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Ciencia hay una sola y comunidad científica una sola.

Juan G. Roederer (Cuba 1993)

Índice

1. Notícias da ALAGE
Monitoramento Ionosférico em Cuba

Recebemos de nosso colega José Silvio Gonzalez Rodríguez do Instituto de Geofísica y Astronomía, CITMA de Cuba um resumo das atividades de monitoramento da Ionosfera em Cuba que aqui reproduzimos.

Renewing ionospheric monitoring in Cuba.

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0.0 Introduction.

At beginning of March 2012 the ionospheric monitoring was re-established in the HABANA station using an ionosonde, type IPS-42. This ionosonde IPS-42 replace an analogical ionospheric station, **AIS** (**from the Russian language, A**vtomaticheskaia **I**onosfernaia **S**tantsia) with a vacuum valve technology base, made in the former USSR which make ionospheric sounding since August 1964 until August 2009.

The aforementioned substitution was an imperative due to the facts that this represents a very obvious technological advance if we compare the IPS-42 technology with the obsolete technology, in this moment, of the Russian analogical ionosonde, AIS.

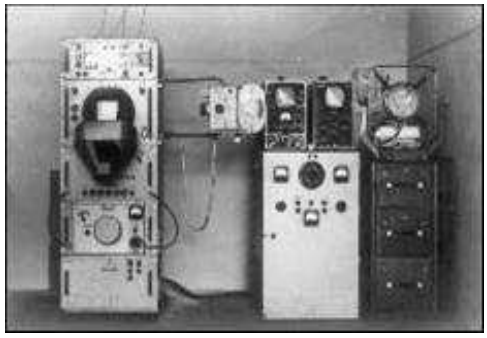
This technological change will allow us:

- To continue the ionospheric monitoring in the Cuban region, the one that began 48 years ago.
- To guarantees the current Data-Base continuity of ionospheric parameter's and ionogram in the region of Cuba.
- To re-establish the traditional service of operative ionospheric data in real time to the Cuban authority's, to administrate and operate different electronic systems of radio-communication and radio navigation.
- Besides, consequently the development of regional ionosphere scientific research that we have been carried out in our area during all these years.

1.0 Historical review

The start of ionosphere monitoring in Cuba was linked with the international program for the ionosphere's research for the period of Minimum Solar Activity, 1964-1965, known as ***International Quit Sun Year (IQSY).***

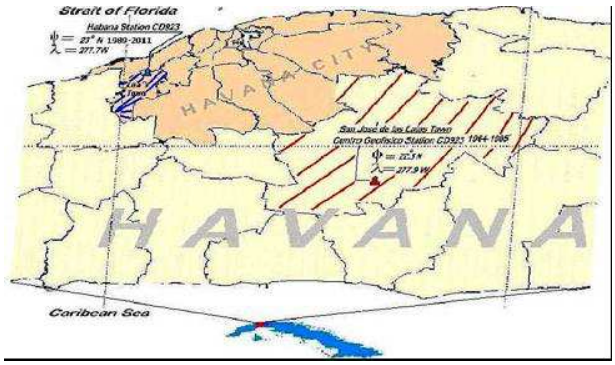
In this way on August 1964 began to work in Cuba an analogical automatic ionosonde type AIS, thanks to the scientific collaboration between the Institute of Terrestrial Magnetism, Ionosphere and Radio wave Propagation (IZMIRAN) of Academy of Sciences from the former USSR and the Department of Geophysics belonging to the Academy of Sciences of Cuba, recently created in these years.



The ionosonde AIS, was initially located near San José de las Lajas town, 1964-1985.

The **AIS** was located in two different locations and with different names, although with geographical coordinated very near.

