International Council of Scientific Unions

SCIENTIFIC COMMITTEE
ON
SOLAR-TERRESTRIAL PHYSICS

79 - 1

President: Prof. K. D. Cole *Vice-President:* Dr. J. W. King *Secretary:* Dr. E. R. Dyer

INTERNATIONAL MAGNETOSPHERIC STUDY
J. G. Roederer, Chairman, IMS Steering Committee
JOE H. ALLEN, HEAD, IMS CENTRAL INFORMATION EXCHANGE OFFICE
TOYOHISA KAMEI, KYOTO UNIVERSITY, IMSCIE ASSOCIATE
MAURIZIO CANDIDI, EUROPEAN SPACE AGENCY, IMSCIE ASSOCIATE
PETER DAVIES, IONOSPHERIC PREDICTION SERVICE, SYDNEY, IMSCIE ASSOCIATE
WORLD DATA CENTER-A FOR STP, D64, NOAA, BOULDER, COLORADO, 80303, USA

IMS NEWSLETTER

Best wishes for the New Year to our readers from the IMSCIE Office staff. We thank you for excellent cooperation in channeling information to us. On pg 6 of this NL we began a report on the recent CDAW but were forced to continue half to next month or else throw out other timely items. Other Newsletters should be included with this IMS NL and they carry explanations. We look forward to a successful concluding year to the observational phase of IMS.

Joe Allen Peter Davies M Candidi

IMSCIE Office: Telex 45897 SOLTERWARN BDR
Telephone: 303-499-1000 x6501 (FTS 323-6501)
IMS Satellite Situation Center (J. Vette): Telex 89675 NASCOM GBLT
Telephone: 301-982-2354
European Information (P. Simon): Telex 200590 CNET OBS B MEUDO
Telephone: 027-75-30 et 75-70
USSR Coordination/Information Office (I. Zhulin): Telex 7523 SOLTER SU

PROGRAM PLANS FOR JANUARY 1979 - MARCH 1979

SPECIAL IMS HIGH-ALTITUDE SATELLITE PERIODS - 1979

Special IMS High-Altitude Satellite Intervals for Jan - Mar 1979 are given below. Page 4 of NL 78-8 has a detailed listing of all the SSC - selected Special Satellite intervals for July - December 1978 and the satellite configurations that were the basis for selection of these periods. As was done for such earlier intervals, start and end times were extended from the model calculations to allow for boundary fluctuations during disturbances. Details for the first half of 1978 were published in NL 78-2, pg 4.

#1	8 Jan	8/0300 UT	to	11 Jan	11/0200 UT
#2	27 Jan	27/2200 UT	to	30 Jan	30/0200 UT
#3	25 Feb	56/0100 UT	to	26 Feb	57/1200 UT

SPECIAL LOW-ALTITUDE SATELLITE CONJUNCTIONS

The IMS Satellite Situation Center prepares a weekly forecast of times of satellite magnetic field line conjunctions for principal high-altitude IMS satellites, selected low-altitude satellites and selected ground-arrays. This information is telexed by the IMSCIE Office, upon request, to some 20 locations for use by project scientists, satellite tracking controllers and administrators. The service was started for those interested in the position of their experiments relative to the orbit foot-track of GEOS-1 and was expanded with the successful launch of ISEE-1&2. It is expected that many of the original interested persons will wish to continue receiving such information to facilitate special data acquisition in connection with the newly-launched GEOS-2 satellite. We will continue to feature conjunction intervals between the ISEEs and GEOS-2. Those interested in addition of other satellite or ground-based experiments to these forecasts should contact J. Vette, IMS SSC (see NL letterhead for address) and anyone wishing to receive the weekly telexes should contact the SSC or the IMSCIE Office. A conjunction forecast telex was shown in NL 78-4, pg 3.

SATELLITE LAUNCHES:

February 1979; T. Obayashi; see note below

GROUND-BASED, BALLOON AND ROCKET CAMPAIGNS:

----------Phenomena-related Campaigns----------

Jan 14 to Mar 9; A. Bryant; "P215K, P216K"; ESRANGE; ROCKETS (2) - Petrel II - see NL 78-12 pg 3
Jan 14 to Mar 9; R. Lundin; "S23 Substorm GEOS"; ESRANGE; ROCKETS (2) - see NL 78-11 pg 2
Jan 14 to Mar 9; L.J.C. Woolliscroft; "VLF"; ESRANGE; ROCKET - Petrel II - see NL 78-11 pg 3
Jan 18 to Feb 3; J.R. Winkler; "ECHO V"; Poker Flat; ROCKET - Strypi - see NL 78-10 pg 2
Jan 18 to Feb 3; H. Anderson; "29.013UEX"; Poker Flat; ROCKET - Terrier Malemute - see NL 78-11 pg 3
Jan 22 ----------; W. Sharp; "29.041UEX"; Ft Churchill; ROCKET - 25.041UEX - see NL 78-12 pg 3
Jan 23 ----------; R. MacQueen; "27.033AS/US"; White Sands; ROCKET - 27.033AS/US - see NL 78-10 pg 3
Jan 24 to Mar 4; I. Zhulin; "SAMBO II"; ESRANGE; BALLOONS (25) - see NL 78-11 pg 3
Feb 24 to Feb 26; L.G. Smith; "Eclipse"; Red Lake; ROCKETS (3) - Nike/Tomahawks - see NL 78-12 pg 2
Feb 24 to Feb 26; L.C. Hale; "Eclipse"; Red Lake; ROCKETS (2) - Astrobee D - see NL 78-12 pg 3
Feb 26 ; M. Kelley; "Eclipse"; Red Lake; ROCKET - Taurus Orion - see NL 78-12 pg 2
Feb 26 ; E.C. Zipf; "Eclipse"; Red Lake; ROCKET - Taurus Orion - see NL 78-12 pg 2
Feb 26 ----------; G. Rottman; "27.028US"; White Sands; ROCKET - see NL 78-12 pg 3
Mar ----------; T.N. Davis; "12.1003, 12.1004"; Poker Flat; ROCKETS - 12.1003, 12.1004 - plasma physics
Mar ----------; Moore; "27.038UEX"; White Sands; ROCKET - 27.038UEX
Mar 13 to Apr 4; G. Holmgren; "Ba-GEOS S-29"; ESRANGE; ROCKET - Nike Black Brant VC - see NL 79-1 pg 2
Mar 16 to Apr 3; J.P. Heppner; "18.217-8GEX, 29.011-2GEX"; Poker Flat; ROCKETS (4) - see NL 79-1 pg 3

------Quasi-synoptic Observations involving Balloons, Rockets, Aircraft, Selected Surface Campaigns------

Mar 15 to Jun 20; Siebert, Wedeken, Krenzien; "GEOMAGNETIC PULSATIONS"; N. Scandinavia;
Monthly; Wright & Hilsenrath; "OZONESONDE"; Various Sites; ROCKETS - See Actualities, NL 77-10, pg 3

----------Observing Plans for Temporary Surface Stations----------

Dec 1 to Jan 31; C. S. Deehr; Norwegian - Alaskan Spitsbergen Expedition; Spitsbergen - see NL 78-9 pg 3
Jan 14 to Feb 8; R. Pellinen; "ABC II"; N. Europe; Surface - see NL 79-1 pg 9

REGIONAL IMS SAT/GBR PROGRAM DETAILS, JANUARY - MARCH

Program details for many brief listings given above appeared, as indicated, in earlier IMS NLs.

