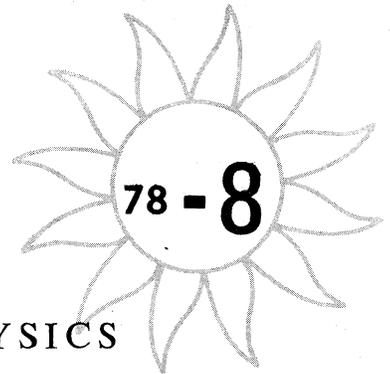


International Council of Scientific Unions

SPECIAL COMMITTEE  
ON

SOLAR-TERRESTRIAL PHYSICS



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## IMS NEWSLETTER

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Acronyms abound: IMS, GBR, SMY, MAP, NOAA, ERL, EDIS, NGSDC/WDC-A STP, etc. While preparing this newsletter, we became depressed by the excess of acronyms. From time to time we try to spell-out names but soon return to the shorter, alphabet soup form of labels. Institutional acronyms often appearing in these NL's are: NOAA = National Oceanographic and Atmospheric Administration, ERL = Environmental Research Laboratories, EDIS = Environmental Data and Information Service, NGSDC = National Geophysical and Solar-Terrestrial Data Center, and WDC-A for STP = World Data Center A for Solar-Terrestrial Physics. NGSDC and WDC-A for STP are co-located in Boulder, Colorado sharing staff, facilities, and data. They are the institutional home of the IMSCIE Office.

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PROGRAM PLANS FOR AUGUST - OCTOBER 1978

SPECIAL IMS HIGH-ALTITUDE SATELLITE PERIODS - 1978

Special IMS High-Altitude Satellite Intervals for August through October 1978 are given below. On page 4 of this NL is given a detailed listing of all 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.

#13	5 Aug	217/1000 UT	to	7 Aug	219/0300 UT
#14	2 Oct	275/1200 UT	to	3 Oct	276/2400 UT
#15	27 Oct	300/1000 UT	to	28 Oct	301/1700 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:

Jul 14; K. Knott; "GEOS-2"; ETR; SATELLITE - launched successfully, see note below  
 Aug 12; T.T. von Rosenvinge; "ISEE-C"; ETR; SATELLITE - see NL 78-6, pg 2  
 Sep 14; T. Obayashi; "EXOS-B"; Uchinoura; SATELLITE - see NL 78-6, pg 3  
 Sep 15; W.R. Bandeen; "NIMBUS-G"; ETR; SATELLITE - see note below and CAMEO

GROUND-BASED, BALLOON AND ROCKET CAMPAIGNS:

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

----- to Sep 30; Ejiri, Kimura, Oya, & Nakamura; "AUSTRAL WINTER CAMPAIGN"; Syowa; ROCKETS(4) - NL 78-3  
 Jul 7 to Aug 8; I.B. Iversen, M.M. Madson; "POLAR 78"; Ny-Alesund; BALLOONS (3) - see NL 78-6, pg 4  
 Jul 27 to Aug 15; L. Bjorn; "D-Layer Campaign"; Kiruna/ESRANGE; ROCKETS (7) - see NL 78-6, pg 4  
 Aug 1 to Aug 31; W.R. Sheldon; "23.009UE & 23.010UE"; White Sands; ROCKET (2) - Plasma Physics  
 Aug 10 to Aug 14; R.H. Holzworth; "E-Field Summer 78"; Canada; BALLOONS (10) - see NL 78-6, pg 3  
 Sep 1 to Sep 30; E.C. Zipf; 33.005UA; White Sands; ROCKET - Taurus/Orion for EUV dayglow, ion chem  
 Sep 9 to Oct 9; G. Haerendel; "PORCUPINE-III&IV"; Kiruna/ESRANGE; ROCKETS (2) - see below  
 Sep 15 -----; J.P. Heppner, "CAMEO"; ETR; ROCKET - see details below  
 Sep 18 to Oct 3; W. Sharp; "MAP-2"; White Sands; ROCKET - 13.135UE  
 Oct 1 to Oct 31; E. Nier; 18.1024UA; White Sands; ROCKET - Taurus/Orion for EUV dayglow, ion chemistry  
 Oct 22 to Nov 8; J.C. Ulwick; 3 programs; Poker Flat; ROCKETS (6) - see details below  
 Oct 22 to Nov 11; L.J.C. Woolliscroft; "U.K. Andoya Campaign 1978"; Andoya; ROCKETS (2) - SL1424 & f6

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

Aug 1-2, Sep 6, and Oct 18; Bauer, Evans; IISN; Global Network; SURFACE - See NL 78-2, pg 2 for details  
 Monthly; Wright & Hilsenrath; "OZONESONDE"; Various Sites; ROCKETS - See Actualities, NL 77-10, pg 3

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

----- to Oct 15; Siebert; "GEOMAGNETIC PULSATIONS"; N. Scandinavia; SURFACE - See actualities  
 ----- to Nov 30; K. Wilhelm; "GEOMAGNETIC PULSATION CAMPAIGN"; 20 W to 40 E; SURFACE - NL 78-5 pg 3&11  
 ----- Sep 30; D.L. Carpenter; "Plasmopause Campaign"; Antarctic; SURFACE - see IPPDYP, NL 78-7, pg 2  
 Aug 15 to Sep 30; Hiroswa & Perraut; "CONJUGATE POINTS"; Syowa/Iceland; SURFACE - see CCOG Hdbk pg 72

REGIONAL IMS SAT/GBR PROGRAM DETAILS, JULY - SEPTEMBER

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

radial booms not yet fully extended to their 20m length. which

SATELLITES

GEOS-2 --- K. Knott telephoned the following information about the successful launch of ESA's GEOS-2, experiment switch-on and satellite drift plans. Consequently, this note is both an "Actuality" and a detailing of future plans.

The longitudinal location of GEOS-2 is 7 degrees East and its drift rate is 0.3 degrees/day eastwards on 31 July 1978. Plans now are to accelerate the drift to 1 degree/day eastward on 2 August in order for the satellite to be stationed at 37.5 degrees East early in September.

The ESA GEOS-2 satellite was launched from NASA's Eastern Test Range (ETR, also Cape Canaveral) on 14 July at 1043 UT and was injected into a nominal transfer orbit by the DELTA launcher at 1710 UT. Firing of the on-board apogee boost motor placed the satellite in its geosynchronous orbit on 15 July at 2354 UT. Payload switch-on and boom deployment were started on 26 July and, as of 1 August, all experiments are on and operating correctly. All booms are deployed with the long

A description of the payload of GEOS-1, which applies to GEOS-2, has been provided in IMS NL 77-6. Distribution of the GEOS-2 daily summary plots is to begin in the third week of August.

\*\*\*\*\*  
 Please note that limited storage capabilities and the exceptionally large quantity of data returned by the GEOS-2 S-300 (Field and Wave) experiment will require that an average of 90% of the data returned by that high-speed experiment be erased

three months after the month of data collection. Anyone interested in suggesting retention of S-300 data for special intervals should notify Dr. A. Pedersen, ESTEC, Noordwijk, Netherlands. He is the present chairman of the S-300 scientific board.

\*\*\*\*\*

GEOS-2 Orbit Foot Tracks --- SSC Maps of northern and southern hemisphere magnetic "footprints" of GEOS-2 are reproduced on page 5 of this NL. The plots were prepared on 31 July from current information about the present orbit and planned shifts through 31 August (day 243). Although in sun synchronous, "geostationary" orbit, the magnetic footprint of GEOS-2 describes a small daily oval that is progressively translated eastwards as the satellite is allowed to drift from about the Iceland/Syowa longitude to arrive on the longitude of Scandinavia in early September in time to be on station for the PORCUPINE-III & IV launches from Kiruna/ESRANGE. The two maps (to slightly different scales) show the magnetic field line tracks of GEOS-2 calculated from the Olson-Pfitzer-77 external field model (with tilt) and the internal field of Barraclough. These maps were prepared based on the planned eastward drift rate of GEOS-2 longitude of 1.0 degrees per day, to be stopped on 31 August 1978.