Due to the urbanization development in the first location (**San José de las Lajas**), it was necessary to stop the work of the ionosonde in 1985 and relocate the **AIS** in a new place for the continuity of the ionospheric sounding. Therefore after 4 years of interruption, in January 1990 the work of the ionosonde is re-established, in the current



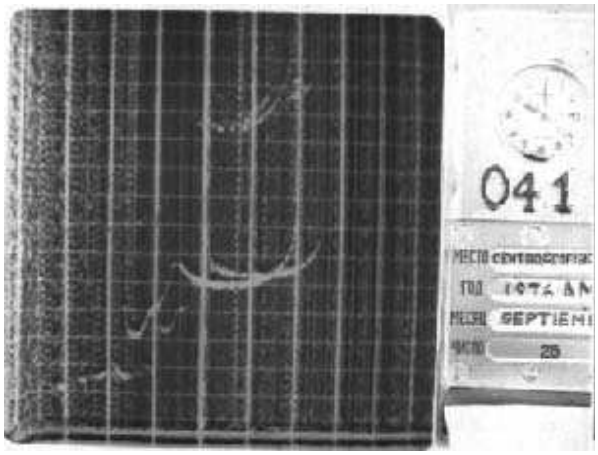
hadquarters of the **Institute of Geophysics and Astronomy (IGA)**, in La Lisa's town, located in the west of Havana city.

The coordinates for both locations are the following ones:
First location. - From August 1964 until December 1985 with the name, **Station Centro Geofísico, Cuba**, in San José de las Lajas town, 35 Km approximately of the Havana city with coordinated:
- Geographical. 22º.58' N, 277.9; Geomagnetic.13.9º N, 155E.2
Second location From November 1989 until August of 2009 with the name, **Station Habana**, in the current headquarters of the Institute of Geophysics and Astronomy, in La Lisa's town, located in the periphery of the Havana city, about 18 Km of the Havana downtown with the following coordinated:
- Geographical. 23º 04' N, 277.7; Geomagetic, 13.88º N, 155.88 E.
Considering the proximity in coordinated of both towns in those that ionosonde, AIS has worked, it is appropriated consider the continuity in the ionospheric parameters that have registered during every year. Concerning the ionospheric parameters registered during the past 45 years, the same ones have been broadly used in national and international scientific research projects, also to support the work of the broadcasting systems and communication for short wave, among others.
Also, the data have been used as a complement and comparison with other research techniques, such as, the vertical sounding of ionosphere from the satellite **Intercosmos-19** (**205 orbit**) and **Cosmos 1809 (60 orbit)** in the period, 1979-1981 and 1987-1988 respectively (**TOPSIDE SOUNDER**), the **E**lectronic **T**otal **C**ontent (**TEC**), using the registration of the Faraday angle rotation of a lineally polarized signal that has been emitted by a geostationary satellite of the series **ATS** and **GOES** (1975-1989).
All this has originated an extensive quantity of publications; some of the most significant will be pointed out in an independent epigraph.
Also, they have been sent to the **WDC** monthly daily data of the ionospheric parameters made in the **CHARS (IIWG**) format.

2.0 - Equipment and Data.

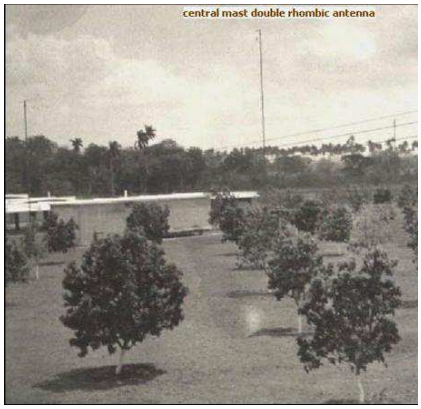
2.1- The ionosonde AIS and their technical characteristic.

The ionosonde **AIS** is an automatic station with technology to vacuum valve base, made in the former URSS, and designed for the vertical sounding of ionosphere. Their main technical characteristics are:
Lineal sweeping of frequency, two sub-bands, 1-10 and 1-18 MHz, with separate marks of frequency each a MHz, duration of the sounding pulse: adjustable between 50 and 70 μ-seconds (for Cuba it was selected 60 μ-seconds), - Period of repetition of synchronization pulses and transmission: T=16, 66 mili-second, Marks of height, every 50 Km, divided in three ranges: 0-250, 0-750 and 0-1500 Km;
- Minimum power in the impulse, no less to 2,5 Kw in the high frequencies. The ionogram recording was made in 35 mm film, photographing the image of them that appear in the screen of the cathode ray tube of the ionosonde.



