements of samples containing ≥ 1 mg of carbon. Measurements of radiocarbon concentration in the pine cores of pine (annual growth rings) will be compared with changes in the reference samples (dendrochronologically dated annual rings of sub-fossil oak) in order to determine the similarity between these two waveforms changes ("wiggle matching"). This will allow the absolute dating of tree rings from floating pine chronology, which has been so far unattainable using radiocarbon method. It will be one of the first applications of this discovery in absolute dating, which will build the longest chronology of pine trees in central Europe.