BIOMOC

Model Uses
BIOMOC is a physical model that simulates the 2-Dimensional transport of solutes through a water system as well as biodegradation rates and microbial growth.

Major Categories
Water Quality

Minor Categories
Nutrient Production; Transport

Model Type
Physical Model

Abstract
BIOMOC is a two-dimensional model that can simulate the transport and biotransformation of multiple reacting solutes. The program is general and flexible, allowing for any combination of biodegradation processes. A number of expressions for biological transformation rates have also been included as options in the program. These include single, multiple, and minimum Monod kinetics and competitive, noncompetitive, and Haldane inhibition. The kinetic parameters can be formulated to simulate zero-order or first-order approximations of biodegradation rates. The growth and decay of several microbial populations performing the transformations is also accounted for. The microbial growth can be disabled, limited by biomass inhibition, or limited by the availability of a specified nutrient.

Future Developments
Unknown

Model Outputs
BIOMOC returns general input information; flow velocities; concentrations of all solutes and microbes; and time history of concentrations.

Model Features
- Generate or reposition particles;
- Compute hydraulic gradients, velocities, dispersion equation coefficients, and time increment for stable solution of transport equation;
- Compute change in chemical concentrations and mass balance for transport model;
- Compute nonlinear retardation factor and correction term for decay of absorbed solute;
- Compute absorbed concentration corresponding to concentration in solution;
- Compute biodegradation terms using multiple Monod formulation;
- Compute biodegradation terms using minimum Monod formulation.

Required Data Types
Input data consist of initial conditions, boundary conditions, aquifer properties, and biodegradation parameters.

See documentation for details.
Hardware Requirements
UNIX or DOS - 386 or later with Math-Coprocessor.

Supported Platforms

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Software Requirements
None Required.

Cost, Licensing and Availability
Model is offered free of charge from link provided.

Source
USGS

Source (URL)
http://water.usgs.gov/software/biomoc.html