

# Numerical analysis of a climate model

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In this work we consider a coupled model surface/deep ocean, which was first proposed by Watts-Morantine (1990). It is a diagnostic model which can be used to understand the long-term climate evolution. The unknown is the temperature over each parallel and the effect of the deep ocean on the temperature of the Earth surface is considered. One of the main difficulties of this problem is the dynamic and diffusive boundary condition. The purpose of this work is to develop a numerical scheme to obtain an approximate solution of the coupled model. The numerical technique used is based on the finite volume method together with WENO reconstruction and a Runge-Kutta TVD scheme for time discretization. As an important consequence, we analyze the behaviour of the solution of the energy balance model with and without the effect of deep ocean. This sort of climate models has been extensively studied by J.I. Díaz.

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