ISEE-1&2 --- Principal investigators for these satellites are now receiving experimenter data tapes and the first data pool tapes on a relatively routine basis. K. Ogilvie, project scientist for ISEE-1, discussed the delays in preparing pool tapes because experimenters had to derive new algorithms to process the preliminary summary data for the pool tape. The main problem was the unexpected degree of experiment interactions, considerably exceeding in space anything suggested by the ground testing before launch. Our first announcement about the availability of the ISEE data pool tape and microfilm of summary data from the IMS SSC office is given on page 4 of this NL.

EXOS-B --- T. Obayashi sends word that the next series of satellites in this sequence will be launched from Uchinoura on 14 September 1978.

NIMBUS-G and CAMEO --- The second stage of the Delta launch vehicle which will place NIMBUS-G into a circular orbit at 965 Km altitude will also carry a "piggyback" payload called CAMEO (Chemically Active Material Ejected in Orbit). Preliminary details about the CAMEO program were in IMS NL 78-7, pg 3. These two programs are not conducting related experiments but are mentioned together here because they share a common carrier.

NIMBUS-G is described as a research and development satellite intended to serve as a stabilized, earth-oriented platform for testing advanced systems for sensing and collecting meteorological data on global scales. Project scientist for this satellite is W.R. Bandeen, NASA-GSFC. A detailed description of the 8-experiment payload is given in "Report on Active and Planned Spacecraft and Experiments", NSSDC/WDC-A-R&S 77-03, Sept 1977 (pgs. 161-163). While these experiments are probably of greatest interest to scientists who are to be involved in the Preparatory MAP Projects (MAP), and later in the Middle Atmosphere Program (MAP), IMS participants may be interested in some of the payload. One such experiment is that of D.F. Heath, team leader for the "Solar and Backscatter Ultraviolet/Total Ozone Mapping System" (SBUV/TOMS) experiment, NIMBUS-G-09. Objectives of this experiment are to determine the vertical distribution of ozone, map the total ozone and 200-mb height fields, and monitor the incident solar ultraviolet (UV) irradiance and ultraviolet radiation backscattered from the earth.

CAMEO carries two experiments into orbit: one a sequential release of barium from four cannisters ejected over northern Alaska, and the other a single long duration (50 sec) lithium release over northern Scandinavia and coordinated with GEOS-2. Primary objectives are investigations of electric

fields, plasma flow and acceleration. Secondary objectives are the study of unexpected behavior which may be monitored. Chemical releases have not previously been conducted at orbital velocities near the earth. There is interest in evaluating extrapolations from sounding rocket and deep space releases to see how well they fit this high velocity case (e.g. field aligned motions, brightness, appearance prediction, auroral responses, ionization rates, etc.).

Project scientist J.P. Heppner, NASA-GSFC, has prepared a "CAMEO Information Memo No. 1" (23 pages) to "provide a brief, not highly technical, description of the experiments and the operations involved." Similar memos will be published to give further details on specific subjects.

EXOS-A "Himowari" --- Apogee of this satellite has been moved to 40 degrees North as of the end of April 1978, to improve conditions for observation of auroral images in the northern hemisphere and plasma waves and VLF waves in the southern hemisphere. Best conditions for observations at Syowa will be the present summer and at Ft. Churchill will begin this fall.

#### GROUND-BASED, BALLOON and ROCKET

#### ANTARCTICA & ICELAND

Conjugate Points Campaign --- H. Fukunishi, NIPR-Tokyo, is project scientist for this campaign linking the Antarctic (Syowa and Mizuho) and Iceland (Husafell). Campaign dates are from 15 August - 30 September 1978, during time intervals when the solar elevation angle is less than -12 degrees at Syowa and Reykjavik (between 0100 and 0300 UT at the beginning and shifting to 2030 - 0030 UT at the end of the window). All three stations will measure magnetic variations (H, D and Z), ULF waves, VLF waves and ionospheric absorption. Auroral measurements (intensity and space-time variations) will be made at husafell and Syowa.

#### ANDOYA

UK Andoya Campaign 1978 --- Rescheduled launch of Woolliscroft's two rockets originally part of the UK 2nd High-Latitude Campaign (see NL 77-7, pgs 2&3). Purpose is to study auroral chorus. Rocket observations will be coordinated with supporting ground-based observations of VLF by the Sheffield & Southampton goniometer network and optical observations of the TMA trail by Univ College London scientists.

#### N. AMERICA

#### POKER FLAT

EXCEDE II, FWIF, and TMA/SWIR/IR --- J.C. Ulwick, AFGL, et.al. will launch 6 rockets under these 3 programs. EXCEDE-II, also called "Spectral", carries an electron gun accelerator to create an artificial aurora for studies of emissions in the visible, ultra-violet and infra-red using photometers, radiometers and spectrometers. IMSCIE Office has received a copy of the report AFGL-TR-76-0308, "EXCEDE II" by O'Neil, Lee, Stair and Ulwick, 21 Dec 1976 938 pgs) that provides detailed information concerning previous launches and the present program.

FWIF will be launched into a bright auroral breakup for detailed spectra measurement using high resolution spectral measurements, 1.5 - 7.5 microns.

TMA, SWIR (2 rockets) and Ik were postponed from Feb 1978. They are to be launched simultaneously into a stable arc to study spatial characteristics and trapping mechanism of the 4.3 micron radiation associated with the arc. A report from AFGL on the SWIR experiment is AFCRL-TR-73-0152, "Project EXCEDE:SWIR Experiment", by O'Neil, Lee, Huppi and Stair (1973).

(Continued on pg 6)

IMS SSC Special High-Altitude Satellite Intervals

The IMS Satellite Situation Center has completed derivation of a set of special intervals for the second half of 1978 based upon configurations of high-altitude IMS satellites of opportunity. These are listed in the table below. The notation used is identical to that for previous special periods (see IMS/SSC Report No. 10 or NL 78-2). For each satellite orbit and each interval, an abbreviation is given that tells the general region in which the satellite will be located. Heavy-case letters indicate that the position was important in selecting that particular interval as offering unique possibilities for multi-satellite data comparisons. The abbreviations for orbit regions are: HT = High-Latitude Magnetotail; MT = Mid-Latitude Magnetotail; Sh = Neutral Sheet; DM = Dayside Magnetosheath; NS = Nightside Magnetosheath; I = Interplanetary Medium; C = Dayside access region (Cusp); S = Bow Shock Wave; and P = Magnetopause. An IMS SSC Report will soon be available illustrating these intervals; however, unlike last year, the report will not include daily bar charts. These will be available on microfilm. By special agreements among experimenters, enhanced data acquisition and processing efforts will be made for these intervals.

