

Ionospheric Active Experiments and Monitoring Systems

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and

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Abstract

The observation of the Earth's ionosphere with ground-based sounders is proved to be valuable for the specification and prediction of the state of the bottomside ionosphere that is strongly affected by space weather disturbances having as direct consequence disturbances ranging from position offset in GPS signals to communication degradation and blackout.

The aim of this practicum is to introduce procedures applied to analyze and evaluate raw observations (vertical and oblique ionograms, drift ionograms) from ionospheric sounders and their derived parameters (i.e. ionospheric characteristics, electron density height distribution function, ionospheric drift velocities).

In the second part, the trainees will practice on the functionality of distributed information systems capable of supporting the real-time acquisition, elaboration, evaluation, dissemination and archiving of the ionospheric nowcasting and forecasting information based on data from ground based ionospheric sounders, solar and geomagnetic indices and satellite missions and on advanced geospace model algorithms.

Practical examples will be based on the DIAS, GIFINT and IPS systems.

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Dr Anna Belehaki is research director and head of the Ionospheric Physics Group in the Institute for Space Applications and Remote Sensing of the National Observatory of Athens (ISARS/NOA). Dr Belehaki obtained a Ph.D. on Space Physics in 1992 from the University of Athens and from 1993 to 1994 she was postdoctoral fellow in the Canadian Network for Space Research, University of Alberta. Her scientific interests are: magnetospheric substorms, geomagnetic storms, solar wind-magnetospheric-ionospheric coupling, ionospheric sounding techniques, ionospheric nowcasting and forecasting, ionospheric mapping, modeling of the topside ionosphere and plasmasphere. She worked systematically on the analysis and interpretation of data obtained by geospace missions (DMSP, IMP8, GEOTAIL, GOES, ACE, CHAMP) and was participated in international space physics projects such as CANOPUS, GEOTAIL (member of the EPIC team) and CHAMP (Co-Investigator). Dr Belehaki is the coordinator and elected chair of the Management Committee of the pan-European COST Action ES0803 on Space Weather (2008-2012), she was Pi-I of the Athens Digisonde Project and coordinator of the European Commission funded project DIAS (FP6, eContent Programme, 2004-2006), while she also coordinated and participated in more than 20 research projects funded by national and international organizations. She has published 70 papers in peer review international scientific journals and participated to more than 120 scientific conferences. Dr Belehaki is Editor-in-Chief in the newly established journal Space Weather International and serves as a reviewer in most well known journals in the field.

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. Stanislawska, 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.