

**1stThunderstorm Effects on the Atmosphere-Ionosphere System
(TEA-IS)summer school**

(ESF Research Networking Programme)

Torremolinos, Málaga, 17 – 22 June 2012

FINAL SCIENTIFIC PROGRAM

Hotel Pueblo Camino Real,
Los Álamos (Torremolinos, Málaga, Spain)

Sunday 17 June

16.30 Registration opens at Hotel Pueblo Camino Real Main Entrance's Desk

19.30 Registration closes

Monday 18 June

- 08:00 – 08:40 Registration opens at Conference Room and Posters Display
- 08:40 – 09:00 Official Opening (**A. Luque and F. J. Gordillo-Vázquez**)

Morning chairperson: T. Neubert

- 09:00 – 09:50 Introduction to the physics of Lightning (V. A. Rakov, INVITED TUTORIAL)
- 09:50 – 10:20 Recent results in TGF research – observations and theories (N. Østgaard, INVITED TOPICAL)
- 10:20 – 10:30 Poster reports (1A) - 4 flash presentations
- 10:30 – 10:55 Coffee Break
- 10:55 – 11:05 Poster reports (1B) - 4 flash presentations
- 11:05 – 11:35 Aerosol effects on convective clouds (I. Koren, INVITED TOPICAL)
- 11:35 – 12:05 Experiments on charge transfer in graupel/crystal collisions (E. E. Ávila, INVITED TOPICAL)
- 12:05 – 12:35 Physics of streamer discharges and lessons learned from the study of discharges in laboratories for the study of atmospheric electrical discharges (A. Bourdon, INVITED TOPICAL)
- 12:35 – 12:45 Poster reports (1C) - 4 flash presentations
- 13:00 – 14:20 Lunch

Afternoon chairperson: N. Østgaard

- 14:20 – 14:30 Poster reports (1D) - 4 flash presentations
- 14:30 – 14:50 Common, Long-Duration Gamma-ray Glows in Thunderclouds (N. A. Kelley, STUDENT TALK)
- 14:50 – 15:00 Poster reports (1E) - 4 flash presentations
- 15:00 – 16:30 POSTER SESSION
- 16:30 – 16:55 Coffee Break
- 16:55 – 17:05 Poster reports (1F) - 4 flash presentations
- 17:05 – 17:25 Monitoring strong gravity wave signatures in the stratosphere due to extratropical cyclones through high resolved radio sounding data (R. Kramer, STUDENT TALK)

- 17:25 – 17:45 TLE observing in Finland (P. Lahtinen, STUDENT TALK)
- 17:45 – 18:05 Extra-terrestrial sprites: Laboratory Investigations in Planetary Gas Mixtures (D. Dubrovin, STUDENT TALK)
- 18:05 – 18:35 Joint Discussion – **Chair: M. Füllekrug**
- 20:30 – 21:30 Welcome cocktail reception at Hotel Pueblo Camino Real swimming pool surroundings

Tuesday 19 June

Morning chairperson: A. Luque

- 09:00 – 09:50 Toward better understanding of sprite streamers: initiation, morphology and polarity asymmetry (V. P. Pasko, INVITED TUTORIAL)
- 09:50 – 10:20 Applications of Lightning Remote Sensing with Low Frequency Radio Measurements (S. A. Cummer, INVITED TOPICAL)
- 10:20 – 10:30 Poster reports (2A) - 4 flash presentations
- 10:30 – 10:55 Coffee Break
- 10:55 – 11:05 Poster reports (2B) - 4 flash presentations
- 11:05 – 11:35 D region Ionosphere sudden perturbations associated with lightning and TLEs (C. Haldoupis, INVITED TOPICAL)
- 11:35 – 12:05 High-speed Observations and Modeling of Elves and Associated Ionospheric Effects (R. A. Marshall, INVITED TOPICAL)
- 12:05 – 12:35 Features of lightning discharges observed by high speed cameras and VHF/VLF total lightning mapping systems at the Ebro Valley (J. Montanyà, INVITED TOPICAL)
- 12:35 – 12:45 Poster reports (2C) - 4 flash presentations
- 13:00 – 14:20 Lunch

