

Press release

Leibniz Institute for Baltic Sea Research Warnemünde (IOW)

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Witnesses wanted....and found

Geochemists from Warnemünde use mineral formation to decipher the conditions during the deposition of marine sediments

Deposits in lakes and seas contain a wealth of information related to the environmental conditions prevalent during their genesis. Thus, they are an unfailing archive, particularly with regard to paleo-environmental conditions, for environmental and climate scientists. Now, the fine art is to interpret the derived data correctly.

For this purpose, geoscientists often use "witnesses" or proxies. Widely known witnesses from sediments are fossils, the remains of plants and animals. By comparisons with their well-studied living relatives, ideas about the conditions that predominated at the time of sediment deposition can be deduced. Minerals potentially offer further valuable insights but only if the environmental circumstances present at the time of their formation have been deciphered.

A team of researchers from Germany, Austria and Spain, under the co-ordination of geochemists from the Leibniz Institute for Baltic Sea Research Warnemünde (IOW) has now succeeded in reproducing the formation of a BaMn-double carbonate originally found in sediments from the oxygen-deficient region of the Landsort Deep in the laboratory, and thus to elucidate the environmental conditions that gave birth to it. This carbonate, which has yet to be named, serves as a mineral witness for future research to hone in on very specific biogeochemical processes and environmental conditions.

„Sediments in which barium-manganese carbonate are found contain dissolved methane“ says Michael E. Böttcher, the leading scientist. "We were able to demonstrate that the prerequisite for the genesis of this carbonate was the microbial decomposition of sulfate and the destruction of barium and manganese minerals stemming from the water column. Methane seems to be involved in these processes." The consortium around Michael Böttcher used a broad range of methods resulting in a detailed characterization of the carbonate enable its unmistakable detection in other locations.

Thus, wherever this new mineral witness is found, additional important information on the environmental conditions at the time of the carbonate's deposition will be revealed, thanks to the fundamental work of the Warnemünde-based geochemists and their co-workers. The word is out - the search can begin.



These results were published in:

Böttcher, M. E., H. S. Effenberger, P.-L. Gehlken, G. H. Grathoff, B. C. Schmidt, P. Geprägs, R. Bahlo, O. Dellwig, T. Leipe, V. Winde, A. Deutschmann, A. Stark, D. Gallego-Torres and F. Martinez-Ruiz (2012). BaMn[CO₃]₂ – a previously unrecognized double carbonate in low-temperature environments: structural, spectroscopic, and textural tools for future identification. *CdE - Geochemistry* 72: 85-89, doi:10.1016/j.chemer.2012.01.001

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