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NEWSLETTER ON ATMOSPHERIC ELECTRICITY

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INTERNATIONAL COMMISSION ON ATMOSPHERIC ELECTRICITY (IAMAS/IUGG)

AMS COMMITTEE ON ATMOSPHERIC ELECTRICITY

AGU COMMITTEE ON ATMOSPHERIC AND SPACE ELECTRICITY

EUROPEAN GEOSCIENCES UNION

SOCIETY OF ATMOSPHERIC ELECTRICITY OF JAPAN

A pair of pets? or monsters? Are they hovering on a big fire? This photo was taken by a small group of high school students from Gizan High School of Gifu Prefecture of Japan during a Japanese winter thunderstorm as part of so called "Super-Science-High-School" activity that was financially supported by Ministry of Education, Culture, Sports, Science, and Technology of Japan.

ICAE

ANNOUNCEMENTS

Special Issue of Atmospheric Research on ICAE 2007 Beijing

Xiushu Qie and Clive Saunders have been co-editing the papers submitted for the Special ICAE 2007 Beijing Conference issue of Atmospheric Research. Almost all of the papers have now been reviewed: 69 Submitted, 28 Under revision, 28 Accepted, 12 Rejected, and 1 still in review.

Xiushu Qie and Clive Saunders sincerely thank all the reviewers for their contributions. We hope to complete the process as soon as possible and have the published volume out around the end of the year.

New Books

A book titled "The art and science of lightning protection" and authored by Prof. Martin A. Uman has been published recently. For detail, please visit the following site: http://www.amazon.com/Art-Science-Lightning-Protection/dp/052187811X/ref=pd_bbs_sr_1?ie=UTF8&s=books&qid=1210667962&sr=1-1.

Conference Report

A Workshop on "Planetary Atmospheric Electricity" was organized jointly by the International Space Science Institute (ISSI, Bern, Switzerland, http://www.issibern.ch/) and the European Network for the Development of Planetary Science Europlanet (http://europlanet.cesr.fr/). The Workshop was held between 23rd and 28th July 2007 at the International Space Science Institute in Bern, under the auspices of the Directors of ISSI, Professors Roger-Maurice Bonnet, André Balogh, and Rudolf von Steiger.

It was the aim of this Workshop to discuss the present understanding of the occurrence of atmospheric electricity on Earth and on other bodies within the Solar System. Planetary scientists and experts in terrestrial atmospheric electricity were given the opportunity to present the main issues in their research fields. The programme, abstracts of presentations as well as the list of names of the participants can be accessed through: http://www.issibern.ch/workshops/Electricity/.

The five day Workshop was attended by 40 scientists who discussed global electrical circuits on the Earth and other planets, ionization processes under the different conditions of the various planetary atmospheres, measurements related to lightning and lightning hazards to humans, aircraft, spacecraft and planetary missions, charge generation and separation processes and aspects of electrical discharges in atmospheric gases.

Overview papers were produced which deal with terrestrial and planetary atmospheric electricity, which will be published as Volume 30 of the Springer Space Science Series of ISSI, a special issue of Space Science Reviews by the end of 2008. http://www.springer.com/astronomy/extraterrestrial+physics/journal/11214.

This book is aimed to serve as a reference book summarizing the present knowledge of Planetary Atmospheric Electricity. The Special Issue of Space Science Reviews and the Space Science Series of ISSI volume will be edited by Francois Leblanc, Michel Blanc, Jean-Pierre Lebreton, Karen Aplin, Michael Rycroft, Giles Harrison, and Yoav Yair.

CONFERENCES

Workshop on Coupling of Thunderstorms and Lightning Discharges to Near-Earth Space

This workshop will be held in University of Corsica, Corte, France on 23-27 June 2008. It covers the following topics. For detailed information, please visit: http://www.oma.be/TLE2008Workshop/.

- TLEs and TGFs
- Response of the Atmosphere to TLEs
- Electrification in Severe Storms
- Troposphere-Stratosphere Transport by Tropical Convective Storms
- Gravity Waves Generated by Thunderstorms
- Lightning-Induced Electron Precipitation (LEP) Events
- Lightning Effects on Mesospheric Airglow
- The Global Atmospheric Electric Circuit
- Current and Future dedicated Missions, associated measurements and modelling
- Instrumental Techniques

ICLP 2008

From 23rd to 26th of June 2008, the 29th International Conference on Lightning Protection (ICLP) will be held in Uppsala, Sweden. http://www-conference.slu.se/ICLP2008/index.html. The Conference will be located in Uppsala University: http://www.uu.se/.

Several topics in the field of lightning physics and lightning protection will be investigated at this Conference:

- Lightning discharge
- Lightning occurrence characteristics
- Lightning electromagnetic pulse
- Lightning attachment
- Lightning down conductors and grounding
- Lightning protection of power systems
- Lightning protection of electronic systems
- Lightning deleterious effects
- Practical and specific lightning protection problems
- Lightning protection of windmills and other alternative power systems,
- Lightning testing standards.

International Symposium on Topical Problems of Nonlinear Wave Physics (NWP-2008)

International Symposium on "Topical Problems of Nonlinear Wave Physics-2008" (NWP-2008) will be held on board a comfortable boat cruising up and down the Volga river starting in Nizhny Novgorod from July 20 through July 26, 2008. This meeting is a continuation of the previous symposia "Topical Problems of Nonlinear Wave Physics-2003 and 2005" that

attracted leading experts from around the world. Information about NWP-2003, 2005 is available at the web site http://www.nwp.sci-nnov.ru.

The upcoming Symposium will be devoted to recent progress in the interrelated fields of nonlinear physics with applications to systems of different origin. The Symposium will include three parallel Topical Conferences:

- NWP-1: Nonlinear Dynamics of Electronic Systems (16-th International Workshop)
- NWP-2: Physics of Extreme Light
- NWP-3: Global and Synoptic Nonlinear Processes in the Atmosphere

Each Conference will feature oral (invited and contributed) talks and poster sessions. Besides, some plenary lectures on interrelated topics are planned. Oral and poster presentations will be selected by the Program Committee Members by results of the considered submissions. For detailed information, please visit the website http://www.nwp.sci-nnov.ru.

XXIX URSI General Assembly, Chicago, Illinois, USA (2008)

The XXIX General Assembly of the International Union of Radio Science (Union Radio Scientifique Internationale-URSI) will be held at the Hyatt Regence Chicago Hotel in downtown Chicago, Illinois, USA on August 7-16, 2008. In the following you can find the description on the two sessions which are mostly related to lightning. For other sessions or detailed information, please visit the website http://www.ece.uic.edu/2008ursiga.

E06: Lightning Discharges and Related Phenomena

Monday 11/08/2008 13:40 – 17:20 / Oral Session / 10 Papers Room: Columbus CD

Conveners:

Z. Kawasaki, zen@comm.eng.osaka-u.ac.jp

V. A. Rakov, rakov@ece.ufl.edu

Summary: The lightning discharge is one of the two natural sources of electromagnetic interference (EMI), the other one being the electrostatic discharge. Lightning can be defined as a transient, high-current (typically tens of kiloamperes) electric discharge whose length is measured in kilometers. Electric and magnetic fields generated by lightning represent a serious hazard to various systems, particularly those containing sensitive electronics. The scope of the session includes the following topics:

Properties of the lightning discharge important for EMC, lightning return-stroke models, lightning electromagnetic pulse (EMP), coupling of lightning electromagnetic fields to overhead lines and buried conductors, lightning locating systems, atmospherics, lightning effects in the middle and upper atmosphere, lightning protection and testing standards.