Afternoon chairperson: C. Hanuise

- 14:20 – 14:30 Poster reports (2D) - 4 flash presentations
- 14:30 – 14:50 How simulated fluence of photons from Terrestrial Gamma ray flashes at aircraft and balloon altitudes depends on initial parameters (R. S. Hansen, STUDENT TALK)
- 14:50 – 15:00 Poster reports (2E) - 4 flash presentations
- 15:05 – 16:35 POSTER SESSION
- 16:35 – 16:55 Coffee Break
- 16:55 – 17:05 Poster reports (2F) - 4 flash presentations
- 17:05 – 17:25 Kinetics of CO₂ and nitrogen oxides in air plasmas produced by the action of sprites and halos in the Earth mesosphere (F. C. Parra-Rojas, STUDENT TALK)
- 17:25 – 17:45 The feedback theory concerning the production of terrestrial gamma-ray flashes (A. B. Skeltved, STUDENT TALK)
- 17:45 – 18:05 Simulation of thunder propagation through a realistic atmosphere model (L. J. Gallin, STUDENT TALK)
- 18:05 – 18:35 Joint Discussion – **Chair: J-L Pincon**

Wednesday 20 June

Morning chairperson: H. Stenbaek-Nielsen

- 09:00 – 09:50 Lightning Applications in Weather and Climate (C. Price, INVITED TUTORIAL)
- 09:50 – 10:20 Optical observations and conditions of production of transient luminous events (sprites, elves, gigantic jets) (S. Soula, INVITED TOPICAL)
- 10:20 – 10:30 Poster reports (3A) - 5 flash presentations
- 10:30 – 10:55 Coffee Break
- 10:55 – 11:35 A Tribute to Dave Sentman (F. São Sabbas, DAVE SENTMAN MEMORIAL TALK) + additional testimonies of colleagues
- 12.00 - Free Afternoon

Thursday 21 June

Morning chairperson: F. J. Gordillo-Vázquez

- 09:00 – 09:50 Lightning NO_x: impact of thunderstorms and TLE's on stratospheric ozone (J.P. Pommereau, INVITED TUTORIAL)
- 09:50 – 10:20 Thunderstorms: Generator and exhaust for pollutants (H. Huntrieser, INVITED TOPICAL)
- 10:30 – 10:55 Coffee Break
- 11:05 – 11:35 Chemical sources and sinks in the middle atmosphere: relevance and detectability of thunderstorm-induced perturbations (E. Arnone, INVITED TOPICAL)
- 11:35 – 12:05 The gravity waves in the atmosphere; their relation with thunderstorm activity (F. Dalaudier, INVITED TOPICAL)
- 12:05 – 12:35 Water vapour transport to the stratosphere driven by thunderstorm activity (J. K. Nielsen, INVITED TOPICAL)
- 13:00 – 14:30 Lunch

Afternoon chairperson: B. E. Carlson

- 14:30 – 14:50 Recent results from the new RHESSI TGFs (T. Gjesteland STUDENT TALK)
- 15:00 – 16:30 POSTER SESSION
- 16:30 – 16:55 Coffee Break
- 17:05 – 17:25 Evaluation of detection techniques of sprites based on infrasound signals measured in Equatorial Africa (M. R. Peris, STUDENT TALK)
- 17:25 – 17:45 Cross sections and modelling results for TGF- and positron spectrum produced by a negative stepped lightning leader (C. Koehn, STUDENT TALK)
- 17:45 – 18:35 Joint Discussion – **Chair: C. Halduopis**
- 20.30 – School Dinner in Málaga (Parador de Gibralfaro). Bus departures at 19.45 at 50 m from the Hotel Camino Real main Entrance. Returning at 24.00.

