

# **Swedish National Seismic Network (SNSN)**

## **A short report on recorded earthquakes during the third quarter of the year 2002**

Reynir Böðvarsson  
University of Uppsala

October 2002

**Svensk Kärnbränslehantering AB**

Swedish Nuclear Fuel  
and Waste Management Co  
Box 5864  
SE-102 40 Stockholm Sweden  
Tel 08-459 84 00  
+46 8 459 84 00  
Fax 08-661 57 19  
+46 8 661 57 19



# **Swedish National Seismic Network (SNSN)**

## **A short report on recorded earthquakes during the third quarter of the year 2002**

Reynir Böðvarsson  
University of Uppsala

October 2002

*Keywords:* Seismic network, earthquakes

This report concerns a study which was conducted in part for SKB. The conclusions and viewpoints presented in the report are those of the author(s) and do not necessarily coincide with those of the client.

A pdf version of this document can be downloaded from [www.skb.se](http://www.skb.se).

## **Abstract**

According to an agreement with Swedish Nuclear Fuel and Waste Management Company (SKB) and University of Uppsala, the Department of Earth Sciences has continued to carry out observation and additional construction of new seismic stations within the Swedish National Seismic Network (SNSN). This report gives some information about the recorded seismicity during July through September 2002.

At present 34 stations are in operation and four additional stations will be put into operation before the end of this year. During the period July through September 2002, there were 62 located events whereof only 6 with magnitude larger than 1.0. The range of the depth to the location to the center of the generated earthquakes varies between 0 and 32.5 km. Most of the earthquake activity is along the Bothnian Sea Coast in general and on or around the Post Glacial Faults close to Skellefteå in particular. The largest event, with magnitude 1.8, was located approximately 20 km north-west of Härnösand.