EGH: Terrestrial and Planetary Electromagnetic Disturbances and Effects

Wednesday 13/08/2008 13:40 – 17:20 / Oral Session / 10 Papers Room: Columbus CD

Conveners:

M. Hayakawa, hayakawa@whistler.ee.uec.ac.jp

C. Price, cprice@flash.tau.ac.il

M. Füllekrug, m.fullekrug@bath.ac.uk

Summary: This session welcomes papers on the general topic of natural and anthropogenic electromagnetic disturbances in the atmospheres of the Earth and other planets. Papers dealing with ULF, ELF and VLF disturbances are particularly encouraged, although papers dealing with any frequency range are welcome. Some topics related to this session include geomagnetic

pulsations and VLF/ELF emissions, Schumann resonances and global lightning, lightning detection and thunderstorm research, upper atmosphere discharges, ionospheric and magnetospheric remote sensing, electromagnetic noise, their effects on transmission lines, etc.

GROUND'2008 and 3rd LPE Conference

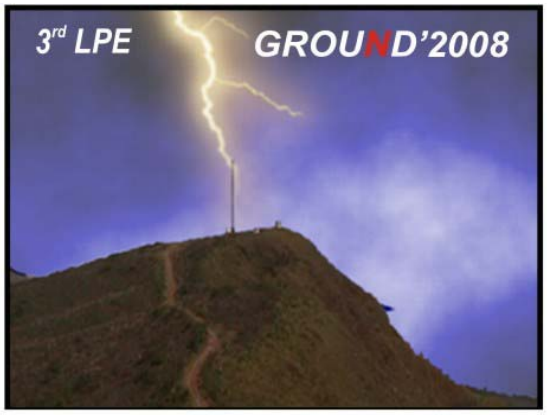
Due to a large number of requests, we have decided to postpone the deadline for submitting abstracts to the GROUND'2008 and 3rd LPE Conference. Notice that the new deadline is June 30th, just after the end of ICLP Conference. You may see following all the updated deadlines. Looking forward to seeing you next November in Florianopolis we send you our best regards.

Silvério Visacro and Osmar Pinto Jr.
LRC - Lightning Research Center (UFMG-CEMIG)
Lrc@cpdee.ufmg.br

GROUND'2008 & 3rd LPE

International Conference on Grounding and Earthing
International Conference on Lightning Physics and Effects

November, 16th - 20th, 2008
Florianópolis – Brazil
Deadlines:
Abstracts: June 30th, 2008
Notification of acceptance: July 18th, 2008
Submission of full paper: September 30th, 2008



Morro do Cachimbo Station - Brazil

AGU FALL MEETING 2008

The fall meeting of AGU will be held on 15-19 December 2008, at the Moscone Center West, 800 Howard Street, San Francisco. For detail, please visit: http://www.agu.org/meetings/fm08/.

IAMAS ASSEMBLY 2009 (CANADA)

The next IAMAS (The International Association of Meteorology and Atmospheric Sciences) assembly will be held in Montreal, Canada 19-29 July 2009. This is also a big meeting for ICAE colleagues. For detailed information, please visit the official site of IAMAS: http://www.iamas.org/.

As one of the 10 commissions of IAMAS, ICAE is going to organize the following two symposia. Your early preparation for attending these symposia is appreciated.

1. Thunderstorms and their Manifestation on Local, Regional and Global Scales

Convenors:

Lead: Earle Williams (earlew@ll.mit.edu)

Serge Soula (Serge.Soula@aero.obs-mip.fr)

Colin Price (cprice@flash.tau.ac.il)

New developments in the observation of thunderstorms span the electromagnetic spectrum: In the X-ray and gamma ray domain (for detection of energetic radiation presumed to be caused by runaway electrons in thunderstorm fields), in the VHF domain (for detailed lightning structure and comparison with radar and in situ measurements of storms), in the VLF region (for regional lightning studies over land and over ocean, including hurricanes), and in the ELF region (for studies of the global circuit and the extraordinary lightning flashes that produce sprites, elves and haloes in the mesosphere). These new observations have all spurred an integration of activity in atmospheric electricity over many scales. In this symposium, we invite papers covering the following topics:

(1) Observational, theoretical and modeling studies on the relationship between storm morphology and the electrical activity both within and above storms, including sprites, elves and haloes

(2) Operational application of lightning data for weather forecasting and climate monitoring

(3) Impact of lightning on climate, lightning's response to climate change, and atmospheric chemistry.

(4) The global electrical circuit and the Earth's Schumann resonances

(5) Energetic radiation from lightning and thunderstorms

(6) All other related subjects in atmospheric electricity.

2. Lightning: Characteristics, Physics, and Hazard Mitigation

Convenors:

Lead: Vladimir Rakov (rakov@ece.ufl.edu)

Christian Bouquegneau (christian.bouquegneau@fpms.ac.be)

Daohong Wang (wang@gifu-u.ac.jp)

Lightning can be defined as a transient, high-current (typically tens of kilo-amperes) electric discharge whose length is measured in kilometers. It represents a serious hazard to human life, as well as to various objects and systems. The scope of the symposium includes the following topics: Properties of different types of lightning discharges, lightning models, various effects of lightning discharges, basic theory of lightning protection and warning systems, evaluation of lightning risk and risk management. One of the objectives of this symposium is to facilitate interaction between lightning researchers and those concerned with mitigation of lightning effects.

X International Symposium on Lightning Protection – X SIPDA

Prof. Alexandre Piantini, Chairman of the X SIPDA, is very pleased to announce the **Call for Papers** of the X International Symposium on Lightning Protection - X SIPDA – which will be held in Curitiba, Brazil, from 9th – 14th November, 2009. The event is organised by the Institute of Electrotechnics and Energy of the University of São Paulo - IEE/USP - with the support of the Institute of Electrical and Electronics Engineers - South Brazil Section - IEEE. The aim of the Symposium is to present and discuss recent developments concerning lightning modelling and measurement techniques, as well as grounding and lightning protection. Prospective authors are invited to submit abstracts on the following topics:

1) Lightning Physics, Characteristics and Measurements

2) Lightning Detection and Location Systems
3) Lightning Protection of Substations and Transmission Lines
4) Lightning Protection of Medium and Low-Voltage Distribution Lines
5) Lightning Protection of Structures and Installations
6) Lightning Protection of Electronics and Telecommunication Systems
7) Grounding
8) Lightning Electromagnetic Fields and Electromagnetic Compatibility
9) Equipment
10) Testing and Standardisation
11) Lightning-caused Accidents and Injuries

Submissions should follow the proposed deadlines:
Abstract submission (min. 300 and max. 500 words): 10th March 2009
Notification of provisional acceptance: 5th May 2009
Full paper submission: 5th July 2009
Notification of final acceptance: 5th September 2009

Registration/Information:
X SIPDA Secretariat
University of São Paulo
Institute of Electrotechnics and Energy
Av. Prof. Luciano Gualberto, 1289
05508-010 - Cidade Universitária
São Paulo - SP - Brazil
Phone: + 55 11 3091-2579
Fax: + 55 11 3812-9251
E-mail: sipda@iee.usp.br
Website: www.iee.usp.br/sipda

RESEARCH ACTIVITY BY INSTITUTION

Atmospheric Air-ion Study at Indian Station Maitri, Antatctica

Devendraa Siingh and A.K. Kamra
devendraasiingh@tropmet.res.in
Indian Institute of Tropical Meteorology, Pune – 411 008, India

Measurements of the small-, intermediate- and large- positive ions and air-earth current density were made at Maitri, Antarctica during January – February 2005. A ion-counter working on the principle on Gerdien's condenser and plate antenna (as shown in the figure) were used for ion measurements ans air-earth current density respectively. Variations in small and large positive ion concentrations are almost similar to each other. On the other hand, variations in intermediate positive ion concentrations are independent of variations in the small/large positive ions and exhibit a diurnal variation which is similar to that in atmospheric temperature on fair weather days with a maximum during the day and minimum during the night hours. No such diurnal variation in intermediate positive ion concentration is observed on cloudy days when variations in them are also similar to those in small/large positive ion concentrations. Scavenging of ions by snowfall and trapping of α-rays from the ground radioactivity by a thin layer of snow on ground, is demonstrated from observations. Variations in intermediate positive ion concentration are explained on the basis of the formation of new particles by the photolytic nucleation process.