Friday 22 June

Morning chairperson: U. Ebert

- 09:00 – 09:50 Causes and Consequences of Energetic Particle Beams in the Atmosphere (M. Füllekrug, INVITED TUTORIAL)
- 09:50 – 10:20 Development of sprite streamers and preceding halos and elves observed in NHK Cosmic Shore Campaign (Y. Takahashi, INVITED TOPICAL)
- 10:30 – 10:55 **Coffee Break**
- 11:05 – 11:35 High Speed Sprite Imaging (H. Stenbaek-Nielsen, INVITED TOPICAL)
- 11:35 – 12:05 Correlation between halos and their parent lightning (C. L. Kuo, INVITED TOPICAL)
- 12:05 – 12:35 Principles of Lightning Detection (H.-D. Betz, INVITED TOPICAL)
- 13:00 – 14:30 **Lunch**

Afternoon chairperson: Ari-Matti Harri

- 14:30 – 14:50 Transient events in the upper atmosphere (V.S. Morozenko, STUDENT TALK)
- 15:00 – 16:30 POSTER SESSION
- 16:30 – 16:55 **Coffee Break**
- 17:05 – 17:25 2012 Summer Campaign. Ground-based correlation between energy electrons and X-ray count increase and lightning (F. Fabr3, STUDENT TALK)
- 17:25 – 17:45 Early/fast VLF events: A comparison between theoretical models and spread-spectrum VLF scattering observations (D.A. Kotovsky, STUDENT TALK)
- 17:45 – 18:00 **Closing**

APPENDIX

Posters for poster flash presentations (two slides in two minutes)

MONDAY June 18

Session 1A

1. Design and implementation of an automatic instrument to diagnose air plasmas produced by Earth mesosphere TLEs (M. Passas *et al.*)
2. Near infrared and ultraviolet spectra of TLEs (F. J. Gordillo-Vázquez *et al.*)
3. The relevance of electron associative detachment in upper-atmospheric electricity (A. Luque and F. J. Gordillo-Vázquez)
4. Kinetics of CO₂ and nitrogen oxides in air plasmas produced by the action of sprites and halos in the Earth mesosphere (F. C. Parra-Rojas *et al.*)

Session 1B

1. High-speed observations and modeling of Elves and associated ionospheric effects (R. Marshall)
2. Infrasound from lightning measured in Ivory Coast (T. Farges *et al.*)
3. Gigantic jet discharges as possible inducers of sprites (Li-Jou Lee *et al.*)
4. Electromagnetic signatures of different forms of gigantic jets above typhoon (Sung-Ming Huang *et al.*)

Session 1C

1. High order fluid model for simulations of streamers and sprites (A. Markosyan *et al.*)
2. Modelling the ion chemical impact of sprites at night and during daytime (H. Winkler and J. Notholt)
3. The principles of imaging devices for high energy photons from Terrestrial Gamma-ray Flashes (P. H. Connell)
4. Finding Schumann resonance transients using an automatic method (T. Nagy *et al.*)

Session 1D

1. The TLE observation site in Sopron, Hungary – an overview (J. Bór *et al.*)
2. Statistics of TLE-causing lightning strokes at high latitudes – FinSprinter results 2009-2011 (A. Mäkelä *et al.*)
3. Lightning activity during 2011 puyehue volcanic eruptions (M. G. Nicora *et al.*)
4. Terrestrial Gamma Ray Flash Imaging (V. Reglero *et al.*)

Session 1E

1. Telescopic Observations of Streamer Splitting in Sprites (M. McHarg *et al.*)
2. A statistical analysis on the relationship between thunderstorms and Sporadic E Layer over Rome (V. Barta *et al.*)
3. Negative streamers branch like coral reefs (M. Arrayás)
4. X-and γ - emissions from runaway electrons associated with thunderstorms (D. Cinar *et al.*)

