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## **Abstract**

Conventional methods determining solute fluxes across the sediment–water interface have limitations in terms of the reproducibility of hydrodynamic forcing and the representativeness of spatially-heterogeneous biological processes. The newly developed eddy-covariance technique overcomes these limitations. The eddy-covariance technique is based on the principle that vertical flux is expressed by an average of the product of fluctuating vertical velocity and passive scalar, such as dissolved oxygen. Here I review previous studies using the eddy-covariance technique and two case studies on in-situ measurement of benthic oxygen exchange rates.