SATELLITES

New Japanese Satellite --- ISAS, University of Tokyo, will launch their next satellite in early February 1979. This satellite will be devoted to the studies of high energy astrophysics. It is anticipated that the launching of this satellite will limit the operation of KYOKKO and JIKIKEN at least for a few months after February 1979.

T. Obayashi reports that ISAS plans to make a concentrated effort on magnetospheric observations in December 1978 and the early part of 1979. They would appreciate if this could be taken into account when choosing intervals for detailed study at the IMS Workshop in Melbourne.

ISEE-1 & GEOS-1,2. --- Project Scientists for these spacecraft participated in the Coordinated Data Analysis Workshop last month. They will provide update information for the next IMS Newsletter. GEOS-1 tracking is done in England, following the demise of SEASAT.

ROCKETS

ESRANGE

Ba-GEOS S-29 --- G. Holmgren, Uppsala Ionospheric Observatory, is the project scientist for this Nike Black Brant VC rocket to be launched at Esrange in the period 13 March to 4 April 1979. An ion jet will be injected along the GEOS magnetic field line and an attempt will be made to detect and analyse the barium ions on board the GEOS satellite. The main scientific aims are to study the electrical potential distribution along the field line, to trace the field line and to study the perturbations associated with the plasma release. A comprehensive network of ground based observations will be operating in association with the experiment, including TV observations in Sweden, Finland,

Norway and Switzerland.
The following institutes are contributing to the payload: Uppsala Ionospheric Observatory, Max Planck Institute Garching, Royal Institute of Technology Stockholm, Cornell University Ithaca, University of Bergen and Kiruna Geophysical Institute.

Ground based observations will be carried out by the following groups; Uppsala Ionospheric Observatory, University of Southampton, Max Planck Institute Garching, Danish Meteorological Institute Copenhagen, Finnish Meteorological Institute Helsinki, The Auroral Observatory Tromso and the Kiruna Geophysical Institute.

POKER FLAT

18.217-8GEX, 29.011-2GEX --- These four rockets will be fired in pairs from the Poker Flat range. The first pair will be a Terrier Malemute fired a few minutes before a Nike Tomahawk. The Terrier Malemute will carry four lithium - sodium - strontium chemical trail releases and three barium release canisters. The Nike Tomahawk will carry an instrumented payload including IMS spectrometers, electric field and particle detectors. The second pair of rockets will have an identical instrumentation payload in the Malemute. The Nike Tomahawk will carry two lithium trail releases and two barium releases. Project scientist is J. P. Heppner, GSFC, and the launching slot is 16 March to 3 April 1979.

GROUND-BASED

N. SCANDINAVIA

1979 Geomagnetic Pulsations Campaign --- U. Wedeken, University of Gottingen reports that a final geomagnetic pulsations campaign is being planned to be operated in N. Scandinavia between 15 March and 20 June, 1979. This interval includes the new Porcupine experiments and a great part of the SBARMO balloon campaign.

The five stations KUN, KEV, IVA, MAR and KUU will run during the whole measuring period. The sixth station will first be set up at ESRANGE (ESR). About the 10th of April it will be transferred to the south of our meridonal profile, namely to KUHMO (abbr. KUH / geographic coordinates 64 06N, 29 39E, L=4.1). At KUH one of our stations was already working during September 1975.

ACTUALITIES

SATELLITES

EXOS-A,B --- T. Obayashi reports that KYOKKO (EXOS-A) and JIKIKEN (EXOS-B), both dedicated to IMS, are functioning satisfactorily and a wealth of interesting data has been and is being accumulated.

ROCKETS

WHITE SANDS, USA

18.1024UA --- E. Nier, University of Minnesota, reports that Nike Tomahawk 18.1024UA (see NL 78-12 pg. 3) was succesfully launched on Dec. 11, 1978.

FORT CHURCHILL, CANADA

Electron Beam Fluorescence Probe --- This Black Brant VB rocket (see NL 78-12 pg. 3) was successfully fired on Dec. 14, 1978. All signals were good and in the anticipated range and rocket mechanics functioned satisfactorily. Project scientist was J.H. deLeeuw, Institute for Aerospace Studies, University of Toronto.

GROUND-BASED

ALASKA

Chatanika Radar --- J.D. Kelley, SRI International, has sent us the Chatanika radar schedule for Dec. 1978. Utah State University (J.R. Doupnik) and SRI have been conducting joint experiments on Regular World Days, using the radar in the multipulse mode to get fine altitude records for studies of neutral winds and tides in the lower E region. E-fields are also measured as a by-product. Other experiments by USU include studies of trough formation and electric fields as a function of latitudinal time. In a cooperative program, two 36-hour experiments are scheduled in the period 16-18 Dec. and 20-22 Dec., using the Chatanika and Millstone Hill radars, and also the CNET radar at St. Santin, France. Object is to measure the latitudinal and local time dependence of E-fields.

M. Baron (SRI) has been using the radar for studies of the interaction of ionospheric currents and their effects on ground communication lines, the ultimate aim being to model the system.

Dr. O. de la Beaujardiere, NASA guest investigator, has been conducting experiments for some time with AE-C and Wideband satellites to measure electrodynamic parameters around the auroral arc. Variations in E fields, currents, electron densities and temperatures, in conjunction with the Chatanika radar. Two to three 8-hour experiments are planned in the period 1-10 Dec.

NORTHERN SCANDINAVIA

"Geomagnetic Pulsations" --- U. Wedeken, University of Gottingen, sent us a summary of the geomagnetic pulsation measurements carried out during 1978 in Northern Scandinavia. For instrumentation and site details see NL 77-1 pg. 4, and NL 77-9 pg. 2. Two distinct campaigns were run:

1) Auroral Breakup Campaign (ABC) 1978: two stations recorded data, namely KEVO, Feb. 24 to Mar.14, and MARTTI, Mar. 1 to Mar. 15, in the framework of the ABC as announced in NL 77-12, pg. 3. 2) Main Campaign 1978: all stations operated for the period from APR.12 to Oct. 13. The most northern station at SKARSVAAG was transferred to KIRUNA at the beginning of September to participate in the "PORCUPINE" experiments.

The data from ESR,SKA,KUN,KEV, all digital recording stations, are available on tape; the data from the other stations can be digitized on special request, while it is announced that in the near future equipment will be available to automatically digitize them. These too will then be available on tape. Quality of data is generally good, but several short periods, different for different stations, are not available at SKA,MRA,KUU.

