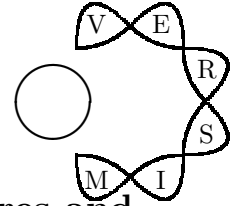


IAGA/URSI  
Joint Working Group on



## VLF/ELF Remote Sensing of Ionospheres and Magnetospheres

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Editor: A J Smith

Newsletter

No. 17 — May 2003

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Dear colleagues,

The 23th General Assembly of IUGG (International Union of Geodesy and Geophysics) will be held next month in Sapporo, Japan. This will include a meeting of IAGA (International Association of Geomagnetism and Aeronomy), which is one of the Union's seven constituent scientific associations and also one of our working group's two parent bodies. I hope that many of the VERSIM community will be able to attend the assembly, and take the opportunity to meet and discuss matters of common scientific and technical interest in the VERSIM field. We plan to hold a meeting of the working group at Sapporo, where we will review recent VERSIM activities and consider what role the working group is or should be playing in the future. This issue of the *VERSIM Newsletter* contains information about the general assembly and other forthcoming meetings, together with other VERSIM news. I will look forward to seeing many of you in Sapporo.

### IUGG, Sapporo, 2003

The 23rd General Assembly of the International Union of Geodesy and Geophysics, which encompasses IAGA, will be held in Sapporo, Japan, 30 June – 11 July 2003. The scientific programme and information on how to register for the assembly may be found on the Web site: <http://www.jamstec.go.jp/jamstec-e/iugg/>, or contact the organising committee at email: [iugg\\_service@jamstec.go.jp](mailto:iugg_service@jamstec.go.jp) or fax: +81 468-

67-9315. There will be several sessions of interest to VERSIM, but particularly:

### How can we use Waves as Diagnostic Probes for Space Weather Studies?

This session, GA 3.10, convened by K. Yomoto, F. Menk and A.J. Smith, will focus on “the use of ULF, ELF and VLF waves as diagnostic probe of the solar wind-magnetosphere-ionosphere coupled system for a space weather study. These waves convey information about the dynamics and morphology of the magnetosphere and its coupling to the solar wind and ionosphere. Papers obtained by new and established coordinated ground and space-based observations for a space weather study are strongly encouraged.”

### VERSIM Business meeting

There will be a meeting of the VERSIM working group during the Sapporo Assembly, at **1900 on Monday 7 July 2003** in Pearl Hall A of the Royton Hotel.

The draft agenda is: 1. Chairman's Report; 2. Future of the working group; 3. Reports from VERSIM research groups; 4. Symposia at future IAGA and URSI Assemblies; 5. Election of the next IAGA co-chairman of VERSIM; 5. Any other business. If you have any specific issues you would like to discuss, please let one of the co-chairmen know (see below for addresses, etc.). **All are welcome!**

As indicated at the Hanoi meeting, I (Andy Smith) will be stepping down as IAGA co-chairman of VERSIM, having served in this capacity since 1981, hence item 5 on the above agenda. If you wish to nominate yourself or someone else to take over this role, please let me know.

## IAGA, Toulouse, 2005

Plans have been made for the 10th IAGA Scientific Assembly in 2005. It will be held in Toulouse, France from 18 to 29 July 2005. The venue will be the Centre de Congrès Pierre Baudis, a modern and very well equipped conference centre. The International Commission on the Middle Atmosphere (ICMA) will join IAGA for this Assembly. (ICMA is a Commission of the International Association of Meteorology and the Atmosphere (IAMAS).)

## URSI, New Delhi, 2005

The 28th URSI General Assembly will be held in New Delhi, India, from 23 to 29 October 2005.