ISEE DATA POOL TAPES --- The SSC is now in receipt of ISEE pool tapes and microfilm data plots, and the SSC is ready to process requests for these products. The pool tapes contain data summaries from 8 of the ISEE experiments and "ON" or "OFF" indicators for 2 other experiments (Mozers & Harvey's). The microfilm contain summary data plots

with 4 frames/day. Details about the experiment data summaries on the magnetic tape and sample figures from the microfilm plots will appear in the next IMS NL (78-9). Copies of the ISEE pool tapes and/or microfilm may be requested from the IMS SSC by writing to Dr. J. Vette (address on IMS NL letterhead, pg 1). Distribution may be restricted to those persons having direct involvement with the ISEE program or proposing specific experiments using ISEE data and hence needing the quick-look provisional data. In addition to the ISEE data pool tape and microfilm, the SSC is generating tapes and microfilm plots of field line tracings and the model magnetic field around the ISEE-1 orbit. Each tape and microfilm reel is based on one month of definitive orbit data. The tapes are 9 track, IBM-compatible with density 1600 bpi and contain the following information: date and universal time, satellite position, internal and external components of the model field at the satellite, the Northern and Southern hemisphere coordinates of the base of the field line containing the satellite, the arc length along the field from the satellite to the ground, and the location and field strength of the minimum field value on the field line containing the satellite.

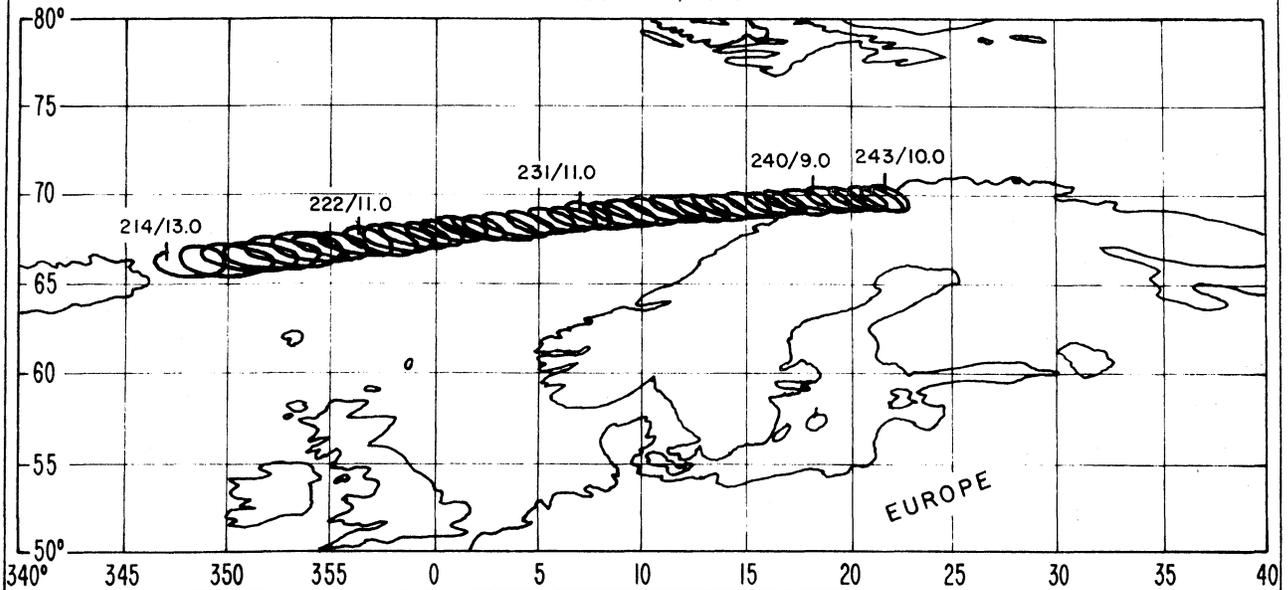
Detailed format information is available from the SSC. The Barraclough internal field model and the Olson-Pfitzer (1977) external field model with tilt are used. The microfilm plots show, on each frame, a world map projection of the type shown in NL 78-1 with the ISEE-1 sub-satellite point and Northern and Southern hemisphere magnetic foot tracks for one revolution of the satellite. Any requests for these products should be addressed to the SSC.

**IMS/SSC Special Periods for Days 182-365 1978 by Region**

Special Period No.	Approx. Time (d/h)	Satellite Regions							Comments
		Vela 5A	Vela 5B	Vela 6A	Vela 6B	IMP-II	IMP-J	ISLL 1	
11	198/22	DS	I	DS	MT	I	MT	NS	2 in midlatitude tail for 4 h.
	199/7	I	DS	MT	HT	I	MT	I	3 in tail for 1 h.
	200/18	DS	HT	HT	I	I	HT	DM	3 in high-latitude tail for 2 1/2 h.
12	210/11	P	HT	P	I	I	NS	P	Boundary encounters within 3 h.
15	217/16	DS	I	DS	HT	P	I	P	Boundary encounters within 1/2 h.
	218/2	I	DS	HT	HT	HT	I	I	3 in high-latitude tail for 1 h.
	218/21	I	MT	HT	DS	HT	I	I	3 in tail.
14	275/18	DS	HT	HT	S	I	HT	I	3 in high-latitude tail for 2 h.
	276/18	NM	NM	DS	I	I	S	S	Boundary encounters within 1/2 h.
15	300/16	NM	DM	DS	DS	I	NS	DS	4 in magnetosheath for 2 h.
	301/11	MT	DS	I	NS	I	S	S	Boundary encounters within 1 1/2 h.
16	312/8	DS	S	NS	Sh	I	Sh	I	2 in neutral sheet for 4 h.
	313/4	I	NS	HT	NS	I	HT	DM	2 in high-latitude tail for 4 h.
	313/6	I	NS	HT	DS	I	P	P	Boundary encounters within 1 h.
17	337/22	NS	Sh	NS	I	I	Sh	I	2 in neutral sheet for 1 h.
	338/2	NS	MT	DS	I	I	MT	I	2 in midlatitude tail for 3 h.
	338/9	HT	HT	DS	I	I	HT	I	3 in high-latitude tail for 2 h.
	339/1	MT	DS	I	DS	I	P	P	Boundary encounters within 1 h.
	340/0	NS	I	DS	HT	I	S	S	Boundary encounters within 3 h.
18	351/11	I	HT	HT	I	I	HT	NM	3 in high-latitude tail for 10 h.
	351/16	DS	HT	NM	I	I	P	P	Boundary encounters within 1 h.
19	362/10	Sh	DS	I	DS	I	Sh	I	2 in neutral sheet for 8 h.
	363/3	HT	I	I	HT	I	HT	NM	3 in high-latitude tail.

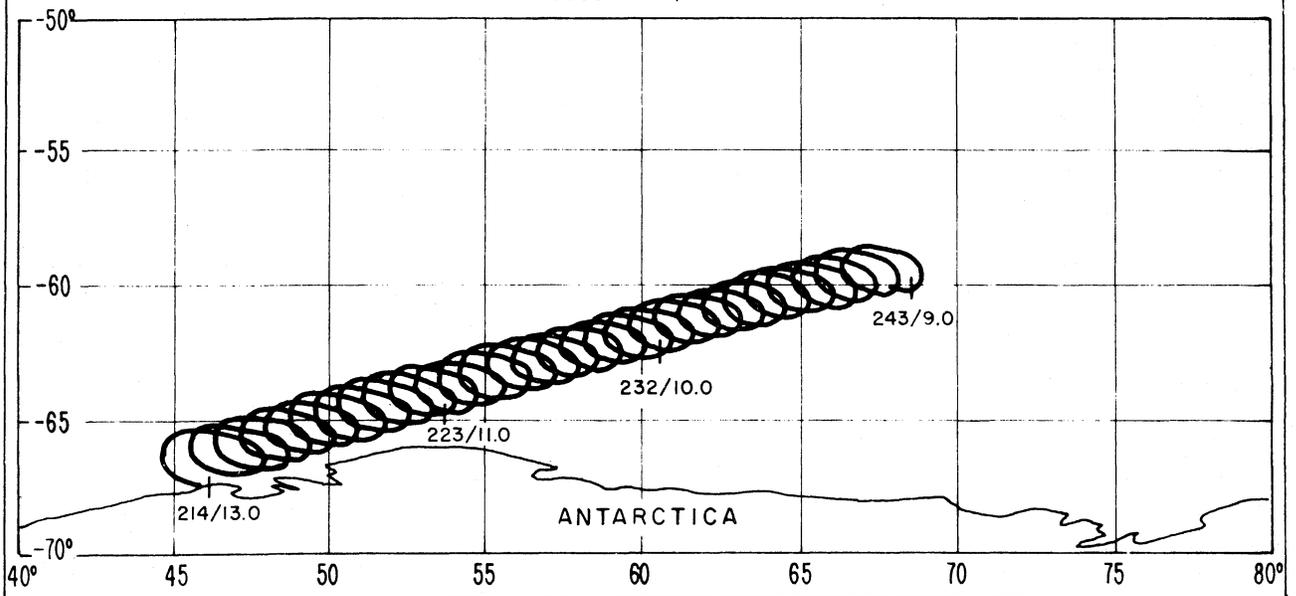
### GEOS-2 NORTHERN HEMISPHERE MAGNETIC FOOTPRINT

