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Computational model of benthic boundary layer over mussel bed

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As data become available for area-specific zoobenthos populations and their population-filtration capacity in shallow fjords and coastal waters, along with data on prevailing current and wind, it should be possible to carry out more comprehensive model calculations to predict the actual grazing impact of filter-feeding zoobenthos. The required model development is aided by the increasing availability of detailed data on turbulent flow properties and concentration distributions of nutrients obtained in controlled flume experiments and in some field experiments.

The present study considers available flume data (Lassen et al. 2006, MEPS, in press) for the developing flow and concentration boundary layer over a dense population of *Mytilus edulis* (2 m long bed, filtering at 147 $m^3\ m^{-2}\ d^{-1}$) at two values of bulk velocity (0.04 and 0.08 m s^{-1}). The modeling consists of solving the partial differential equation governing the convection-diffusion problem. Particular attention is given to the added mixing caused by exhalant jets flows from the mussels, which experiments have shown increases the friction velocity and increases the peaks in Reynolds shear stress and turbulent kinetic energy near the bed. The study examines the sensitivity of solutions to assumptions regarding profiles of velocity and effective diffusivity.