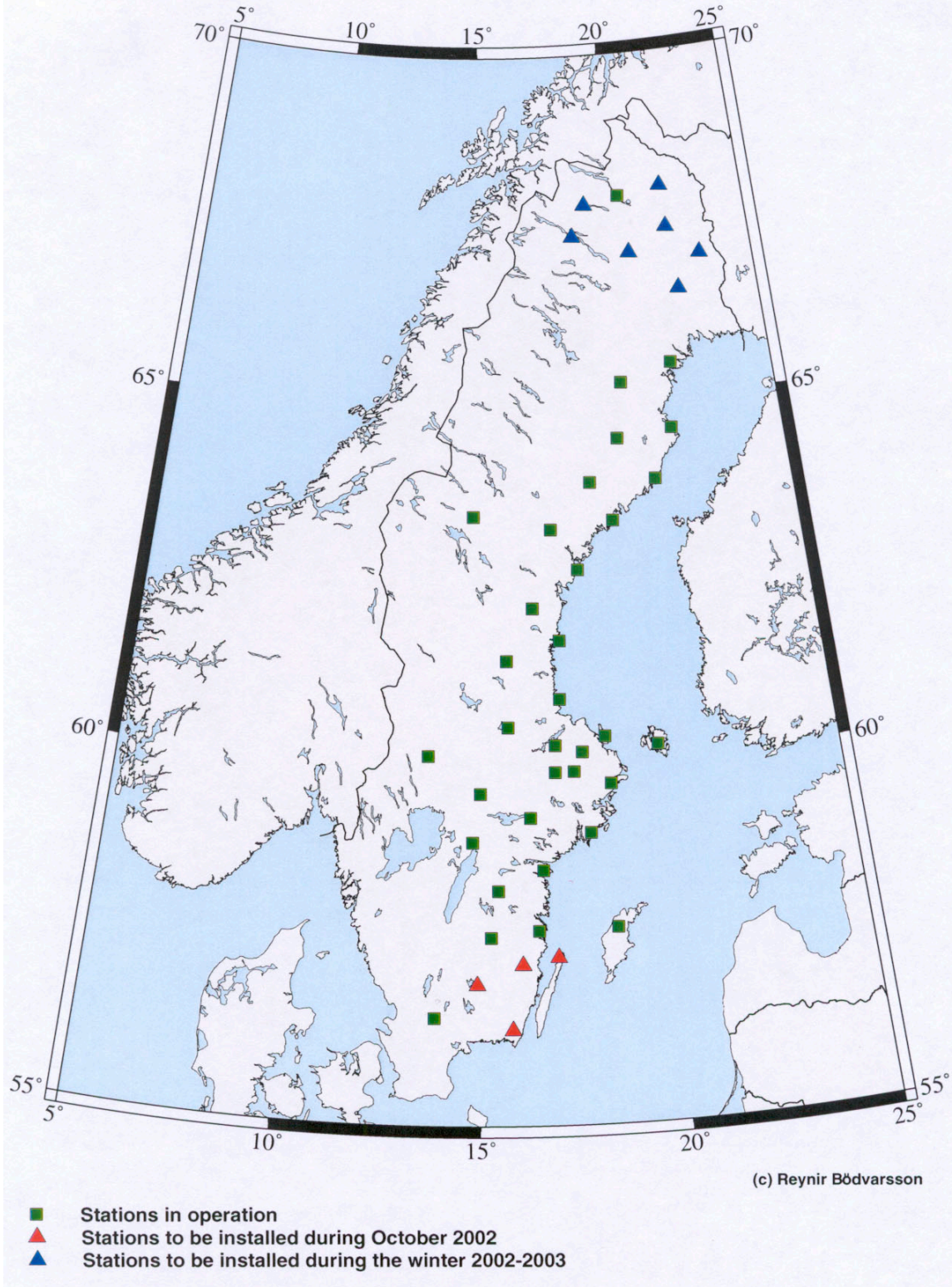
# Contents

<b>1</b>	<b>Introduction</b>	7
<b>2</b>	<b>Objective and scope</b>	9
<b>3</b>	<b>Equipment</b>	11
3.1	Description of equipment	11
<b>4</b>	<b>Recorded earthquakes during the third quarter of 2002</b>	13
4.1	July	13
4.2	August	15
4.3	September	16

# 1 Introduction

This is the third quarterly report on seismic events recorded by the Swedish National Seismic Network (SNSN) for the year 2002, see Figure 1-1. The report includes fundamental information about the seismic events, including origin time and hypocenter location. Information of the source parameters is not included in the present report but is delivered as a separate ASCII-text. This report is a preliminary analysis report including only the automatic and the brief interactive analysis done on the routine bases at SNSN.

# Swedish National Seismic Network Oct 2002



*Figur 1-1. The present Swedish National Seismic Network (SNSN) network.*

## 2 Objective and scope

According to an agreement with Swedish Nuclear Fuel and Waste Management Company (SKB) and University of Uppsala, the Department of Earth Sciences continues to carry out observation and additional construction of new seismic stations within the Swedish National Seismic Network (SNSN). The seismic network in the vicinity of the investigation sites at Forsmark and Oskarshamn is now under construction from Uppsala in the north to Oskarshamn in the south.

The goal is to complement the existing regional seismic network to establish a local seismic network that also permits registration of small earthquakes in order to obtain relatively long time series and thereby gain a better understanding of the causes of seismic events in the site investigation areas.

Fundamental information about the seismic events, including origin time, hypocenter location and information about the source parameters will be given after every three month period.

Expected results is to obtain information on location, magnitude and source parameters of small earthquakes down to a magnitude of 0.0 near the investigation sites.

## 3 Equipment

### 3.1 Description of equipment

The seismometers are digital output broadband seismometers, with a frequency range of 1–50 Hz. They are installed in a digged ditch down to the rock surface, installed within a concrete construction, see Figure 3-1. Optical cables are connected to a building located nearby where computers/loggers are installed.



*Figure 3-1. A digged ditch down to the rock surface with a concrete construction where the seismometers will be placed.*



## 4 Recorded earthquakes during the third quarter of 2002

At present 34 stations are in operation and four additional stations will be put into operation before the end of this year, see Figure 1-1. During the period July through September 2002, there were 62 located events whereof only 6 with magnitude larger than 1.0. As seen on Figure 4-1 most of the earthquake activity is along the Bothnian Sea Coast in general and on or around the Post Glacial Faults close to Skellefteå in particular. The largest event, with magnitude 1.8, was located approximately 20 km north-west of Härnösand

The event lists for July until September 2002 are given in sections 4.1 through 4.3.

