

Nonlinear model of stationary atmospheric vortex with moisture transport

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In this work a problem of tornado like stationary vortex is considered. The tornado vortex is believed to be essentially nonlinear phenomenon; and the puzzle to choose the correct nonlinear term(s) is still unresolved. In the present report we consider the nonlinear term associated with atmosphere humidity. This term can yield energy to the system and is very suitable for such a problem. We consider one-dimensional radial boundary problem, and use the method of determining the given boundary conditions on one of the boundaries due to the boundary conditions on the other side. We obtained numerical solutions of our model nonlinear differential equation which qualitatively agree with the observed atmosphere vortices (tornados, tropical cyclones). The obtained results model shows general possibility of existence of unstable motion even in convectively stable atmosphere stratification.