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Evolution of Ion Clouds in the Equatorial Ionosphere YEVGENY PETROCHUK, NATHAN BLAUNSTEIN, Ben Gurion University of Negev, EVGENY MISHIN, TODD PEDERSEN, RON CATON, AL VIGGIANO, NICK SCHUMAN, Air Force Research Laboratory — We report on the results of 2- and 3-dimentional numerical investigations of the evolution of samarium ion clouds injected in the equatorial ionosphere, alike the recent MOSC experiments. The ambient conditions are described by a standard model of the quiet-time equatorial ionosphere from 90 to 350 km. The altitudinal distribution of the transport processes and ambient electric and magnetic fields is taken into account. The fast process of stratification of ion clouds and breaking into small plasmoids occur only during the late stage of the cloud evolution. The role of the background plasma and its depletion zones formed due to the short-circuiting currents is not as evident as in mid latitudes. It is also revealed that the altitudinal dependence of the diffusion and drift plays a minor role in the cloud evolution at the equator. Likewise, the cloud remains stable with respect to the Raleigh-Taylor and gradient-drift instabilities. These two features are defined by the equatorial near-horizontal magnetic field which leads to a strongly-elongated ellipsoid-like plasma cloud. The critical dip angle separating the stable (equatorial) and unstable (mid-latitude) cloud regimes will be defined in future simulation studies, as well as the dependence on the ambient electric field and neutral wind. [2]Space Vehicles Directorate, Air Force Research Laboratory

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