

Abstract Submitted  
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**Interaction of electric field with plasma clouds in lower ionosphere**<sup>1</sup> YAKOV DIMANT, MEERS OPPENHEIM, Boston University — At the lower-E/upper-D altitudes between 80 and 120 km, the ionospheric plasma density is low, especially at nighttime. At these altitudes, meteor plasma trails and sporadic-E layers are often present. The former, highly elongated and slowly diffusing structures have the lengths of several kilometers, the lifetimes from 1s to several minutes, and they fill the entire lower ionosphere. The latter, pancake-like clouds are much rarer, but they span tens to thousands of kilometers in horizontal direction and live several hours and longer. In the lower ionosphere, especially at high latitudes or near the magnetic equator, an external electric field often occurs. This field polarizes the highly conducting clouds, redistributes the electrostatic potential, and generates currents both within and around the cloud. Using a universal approach, we have developed a 3D analytical theory of these phenomena. The theory predicts significant amplification of the electric field in the near-cloud region and strong currents. This is important for generation of plasma instabilities, electron heating, and magnetosphere-ionosphere coupling.

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