ANTARCTIC

KEOGRAMS --- The text and tables following and the data displayed in the Keograms on page 5 were supplied by S.B. Mende, following the Los Alamos Substorm Symposium. Information about earlier campaigns of photometric observations by Eather & Mende has appeared in IMS NLs 76-12 (pgs 1,2 & 7) and 77-3 (pg 2). This is the first sample Keogram received at WDC-A for Solar Terrestrial Physics (IMSCIE Office) from observations during the IMS. We will continue to share information about the timing of earlier IMS photometric campaigns, availability of processed data, etc. as this becomes available from the project scientists.

"As part of the U.S. Antarctic Research Program, Lockheed Palo Alto Research Laboratories have operated a multi-channel spectro photometer at South Pole Station, Antarctica. Reduction of data from earlier years has uncovered some significant results regarding the mid-day auroral precipitation during the Antarctic winter (see Eather et al. 1978). During the Antarctic winter of 1977 in the period of May to August, the photometer was operated with increased time resolution. The photometer data is presented in the form of Keograms, computer-generated grey scale presentations. An example of a Keogram is shown in the accompanying figure. The bottom scale is universal time. Magnetic midday, local time, is at 1530 UT at South Pole. The left hand scale is

equivalent latitude as derived by the "KEO" program (see appendix of Eather et al. 1976). Poleward is up, equatorward is down.

The top panel is H-beta, representing precipitating protons in the dayside high latitude atmosphere. The center panel is OI λ = 6300Å which is characteristic of soft auroras customarily observed at high latitudes on the dayside and shows the abundance of soft electrons. The bottom panel is N2+ λ 4278Å which is closely related to the precipitated energy of the particles. The general arc-like motion, which is primarily observed in H-beta and L6300, reaching its highest latitude at midday, is associated with the diurnal motion of the auroral oval. The short-term equatorward excursions during the day (08-23 UT) are individual substorms. At night substorms manifest themselves in their poleward expansion. See a large example of this at 00 UT.

In Table 1 (following), we are presenting the data which is reduced and available for joint geophysical studies.

The observing program is funded by the National Science Foundation under contract number DPP 71-01668. Dr. S.B. Mende, Lockheed Palo Alto Research Lab, 3251 Hanover Street, Palo Alto, California 94304, USA, is the principal investigator and Dr. R.H. Eather, Physics Dept, Boston College, Chestnut Hill, Massachusetts 02167, USA is a co-investigator. The 1977 data were taken by S. Harris who is also at the Palo Alto Research Lab. Further information about the data can be obtained by writing to any of these persons."
References: Eather, R.H., S.B. Mende and R.J.R. Judge, Plasma Injection at Synchronous Orbit and Spatial and Temporal Auroral Morphology, J. Geophys. Res., 81, 2805, 1976. And Eather, R.H., S.B. Mende and E.J. Weber, Dayside Auroras and Relevance to Substorm Current Systems and Dayside Merging, submitted to J. Geophys. Res., 1978.

SOUTH POLE 1977

Tape #	File #	From	To	Visibility
SP77-1	1	13 May 0208	13 May 1121	3.5
	2	20 May 0308	20 May 1122	3.0
SP77-2	1	21 May 0023	21 May 1219	4.0 - 0
	2	23 May 0339	22 May 1009	4.0
SP77-3	1	23 May 1107	23 May 2243	3.0 - 0
	2	10 Jun 0205	10 Jun 1027	3.0
SP77-4	1	10 Jun 1051	11 Jun 0127	1.5 - 3.0
	2	11 Jun 0206	11 Jun 0724	3.0
SP77-5	1	11 Jun 0737	12 Jun 0313	3.0 - 4.0
SP77-6	1	12 Jun 0349	12 Jun 1417	4.0
SP77-7	1	12 Jun 1440	13 Jun 0032	3.5
	2	13 Jun 0042	13 Jun 1040	5.0
SP77-8	1	13 Jun 1249	14 Jun 0112	4.0
	2	14 Jun 0122	14 Jun 0205	3.0
SP77-9	1	14 Jun 0252	14 Jun 1305	2.5 - 1.0
	2	15 Jun 0325	15 Jun 1300	2.5 - 1.0
SP77-10	1	15 Jun 1309	16 Jun 0615	2.5
	2	16 Jun 0338	16 Jun 0615	2.5
SP77-11	1	16 Jun 0641	17 Jun 0056	3.0
SP77-12	1	17 Jun 0115	17 Jun 1425	2.5 - 5.0
SP77-13	1	17 Jun 15-1	18 Jun 0341	4.0
SP77-14	1	18 Jun 0404	18 Jun 1240	4.0
SP77-15	1	18 Jun 1250	19 Jun 0253	5.0
	2	19 Jun 0325	19 Jun 0849	5.0
SP77-16	1	19 Jun 0915	20 Jun 0423	4.0
SP77-17	1	20 Jun 0434	20 Jun 0821	4.0
	2	20 Jun 0821	20 Jun 2258	4.0 - 3.5
SP77-18	1	20 Jun 2324	21 Jun 0612	3.5
	2	21 Jun 0614	21 Jun 1606	3.5 - 3.0
SP77-19	1	22 Jun 0425	22 Jun 1318	3.5 - 2.0
	2	23 Jun 0238	23 Jun 1223	2.5
SP77-20	1	23 Jun 1248	24 Jun 0250	4.5
	2	24 Jun 0308	24 Jun 0739	1.0
SP77-21	1	24 Jun 0751	24 Jun 1300	0 - 1.0
	2	7 Jul 0300	7 Jul 1100	4.0
SP77-22	1	7 Jul 1111	7 Jul 2340	4.0
	2	7 Jul 2358	8 Jul 0730	1.5 - 1.0
SP77-23	1	8 Jul 0753	9 Jul 0311	1.5 - 4.0
SP77-24	1	9 Jul 0338	9 Jul 1223	4.0 - 0.5
	2	10 Jul 0024	10 Jul 0800	3.5
SP77-25	1	10 Jul 0832	11 Jul 0232	3.5
SP77-26	1	Erased		
	2	11 Jul 0737	12 Jul 0208	3.0
SP77-27	1	12 Jul 0228	12 Jul 0702	4.0 - 1.0
	2	12 Jul 0715	12 Jul 1534	1.0 - 0
	3	14 Jul 2326	15 Jul 0523	3.5
SP77-28	1	15 Jul 0540	16 Jul 0059	4.0 - 2.0
SP77-29	1	16 Jul 1137	17 Jul 0555	3.0
SP77-30	1	17 Jul 0610	17 Jul 2348	4.0
SP77-31	1	18 Jul 0004	18 Jul 0338	4.0
	2	18 Jul 0359	18 Jul 0715	3.5
	3	18 Jul 0939	18 Jul 2221	4.0
SP77-32	1	20 Jul 1202	21 Jul 0157	5.0
	2	21 Jul 0209	21 Jul 0725	4.5
SP77-33	1	21 Jul 0753	21 Jul 2351	4.0
SP77-34	1	22 Jul 0015	22 Jul 1304	4.0
	2	23 Jul 0412	23 Jul 1103	4.0
SP77-35	1	3 Aug 0449	4 Aug 0031	3.0 - 2.5
SP77-36	1	4 Aug 0046	4 Aug 1056	4.0
SP77-37	1	4 Aug 1123	5 Aug 0107	4.0 - 0
	2	7 Aug 0334	7 Aug 0850	4.0
SP77-38	1	7 Aug 0859	7 Aug 2138	4.5
SP77-39	1	7 Aug 2149	8 Aug 1655	4.0
SP77-40	1	8 Aug 1717	9 Aug 1305	3.5 - 3.0
SP77-41	1	9 Aug 1323	10 Aug 0529	3.0 - 4.0
SP77-42	1	10 Aug 0547	11 Aug 0106	4.0
SP77-43	1	11 Aug 0120	11 Aug 1111	4.0
SP77-44	1	11 Aug 1123	11 Aug 2202	3.5
	2	11 Aug 2214	12 Aug 0704	4.0
SP77-45	1	12 Aug 0716	13 Aug 0137	3.5
SP77-46	1	13 Aug 0147	13 Aug 1405	4.0