Ionogram photographed in the cathodic ray tube of AIS in San José de las Lajas, Sept 25 1976, 10:00,

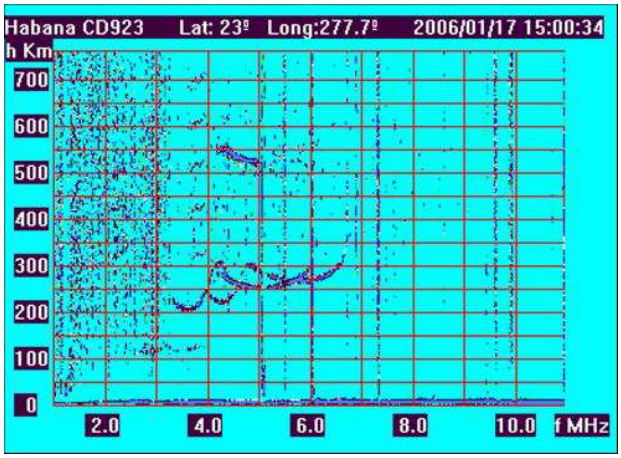
The ionosonde, **AIS** uses the same antenna to transmit and to receive. In their first location double rhombic antennas were used in a mast of 26 m of height, covering two ranges of frequency, 1-6 MHz Big Rhombus and 6,1 - 18 MHz small Rhombus.



The double rhombic antennas see in the San José's town, 1964-1985.

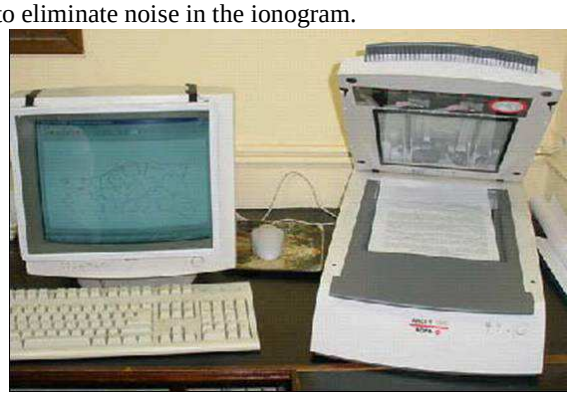
The antenna used in the second location of the **AIS** consisted on an antenna delta with mast of 14 m of height and a base of 50 m between its ends. The base and lateral sides of the antenna delta are made of three copper wire spaced to each other, conforming an equilateral triangle of 10 cm of side.
From August 1964 until July 2003 the ionogram were recording in 35 mm film, while the scaling of ionogram and compilation of the data was made by the traditional method of the URSI.

In August 2003 the photographic recording system of ionogram was replaced by a digital recording system of ionogram. ***INAG Bulletin No. 66, 2006***.
The digital ionogram were scaled according to the URSI methodology, by means of a system developed for the Institute of Geophysics and Astronomy, called **IONOVISOR**, which allows from an interactive way to the specialized personnel, to determine the values of 13 ionospheric parameters, such as: fmin, foE, foF1, foF2, fxI, foES, fbES, h"E, h"F, h"F2, h"Es, M(3000)F2 and type Es.



Digital Ionogram registered by ionosonde AIS and viewer by IONOVISOR system in HABANA station4

The IONOVISOR system, keeps the scaled parameters in an automatic way in files with daily table URSI format also keeping them in a database in CHARS format of the IIWG. The system also allows to make the necessary input format to calculate the Profile of electronic density, Profile N(h), by means of the program **NH-PC**. The IONOVISOR has incorporated a system to eliminate noise in the ionogram.

