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Interactive comment on "Self-organization of ULF electromagnetic wave structures in the shear flow driven dissipative ionosphere" *by* G. Aburjania et al.

Anonymous Referee #1

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I do not agree with the major assumption used in the paper to get the solutions. This assumption is that the plasma is considered to be incompressible and the governing equations are derived for the stream function and a single component of the disturbed magnetic field in the direction of the background magnetic field. In other words, authors derived solutions for the strongly compressible fast and slow MHD waves, assuming that they are propagating in the incompressible plasma. This is just plain wrong.

Another problem is that the authors consider their fast modes propagating only across the magnetic field in the x-y plane, corresponding to the ionosphere. This is wrong again, because fast modes propagates isotropically across the background magnetic field and along it, so the propagation along the background magnetic field cannot be

ignored for fast and slow modes.

In all classical papers of the ULF vortex structures in the magnetosphere and the ionosphere (e.g. Chmyrev et al., 1991 or Petviashvili and Pokhotelov, 1992) these structures are considered to be formed by shear Alfven waves, which are incompressible indeed. These waves are described with a scalar potential and a single component of the vector potential in the direction of the background magnetic field. This is a standard procedure. In this paper the authors use a single component of the wave magnetic field along the ambient field, which correspond to the fast and slow compressible modes which are certainly not described by their model.

Interactive comment on Nonlin. Processes Geophys. Discuss., 1, 1431, 2014.