Microxanox: an R package for simulating an aquatic *MICR*obial ecosystem that can occupy *OX*ic or *ANOX*ic states.

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Abstract

Microxanox is an R package to simulate a three functional group ecosystem (cyanobacteria, phototrophic sulfur bacteria, and sulfate-reducing bacteria) with four chemical substrates (phosphorus, oxygen, reduced sulfur, and oxidized sulfur) using a set of ordinary differential equations. Simulations can be run individually or over a parameter range~~, to find stable states~~. The model can be implemented with different numbers of species per functional group. The package is constructed in such a way that the results contain the input parameter used, so that a saved results can be loaded again and the simulation be repeated. Furthermore, the package framework and code should serve as a useful starting point for making simulation models of other types of ~~ecosystem~~ecosystems.

Keywords: reproducibility, regime shift, ~~stable~~ final state, ordinary differential equations

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