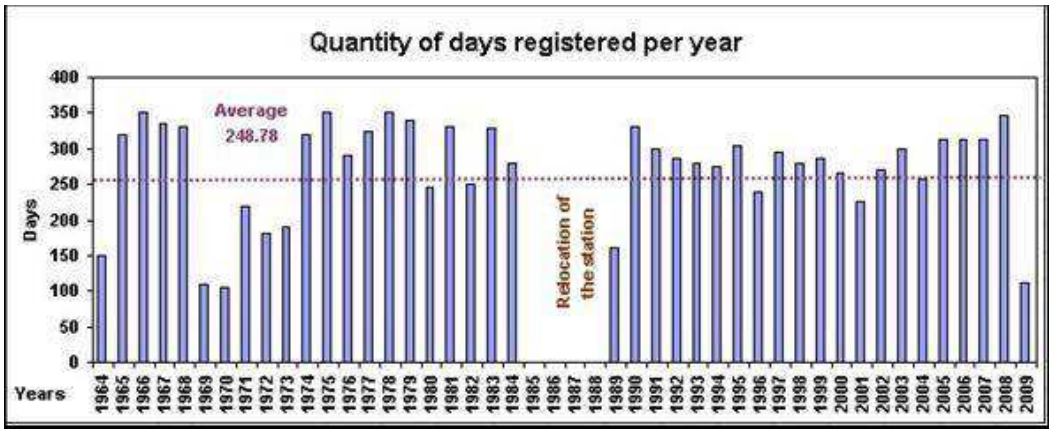


To preserve the ionogram supported in 35mm film, we proceeded to transform into images the ionogram by means of a Scanner ARGUS1200 from AGFA. However, the used Scanner is not the most suitable for this work, because the ionogram cannot become to image in a serial way, being necessary to split the film tape that contains them according the scanner dimensions.

Until now, the number of ionograms converted to digital image per years is not appreciable, due to the artisanal work that this means. However, this activity is among the most important that we should continue carrying out for the next years. With regard to the monthly table of daily parameters of ionosphere made in paper, the same ones are publishing in digital format CHARS (IIWG) by means of an appropriate edition program. Being published until the moment the following years:

1964, 1965, 1968, 1969, 1972, 1973, 1974, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 12001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and, 2009.

The total of ionogram registered in these 45 years and their average is shown in the following graph.



