

Role of Low Frequency Waves in Atmospheric Circulation

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Investigation of coupling mechanisms between the troposphere and the Ionosphere requires a multidisciplinary approach involving several branches of atmospheric sciences, from meteorology, atmospheric chemistry, plasma physics, and space weather. We review low frequency wave observations in the Earth-ionosphere cavity from a troposphere ionosphere coupling perspective. The main goal of our presentation deals with a theoretical description of the generation of zonal winds and vortices in a turbulent barotropic atmosphere. These large-scale structures largely determine the dynamics and transport processes in planetary atmospheres. The role of nonlinear effects on the formation of meso-scale vortical structures (cyclones and anticyclones) is examined. The theoretical results are compared to the results of satellite microwave monitoring of the Earth's atmosphere.