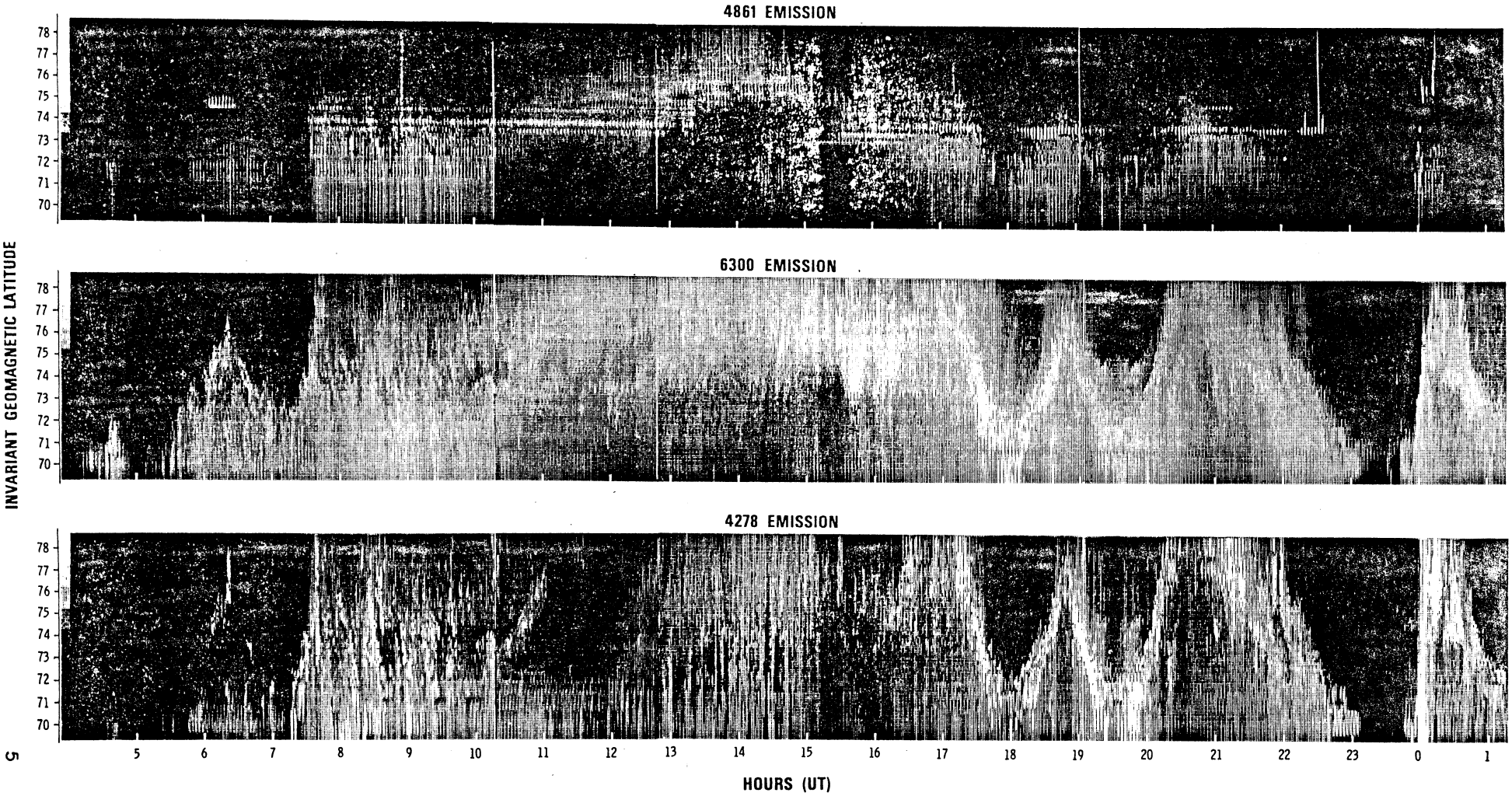
SACHS HARBOUR, CANADA

Cleft Studies --- D. McEwen has sent the following report to the Canadian IMS Newsletter; "Steady progress has been made on analysis of Sachs Harbour (Λ=76.7) photometric data obtained Dec 1 - 20, 1977 by C. Duncan and J. Gilmer. All of the dayside post-noon data have been processed and the general morphology of the cleft has been extracted as a function of both time and magnetic activity. A summary of 6300 Å cleft emissions observed is shown in the accompanying figure (see page 7 of this newsletter). This shows the cleft position, intensity and width at half-maximum during the afternoon hours on the six clear days when the cleft was observed. On two additional clear days the cleft was too far south to be observed well from Sachs Harbour.

U.S. PANEL FOR THE IMS

MEETING OF THE US PANEL ON THE IMS. DEC. 5, 1978, SAN FRANCISCO --- The United States Panel for the IMS is a subcommittee of the US Committee on Solar-Terrestrial Research, US National Academy of Sciences-National Research Council. The CSTR serves as the US national committee for SCOSTEP, and the US Panel is the US counterpart of the SCOSTEP Steering Committee for the IMS. The Chairman of the US Panel is Dr. F. L. Scarf and an important link with US agencies is Dr. R. Manka, the head of the US IMS Coordination Office. The 5 Dec. 1978 meeting was concerned mainly with the following questions: (1) What problems is the US IMS program experiencing, if any? (2) What observational facilities in place for the IMS should not be dismantled after the official end of the IMS on 31 Dec. 1979, if it can be avoided? (3) What coordination facilities should be continued after 1979? (4) How can the Panel help bring the Data Analysis Phase into full swing as soon as possible? (5) What financial and administrative resources can be brought to bear to carry out items (2) to (4) above? (6) What problems in magnetospheric physics will certainly not be solved with the IMS data sets now accumulating? These problems should constitute the focus of coordinated post-IMS research. On item (1), the Panel heard reports on ISEE and other spacecraft, the North American Magnetometer and Midlatitude nets, the Chatanika and Millstone Hill radars, SELDADS, and some other facilities. On item (2), it agreed to ask through official channels to keep data coming from a number of observational facilities. On item (3), it agreed that the IMSCIE Office and the Satellite Situation Center will continue to be needed not only for post-IMS

(continued on pg. 6)


SOUTH POLE DAY 169 1977
4861 EMISSION
6300 EMISSION
4278 EMISSION
INVARIANT GEOMAGNETIC LATITUDE
78
77
76
75
74
73
72
71
70
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 0 1
HOURS (UT)

(continued from pg. 4)

magnetospheric programs but for other international cooperative programs requiring efficient communications of information. The discussion of item (4) centered on a review of recent and prospective workshops, and on data management. The objective will be to provide facilities to make easy for investigators to collaborate in a data-intensive mode without, however, telling them what to do. Item (5) was discussed informally with agency officials present. Item (6) was not discussed in detail. This, and other matters will be on the agenda at the next meeting.

