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When did the ”Cambrian agronomic revolution” start?

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A variety of benthic animals have appeared in the Cambrian, marine bottom sediments have started to be subjected to bioturbation, and microbial mats, which had widely covered the sea floor in the Proterozoic, have generally declined except for special environment. This phenomenon is known as ”the Cambrian agronomic revolution” (Seilacher and Pfluger, 1994), and this is one of the major evolutionary changes caused by the evolution of benthic anmimals. Previous studies showed that this kind of substrate change has started only after the early Cambrian. However, we have discovered a new evidence that indicate existence of deep burrows made by benthic animals from the Ediacaran of western Mongolia.

Upper Proterozoic to Cambrian deposits are widely distributed in the Govi Altay area in western Mongolia. In the Bayan Gol valley, we found large-sized *Arenicolites* isp. with vertical burrows from as many as 11 horizons in the Ediacaran bedded limestones. These burrows reaches 4 cm in maximum in vertical orientation. We collected rock samples in 2 m interval, for the carbon isotope stratigraphy.

The horizons with *Arenicolites* isp. are in the bedded limestone of the upper Tsagaan Oloom Formation. They are located at 190-140 m lower than the base of the Cambrian determined by the first occurrence of the ichnofossil *Treptichnus pedum* in this section, and at 120-70 m lower than the horizon of the ”BACE event”, which is characterized by a clear negative excursion and is correlated approximately to the horizon of the Pc/C boundary. It is clarified that the ichnofossil *Arenicolites* isp. with vertical structure certainly occurs from the Ediacaran as opposed to the previous interpretation. This shows that ”The Cambrian agronomic revolution” had already begun in Ediacaran in western Mongolia. This early start of this revolution can be attributed to the geographic position of Mongolia in late Ediacaran-early Cambrian, because Mongolia was located near the equator under warm environment during this interval.

Keywords: Ediacaran, Cambrian, ichnofossil, Cambrian explosion, Cambrian agronomic revolution