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Towards global weather forecasting with IFS-FVM

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Over the next decade, various aspects of ECMWF's Integrated Forecasting System (IFS) need to be adapted for higher-resolution global forecasts called for by ECMWF's long-term strategy. The current IFS dynamical core relies on the spectral-transform method to solve the hydrostatic primitive equations with a semi-implicit semi-Lagrangian integration scheme. ECMWF is continuing to develop this dynamical core, which also includes a nonhydrostatic option, to make it as computationally efficient as possible. Additionally, ECMWF develops alternative nonhydrostatic dynamical core formulations with complementary numerical and computational properties for high-resolution applications. The IFS-FVM employs finite-volume semi-implicit integration of the deep-atmosphere fully compressible equations. Various options of flux-form non-oscillatory Eulerian advection are combined with a 3D implicit time stepping of rhs dynamics forcings, all embedded in a horizontally- unstructured vertically-structured co-located discretisation framework. We present the ongoing IFS- FVM development towards realistic weather configurations at ECMWF. We further highlight some of the recent numerical and computational enhancements.

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