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Äspö Hard Rock Laboratory

Prototype Repository

Hydrogeology interference test campaign 1 after drill campaign 3

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November 1999

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Abstract

The Prototype Repository Test is focused on testing and demonstrating the function of the SKB deep repository system. Activities aimed at contributing to development and testing of the practical, engineering measures required to rationally perform the steps of a deposition sequence are also included in the project but are also part of other projects.

The characterisation will be made in three stages. Each stage is intended to contribute to more details useful for the determination of the localisation of the deposition holes and also the boundary and rock conditions needed for the interpretation of the experimental data.

This report describes the interference test campaign 1 made after drill campaign 3.

Two major features, one on the south side and one on the north side of the repository, have been observed and evaluated regarding geometry (strike and dip) and hydraulic parameters, such as transmissivity and storativity.

Some minor features close to the location of the deposition boreholes are also described.

Sammanfattning

Huvudsyftet med prototypförvaret är att testa och demonstrera funktionen av en del av SKB:s djupförvars system. Aktiviteter som syftar till utveckling och försök av praktiska och ingenjörsmässiga lösningar, som krävs för att på ett rationellt sätt kunna stegvis utföra deponeringen av kapslar med kärnbränsle, är inkluderade i projektet för prototyp förvaret men även i andra projekt.

Karakteriseringen av bergmassan genomförs i tre steg. Varje steg syftar till att bidra med mer detaljer som skall vara användbara för att kunna lokalisera deposition hål och för att också kunna bestämma randvillkor och bergegenskaper som behövs för att kunna tolka experimentella data.

Denna rapport behandlar de interferenstester som genomförts efter att borrningsomgång 3 hade avslutats.

Två större hydrauliska strukturer, den ena på den södra sidan och den andra på den norra sidan av prototypförvaret, har observerats och utvärderats med avseende på geometri (strykning och stupning) samt hydrauliska egenskaper såsom transmissivitet och magasinskoefficient.

Ett antal mindre hydrauliska strukturer i omedelbar närhet till de planerade depositions borrhålen har också utvärderats.

Executive Summary

The Prototype Repository Test is focused on testing and demonstrating the function of the SKB deep repository system. Activities aimed at contributing to development and testing of the practical, engineering measures required to rationally perform the steps of a deposition sequence are also included in the project but are also part of other projects.

The characterisation will be made in three stages. Each stage is intended to contribute to more details useful for the determination of the localisation of the deposition holes and also the boundary and rock conditions needed for the interpretation of the experimental data. The three stages are:

1. Mapping of the tunnel
2. Pilot and exploratory holes
3. Deposition holes

Stage 1 is completed and stage 2 has been divided into three drilling campaigns:

1. Drilling of pilot holes
2. Drilling of short exploratory holes
3. Drilling of long exploratory holes

This report describes the interference test campaign 1 made after drill campaign 3.

Two major and six minor hydraulic features have been located. In *Figures 1, Figure 2* and *Table 1* the location of the features are shown.

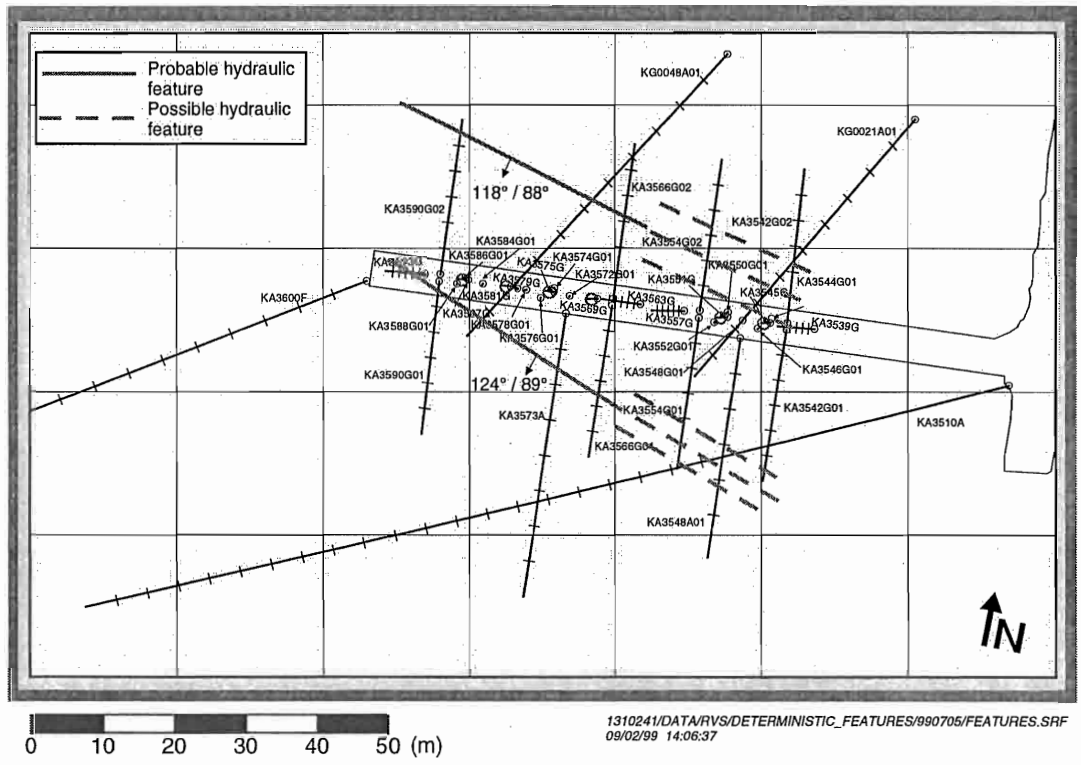

Figure 1 Major hydraulic features located during interference tests 1:1 - 1:6.

North major feature

This feature is located north of the prototype repository, most notably observed in bore holes KA3566G02 and KA3590G02. The strike and dip of this feature is approximately 118 ° and 88 ° respectively. The location of the centre with an estimated hydraulic radius of 20 m, of this feature, is estimated to be at

X (East) = 1892 m

Y (North) = 7289 m

Z = -449 mamsl (meters above mean sea level)

This feature has a transmissivity of $5 - 10 \cdot 10^{-8}$ m^2/s and a storage coefficient of $1 - 3 \cdot 10^{-7}$.

South major feature

This feature is located south of the prototype repository, most notably observed in bore holes KA3566G01 and KA3590G01. It does not intersect KA3573A or KG0048A01. The strike and dip of this feature is approximately 124 ° and 89 ° respectively. The location of the centre with an estimated hydraulic radius of 20 m, of this feature, is estimated to be at

X (East) = 1887 m

Y (North) = 7266 m

Z = -449 mamsl (meters above mean sea level)

This feature has a transmissivity of $7 - 9 \cdot 10^{-8}$ m^2/s and a storage coefficient of $4 - 5 \cdot 10^{-8}$.

Minor features

In *Figure 2* and *Table 1* the properties of the six minor features are shown.

