Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

MIS30-11 Room:304 Time:May 26 11:45-12:00

Trace fossils of Ordovician chert and siliceous rocks from Newfoundland, northeastern Canada

KAKUWA, Yoshitaka[1*]

[1]Gas Hydrate Research Lab., Meiji Univ.

Sudden and continuous increase in biodiversity in Ordovician is named as ”Great Ordovician Biodiversification Event” (Webby, 2004). But the evolution of benthic animals in pelagic realm remained unstudied. One of the typical sediment of the pelagic ocean bottom is radiolarian chert, and the studies on the chert and the associated siliceous rocks especially on trace fossils recorded in those rocks are essential. Records of trace fossils in the upper Cambrian to the upper Ordovician chert and siliceous rocks are examined in detail that is summarized as follows; tiny and simple ones in the Late Cambrian increase their size and morphological varieties in the late Middle Ordovician (Kakuwa & Webb, 2007; 2010), and the result is supported by Percival (2012). This presentation reports the Canadian case.

Chert and siliceous sediments had been deposited by the spreading and deepening of Iapetus Ocean, and the rocks are exposed in the Newfoudland, northeastern Canada. Examined are three rock units; (1) Shoal Arm Formation, which is composed of red chert, gray chert and black shale in ascending order, conformably overlies the volcanic rocks of the Wild Bight Group, and is conformably overlain by turbidite sandstone of the Gull Island Formation, Badger Group. The age of the chert of Shoal Arm Formation is almost correlated to the N. gracilis zone that is correlated to early half of Sandbian (Caradocian). (2) Strong Island Chert, which is composed of argillaceous chert and siliceous mudstone with some turbidite sandstone interbeds, overlies tholeiitic and alkaline pillow lava and pillow breccia of the Lawrence Head Formation. The age is correlated to the basal Darriwilian to lower Sandbian. (3) Sanders Cove Formation, which is composed of red and green siliceous mudstone, chert (silicified tuff?) and volcaniclastic sandstone turbidite overlies volcanic rocks of the Tea Arm Formation. The age is Tremadocian to Dapingian. All the geologic information is based on O’Brien (2012).

These three units of Ordovician siliceous rocks are not comparable to the typical pelagic sediment of the deep-sea ocean, but the general evolutionary trend of the trace fossils is consistent with the Australian case. The lower Ordovician siliceous rocks of the Sanders Cove Formation bears only small and tiny burrow tunnels of Planolites-type. And small and simple burrow tunnels of Planolites-type both in the lower section of the Shoal Arm Formation and the Strong Island Chert change to large burrows such as Teichichnus-type in the upper section.

This general evolutionary trend is overlapped by the development of the basin and/or local changes in the environment. The early stage of the formation of the basin allowed only small and simple type burrows even in an oxidized basin of the Late Ordovician time. Frequent anoxic events in the later half, on the other hand, interrupted the oxygenated environment of large Teichichnus-type burrows.

Keywords: trace fossil, Ordovician, chert, Canada, Teichichnus, evolution