

Dear Editor/Reviewer,

The derivation of the system (1) is not the goal of our manuscript. It is discussed in many earlier published papers. To this end, we added most preferable reference (T.D. Kaladze, G.D. Aburjania, O.A. Kharshiladze, W. Horton, Y.-H. Kim, Theory of magnetized Rossby waves in the ionospheric E layer, J. Geophys. Res., v. **109**, A05302, doi: 10.1029/2003JA010049, 2004), where the reader can find answer about the system (1).

Meanwhile in the page #2, line 91, paragraph before the system (1) we have added two sentences in this connection: Here we obtained the following system of Eqs. (1) under the assumption that electron and ion flows due to the small concentration number (compared to the neutral particles) gives the contribution only in the inductive current (Kaladze, et al. 2013). The quantity $\zeta_z = \mathbf{e}_z \cdot \nabla \times \mathbf{v}$ is the z-component of the vorticity.

In page#7, line 286, the following reference has been added “[19] Kaladze T.D., Horton W., Kahlon L.Z., Pokhotelov O., and Onishchenko O., Zonal flows and magnetic fields driven by large-amplitude Rossby-Alfvén-Khantadze waves in the E-layer ionosphere, J. Geophys. Res.: Space Physics **118**, 1-12 2013.”

P.S. The BRIEF COMMUNICATION status of the manuscript gives no possibility to discuss the questions set by reviewer in details.

Also, if our reviewer is familiar with any other new ionospheric equations, we are requesting to provide us the reference. As to the nonlinearity it is presented by Jacobian vector nonlinearity, which always exists as convective derivative of the z-component of the vorticity.