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Plasma blobs associated with plasma bubbles observed in the Brazilian sector

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Abstract

In this paper we present a case of plasma blobs associated with plasma bubbles which were observed by emission of OI 630.0 nm airglow, using ground-based (all-sky images) and DMSP-F15 satellite data on 23 February 2007, over a low latitude station São José dos Campos (SJC) (23.21°S, 45.86°W; dip latitude 18.3°S) in the Brazilian sector. We calculated the zonal drift velocities of the plasma bubble and plasma blobs, and the longitudinal drift of the blobs that occurred that night using the linearization method presented by Pimenta et al., [2001]. The north/south and east/west extensions of plasma blobs have also been estimated. The mean velocity of the plasma bubble is found to be 74 ± 8 m/s and the plasma blob zonal drift is 61 ± 6 m/s. The average velocity of the longitudinal drift of the plasma blob was 85 ± 13 m/s and the analyzed blobs had the mean north/south extension of 591 km and east/west extension of 328 and 263 km.

1. Introduction

Plasma bubbles are a phenomenon in the F-region of the ionosphere that originates over the equator, and are characterized by a decrease or depletion in plasma density with respect to the density of the ambient plasma and can extend in large scales. In the Brazilian sector, Sobral et al., [1980] and Sahai et al., [1981] observed these irregularities for the first time through a scanning

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