## URSI, 2002

The 27th URSI General Assembly was held in Maastricht, the Netherlands, 17-24 August 2002. This was a very good meeting, and there were several sessions containing contributions of interest to VERSIM, e.g. *Terrestrial electromagnetic EM phenomena, Plasmaspheric structure and phenomena, Spacecraft and ground observations of stimulated and natural space-plasma waves, Lightning effects in the ionosphere and the radiation belts.*

## VERSIM Business meeting

There was a meeting of the VERSIM working group during the Maastricht Assembly, at 1800 on Monday 19 August 2002. Present: AJ Smith (UK) in the chair, D Carpenter (USA), M Clilverd (UK), A Collier (South Africa), Y Hobara (France), J Manninen (Finland), A Nickolaenko (Ukraine), D Nunn (UK),

A Oikarinen (Finland), M Parrot (France), T Raita (Finland), S Shimakura (Japan), O Soloviev (Russia), NR Thomson (New Zealand), T Ushio (Japan).

## Chairman's Report

Andy Smith (the IAGA co-chairman), on behalf of the working group, congratulated Don Carpenter of Stanford University, the first chairman of the working group, on being awarded the Dellinger Gold Medal the previous day. He then summarised the activities of the working group since the previous URSI General Assembly in 1999, held at Toronto.

## Future of the working group

It was unanimously agreed to recommend that the working group continue in existence for the next triennium (2002-2005), and that Michel Parrot continue as URSI co-chairman.

## Reports from VERSIM research groups

**France.** Michel Parrot reported that LPCE is involved in three projects of microsatellite in order to study the Earth's environment:

DEMETER is devoted to the study of ionospheric perturbations in relation to seismic activity and anthropogenic activity. The launch is expected in March 2004 and the duration of the mission will be two years. It is a low-altitude (750 km) and polar micro-satellite with a payload composed of experiments to measure wave and plasma parameters. Cooperation with ground-based experiments will be done and scientists are encouraged to propose coordinated active experiments.

PROBA 2 is an ESA micro-satellite. LPCE will provide the MWF (Magnetic Wave Field) experiment. The objectives of the MWF instruments are : (i) to characterise the waves associated with the accelerated and/or precipitated electrons, (ii) to look for electromagnetic signatures of the radiation effects, (iii) to test equipment to be launched on recurrent satellites in order to create the statistical data bases needed to elaborate a wave model to be entered into physical radiation belt models. If for the first two objectives

one may consider that MWF provides environmental data for the radiation instruments, the third objective is a proper one. The elaboration of physical radiation models is one of the primary goals for a Space Weather programme. Indeed, operational radiation belt models are presently missing both: for testing the electronic components before the launch, and for predicting the flux of electrons which may impact a spacecraft. A wave model is a key element in a radiation belt model. Data bases will be constructed from each type of emission which might be involved in the acceleration and/or precipitation of energetic electrons (VLF ground-based transmitters, chorus, hiss, magnetosonic waves, ion cyclotron waves). They will contain the power spectral density of the observed magnetic wave fields in the frequency range 1 Hz to 25 kHz and propagation characteristics (propagation mode, degree of polarisation, wave normal direction) at 256 different frequencies.

TARANIS is a CNES micro-satellite with a platform identical to DEMETER. The TARANIS (Tool for the Analysis of RADIations from lightNINGs and Sprites) project will be devoted to the study of atmosphere-ionosphere-magnetosphere coupling during thunderstorm activity. The study will be done for local and global scales in order to understand the physical mechanisms responsible for the impulsive transfer of energy between the neutral atmosphere and the ionospheric and magnetospheric plasmas. The final goal is to determine the impact of these processes on the Earth's environment. LPCE will provide the wave experiment

**USA.** Don Carpenter said that some interesting new results (to be reported elsewhere at the conference) were coming out of the RPI experiment on IMAGE, including discrete spectrogram traces corresponding to field line guiding and spread echoes from the plasmopause indicating density structures near the surface. 125ms transmissions were ongoing in a collaboration with Craig Rodger. During the December 2001 campaign aimed at looking for whistler mode propagation to the ground, using 375ms pulses at VLF frequencies 5–15 kHz, no signals had been reported to be observed, though they had been received on CLUSTER. Andy Smith commented that the records from Halley made during the campaign had been

scanned for the IMAGE transmissions, but that the satellite was not in an ideal location because the VLF transmissions were replaced by higher frequency transmissions intended for South Pole before the satellite approached Halley near perigee. Don responded that there may be another similar campaign organised, modified to address this problem. He also commented that since IMAGE had received a 2 year extension, it should overlap with DEMETER.

