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The analysis of D47 and oxygen isotope ratio of the Ediacaran Doushantuo Formation South China

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The Ediacaran period was one of the most important periods in the history of life when multicellular animals first appeared on the earth (Brasier and Antcliffe, 2004). However, the relationship between the abrupt biological evolution and environmental change is still ambiguous. In order to examine the environmental change, for example seawater temperature through the Ediacaran, we analyzed the carbon and oxygen isotope compositions of carbonate rocks from drill cores from the Three Gorges area, South China. In addition, we analyzed the D47 from the same samples. The core samples include the Nantuo tillite, corresponding to the ca. 635 Ma Marinoan glaciation, through the Doushantuo to the lower Dengying formations in ascending order.

D47 values allow to estimate the change of seawater temperature (Ghosh et al., 2007). So far, there were no D47 data in the Ediacaran because of the new analytic method. On the other hand, the $\delta^{18}\text{O}$ values of carbonate rocks depend on seawater temperature and oxygen isotope ratio of seawater (Kim and O'Neil, 1997). So, the combination leads to separately estimate the change of seawater temperature and oxygen isotope ratio of seawater through the Ediacaran Period.

Tahata and others (2011) showed a positive oxygen isotope excursion in middle Ediacaran and argued that it corresponds to the Gaskiers glaciation. On the other hand, preliminary D47 data shows that the interval also has high D47 values. The D47 values in the Gaskiers glaciation show about 0.610, calculated to be about 23 degrees C. The change of D47 is consistent with the change of $\delta^{18}\text{O}$. We first showed the change of D47 in Ediacaran, so we first cleared the change of seawater temperature in Ediacaran Period.

Keywords: D47, Ediacaran, South China, oxygen isotope ratio