

A COMPARISON OF ADVECTION SCHEMES FOR USE IN A GLOBAL ATMOSPHERIC MODEL

A. R. Gregory and A. O'Neill

Centre for Global Atmospheric Modelling, University of Reading, UK.

`a.r.gregory@reading.ac.uk`

The accurate representation of advection in a numerical model of the atmosphere is highly desirable since advective processes have an important role in both the fundamental fluid dynamics and the distribution of trace chemical species. The current version of the Unified Model, the global atmospheric model of the United Kingdom Meteorological Office, uses some rather basic methods for advection. In this paper a range of more sophisticated techniques are considered as possible replacements for the old schemes of the Unified Model. These include both semi-Lagrangian methods and upwind, finite-volume schemes developed by the wider computational fluid dynamics community. The accuracy and efficiency of the schemes is compared using idealised two-dimensional problems for which the exact solution is known. The most promising schemes have been implemented in the Unified Model, initially only for the advection of passive tracers. Preliminary results of the impact of these new schemes will be presented.