The number concentration and size-distribution of aerosol particles in the size-ranges 4.4 - 163 nm and 0.5 - 20 µm diameters were also measured simultaneously along with the measurements of ion concentrations and the air-earth current density during blizard. Ion concentrations of all categories and the air-earth current simultaneously decrease by approximately an order of magnitude as the wind speed increases from 5 to 10 ms^{-1}. The rate of decrease is the highest for large ions, lowest for small ions and in between the two for intermediate ions. Total aerosol number concentration decreases in the 4.4 – 163 nm size-range but increases in 0.5 – 20 µm size range with wind speed. Size distribution of the nanometer particles show a dominant maximum at ~ 30 nm diameter throughout the period of observations and the height of the maximum decreases with wind speed. However, larger particles show a maximum at ~ 0.7 µm

diameter but the height of the maximum increases with increasing wind speed. The results are explained in terms of scavenging of atmospheric ions and aerosols by the drifting snow particles.

Atmospheric Electricity Group, Departments of Physics University of Shkodra and Tirana， Albania

The last activities carried out by our research group include detailed and continuous analysis about the small air ion concentration and their properties in urban and suburban areas. One of the letters related with the atmospheric electricity was presented in the ICAE Conference in Beijing (F. Mandija, F. Vila). The experimental results of our measurements suggest an important role of the aerosol and radon concentration, and the meteorological parameters on the concentration of the small air ions. The range of the areas where the measurements are realized includes major urban centers and suburbs in Albania, especially the areas in the vicinity of the city of Shkodra. Most of the measurements were realized near the lake of Shkodra (left) and in the center of the city (right).

Numerous research projects are under way, such as continuous observation of small air ion concentration at different meteorological conditions, monitoring of different electric parameters of the air in urban areas. A particular interest is expressed in determining the coefficients of the altitude profile of small air ions. Another project in cooperation with the Regional Environmental Agency includes measurements and monitoring environmental parameters of the air in varied areas. The recording data are continuously published in the Scientific Bulletin of University of Shkodra. Based on those data, several scientific papers are prepared and will be prepared in the nearest future.

Nowadays a campaign is scheduled to make continuous measurements and analysis of the aerosol spectrum of the air in these zones, and the correlation between small air ion and aerosol concentrations. This project involves researchers of both University of Tirana and Shkodra.

Atmospheric Electricity Group, ELAT

The last recent activities of ELAT includes: the participation in the ILDC/ILMC in Tucson with a total of 12 papers. The topics of the presentations were: investigation of the relationship between lightning activity and surface air temperature changes in the city of São Paulo; detailed analysis of positive lightning data in the South of Brazil; lightning characteristics of negative CG flashes in Brazil and in Arizona, United States; use of neural networks to predict lightning activity; the climatology of large peak current CG flashes in Brazil; a new lightning detection efficiency model to correct data from lightning detection networks; the first results of the LS7000 observations in Brazil; relationship between CG flashes and geographical features in the South of Brazil; positive leader characteristics from high-speed video observations; an overview of past CG observations in Brazil; some ideas related to the misleading use of lightning detection network data; the spatial and meteorological conditions associated with very large peak current flashes observed by the Brazilian lightning detection network; and waveshapes of continuing current of CG flashes.

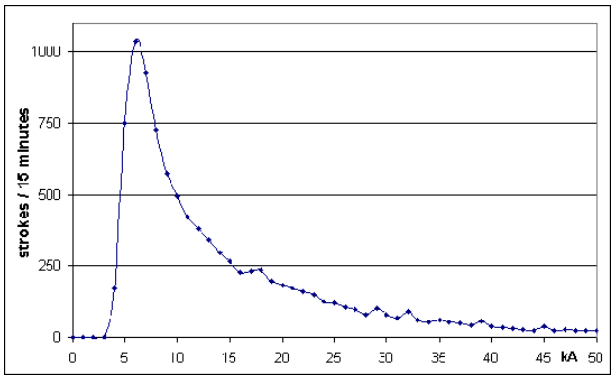
Atmospheric Electricity Group

Physics Department, University of Munich

Garching, Germany

The international Lightning Detection Network LINET was extended and now comprises some 90 sensors in 17 European countries. Real-time and archived data, continuously collected by nowcast GmbH, is made available for scientific and operational purposes. Present research of our group concentrates on topics related to network performance, studies of basic discharge phenomena, and a variety of questions in atmospheric electricity treated in co-operation with many other institutions. A particularly intricate lightning phenomenon is illustrated below.

Continued attention is given to the experimental observation of cloud lightning in the VLF/LF regime. LINET detects and locates large amounts of strokes originating from cloud processes. Highly reliable distributions of IC-strokes could be derived, whereby IC identification was achieved by both the LINET-specific 3D-discrimination technique to distinguish IC from CG, and close time-coincidences between LINET IC-strokes and radio source points that indicate the start of formation of a leader channel, as detected from VHF (SAFIR-) networks. An example is shown in the following figure:



Amplitude distribution of IC-strokes located with LINET, range-normalized ('CG-equivalent'; bin size 1 kA), and time-coincident with first VHF radio source signals.

It remains to be understood, what kind of discharge step produces the many IC-strokes, most of them with remarkable signal strength. In particular, the initiation process needs to be investigated under fundamental aspects because the shown events occur without prior electrical cloud activity that is measurable with operational SAFIR-networks. Insofar, the reported IC-strokes are not the consequence of detected stepped-leader action and, thus, represent a type of discharge not well studied in the past. Since the strokes are abundant and do not reflect rare events, several efforts are under way in order to shed more light to the underlying mechanism.

Atmospheric Electricity Research, University of Texas at Dallas

Our group, with overseas collaborators, has constructed a model of the effects of the downward flow of fair-weather current density (Jz) in the global electric circuit on clouds. When current generated by any source flows through gradients of conductivity, determined by gradients of droplet concentration at the boundaries of, and within clouds, space charge is produced in accordance with Gauss's Law, with the charges attaching to aerosol particles (including condensation nuclei, CCN, and ice forming nuclei, IFN). The charges affect the rate at which these nuclei are scavenged by droplets and ice crystals. Our modeling of these electrical processes and analysis of meteorological data in relation to global circuit Jz changes supports the concepts that (1) contact ice nucleation in cold clouds is electrically enhance via by IFN scavenging, which increase precipitation from cold clouds in 'warm' frontal regions of winter cyclones, and (2) that electrically-induced changes in CCN scavenging in both warm and cold clouds affect the CCN size distribution in such a way to reduce precipitation and increase the lifetime of clouds (Albrecht effect). The former explains many observations of changes in vorticity of winter cyclones correlating with Jz changes, and the latter explains observations of changes in surface pressure within the polar caps also correlating with Jz changes. In both cases the changes in Jz and the meteorological responses of small amplitude, but are highly significant. Much larger effects are predicted with the larger Jz changes that are known to occur. See also:
http://www.utdallas.edu/physics/faculty/tinsley/html.

