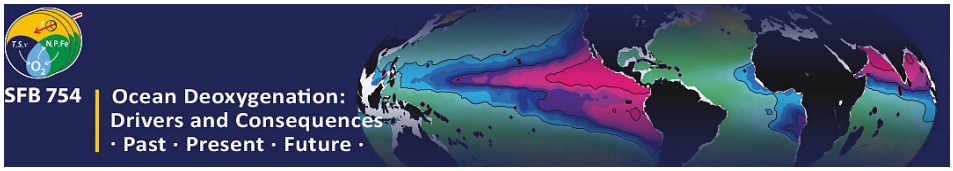


Contribution ID : **253** Type : **Oral**

# I/Ca ratios of carbonates as proxy for changes of deoxygenation in the past: A Nano-SIMS study on benthic foraminifera for better mechanistic understanding, evaluation and application

*Thursday, 6 September 2018 15:00 (15)*

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Oceanic oxygen decline due to anthropogenic climate change is a matter of growing concern. A quantitative oxygen proxy is highly desirable in order to identify and monitor recent dynamics as well as to reconstruct pre-Anthropocene changes in amplitude and extension of oxygen depletion. Geochemical proxies like foraminiferal I/Ca ratios seem to be promising redox proxies. Nevertheless, recent studies on microanalyses of benthic foraminiferal I/Ca ratios at the Peruvian Oxygen Minimum Zone (OMZ) measured with Secondary-Ion-Mass-Spectrometry (SIMS) revealed a possible association of iodine with organic accumulations within the test. Furthermore, it appeared that oxidative cleaning even removed organics from within the massive centre of the foraminiferal test walls.
Here we present a new study on the microdistribution of nitrogen, sulphur and iodine within the test-walls of Uvigerina striata from the Peruvian OMZ measured with Nano-SIMS. Uncleaned specimens were compared with specimens which have been treated with an oxidative cleaning procedure. Both nitrogen and sulphur which are used as tracer for organics show a patchy distribution within the test walls of the uncleaned specimens and a strong association with the iodine distribution. All three elements, sulphur, nitrogen and iodine are strongly depleted in the cleaned specimens, even within the massive parts of the test walls which lack test pores. These results indicate that the organic parts of the test walls are located inside a microporous framework within the foraminiferal calcite which has yet been overseen. This has to be considered in the interpretation of geochemical proxies on foraminiferal calcite, especially for microanalytical methods.

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**Session Classification :** 09 Ocean Deoxygenation - how the Past can Inform the Future

**Track Classification :** 09 Ocean Deoxygenation - How the Past can Inform the Future