**Ukraine.** Sasha Nickolaenko commented that it was the 50th anniversary of the discovery of Schumann resonances, and that a session was to be held later in the week on this theme.

**Finland.** Jyrki Manninen introduced the LAPBIAT scheme (Lapland Atmosphere-Biosphere Facility). Funds are available to support scientific research and collaboration in Lapland. Full details are on the Sodankylä Geophysical Observatory website.

Jyrki also reported on a plan to hold a specialised meeting on ELF/VLF phenomena in Finland in September 2004. The venue would be Sodankylä Geophysical Observatory. URSI sponsorship (non-financial) would be sought via the Commission H Business meeting later in the week.

**UK.** Andy Smith summarised the current VLF/ELF observations being made by British Antarctic Survey, at Halley and Rothera stations. The trimp experiment at Halley was turned off at the end of 2001 but the other recordings were continuing. Future plans included the decommissioning of the Automatic Geophysical Observatories between Halley and South Pole, and completion of the new global network, VELOXnet, to cover all local times at every UT. A dedicated narrowband receiver at Halley was ready to receive transmissions from the South Pole VLF beacon at about 20 kHz. The beacon is due to be operating in late 2002/ early 2003.

#### **Symposia at future IAGA and URSI Assemblies.**

#### **IAGA, Sapporo, 30 June - 11 July 2003**

The session GAIII.10 Waves as diagnostic probes for space weather studies will include ULF, ELF and VLF observations and theory,

and both space-based and ground-based studies. It will thus cover many of the interests of the VERSIM group. The conveners are K Yumoto, A J Smith and F Menk.

### **URSI, New Delhi, October 2005**

It was proposed from the floor that there should be a session on “ULF, ELF, and VLF impacts on the radiation belts” with possible conveners Rodger (New Zealand), Heynderickx (Belgium) and Fraser (Australia). This was endorsed by the meeting and would be presented to the G/H Business meeting later in the week. [Note added later: It was approved as a G/H session for 2005 with the addition of Horne (UK) as another convener.]

## **VERSIM Electronic Mailing List**

The VERSIM electronic mailing list is available for use by the VERSIM Community. It has recently been used for disseminating information about the Japanese Polar Patrol Balloon programme. Details (including how to subscribe and unsubscribe) and posting guidelines, are available on the VERSIM website at: <http://www.nerc-bas.ac.uk/public/uasd/versim/vrsmeml.html>. Please send any information of interest to other members of the working group, directly to the electronic mailing list at [versim@mail.nerc-bas.ac.uk](mailto:versim@mail.nerc-bas.ac.uk). It will be relayed to everyone who is subscribed to the list. Send any comments to [owner-versim@mail.nerc-bas.ac.uk](mailto:owner-versim@mail.nerc-bas.ac.uk).

## **The role of the VERSIM Working Group**

The working group serves as a forum for workers studying the behaviour of the magnetosphere and ionosphere by means of ELF and VLF radio waves, both naturally and artificially generated. Originally the emphasis was on probing of the magnetosphere by whistlers, but later the scope became somewhat broader. The group aims to promote research in this field by facilitating the exchange of ideas, information and experience between active research workers and other in-

terested scientists. This is done through regular meetings at IAGA and URSI Assemblies, and via the circulation of a newsletter. The group has also been active in sponsoring scientific symposia at IAGA and URSI Assemblies, in areas relevant to its field of interest, and in coordinating observational campaigns. There are currently ~96 scientists from 22 different countries (Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Finland, France, Germany, Hungary, Israel, Japan, Netherlands, New Zealand, Norway, Russia, Serbia, South Africa, Ukraine, UK and USA) on the VERSIM mailing list.

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