Characteristics of Thunderstorm Activity over India

M.K. Kulkarni and M.I.R. Tinmaker
Indian Institute of Tropical Meteorology, Pune

Thunderstorms play important roles in many areas of information about earth atmosphere relationship. Characteristics of thunderstorm activity over the Indian region have been examined. For this purpose 15 years, (1981-95) monthly mean number of thunderstorm day's data for 64 Indian stations distributed between 8-30°N is utilized and the

results have been discussed. The latitudinal range 8-30°N is divided into 5 belts of 5° interval each and the variation of thunderstorm activity across these belts is studied on their seasonal and annual scales. On seasonal scale, the thunderstorm activity is widespread in the lower latitudinal range and decreases with increasing latitudes in pre-monsoon season, whereas in the monsoon season the activity is in contrast with the pre monsoon season, suggesting the preponderance of thunderstorm activity in the monsoon season. In the post-monsoon season, the thunderstorm activity is widespread in equatorial region and the magnitude in the month of October is higher than that in the month of November. Thunderstorm activity is recorded least in the winter season. On an annual scale, monthly thunderstorm activity follows a typical semi-annual oscillation in lower three belts (8-10°N, 10-15°N, 15-20°N). Semi-annual oscillation of thunderstorm activity seems to be vanishing and turning later into uni-modal with maximum activity spread between June, July and August months in the fourth belt. The semi-annual character seen in lower three belts seems to disappear in this belt. This feature is associated with the presence of ITCZ. In the last belt, the activity shifts to a single peak spread between July and August months and the semi-annual oscillation seen in earlier belts is totally vanished. The above results support the latitudinal dependence of thunderstorm activity. The association between monthly mean rainfall and number of thunderstorm days has been studied for pre-monsoon and monsoon seasons by employing the RTR index. The RTR value for pre-monsoon and monsoon season varied between 2-6 and 8-18 respectively. The consistency in higher RTR in the monsoon regime of cumulonimbus clouds seems to be well maintained.

International Center for Lightning Research and Testing

Experiments will continue in summer 2008 (for the 15th year) at the International Center for Lightning Research and Testing (ICLRT) at Camp Blanding, Florida. These include continued studies of the properties of natural lightning using multiple-station measurements of electric and magnetic fields and continued studies of the energetic radiation (X-rays, gamma-rays) during both natural and triggered lightning discharges using the Thunderstorm Energetic Radiation Array (TERA), in collaboration with the Florida Institute of Technology (FIT). The field measuring station at the University of Florida Campus in Gainesville, located at a distance of about 45 km from Camp Blanding and linked to the Camp Blanding facility by a dedicated phone line, now includes electric field, dE/dt, HF (5 MHz), and VHF (36 MHz) systems, and an x-ray detector (provided by FIT). The Gainesville station will be operated in either stand-alone mode or two-station mode with the Camp Blanding facility.

Sandip Nallani defended his Masters thesis titled “Characterization of lightning using optical techniques” and Denis Flache (Univ. of Federal Armed Forces, Munich, Germany) prepared at UF his Masters thesis titled “Analysis of Lightning Current Waveforms and Corresponding Video Records with Emphasis on Leader/Return Stroke Mode Versus M-Component Mode of Charge Transfer to Ground”.

J. Schoene, M.A. Uman, V.A. Rakov, J. Jerauld, B.D. Hanley, K.J. Rambo, J. Howard, and B. DeCarlo authored a paper titled “Lightning-induced currents in a buried loop conductor and a grounded vertical conductor”. Currents induced in: 1) a 100 m×30 m buried rectangular loop conductor (counterpoise) and

2) a grounded vertical conductor of 7-m height by natural and rocket-triggered lightning at distances ranging from 60 to 300 m were recorded in 2005 at the ICLRT. The peak values of 12 triggered lightning channel-base currents and the peak values of the induced currents in the counterpoise are strongly correlated. The first few microseconds of the current induced in the vertical conductor by triggered lightning return strokes 100 m away resemble electric field time-derivative waveforms simultaneously measured at the ICLRT. During a close natural lightning flash, five pre-first-return-stroke current pulses with peak currents up to 140 A were measured in the vertical conductor. These are apparently associated with multiple attempts of an upward-moving unconnected leader occurring in response to the charge lowered by downward-propagating leader steps. The paper is published in the IEEE Trans. on EMC.

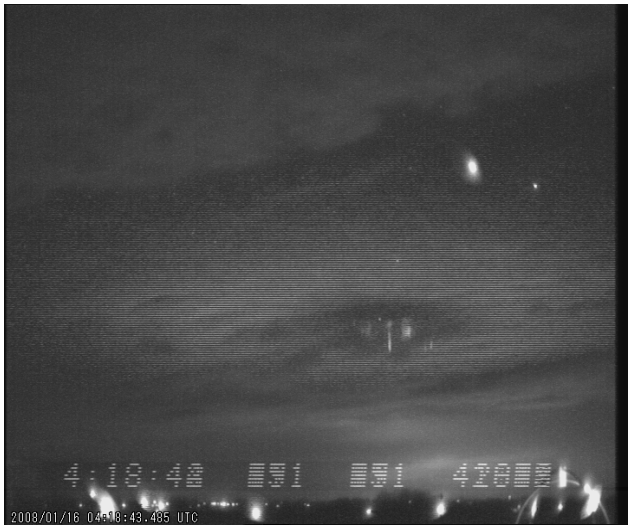
A. Nag and V.A. Rakov authored a paper titled "Pulse trains characteristic of preliminary breakdown in cloud-to-ground lightning that are not followed by return stroke pulses". They identified and examined electric field pulse trains that are characteristic of preliminary breakdown in negative cloud-to-ground discharges but are not followed by return stroke waveforms. It was assumed that such trains are manifestations of the initiation of downward negative stepped leaders that fail to propagate all the way to the ground. These events were referred to as ''attempted first cloud-to-ground leaders,'' although some of them were followed by full-fledged cloud discharges. It was observed that at the beginning and at the end of the pulse train, there were narrower pulses, often having durations in the range of 1–2 us, which are more than an order of magnitude shorter than for ''classical'' preliminary breakdown pulses. The arithmetic mean of total pulse train durations is 2.7 ms, and the weighted arithmetic means of individual pulse durations and interpulse intervals are 17 and 73 us, respectively. Some of the attempted cloud-to-ground leaders, which should belong to the cloud discharge category, can be misclassified as negative cloud-to-ground discharges by lightning locating systems such as the U.S. National Lightning Detection Network. The paper is published in the JGR.

Laboratoire d' Aerologie, Universite de Toulouse

Toulouse, France

During the summer and the fall of 2007, our group participated to a campaign of TLEs observation. Several low-light cameras for TLEs observation were deployed in different sites of South-Western France and North-Eastern Spain. Some were located in altitude (Pic du Midi, 2877m; La Molina, 2537m) and other in plain areas (Lannemezan, 600m; Toulouse, 150m). About 395 TLEs were observed during 19 nights of the period, including 355 sprites and 40 elves. 42 sprites were observed with two cameras, allowing their location by triangulation. The most favourable period was October and November with several storms located over Mediterranean Sea. 89% of the events and 100% of the elves were observed from October 2007 to January 2008. A maximum of 65 events including a majority of sprites and one elve were detected during the night of 11-12 October while a storm was located in the Balearic Islands area. The colour camera of Pic du Midi detected a sprite that night. During the night of 15-16 November around 30 events were detected with several haloes and elves over a storm located close to Corsica. Late in the season, during two nights

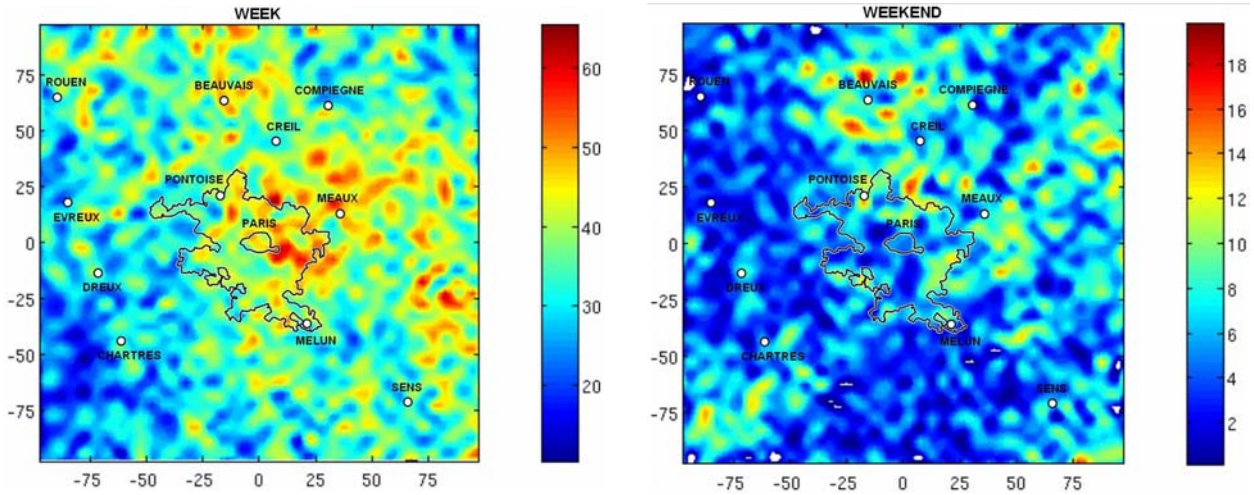
of December (16-17 and 17-18) and one night of January (15-16), several events with a large amount of elves and haloes were detected over winter thunderstorms.