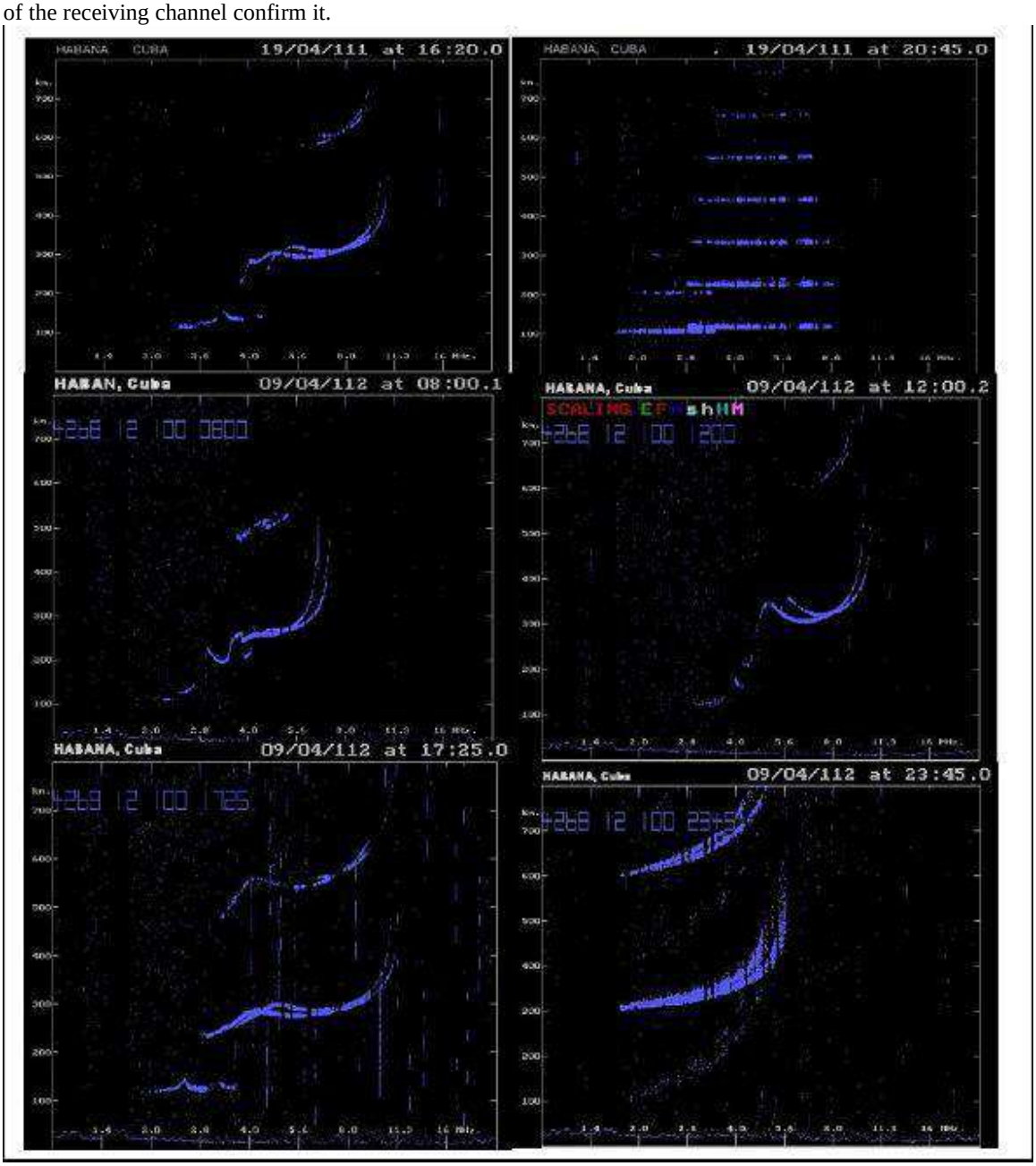
2.2. - The ionosonde IPS-42

The ionosonde IPS-42 is broadly well-known for the scientific community that is in charge of the ionosphere's research.

To put operational the ionosonde IPS42 two delta antennas were built, similar to those designed for the Australian ionosonde IPS-71, also, the block to register and to process the ionograms, DBD43, it was substituted by the system of digital registration of ionogram "**DIGION**". This system was developed by the technical orientation of the Dr. J.E. Thitheridgeen of the Department of Physics, University Auncklan in New Zealand. Thitherige J.E. INAG 60.

The ionosonde IPS42 located to a side of the ionosonde AIS in the Ionospheric Station HABANA

The technical conditions of the ionosonde are excellent and the recording ionogram after some adjustments of the receiving channel confirm it.



Recording Ionograms in the HABANA station, April/19/2011 and April/09/2012

At the present time we are using to ionogram scale the program Digion.exe, which allows scaling the following parameters, fmin, foE, foF2, fEs, h"E, h"F2, M(3000)F2.

Later on it will be necessary to develop a new system to scale ionogram with more possibilities that it allows, among others:

- To scale all parameters of height vs. frequency of the ionogram, storing them automatically in a Database existing in the IGA of ionograms and ionospheric parameters with a CHARTS format
- To calculate the Profile N(h), of the ionogram and to store it in their corresponding database, according to the established international formats.

Also, it presents great interest for the scientific community, to put on-line in the WEB, for operative use of the radio-communication systems, the ionogram and some fundamentals ionospheric parameters

3.0 - PUBLICATIONS AND RESULTS.

