

#113 Received 01/20/2015

Yizengaw, Endawoke¹; Retterer, John¹; Carter, Brett^{1,2}; Groves, Keith¹; Caton, Ron³; Bridgwood, Chris¹

1. Institute for Scientific Research, Boston College, Chestnut Hill, MA, USA

2. RMIT University, Melbourne, VIC, Australia

3. U.S. Air Force Research Laboratory, Space Vehicles Directorate, Kirtland AFB, NM, USA

Post-Midnight Bubbles Longitudinal Dependence

Abstract:

This paper presents a case study of the strong postmidnight bubbles that often occur, even during magnetically quiet periods, at different longitudinal sectors using data from ground- and space-based multi instruments. The statistical (2009–2014) longitudinal variability of the post-midnight bubbles shows stronger in the African and Asian sectors. While the mechanism for producing plasma irregularities in the dusk sector is believed to be fairly well understood, the cause for the formation of irregularities/bubbles during postmidnight sector is still unknown, especially for magnetically quiet periods. For the first time, the presence of Rayleigh-Taylor (RT) instability during postmidnight hours has been confirmed by using the physics-based model for plasma densities and RT growth rates. The question is what cause for the generation of eastward electric field, which is the prime driver of RTI, during post-midnight sector and what causes for its strong longitudinal dependences? Several possible sources of the eastward electric fields that permit the RT instability to develop and form bubbles in the postmidnight local time sector has been considered.