The picture displays a TLE event triggered after a negative cloud to ground flash with a huge peak current (- 472,3 kA), during a winter storm on the night of the 15-16 January, 2008. This event started with one elve triggered between 0 and 2 ms after the flash, followed by column sprites a few tens of ms later.

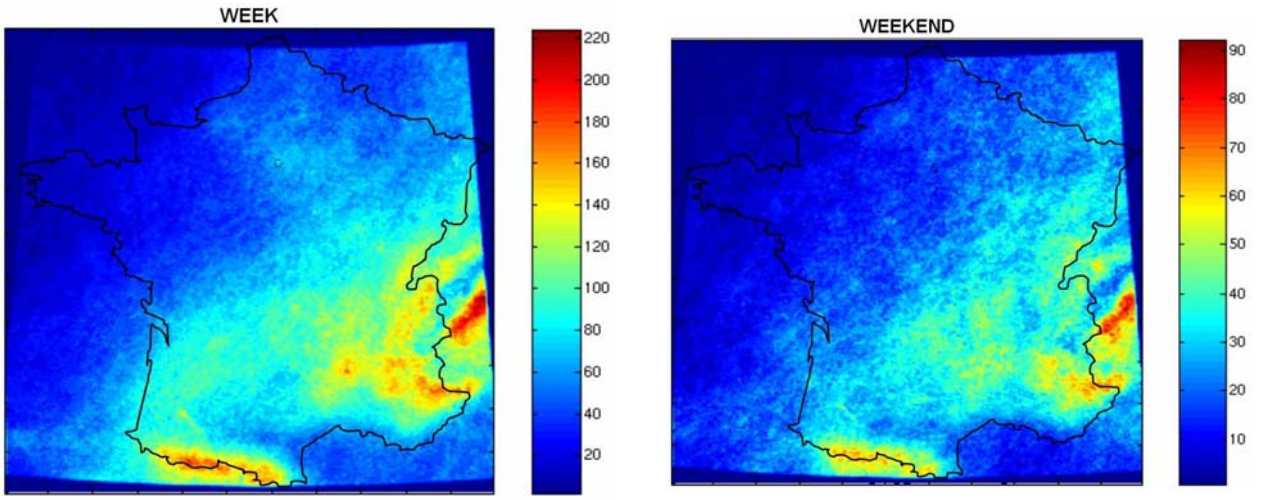
Oscar van der Velde defended his Ph.D. dissertation titled "Morphology of sprites and conditions of sprites and jets in mesosclae convective systems" on 21st of February, 2008. Oscar works now at the University of Terrassa (Spain) with Joan Montanya in a project associated with ASIM.

In order to explore the relationship between pollution and lightning production, our group has been analyzing the CG flash production over Paris and over France during the summer time on long periods. We first focused on the Paris area between May and September from 1992 to 2003 (see next figure). During weeks, the flash density maxima are located over Paris city, downstream Paris (the main winds come more often from South-West or from West), and over surrounding hills. During weekends, the flash density maxima are relatively lessened over and downwind Paris city. These observations suggest an apparent relationship between pollution and lightning production. Relief, dynamics, urban heat island are other parameters that have to be considered. This study is the subject of a forthcoming paper.



Number of CG flashes per pixel on the 200 km × 200 km area centred on Paris during summers (May-September) between 1992 and 2003. A data filtering according to the method by Gauthier et al (2005) allows to disregard the large events (maximum flash number per pixel and per day: 3). Paris city and its surrounding build-up area are drawn in black lines.

We are presently extending this study on the whole French metropolitan territory, during summer time again (June-October) from 2003 to 2007. This work is carried on by Magalie Buguet (Master trainee), Sylvain Coquillat, and Pierre Tulet (Météo France). The same kind of observation can be made over Bordeaux, Lyon, or Grenoble (see next figure). We are currently studying the influence of the relief and we use the chemistry transport model MOCAGE to identify the evolution of pollutants during specific events, via the distribution of CO that figures a tracer of aerosols.



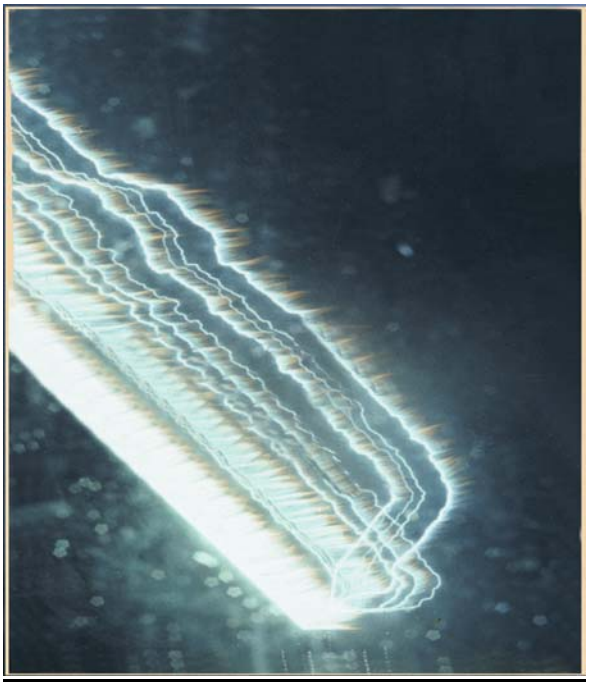
Number of CG flashes per pixel over the French metropolitan territory during summers (June-October) between 1992 and 2007. A data filtering according to the method by Gauthier et al (2005) allows to disregard the large events (maximum flash number per pixel and per day: 3).

Laboratory for Middle Atmosphere and Global Environment Observations (LAGEO)

Institute of Atmospheric Physics, Chinese Academy of Sciences (CAS)
Beijing 100029, China

Five students finished Dissertation and got their Ph.D degree during the last 6 months. **Ting Zhang** and **Xiangzhen Kong** got their Ph.D. degree with dissertation titled "Studies on the Electrical Characteristics of Thunderstorm and the Mechanisms over Tibetan Plateau and Its Surrounding Areas" and "Optical and electric observations with high time resolution on the lightning discharge process and characteristics of leader process of cloud-to-ground lightning flashes", respectively, and continue their career in Cold and Arid Regions Environmental and Engineering Research Institute in Lanzhou. **Tie Yuan** got his Ph.D. degree with a dissertation titled "TRMM-based Studies on Lightning Activity and its Relationship with Precipitation Structure of Thunderstorms over China" and continues his career in Lanzhou University. **Jing Yang** got her Ph.D. degree with a dissertation titled "Red Sprites and the Related Characteristics of Lightning Flashes" and joined LAGEO group in Beijing. **Guili Feng** got his Ph.D. degree with a dissertation titled "Studies on Lightning Activity and its Relationship with Dynamics and Precipitation Structure of Severe Convective Weather Systems" and continues the operational lightning research in Shandong Meteorological Bureau. These three groups in Beijing, Lanzhou and Shandong will continue their cooperation campaign "Shandong

Artificially Triggering Lightning Experiment (SHATLE)" in the summer of 2008.



