Progress Report No 15

for the project

Norwegian National Seismic Network

For the period July 1st to Desember 31st, 1999

Sponsored by

Oljeindustriens Landsforening

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and

NORSAR
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1. Introduction

This 15th progress report, under the project Norwegian National Seismic Network (NNSN), covers the last half of 1999. The purpose is to describe the current technical operation of the stations, the data recorded, the costs and the budget for the project for the reporting period. A separate report is given on the seismicity of Norway and surrounding areas in which the data recorded is presented (Appendix 1). A report for the NORSAR arrays is given in Appendix 2.

2. Operation

The operational stability for each station is shown in Table 1. The average downtime for all 13 stations is 1.3 % compared to 1.2% for the last reporting period. This is well within acceptable limits, since the goal is to keep average downtime below 2 %.

Table 1. Downtime in % for the time period January to December, 1999 for each station of the NNSN.

Station	Downtime in %
Karmøy (KMY)	2
Odda (ODD1)	0.7
Blåsjø (BLS)	8.7
Høyanger (HYA)	0.5
Sulen (SUE)	0.3
Molde (MOL)	1.3
Florø (FOO)	1
Namsos (NSS)	0
Mo i Rana (MOR8)	0
Lofoten (LOF)	1.8
Tromsø (TRO)	1.7
Kautokeino (KTK)	0
Bjørnøya (BJO1)	0

3. Field stations and technical service

The technical changes for each seismic station, are listed below. It is noted if these changes are not related to a visit of the UiB technical staff. When a station stops working, tests are made to locate the problem. Sometimes the reason cannot be found and the cause of the problem will be marked as unknown.

Bjørnøya (BJO1)

No visits or technical changes.

Florø (FOO)

06.07.99 Cisco-760 upgraded to version 4.2
06.10.99 PC restarted by local operator.

Høyanger (HYA)

07.07.99 Cisco-760 was upgraded to version 4.2.
25-29.11.99. Several restarts were necessary, unknown cause.

Karmøy (KMY)

29.10.99. Installation of new garmin GPS clock, version 4.2 on Cisco-760 and Seislog (QNX) version 8.0.
30.10-1.11-99. Several restarts were necessary, unknown cause.

Lofoten (LOF)

17.11.99. Seislog version 8.1 was installed from Bergen.
25.11.99. Error in Seislog software corrected.
Installation of un-interruptible power supply (UPS), lightning protection and GPS with one pulse pr. second (PPS).

Mo i Rana (MOR8)

24.11.99. Installation of UPS, lightning protection and GPS with 1 PPS. Due to too small hard disk it was not possible to install Seislog version 8.1.
03.12.99. New PC with Seislog version 8.1 was installed by the local operator. From this date spikes were introduced in the data.
27.12.99. New PC with Seislog version 8.1 was installed by the local operator. No spikes observed.

Molde (MOL)

19.12.99. Lightning caused damages to Cisco box, PC, digitizer and ISDN line.
22.12.99. Installation of a new PC, Cisco box and digitizer, all done by the local operator. GPS clock out of function.
24.12.99. New Garmin GPS clock installed by the local operator.
31.12.99. ISDN line ok.

Namsos (NSS)

23.11.99. Installation of Seislog (QNX) version 8.1, GPS with 1 PPS, UPS and lightning protection. The vertical seismometer was centred.
31.12.99. Several restarts, unknown cause.

Tromsø (TRO)

16.08.99. Several restarts necessary, unknown cause.

Sulen (SUE)

05.07.99. Installation of Seislog (QNX) version 8.0 and version 4.2 on Cisco-760.

Odda (ODD1)

13.09.99. Lightning caused problems.
14.09.99. Installation of new ISDN box by Telenor. The local operator installed a new Cisco box.

Blåsjø (BLS)

12.10.99. No triggers, unknown fault on system.
27.10.99. Minor technical repair. Installation of PC with Seislog version 8.0, Cisco box, UPS and serial-line protection.

Kautokeino (KTK)

01.07.99. Installation of PC with Seislog version 8.0, USRobotics modem, UPS and serial-line protection. The seismometers were checked.
17.08.99. Restart by local operator since there had been an occasional problem to log in to the station.

Other technical matters

All stations now have UPS, new generation GPS clock with 1 Hz synchronisation pulses (1 PPS) and serial line protectors.
For the stations Kautokeino and Mo i Rana it is now apparently possible to get ISDN connections which have been ordered but not installed. The Blåsjø station got ISDN during the fall of 1999. This means that all stations will be on internet this year which further will improve stability and accurate logging.
Blåsjø was the station with the largest downtime during this period (2 weeks). 3 days after the breakdown, it was found out that ISDN could be delivered shortly so the repair was not done until the ISDN line was ready, this in order to visit the station only once.
It was the plan to visit the Bjørnøya station late fall in order to try to improve the earlier unstable operation. However Bjørnøya has worked very well for all of 1999 (and still is) so due to that fact and the rather tight economy, no visits to Bjørnøya was made. There is a plan for an upgrade visit later this year.

4. Data

An overview of the seismic activity in Norway and surrounding areas for the last half of 1999 is given in Appendix 1. The data recorded by the seismic stations were collected and monthly bulletins were prepared and distributed. Since there was no event in Norway of magnitude larger than 5.0 during the last half of 1999, no special report has been written.

6. Use of NNSN data during 1999

Publications and reports

Atakan, K. The role of Caledinoan structures in present day seismicity of Norway and the adjacent areas. Geonytt No.1, 2000, 33

Dehls J. and O. Olesen (eds.) (2000): Neotectonics in Norway. Annual Technical report 1999. NGU Report 2000.001.

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Midzi, V., Singh, D. D., Atakan, K. and Havskov, J. 1999. Transitional continental-oceanic structure beneath the Norwegian Sea from inversion of surface wave group velocity data. Geophysical Journal International, 139, 433-466.

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Ottemøller, L and J. Havskov. SEISNET: A general purpose virtual seismic network, Seismological Research Letters, 70, 522-528

Pacesa, Andrius. Near surface attenuation in Norway, MSc thesis, University of Bergen.

Sellevoll, A, H. Bungum and J. Havskov. Fra spørrskjema til storpolitikk, GEO, Februar 1999, 12-16.

Oral and poster presentations

Bungum, H., Hicks, E., Lindholm, C., Olesen, O., Dehls, J., Olsen, L., Bockmann, L. & Riis, F. 1999: Neotectonics in Norway - NEONOR. Abstract. International Association of Seismology and Physics of the Earth's Interior, International Union of Geodesy and Geophysics, Birmingham 19-30 July 1999. A.170. Poster

Bungum H., O.T. Gudmestad, T.S Hagberg, J.K. Holme, K. Karthegian, C. Lindholm, F. Nadim and G. Woo (1999): New seismic zonations in cooperation between Norway and UK. Abstract. Ninth Int. Conf. on Soil Dynamics and Earthquake Engineering, SDEE `99, Bergen, August 9-12, 1999.

Hicks, E.C., Bungum, H. & Lindholm, C.D. 1999: Concentrated earthquake zones on the Norwegian continental margin. Abstract. International Association of Seismology and Physics of the Earth's Interior, International Union of Geodesy and Geophysics, Birmingham 19-30 July 1999. A.166.

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Lindholm C. and H. Bungum (1999): Earthquake hazard in Norway: The seismological frame of reference. Ninth Int. Conf. on Soil Dynamics and Earthquake Engineering, SDEE `99, Bergen, August 9-12, 1999.