

Flow pattern formation in turbulence in a circular domain on a rotating sphere.

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In two-dimensional incompressible Navier-Stokes flow on a rotating sphere, zonal flow patterns and westward circumpolar jet are known to emerge in the time development. Here we study the time evolution of flow field with rigid circular boundary on a rotating sphere. We report two cases where the circular domain is a hemisphere. In one case in which the boundary coincides with the meridian, a westward propagation of flow pattern is observed when the initial streamlines are coaxial circles. In the other case in which the boundary makes an angle of $\pi/4$ with the equator, an eastward circumpolar jet emerges from random initial fields and the direction of the jet does not change even if the initial velocity field is reversed.