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**SEMIANNUAL TECHNICAL REPORT
NORSAR PHASE 3**

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VII.5 NORSAR Operational Capabilities

Using the same regionalization and estimation procedures as Bungum and Husebye (1974) an evaluation of the NORSAR Event Processor performance for the period April 1972 until March 1975 has been undertaken.

Detectability Thresholds

Table VII.5.1 shows the estimated 50 and 90 per cent cumulative detection thresholds for the period April 1972 - March 1973, April 1973 - March 1974, April 1974 - March 1975 and April 1973 - March 1975. There is a small tendency for higher thresholds for the last two years, although for regions 6, 7 and 8 the thresholds for the period 1974-75 are lower than those for 1972-73. The main impression is that there is a remarkable stability in the performance over the three years. Using only one year intervals, there are some regions where there are too few events, or the distribution is such that the method applied is not usable. With three years of data a relatively reliable estimate of the detection threshold for all the regions is, however, achieved.

Location Estimation

The difference in epicenter solutions has been calculated for the events reported jointly by USGS and NORSAR in the period January 1973 until March 1975. Fig. VII.5.1 presents the results for region 14 (distance limits 30-90 degrees from NORSAR) in increments of 50 km location difference. Fig. VII.5.2 shows the same data for the interval February to November 1972. It is seen that the distribution in Fig. VII.5.1 has a much shorter tail, indicating that most of the large location errors have been removed. Since the data is so skew the 50 per cent (median) and the 90 per cent level of location differences is used as characterizing parameters. In Table VII.5.2 the values observed for the period February to November

1972 (by Bungum and Husebye, 1974) is listed together with the values observed for the period January 1973 until March 1975. For most of the regions there is a considerable reduction in location differences especially on the 90 per cent level. This is partly due to the implementation of new region corrections at NORSAR in November 1972, and partly due to the more experienced analysts.

A more thorough discussion of both detection and location performance will be published in a forthcoming report.

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REFERENCES

- Bungum, H., and E.S. Husebye (1974): Analysis of the operational capabilities for detection and location of seismic events at NORSAR, Bull. Seism. Soc. Am., 64, 637-656.

Table VII.5.1

Cumulative 50 and 90 per cent detection thresholds in terms of NORSAR m_p units for the intervals April 1972 - March 1973, April 1973 - March 1974, April 1974 - March 1975 and April 1972 - March 1975. N means number of events. A dash indicates that there were too few data or a too difficult distribution for detectability estimates. Area of coverage for the different regions is given in Table VII.5.2. (They are defined in Bungum and Husebye, 1974.)

REGION	1972 - 1973			1973 - 1974			1974 - 1975			1972 - 1975		
	MB-50	MB-90	N	MB-50	MB-90	N	MB-50	MB-90	N	MB-50	MB-90	N
1	-	3.6	392	3.4	3.8	319	3.6	3.8	397	3.4	3.7	1108
2	-	-	99	3.5	4.0	91	-	-	42	2.7	3.8	232
3	3.7	4.1	138	3.9	4.4	88	3.8	4.3	102	3.8	4.3	328
4	-	-	147	3.5	3.9	151	3.4	3.8	184	3.4	3.8	482
5	3.0	3.6	466	3.6	3.7	409	3.3	3.8	469	3.1	3.6	1344
6	3.4	3.8	386	3.3	3.8	241	3.1	3.5	263	3.3	3.8	890
7	3.2	3.6	524	3.1	3.5	396	3.1	3.5	770	3.1	3.5	1690
8	-	4.4	299	3.0	4.0	290	3.3	3.7	453	3.2	3.6	1042
9	4.0	4.5	961	3.9	4.5	546	3.9	4.4	466	3.9	4.5	1973
10	3.4	3.9	841	3.3	3.7	1395	3.4	3.9	912	3.4	3.8	3148
11	4.0	4.6	146	4.3	4.6	238	4.2	4.7	141	4.1	4.5	525
12	3.4	3.9	663	3.3	3.9	777	3.4	4.0	799	3.4	3.9	2239
13	4.4	4.7	88	4.2	4.9	91	4.4	4.9	165	4.3	4.8	344
14	3.4	3.8	4335	3.4	3.9	4011	3.5	3.9	4278	3.4	3.9	12624
15	4.0	4.5	1057	4.2	4.6	1298	4.3	4.7	1188	4.2	4.6	3543

Table VII.5.2

Estimates of median and 90 per cent location difference (in km) between USGS and NORSAR epicenter solutions. N means number of events.

