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A Least Norm Finite Volume Scheme for a Future Numerical Prediction Model

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At Chinese Academy of Meteorological Sciences, we are developing a next generation global gridded atmospheric numerical prediction model. It deals with unstructured and irregular grids on a surface of a sphere, either cubic sphere grids or Icosahedral Hexagon Pentagon (IHP) grids. For a given grid stencil to construct a finite volume scheme, it is important to select a scheme such that its coefficients over these stencils change continuously from place to place over a sphere. Any discontinuous change of the coefficients could cause shock waves through a numerical prediction system. In this presentation, we introduce a new least norm finite volume scheme with continuous changes of coefficients and demonstrate its numerical accuracy and stability on a shallow water equation system over a rectangular grid. This work is a prelude of a least norm finite volume scheme for a future global forecast model at the academy. Numerical results will be presented comparing to some well-known schemes in the existing global models.