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**Linearly forced fluid flow on a rotating sphere** ROHIT SUPEKAR, Department of Mechanical Engineering, Massachusetts Institute of Technology , VILI HEINONEN, KEATON BURNS , JRN DUNKEL, Department of Mathematics, Massachusetts Institute of Technology — We investigate generalized Navier-Stokes (GNS) equations that couple nonlinear advection with a generic linear instability. This analytically tractable minimal model for fluid flows driven by internal active stresses has recently been shown to permit exact solutions on a stationary two-dimensional sphere. Here, we extend the analysis to linearly driven flows on rotating spheres. We derive exact solutions of the GNS equations corresponding to time-independent zonal jets and superposed westward-propagating Rossby waves, qualitatively similar to those seen in planetary atmospheres. Direct numerical simulations with large rotation rates obtain statistically stationary states close to these exact solutions. The measured phase speeds of waves in the GNS simulations agree with analytical predictions for Rossby waves.

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