

NIGHTTIME IDENTIFICATION OF F REGION
CURRENTS FROM CHAMP SATELLITE
OBSERVATIONS OVER EQUATORIAL AFRICA

By

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DECLARATION

This dissertation is my own work and has not been examined or submitted for examination in any other university.

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This dissertation has been submitted for examination with the approval of my supervisors.

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Abstract

This dissertation investigates the ionospheric F-region currents inferred from the interpretation of the magnetic signatures using Challenging Minisatellite Payload (CHAMP) satellite data. The observations are limited to the quiet days, with the Dst index less than 20 and on the nightside of 2000hrs to 0500hrs for a period Jan, 2001 to Dec, 2001. In this study, we report for the first time, the F-region currents as inferred from the CHAMP vector data. We find the spatial confinement of the currents to the near the equatorial region bounded by the Appleton anomaly and their appearance in the pre-midnight and post-midnight sectors. The current densities are greatly varied along all the three magnetic field components with the z-component recording the highest values. The current densities along y-component is highest in the months of November, about 7.7 mA/m, but generally less than 5.6 mA/m for the rest of the months. The months of September, August and November record the highest current densities with August recording a density of 31.35mA/m along the x-component showing the seasonal variation of the currents along all the three magnetic field components.