

Palaeoworld

This is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship.

PALAEOWORLD Editorial Office

State Key Laboratory of Palaeobiology and Stratigraphy

Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences

Beijingdonglu 39, 210008 Nanjing, PR China

e-mail: palaeoworld@nigpas.ac.cn

PALAEOWORLD online submission:

<http://ees.elsevier.com/palwor/>

PALAEOWORLD full-text (Volume 15 –) available at:

<http://www.sciencedirect.com/science/journal/1871174X>

ORGANIC CARBON ISOTOPE PERTURBATION ACROSS THE ORDOVICIAN-SILURIAN BOUNDARY LAYER OF THE WANGJIAWAN SECTION, YICHANG CITY, CHINA

Xu Dao-yi, Yan Zheng and Ye Lian-fang

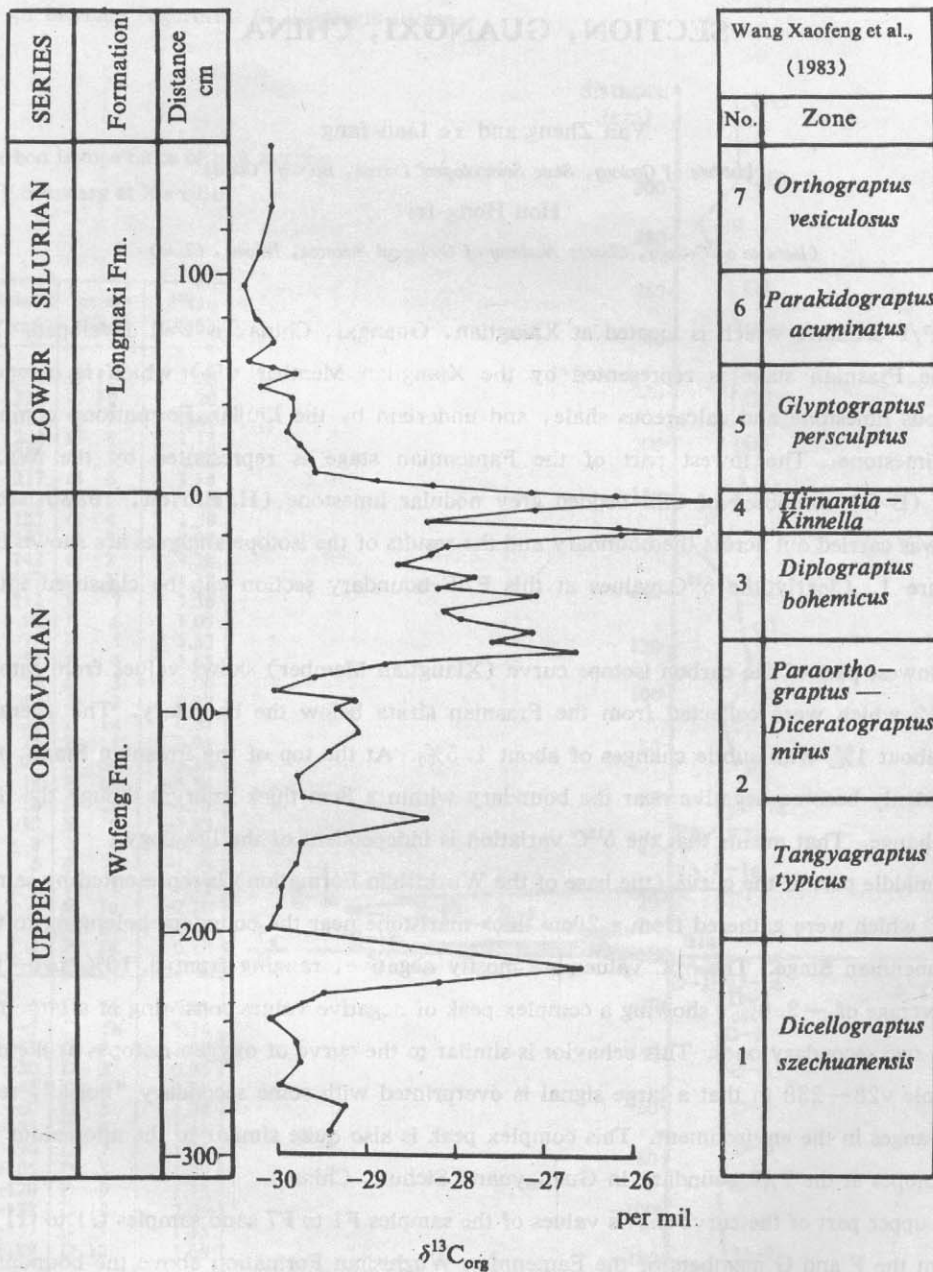
(Institute of Geology, State Seismological Bureau, Beijing, China)

The Wangjiawan Section, Yichang City, Hubei Province is one of the best Ordovician-Silurian boundary (OSB) sections in China with good biostratigraphic control. Due to the fact that the strata across the OSB of the Wangjiawan Section are rich in organic material and poor in CaCO_3 , the organic carbon isotope ratios in the rock have been determined, and the results are shown in Figure 1.

From the base of the five fossil zones in the Late Ordovician, $\delta^{13}\text{C}$ values become gradually more positive from $\delta^{13}\text{C} = -30\text{‰}$ to -25‰ . There are four peaks of organic carbon isotopic values, each of which appears in the upper part of a fossil zone. The most positive values are found in the uppermost part of the Wufeng Formation below the OSB, which coincides with the base of the *Glyptograptus persculptus* Zone in China. The organic carbon isotope ratio rises sharply by 3‰ within a 20cm section of the *Hirnantia-Kinella* Zone, which is rich in brachiopods. From the OSB upward, a decline of $\delta^{13}\text{C}$ to a minimum of -29‰ occurs within a 20cm section of the *G. persculptus* Zone, and then gradually becomes more negative from -29‰ to -30‰ . The variations of the organic carbon isotope ratio illustrate a remarkable change across the OSB layer and is basically similar to the pattern of the same parameter in the OSB layer of the Huanghuachang Section, located 25km south of the Wangjiawan Section.

The sudden excursion of $\delta^{13}\text{C}$ values at the OSB is associated or coincides with other event markers: a moderate Ir anomaly in the Fenxiang Section located 15km to the south of the Wangjiawan Section, carbon isotope perturbations in a carbonate layer of the OSB in northwestern Canada, plankton extinction of shallow shelf biota (including corals, ostracodes, brachiopods etc.), and also a global rise of sea level. All abovementioned perturbations have not been observed or are only weakly displayed at the base of the *Parakidograptus acuminatus* Zone, taken as the standard position of the OSB.

Therefore, it is better to place the OSB at the base of the *G. persculptus* Zone than at the base of the *P. acuminatus* Zone defined at the Dob' s Linn Section in the UK. The organic carbon isotope ratio can serve as a good catastrophic event marker, especially where the marine boundary layers have a lower carbonate content.



Text-fig. 1 Carbon isotope ratios of whole rock samples across O/S boundary at Wangjiawan Section