Geophysical Research Abstracts,
Vol. 10, EGU2008-A-12191, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-12191
EGU General Assembly 2008

New accurate methods for modelling of the continuity equation

A. Buus Hansen (1), E. Kaas (1) and J. H. Christensen (2)

(1) University of Copenhagen), (2) National Environmental Research Institute, University of Aarhus

A new efficient and accurate numerical method for solving of the continuity equation is proposed. Aiming to fulfill two of the ten desirable properties, namely local mass conservation and computational efficiency, by Rasch and Williamson (1990) and Machenhauer et al. (2007). The new method is developed using cascade interpolation by Nair et al. and a locally mass conserving modification of traditional semi-Lagrangian cubic interpolation scheme (LMCSL-scheme) by Kaas (2008). The cascade interpolation reduces the number of interpolative operations needed, thereby enabling a scheme with higher computational efficiency. However, the scheme requires more memory than the LMCSL scheme due to the intermediate step in the cascade interpolation. The method has been tested on a slotted cylinder as described by e.g. Zerroukat et al. (2002) and we aim to implement it in a full scale chemical transport model. Locally mass conserving semi-Lagrangian transport based on cascade interpolation is especially efficient when more (e.g. chemical) tracers are considered since they need not be recalculated for every specific tracer.