

Long term monitoring of oxygen distributions at sea floor, Sagami bay, Japan.

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Oxygen (O₂) distributions at the sediment water interface (SWI) are fluctuated by physical, chemical and biological interactions. Especially, bioturbation and bioirrigation at SWI enhance O₂ supply into the sediment, and such benthic activities play significant role on maintaining oxic environment at sediment surface. However, studies of these interactions in deep sea SWI have been limited due to technical limitations for the instrument developments and the operations. In order to investigate the SWI, we constructed a planar O₂ optode system to visualize O₂ distributions across SWI. This system was optimized for low O₂ concentrations, which value was equivalent to the typical O₂ minimum zone, ~50 μM. Using with a platform (so-called lander) to mount the planar O₂ optode, the system was set on the sea floor. On 21/Jan/2008, the deployment for the measurement was stated at Sagami bay, 1170m in water depth by extension of the power cable from Hatsushima deep-sea observatory. Until 31/Jan/2008, the two dimensional O₂ profiles were obtained at 1 hour interval. Throughout the deployment, 245 O₂ profile images and the corresponding grayscale images were obtained. Throughout the analysis of the images, we found the following aspects and phenomena: (1) O₂ penetration depth ranged 5~8mm. (2) O₂ irrigations sporadically enhanced the O₂ penetration depth to ~10mm. (3) O₂ concentrations in the sediment were fluctuated by time. (4) Microtopography and hydrodynamics affected to the O₂ concentrations on the sediment surface. (5) Meiobenthic activities suggesting anoxic metabolism were found below O₂ penetration depth. In the presentation, we present these characteristics with the O₂ images obtained from the *in situ* measurement.

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