
QIANG GUO, York University

Adaptive splitting wavelet method for atmospheric problems

Aerosol particles in the atmosphere have big significance due to their effects on climate change and human health. A new and robust wavelet-based splitting method has been developed to solve the general aerosol equations. The considered models are the nonlinear integro-partial differential equations on time, size and space, which describe different processes of atmospheric aerosols including condensation, nucleation, coagulation, deposition, sources as well as turbulent mixing.

Wavelet technique has been a great tool for adaptivity and multi-resolution schemes to obtain solutions of systems which vary dynamically both in space.

The proposed method reduces the complex general aerosol dynamic equation to two directional splitting equations. Because there are steeply varying number densities across a size range, we develop the adaptive technique in which the solution is represented and computed in a dynamically evolved adaptive grid. Numerical experiments are given to show the effective performance of the method.