AUGUST 2-31, 1978



### GEOS-2 SOUTHERN HEMISPHERE MAGNETIC FOOTPRINT

AUGUST 2-31, 1978



#### IMS NEWS FROM INNSBRUCK

1-15 DECEMBER 1977 Special IMS Observational Interval - G. Rostoker, convener of the IMS Working Conference at Innsbruck this past June tells us that he has prepared a report on the Working Conference. IMS Secretary E.R. Dyer will distribute the report and extracts will appear in these NL's. We understand that it will contain listings of the most important features discussed at the Working Conference and will summarize the written responses of the participants.

#### POTENTIAL FOR IMS ANALYSIS PROJECT FUNDING

D. Peacock, US NSF, has indicated that fewer proposals have been received than were expected for new cooperative studies during the IMS Analysis Phase. Although it is probably too late to suggest new initiatives for the final year of the IMS Observational Phase (1979), it has been proposed that the Analysis Phase extend from 1980-1985 (see

IMS Steering Committee recommendations, this NL, pg 7). Proposals for appropriate national and international cooperative IMS projects should be sent to the NSF to the attention of either H. Carlson, Aeronomy Program Director, or D. Peacock, Solar-Terrestrial Physics Program Director.

#### Ground Support for JASPIC

The JASPIC program actualities are given on pg 7 of this NL. J.W. Wright has written to inform us about ground support for this rocket program. The Wallops ionosonde, operated regularly for NASA and NOAA-ERL by NOAA-EDIS, was upgraded for the JASPIC program. Nighttime E-region recordings in the 0.25 - 2 MHz range were improved by adding a small spaced receiving array and working on the long switched-dipole transmitting antenna. Residual night-E layer, and occasional occurrences of the "intermediate layers" possibly caused by particle precipitation are now observable by the ionosonde.

ACTUALITIES

SATELLITE

EXOS-A "KYOKKO" --- A. Nishida sent us a copy of a Japanese-language quick report on Kyokko scientific experiments. The booklet contains brief reports on each experiment with sample data plots of some results and a brief description of telemetry reception at Churchill and Kagoshima. Status of this satellite is described as "very healthy" and it is "supplying exciting data". Recording of data at the Japanese Northern Ground Station (Churchill site) took place from March through June 1978, and was then suspended until September 1978. Tracking of this satellite is determined by local conditions with JNGS usually covering orbits for 4 days per week and KCS (Kagoshima) and Syowa covering 3 days.

GMS "HIMAWARI" --- Summary data plots for 13-14 July 1978, from the GMS energetic particle sensors are reproduced on page 8 of this NL (Note: after sending the figure to the printer, we noticed that the data for 13 July should have been displayed on the left side of that for the 14th).

GOES-2 --- Preliminary X-ray plots from the space environment monitor sensors of the SMS/GOES satellite series have appeared before in these NL's to illustrate X-ray flare effects sensed at geostationary altitudes. Data from the SEM (X-ray, magnetic fields and energetic particles) are routinely collected by NOAA's Space Environment Laboratory and eventually transferred on tape and microfilm to NGSDC/WDC-A for STP (see acronym note below). On pg 9 of this NL is shown the signal recorded by GOES-2 from the record X-ray flare of 11 July 1978 (X15 level). The sensors on both GOES-2&3 were offscale for this event and the peak values are estimated in this figure.

GROUND-BASED, BALLOON and ROCKET

ANTARCTICA

SYOWA Austral Winter Program --- Two rockets from this program were launched during the first half of 1978: Nakamura's S-310JA-7 on 27 March at 1915 UT and Kimura's S-310JA-5 on 11 June at 2256 UT. Details about these rocket experiments were given in NL 78-3, pgs 4&5.

MULTIPLE SITES

Japanese IMS Experiments --- Two reports have been received by the IMSCIE Office giving details of many IMS experiments (monitoring and campaigns). "IMS Interim Report" is a 240-page report on practically all Japanese observations connected with IMS during the first half of the "observational phase" (1976 and 1977). It also includes plans for the remainder of IMS observations (in Japanese). The second report from the Japanese IMS Committee was presented at the IMS Working Conference in Innsbruck this past June. In some 70 pages this excellent publication provides detailed descriptions and pictures of summary data for some 13 programs during the special IMS intervals 1-3 and 10-12 December 1977. Emphasis is primarily on ground-based data collected; however, ionospheric total electron content observations by ETS-II satellite is discussed and comparisons with earlier solar activity and interplanetary conditions are given in another paper. The many figures are most helpful in displaying the phenomena during this time as observed by a variety of techniques.

NORTH AMERICA

White Sands --- A. Christensen launched rocket 18.1023UE on 15 June. Details not yet available.

JASPIC --- Launches of a Soviet MR-12 payload and an American (Cornell University) Chemical trial payload were made during a geomagnetic substorm on 11 June. On 20 June, an MR-12 and a University of Illinois at Urbana Champagne (UIUC) payload were

launched into a "recurrent" magnetic storm; on 24 June, an MR-12 was launched into quiet conditions, and on 26 June, two MR-12's and an Aerospace Corporation-University of Texas at Dallas - Federal Republic of Germany (A-UTD-FRG) payload were launched into a flare produced geomagnetic storm. This storm was a K=4 event. The final University of Illinois payload is waiting for a larger flare induced storm and is likely to be launched in July.

MR-12 apogees were approx 180km, the Nike-Apache payloads reached 180-200km (Cornell Chemical and UIC) and the Nike-Tomahawk (A-UTD-FRG) payload reached 315km. Quick look analysis indicates at least a rough agreement between the instrumentation on each of the payloads. All instruments indicate small fluxes during these quiet to moderately disturbed conditions. Since the observed fluxes were small, detailed data analysis, including careful noise level determinations, will have to be made before the degree of agreement can be ascertained; however, no large discrepancies appear to be in the data.

The total program consisted of the above mentioned rockets plus several ground based and airborne measurements. On the night of 11 June, ionospheric data were obtained from the Millstone Hill radar and from the AFGL flying ionospheric lab. Airglow measurements were obtained from the ground at Wallops, Arecibo and Huancayo and from the AFGL aircraft. Airglow measurements were made throughout the month (moon and weather permitting) from Wallops and from Arecibo. Ionograms were made every night according to the normal NOAA program at Wallops and during launches made once per minute.

