



Preface: Studies on mesosphere, thermosphere and ionosphere from equatorial to mid latitudes – Recent investigations and improvements – Part 2

This is the second part of a special issue which obtained a significant success: in fact Part 1 (vol. 60(8), 2017) is formed by 29 papers while this part is formed by 28 papers, but the total number of submitted papers was higher than 100. This means that the subjects of research related to mesosphere, thermosphere and ionosphere, from equatorial to mid latitudes, represent hot topics, especially in light of the consequences they have on both ground-based and satellite-based technologies which have by now a crucial role in our life. As it was for Part 1, a rigorous review process has been carried out for each of the papers forming Part 2 of the special issue with most of the manuscripts reviewed by more than two reviewers.

Topics investigated were again various: the variability of the plasma during quiet and disturbed conditions, the equatorial ionospheric anomaly, the plasma vertical drift over the equatorial region, multiple stratifications of the F layer, the E region variation under different geomagnetic conditions, the variability of the sporadic E layer, traveling ionospheric disturbances, the ionospheric scintillation variability, the response of the lower ionosphere when artificially disturbed, thermospheric wind changes during geomagnetic disturbed conditions, the mesopause sodium and potassium layer variability, the variability of the midnight values of the OH* temperature in the mesopause region, whistlers and co-seismic ionospheric perturbations.

Moreover, the reliability of several models like NeQuick2, IRI, IRI-Plas, the Horizontal Wind Model 2007, the NRLMSISE-00 empirical atmospheric model, was tested. An interesting new approach to upgrade CCIR foF2 maps, based on genetic algorithms, was proposed. An updating of the Middle and the Upper Atmosphere Model (MUAM) was implemented.

Similar to that in Part 1, also the studies presented in Part 2 are based on observations from satellite missions (ROCSAT, CHAMP) and from a wide variety of instruments and networks such as: Fabry-Perot Interferometers, Scintillation Receivers and Scintillation receiver networks (CIGALA/CALIBRA), GNSS receiver networks (IGS,

UNAVCO, CONUS), an Na-K Lidar, the AWESOME network, an Automatic Whistler Detector, Ionosondes and Ionosonde networks (RAPEAS), VLF equipment, the JULIA radar, the Incoherent Scatter Radar of the Arecibo Observatory, magnetometers, ionospheric oblique chirp equipment, an hydroxyl airglow spectrograph, All-Sky Imagers, HF Doppler sounders, Partial Reflection Radars.

Papers are again organized according to the following five topics, the second of which is slightly changed with respect to Part 1: (1) Recent findings and new developments to monitor mesosphere, thermosphere and ionosphere system. (2) Post-midnight irregularities and ionospheric scintillations at multiple frequencies. (3) Advances in ionospheric empirical modelling with new adaptations for improved accuracy. (4) Thermospheric and ionospheric response to space weather events including the St. Patrick's Day storm of March 2015. (5) Lower, upper atmosphere and ionospheric interactions.

We wish to thank all the authors for their contributions and all the reviewers for their invaluable assistance in evaluating the validity of each of them. We want to conclude by thanking once again Dr. Paulo Fagundes, Brazil for proposing us to lead this special issue, and Dr. Peggy Ann Shea, ASR Past Editor in Chief for her kind cooperation and valuable advices without which the realization of this special issue would not have been possible.

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