3.1 - Doctoral and master thesis

- Palacio Suárez Lourdes B. (1985): Investigation of the Sporadic Layer in the Region of Cuba and their Paper in the Propagation of the Radio Waves [in Russian] Doctoral Thesis, IZMIRAN, Moscow, 138 pp
- Lois Menéndez Luis. (1985): Variability of the ionosphere over Cuba [in Russian]. Doctoral Thesis, IZMIRAN, Moscow, 238 pp. Summary of Doctoral the Thesis, Spanish Translation, 10 pp;
- Lazo Olazábal Bienbenido (1986): Effects of the Solar Activity in the low latitudes ionosphere in the region of Cuba [in Russian] Doctoral Thesis, IZMIRAN, Moscow, 155 pp
- Calzadilla Mendez Alexander (2005):
- Siomel Savio Odriozola. (2008): Variabilidad de perfiles de concentración electrónica a alturas fijas sobre La Habana (in Spanish) Master Thesis, La Habana, xxxpp. (Variability of electronic profiles concentration at fixed heights over Havana city.)

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4.0 -Some perspectives about the ionospheric vertical sounding in Cuba.

The operation of a new ionosonde in HABANA ionospheric station allows giving continuity to the ionospheric monitoring in the region of Cuba, opening new perspectives.
During the past 45 years the monitoring of the ionosphere in Cuba has been carried out in the western region of the Island. Just only in the summer of 1983 were carried out mensuration with ionosonde AIS in a town locate about 500 Km to the east of country, in the coordinates; 21.8º N, latitude and 281.2 longitude, near to Ciego de Avila city. These measurements had as objective to make studies of the sporadic E layers, (Es layer), in the half point of High-frequency radio-communication circuit, between the cities of Santiago de Cuba and Havana.
Cuba is an island lengthened in longitude on the Caribbean Sea and projected toward the oriental Atlantic, for such a reason to locate an ionosonde in the Oriental region of the country will allow enlarging the temporary-space resolution of the ionosphere in our region in approximately 1000 Km.
Another important aspect is that the current database of ionogram and ionospheric parameters should be strengthened, contributing this way to improve the information of a region that don't have continuous measurements of ionosphere.
The previous considerations are based on the possibility to locate another ionosonde in the oriental region of the country in near future, what will depend on our capacity to guarantee appropriated infrastructure for a new ionosonde IPS-42.

5.0- Acknowledgements.

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- CITMA*- Ministry of Sciences Technology and Environment.

- Agencia de Medio Ambiente*- Environment Agency.

2. Partial list of meetings for 2012/2013

XXXXXXXXXXXXXXXXXXXXXXX
We have constructed a simple web site containing information about events of interest (Conferences, Schools, Workshops, etc) for the ALAGE community. The site address is:
http://www.iafe.uba.ar/u/alageargentina/meetings/
We hope it can be useful for all members of ALAGE.

Best Regards.
Sergio Dasso.
XXXXXXXXXXXXXXXXXXXXXXX

ALAGE

Asociación Latinoamericana de Geofísica Espacial

Sites with meeting calendars

AGU GeoPhysical year — Searchable database of scientific meetings

Meeting Calendar (Space physics, UCLA)

Meeting Calendar COSIS

Meeting Calendar SCOSTEP

Meeting Calendar AGU

Conferences, Workshops and Schools (2012)

Workshop sobre Space Weather, 12-14 March, Aichi, Japan.

13th International Symposium on Equatorial Aeronomy, 12-17 March, Paracas, Peru.

11th Annual International Astrophysics Conference Space Weather: The Space Radiation Environment, 19-23 March, Huntsville, USA.

European Geosciences Union General Assembly 2012 (EGU), 22-27 Abril, Vienna, Austria.

Solar Origins of Space Weather and Space Climate: Connecting the Interior to the Corona, 30 April-4 May, Sunspot, New Mexico, USA.

Extreme Space Weather Events Workshop, 14-17 May, NCAR Foothills Laboratory, Boulder, Colorado, USA.

International Conference on Radiation Belts and Space Weather, New Horizon from RBSP (Radiation Belt Storm Probes) Mission, May 29-June 1, Daejeon, Korea.

Heliophysics Summer School 2012, 31 May-7 June, Boulder, USA.

Dust, Atmosphere and Plasma environment of the Moon and Small Bodies (DAP-2012) workshop, 6-8 June, Boulder, Colorado, USA.

AAS/SPD meeting, 10-14 June, Anchorage, Alaska.