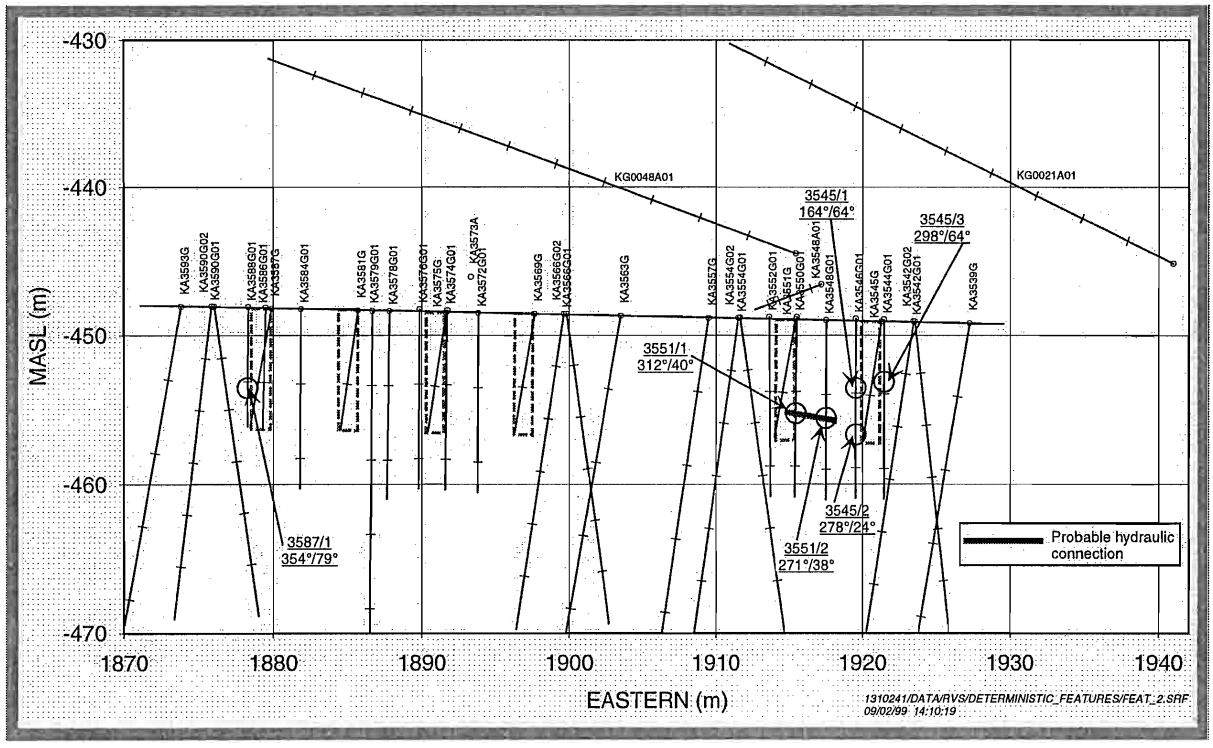

Figure 2 Minor identified features in the close vicinity of the deposition bore holes labelled with feature name and strike/dip.

Table 1 Data of minor features. The co-ordinates indicate the centre of the feature plane

Feature	X (east) (m)	Y (north) (m)	Z (mamsl)	Strike (°)	Dip (°)	Radius (m)	T (m^2/s)	S (-)
3587/1	1878.28	7275.03	-453.53	354	79	2	$8.1 \cdot 10^{-9}$	$3 \cdot 10^{-7}$
3551/1	1915.42	7271.06	-455.24	312	40	2	$4.7 \cdot 10^{-9}$	$3 \cdot 10^{-7}$
3551/2	1917.50	7269.90	-455.56	271	38	2	$3.3 \cdot 10^{-9}$	$2 \cdot 10^{-7}$
3445/2	1919.55	7268.80	-456.66	278	24	2	$1.7 \cdot 10^{-9}$	$2 \cdot 10^{-7}$
3445/1	1919.55	7268.80	-453.54	164	64	2	$2.8 \cdot 10^{-10}$	$9 \cdot 10^{-8}$
3445/3	1921.45	7270.22	-453.14	298	64	2	$1.3 \cdot 10^{-8}$	$4 \cdot 10^{-7}$

Storativity

In order to be able to estimate an approximate value of storativity a relationship between transmissivity T_{EVAL} and the evaluated storativity S have been established as presented in *Figure 3*.

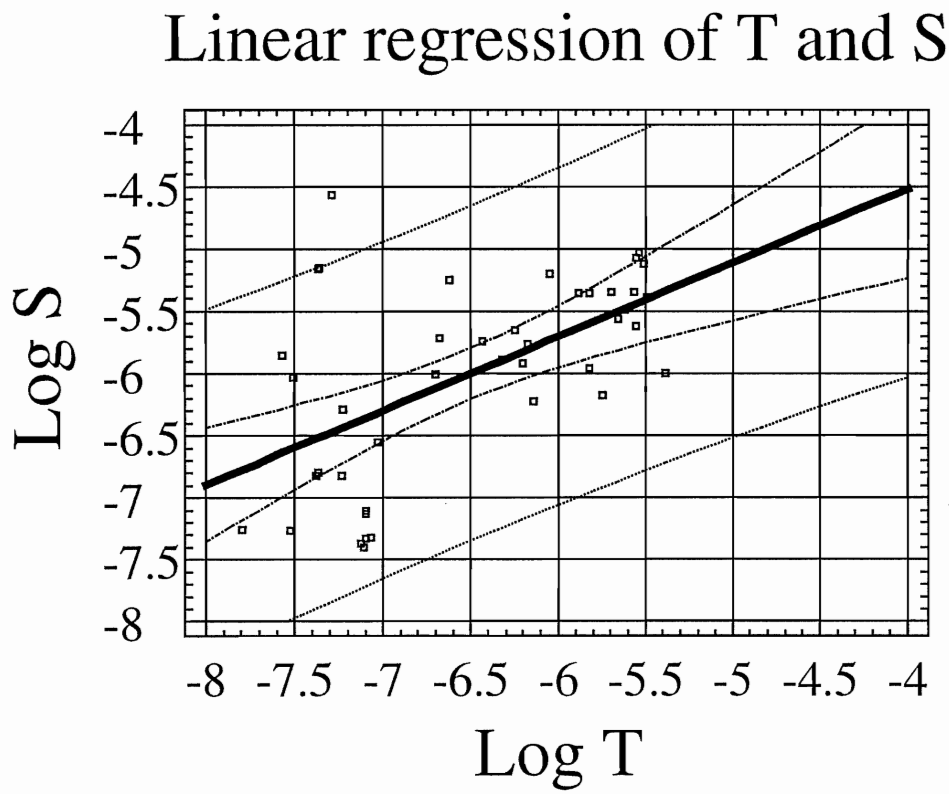

Figure 3 Linear regression of T_{EVAL} and S. The outermost lines represent the 95 % prediction band on S as a function of Log10 T. The innermost lines represent the 95 % confidence band of S.

The equation of the regression line in *Figure 3* is

$$Log_{10} S = 0.595 * Log_{10} T_{EVAL} - 2.135$$

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1 BACKGROUND

1.1 Äspö Hard Rock Laboratory

In order to prepare for the siting and licensing of a spent fuel repository SKB has constructed an underground research laboratory.

In the autumn of 1990, SKB began the construction of the Äspö Hard Rock Laboratory (Äspö HRL) near Oskarshamn in the south-eastern part of Sweden, see *Figure 1-1*. A 3.6 km long tunnel was excavated in crystalline rock down to a depth of approximately 460 m.

The laboratory was completed in 1995 and research concerning the disposal of nuclear waste in crystalline rock has since then been carried out.