MEETINGS AND WORKSHOPS

AGU CHAPMAN CONFERENCE ON MAGNETOSPHERIC SUBSTORMS, LOS ALAMOS.

S.-I. AKASOFU, convenor of this Conference, sent us a copy of his report to the AGU. Excerpts from it follow in our free summarization.

"The Los Alamos Substorm Conference was the fourth devoted to magnetospheric substorms, after Moscow (1971), Houston (1972) and Bryce Mountain (1974). Its main motivation was that magnetospheric substorm studies have advanced enough to the point of bringing experimenters, analysts and theorists together to discuss major substorm problems with special emphasis on theoretical interpretations in terms of plasma processes. The first four sessions were devoted to reviews in terms of what has been established so far and what is not understood at present. These reviews gave the attendees, a mixture of graduate students, plasma physicists and magnetospheric physicists, whose interests have been other than substorms, as well as "substorm professionals", a perspective on the problems under consideration and the progress made in the last four years. The conclusion of such reviews was that it is much more reasonable to consider that the magnetosphere is an open system rather than a closed system. This open magnetosphere responds specifically to a specific change in the IMF. Then what is a magnetospheric substorm? The general agreement was that the magnetosphere develops a particular mode of energy dissipation when its generating power, partially controlled by the IMF, is high. There was not a consensus among the speakers about the nature of this process. The two opinions can be summarized in Schindler's view of a spontaneous process, and in Swift's conclusion that a substorm is a directly driven process. It is important that such a fundamental issue of substorms has finally been brought to the attention of substorm workers by contrasting these two views, while in the past it was simply assumed that a substorm is an instability process. Within the general agreement that a magnetospheric substorm is associated with a diversion of the cross-tail current to the polar ionosphere, there were contrasting points of view on the morphological interpretation of magnetotail phenomena. The one opinion of the formation of a magnetic X-line was contrasted by the other invoking interruption of the cross-tail current near the earthward edge of the current sheet, without an X-line being formed. Several plasma physicists attempted to give a general overview of various plasma processes which might be involved in substorm development. The general conclusion was that at the present stage of theoretical studies of magnetospheric substorms, both reconnection and current interruption are possible mechanisms. Reconnection in turn could be the result of spontaneous tearing or forced X-line formation. Most panel members pointed out specifically that it is vital to develop a three dimensional simulation model in order to treat the diversion of the cross-tail current".

In conclusion we like to quote AKASOFU's introduction to his report which spells: "John Winckler led a group of the attendees and climbed up to the ceremonial cave of a prehistoric Indian ruin at Bandelier National Monument. There, they danced as the former dwellers of the pueblo had, perhaps as an impromptu evocation of a magnetospheric event". It is not clear from the text whether this is suggested to the scientic community as one of the most promising ways to an understanding of magnetospheric substorm phenomena.

CDAW AT THE DAWOC

We haven't switched to a new language in our caption above, it refers to the recent Coordinated Data Analysis Workshop (CDAW) at the Data Analysis WOrkshop Center (DAWOC). The CDAW concept has been a familiar theme to those discussing new ways of studying the mass of data accumulated during international scientific programs. Dr. J.I. Vette, Director National Space Science Data Center (also the World Data Center A for Rockets & Satellites and the IMS Satellite Situation Center) at NASA's Goddard Space Flight Center, has been explaining this concept in person and via videotape for months.

As realized at Goddard, the first CDAW (CDAW-1.0) was both a real hands-on workshop with a common, computerized data base accessible through a sophisticated hard and soft-ware system and an educational experience for the scientists (experimenters and theoreticians) and administrators present. The following is a brief summary of our observations.

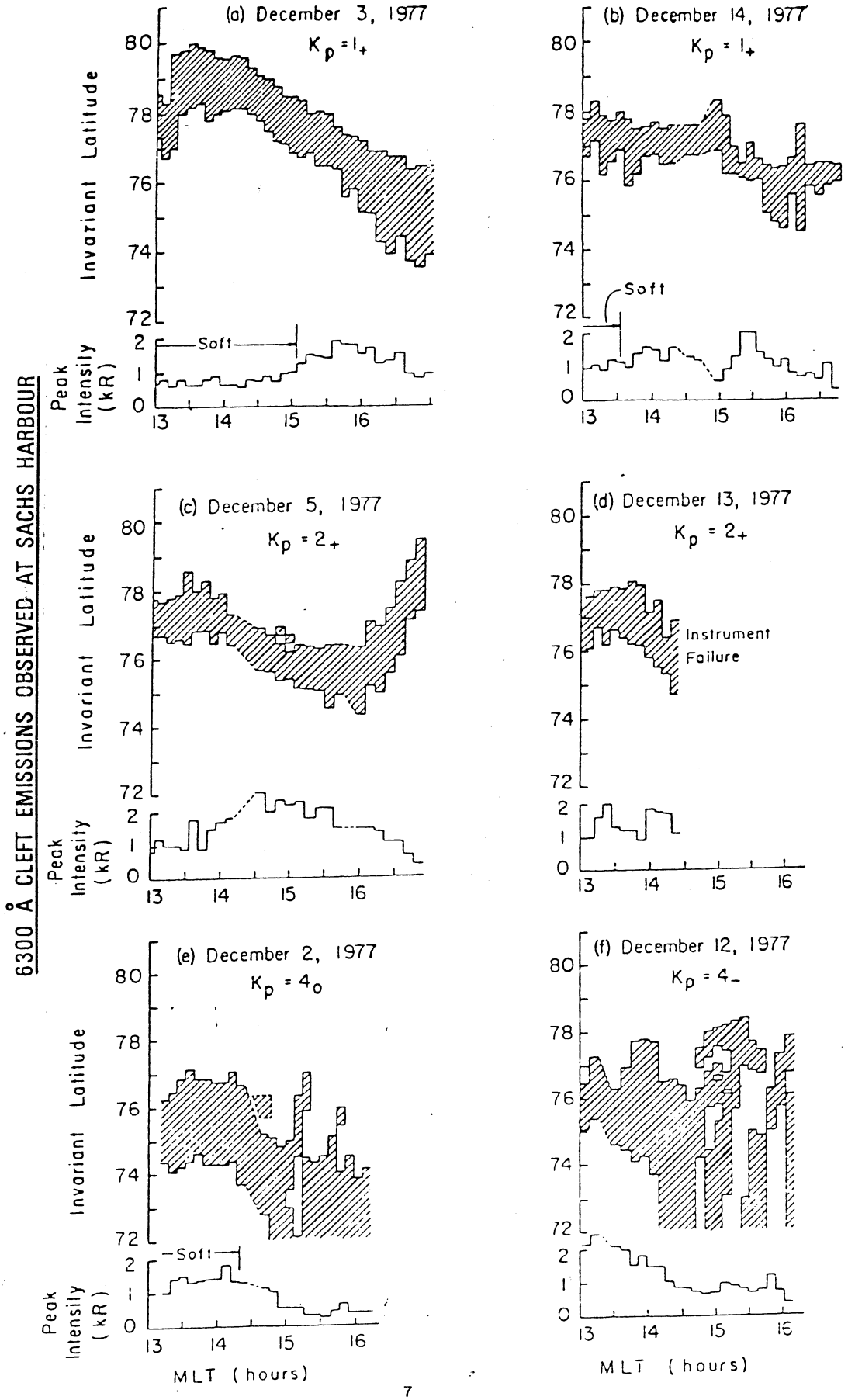
Some 55 digital data sets were received (170 Mbytes of data) covering the periods 1 Dec 1500 UT to 2 Dec 2400 UT, and 11 Dec 2100 UT to 12 Dec 0730 UT, 1977. These times are subsets of the special IMS study period selected at the IAGA meeting in Seattle (Aug 1977) and first studied in detail at the IMS Working Conference at Innsbruck (see NL 78-9, pps 7,8) in June 1978.

