Environmental change in Ediacaran period :estimated from radiogenic Sr isotope ratios preserved in strata at Three Gorges.

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The Ediacaran period is one of the most important intervals for the evolution of life. However, the scarcity of well-preserved outcrops during the Ediacaran leaves an obstacle in decoding surface environmental changes and patterns of biological evolution.

In south China, strata during the Ediacaran are almost continuously exposed and contain many fossils, suitable for study of environmental and biological change in Ediacaran. We undertook deep drilling at four sites in the Three Gorges area to obtain continuous and fresh samples without surface alteration and oxidation. 87Sr/86Sr ratios of the fresh carbonate rocks, selected based on microscopic observation and geochemical signatures of Mn/Sr and Rb/Sr ratios and $D^{13}C$ and $D^{18}O$ values, were measured with multiple collector-inductively coupled plasma-mass spectrometric techniques.

The chemostratigraphy of $^{87}Sr/^{86}Sr$ ratios of the drilled samples displays a smooth curve and two large positive shifts in Ediacaran. The combination of the detailed chemostratigraphies of $D^{13}C$, $D^{18}O$ and $^{87}Sr/86Sr$ enable us to find connections among them and indicates that the first large positive shift of 87Sr/86Sr is slightly preceded by $D^{13}C$ and $D^{18}O$ negative excursions and that the second large positive shift of $^{87}Sr/^{86}Sr$ clearly precedes a $D^{13}C$ negative excursion. The first positive shift can be explained by Gaskiers glaciation. We speculate enhanced weathering rate, resulting from convergence of Gondwana supercontinent, as a cause of the second positive shift of $^{87}Sr/^{86}Sr$. These two events influenced evolution of life.