

## **Ba evidence for upwelling in the Ediacaran ocean**

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The Ediacaran Period (~635–541 Ma) witnessed the largest negative carbon isotope excursion (DOUNCE/SE) in Earth's history [1]. Barium (Ba) behavior in the ocean is closely related to carbon cycling and Ba concentration in geological sediments is thus widely used to track the paleoproductivity [2]. Here we report episodes of substantial Ba accumulations in the Ediacaran Doushantuo Formation (635–551 Ma) at upper-slope Siduping section in Yangtze Block. The Yangtze Block located at low-mid latitude during the Ediacaran which favors oceanic upwelling. SEM and EDS analyse reveal barites at Siduping are generally ellipsoidal with small size of ~5 μm, indicating marine origin. Ba concentration shows a significant increase from <100 ppm to >10000 ppm at the top of Member III, roughly correlating to the DOUNCE. We attribute that the Ba enrichments at Siduping as a result of high productivity fueled by upwellings in Ediacaran ocean shelf regions, which might also transport dissolved organic carbon (DOC) to shallow waters, increasing the productivity and inducing the oxidation of DOC at Siduping. Our study suggests that the upwelling might be an important factor to the development of DOUNCE.

### References:

- [1] Li, C. et al., 2017. Uncovering the spatial heterogeneity of Ediacaran carbon cycling. *Geobiology*, 15(2): 211-224.
- [2] Griffith, E.M., Paytan, A., 2012. Barite in the ocean - occurrence, geochemistry and palaeoceanographic applications. *Sedimentology*, 59(6): 1817-1835.