

# Spatial variation in carbonate carbon isotopes during Cambrian SPICE event across eastern North China

April 27 2020, by Zhang Nannan

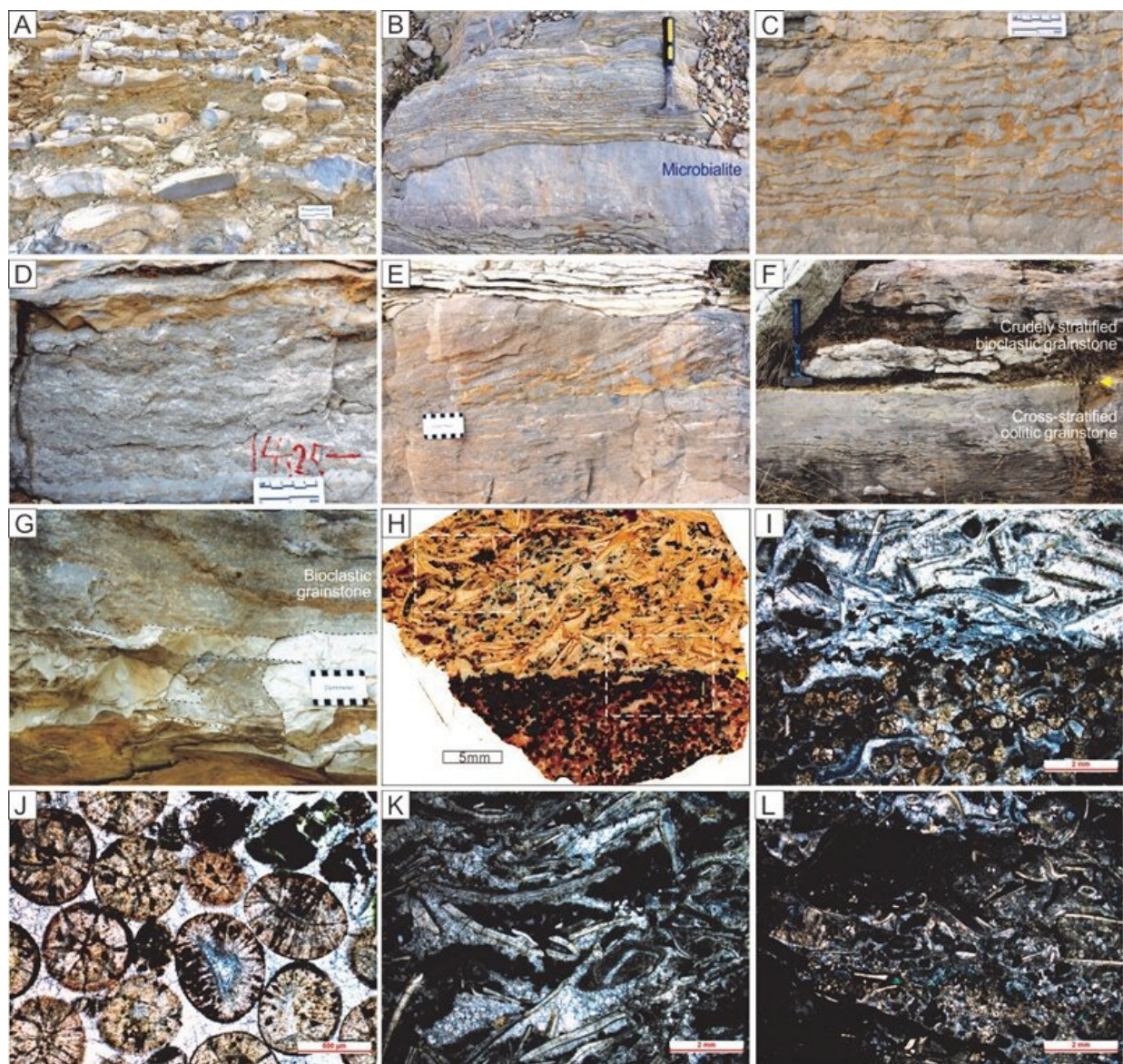


Fig. 1 Representative facies of the Miaolingian-Furongian boundary successions in the eastern part of the North China Platform. Credit: NIGPAS

The Steptoean positive carbon isotope excursion (SPICE) is a large excursion (by  $\sim 5\%$ ) in marine carbon isotope ( $\delta^{13}\text{C}$ ) records during the middle-late Cambrian transition. The SPICE is hypothesized to be caused by enhanced global carbon burial, a global carbon cycle perturbation accompanied with dramatic marine anoxia and euxinia.

Recent studies imply that the synchronicity and magnitude of SPICE may be controversial, which hampers proper interpretation on stratigraphic correlation and biogeochemical cycling.

In order to test the spatial variation of SPICE, Prof. Chen Jitao from the Nanjing Institute of Geology and Palaeontology of the Chinese Academy of Sciences (NIGPAS) and his colleagues studied six outcrop sections across a  $\sim 700$  km transect along the eastern North China Platform using sedimentology, trilobite biostratigraphy and [carbon](#) isotopes methods in recent years. The study was published in *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*.

The researchers found that SPICE was present in all the studied sections, but showed different features regarding the duration and magnitude. An abrupt increase in  $\delta^{13}\text{C}$  from  $\sim 1.5\%$  to  $3.5\%$  occurred in three Shandong sections, with maximum value present only in a thin (0.5-1.2 m thick) transgressive lag deposit (crudely wave stratified, bioclastic grainstone).

In contrast, the  $\delta^{13}\text{C}$  record of Baijiashan and Shashan sections in Liaoning region displayed a gradual increase ( $\sim 20$  m thick) from  $\sim 1.5\%$

to the maximum value of 4.7‰.

Both facies analysis and trilobite collections suggested that the spatial variation of SPICE in the North China Platform most likely resulted from missing of sedimentary record (with high  $\delta^{13}\text{C}$  values) in Shandong sections as a result of erosion and non-deposition during sea-level lowstand.

This study reports the complete [record](#) of SPICE from the North China Platform, and provides fundamental basis for future global correlation of SPICE. It was supported by the Strategic Priority Research Program of Chinese Academy of Sciences and the National Natural Science Foundation of China.

**More information:** Spatial variation in carbonate carbon isotopes during the Cambrian SPICE event across the eastern North China Platform. *Palaeogeography, Palaeoclimatology, Palaeoecology*, Volume 546, 15 May 2020, 109669. [doi.org/10.1016/j.palaeo.2020.109669](https://doi.org/10.1016/j.palaeo.2020.109669)

Provided by Chinese Academy of Sciences

Citation: Spatial variation in carbonate carbon isotopes during Cambrian SPICE event across eastern North China (2020, April 27) retrieved 26 June 2024 from <https://phys.org/news/2020-04-spatial-variation-carbonate-carbon-isotopes.html>

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