The data reduction efforts are in progress. The Millstone Hill Observatory had a malfunction during the actual launch minutes, but provides ionospheric data before and after launch. Azimuthal scans from Millstone Hill provided radar data from over Wallops Flight Center, south of Millstone to the disturbed subpolar regions to the north.

The aircraft data were obtained along a flight vector which initially went to the east of Wallops Flight Center and then along the 75 degree meridian to the north into the ionospheric trough region. Preliminary data analysis indicate that H-Balmer-alpha was being emitted weakly to the north of Wallops Island and south of the trough. None of the airglow data (preliminary analysis, background corrections not yet made) show significant 391.4 m emission from N2+ but this fact is consistent with observed weak particle fluxes.

All MR-12 payloads were alike and contained particle flux instruments (a low keV energy electrostatic analyzer, a Geiger Counter, and a dosimeter type instrument called Phosphor) and ionospheric instruments (RF mass spectrometer and an impedance probe). The University of Illinois instruments similarly included particle instruments (a low keV electrostatic analyzer and solid state detectors) and ionospheric instrumentation (a transmission electron content measurement). The A-UTD-FRG payload was also similarly instrumented with corpuscular flux measurements (a magnetic spectrometer and a solid state detector) and ionospheric instruments (an impedance probe from FRG and a high spatial resolution Langmuir Probe from UTD).

All instruments worked well and all but the last Soviet rocket worked as designed. The last MR-12 to be launched performed at less than expected thrust levels and reached an apogee of 90 km.

The Wallops Flight Center summary of operations for June show how frustrating a program like JASPIC can be. During the scheduled launch period 04-26 June there were over 24 postponements, mainly due to quiet ionospheric conditions. Forecasters at the SESC were in daily touch with the experimenters at Wallops Island to give warning of increased magnetic activity, a necessary requirement for launch. Alas, magnetically June was fairly quiet.

**MORE IMS NEWS FROM INNSBRUCK**

Auroral Breakup Campaign (ABC) <<< The proposal for a cooperative, multi-national observational campaign to study the auroral breakup phase was proposed by Heikkila and Pellinen and announced in IMS NL 77-12 (pg 3). Observations were to be taken during the new moon interval 27 Feb - 13 March 1978, primarily by the dense N. European network of IMS ground-based sites. A working campaign was evolved and a meeting convened on 8 June to discuss results. R. Bostrom took notes and we here abstract from this source material about joint study intervals, further studies/future meetings, and repetition(s) of the campaign.

During this campaign the Kiruna receiving station for TRIAD magnetometer data was operated but the data has not yet been associated with interesting events. Munster and Gottingen magnetometer networks were operated. The STARE radars were operating and some data has been reduced. The Finnish riometer net was also in operation. Interesting ps6 events were recorded at Apatity and TV aurora recordings were made at Loparskaya and Apatity. Other photometric and ionospheric recordings were made at many sites.

For special study the interval 2 March (1800 UT) to 3 March (0400 UT) was selected. Second choices of several groups were: March 8-9 (1440 UT) pulsations; (1800-2000 UT) red aurora; (2017.30 UT) surge; March 7 (1830 UT) good optical observations at Kevo; (2020 UT) breakup; March 9 (1900-2130 UT) quiet period; March 11 (all day?) good optical observations from Kiruna; and during absorption events Feb 27 (1822 UT, 2138 UT), and March 2 (0004 UT).

The next meeting of study groups for these events will be at the Bad Lauterberg conference, 24-27 October 1978 (see IMS NL 78-7, pg 8). Sub-groups may meet before this time. R. Pellinen will act as coordinator and each group is to send him a summary (1 page) of their data as soon as possible.

Possible campaign repetition times for ABC are during the Porcupine rocket launch window (Sept-Oct 1978) and during the Substorm=GEOS rocket launch window (14 Jan - 8 Feb 1979) were adopted by the group. Expansion of observational coverage during this time to include Iceland and Greenland was encouraged.

I. Zhulin sent a note about ABC observations by O.M. Raspopov, M. Uspenski and G. Starkov. All are at the Polar Geophysical Institute (PGI). Within the ABC-78, PGI staff observed auroras and radio auroras on 3 Feb (1810-1855 UT), 8 Feb (2250-2350 UT), 15 March (0020-0140 UT), 16 March (1730-1900 UT) at Loparskaya's meridian. We have used Essoyla 93 MHz radar with 1.5 degree wide lobe of the antenna, all-sky camera with the image intensifier and two ordinary all-sky cameras. Our purpose was to measure the joint location of the radio aurora and aurora during substorms and the radar sight of fast auroral forms.

Excerpted from Draft Report of the IMS Steering Committee Meeting, Moscow, March 1978

Item 13. Recommendations

The IMS Steering Committee,

1. RECOGNIZING that the scientific goals of the IMS cannot be achieved without systematic data analysis, and that such analysis will certainly require several years after 1979 (the end of the observational interval for the IMS as now agreed),

RECOMMENDS that an "IMS Data Analysis Phase" be organized to begin no later than 1980, and to continue through 1985, and

CALLS the attention of national funding agencies to the need for setting aside adequate funds for the analysis and interpretation of IMS data during this interval.

2. EXPRESSES ITS DEEP APPRECIATION for the highly effective services provided to the IMS by the IMS Central Information Exchange Office and its branches, and by the IMS Satellite Situation Center, and

RECOMMENDS that SCOSTEP consider immediately undertaking the steps necessary to ensure the continuation of these services to the extent they will be needed for future solar-terrestrial programs, such as MAP and the IMS Data Analysis Phase.

3. RECOMMENDS TO SCOSTEP that it establish a small ad hoc working group, with the task of familiarizing itself with proposals for future magnetospheric studies and of advising SCOSTEP on its coordinating role in this field.

4. RECOMMENDS the establishment of a small ad hoc working group to investigate the feasibility of establishing a "Data Analysis Workshop Center" (DAWOC). (Ideally, a DAWOC is a place equipped with a small computer and accessories such as memory and display units where data analysts and theorists might work together on coordinated data sets with the aim of maximizing the scientific return from them.)

5. NOTING that the Socialist countries participating in the Interkosmos program propose to concentrate their contributions to the IMS during the interval January-March 1979 (e.g., by special balloon and rocket campaigns), at a time when both the Interkosmos spacecraft MAGIK and Ionosonde=IK will be operating, and

TAKING INTO ACCOUNT the high potential for attaining some IMS goals presented by the above factors and by the expected situation of other spacecraft like GEOS and ISEE, together with the possibility of extended supporting ground-based, balloon, and rocket campaigns,

CALLS THIS OPPORTUNITY TO THE ATTENTION of all countries and workers participating in the IMS, and

