

NORSAR

ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

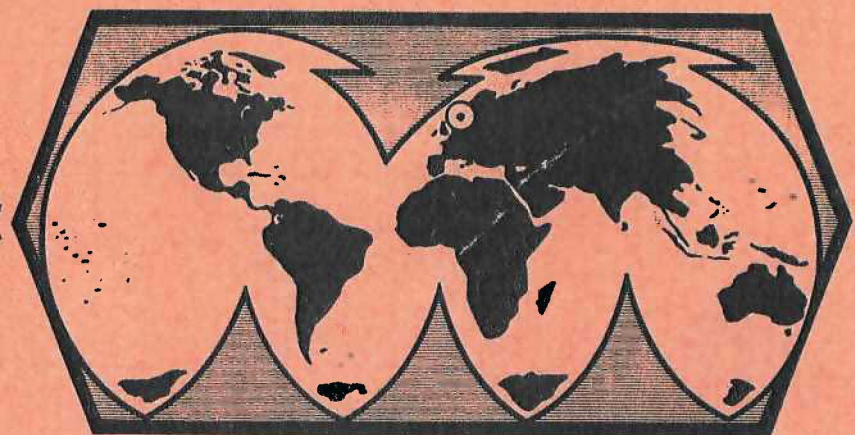
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FINAL TECHNICAL SUMMARY

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VI.4 Seismic Event Discrimination Based on Near-Field Observations

Up to now the NORSAR event discrimination efforts have to a large extent been based on information extended from teleseismic recordings corresponding to epicentral distances mostly in excess of 30 deg. Lately we have taken up research aimed at several aspects related to seismic event discrimination based on near-field recordings. Although only preliminary results are available at present, we consider it worthwhile to present in some detail the rationale behind these efforts and also the work done so far.

Seismograph Station Detectability Studies in Near-Field Distance Ranges

Most event detectability studies previously undertaken have been based on the reporting performance of individual stations of P-wave recordings in the epicentral distance interval of 30-90 deg. The actual observational data necessary for such studies may be extracted from easily available files, and in this respect the ISC (International Seismological Centre, U.K.) bulletin files have been widely used, e.g., see Ringdal et al (1977). Now, in this approach a prerequisite is that a station reporting performance is somewhat lower than that of the reference station or reference reporting agency like ISC, a condition which with few exceptions is fulfilled for teleseismic distance ranges. For example, out of the 482 stations analyzed using the ISC focal parameters as a reference, only 4 stations had a P-wave reporting performance better than or equivalent to that of ISC, so that their detectability performance could not be estimated reliably. Problems of the latter type may become much more severe for near-field distance ranges, as in this case we have to actually consult individual station bulletins to check on possible mismatches in event detectability with that of ISC. As NORSAR's event detectability performance is superior to that of most other stations and networks for events occurring in large parts of Eurasia, we are considering options to replace ISC by NORSAR as a reference station in the detectability analysis. We are also investigating the possibility of obtaining local station bulletins so as to enable us to undertake specialized analysis of stations of particular interest in this respect.

Work accomplished so far here is as follows:

- All available ISC-bulletin files since 1971 have been transformed to a special compact format suitable for our particular kind of analysis.
- The corresponding data analysis routines have been adapted for detectability estimates for all stations consistently reporting to the ISC and for near-field distance intervals of 5, 10 and 15 deg to ensure that at least in some intervals sufficient data will be available.

We are also considering an extended detectability study based on the fact that stations in coastal and some other areas have an event detectability which is likely to be subjected to seasonal weather conditions. In other words, we are considering estimating station detectability as a function of time of year in intervals of 3 months. The outcome of this experiment will be used for checking whether there is a significant difference in event detectability of certain areas at high latitudes by using an appropriate network of high-quality seismograph stations.

Present status on the various detectability experiments is that the necessary software developments have been completed, and that the first analysis of real data has commenced.

J. Fyen
E.S. Husebye
F. Ringdal

Reference

Ringdal, F., E.S. Husebye and J. Fyen (1977): Earthquake detectability estimates for 478 globally distributed seismograph stations, Phys. Earth Planet. Inter., 15, P24-P32.