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Biomass-specific respiration rates of benthic meiofauna: Demonstrating a novel oxygen micro-respiration system

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Abstract:

Meiofauna (small-sized Metazoa and Foraminifera) may constitute a significant part of seafloor biomass and potentially play an important role in benthic metabolism. However, respiration measurements are limited and the methods used are diverse together complicating comparison or upscaling. Here we describe a novel glass micro-respiration chamber used to perform non-invasive measurements (built-in oxygen-sensitive fluorogenic membrane and stirrer) and together with direct organic carbon measurements report initial biomass-specific respiration rates of common intertidal meiofauna. Results indicate large differences between respiration rates of different taxa (biomass 0.7–5.2 $\mu\text{g C}$ per individual) but very similar organic carbon biomass-specific respiration rates (1.6–2.5 $\mu\text{l O}_2 \text{ h}^{-1} \text{ mgC}^{-1}$ or on average $2.0 \pm 0.3 \mu\text{l O}_2 \text{ h}^{-1} \text{ mgC}^{-1}$). This new, rapid and accurate method allows the study of metabolic allometry of the different small-sized taxa and determining their functional role in benthic metabolism.

Key-words: Benthic, foraminifera, meiofauna, optodes, respiration