

F-REGION PLASMA BUBBLES OBSERVED BY A ROCKET-BORNE  
LANGMUIR PROBE AND A HIGH FREQUENCY CAPACITANCE PROBE

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Ionospheric E and F region electron density measurements were made using a Langmuir probe and a High Frequency Capacitance probe, mounted on-board a SONDA III rocket launched from Natal, Brazil at 2030 hrs. Local Time on 11th December 1985. The main objective of the experiments was to study structure and dynamics of depleted plasma density regions, generally known as plasma bubbles; observed occasionally in the ionospheric F-region. The rocket, in fact, passed through at least a pair of plasma bubbles, one in the altitude region of around 370 km and the other around 420 km. The plasma bubbles could be dominantly seen in the upleg of the trajectory, but in the downleg part of the trajectory, the bubble amplitudes decreased considerably. In spite of being two completely different techniques, both the LP and HFC measurements clearly showed the presence of bubbles. In one of the bubble structures the electron density decreased by a factor of more than 10, while in the other the decrease was only by a factor of around 4. The vertical scale sizes of the bubbles was about 30 to 40 km. Their observation, though with reduced amplitudes even during the rocket descent, indicates the large (a few hundred km) horizontal scale sizes of these bubbles. The physical characteristics of these bubbles, in the light of the small scale plasma irregularities associated with them are reviewed and discussed here.