

NanoSIMS imaging of cells – examples of environmental relevance with a view to the future

ANDERS MEIBOM^{12*}

¹Laboratory for Biological Geochemistry, School of Architecture, Civil and Environmental Engineering (ENAC), Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland.

²Center for Advanced Surface Analysis, Institute of Earth Sciences, University of Lausanne, Switzerland

*Correspondance: anders.meibom@epfl-ch.

Understanding fundamental cellular processes, such as metabolic turnover and transfer of nutrients, has gained importance in the study of organisms suseptible to the effects of environmental change(s) - ranging from localized phenomena (e.g. anoxia and polution) to global climatic change, such as increasing temperature. Examples from the marine environment include reef-building corals and forminifera.

NanoSIMS isotopic mapping correlated with transmission electron microscope (TEM) imaging, in combination with targeted isotopic labeling experiments, represents a cutting-edge methodological approach to the study of metabolism in a very broad suite of organisms. With such analytical capabilities it is now possible to quantitatively trace *in situ* the assimilation of nutrients and metabolite translocation between specific cell-types and to evaluate the effects that environmental change has, or will have, on these cellular processes.

Examples of ongoing work will be given in order to illustrate the kind of data can be achieved in pratice. as we push the limits of spatial resolution and sensitivity. Discussion of the shortcomings that NanoSIMS imaging do suffer from will also be presented.