The CDAW-1.0 Program Committee, Chaired by G. Rostoker, invited some 21 participants, 7 analysis consultants, and 10 to 15 observers to come to the week-long workshop at Goddard. While the number of participants was larger than would be optimal for future CDAW's, the size was appropriate to the desire to obtain a comprehensive base of data from many systems and to expose this type of workshop to a large number of interested persons.

The common data base could be accessed by each of the 4 working groups (problem oriented) whose members submitted data request forms to the local staff. Two seperate video-graphic terminals at the remote minicomputer site were used to display the requested parameters, plotted agains time as the indepent variable. These signals were transmitted to the workshop area and displayed on video monitors for working groups and observers. Once a useful data display was obtained, this was cataloged by the computer system and recorded on the video disc units assigned to each group. Up to some 200 full-screen images could be stored on a single disc and recalled to view by those working on the problem. As needed, paper copies could be generated by local staff and viewgraphs prepared. The data frames could also be projected onto a large screen for group viewing. From one to six parameters could be displayed on a single frame for a requested period of time. Algorithms created by the SSC staff could be displayed instead of the "raw" data and new algorithms were requested and created routinely during the CDAW. Paper copies of special data presentations, microfilm of other data formats and slides or viewgraphs of data were brought by many participants to supplement the parameter vs. time displays available through the CDAW system.

Initial division of participants and analysis consultants into working groups tended to be discipline/vehicle oriented. In particular, the ISEE experimenters and GEOS experimenters tended to examine their different data sets among themselves to be assured that independent ways of measuring the same physical information were yielding consistent results. One working group seemed mostly composed of ground-based experimenters. Later the groups began to reform around specific events and involve more intercomparisons between different groups.

(To be concluded next month in NL 79-2)


6300 Å CLEFT EMISSIONS OBSERVED AT SACHS HARBOUR
(a) December 3, 1977
Kp = 1+
(b) December 14, 1977
Kp = 1+
(c) December 5, 1977
Kp = 2+
(d) December 13, 1977
Kp = 2+
(e) December 2, 1977
Kp = 4o
(f) December 12, 1977
Kp = 4-
Invariant Latitude
Peak Intensity (kR)
Soft
Instrument Failure
MLT (hours)

Bulletin 1

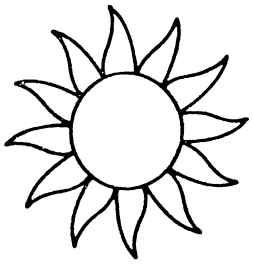
The First Major Symposium of the Scientific Committee on Solar-Terrestrial Physics' Program.

International Magnetospheric Study

27 Nov. - 1 Dec. 1979 at La Trobe University

Co-sponsors:
International Association of Geomagnetism and Aeronomy
Australian Academy of Science
Australian Institute of Physics

Professor K.D. Cole, Chairman
Local Organising Committee
Division of Theoretical and Space Physics
La Trobe University
Bundoora, Victoria
Australia, 3083



La Trobe University, the venue for the IMS Symposium, is in Melbourne, a cosmopolitan city of 2¼ million people. The University campus covers about 200 beautiful hectares. The residential colleges provide excellent accommodation in new buildings. Hotel or motel accommodation in the area is scarce, but there is plenty 10-15 km away in the centre of Melbourne. In the two weeks following the IMS Symposium, other symposia of IAGA and of other associations of IUGG will be held in Canberra, 400 km away.

First symposium on IMS results

La Trobe University

Programme Committee:

IAGA (Divisions II and III):
Dyson, Falthammar, Russell, Tinsley, Troitskaya
SCOSTEP (IMS Steering Committee):
Roederer (Chairman), Cole, Haerendel, Rostoker, Williams

Terms of reference:

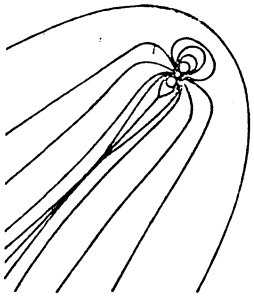
- To critically examine what has been learned so far during the IMS; to analyse phenomena observed by different techniques; to synthesise interpretation of results.
- To focus primarily on physical mechanisms, and on morphological characteristics where these still await understanding (separation of space-time effects; time-sequence of events).
- To carry out a critical comparison between theoretical expectations and the new observations.
- To consider problems in broad context such as 'dependence of magnetospheric processes on solar wind conditions', 'energy and momentum balance', etc.

Topics:

1. *Solar wind plasma entry mechanisms.* (Includes recent developments in the understanding of macroscopic boundary features; the hunt for day-side reconnection; boundary field topology; boundary layers.)
2. *Turbulence and wave-particle interactions in the magnetopause and cusp regions.* (Specialised topic dealing mainly with microscopic processes.)
3. *Substorms and auroral processes: relationships among currents, electric fields and particle precipitation.* (IMS results on polar cap processes; time-sequence of events; the role of the ionosphere, etc. Excluding those non-linear effects which belong into the IAGA Symposium on Non-linear Waves in Geophysical Plasmas.)
4. *Plasma processes in the tail.* (Mainly local processes such as flows, expansions and contractions, merging, tearing, bubbles, plasmoids, etc.)
5. *Structure and origin of large-scale electric fields.* (Specialised topic on convection fields, field-aligned electric fields, and wave electric fields that cause plasma motion.)
6. *Energetic particle composition and dynamics, and wave-particle interactions.* (Injection into trapped orbits, acceleration, diffusion. Excluding those ULF topics which belong into the IAGA Symposium on Geomagnetic Pulsations.)

