POSTER PRESENTATION

P-10. Brian Sørensen: An improved vertical remapping scheme

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An improved vertical remapping scheme will be presented on a poster. The scheme is being implemented into a Locally Mass Conserving Semi-Lagrangian Scheme (LMCSL), developed by Kaas (2008).
In an ordinary Semi-Lagrangian scheme, the vertical levels are remapped to Eulerian model levels after each time step. This introduces an undesirable tendency to smooth sharp gradients in the vertical levels. This can be reduced by keeping the Lagrangian levels, and only interpolate the tendencies between the Lagrangian levels and Eulerian levels. Because tendencies are small compared to the absolute values, their gradients will be significantly smaller and therefore they can be interpolated with less smoothing. At each time step the Lagrangian levels will be used as model levels for the following time step. The Eulerian model levels will be kept at each step as well. This has to be done in order to calculate the physics in the model, and also in order to have some fixed levels in the semi-implicit calculations. After several time steps (dynamically calculated or a fixed number), the Lagrangian levels will be interpolated to Eulerian model levels to insure that they do not change too much, and the process will start again.

References:

Kaas, E., 2008. An accurate and efficient transport scheme. part i: A new locally mass-conserving semi-Lagrangian solution to the continuity equation.