

Preface

The 11th International Symposium on Equatorial Aeronomy (ISEA-11), Taipei, May 2005

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This issue of *Annales Geophysicae* contains selected papers from the 11th International Symposium on Equatorial Aeronomy (ISEA-11) and the Climate and Weather of the Sun-Earth System (CAWSES) Mini-Workshop. ISEA-11 and the CAWSES Mini-Workshop were hosted by the Institute of Space Science at National Central University and were held at the Civil Servant's Training Center in Taipei, Taiwan from 9–14 May 2005.

The International Symposium on Equatorial Aeronomy is held approximately every three to four years and is typically a major gathering of scientists from around the world interested in the low-latitude atmosphere and ionosphere, as well as coupling with other latitudinal and altitudinal regions. Each ISEA represents an opportunity for researchers to share their most recent results as well as discuss possibilities for future campaigns and experiments. Over 130 scientists attended ISEA-11 from 15 countries, participating in eight different scientific sessions. The sessions were: (1) K. C. Yeh memorial session: F-region irregularities and scintillations, radio occultation and tomographic imaging; (2) Upper atmospheric responses to seismic and volcanic activities; (3) Equatorial and low-latitude studies: ionospheric and thermospheric dynamics; (4) Numerical simulation, modeling and data assimilation; (5) Magnetic storm effects and space weather features at low latitudes; (6) E-region plasma irregularities and instabilities; (7) Equatorial and low-latitude studies: middle atmosphere dynamics and coupling processes; (8) Experimental techniques and recent low-latitude campaigns.

In conjunction with ISEA-11, a CAWSES Mini-Workshop was also held. CAWSES is a program sponsored by the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) aimed at coordinating international activities related to furthering our understanding of the space environment and its impacts on society. The purpose of the mini-workshop was to analyze and present results from recent CAWSES campaigns

conducted in 2004. Two sessions were convened: (1) Space Weather: Science and Applications; (2) Atmospheric Coupling Processes.

This issue contains articles based upon the research and results that were presented at ISEA-11 and the CAWSES Mini-Workshop. They represent a body of work ranging from the mesosphere, through the D- and E-regions, to the F-region at equatorial and low-latitudes. We are pleased to include 18 articles describing recent results pertaining to the background dynamics and coupling processes present at all altitudes in the low-latitude region, as well as studies of some of the interesting irregularity processes that can occur there.

The results presented are based on a combination of observations performed with a variety of incoherent and coherent scatter radars at different longitudes (e.g., J. L. Chau and E. Kudeki, S. Fukao et al., K. J. W. Lynn et al., T. Maruyama and M. Kawamura, R. Sheth et al., D. Tiwari et al., M. Vellante et al.) as well as optical (e.g., H. Kil et al., C. Martinis et al., R. H. Wiens et al.), rocket-borne (D. L. Hysell et al.) and satellite-borne instruments (e.g., M. V. Ratnam et al., A. V. Dmitriev et al.). It is specifically these types of multi-instrument experiments that are beginning to shed new light and reveal features of the low-latitude ionosphere that were previously unclear (e.g., D. L. Hysell et al., M. J. Nicolls et al., S. Ray et al.). These insights are being folded into state-of-the-art models that can help elucidate the physical mechanisms dominating the low-latitude region (e.g., D. L. Hysell et al., M. Milla and E. Kudeki, J. P. St. Maurice and R. K. Choudhary). However, the observations also highlight aspects of phenomena for which there are still no accepted theories, such as the occurrence of 150-km echoes in the daytime equatorial ionosphere (e.g., J. L. Chau and E. Kudeki). To address these shortcomings and further our understanding of the low-latitude regions, exciting new experiments and satellite missions are being undertaken (e.g., C/NOFS, FORMOSAT-3/COSMIC).

These missions will present an unprecedented view of the ionosphere, in terms of the coverage, level of detail, and number of parameters that will be measured. The next few years should be very fruitful and we are looking forward to discussing the results at ISEA-12!

We are grateful to the sponsors of ISEA-11 and the CAWSES Mini-Workshop, namely SCOSTEP, the National Science Council of the Republic of China, National Central University, and the CAWSES-AOPR Coordinating Office. The workshop would not have occurred were it not for the dedicated work of the ISEA-11 Organizing Committee: C. H. Lu (Chair), J. L. Chau, E. Kudeki, C. G. Fesen, and S. Fukao. The CAWSES Mini-Workshop was organized by the CAWSES science steering committee which is chaired by Su. Basu. Local arrangements were made by the Institute of Space Science, National Central University led by S.-Y. Su. We would also like to thank the many referees who helped to evaluate the articles that are contained in this special issue as well as the authors who submitted their manuscripts for consideration.

Figure captions

1. Images taken of the nighttime ionosphere by the Global Ultraviolet Imager. (Figure 1 of H. Kil et al.)
2. Power and Doppler altitude-time plots of 150-km echoes. (Figure 1 of J. L. Chau and E. Kudeki)
3. RTI plot of high-resolution mesospheric echoes. (Figure 4 of R. Shet et al.).
4. Altitudinal-zonal plots of incoherent and coherent power maps. (Figure 13 of D. L. Hysell et al.)

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Special Issue Editors