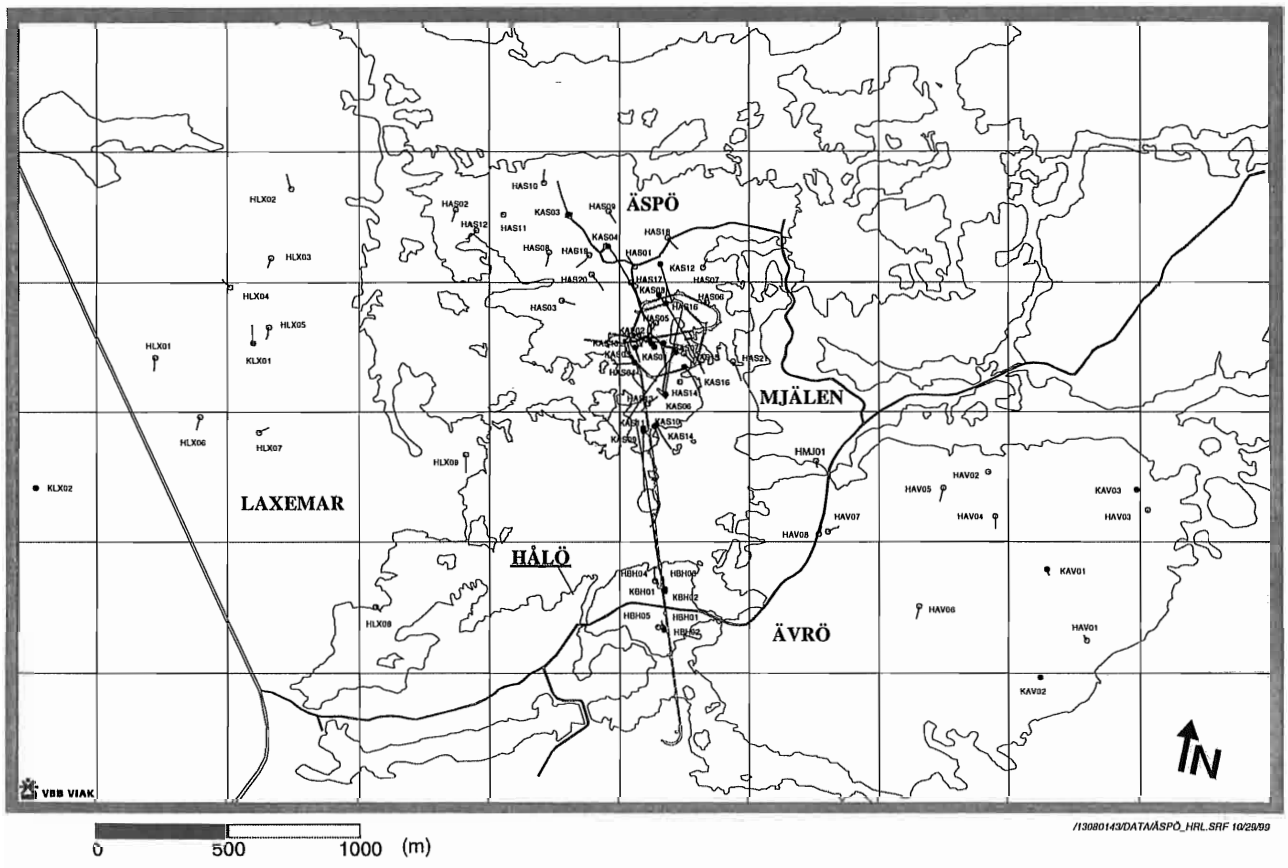

Figure 1-1 Äspö Hard Rock Laboratory

1.2 Prototype repository

The Äspö Hard Rock Laboratory is an essential part of the research, development, and demonstration work performed by SKB in preparation for construction and operation of the deep repository for spent fuel. Within the scope of the SKB program for RD&D 1995, SKB has decided to carry out a project with the designation "Prototype Repository Test". The aim of the project is to test important components in the SKB deep repository system in full scale and in a realistic environment.

The Prototype Repository Test is focused on testing and demonstrating the function of the SKB deep repository system. Activities aimed at contributing to development and testing of the practical, engineering measures required to rationally perform the steps of a deposition sequence are also included. However, efforts in this direction are limited, since these matters are addressed in the Demonstration of Repository Technology project and to some extent in the Backfill and Plug Test.

1.2.1 General objectives

The Prototype Repository should simulate as many aspects as possible a real repository, for example regarding geometry, materials, and rock environment. The Prototype Repository is a demonstration of the integrated function of the repository components. Results will be compared with models and assumptions to their validity.

The major objectives for the Prototype Repository are:

- To test and demonstrate the integrated function of the repository components under realistic conditions in full scale and to compare results with models and assumptions.
- To develop, test and demonstrate appropriate engineering standards and quality assurance methods.
- To simulate appropriate parts of the repository design and construction process.

The objectives for the characterisation program are:

- To provide a basis for determination of localisation of the deposition holes
- To provide data on boundary and rock conditions to enable interpretation of the experimental data

1.2.2 Characterisation stages

The characterisation will be made in three stages. Each stage is intended to contribute to more details useful for the determination of the localisation of the deposition holes and also the boundary and rock conditions needed for the interpretation of the experimental data. The three stages are:

1. Mapping of the tunnel
2. Pilot and exploratory holes
3. Deposition holes

Stage 1 is completed and stage 2 has been divided into three drilling campaigns:

1. Drilling of pilot holes
2. Drilling of exploratory holes - short bore holes
3. Drilling of exploratory holes - long bore holes

This report describes the results of six interference tests carried out in four of the long exploratory holes.

2 OBJECTIVE

The objectives of the exploratory bore holes is to obtain data for prediction of the characteristics in the deposition holes, data for modelling and to quantify the criteria needed for validation of the suitability of the position for canister deposition. Acceptance of a canister position is based on scrutinization of characterisation data such as fracturing, permeability and stability of the bore hole wall.

The objectives for the interference tests in the long exploratory holes:

- The hydraulic tests the exploratory holes shall provide hydrogeological data useful for setting up a hydrogeological model of the rock volume around the TBM tunnel. Identification of the position and properties of larger conductive features are the main objectives. Possible minor features intersecting the planned deposition bore holes should also be identified.

3 SCOPE

Interference tests were performed in five bore hole sections in four of the long exploratory holes of the Prototype Repository tunnel. The tested intervals and basic test data are listed in *Table 3-1*. Originally four tests were planned to be carried out. Due to different technical reasons six tests were done. Test number 1:3 was repeated as test number 1:6, while test number 1:4 was merely a function test. The first figure in the test number indicate the first Interferencetest campaign number, while the second number indicate the chronological order of the interference tests. The first test in the second interference test campaign will accordingly be named 2:7.

Observations were carried out in 56 observations bore hole sections located around the flow section of each test. All test sections were connected to the Hydro Monitoring System (HMS) at Äspö Hard Rock Laboratory.

Table 3-1 Interference tests carried out during February and April 1999

Bore hole	Section	Date of test	Test no.	Start of test	Valve opened	Valve closed	End of test
KA3566G01:2	12.30-19.80	1999-02-20	1:1	00:00	14:01	20:05	08:00 (1999-02-24)
KA3566G02:2	12.30-18.30	1999-02-24	1:2	07:00	08:26	14:43	08:00 (1999-02-25)
KA3590G01:3	1.30-6.80	1999-02-25	1:3	07:30	08:20	14:23	07:30 (1999-02-26)
KA3590G01:2	7.80-16.30	1999-02-26	1:4	07:30	07:53	08:03	08:33 (1999-02-26)
KA3590G02:1	23.30-30.05	1999-02-26	1:5	07:30	08:35	16:05	08:00 (1999-03-01)
KA3590G01:3	1.30-6.80	1999-04-06	1:6	09:00	09:59	16:01	06:30 (1999-04-07)

In chapter 4 the results of the tests are presented.

4 RESULTS

Pressure registration were made in neighbouring bore holes during the flowing and recovery phase of every interference test. In *Table 4-1 to 4-6* the results of the tests are presented. The hydraulic centre of each bore hole section has been calculated as the weighted average point of the inflow of water to the bore hole section. The distance, r, between different bore hole sections has been calculated as the spherical distance using co-ordinates for the weighted average point of inflow. The evaluation of transmissivity T_{EVAL}, and storativity S, has been made using the Theis log-log type curve method assuming radial flow. The calculation of the hydraulic diffusivity is based on radial flow:

$$\eta = T / S = r^2 / [4 \cdot t_L \cdot (1 + t_L / dt) \cdot \ln(1 + dt / t_L)] \qquad (4\text{-}1)$$

The timelag t_L is defined as the time when the pressure response in an observation section is greater than 0.1 metres. The pumping time is included as dt. As can be seen in equation above the diffusivity is proportional to r^2 / t_L. S^* in the table is calculated as $S^* = T / \eta$. The values of diffusivity and storativity should be seen as approximate values as the flow dimension is not always radial. When the flow is interpreted as radial flow T_{EVAL} is shown in the table for the observation sections. The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m). This classification is made from pressure head plots. Two columns in the tables show P_0-P_f and P_p-P_f using logger data. These data are not always stable therefor for some sections where no response is noticed the value may be negative or there may exist a general pressure trend, increasing or decreasing.

Key pressure data from the interference tests are presented in *Appendix 1*.

4.1 Interference test 1:1

The test was carried out in KA3566G01, section 12.30 - 19.80 m, with a flow period of 364 minutes with a final flow of 0.1155 l/min, while the pressure build-up time was 2155 minutes. In *Figure 4-1* and *Figure 4-2* the pressure drawdown recordings are shown and in *Table 4-1* the interference test results are presented. Diagrams of evaluated bore hole sections are presented in *Appendix 2*.

