

Supplementary File 3 for Uchman A., Hanken N.-M., Nielsen J.P., Grundvåg S.-A. & Piasecki S. 2016. Depositional environment, ichnological features and oxygenation of Permian to earliest Triassic marine sediments in central Spitsbergen, Svalbard. *Polar Research* 35. Correspondence: Alfred Uchman, Jagiellonian University, Institute of Geological Sciences, Oleandry Str. 2a, PL-30-063, Kraków, Poland. E-mail: alfred.uchman@uj.edu.pl

Preparation of borings

The Vøringen Member contains a rich skeletal fauna, which is partly silicified. The brachiopod shells were often bioeroded before final deposition. The study of borings was limited to samples collected from 10 different levels in the Vøringen Member (Fig. 4). The three-dimensional form of the borings was revealed by selective dissolution of carbonate constituents (non-silicified calcitic fossils, carbonate matrix and carbonate cement) in buffered acetic acid according to the procedure given by Jeppsson et al. (1999) and Jeppsson (2005). To avoid crushing of the silicified fossils situated in the lower part of the blocks, the bottom side was coated with a solution of pioloform dissolved in alcohol. When the alcohol evaporates, the pioloform precipitates as a thin skin, which is fairly impermeable to the acid. In this way the blocks dissolve only from the top and the sides, avoiding mechanical breakage of the skeletal material in the lower part. An analogous technique has also been described by Cooper & Grant (1972).

The silicification of the brachiopod material varies from nearly negligible to complete silicification of the primary skeleton. The borings have been preserved in ~~basically~~ two different ways, depending on the silicification: (1) the outline of the borings is more or less well preserved in partly silicified brachiopod shells; (2) the best preservation of the borings was found in those cases where they had been infilled with glauconite. The glauconite moulds in non-silicified brachiopod shells were unaffected by the acid treatment, giving a very good three-dimensional preservation of even obscure details.

The isolated silicified material turned out to have low mechanical strength, so it was necessary to stabilize the fossils by impregnating them with pioloform dissolved in alcohol. The solution has great penetrating power and is very useful for consolidating porous fossils with low mechanical strength (see Wolberg 1989). After evaporation of the alcohol, the specimens' improved mechanical strength made them easy to handle.

Silicified skeletal material in a carbonate matrix was only found in the Vøringen Member, so we do not have any information about the stratigraphic range of the borings throughout the remaining part of the Kapp Starostin Formation.

References

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