Geophysical Research Abstracts
Vol. 21, EGU2019-4674, 2019
EGU General Assembly 2019

Cyclostratigraphic constraints on the negative carbon isotope excursion from the upper part of Member 3 of Doushantuo Formation, South China

Haiyan Li (1), Shihong Zhang (1), Jian Han (2), Ganqing Jiang (3), Huaichun Wu (1), Jikai Ding (1), Tao Zhong (1), Jin Dong (4), and Tianshui Yang (1)

(1) China University of Geosciences (Beijing), Beijing 100083, China (hai2216@cugb.edu.cn), (2) Northwest University, Xi'an 710069, China, (3) University of Nevada, Las Vegas, NV89154-4010, USA, (4) Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China

The marked negative carbon excursion from the upper part of the Member 3 of the Doushantuo Formation (DST3) in South China is generally considered as equivalent of the Shuram excursion. This negative carbon excursion has been identified in numerous sections globally. Due to the lack of chronologic constraints, however, its duration and global synchronicity are obscure and thus much debate still exists regarding to its origin.

In order to constrain the duration of the negative carbon excursion from the upper part of DST3, a cyclostratigraphic study has been conducted on two sections around the Huangling Granite (HG), in the eastern Three Gorges region. One section is a segment of the Wuhe-Gaojiaxi (WG) core that was jointly collected by Northwest University and Tokyo Institute of Technology. The WG core is located on the southeast to the HG. The other section is located on the northwest to the HG, named the Zhengjiatang (ZJT) section. The DST3 of the WG core contains two parts in lithology. The upper part is ribbon grey dolomite and the lower is thick-bedded grey dolomite. The DST3 of the ZJT section is more complex in lithology, the top ∼5-meter interval is predominated by light grey and pale red dolomite and intervals downward are thin-bedded grey calcite (∼9-meter in thickness), thin-bedded purple calcite (18.5-meter in thickness), thin-bedded pink dolomite (∼6-meter in thickness) and thick-bedded grey dolomite.

The magnetic susceptibility (MS) sequences were achieved from the WG core at 1 cm interval and from the ZJT section at ∼5 cm interval. These two MS sequences were comparable. After linear interpolation at 4 cm interval and detrending by subtracting 10% weighted averages, both the MS sequences were ready for cyclostratigraphic analyses, including power spectral analysis, Evolutionary Fast Fourier Transform (FFT) spectrograms, and Gaussian bandpass filtering.

The spectral peaks of the MS sequence of the WG core revealed cycle periods of 588-243 cm, 108-78.1 cm, 37.9-24.3 cm, 20.6-15.5 cm and cycle periods of the ZJT section were 325-245 cm, 81.3-60.6 cm, 30.1-19.2 cm, 18.8-14.1 cm. They were consistent and interpreted to correspond to the Milankovitch cycles at ∼570 Ma, i.e. eccentricity periods (E, 405 k.y. and e, 100 k.y.), obliquity period (O, 31.7 k.y.) and precession periods (P1, 20.2 k.y., P2, 19.2 k.y. and P3, 16.6 k.y.). The E-filter-output results suggested that duration of the entire negative carbon excursion from the upper part of DST3 in the region was ∼6.1 m.y. (∼15.2 E).