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PLASMA IRREGULARITIES IN THE IONOSPHERIC F-REGION UNDER DIFFERENT SOLAR ACTIVITY CONDITIONS: A STUDY USING NANOSATELLITES

Abstract

In the NANOSATC-BR2 satellite project, it was decided that the scientific mission should focus on the observation of the nighttime plasma irregularities in the ionospheric F-region and in the airglow phenomena like plasma blobs and plasma bubbles over South American. A Langmuir probe will be used to measure the electron density and temperature in the topside ionosphere around 700 km while a photometer will detect the OI 630 nm emission, which comes from an altitude about 220-300 km. The OI 630 nm emission is produced in the bottomside of the F-region by its dissociative recombination process, and has been widely used to monitor important ionospheric processes at F-region heights. With the advances in the imaging technology for nightglow emission studies the F-region OI 630 nm emission has become an important tool for ionospheric/thermospheric coupling studies. At equatorial and low latitude regions, the observations of the OI 630 nm emission show intensity depletion bands, which are the optical signatures of large scale F-region plasma irregularities or plasma bubbles. By observing the motion of the intensity depleted bands it is possible to infer the ionospheric plasma zonal velocity of the depletion. On the other hand, by the simultaneous measurements in both topside and bottomside ionosphere, it is possible to study the plasma bubbles generation mechanism. Details on NANOSATC-BR2 satellite program and the experiments will be given in this paper.