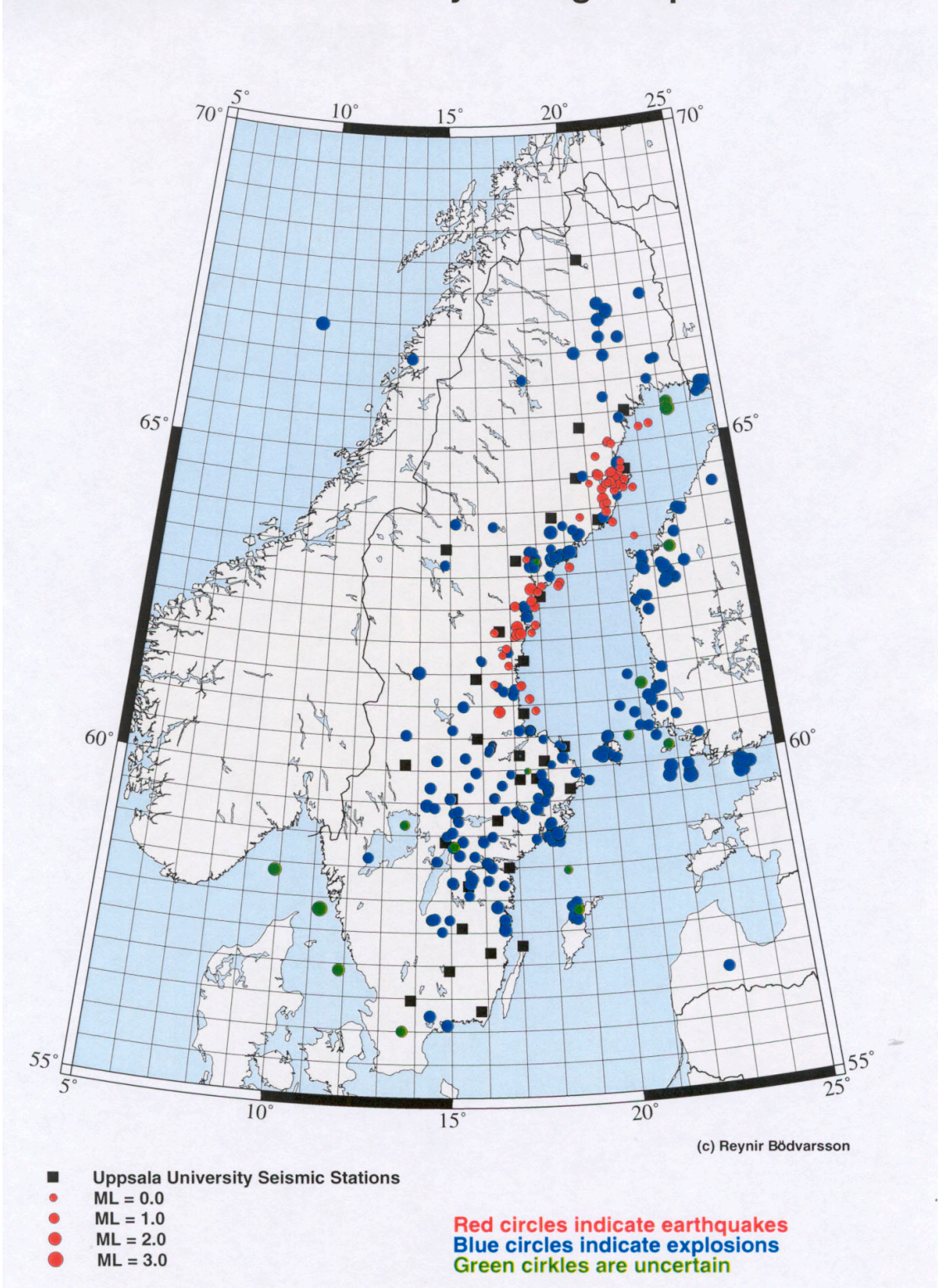
### 4.1 July

Event list for July is given in Table 4-1 with date, time, longitude, latitude, depth and local magnitude (ML). In July only 11 events were located whereof 2 with magnitude above 1.0. The depth range varies between 0.0 and 31.0 km.

**Table 4-1. Date, time, longitude, latitude, depth and local magnitude (ML) of recorded earthquakes in July.**

Date	Time	Longitude	Latitude	Depth Km	ML Local Magnitude
20020704	010308.1	64.142	20.483	2.7	1.4
20020705	141520.3	64.254	20.939	23.5	0.5
20020712	123243.2	62.879	18.742	0.0	0.5
20020712	233439.1	63.757	20.745	12.7	0.4
20020719	073320.5	62.798	17.737	6.0	1.8
20020720	054819.0	64.352	21.077	31.0	0.6
20020723	131639.8	64.541	20.347	13.5	0.5
20020726	011512.9	63.106	19.108	12.0	0.5
20020727	020849.2	64.409	20.761	12.4	0.2
20020727	081143.5	64.427	20.921	10.8	0.1
20020727	135209.5	64.343	20.903	9.8	0.1

# SNSN recorded events July through September 2002



**Figur 4-1.** Recorded events in the SNSN network during the period July to August 2002.

## 4.2 August

Event list for August is given in Table 4-2 with date, time, longitude, latitude, depth and local magnitude (ML). In August 30 events were located whereof only 1 with magnitude above 1.0. The depth range varies between 3.0 and 32.5 km.

