SPECTRAL CHARACTERISTICS OF LIGHTNING AND TLE AND THEIR EFFICIENCY TO IONIZE THE LOWER IONOSPHERE

Frey Harald, S.B. Mende, H.-T. Su, R.-R. Hsu, A. Chen,L.-C.Lee,

H. Fukunishi, Y. Takahashi

Space Sciences Laboratory, University of California, 7 Gauss Way, Berkeley, USA

ABSTRACT

The Imager for Upper Atmospheric Lightning (ISUAL) on ROCSAT-2 contains a Spectrophotometer instrument with six individual photometers. The photometers cover well known spectral ranges of transient luminous events (TLE) as for instance the N_2-1P band at 623-750 nm or the lightning signature of OI at 777.4 nm. In addition there are two photometers for the far-UV (150-280 nm) and near-UV (250-390 nm) that are aimed at spectral signatures of TLE that are only observable from space due to the absorption by atmospheric O_2 towards ground-based instruments. One channel observes the N_2^+-1N line at 391.4 nm that is an indicator for ionization.

The photometers are aimed at the limb and integrate over a 20x5 degrees field of view. Sometimes the spectral signatures of the parent lightning and the TLE (sprite, elve) can be separated temporally, or spatially if the lightning is blocked by the solid Earth. In such cases the ionization by sprites and elves can be estimated. We will also discuss the temporal structure of lightning that preferentially creates either sprites or elves.