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Farley-Buneman instabilities in the Auroral region: Continuous hybrid simulations ENRIQUE ROJAS, Cornell University — The magnetosphere couples with the high-latitude ionosphere through the Earths magnetic field lines. This coupling occurs mainly through energetic particle precipitations and electromagnetic fields. In the auroral E region, these processes cause Hall currents that drive Farley-Buneman instabilities, generating a spectrum of field-aligned plasma density irregularities. Although fully kinetic particle-in-cell simulations of Farley-Buneman instabilities offer the most complete description of the underlying physics, its computational cost for studying non-local phenomena is tremendous. To capture non-local physics, new methods based on hybrid and continuous approaches have to be explored. In this work, we present a new continuous hybrid simulation of Farley-Buneman waves, where electrons and ions are modeled using a fluid and kinetic formalism, respectively. We investigate phase speed saturation and examine whether the phase speeds scale with the background electric field in the way observed by radars. We also try to quantify wave turning effects, examine whether wave heating is commensurate with incoherent scatter radar observations, and determine the dominant wavelength of the waves.

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