Triggered lightning during SHATLE

Characteristics of Downward Leader in a Positive cloud-to-ground Lightning Flash: The positive leader branches seemed to develop horizontally with a speed of the order of 10^4 m/s (documented by the high-speed video camera with a time resolution of 1000 frames/s) during the initial stage just outside the thundercloud. The luminous duration of the leader was about 12 ms, and the luminous intensity at the tip was much stronger than the channel behind it, presented obviously a stepped-like characteristic. The 2-D propagation speed of the stepped-like leader ranged from 0.1×10^5 m/s to 3.8×10^5 m/s. The time interval between 26 leader pulses during the last 0.5 ms just before the stroke was about 17 ms according to E-field changes.

Study on Lightning Activity and Precipitation Characteristics before and after the Onset of the South China Sea Summer Monsoon: The data from the LIS, PR, and TMI onboard the TRMM satellite from 1998 to 2005 have been used to investigate the lightning activity and precipitation characteristics before and after the onset of the South China Sea summer monsoon. The vertical development of precipitation systems in the pre-monsoon season was stronger than that in the monsoon season, so frequent lightning activity were observed. The flash rate of precipitation systems can be expressed as functions of maximum storm top height, maximum snow depth and minimum polarization corrected temperatures, respectively. Among those, the relationship between flash rate and maximum snow depth is the most stable one.

Observation on whole discharge process of a CG flash with a new-developed narrowband Interferometer: A narrowband radio interferometer has been developed by Lanzhou Group in Cold and Arid Regions Environmental and Engineering Research Institute cooperated with LAGEO in Beijing, and used to locate the entire sources of VHF radiations from a negative CG lightning discharge which contains 19 strokes. It is found that the preliminary breakdown event of the CG flash started from negative charge region and exhibited firstly a downward progression and then an upward propagation. The progression speed of initial stepped leaders was about 10^5 ms^{-1}, while that was about 4.1×10^6 and 6.0×10^6 ms^{-1} for dart leaders and dart-stepped leaders, respectively. Followed active radiation processes, M events appeared to contact finally into conducting main discharge channels.

Magnetic Field Measuring System and Current Retrieval in SHATLE: A magnetic field measuring system with two rectangular loops perpendicular to each other is developed and used to detect the total horizontal magnetic field produced by lightning discharges. Two sets of antenna with low gain and high gain are designed separately and were tested experimentally in a high-voltage laboratory. The results show that waveforms detected by the system are very similar to the source current. Using Ampere's Law, the inferred currents from the magnetic fields for three artificially triggered lightning return strokes were 39.8 kA, 29.1 kA and 43 kA, respectively,

being close to the directly measured results of 41.6 kA, 29.6 kA and 38 kA. The system can be a useful tool in the research of close electromagnetic environment of lightning flashes.

Lightning Group in LAGEO

Laboratory of Lightning Physics and Protection Engineering (LLPPE)

Chinese Academy of Meteorological Sciences (CAMS)
Beijing 100081, China

The research fields of the Laboratory of Lightning Physics and Protection Engineering (LLPPE) of the Chinese Academy of Meteorological Sciences include:

- Lightning Physics, Mechanism and Protection

Measuring lightning parameters with advanced sounding detection methods. The parameters include light, electric field, magnetic field, radiation field et al.

Analyzing the physical process of lightning initiation and development.

Studying the lightning interaction with ground objects and surrounding facilities, especially electronic equipments.

Studying the lightning strike mechanism, developing new methods and technologies of lightning protection and keeping further research on electromagnetic compatibility.

Supplying scientific considerations and key techniques for lightning electromagnetic interference protections.

- Lightning Detection Technology

Based on the existing detection methods, our research focus on the key techniques of lightning detection and data application.

Studying spatial-temporal propagation of lightning discharges, revealing the occurrence and development of lightning discharge through the new lightning protection techniques. Improving lightning detection and forecasting ability.

- Lightning Forecasting and Warning for Convectional Weather

Studying the spatial-temporal evolution of lighting activity using lightning locate system

and lightning detection techniques. Combining radar data with numerical models, we study the coupling mechanism among lightning discharge, dynamics, precipitation and microphysical process.

Developing new forecasting methods and techniques for local meteorological disaster in heavy convectional storms, including hail, gale and lightning. Establishing foundational methods and techniques for super short time fixed-point lightning forecasting.

- Relationship between Lightning and the Climatic Change

According to the characteristics of climate distribution and lightning evolution in the global lightning activities, we study the coupling relationships of weather systems in different scale; study the relationship between lightning and meteorology; and the application of lightning data in climate prediction and environmental monitoring.

Achievements of lightning nowcasting and forecasting technique and its operational applications: Developed a Lightning Nowcasting and Warning Method which was a breakthrough in the domestic field. This method integrated multi-source observation data such as lightning detecting, SAFIR, radar, satellite, surface electric field instrument and sounding data and synthesized charge and discharge model of thunderstorm to do lightning nowcast. Studied and developed the Lightning Nowcasting and Warning System (CAMS_LNWS). The system was designed by framework and modularization and applied integrated warning methods in the warning program. CAMS_LNWS can identify, track and extrapolate the potential areas and yield lightning nowcasting and warning products (such as lightning occurrence probability, moving trends of lightning activity areas, and lightning risk degree in key areas) automatically. Conducted operational experiments with CAMS_LNWS and evaluated accuracy of the warning products. CAMS_LNWS present a good forecasting ability for regional lightning activities and accuracy of the warning products achieved advanced level in the domestic field.

Development of lightning locating system: A new-type Broadband Interferometer System for locating lightning radiation in three dimensions has been designed. This Broadband Interferometer could locate the breakdown process of lightning with a time resolution in microsecond, and depict the more detailed three-dimensional structure of lightning channel. So it could be widely used in regional lightning detection and warning. In the other side, it could provide the broadband frequency spectrum and electric field change information. Combined with 3-D location results, it could provide abundant information for the discussion of physical mechanism of lightning discharges and lightning research. The system was tested in the field observation campaign in 2007, and the observation results indicated that this system could locate close radiation sources very well, which are consistent with observations from other instruments.

Statistical analysis of lightning disaster data in China: We established a national lightning disaster database and made statistical analysis of the lightning disaster data collected by China Meteorological Administration from 1997 to 2006, in combination with the analysis of satellite-based Optical Transient Detector and Lightning Imaging Sensor lightning detecting data provided by the Global Hydrology Resource Center from 1995 to 2005 over China. Characteristics of lightning disasters and correlative factors are studied, including lightning exposure, hazard formative environment, hazard, hazard affected bodies and their interactions. Lightning casualties of areas in China correlate significantly with lightning activities of the local areas.

Analysis of characteristics of the lightning activities and charge structures of hailstorm: A hailstorm process in Beijing was analyzed about its total lightning activities observed by SAFIR3000 and the radar detection was combined to discuss its electric structure. The

results indicated that there were two active periods for lightning activities during the hailstorm process. The hail shooting was found in the first period. The peak time of the lightning activities was prior to the hail shooting about 5 minutes. The ratio of the cloud-to-ground lighting discharges was only 6.16% and 20% of them was positive. The electric structure of the hailstorm changed from inverted polarity during the hail shooting to normal polarity during the second active periods for lightning activities. The adjustment phase of the electric structure was corresponding with the weakened stage of the lightning activities.

Lightning Research Group of Gifu University

Gifu, Japan

During the last winter, we continued observation on the lightning that strike on a windmill and its lightning protection tower as shown in the following figure. Two interesting results have been obtained:

(1) all lightning recorded are upward lightning and they can be sub-classified into two types according to whether or not their initial upward leaders are preceded by discharge activities occurred in another place, such as in cloud;

(2) Wind appears to play a certain role in initiating the latter type of lightning from the tower. Without assistance of nearby lightning discharge activities and strong wind, a rotating windmill tends to have more chance to initiate an upward lightning.

