

**Science results of the Imager for Sprites and Upper Atmospheric Lightning (ISUAL) on FORMOSAT-2**

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The Imager for Sprites and Upper Atmospheric Lightning (ISUAL) on FORMOSAT-2 is the first dedicated instrument for the observation of Transient Luminous Events (TLE) like sprites and elves from space. Since its launch in May 2004 it has been providing a good wealth of images and photometric data to study TLE and lightning. The long term observations provided the first view of the global distribution and relative importance of sprites, elves, halos, and gigantic jets. ISUAL provided proof that elves are the most important TLE with a strong occurrence maximum over oceans. Spectrographic recordings of the N<sub>2</sub>-1P emission in elves was also proof of the occurrence of local ionization that has implication for the modification of ionospheric electron density and chemistry. ISUAL also provided proof for the uneven local distribution of the different TLE classes that is most likely related to the attachment process of the cloud-to-ground discharge to either water or land on the ground. The availability of photometric recordings in different spectral regions and especially the absorption-free far-ultraviolet channel allowed the determination of the electric field and electron energies in sprites. It also allowed the comparison between emissions in elves and sprites expected from models and those actually measured from space.