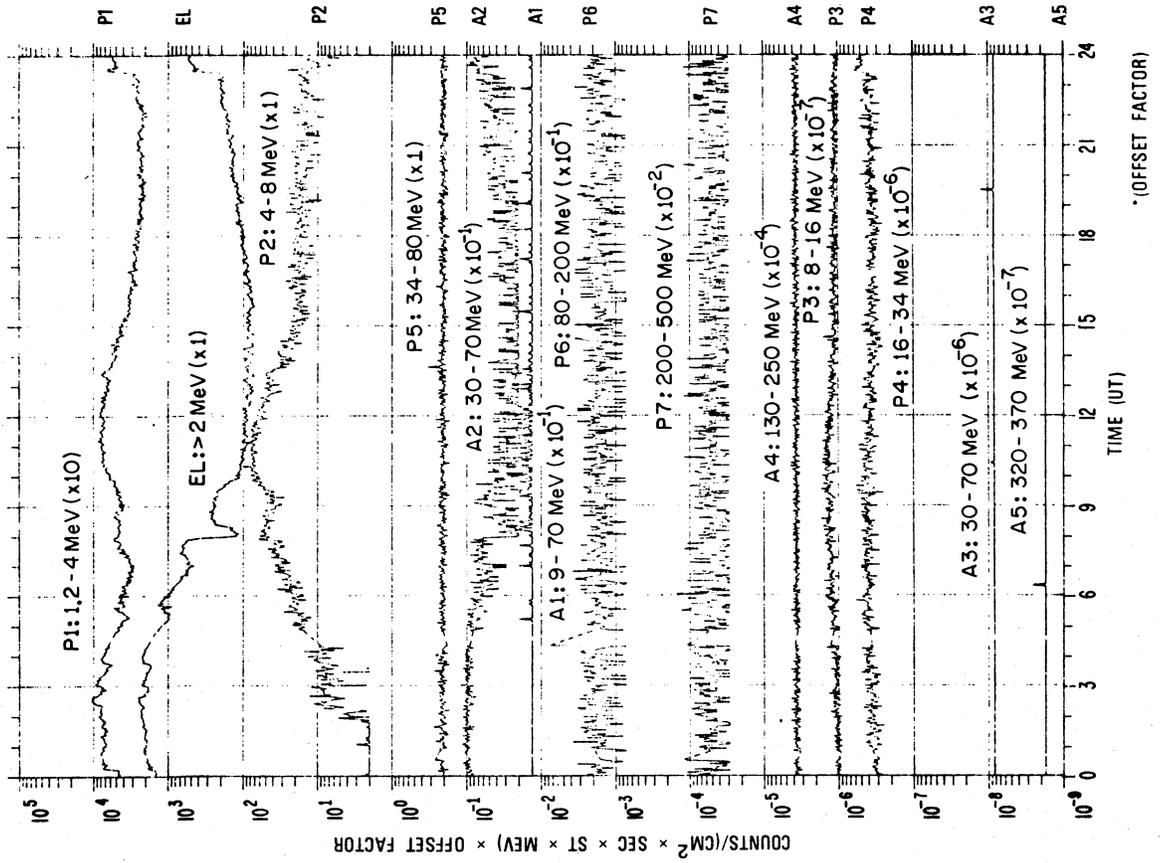
SOLICITS their cooperation in coordinating their own efforts with the Interkosmos proposal.

6. EXPRESSES its gratitude to the Soviet Academy of Sciences and its IMS Commission and the "Sun=Earth" Council for inviting and hosting this meeting of the IMS Steering Committee (the first such held in the USSR). The Steering Committee welcomes the opportunity that the meeting provided for a fruitful exchange of information and views with representatives of the Soviet IMS community.

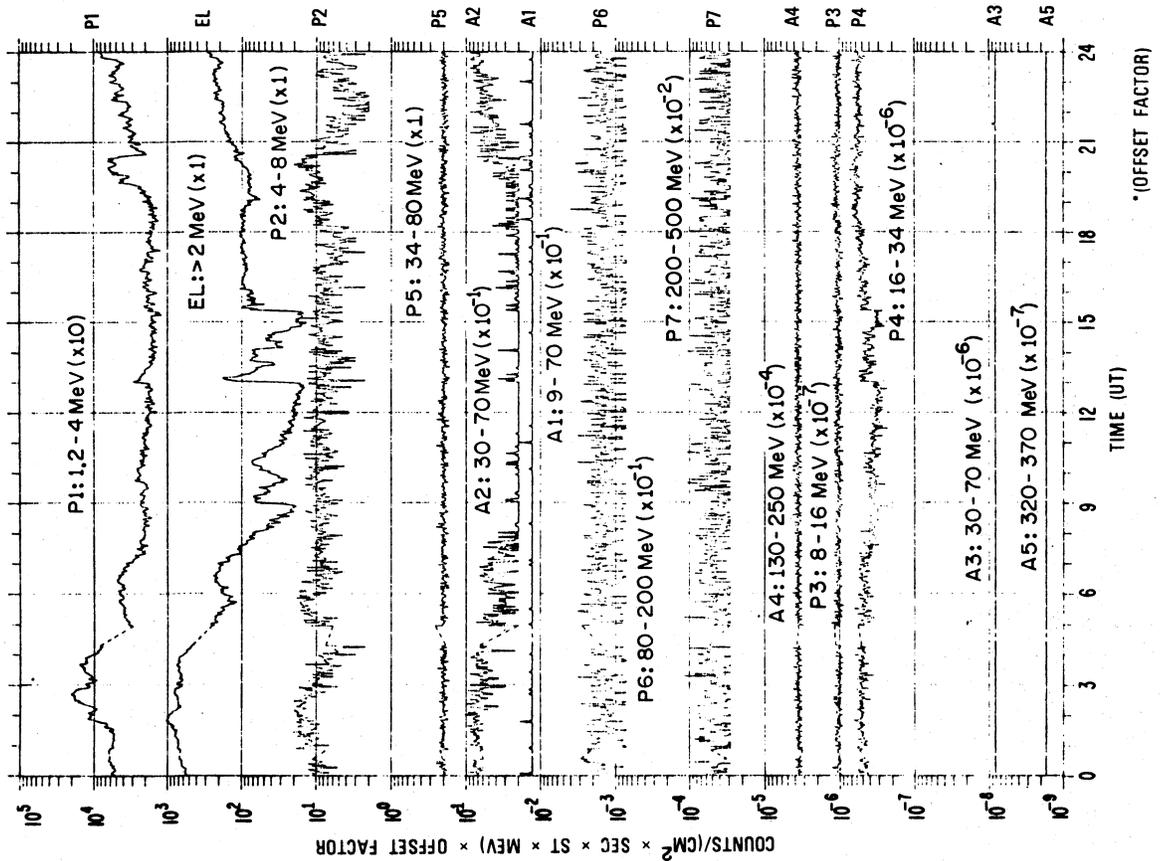
SPECIAL IMS STUDY INTERVAL

29 July 1977 <<< R.H. Manka convened a special workshop at Innsbruck to study data acquired for this disturbed period when GEOS=1, several low-altitude satellites and many ground-based instruments were recording interesting data (see previous IMS NL's since 77-9). He sent a note from which comments about results of the meeting are taken: Several further steps in the analysis of this event are planned, these include: (1) preparation of a data catalog for the event, (2) obtaining suggestions and contributions from the magnetospheric modelling community at the La Jolla conference in Sept, (3) six months of interactions between scientists having related data analyses in selected sub-area of this problem, and (4) a final workshop focusing on the physics of the event and its contribution to the understanding of major magnetospheric problems. IMS scientists interested in this event are reminded to send abstracts about their data from the 29 July substorms to R. H. Manka, US IMS Coordination Office, NSF, Washington, D.C. 20550, USA (Telephone # 202-632-5944). This abstract should contain a broad description of phenomena monitored along with the scientist's address, telephone and telex number. These will be combined into a "catalog" of the event describing the key events and showing summary figures, where possible. Distribution will be to all participants.