In addition, we have also documented simultaneous recordings of electric current and electric field change of three upward bipolar lightning. Based on these data, we have proposed a scenario of bipolar lightning. For detailed information, please read our 2008 GRL paper, 2008 ICLP paper and 2008 URSI paper authored by D. Wang, N. Takagi et al.

Massachusetts Institute of Technology

Cambridge, MA

Gabriella Satori, Vadim Mushtak and Earle Williams have recently completed a chapter for a book organized by Hans-Dietrich Betz, and co-edited by Ulrich Schumann and Pierre Laroche, which is entitled: “Lightning: Principles, Instruments and Applications”. This chapter reviews the use of Schumann resonance methods for characterizing global lightning activity.

The role of West African squall lines in the production of energetic transient excitations of the Earth’s Schumann resonances was

discussed in an invited presentation at the AMS Annual Meeting in New Orleans in January. These events were simultaneously recorded at multiple ELF sites worldwide (Duke University, North Carolina (USA), Mitzpe Ramon (Israel), Moshiri (Japan), Nagycenk (Hungary) and Rhode Island (USA)). The MIT radar-measured front-to-rear extents of these squall lines occasionally exceeded 300 km. These values are exceptional even when compared with systems in the Great Plains of the US.

Wave impedance methods on exceptional, independently-located lightning transients are being used by Vadim Mushtak to refine estimates for the upper characteristic height in a transmission line model for an asymmetric Schumann resonance cavity. The parameters for the lower characteristic height were worked out in a recent paper in the Special Issue on Schumann resonances (Greifinger et al, 2007).

A 'News and Views' comment (Predictable Lightning Paths?) has been prepared for Nature in response to a provocative article by Paul Krehbiel, Jeremy Riousset, Victor Pasko, Ron Thomas, Bill Rison, Mark Stanley and Harald Edens entitled: "Upward Electrical Discharges from Thunderstorms".

Chuntao Liu and Ed Zipser have recently reorganized their global observations of tropical continental rainfall (measured with the NASA TRMM radar) to produce a UT 'Carnegie curve' for rainfall. Preliminary results indicate a close agreement in amplitude and phase with the well-known Carnegie curve of atmospheric electricity.

MIT Lincoln Laboratory

Lexington, MA

Mike Donovan and Earle Williams are collaborating on a NASA-supported project with Cathy Kessinger and her colleagues at NCAR, and with Jeff Hawkins and Rich Bankert at NRL Monterey, on the space-based validation of convection hazardous to aviation. Observations from the NASA TRMM satellite, using primarily the Precipitation Radar and the Lightning Imaging Sensor, are important components of the validation of inferences drawn from satellite imagery in geo orbit.

Joe Prospero (University of Miami), Vaughan Phillips (University of Hawaii and Earle Williams are making comparisons between the daily arrival of mineral dust in Miami, Florida from West Africa, and the lightning activity over South Florida and in the Gulf of Mexico, as measured with the National Lightning Detection Network. The most common behavior for the most intense dust events is for a complete suppression of lightning activity over a large area. This behavior is attributable to the inversion accompanying the Sahelian Air Layer (SAL) from West Africa..

A comment concerned with the origins of mineral dust in West Africa ("Comment on "Atmospheric Controls on the Annual Cycle of North African Dust" by S. Engelstaedter and R. Washington : Why have Sahelian Haboobs been Ignored?") has recently been accepted for publication by the Journal of Geophysical Research (Atmospheres).

National Severe Storms Laboratory

Norman, Oklahoma, USA 73072

We are involved in risk reduction research for the satellite GOES R, which is scheduled for launch in 2014. The primary data source for our part of this research is the eleven-station Oklahoma Lightning Mapping Array, which is located approximately in central Oklahoma,

U.S.A.

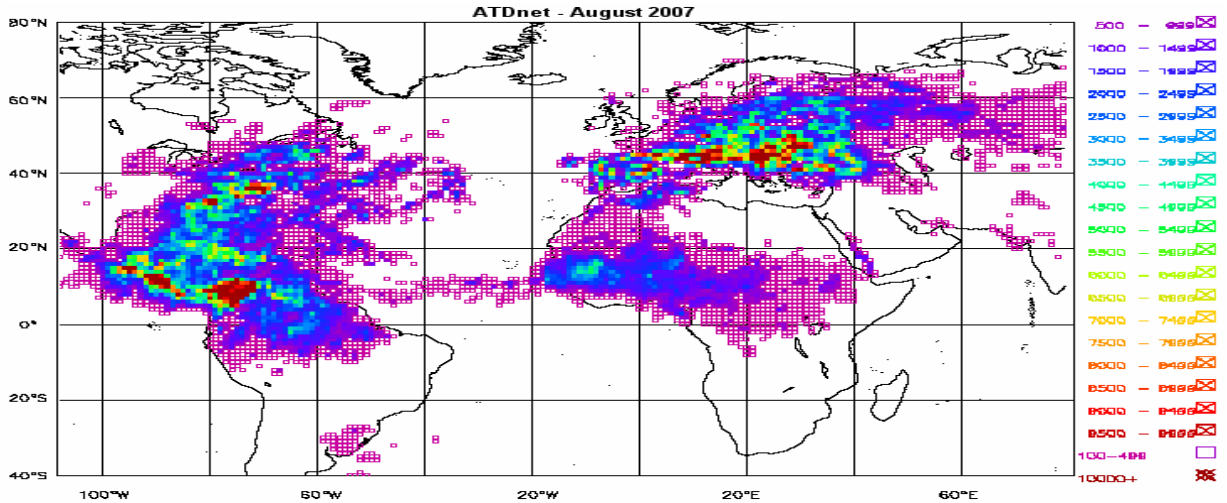
With collaborators, we plan on flying instrumented balloons during July into thunderstorms over Langmuir Laboratory in New Mexico. The balloons will carry instruments to measure ozone and electric field profiles. Other sensors may be flown in addition. With other federal agencies in the U.S., we are doing the background work for procurement of lightning data from a national network. A new contract is scheduled to be in place in 2010.

Congratulations to Eric Bruning upon completion of his Ph.D. in meteorology at Oklahoma University, May 2008. His dissertation is titled Charging regions, regions of charge, and storm structure in a partially inverted polarity supercell thunderstorm.

Observation Development Group of the UK Met Office Long Range Lightning Location Network (ATDnet)

Alec Bennett
alec.bennett@metoffice.gov.uk

The UK Met Office long range lightning location network (ATDnet) team is involved with the EUMETNET task force on lightning detection. This is a European task force designed to compare the lightning detection networks and user requirements of several European countries. Initial comparisons of lightning location and detection rates have been made between the UK Met Office ATDnet network, the Meteo-France network, the Austrian ALDIS network and the Dutch KNMI network. A similarity in lighting location and detection rates between ATDnet and Meteo-France was found over France, with stroke location differences usually within 5km. More low-amplitude strokes were detected by ALDIS than ATDnet over Austria. It was observed that a pronounced diurnal variation exists for the number of strokes detected by ATDnet that pass the quality control check, with a lower percentage of detected strokes passing quality control at night. The source of this variation was attributed to the diurnal variation of modal interference patterns around the ATDnet outstations. Continued investigation into modification of the ATDnet quality control algorithms to incorporate modal interference variability will be made. Further comparisons between European networks are also planned for the future.



A map of lightning intensity during August 2007 as measured by the Met Office ATDnet lightning detection network.