Summer School on Atmospheric Modeling (SSAM-2012), 16-20, July, Princeton, NJ, USA.

Geospace Environment Modeling (GEM) summer Workshop, 17-22 June, Snowmass, Colorado, USA.

Solar Wind 13 Conference, 18-22 June, Hawai, USA.

International Summer School Solar Astrophysics: Modern trends and techniques, 3-19 Jul, Bogota, Colombia.

Solar Heliospheric and INterplanetary Environment 2012 (SHINE 2012), 25-29 Jun, Maui, Hawaii.

39a Asamblea de COSPAR, 14-22 July, Mysore, India.

XIV escuela de invierno J. J. Giambiagi, Applied and Environmental Geophysics, 16-20 Jul, Buenos Aires, Argentina.

International Astronomical Union (IAU), XXVIII Asamblea general, 20-31 Aug, Beijing, China.

First Solar and Space Weather Network of Excellence summer school and workshop, SOLSPANET 1, 27 Aug-21 Sep, Tbilisi, Georgia.

IAU Symposium 293: Formation, Detection, and Characterization of Extrasolar Habitable Planets, 27-31 Aug, Beijing, China.

Astrophysical and Space Plasmas, 2-8 Sep, L'Aquila, Italy.

IV Simposio Brasileiro de GeoFisica Espacial e Aeronomia, SBGEA-2012, 10-14 Sep, Sao Paulo, Brazil.

7th Workshop on long-term changes and trend in the Atmosphere, 11-14 Sep, Buenos Aires, Argentina.

97a Reunión Nacional de Física, 25-28 Sep, Villa Carlos Paz, Córdoba, Argentina.

55a Reunión Nacional de Astronomía, 17-21 Sep, Mar del Plata, Argentina.

Joint Cluster -THEMIS meeting, 1-5 Oct, Colorado, USA. Contact Matt Taylor

College on Plasma Physics, 1-12 Oct, Trieste, Italy.

The Third Moscow Solar System Symposium, 8-12 Oct, Moscow, Russia.

Ecuador Workshop on the International Space Weather Initiative, 8-12 Oct, Quito, Ecuador.

High Energy Particle Precipitation in the Atmosphere SOLAR Influences for SPARC (Stratospheric Processes and their Role in Climate), 9-12 Oct, Boulder, Colorado, USA.

COSPAR (Committee On SPAce Research) Capacity Building Workshop on the analysis of Herschel and Spitzer data, 15-26 Oct, Buenos Aires, Argentina.

Reunión anual Unión Geofisica Mexicana, 28 Oct - 2 Nov, Puerto Vallarta, Mexico.

Encuentro ICES 8, 30 Oct - 2 Nov, Mar del Plata, Argentina.

XII Reunión sobre Recientes Avances en Física de Fluidos y sus Aplicaciones, 5-7 Nov, Buenos Aires, Argentina.

26a Reunión Científica de Geofísica y Geodesia y Taller Internacional de Geomática en Ciencias de la Tierra, 5-9 Nov, San Miguel de Tucumán, Argentina.

International Symposium on Solar-Terrestrial Physics, 6-9 Nov, Pune, India.

AGU Chapman Conference "Hemispheric and Longitude Dependence of Space Weather" 12-16 Nov, Addis Ababa, Ethiopia.

2012 Fall Meeting of American GeoPhysical Union (AGU), 3-7 Dec, San Francisco, USA.

Next year (2013)

Fifth Conference Earth-Sun Systems Exploration, 13-19 Jan, Kona, Hawaii.

Chapman Conference on Fundamental Properties and Processes of Magnetotails, 10-15 March, Reykjavik, Iceland

Enviado por Dr. Sergio Dasso

3. Agradecimentos

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Reforço aqui também, a todos os colegas que tenham notícias de interesse para a divulgação nos próximos Boletins da ALAGE, que me enviem diretamente, ou o façam chegar através de seus representantes regionais. Comentários e sugestões serão bem-vindos.

O Boletim da ALAGE é publicado na página da Web da Associação e difundido a seus membros através de seus representantes nacionais:

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