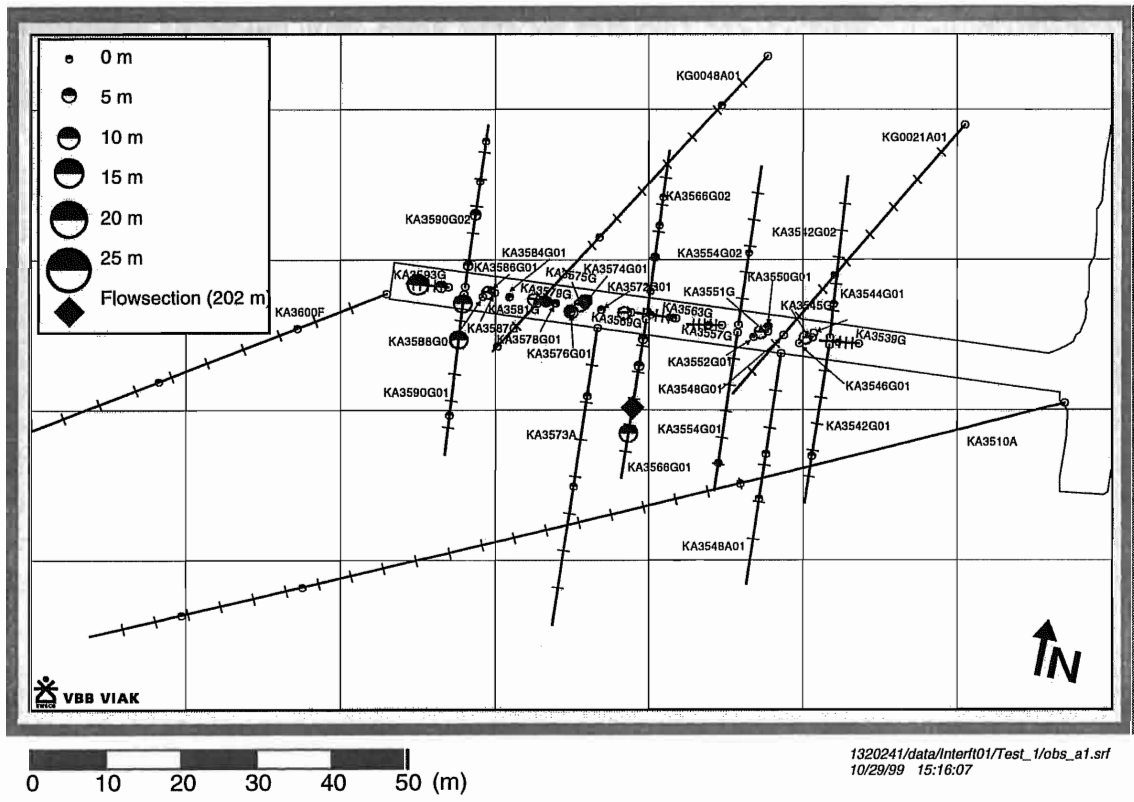

Figure 4-1 Drawdown during flowing of KA3566G01:2 (Interferencetest 1:1) - plan view

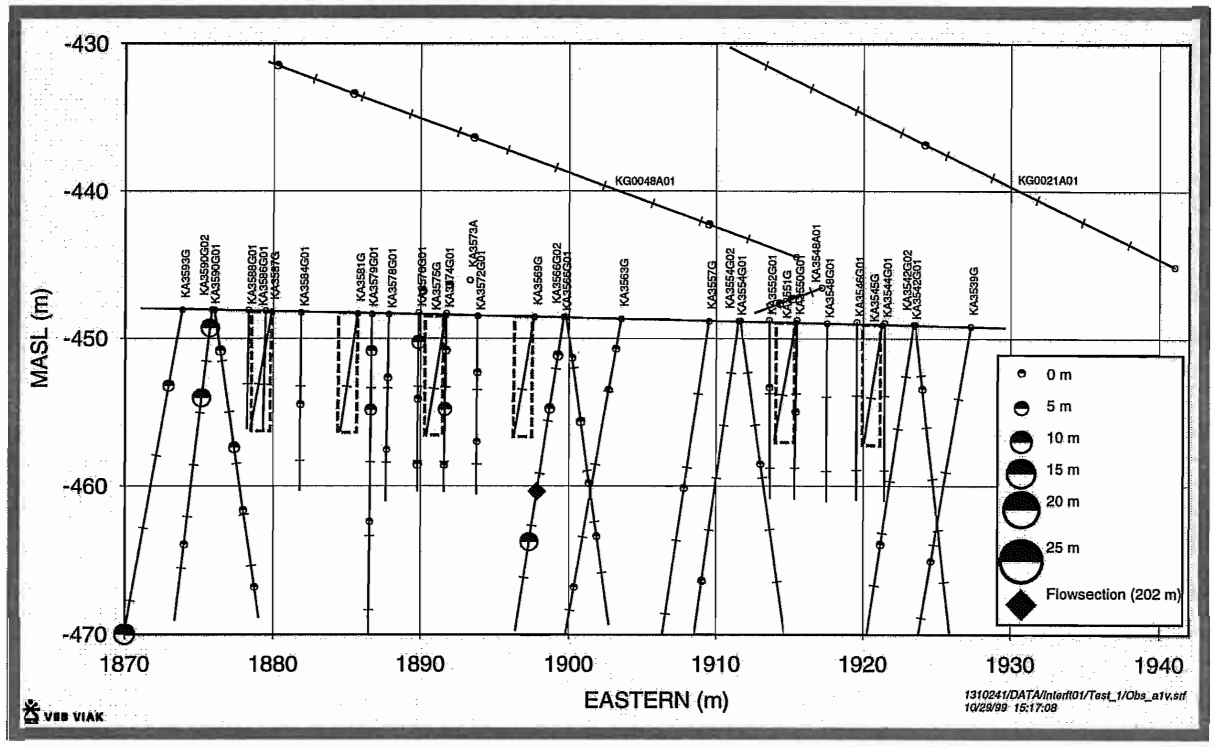

Figure 4-2 Drawdown during flowing of KA3566G01:2 (Interferencetest 1:1) - vertical view

This test indicates a hydraulic feature, striking approximately WNW, south of the tunnel and westward from the test section, with distinct responses in KA3590G01 with short response times, t_L, see *Table 4-1*. East of the flow section the responses are more diffuse and the response times are considerably longer. It is noted that neither KG0048A01 nor KA3573A responds until very late. There does not seem to exist a direct connection between these bore holes and KA3590G01 or KA3566G01.

The evaluated transmissivity for the test section is $5.9 \cdot 10^{-8}$ m^2/s, with the evaluation time for this section being 5 - 50 minutes. In most cases the evaluation time of the observation sections are within that interval.

The evaluated transmissivity and storage coefficient KA3590G01:3 are $7.8 \cdot 10^{-8}$ m^2/s and $4.0 \cdot 10^{-8}$ respectively. These values are close to the parameters evaluated, in KA3566G01:2, during test 1:3.

Table 4-1 **Interference test results for KA3566G01, 12.30 - 19.80 m. (r = aprox. distance from flowing bore hole section to observation bore hole section, t_L = time lag for a pressure response of 0.1 m to be registered in an observation section, T = transmissivity, S = storage coefficient, S^* = storage coefficient from diffusivity, η.) The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m).**