Abstracts must reach J.G. Roederer (Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701) before 1 August 1979. See IAGA News No. 17 for required format.* The Programme Committee will screen the abstracts and schedule papers according to topics.

*To appear November 1978. If you do not receive IAGA News contact your IUGG National Committee or write to the IAGA Secretary General (Dr N. Fukushima, Geophysics Research Laboratory, University of Tokyo, Tokyo 113, Japan).



For registration write to
Dr B.P. Lambert, Executive Director, Organising Committee, XVII General Assembly of IUGG, Australian Academy of Science, PO Box 783, Canberra City, ACT, 2601, Australia

MORE GROUND-BASED

ABC II --- Just before going to press we received an announcement from Risto Pellinen, Finnish Meteorological Institute, of a Second Auroral Breakup Campaign (ABC II), from Jan 14 to Feb 8, 1979. The first ABC took place on Feb 27 - Mar 13 1978 and proved to be a success even if the weather conditions were not the best possible. For ABC II most of the operations will follow the ABC I tracks. Optical instruments should be switched on (whenever weather conditions are appropriate) at twilight and the recordings should continue to 24 UT or later. The auroral condition determines the switching off time after 24 UT. Below are summarized the different activities that will take place during the campaign.

Ground-based Observations - Murmansk region, USSR - O. Raspopov, Director PGI, has informed that all possible instruments will be operated in Kola peninsula during the campaign. This also includes TV recordings of aurora, and doppler auroral radar operations in eastern Karelia. The radar beam is directed over Kiruna and hence overlaps with the STARE beams.

Finland - most of the instruments operated in Finland make continuous recordings year round.. During the campaign special care will be taken on timing, and the recording speeds will be increased so that the time resolution of 20 seconds or less is possible. At Kilpisjarvi (69 03 07N 20 47 13E) a TV camera provided by MPI and a 630.0 nm zenith photometer provided by G. Shepherd will be in operation.

Sweden - KGI and UIO will take care of the observations at Kiruna and ESRANGE. Most of the activity at ESRANGE is associated with the rocket campaigns that take place there during ABC (see IMS newsletters e.g. NL 78-12).

Norway - The main Norwegian campaign will take place at Svalbard in Jan 1979. Their main object will be to record polar cusp aurora. They will also make some eveningside recordings.

Other European countries - The magnetometer chains of the German groups, riometers of the Danish groups and the pulsation instruments of the Edinburgh group will be in full operation during the campaign. STARE will be operated continuously with 20 sec integration time.

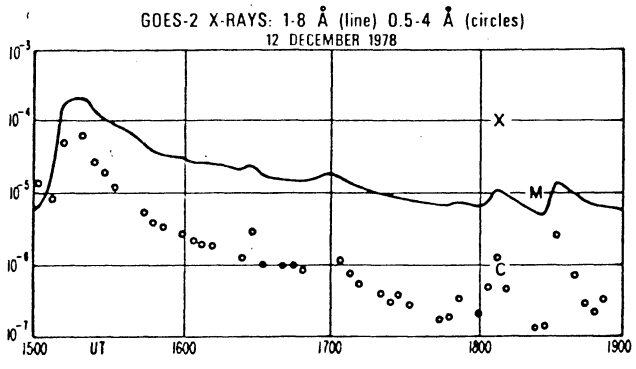
Balloons - ABC II partly overlaps with the SAMBO-II campaign which includes multiple balloon launches from ESRANGE. These balloons will drift eastwards over Finland and Kola peninsula. During SAMBO-I the flight times were between 20-40 hours. Launch window is from 24 Jan to 4 Mar, 1979. Scientific objective of the balloons is to study auroral disturbance effects at 33-35 km altitude by measuring X-rays (30KeV-160KeV, 13 channels), electric field and photometric emissions (6300,5577,5200 and 4278 A).

Satellites - Coordination with different satellite groups has been established. ISIS 1 and 2; all northern transpolar passes over Scandinavia from 18 to 24 UT will be received at Sodankyla. Optical, particle and VLF data have been requested. EXOS A; data of one or two passes per day (except Saturday and Sunday) will be obtained by KSC (Japan) operation. These passes over Northern Europe will be around 01 UT (Jan 15) to 21 UT (early February). The satellite has UV TV recorder and particle detectors. GEOS-2; Footprint over N. Scandinavia. 24 h continuous operation. If there are any suggestions for optimizing the satellite position or for special experiment modes during the campaign the project scientist K. Knott should be contacted as soon as possible. TRIAD; All suitable passes over N. Europe will be recorded at Kiruna. The satellite has 90 degree inclination and altitude around 800 km. The satellite carries triaxial fluxgate magnetometer onboard. All those who wish to make special recordings during the satellite passages (TV, optical data, soundings etc.) could receive the weekly orbit data directly from FMI by telex about one week to a few days before the first day of recording. Please write or telex as soon as possible to R. Pellinen.

