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NORSAR

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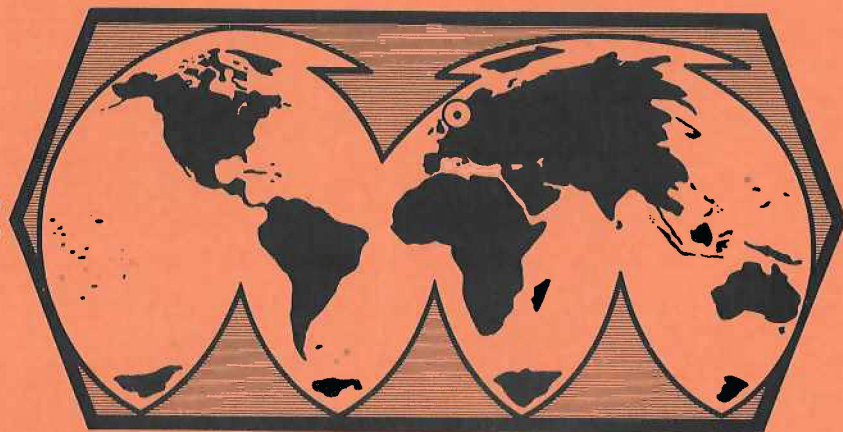
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SEMIANNUAL TECHNICAL REPORT NORSAR PHASE 3

1 January – 30 June 1974

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Kjeller, 1 September 1974



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P. EVENT PROCESSOR OPERATION

General Considerations

The Event Processor programs are still vulnerable to improper/incorrect input data from the files on the Shared Disk Pack. However, a battery of off-line utility programs has been developed. These programs makes it easy to check file content, move pointers, and to change incorrect entries in these files.

Computer Utilization

During this period the Event Processor (EP) was up and running 29.5% of the time, compared to 41.1% in the last reporting period. This significant decrease in processing time is caused by various factors, such as a decrease in the total number of processed detections, fewer EP breakdowns with reprocessing of already processed data, and implementation of an SNR pre-processing threshold with diurnal variation (see below).

EP Operational Problems

The Shared Disk Pack, which is the communication link between DP and EP, was declared to be down from DP on 19 January, caused by the disk pack being in the "rest ready" status for a short while. This went unnoticed by the operator. Since EP got no new detections to process, it was idle after processing the detection comprising the lag in time between DP and EP. On 20 January the Shared Pack was declared up by the operator. The missing interval was processed by off-line EP, using the Detection Log tape as input. To prevent such an event to occur once more, some of the DP routines have been modified to alert the operator repeatedly when the Shared Pack is declared down (described elsewhere).

On 1 February the EP terminated each time it was executing the Detection Bulletin File Generation Package in Job Step 3. Investigation of the dumps showed that during the "publish" function, both partitions of the Detection Bulletin File had the same date. This caused a situation not accounted for in the algorithms, and thereby a following termination. On 3 February the deadlock was broken by performing a "release" function from the 1052 console in Job Step 4. To secure that one partition always was picked to be published, even if the two dates were identical, a small modification was implemented in the corresponding algorithm.

On 24 June the Time-of-Day (TOD) unit stopped because of a power break, and was afterwards started with a completely erroneous time. It ran for a short time with this incorrect time before it was stopped and adjusted. However, some detections had already been written to the Signal Arrival Files on the Shared Pack with wrong start and stop times. Also, entries had been written to the Shared Pack Time/Tape File, which contained erroneous start and stop times for the tapes. The erroneous times were propagated to the Detection File, and a loop occurred in the Detection Bulletin File Generation Package when one of these times were read from the Detection File. Also, the wrong times in the Time/Tape File entries caused many detections to be processed with EP-code=3 ("No HR-tapes available"). Various utility programs were used to move pointers past bad detections in the Signal Arrival Files, and to correct the bad times in the Time/Tape File entries.

EP Parameters and Algorithms

The following changes were made to the Event Processor system in this period:

On 28 February an improved version of the procedure for local events and glitches was implemented. DP performs

six different tests on detections to check if they might be local events (explosions) or glitches. The results of these tests are sent to EP along with the detection via the Shared Pack Signal Arrival Files. On the basis of these test results, EP classifies the event as local, glitch or processable. The improved procedure accepts more events for processing (not local or glitch) than was allowed in the old version.

At the same time the read-in logic of incoherent detections from the Shared Disk Pack file was simplified in such a way that no wait for a duplicate arrival is taking place, since duplicate arrivals cannot take place under incoherent beamforming. Also the ringing of the alarm bell was removed from the "ready-for-operator-input" message as this was considered superfluous.

The Event Family Grouping procedure, which has been implemented as a separate overlay in the EP monitor, has never been working properly. Its only function has been to read a phase from the Phase/Hypothesis table. On 8 April the Event Family Grouping phase was removed, and corresponding modifications performed in the EPCON part of the monitor. This simplifies EP logic considerably, and reduces the monitor overhead time for each event.

At the same time implementation of a statistical sign-bit semblance test in the Beampacking and Array Beamforming package was performed. The result of the test is normalized and saved as an intermediate result in the Short Period Variable File for the event on disk, to be printed out later by the Summary Report Package in Job Step 3.

Also, a small change in the tape management routine now secures that the volume label of an input tape conforms to ISRSPS standards.