GMS/SEM TWO-MIN. AVERAGES  
JULY 13, 1978

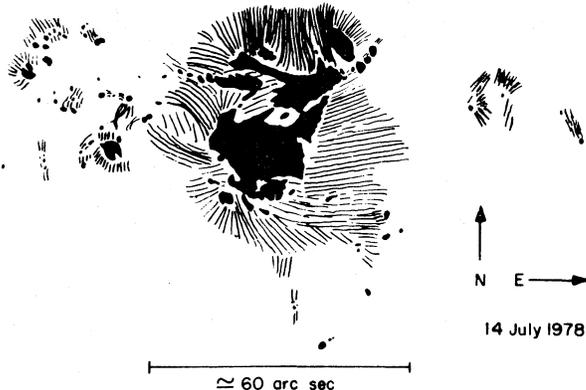
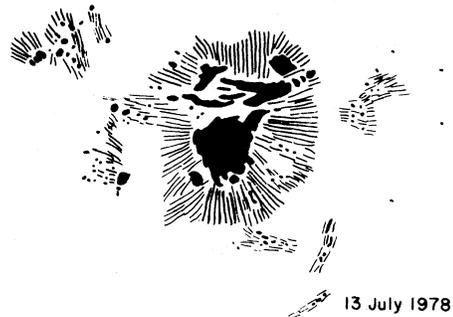
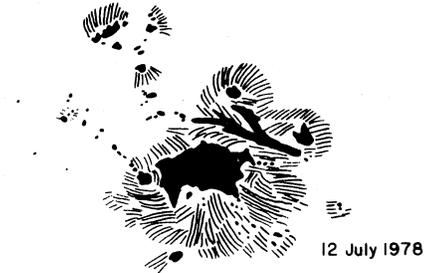


GMS/SEM TWO-MIN. AVERAGES  
JULY 14, 1978



Record Solar X-ray Burst Monitored - - - Region 1203 (McMath 1503, N17, L=168) produced two large events on 10 and 11 July. The 10 July event was an X8 x-ray burst with a 2B optical flare and a 2000 flux unit radio burst on 10cm wavelength. The 11 July event saturated the GOES-2 satellite sensors at class X-15 and was projected to be an X-30 x-ray burst. An importance 2B flare (N18 E38), visible in white light, also correlated with this event. Radio burst was 4900 flux units at 10cm. Sunspot drawings below, by observers at the Boulder SEL observatory, show how the region continued to grow (class/area Ekc/1040 on 14 July), being comparable to the great active center of Aug 1972. High magnetic field gradients and increased shear motion evident along the neutral line in the area of the steepest magnetic gradients, along with the complexity of the region led to expectation of further major activity. However, no further X-class events were recorded, and the region rotated over the west limb of the sun on 20 July.

A small enhancement of the 10meV particle flux was noted for a short period on 13 July. A maximum of 20 protons/cm<sup>2</sup>/sec/ster was observed at 1000Z. The greater than 10 protons/cm<sup>2</sup>/sec/ster threshold was exceeded from 13/0300Z until 13/1300Z. The geomagnetic field was at minor storm levels on 14 July aft. experiencing a rather sharp sudden commencement at 2328Z on 13 July. (Extracted from SESC reports).

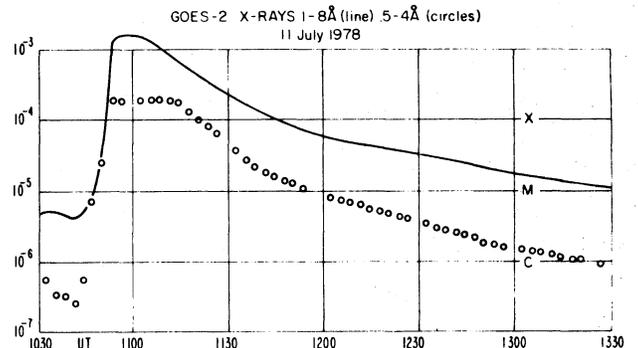


Preliminary Listing of Solar Flares

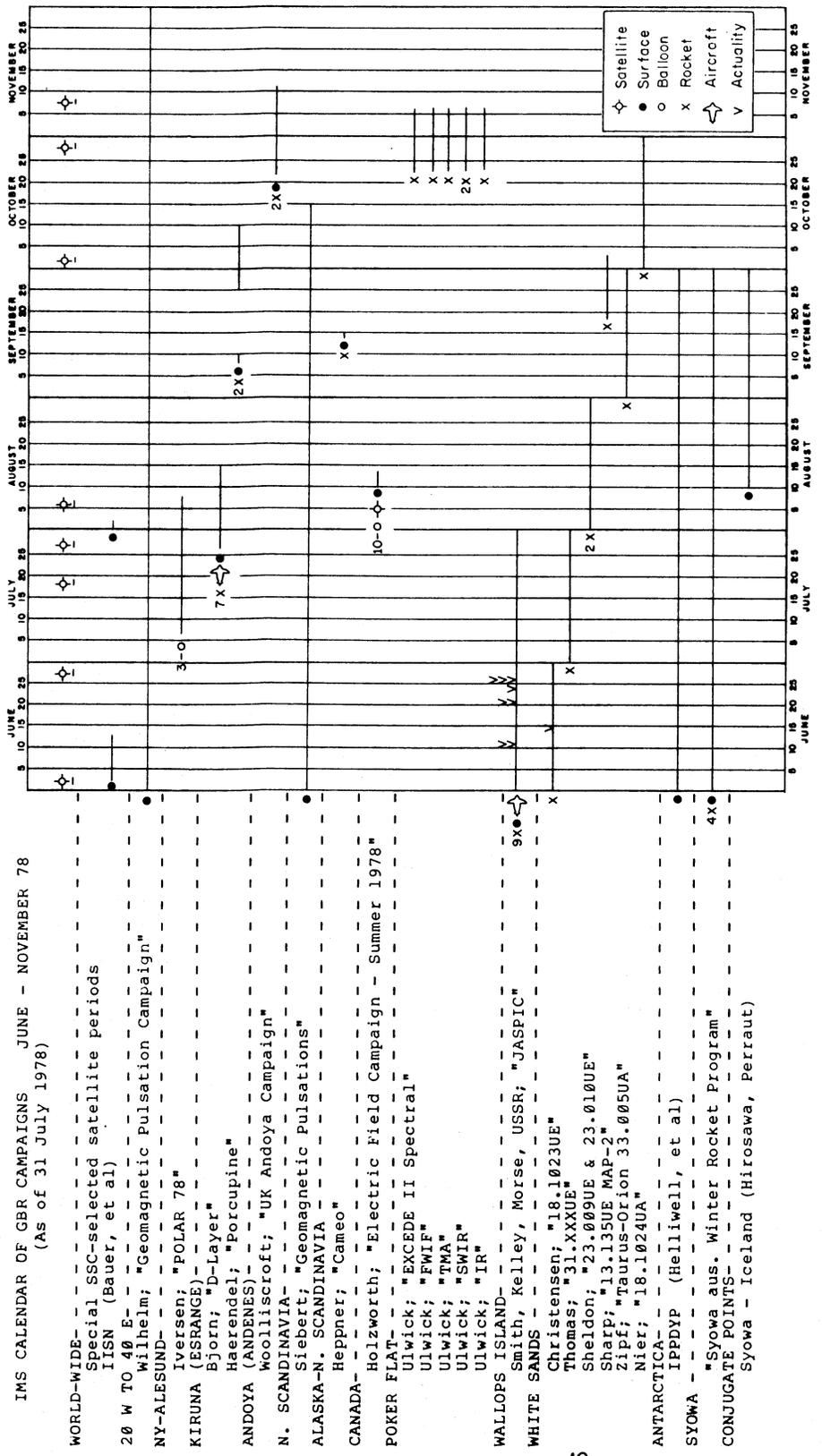
Solar Flare Data --- The table below contains a listing of X-ray flares, class M1 and higher, for the period 24 June - 23 July 1978 extracted from "Preliminary Report and Forecast of Solar Geophysical Data", published by SESC in Boulder (see IMS NL 78-5).