REGION	AREA OF COVERAGE	February - November 1972			January 1973 - March 1975		
		50%	90%	N	50%	90%	N
1	Aleutians-Alaska	135	330	157	110	220	461
2	Western North America	185	310	39	130	260	129
3	Central America	430	830	61	200	590	146
4	Mid-Atlantic Ridge	360	790	31	150	420	143
5	Mediterranean-Middle East	220	650	120	300	610	389
6	Iran-Western Russia	150	580	76	170	710	182
7	Central Asia	105	270	120	120	300	349
8	Southern-Eastern Asia	130	340	42	150	290	205
9	Ryukuo-Philippines	195	610	166	200	540	424
10	Japan-Kamchatka	95	260	255	100	230	1062
11	New Guinea-Hebrides	380	1330	87	210	840	263
12	Fiji-Kermadec	310	910	183	230	640	508
13	South America	390	680	33	210	495	112
14	Distance Range 30°-90°	145	490	1191	130	310	3775
15	Distance Range 110°-180°	320	1020	409	220	670	1195

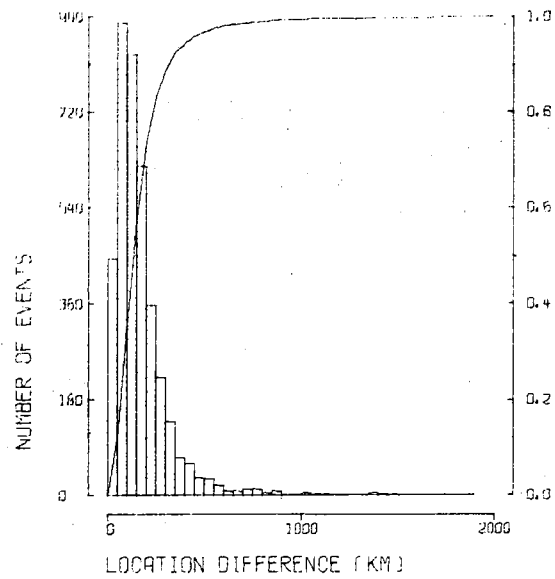


Fig. VII.5.1 Cumulative and incremental distribution of epicenter location difference between USGS and NORSAR for region 14 (distance 30-90 degrees from NORSAR) for January 1973 until March 1975.

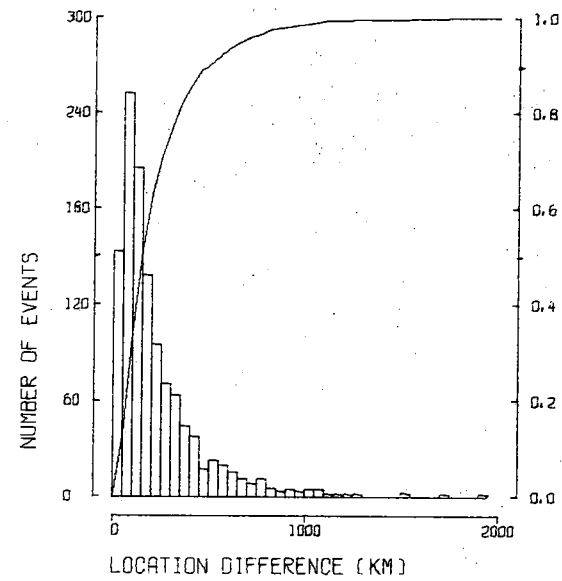


Fig. VII.5.2 Same as VII.5.1 for the time period February to November 1972 (from Bungum and Husebye, 1974).