Parameter-free radial basis functions for Eulerian and semi-Lagrangian discretizations on the sphere

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A flexible high-order finite volume reconstruction is described in the flat 2D plane, and extended to the surface of the sphere for conservative transport. The local basis includes polynomials for accuracy and radial basis functions for flexibility. Results are compared to a conventional mesh-free semi-lagrangian method which uses the same underlying basis for spatial interpolation. If time permits, numerical results for the shallow water equations will also be presented.