Date	Begin	Max	End	Location	Imp	Reg	C1
Jun26	1529	1542	1805	N17 W15	2B	1170	M3
28	B0252	0256	0314	S20 W15	-B	1172	M2
Jul 1	B1340	1343	1403	N19 W83	-N	1170	M1
2	1403	1404	1420	S18 W90	2B	1172	M1
7	0530	0533	A0540	N15 W90	2N		M2
	0946	0951	1024	N15 W90	1N		M3
	B1212	1215	A1231	N18 E64	1B	1197	M1
	1801	1802	1819	S18 W52	-F	1184	M1
8	1945	1956	2015	N17 E79	1B	1203	M3
9	B1010	1016	1024	N19 E72	-B	1203	M1
	B1258	1424	1531	N19 E68	1B	1203	M3
	1635	1650	1652	N19 E68	-B	1203	M2
	1804	1832	1847	N19 E68	2B	1203	X3
	1653	1654	1700	S18 E38	-B	1197	M2
	1735	1741	1840	S18 E37	1B	1197	M1
10	0137	0143	0258	N18 E63	1B	1203	M5
	B0150	0150	A0224	N20 E65	1B	1203	M1
	0312	0314	0414	N18 E62	1N	1203	M2
	0502	0504	0532	N15 E59	1B	1203	M2
	B0620	0624	0707	N18 E58	2B	1203	X8
	1307	1320	1441	N18 E56	1B	1203	M2
	1655	1734	A1737	N19 E54	2B	1203	M7
	1819	1920	2123	N17 E54	1B	1203	M4
11	0054	0055	0105	N17 E47	-N	1203	M2
	B0359	0402	A0406	N18 E55	1N	1203	M1
	B1054	1058	1150	N20 E46	1B	1203	X15
	1642	1650	1706	N18 E41	-B	1203	M1
	2022	2033	2111	N18 E39	-B	1203	M1
	2215	2231	2301	N18 E38	2B	1203	X2
	2354	0014	0050	N18 E37	-B	1203	M1
12	B0249	0251	A0251	N18 E36	1N	1203	M4
	1001	1016	1026	N11 E28	-B	1203	M1
	1548	1606	1639	N16 E27	-B	1203	M1
	2049	2058	2120	N17 E27	1B	1203	M3
15	B0046	0055	0140	N17 W03	1B	1203	M2
	1425	1431	1451	N19 W10	1B	1203	M1
18	1719	1726	1859	N17 W51	-B	1203	M2
	1922	1958	2102	N17 W52	2B	1203	M6
20	B0037	----	0100	N20 W72	1F	1203	M1
21	B0451	0453	A0500	N17 W83	-B	1203	M1
	1857	1900	A1926	N17 W90	1B	1203	M8
22	1250	1336	1403				M1

GMS/SEM proton data - - - On the facing page are GMS (Himawari) 2 min. average particle flux values for all channels, sent to the IMSCIE office by T. Kohno, Meteorological Research Institute, Tokyo. The data cover the period 13 - 14 July 1978. An enhancement of the 4 - 8 MeV proton flux (channel P2) is evident from 13/0200 UT. Kohno has also sent us hourly averaged fluxes of protons, alphas and electrons observed by Himawari for the period 18 - 26 Sep. 1977 which clearly show the large flux increases of solar protons on Sep. 19 and 24, following the large solar events beginning 19 Sep. (see NL 77-10 pg 10).

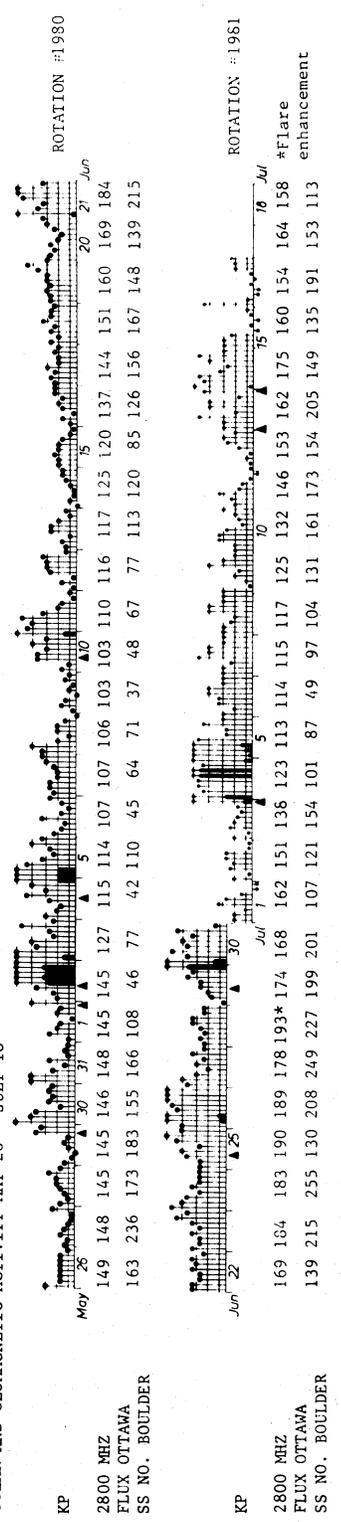


IMS CALENDAR OF GBR CAMPAIGNS JUNE - NOVEMBER 78  
(AS of 31 July 1978)



- WORLD-WIDE - - - - -
- Special SSC-selected satellite periods
- IISN (Bauer, et al)
- 20 W TO 40 E - - - - -
- Wilhelm; "Geomagnetic Pulsation Campaign"
- NY-ALBESUND - - - - -
- Iversen; "POLAR 78"
- KIRUNA (ESRANGE) - - - - -
- Bjorn; "D-Layer"
- Haerndel; "Porcupine"
- ANDOYA (ANDENES) - - - - -
- Woolliscroft; "UK Andoya Campaign"
- N. SCANDINAVIA - - - - -
- Siebert; "Geomagnetic Pulsations"
- ALASKA-N. SCANDINAVIA - - - - -
- Heppner; "Cameo"
- CANADA - - - - -
- Holzworth; "Electric Field Campaign - Summer 1978"
- POKER FLAT - - - - -
- Ulwick; "EXCEDE II Spectral"
- Ulwick; "FWIF"
- Ulwick; "TMA"
- Ulwick; "SWIR"
- Ulwick; "IR"
- WALLOPS ISLAND - - - - -
- Smith, Kelley, Morse, USSR; "JASPIC"
- WHITE SANDS - - - - -
- Christensen; "18.1023UE"
- Thomas; "31.XXXUE"
- Sheldon; "23.009UE & 23.010UE"
- Sharp; "13.135UE MAP-2"
- Zipf; "Taurus-Orion 33.005UA"
- Nier; "18.1024UA"
- ANTARCTICA - - - - -
- IPPDYP (Helliwell, et al)
- SYOWA - - - - -
- "Syowa aus. Winter Rocket Program"
- CONJUGATE POINTS - - - - -
- Syowa - Iceland (Hirosawa, Perraut)

SOLAR AND GEOMAGNETIC ACTIVITY MAY 26 - JULY 18



- RP
- 2800 MHZ
- FLUX OTTAWA
- SS NO. BOULDER
- 149 148 145 146 148 145 145 127 115 114 107 107 106 103 103 110 116 117 125 120 137 144 151 160 169 184
- 163 236 173 183 155 166 108 46 77 42 110 45 64 71 37 48 67 77 113 120 85 126 156 167 148 139 215
- RP
- 2800 MHZ
- FLUX OTTAWA
- SS NO. BOULDER
- 169 184 183 190 189 178 193\* 174 168 162 151 138 123 113 114 115 117 125 132 146 153 162 175 160 154 164 158 \*Flare
- 139 215 255 130 208 249 227 199 201 107 121 154 101 87 49 97 104 131 161 173 154 205 149 135 191 153 113 enhancement