

## **Radar observations of long-duration meteor trails at Sanya**

Guozhu Li, Baiqi Ning, and et al.

Key Laboratory of Ionospheric Environment, Institute of Geology and Geophysics,  
Chinese Academy of Sciences, Beijing, China (gzlee@mail.iggcas.ac.cn).

High power and large aperture (HPLA) radar observations of range spread meteor trail echoes (RSTEs), also known as non-specular echoes, have provided new insights into both meteor trail irregularity structures and lower thermospheric winds. Unlike specular meteor trail echoes which generally appear in one range bin and last approximately 1 second, RSTEs persist from a few milliseconds to several minutes and cover a few kilometres in altitude. RSTEs are generally believed to be the result of backscatter from field-aligned irregularities (FAI) produced in meteor trails through the Farley-Buneman and/or Gradient drift (FBGD) instabilities. However, for long lasting RSTEs with lifetimes ranging from tens of seconds to several minutes, the generation mechanism is still not well understood. By using the Sanya (18.4°N, 109.6°E) VHF coherent radar, experiments on spatial domain interferometry observations of meteor trail irregularities were conducted during summer (June, July and August) and winter (November, December and January) months of 2013-2015. A large number of RSTEs were observed. Among the trail echoes, the spatial structures of meteor trail irregularities responsible for the long-duration RSTE events persisting for more than 1 min were reconstructed. In this talk, we will report the results of a statistical investigation on the occurrence and structural evolution characteristics of the long-duration meteor trails. Based on the simultaneous optical video observations of meteors, and horizontal wind measurements made with an all-sky meteor radar located near Sanya, possible mechanisms responsible for the generation of the long-duration RSTE events will be discussed.