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## Self-consistent finite-mode approximations for hydrodynamics of incompressible fluid on rotating sphere

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Self-consistent finite-mode approximations for both Euler and Navier-Stokes equations for vorticity on the sphere are constructed and extended to the case of rotating sphere, aiming at applications in ocean and atmosphere modelling. In the absence of dissipation they preserve the specific Hamiltonian structure of hydrodynamics and have, at each level of approximation, an appropriate number of integrals of motion, which is not the case of standard schemes. The truncations are based on the same principle as the sine-truncations for the 2D Euler equations with periodic b.c. [1]. In the context of quasi-geostrophic models (e.g. the Marshall- Molteni model) they provide an intrisically PV-conserving discretization schemes.

[1] Zeitlin, V., Physica D, v. 49, 353, (1991)