**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "A hybrid bin scheme to solve the condensation/evaporation equation using a cubic distribution function" *by* T. Dinh and D. R. Durran

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Chapter 2:

The use of Legendre polynomials is a common tool in discontinuous Galerkin methods for hyperbolic problems (cite for instance the introductory paper by Cockburn).

It is possible to perform the positivity tests and the redistribution procedure in the Legendre basis.

Chapter 3: The phrase "extra work" should be comment with some numbers concerning the additional flops.

The error measures should be explained more precisely. How is the root-mean-square

error related to the L_1 error? Since the bins are not equally spaced in the first example the L_1 error should be a more appropriate measure. The error plots (Fig. 2 and Fig. 4) may be dominated by the time error for increasing number of bins. The computations should be repeated for a smaller time step. It should be mentioned that the error plots are half logarithmic.

The initial and the exact solution should be presented as a continuous curve (use more points for plotting). The bin number axes should be avoided. Take the radius axes above. Indicate the type of plotting (linear or logarithmic). A comparison for finer grid resolution may be also useful. There is some feeling, that the chosen resolution is very crude (at least from a mathematical point of view).

It is possible to make some order studies which confirms that the new interpolation leads to a better approximation order.

The examples are simple by the chosen growth rate function. A test with the growth rate function mentioned in the appendix of the seminal paper by Chen and Lamb would be very interesting. Their non-monotonic behavior allows the simultaneously condensation and evaporation of different bins.

How often does the algorithm switch back to linear approximation.