**Table 4-2. Date, time, longitude, latitude, depth and local magnitude (ML) of recorded earthquakes in August.**

Date	Time	Longitude	Latitude	Depth Km	ML Local Magnitude
20020801	112332.2	64.357	20.671	9.9	-0.1
20020801	162101.1	64.043	20.506	4.7	0.7
20020804	143627.3	64.360	20.614	11.9	-0.4
20020805	020319.9	61.300	17.272	20.9	0.8
20020805	231829.0	64.501	21.136	21.0	0.4
20020807	030304.2	64.530	20.808	25.4	0.4
20020807	170204.6	64.469	20.858	6.2	-0.3
20020807	195051.3	64.395	20.749	20.5	-0.1
20020809	090804.0	63.511	21.446	4.5	-0.1
20020809	135520.9	64.293	20.477	5.5	0.5
20020810	151341.7	64.072	20.623	7.6	-0.0
20020811	063957.7	64.466	21.033	7.0	-0.2
20020813	085948.2	64.415	21.326	23.4	0.2
20020814	081925.2	63.933	20.558	4.2	0.6
20020815	182919.2	65.013	20.830	12.4	0.3
20020815	201915.3	61.331	16.418	4.1	0.2
20020816	003814.2	64.549	20.890	6.5	0.7
20020817	121521.9	62.834	18.100	4.1	0.3
20020817	205255.6	64.285	21.264	29.3	0.1
20020818	111120.7	63.876	19.605	32.5	0.0
20020818	183119.1	60.907	16.553	11.2	1.5
20020819	010754.3	64.815	20.360	3.6	0.2
20020819	073126.1	62.749	17.969	3.7	0.3
20020820	182514.9	61.881	16.837	14.5	0.4
20020821	071340.4	61.619	16.892	19.4	0.3
20020821	124734.8	62.830	18.671	8.8	0.5
20020823	160237.9	62.139	16.455	4.4	0.3
20020823	200200.0	65.038	20.864	3.0	0.4
20020827	015123.0	64.595	21.232	4.2	0.3
20020827	205918.5	64.400	20.821	25.5	0.7

### 4.3 September

Event list for September is given in Table 4-3 with date, time, longitude, latitude, depth and local magnitude (ML). In September 21 events were located whereof 3 with magnitude 1.0 or above. The depth range varies between 2.7 and 19.9 km.

**Table 4-3. Date, time, longitude, latitude, depth and local magnitude (ML) of recorded earthquakes in September.**

Date	Time	Longitude	Latitude	Depth Km	ML Local Magnitude
20020902	071349.9	65.221	22.069	3.7	0.3
20020903	033126.5	62.520	17.839	7.4	0.7
20020903	101311.9	62.539	17.178	12.6	0.7
20020904	214017.0	61.097	17.527	8.1	0.6
20020904	235228.1	62.221	17.222	13.5	1.6
20020907	074512.2	64.695	21.257	5.7	-0.1
20020908	083147.0	64.513	20.391	18.0	1.0
20020911	194639.6	62.123	17.695	3.8	0.1
20020913	113618.6	61.784	16.705	10.2	0.2
20020913	140326.7	63.265	17.641	12.1	-0.2
20020915	124649.4	64.369	20.653	11.3	0.6
20020915	191950.8	62.062	17.119	19.9	0.2
20020917	013707.2	64.272	21.586	2.7	0.3
20020918	232632.5	60.909	17.702	6.9	0.2
20020920	084754.5	62.615	17.747	6.1	0.9
20020922	104643.9	64.397	20.043	5.2	-0.3
20020923	082942.3	62.104	17.210	10.6	1.4
20020925	142536.1	62.238	17.836	8.9	0.4
20020927	033801.1	64.380	20.723	11.4	-0.1
20020928	231032.3	64.995	20.986	10.6	0.3
20020929	072524.9	65.255	22.455	12.4	0.4