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Bioirrigation in Marine Sediments: Ecological Conclusions from Numerical Modelling

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Porewater flow in the marine sediments due to pumping activity of the benthic animals (the lugworm Arenicola marina is used as a model organism) was simulated using finite element approach. The hydromechanical insulation of the burrow walls turns essential for ensuring the oxygen supply. This may explain a semi-permanent nature of the lugworm burrows: actively lining the walls with mucus requires extra energy, while passive insulation due to accumulation of iron oxides takes time. Disturbed sediment inside a quick sand channel seems to play a limited role in the total solute transport, which means that oxygen and other dissolved substances are effectively reaching deeper layer of sediments below the animal burrow due to advective flux (not merely by molecular diffusion).

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