EP Performance Statistics

A summary of the analyst decisions for each of the detections processed by EP is given in Table P1. The statistics are not significantly different from previous reporting periods, although somewhat fewer events are reported, which can be attributed to variations in seismicity. A somewhat more effective computer utilization should be expected after the introduction of a diurnal variation in pre-processing threshold, leading to a constant false alarm rate throughout the day (but

TABLE P1

Analyst decisions for detections processed by EP during the time period January-June 1974.

Analyst Classifications	Number of Processings	Percentage
Accepted as events	3298	47.0
Rejected as being		
- Poor SNR or noise	1412	20.1
- Local events	1103	15.7
- Double processings	671	9.5
- Communications errors	539	7.7
Sum processed	7023	100.0

not necessarily fewer noise detections). A more effective screening of local events has also been introduced (28 Feb), and the fact that there are equally many local events processed must therefore be due to the occurrence of a larger number of such events. Finally, it should be noted that one third of the detections caused by communication errors occurred during one week in June with high activity of thunder and lightning.

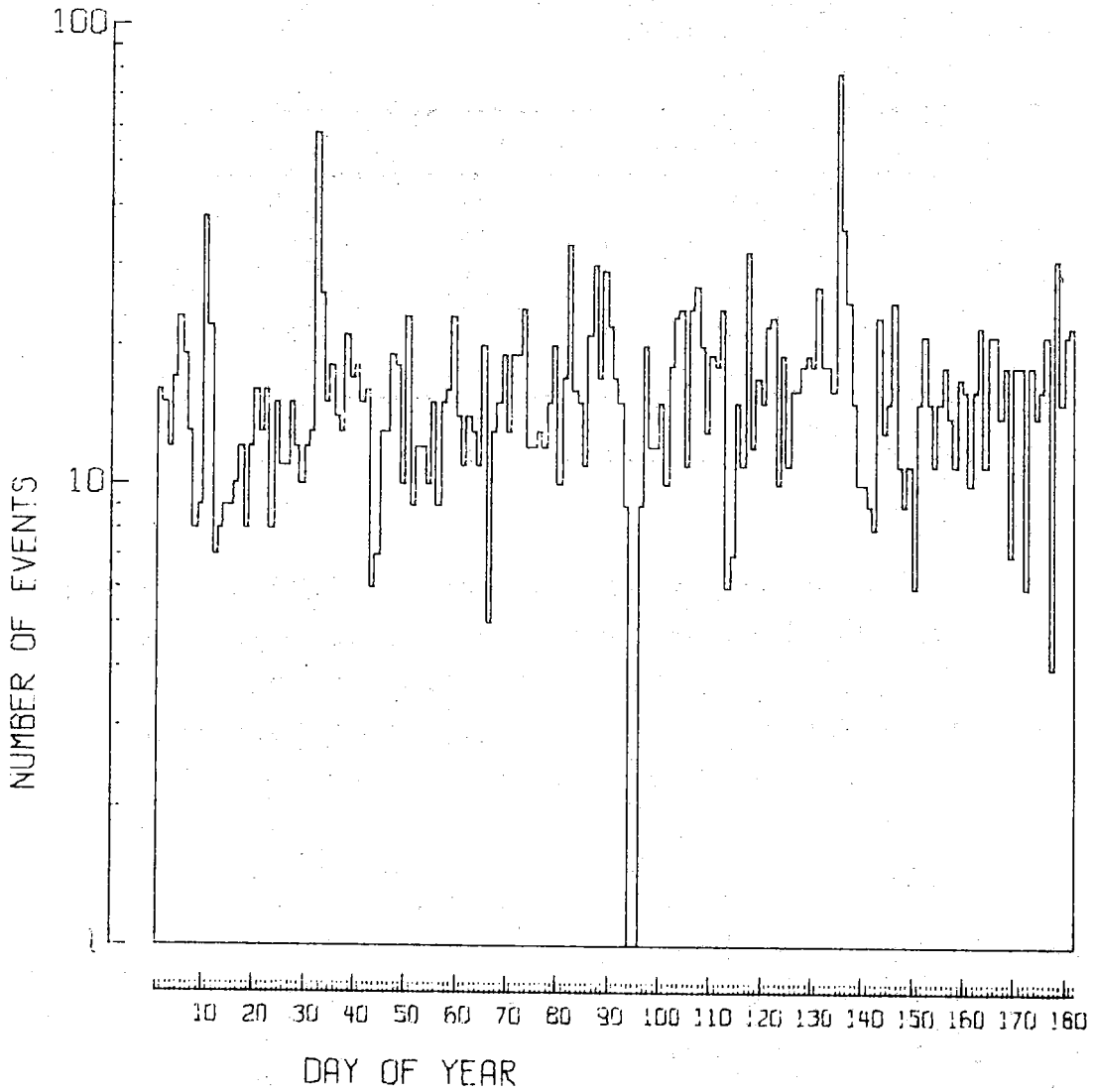


Fig. P.1 Number of reported events as a function of day of year for Jan-June 1974.

TABLE P2

Number of teleseismic and core phase events reported during the time period January-June 1974.

Month	Teleseismic	Core	Sum
Jan	308	111	419
Feb	322	139	461
Mar	361	155	516
Apr	355	102	457
May	451	121	572
Jun	364	118	482
Sum	2161	746	2907

The number of reported events on a monthly basis is given in Table P2, and the distribution on a daily basis is given in Figure P1. It should be noted that the last 40 days were relatively quiet, especially taking into account that the noise level was quite low.

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