Tel Aviv University and the Open University of Israel

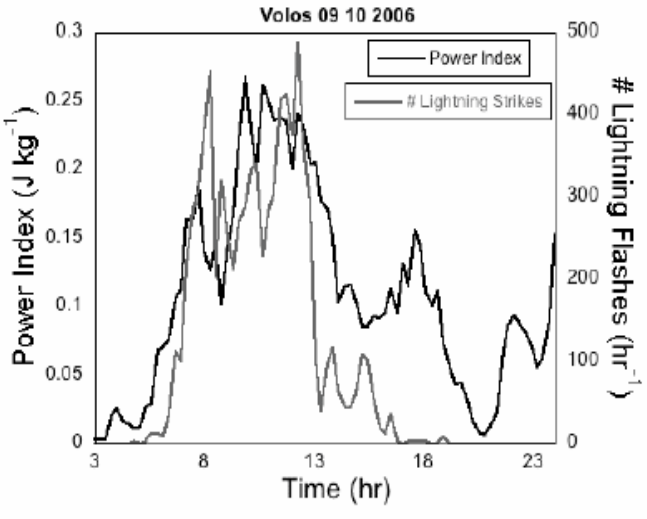
Colin Price, Mustafa Asfur and Yoav Yair are continuing the analysis of the relationship between lightning activity and the increase in wind-speeds within severe hurricanes and typhoons. The analysis shows that in most Category 4 and 5 storms of the 2005-2007 seasons, there exists a clear time lag of 24h between maximum lightning activity and the maximum sustained winds in the hurricanes. The physical mechanism explaining this high correlation is still being sought.

Yoav Yair (OUI), Colin Price (TAU) and TAU students Michal Ganot, Roy Yaniv and Na'ama Reicher have now completed the 4th winter sprite campaign with optical measurements conducted with three WATEC cameras. The 2007/8 measurements yielded a total of 60 new events, some with spectacular features such as bended tendrils (image inset). All the events were off-shore above the Mediterranean Sea (http://geophysics.tau.ac.il/personal/ILAN/).

Simultaneous observations from the Hebrew University of Jerusalem were conducted by Caryn Ehrlich and student Elyakom Vadislavski, showing that in some events, column sprites are arranged in a 3D circular structure. In conjunction with the optical measurements, ELF and VLF data were continuously recorded in our Negev stations by students Eran Greenberg and Yuvel Reuveni.

Reuven Aviv (Tel-Hai Academic College), Yoav Yair (OUI) and Gilad Ravid (Ben-Gurion University of the Negev) developed a theoretical model that is based on the "leaky fire and integrate" approach in order to simulate the flashing behavior of a coupled network of thunderstorm cells. In this type of network, the intensity of the electric field Ei within thunderstorm (i) grows with time until it reaches the critical breakdown value, generates a flash as its electric field drops to zero, simultaneously adding a delta-E to the intensity of the internal electric field in all linked thunderclouds (Ej,k,l…). The results suggest that when the coupling in the network is higher than a certain critical value, all thunderstorm cells will eventually flash in a synchronized manner.

Yoav Yair and Barry Lynn (OUI) are working with colleagues in the framework of the FLASH project (http://www.flash-eu.tau.ac.il/) to develop a new lightning "Power Index" to be used in forecast models such as WRF and MM5. The Power Index is calculated in the charge separation region of simulated clouds between the 0ºC and -20ºC isotherms, in which the non-inductive charge separation mechanism is most effective by collisions of ice and grauple particles in the presence of super-cooled water. Several case studies in Israel, Greece, Italy and Spain were simulated to demonstrate the



potential for this index to be used in conjunction with lightning observations to predict the onset of heavy convective rain that resulted in extreme hydrological discharge (flash flooding). The results show a high correlation between the maximum power index and peaks in the measured lightning activity.

The City College of New York, NOAA-CREST

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Developing a Rainfall-Retrieval Algorithm, NLPC-RICS, for Summer Thunderstorms using CT-Tb IR and LF EM CGL Data via PERSIANN: Rainfall studies have demonstrated that colder cloud-top brightness temperature (CT-Tb) cumuliform clouds usually generate more rainfall in comparison to stratiform and none in cirriform clouds. The present study confirms the results of existing literature, in addition, shows that there is a strong correlation between negative cloud-to-ground lightning peak current (nCGLpc) and rainfall intensity during summer thunderstorms. The objective of this study is to develop a remotely sensed rainfall-retrieval algorithm for summer thunderstorms. High-resolution CT-Tb from geostationary satellite (GOES) thermal infrared (IR) in conjunction with low frequency (LF) CGL from the National Lightning Detection Networks (NLDN), is used for Next-Generation Radar (NEXRAD) rainfall classification and estimation. We are applying an artificial neural networks system named Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks (PERSIANN), for rainfall estimation from the combination of IR-CT-Tb and LF-CGL, at 0.12o * 0.12o spatial resolution. The presented results are for July and August 2006, generating heavy rainfall and damaging lightning events. The study area is located in the Southwest United States (i.e., lat / lon: 32oN-38oN / 106oW-112oW), comprising mostly Arizona and New Mexico, and parts of Colorado and Utah. The results show that incorporating CGL data to CT-Tb, and creating a rainfall intensity classification scheme (RICS) greatly improve PERSIANN rainfall estimates (i.e., cc= 0.7533).

The Upper Atmosphere Research Group
National Space Institute

Danish Technical University
Copenhagen Denmark

The group conducts research into studies of sprites, jets, eves, and the terrestrial gamma-ray flashes and has proposed “The Atmosphere-Space Interactions Monitor” (ASIM) to the Human Spaceflight, Microgravity and Exploration Directorate within ESA www.spacecenter.dk/ASIM. ASIM is an instrument suite to be mounted on an external platform on the International Space Station (ISS). ASIM is currently in the middle of Phase B. The mission is supported by an international science team. Scientists interested in joining the mission preparations, for instance by planning for co-ordinated ground, aircraft or

balloon campaigns during the mission, are welcome to join the science team and should contact Torsten Neubert, neubert@space.dtu.dk.

The group will support the EuroSprite2008 campaign that will start on July 1. One optical camera system will be mounted as usual at the Observatoire Midi Pyrénées and a second camera on Monte Corona, Corsica. The camera on Corsica is semi-autonomous, powered by solar cells and controlled over the Internet via a satellite link. It is shown on the photo. The duration of the campaign will depend on the success of the camera systems. Last year, which was our first time on Monte Corona, problems were encountered with the pan-tilt.

Finally, the group has completed a 2D cylinder symmetrical PIC-MCC code for studies of discharges. It is described in one of the publications given below.

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Reminder

Newsletter on Atmospheric Electricity presents twice a year (May and November) to the members of our community with the following information:

- ✧ announcements concerning people from atmospheric electricity community, especially awards, new books...,
- ✧ announcements about conferences, meetings, symposia, workshops in our field of interest,
- ✧ brief synthetic reports about the research activities conducted by the various organizations working in atmospheric electricity throughout the world, and presented by the groups where this research is performed, and
- ✧ a list of recent publications. In this last item will be listed the references of the papers published in our field of interest during the past six months by the research groups, or to be published very soon, that wish to release this information, but we do not include the contributions in the proceedings of the Conferences.

No publication of scientific paper is done in this Newsletter. We urge all the groups interested to submit a short text (one page maximum with photos eventually) on their research, their results or their projects, along with a list of references of their papers published during the past six months. This list will appear in the last item. Any information about meetings, conferences or others which we would not be aware of will be welcome.

Newsletter on Atmospheric Electricity is now routinely provided on the web site of ICAE (http://www.Atmospheric-Electricity.org), and on the web site maintained by Monte Bateman http://ae.nsstc.uah.edu/.

In order to make our news letter more attractive and informative, it will be appreciated if you could include up to two photos or figures in your contribution!

Call for contributions to the newsletter

All issues of this newsletter are open for general contributions. If you would like to contribute any science highlight or workshop report, please contact Daohong Wang (wang@gifu-u.ac.jp) preferably by e-mail as an attached word document.

The deadline for 2008 winter issue of the newsletter is **November 15, 2008**.

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