Observation borehole	Secup (m)	Seclow (m)	Hydraulic centre of borehole (m)	r (m)	t_L (recovery) (min)	r^2/t_L (m^2/s)	η (m^2/s)	T_{EVAL} (m^2/s)	S (-)	S^* (-)	Response (0 = no, 1 = some, 2 =good response	Po - Pp (kPa)	Pf - Pp (kPa)	Comments
KA3510A:1	122.02	150.00	136.00	85.71	200	6.12E-01	9.53E-02	-	-	-	1	0	2.8	Not evaluable
KA3510A:2	114.02	121.02	117.50	67.99	140	5.50E-01	7.76E-02	-	-	-	1	0	2.4	Not evaluable
KA3510A:3	4.52	113.02	50.00	21.91	26	3.08E-01	2.65E-02	9.0E-07	6.3E-06	3.4E-05	1	1.9	4.3	
KA3539G:1	0.30	30.01	16.11	28.54	-	-	-	-	-	-	0	-4.9	-26.4	No response
KA3542G01:1	0.30	30.04	21.05	24.48	-	-	-	-	-	-	0	3.1	2.5	No response
KA3542G02:1	0.30	30.01	6.28	30.40	50	3.08E-01	3.20E-02	-	-	-	1	-1.1	-26.6	Not evaluable
KA3548A01:1	15.00	30.00	19.56	24.12	50	1.94E-01	2.02E-02	-	-	-	1	0.8	3.3	Not evaluable
KA3548A01:2	10.00	14.00	13.49	22.59	60	1.42E-01	1.56E-02	-	-	-	1	0.7	2.5	Not evaluable
KA3550G01:1	0.30	12.03	6.21	21.31	-	-	-	-	-	-	0	-1	3.9	No response
KA3552G01:1	0.30	12.01	4.56	19.66	-	-	-	-	-	-	0	-4.3	-14.4	No response
KA3554G01:1	0.30	30.01	24.83	14.72	250	1.45E-02	2.38E-03	-	-	-	1	1.2	3	Not evaluable
KA3554G02:1	0.30	30.01	13.69	25.66	90	1.22E-01	1.51E-02	-	-	-	1	-3.7	-20.9	Not evaluable
KA3557G:1	0.30	30.04	11.40	14.85	-	-	-	-	-	-	0	-0.2	-4.5	No response
KA3563G01:1	9.30	30.00	18.42	14.16	26	1.29E-01	1.11E-02	-	-	-	2	-3.7	30.5	Not evaluable
KA3563G01:2	3.80	8.30	4.87	14.67	29	1.24E-01	1.10E-02	-	-	-	2	-3.7	30.3	Not evaluable
KA3563G01:3	1.30	2.80	2.05	16.26	270	1.63E-02	2.74E-03	-	-	-	1	-0.4	0.6	Not evaluable
KA3566G01:1	20.80	30.01	21.57	4.86	0.15	2.62E+00	8.41E-02	-	-	-	2	73	74.3	Not evaluable
KA3566G01:2	**12.30**	**19.80**	**16.71**	**0.00**	**-**	**-**	**-**	**5.9E-08**	**-**	**-**		**2019.8**	**2003.1**	
KA3566G01:3	7.30	11.30	8.81	7.90	0.15	6.93E+00	2.22E-01	-	-	-	2	14.9	116.7	Not evaluable
KA3566G01:4	1.30	6.30	3.70	13.01	0.15	1.88E+01	6.03E-01	-	-	-	2	13.5	40.3	Not evaluable
KA3566G02:1	19.30	30.01	21.41	28.46	100	1.35E-01	1.73E-02	-	-	-	1	-2.5	-11.1	Not evaluable
KA3566G02:2	12.30	18.30	16.23	24.57	110	9.15E-02	1.20E-02	-	-	-	1	-0.8	-0.4	Not evaluable
KA3566G02:3	7.80	11.30	10.25	20.78	90	8.00E-02	9.91E-03	-	-	-	2	7	17.6	Not evaluable
KA3566G02:4	1.30	6.80	3.99	18.13	190	2.88E-02	4.43E-03	-	-	-	1	-0.8	3.9	Not evaluable
KA3572G01:1	6.30	12.00	8.49	14.04	31	1.06E-01	9.60E-03	-	-	-	2	-5.5	49.3	Not evaluable
KA3572G01:2	1.30	5.30	3.82	15.83	240	1.74E-02	2.84E-03	-	-	-	1	-0.2	3.9	Not evaluable
KA3573A:1	18.00	40.07	21.34	18.77	121	4.85E-02	6.56E-03	-	-	-	1	0.2	2.5	Not evaluable
KA3573A:2	4.50	17.00	9.16	15.23	51	7.58E-02	7.93E-03	-	-	-	1	0.4	3.3	Not evaluable
KA3574G01:1	8.80	12.00	10.25	15.56	26	1.55E-01	1.34E-02	-	-	-	2	-4.7	27	Not evaluable
KA3574G01:2	5.30	7.80	6.50	16.42	-	-	-	-	-	-	0	38.5	-173.1	No response
KA3574G01:3	1.30	4.30	2.50	18.16	282	1.95E-02	3.31E-03	-	-	-	1	4.3	0.8	Not evaluable
KA3576G01:1	8.80	12.01	10.25	15.12	-	-	-	-	-	-	0	7.6	-29	No response
KA3576G01:2	3.80	7.80	5.86	16.27	-	-	-	-	-	-	0	0.6	-3.1	No response
KA3576G01:3	1.30	2.80	2.00	18.12	-	-	-	-	-	-	0	43.1	-190.6	No response
KA3578G01:1	6.80	12.58	9.14	17.41	29	1.74E-01	1.55E-02	-	-	-	2	-6.5	42.2	Not evaluable
KA3578G01:2	1.30	5.80	4.30	18.79	-	-	-	-	-	-	0	0.8	-3.5	No response
KA3579G01:1	9.30	22.65	14.02	18.24	46	1.21E-01	1.22E-02	-	-	-	2	-4.9	45.1	Not evaluable
KA3579G01:2	5.30	8.30	6.50	18.87	-	-	-	-	-	-	0	27.1	-435.6	No response
KA3579G01:3	1.30	4.30	2.50	20.36	-	-	-	-	-	-	0	21.3	-98.4	No response
KA3584G01:1	0.30	12.00	6.24	22.51	280	3.02E-02	5.12E-03	-	-	-	1	-0.4	0.6	Not evaluable
KA3590G01:1	17.30	30.06	22.70	24.11	70	1.38E-01	1.59E-02	-	-	-	1	0.8	4.5	Not evaluable
KA3590G01:2	7.80	16.30	8.56	25.18	0.8	1.32E+01	5.38E-01	8.5E-08	4.8E-08	1.6E-07	2	73.5	70	
KA3590G01:3	1.30	6.80	1.76	28.32	0.8	1.67E+01	6.81E-01	7.8E-08	4.0E-08	1.1E-07	2	73.5	70.5	
KA3590G02:1	23.30	30.05	27.06	40.77	110	2.52E-01	3.31E-02	-	-	-	1	-1	3.3	Not evaluable
KA3590G02:2	17.30	22.30	19.56	36.06	90	2.41E-01	2.98E-02	-	-	-	1	-1.6	7.6	Not evaluable
KA3590G02:3	8.30	16.30	13.44	32.98	50	3.63E-01	3.77E-02	3.1E-08	9.2E-07	8.2E-07	2	22.7	23.7	
KA3590G02:4	1.20	7.20	4.00	30.12	-	-	-	-	-	-	0	16.1	-30.5	No response
KA3593G01:1	8.30	30.02	22.13	33.70	2.8	6.76E+00	3.44E-01	3.0E-08	5.4E-08	8.7E-08	2	89.9	88.1	
KA3593G01:2	1.30	7.30	5.24	30.52	25	6.21E-01	5.29E-02	5.1E-08	2.7E-05	9.6E-07	2	27.4	30.7	
KA3600F:1	22.00	50.10	31.78	62.98	160	4.13E-01	6.05E-02	-	-	-	1	-0.1	2.1	Not evaluable
KA3600F:2	4.50	21.00	12.51	46.96	150	2.45E-01	3.52E-02	-	-	-	1	0.2	2.4	Not evaluable
KG0021A01:1	0.00	48.82	27.41	39.48	100	2.60E-01	3.32E-02	-	-	-	1	-1.1	6	Not evaluable
KG0048A01:1	49.00	54.69	53.81	34.77	40	5.04E-01	4.91E-02	-	-	-	1	1	4.6	Not evaluable
KG0048A01:2	41.00	48.00	45.90	32.74	50	3.57E-01	3.71E-02	-	-	-	1	0.5	4.6	Not evaluable
KG0048A01:3	30.00	40.00	33.50	33.30	90	2.05E-01	2.54E-02	-	-	-	1	-0.5	4.1	Not evaluable
KG0048A01:4	4.00	29.00	9.12	45.58	90	3.85E-01	4.77E-02	-	-	-	1	-1.6	6.5	Not evaluable

4.2 Interference test 1:2

The test was carried out in KA3566G02, section 12.30 - 18.30 m . The flow period was for 377 minutes with a final flow of 0.0845 l/min, while the pressure build-up time was 1037 minutes. In *Figure 4-3* and *Figure 4-4* the pressure drawdown recordings are shown and in *Table 4-2* the interference test results are presented. Diagrams of evaluated bore hole sections are presented in *Appendix 3*.

