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Representing Microbial Processes in Environmental Reactive Transport Models

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The activities of microorganisms profoundly impact the chemical structure and biogeochemical dynamics of surface and subsurface environments. In the context of reactive transport modeling, a major challenge is to derive, calibrate and validate rate expressions for microbially-mediated reaction processes. This challenge is best met by combining field observations, laboratory experiments and theory. In my presentation, I will illustrate such an integrated approach for the case of microbial respiration in aquatic sediments. Topics that will be dealt with are model consistency, interpretation of experimental data, bioenergetics, transient behavior and model performance.