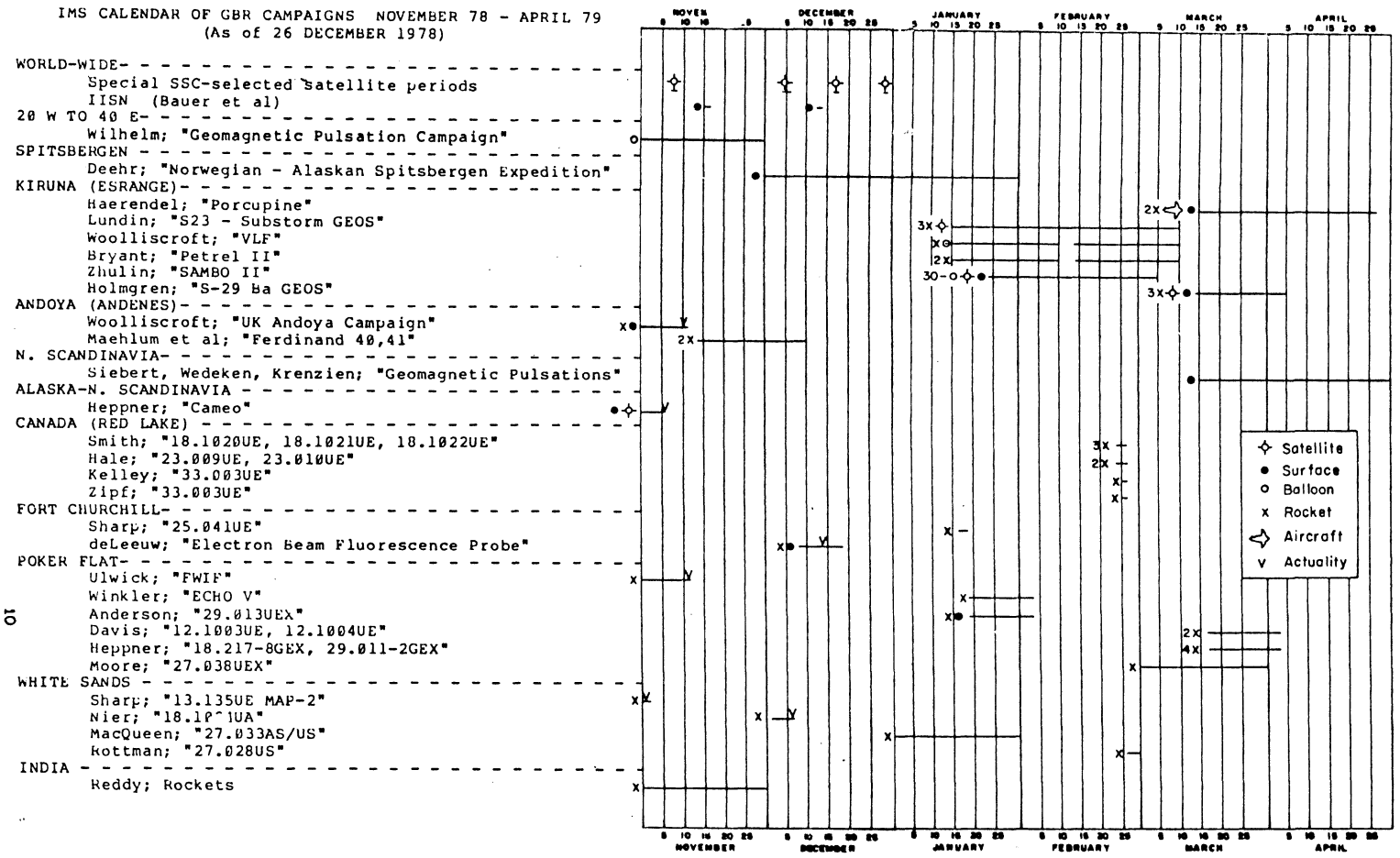
Preliminary Listing of Solar Flares

Solar Flare Data --- The table below contains a listing of X-ray flares, class M1 and higher, for the period 18 October - 19 November 1978 extracted from "Preliminary Report and Forecast of Solar Geophysical Data", published by SESC Boulder (see IMS NL78-5).

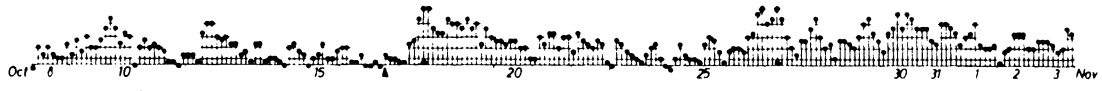
Date	Begin	Max	End	Location	Imp	Reg	Cl
Oct28	1552	1604	1655	N20 E01	2B	1365	M3
Nov 3	0028	0033	0049	Unknown	--	----	M1
10	B0113	0113	A0232	N17 E02	2N	1385	M1
	1359	1402	1415	S14 W38	1B	1382	M2
28	0530	0532	A0609	N15 E52	-N	1417	M1
	1023	1028	1030	Unknown	--	----	M3
29	0517	0521	0550	N16 E40	2B	1417	M2
30	0147	0155	0233	N16 E22	-N	1417	M1
Dec 3	2032	2033	2042	S22 E65	-B	1442	M2
4	0541	0547	0550	Unknown	--	----	M1
	1051	1058	1102	Unknown	--	----	M1
	1844	1846	1857	S23 E47	-B	1442	M1
7	0955	1004	1009	Unknown	--	----	M3
	1930	1951	2010	Unknown	--	----	M2
	B2345	2348	0020	S16 W55	2N	1429	M2
9	1056	1100	1103	Unknown	--	----	M1
10	0206	0207	A0208	S13 W90	-F	1437	M2
	0440	0448	0457	Unknown	--	----	M1
	2332	0003	0030	Unknown	--	----	M3
11	0134	0138	0147	Unknown	--	----	M2
	0306	0314	0327	Unknown	--	----	M2
	0343	0346	0348	Unknown	--	----	M1
	1750	1814	1832	S19 W51	-B	1447	M1
	B1807	1925	2325	S16 W48	2B	1447	M7
	1833	1942	2018	S17 E14	2b	1444	X1
12	B0525	0527	A0537	S16 W55	-F	1447	M1
	0645	0646	0655	S17 W54	-F	1447	M1
	0826	0833	0844	Unknown	--	----	M1
	0959	1048	1058	Unknown	--	----	M5
	1503	1514	1636	S19 W73	2B	1447,	X2
	1726	1836	A1840	S19 W74	1B	1447	M1
	1806	1811	1817	Unknown	--	----	M1
	B1836	1836	A1900	S17 W64	2B	1447	X1
	2012	2012	2023	S15 E01	-N	1444	X2
	B2053	2053	2056	S18 W65	1N	1447	M1
	2226	2230	2233	Unknown	--	----	M1
	2302	2309	2330	Unknown	--	----	M2
13	B0017	0018	A0103	S18 W67	1N	1447	M2
	0037	0042	0054	Unknown	--	----	M3
	0109	0120	0128	Unknown	--	----	M2
	0231	0237	0240	Unknown	--	----	M2
	0513	0623	0731	S16 W73	1B	1447	M1
	0720	0723	0729	Unknown	--	----	M1
	0736	0739	0743	Unknown	--	----	M6
	1802	1826	1906	S19 W87	-B	1447	M2
	2008	2011	2035	S19 W88	-B	1447	M1
	2034	2046	A2057	S15 W13	1B	1444	M1
	B2353	2358	0020	S17 W79	1B	1447	X1
14	0053	0103	0109	Unknown	--	----	M1
	0355	0355	A0415	S15 W80	-N	1447	M1
	B0438	0438	A0447	S15 W14	-N	1444	M1
	0722	0724	A0735	S15 W80	-N	1447	X1
	1359	1412	1422	Unknown	--	----	M1
	1623	1625	1630	S19 W90	-B	1447	M1
15	0747	0754	0801	Unknown	--	----	M1
17	1654	1657	1717	N18 W18	1B	1462	M1
	1807	1808	1850	S16 W62	-B	1444	M2



IMS CALENDAR OF GBR CAMPAIGNS NOVEMBER 78 - APRIL 79
(As of 26 DECEMBER 1978)



SOLAR AND GEOMAGNETIC ACTIVITY OCTOBER 8 - NOVEMBER 30



Rotation #1985

2800 MHZ FLUX OTTAWA	150	156	160	177	179	179	181	183	179	173	171	172	173	170	163	164	159	158	156	153	154	152	149	146	154	162	173
SS NO. BOULDER	176	204	191	257	276	245	284	298	272	215	242	236	218	250	238	160	194	146	167	171	152	185	181	156	170	207	275

Rotation #1986

2800 MHZ FLUX OTTAWA	181	184	179	177	180	170	171	166	154	148	138	137	132	131	130	131	138	129	130	126	127	131	136	149	167	167	172
SS NO. BOULDER	221	134	186	173	153	150	219	150	161	112	124	102	138	147	151	102	143	127	131	86	138	154	220	218	217	177	176