The study of the lower ionosphere in the South Atlantic Anomaly (SAA) Region

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South Atlantic Anomaly (SAA) corresponds to a region where the geomagnetic field is relatively weak; such a magnetic field enables energetic particles from the inner radiation belt to penetrate closer to the Earth's surface more easily, thus resulting in relatively high level of radiation in the environment. In this study, we analyze the nighttime airglows in 2007 to 2008 in the SAA region by using the data from the ISUAL (Imager of Sprites and Upper Atmospheric Lightning) experiment aboard the FORMOSAT-2 satellite. We focus specifically on the measurements by the six spectrophotometers and the CCD Imager, which overall cover the spectrum from ultraviolet to infrared wavelengths. Based on our analysis, features of clear enhancements and annual variations at 337 nm, 391.4 nm and 777.4 nm are identified in the SAA region. Through comparing these multiple-band emissions, we can identify energy variation of incident particles and atmospheric compositions of SAA region.

Keywords: South Atlantic Anomaly, SAA, airglow, ISUAL, FORMOSAT-2

