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Flushing of Ölüdeniz Lagoon

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Abstract

The flushing properties of Ölüdeniz Lagoon located at the Mediterranean coast of Turkey are investigated. By employing a one dimensional mathematical model, closed form solutions are provided for the timely change of average pollutant concentration inside the lagoon. The pollutant may be conservative or degradable. A three dimensional numerical model which consists of hydrodynamic, transport and turbulence model components is also applied to Öludeniz Lagoon to simulate the tidal currents and the progress of pollutant concentrations. In the turbulence model, a two-equation k-(formulation is solved to calculate the kinetic energy of the turbulence and its rate of dissipation, which provides the variable vertical turbulent eddy viscosity. The solution method is a composite finite difference-finite element method. In the horizontal plane finite difference approximations and in the vertical plane finite element shape functions are used. The governing equations are solved implicitly in the Cartesian coordinate system.