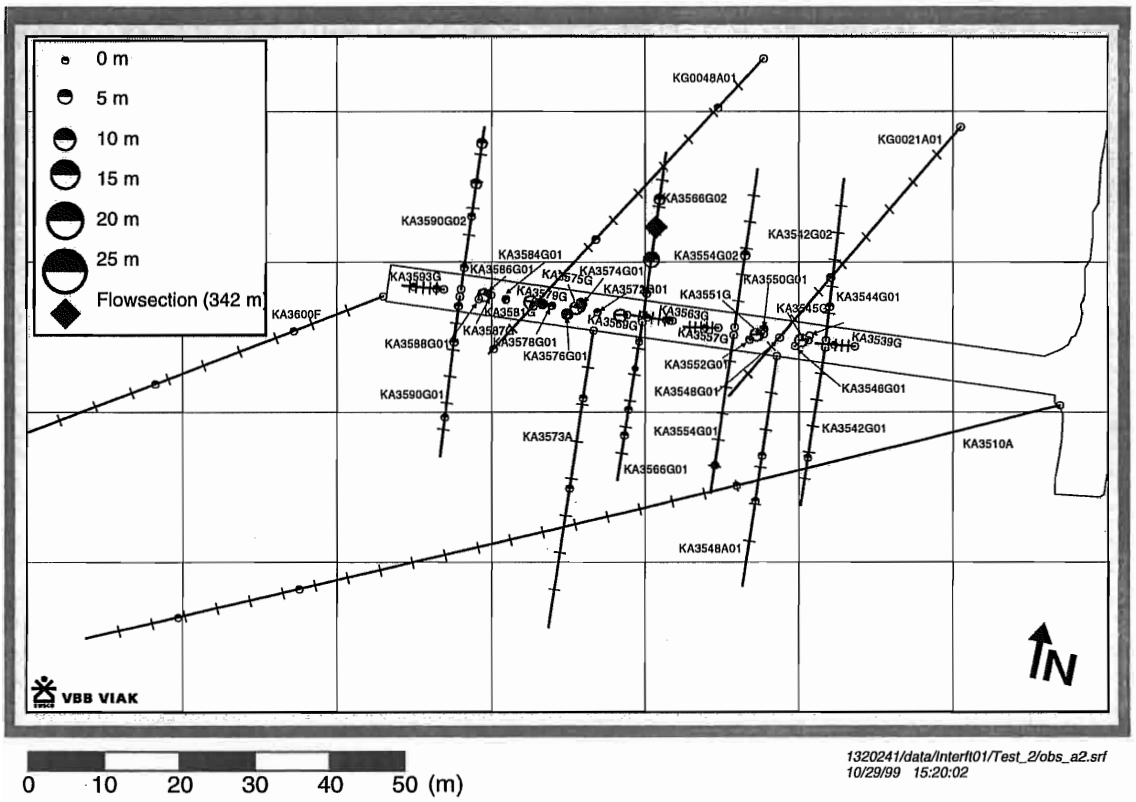

Figure 4-3 Drawdown during flowing of KA3566G02:2 (Interferencetest 1:2) - plan view

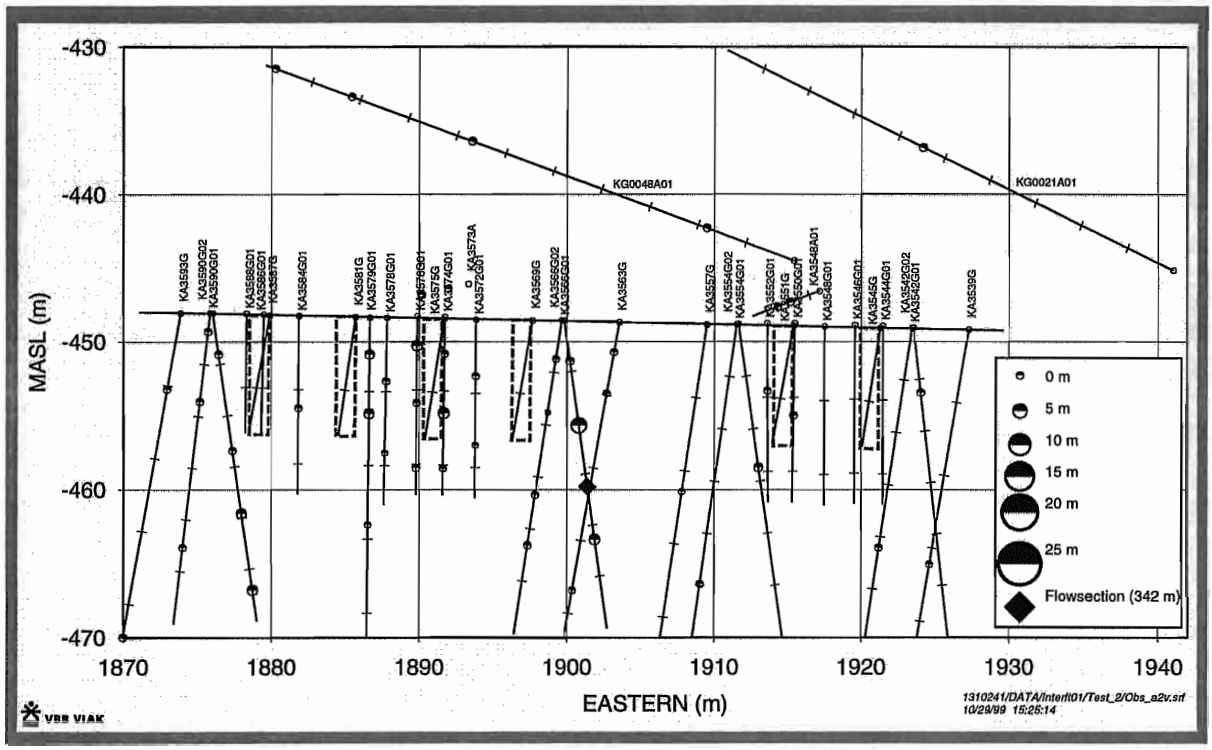

Figure 4-4 Drawdown during flowing of KA3566G02:2 (Interferencetest 1:2) - vertical view

This test indicates a hydraulic feature, striking WNW, north of the tunnel. The responses west of the flow section are not as distinct as for the feature south of the tunnel during test 1:1, but they are certain enough to make this feature probable. East of the flow section the responses are again more diffuse than to the west but there is a possible feature or system of subvertical features striking approximately WNW.

The evaluated transmissivity for the test section is $6.0 \cdot 10^{-8}$ m^2/s, with the evaluation time for this section being 200 - 250 minutes. In most cases the evaluation time of the observation sections are within that time interval.

The evaluated transmissivity and storage coefficient KA3590G02:1 are $9.3 \cdot 10^{-8}$ m^2/s and $2.8 \cdot 10^{-7}$ respectively.

Table 4-2 **Interference test results for KA3566G02, 12.30 - 18.30 m. (r = aprox. distance from flowing bore hole section to observation bore hole section, t_L = time lag for a pressure response of 0.1 m to be registered in an observation section, T = transmissivity, S = storage coefficient, S^* = storage coefficient from diffusivity, η.) The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m).**

