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Interactive comment on "Development and evaluation of a hydrostatic dynamical core using the spectral element/discontinuous Galerkin methods" *by* S.-J. Choi and F. X. Giraldo

Anonymous Referee #1

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Title: Development and evaluation of a hydrostatic dynamical core using the spectral element/discontinuous Galerkin methods

Authors: S.-J. Choi and F. X. Giraldo

General comments:

This paper compares idealized global atmospheric simulations using the continuous versus discontinuous Galerkin (CG vs DG) methods for horizontal discretization of the primitive equations. In the vertical, a finite difference (FD) method is employed. The

model provides comparable results to those of previous publications. The reviewer does not see any major problems with the paper. A few minor comments are provided below.

Specific comments:

1) Section 2 Governing Equations: It would be helpful to readers not familiar with the Cartesian-coordinate framework of motion on the sphere to give some background about this system. For example, where the Lagrange multiplier is introduced (p. 4124, line 18) it would be appropriate to cite Côte (QJRMetSoc 1988) and Giraldo's earlier work. Reference to these papers might be good at the beginning of Section 2 to warn readers that the system of equations about to be presented are not the "conventional" spherical-coordinate system of equations.

Also, when the 3D Cartesian space is mentioned, it should be pointed out that it is a rotating (non-inertial) reference frame.

2) Starting on page 4127, line 12 the Rusanov scheme is mentioned a number of times. There should be a bibliographic reference to the scheme.

Technical corrections:

1) Page 4120, line 5 in the Abstract – The abbreviation "CG" is introduced without definition (i.e., Continuous Galerkin).

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