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IONOSPHERIC IMAGING OF THE SOUTHERN CREST OF THE EQUATORIAL IONIZATION ANOMALY OVER BRAZIL

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A four-dimensional time-dependent tomographic algorithm, named Multi Instrument Data Analysis System (MIDAS), is used to image the equatorial and low-latitude ionosphere over the central-eastern sides of the Brazilian territory. From differential phase data obtained by a chain of ground-based GPS receiver the total electron content (TEC) is estimated and then, together with a modeled ionosphere from International Reference Ionosphere (IRI) model, the electron density distribution is reconstructed and the parameters of the F2-peak layer are accessed from the images. This paper presents the first study of ionospheric tomography using real dual-frequency data from the Brazilian Network for Continuous GPS Monitoring (RBMC). Ionospheric F2- peak electron density (NmF2) accessed from the images are compared to concurrent measurements from three ionosondes installed across Brazil. One year of data during the solar maximum period from March/2001 to February/2002 is used to analyze the seasonal and hourly variation of the F2-layer peak density. The accuracy with which MIDAS images the electron density during geomagnetic quiet periods is investigated through its correlation and deviation with the ionosonde and IRI model data, respectively. The main aspects of the reconstruction results at the equatorial ionization anomaly (EIA) region over Brazil are highlighted and discussed.