

Bottomside Ionosphere, Empirical Nowcasting and Forecasting Models

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and

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Abstract

This lecture aims to provide an introduction to empirical modeling efforts available for the prediction of key ionospheric characteristics in long, near real time and short term horizon. The discussion accommodates also introductory notes for the morphology and the monitoring of the bottomside ionosphere as well as a brief outline of the ionospheric variability during quiet and disturbed space weather conditions that are the key challenges for all ionospheric modeling efforts.

List of topics

- Morphology of the Earth's ionosphere and the effects of space weather
- Ground-based radio sounding techniques (vertical and oblique)
- Ionospheric storm effects in F-region
- Ionospheric modeling
 - i. Climatological models available for long term predictions – Regional mapping
 - ii. Specification of ionospheric conditions in near real time to monitor the effects of space weather
 - iii. Modeling the ionospheric response to extreme space weather conditions

Date: Thursday 28 October 2010
Time: 11:10-13:00
Room: Kastler Lecture Hall @ Adriatico Guest House

Ioanna Tsagouri

Dr Ioanna Tsagouri is researcher in the Institute for Space Applications and Remote Sensing of the National Observatory of Athens (ISARS/NOA) since 2006 and member of the Ionospheric Physics Group of NOA since 2000. From 2000 to 2006 she worked as research assistant in ISARS/NOA. Dr I. Tsagouri obtained a Ph.D. on Space Physics in 2003 from the University of Athens. Her main field of specialization concerns the ionospheric research towards the ionospheric storm dynamics, ionospheric monitoring techniques, solar wind – magnetosphere - ionosphere coupling and ionosphere - plasmasphere interactions. Her current research interests include ionospheric soundings using ground digisondes, ionospheric modelling for nowcasting and forecasting purposes, regional ionospheric mapping techniques and modelling of the topside ionosphere and plasmasphere for operational applications. She has participated in a large number of research and development projects funded by the European Commission and other national and international organizations (ESA, NATO, EOARD, AOARD, GSRT in Greece) and in international projects such as CHAMP, COST 271, COST296, COST724 and COST ES0803. She has published more than 30 papers in peer review international scientific journals and she has participated to more than 40 scientific conferences.

Curriculum Vitae et Studiorum of Dr. Bruno Zolesi

Dr. Bruno Zolesi was born in Monte Argentario, Italy, on 8 th July 1949; In 1973 he received the Doctor Degree in Physics at University "La Sapienza", Rome, Italy. Since 1979 he was a scientist at Istituto Nazionale di Geofisica where in 1990 took the position of Director of Research. Since 1985 to 2001 he was the Head of the former Department of Aeronomy. He was Nominated Director of the Section Roma 2 -Geomagnetism, Aeronomy and Environmental Geophysics, one of the seven scientific sections of the new Istituto Nazionale di Geofisica e Vulcanologia. The position was confirmed in 2004 till May 2007. In July 2007 he was nominated head of the Research Unit: Physics of the Upper Atmosphere.

Activities and interests

The principal subjects of interest and research deal with the upper atmosphere observation and investigation, particularly connected with the terrestrial ionosphere, its temporal and spatial variability, its medium term prediction and forecasting models. Involved in several national and international research projects including: the European COST 238 PRIME Project (Prediction Retrospective Ionospheric Mapping over Europe) as working group leader of one of the five working groups; the European COST 251 IITS (Improved Quality in Ionospheric Telecommunication) as vice chairman; the COST 271 action entitled Effects of Upper Atmosphere on Earth and Satellite Communications as chairman; and finally the COST 296 action entitled MIERS (Mitigation of Ionospheric Effects on Radio Systems) as vice chairman.

Further activities

Member of the Scientific Committee of the Italian National Plan for Space Weather; Convenor of the sessions concerning Ionospheric Science and Space Weather during the European Geophysical Society General Assemblies in 1998, 1999, 2000 2001, 2002, 2003 and 2004, 2005,2006 and 2007. Editor of the proceedings published on Physics and Chemistry of the Earth and on Annals of Geophysics; . Member of the International Reference Ionosphere; . Member of the Italian delegation in the negotiation of scientific bilateral agreements between Italy and Greece and Italy and China.

Additional information

Associated editor of Annali di Geofisica and of the Bulgarian Journal of Geophysics for the Ionospheric Physics section;. Coeditor of four special issues of Annals of Geophysics on the theme of Ionospheric Physics; Director of the 24th Course of the International School of Geophysics on Ionospheric Physics and Propagation held at the "Ettore Majorana" Foundation and Centre for Scientific Culture in Erice, Italy (24-29 September, 2004) and of the Course of Geomagnetism and Ionosphere organized by the International School of Space Science at L'Aquila, Italy on April 2008 ; Director and organizer of periodic seminars and training courses devoted to the Italian users of ionospheric predictions ; Co-author of two books and of more than 100 papers published in the national and international scientific literature. **Selected**

publications:

1. Boschi, E., V. Rizi, G. Visconti and **B. Zolesi**, *Il buco dell'ozono. Indizio del cambiamento globale?*, Edizione il Cigno Galileo Galilei, pp. 108, 1991.
2. **Zolesi, B.**, A. Belehaki, I. Tsagouri and Lj.R. Cander, Real-time updating of the simplified ionospheric regional model for operational applications, *Radio Sci.*, 39, 2, RS2011, doi:10.1029/2003RS002936, 2004.
3. Tsagouri, I., **B. Zolesi**, A. Belehaki and Lj.R. Cander, Evaluation of the performance of the real-time updated simplified ionospheric regional model for the European area, *J. Atmos. Sol.-Terr. Phys.*, 67, 12, 1137-1146, 2005.
4. Belehaki, A., Lj.R. Cander, **B. Zolesi**, J. Bremer, C. Juren, I. Stanislawski, D. Dialetis and M. Hatzopoulos, DIAS Project: The establishment of a European digital upper atmosphere server, *J. Atmos. Sol.-Terr. Phys.*, 67, 12, 1092-1099, 2005.
5. Cander, Lj.R. and **B. Zolesi**, Space weather and RF communications: Monitoring and modelling, *J. Atmos. Sol.-Terr. Phys.*, 67, 12, 1053, 2005.