

Dear colleague,

You might have wondered whether this working group had ceased to exist. It has not and we apologise for the lack of newsletters since the Vancouver IUGG assembly.

The aim of our working group is to provide a forum for workers in the field of 'passive em probing of the magnetosphere' to exchange information, ideas, and experience; this is achieved through regular meetings during IAGA and URSI scientific assemblies, and via the newsletter.

The group's activities in the past have included co-ordinating observational campaigns and organising scientific symposia. Since we do not wish to overlap subjects which have their own specific working groups, such as ULF phenomena and waves in plasmas, the emphasis historically has been mainly on VLF and whistler probing, which has been and continues to be an important technique, chiefly because of its convenience and its ability to view a significant volume of the magnetosphere. The traditional emphasis on natural whistler mode waves has changed somewhat recently, and some of those in our community who observe ELF and VLF waves for ionospheric and magnetospheric research have been making increasing use of narrow band signals broadcast from VLF transmitters — which arrive at the receiver after either whistler-mode or subionospheric propagation. An example is the use of the so-called "trimp" effect to investigate wave induced burst electron precipitation. We have considered whether we should propose to change the name of the working group to reflect this change, but it is probably less confusing not to do so. After all, the use of transmissions not under the control of the observer is effectively a passive technique. If you have any views on this or any other issues connected with the interests of the working group, please let us know.

Last meeting of the working group. This was held on 18 August 1987 during the 19th IUGG general Assembly in Vancouver. Eight scientists attended. It was intended to circulate a report of the meeting soon afterwards but by an oversight this was omitted. The report is appended to this newsletter; we are sorry that its contents will now be somewhat out of date.

IAGA 6th Scientific Assembly, Exeter, UK.

This Assembly will be held from 24 July to 4 August 1989. We hope many of you will be able to come. Further information can be obtained from the secretary of the local organising committee: Dr R. Jady, Secretary LOC IAGA 1989, Department of Mathematics, University of Exeter, Exeter EX4 4QE, United Kingdom. Telephone (0)392 263989; Fax (0)392 263108; Telex 42894 EXUNIV G; Electronic mail JADY.RJ@UK.AC.EX.PC.

During the Assembly, a meeting of the working group will be held. This will be on the evening of Tuesday 1 August, the time and venue to be announced later. All are welcome.

A proposed agenda is as follows:

- Report on last meeting (Vancouver 1987), and activities since.
- Reports from representatives of research groups
- Proposals for symposia for the next IAGA (1991)
- Future international programmes and the role of the working group.
- Any other business.

If you wish to propose any other agenda items for the meeting, or if you are unable to attend and have any contributions or comments, please send them to one of us before the meeting.

WIPP (Wave induced particle precipitation)

A meeting on this subject was recently held in Dunedin, attended by 37 scientists from 11 countries. The 49 papers presented thoroughly discussed the present state of this subject and identified unsolved problems.

Of particular interest to our working group was the increasing use of remote sensing of burst electron precipitation, particularly LEP (lightning electron precipitation) caused by whistlers, using broadcast signals from VLF transmitters. Specialised networks of receivers have been or are being set up for this purpose. For example networks of OPAL (Omega phase and amplitude logger) receivers, which detect the WIPP related phase and amplitude perturbations (trimp events) on signals from the Omega navigation system, have been established in New Zealand and Antarctica, and other networks are deployed in USA, Canada, and Brazil. We hope that this working group will be able to facilitate exchange of information about such experiments, both through the newsletter and meetings such as the one scheduled at Exeter.

There are a number of important new programmes in solar terrestrial science being planned or proposed for the next decade. No doubt many members of the working group will be involved in these.

ISTP (International Solar Terrestrial Physics programme) is a major international programme which aims to study the solar wind, interplanetary medium, magnetosphere, ionosphere and atmosphere as a complex linked system, focussing on the interactions between the different parts of the system and the flow of energy and plasma through it. It will comprise major spacecraft missions such as GGS (Global Geospace Study) and CLUSTER, together with ground based experiments and modelling/theory.

New VLF transmitter in Antarctica.

The highly successful experimental VLF transmitter at Siple station, Antarctica, has now ceased operating due to the deterioration of the station buildings. Discussions are under way on the possibility of deploying a new transmitter as an internationally supported facility, and a workshop on this subject is being held in Stanford this month.

The ACTIVE mission

This mission by the USSR will study plasma waves and interactions by putting into orbit a VLF transmitter (9.6 kHz, 5–500 W radiated power), the first time that a VLF transmitter of such power has operated in space. There is an international cooperation, involving a subsatellite and coordinated ground based observations.

AGOs (Automatic Geophysical Observatories)

Several nations working in our field in Antarctica are considering the feasibility of operating automatic stations for the purpose of obtaining observations from remote locations in Antarctica, where there is no possibility of establishing a manned observatory. Internationally, progress in this area is being coordinated by a working group of SCAR (Scientific Committee for Antarctic Research). Data from appropriate instruments mounted on AGOs will be available to address a number of scientific questions related to the high latitude region (polar cap, cusp, auroral zone) which are of interest to members of the working group, although of course the conventional studies of whistler propagation and wave particle interactions on closed field lines are less relevant to these high latitude regions.

Mailing list

Currently on the mailing list we have 56 scientists from 19 countries. We would like to update the list, and if you wish to continue on the mailing list we would be grateful if you would fill in and return the attached questionnaire.