Observation borehole	Secup (m)	Seclow (m)	Hydraulic centre of borehole (m)	r (m)	t_L (recovery) (min)	r^2/t_L (m^2/s)	η (m^2/s)	T_{EVAL} (m^2/s)	S (-)	S^* (-)	Response (0 = no, 1 = some, 2 =good response	Po - Pp (kPa)	Pf - Pp (kPa)	Comments
KA3510A:1	122.02	150.00	136.00	98.85	250	6.51E-01	1.07E-01	-	-	-	1	-0.4	1.1	Not evaluable
KA3510A:2	114.02	121.02	117.50	82.13	220	5.11E-01	8.08E-02	-	-	-	1	0.4	1.6	Not evaluable
KA3510A:3	4.52	113.02	50.00	38.61	60	4.14E-01	4.50E-02	-	-	-	1	1.4	3.3	Not evaluable
KA3539G:1	0.30	30.01	16.11	28.49	14	9.66E-01	7.00E-02	-	-	-	1	-2	-14.5	Not evaluable
KA3542G01:1	0.30	30.04	21.05	36.79	33	6.83E-01	6.24E-02	3.7E-07	1.8E-06	5.9E-06	1	1.8	3.9	
KA3542G02:1	0.30	30.01	6.28	25.77	-	-	-	-	-	-	0	3.9	-28.8	No response
KA3548A01:1	15.00	30.00	19.56	40.56	55	4.98E-01	5.28E-02	-	-	-	1	1.3	3.7	Not evaluable
KA3548A01:2	10.00	14.00	13.49	35.71	40	5.31E-01	5.12E-02	-	-	-	1	1.8	4.1	Not evaluable
KA3550G01:1	0.30	12.03	6.21	20.10	-	-	-	-	-	-	0	2	6.1	No response
KA3552G01:1	0.30	12.01	4.56	20.39	-	-	-	-	-	-	0	1	11	No response
KA3554G01:1	0.30	30.01	24.83	33.27	30	6.15E-01	5.46E-02	-	-	-	1	1.2	3.1	Not evaluable
KA3554G02:1	0.30	30.01	13.69	12.30	5	5.04E-01	2.87E-02	2.1E-07	1.9E-06	7.3E-06	1	11.6	-13.5	
KA3557G:1	0.30	30.04	11.40	14.79	-	-	-	-	-	-	0	-2.4	9	No response
KA3563G01:1	9.30	30.00	18.42	13.91	70	4.61E-02	5.24E-03	-	-	-	2	-2.4	10.3	Not evaluable
KA3563G01:2	3.80	8.30	4.87	13.88	80	4.01E-02	4.75E-03	-	-	-	2	-2.7	10	Not evaluable
KA3563G01:3	1.30	2.80	2.05	15.44	-	-	-	-	-	-	0	0.5	0.7	No response
KA3566G01:1	20.80	30.01	21.57	28.29	45	2.96E-01	2.96E-02	-	-	-	1	2.3	2.7	Not evaluable
KA3566G01:2	12.30	19.80	16.71	24.57	-	-	-	-	-	-	0	0	0.4	No response
KA3566G01:3	7.30	11.30	8.81	19.62	15	4.28E-01	3.15E-02	-	-	-	2	-11.4	35.6	Not evaluable
KA3566G01:4	1.30	6.30	3.70	17.60	-	-	-	-	-	-	0	-2.3	12.3	No response
KA3566G02:1	19.30	30.01	21.41	5.18	0.1	4.47E+00	1.36E-01	-	-	-	2	24.7	17.4	Not evaluable
KA3566G02:2	**12.30**	**18.30**	**16.23**	**0.00**	-	-	-	**6.0E-08**	-	-		3417.9	3417.9	
KA3566G02:3	7.80	11.30	10.25	5.98	0.1	5.96E+00	1.81E-01	-	-	-	2	56.7	62.2	Not evaluable
KA3566G02:4	1.30	6.80	3.99	12.24	0.1	2.50E+01	7.58E-01	-	-	-	2	6	11.9	Not evaluable
KA3572G01:1	6.30	12.00	8.49	13.91	25	1.29E-01	1.09E-02	-	-	-	2	-6.1	21.9	Not evaluable
KA3572G01:2	1.30	5.30	3.82	15.51	50	8.01E-02	8.25E-03	-	-	-	1	-0.48	3.1	Not evaluable
KA3573A:1	18.00	40.07	21.34	38.80	20	1.25E+00	9.97E-02	-	-	-	1	0.9	2.7	Not evaluable
KA3573A:2	4.50	17.00	9.16	28.06	50	2.62E-01	2.70E-02	-	-	-	1	1.2	3.4	Not evaluable
KA3574G01:1	8.80	12.00	10.25	14.15	25	1.33E-01	1.13E-02	-	-	-	2	-2.6	16.4	Not evaluable
KA3574G01:2	5.30	7.80	6.50	14.90	-	-	-	-	-	-	0	24.4	-48.9	No response
KA3574G01:3	1.30	4.30	2.50	16.63	100	4.61E-02	5.83E-03	-	-	-	2	0	41.9	Not evaluable
KA3576G01:1	8.80	12.01	10.25	16.46	-	-	-	-	-	-	0	3.9	-0.8	No response
KA3576G01:2	3.80	7.80	5.86	17.31	-	-	-	-	-	-	0	0.6	-0.2	No response
KA3576G01:3	1.30	2.80	2.00	18.88	-	-	-	-	-	-	0	24.9	-59.1	No response
KA3578G01:1	6.80	12.58	9.14	17.36	-	-	-	-	-	-	0	-7.1	26.4	No response
KA3578G01:2	1.30	5.80	4.30	18.55	-	-	-	-	-	-	0	0.6	-0.2	No response
KA3579G01:1	9.30	22.65	14.02	18.14	25	2.19E-01	1.85E-02	-	-	-	2	-6.3	18.6	Not evaluable
KA3579G01:2	5.30	8.30	6.50	18.58	-	-	-	-	-	-	0	19.2	-45.2	No response
KA3579G01:3	1.30	4.30	2.50	20.00	-	-	-	-	-	-	0	13.5	-57	No response
KA3584G01:1	0.30	12.00	6.24	22.41	-	-	-	-	-	-	0	0.2	0.2	No response
KA3590G01:1	17.30	30.06	22.70	37.51	100	2.34E-01	2.97E-02	-	-	-	1	0.6	5.1	Not evaluable
KA3590G01:2	7.80	16.30	8.56	30.87	-	-	-	-	-	-	0	2.3	0	No response
KA3590G01:3	1.30	6.80	1.76	29.61	-	-	-	-	-	-	0	2.1	-0.2	No response
KA3590G02:1	23.30	30.05	27.06	26.18	5	2.28E+00	1.30E-01	9.3E-08	2.8E-07	7.2E-07	2	20.7	31.5	
KA3590G02:2	17.30	22.30	19.56	24.15	12	8.10E-01	5.64E-02	5.9E-08	5.1E-07	1.0E-06	2	19.5	30.9	
KA3590G02:3	8.30	16.30	13.44	24.15	90	1.08E-01	1.32E-02	-	-	-	1	1.8	5.1	Not evaluable
KA3590G02:4	1.20	7.20	4.00	27.02	-	-	-	-	-	-	0	3.7	3.5	No response
KA3593G01:1	8.30	30.02	22.13	33.90	150	1.28E-01	1.82E-02	-	-	-	1	1.2	1.4	Not evaluable
KA3593G01:2	1.30	7.30	5.24	30.30	120	1.28E-01	1.70E-02	-	-	-	1	0.6	4.2	Not evaluable
KA3600F:1	22.00	50.10	31.78	69.45	200	4.02E-01	6.20E-02	-	-	-	1	0.8	2.8	Not evaluable
KA3600F:2	4.50	21.00	12.51	50.88	210	2.05E-01	3.21E-02	-	-	-	1	0.4	2.2	Not evaluable
KG0021A01:1	0.00	48.82	27.41	33.04	20	9.10E-01	7.23E-02	-	-	-	2	4.7	28.6	Not evaluable
KG0048A01:1	49.00	54.69	53.81	38.85	30	8.38E-01	7.45E-02	-	-	-	1	1.9	3.7	Not evaluable
KG0048A01:2	41.00	48.00	45.90	32.59	30	5.90E-01	5.24E-02	-	-	-	1	1.8	4.1	Not evaluable
KG0048A01:3	30.00	40.00	33.50	24.75	20	5.10E-01	4.05E-02	-	-	-	2	4.6	12.2	Not evaluable
KG0048A01:4	4.00	29.00	9.12	25.01	22	4.74E-01	3.86E-02	-	-	-	2	4.1	24.5	Not evaluable

4.3 Interference test 1:3

The test was carried out in KA3590G01, section 1.30 - 6.80 m . The flow period was for 363 minutes with a final flow of 0.340 l/min, while the pressure build-up time was 1027 minutes. In *Figure 4-5* and *Figure 4-6* the pressure drawdown recordings are shown and in *Table 4-3* the interference test results are presented. Diagrams of evaluated bore hole sections are presented in *Appendix 4.*

During this test one of the packers, enclosing the flow section, was leaking causing the pressure data of KA3590G01:2 to be unreliable. This circumstance does not however affect the pressure responses in the observation sections. The test was later carried out once more as test 1:6.

