

BPT024-P02

Room:Convention Hall

Time:May 22 10:30-13:00

The age correlation of carbon isotopic ratios from terrestrial woody materials in Lower Cretaceous Sasayama Group

Fumitaka Akiyama^{1*}, Toshiro Yamanaka¹, Takuya Goto¹, Reishi Takashima², Takashi Matsubara³

¹Okayama University, ²Tohoku University, ³Museum of Nature and Human Activities

The Earth has experienced lots of environmental changes in the past. Especially, during Cretaceous period in Mesozoic, the average global surface temperatures were 14 degree higher than today, therefore, this period was called Greenhouse Earth. Under such a condition, it has been documented various global events such as sea level raise and absence of permanent ice sheets. On the other hand, it is reported that absence of geomagnetic anomaly (Cretaceous superchron) lasted for almost 40 million years from about 120Ma to 83Ma. Therefore, age correlation using paleomagnetism is difficult during the period. To overcome the difficulty, stable carbon isotope stratigraphy, come to use progressively recently as a new stratigraphic tool.

The plants use atmospheric $^{12}\text{CO}_2$ preferentially during the photosynthetic processes. It is expected that stable carbon-isotope fluctuations by plants precisely trace that of atmospheric CO_2 . Stable carbon isotopic compositions in plants could be affected by various factors more than once such as increasing or decreasing of vegetation. Hence, carbon-isotope fluctuations preserved in plant tissues serve as a good correlative tool.

Here, we measured stable carbon-isotopic compositions of isolated terrestrial plant fragments, fossil wood, in the sedimentary rocks through the non-marine Sasayama Group, distributed western Honshu, Japan, and then we evaluated the potential of stable carbon-isotope stratigraphy.

The carbon-isotopic values obtained from the fossil woods varied ranging from -19.0 to -25.9 permil, with an average of -22.0 permil. At the two stratigraphic level, carbon-isotopic ratios of fossil wood exhibit significant shifts toward relatively high value. We correlate ages comparing carbon isotope fluctuations within 93-125Ma, the Fission-track (F.T.) age previously published.

In Aptian-Cenomanian, carbon-isotope records obtained from the fossil wood fragments vary ranging from -20 to -25 permil and only during Aptian period, major positive excursions exhibit. Our data closely consistent with that of the marine Lower Greensand Formation, England and the apparent patterns agree with in mid-Aptian trends.

Accordingly, it may be assumed that the age of Sasayama Group, based on stable carbon-isotope stratigraphy, could become detailed much more than F.T. dating. Our data also coincide well with previous study (114Ma) and it may support the applicability of stable carbon-isotope stratigraphy. The combination of both carbon-isotope stratigraphy and radiometric age allows more significant and detailed correlation.

Keywords: Sasayama Group, terrestrial organic carbon, carbon isotope, age correlation