If you have any news which could be included in the next issue of this newsletter, proposals for scientific symposia, suggestions for topics of discussion at the working group meeting at Exeter, or any other relevant comments, please send them to one of us.

Hope to see you in Exeter.

With very best wishes.

A.J.Smith
(IAGA Co-chairman of the JWG)

U.S. Inan
(URSI Co-chairman of the JWG)

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Questionnaire:

Return to: Dr A.J. Smith, British Antarctic Survey, c/o Dept of Physics, Sheffield University, Sheffield S3 7RH, UK.

Name:
Address:
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.....
Telephone:
Fax:
Telex:
Electronic mail:.....
.....

I wish to remain on the mailing list: YES/ NO
I will attend the IAGA Assembly at Exeter: YES/ NO/ POSSIBLY
I will attend the working group meeting: YES/ NO/ POSSIBLY

If any of your colleagues would like to be on the mailing list, please ask them to return a copy of this form.

Meeting of:

IAGA/URSI Joint working group on passive electromagnetic probing of the magnetosphere.

This was held at Vancouver on Tuesday 18 August 1987 at 1930.

Present: A.J. Smith (BAS, UK), chairman, Z.T. Bao (Wuhan University, China), D.L. Carpenter (Stanford University, USA), K. Hayashi (Tokyo University, Japan), N.M Paes Leme (INPE, Brazil), J.P.S. Rash (Natal University, South Africa), L. Rizzo Piazza (INPE, Brazil), M.J. Rycroft (BAS, UK)

The chairman reported on the last meeting which had been held in 1985 at the Prague IAGA assembly. This had been well attended, especially by colleagues from USSR and eastern Europe. Two symposia, on Wave Induced Particle Precipitation and on Longitudinal Variations in VLF Wave Activity had been proposed for the Vancouver Assembly, but had not in the end been included in the programme because of shortage of available time.

The chairman reported on activities of the working group since the last meeting, which had consisted of the circulation of newsletters and the coordination of an international earth-ionosphere waveguide probing campaign in 1986 in Antarctica using the Siple VLF transmitter.

Reports on activities of individual research groups.

A.J. Smith described the recent and current BAS programmes in Antarctic, in relation to the interests of the working group. Broadband VLF recordings were made routinely at Halley and Faraday stations in Antarctica. Narrow band receivers were also in use for studies of burst precipitation using the trimpi effect. The VLF Doppler experiment at Faraday routinely received whistler mode signals from the NAA and NSS VLF transmitters in the conjugate region, and the data were being used to study electric fields and field aligned plasma fluxes in the inner plasmasphere.

D.L. Carpenter reported on the Stanford programme. The transmitter had operated at Siple during the 1986 winter but after that, operation was only in the austral summer, in order to prolong the life of the station. Crossed dipole transmitting antennas were being used to vary the polarisation of the transmitted signal. Waveguide probing experiments had been carried out and were planned to continue over the next few years. During 1986, transmissions had been successfully made on whistler paths outside the plasmasphere. A collaborative transmitter experiment was being planned for the coming December-January and details would be circulated to those interested in participating. A future aim of the transmitter programme was to try to stimulate emissions on such paths. Another future experiment was the investigation of the location and character of lightning which caused whistlers associated with electron precipitation. Also, in collaboration with Utah State University, conjugate measurements of natural wave activity were combined with HF radar observations of the ionosphere.

L.R. Piazza reported that she had deployed VLF propagation experiments in Antarctica every year since 1983, and was now involved in a new collaborative experiment with Stanford and with BAS/Sheffield University. This would involve equipment to look for trimpi events, which would be run in Brazil for a year and then moved to the Brazilian Antarctic station on King George Island (Ferraz). In the next 3 years an automatic observatory containing magnetometers, cosmic rays detectors etc. was to be developed, tested at Ferraz and then moved further south to near 70°S, 0–10°E.

Z.T. Bao described whistler observations at low latitude stations in southern China. The stations were spaced in longitude by up to 10 degrees and were being used in conjunction with ray tracing to study longitudinal variations in low latitude whistler propagation. A direction-finding system was being developed and a network would be deployed next year. Whistler measurements were also being made (by a different group) at the Chinese Antarctic station of Great Wall.

J.P.S. Rash reported that his group were now operating a Sheffield type VLF goniometer receiver at Sanae station. It had recently been found, using this, that whistlers arrived at Sanae more often from the west than the east. A field version of the goniometer had been developed and used in a campaign in Northern Norway. Rash also mentioned his involvement in a SCAR study of longitudinal variations in whistler and chorus activity near $L = 4$, using data from Siple, Halley, Sanae, and Kerguelen.

Hayashi described his group's VLF observations in Canada and Europe. A new auroral zone experiment had been carried out more recently involving VLF and auroral TV observations at College, Saskatoon, and Ny Alesund.

Future of the working group. Those present expressed the view that the working group fulfilled a valuable role and should continue in existence. Important new international programmes in solar terrestrial physics were being planned for the next decade, and the working group would have a role to play in coordinating certain kinds of observations, especially (as in the past) VLF observations made on the ground. For example the International Solar Terrestrial Physics programme (ISTP) would involve multi-satellite missions from USA, Europe and Japan, and would also probably involve new kinds of techniques on the ground at high latitudes, such as the deployment of Automatic Geophysical Observatories.