Session 1F

1. Preliminary results from the DTU automatic camera pointing system for TLE detection (O. Chanrion *et al.*)
2. Common, long-duration Gamma-ray glows in thunderclouds (N.A. Kelley *et al.*)
3. On the breakdown electric field of the mesosphere (T. Neubert *et al.*)
4. Towards user-friendly, public domain simulations of the precursor of lightning: streamers (A. Sun *et al.*)

TUESDAY June 19

Session 2A

1. Small scale interferometric network of low frequency radio receivers (A. Mezentsev and M. Füllekrug)
2. Energetic radiation observations near meter-scale sparks in the laboratory (B. E. Carlson *et al.*)
3. On sanitizing background Schumann resonance observations from strong transient events for inversion calculations (V. Mushtak *et al.*)
4. Towards understanding the formation of lightning: simulating the inception of streamer discharges (J. Teunissen *et al.*)

Session 2B

1. Early/fast VLF events: A comparison between theoretical models and spread-spectrum VLF scattering observations (D.A. Kotovsky *et al.*)
2. Fine structure of magnetic field waveforms from the first return stroke of inland Lightning (O. Santolík *et al.*)
3. The submicrosecond structure of unipolar magnetic field pulse trains generated by lightning discharges (I. Kolmašová and O. Santolík)
4. Study of X-ray emission in long sparks combined with ns-fast photography (P. Kochkin and A.P.J. van Deursen)

Session 2C

1. Ponderomotive model of plasma confinement and border formation in astrophysical jets (A. Dubinova and V. V. Kocharovsky)
2. Diagnostics of hollow cathode low pressure air discharges as a tool for understanding Halo spectral features in the Earth mesosphere (F. C. Parra-Rojas, I. Tanarro *et al.*)
3. Positive streamer propagation due to background or photo ionization: Experiments and theory (S. Nijdam, G. Wormeester, U. Ebert)
4. The COBRAT project – scientific payload and mission (J.-L. Pinçon *et al.*)

Session 2D

1. Ebro Lightning Mapping Array: Sprite-producing (O.A. van der Velde *et al.*)
2. Study of the High Energy Emissions Related with Lightning and Thunderstorm (R. Winkelmann and F. T. São Sabbas)
3. Preliminary Lightning Observations over Greece (T. Chronis)
4. Lightning distribution analysis for Natural Hazard (L. V. Sorokin)

Session 2E

1. Neutron component of the radiation dose related to thunderstorm (A. Drozdov *et al.*)
2. ESA's Atmosphere-Space Interactions Monitor (ASIM) for the ISS (A. Orr on behalf of the ASIM scientific and industrial consortium)
3. Current Status and Future Collaborative Observation Plan of JEM-GLIMS Mission (M. Sato *et al.*)
4. TLE study in South America using triangulation (A. Morais and F. T. São Sabbas)

Session 2F

1. Relationship between duration of optical emission of sprites and charge moment change of their parent CG (T. Kudo, *et al.*)
2. Comparing lightning activities with climatic reanalysis (Y. Sanmiya *et al.*)
3. Physical properties of sprite-producing MCS (R. R. Azambuja *et al.*)
4. Three-dimensional Structure of Sprite Streamers Derived from Aircraft Observations (N. Kobayashi *et al.*)

WEDNESDAY June 20

Session 3A

1. Thunderstorm activity as observed by the ARISE (E. Blanc *et al.*)
2. A self-consistent model of sprite influence on the chemical balance of mesosphere (A. Evtushenko *et al.*)
3. LATINELT – Latin American Collaborative Network for Observation of Transient Luminous Events (F. T. São Sabbas)
4. INTA Contribution to MXGS Instrument for the ASIM Payload (V. Eiriz *et al.*)
5. Importance of receiver transfer function in interpretation of ELF pulses related to Transient Luminous Events (J. Mlynarczyk *et al.*)