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Session 10 Paper 2

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### **Unseasonal equatorial F-region irregularities in Southeast Asian sector**

Equatorial Plasma Bubbles (EPBs), and the associated Equatorial F-region Irregularities (EFIs), are known to exhibit a clear seasonal/longitudinal occurrence climatology that is controlled by the local magnetic field alignment with the solar terminator. It is understood that the climatology of the pre-reversal enhancement (PRE) in the upward plasma drift is the primary factor in the EPB occurrence climatology; i.e., low PREs leads to lower chance of EPBs/EFIs developing, and vice versa. In the Southeast Asian EPBs/EFIs are common during the equinox months due to strong PREs. However, during the solstice months the PREs are weak in this region and therefore EPBs/EFIs are rare. Typically in the Southeast Asian region, post-sunset EPBs/EFIs develop on approximately 50% of the evenings during the peak EPB seasons, and less than 10% of the evenings during the off-peak EPB seasons.

Research attention has recently focused on gaining a better understanding of the sources of daily variability in the EPB occurrence. While some progress has been achieved in describing the EPB daily variability during peak EPB seasons, understanding and describing the occurrence of unseasonal EPBs remains to be a challenge. One such unseasonal EPB/EFI event during July 2014 in the Southeast Asian sector is presented in this analysis, and the physical mechanism that caused the event is investigated. Ionosonde data reveal the presence of an abnormally strong PRE on the evening of this EPB event compared to the rest of July, which subsequently created favorable EPB growth conditions. Solar wind data show a lack of prompt penetration electric field activity during the EPB development phase. Therefore, it is suggested that forcing from the lower atmosphere, such as tidal/planetary wave activity, played a significant role in the development of this unseasonal EPB/EFI event.