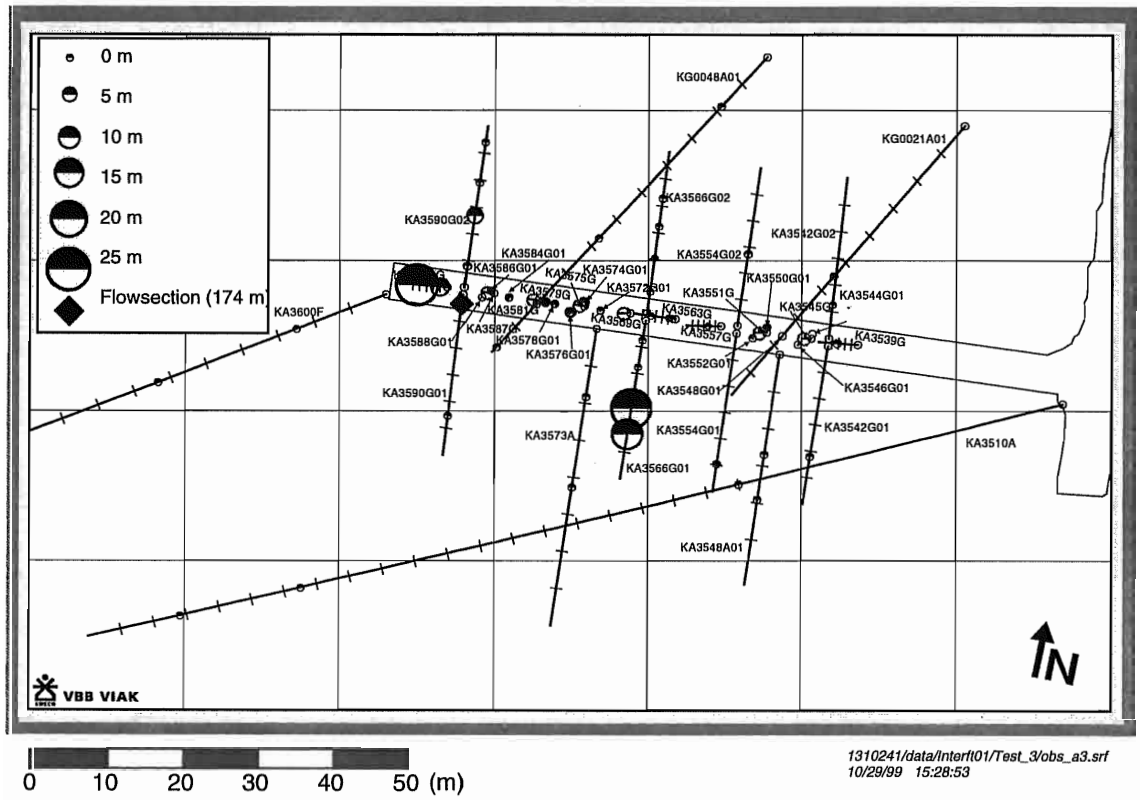

Figure 4-5 Drawdown during flowing of KA3590G01:3 (Interferencetest 1:3) - plan view

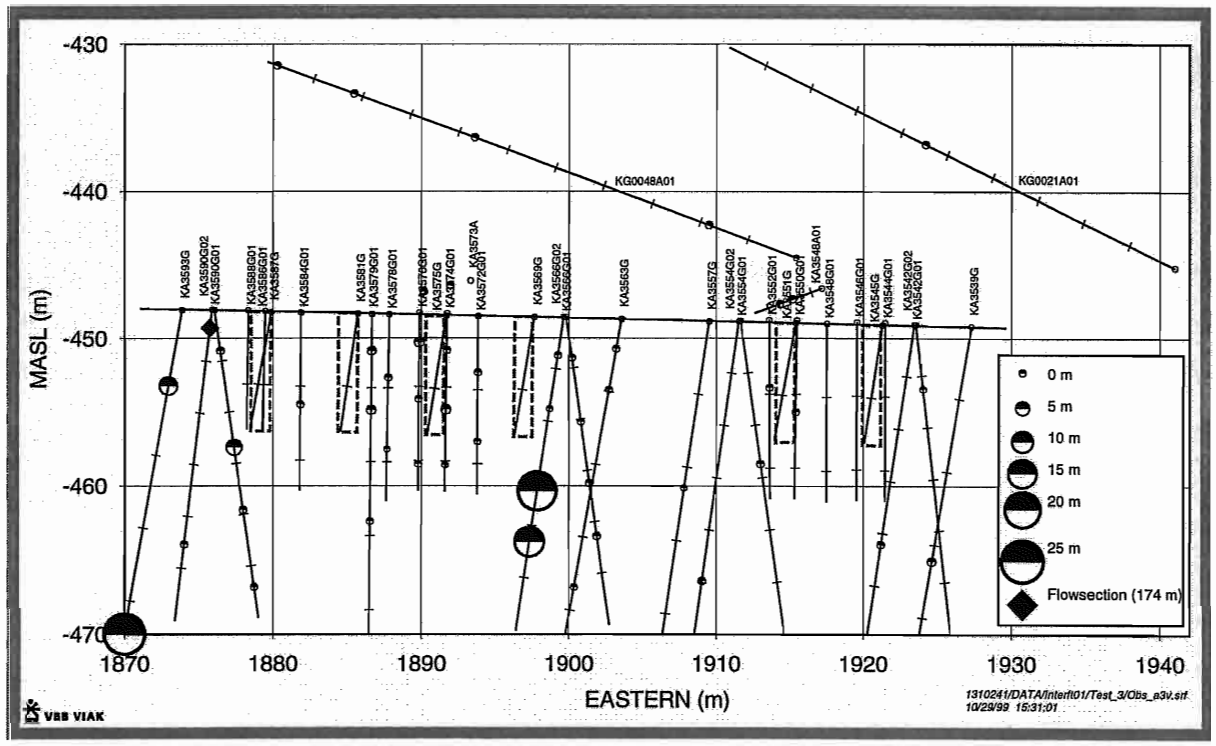

Figure 4-6 Drawdown during flowing of KA3590G01:3 (Interferencetest 1:3) - vertical view

The test gives a certain indication of the same hydraulic feature, observed during test 1:1, located south of the tunnel. The response time in KA3566G01 is as short as the response time in KA3590G01 during test 1:1. The evaluated transmissivity for the tests section is $1.3 \cdot 10^{-7}$ m^2/s, with the evaluation time for this section being 3 - 8 minutes. In most cases the evaluation time of the observation sections are within that time interval. The evaluated transmissivity is twice as high as the transmissivity from test 1:1. The values are still within the same order of magnitude. It is noted that as during test 1:1 neither KG0048A01 nor KA3573A responds until very late. There does not seem to exist a direct connection between these bore holes and KA3566G01 or KA3590G01.

The evaluated transmissivity and storage coefficient KA3566G01:2 are $8.0 \cdot 10^{-8}$ m^2/s and $4.7 \cdot 10^{-8}$ respectively. These values are close to the parameters evaluated, in KA3590G01:3, during test 1:1.

Table 4-3 **Interference test results for KA3590G01, 1.30 - 6.80 m. (r = aprox. distance from flowing bore hole section to observation bore hole section, t_L = time lag for a pressure response of 0.1 m to be registered in an observation section, T = transmissivity, S = storage coefficient, S^* = storage coefficient from diffusivity, η.) The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m).**

Observation borehole	Secup (m)	Seclow (m)	Hydraulic centre of borehole (m)	r (m)	t_L (recovery) (min)	r^2/t_L (m^2/s)	η (m^2/s)	T_{EVAL} (m^2/s)	S (-)	S^* (-)	Response (0 = no, 1 = some, 2 =good response	Po - Pp (kPa)	Pf - Pp (kPa)	Comments
KA3510A:1	122.02	150.00	136.00	87.08	250	5.06E-01	8.34E-02	-	-	-	1	-0.2	1	Not evaluable
KA3510A:2	114.02	121.02	117.50	72.40	-	-	-	-	-	-	0	0	0.7	No response
KA3510A:3	4.52	113.02	50.00	49.81	10	4.13E+00	2.78E-01	-	-	-	1	5.6	6.6	Not evaluable
KA3539G:1	0.30	30.01	16.11	51.61	-	-	-	-	-	-	0	7.2	2	No response
KA3542G01:1	0.30	30.04	21.05	51.87	40	1.12E+00	1.09E-01	-	-	-	1	2.5	3.5	Not evaluable
KA3542G02:1	0.30	30.01	6.28	48.47	-	-	-	-	-	-	0	-3.7	3.6	No response
KA3548A01:1	15.00	30.00	19.56	46.57	30	1.20E+00	1.08E-01	3.2E-06	4.1E-06	3.0E-05	1	2	3.6	
KA3548A01:2	10.00	14.00	13.49	44.30	35	9.35E-01	8.76E-02	-	-	-	1	2.4	4	Not evaluable
KA3550G01:1	0.30	12.03	6.21	40.20	-	-	-	-	-	-	0	0	0.4	No response
KA3552G01:1	0.30	12.01	4.56	38.37	-	-	-	-	-	-	0	-0.8	5.2	No response
KA3554G01:1	0.30	30.01	24.83	43.04	15	2.06E+00	1.53E-01	2.8E-06	2.4E-06	1.8E-05	1	3.3	4.9	
KA3554G02:1	0.30	30.01	13.69	38.99	120	2.11E-01	2.85E-02	-	-	-	1	3.9	3.9	Not evaluable
KA3557G:1	0.30	30.04	11.40	33.96	-	-	-	-	-	-	0	-5.1	0.6	No response
KA3563G01:1	9.30	30.00	18.42	30.25	75	2.03E-01	2.39E-02	-	-	-	1	-3	9.7	Not evaluable
KA3563G01:2	3.80	8.30	4.87	27.33	70	1.78E-01	2.05E-02	-	-	-	1	-2.9	9.9	Not evaluable
KA3563G01:3	1.30	2.80	2.05	27.53	-	-	-	-	-	-	0	0.2	0	No response
KA3566G01:1	20.80	30.01	21.57	31.19	0.9	1.80E+01	7.48E-01	8.0E-08	7.5E-08	1.1E-07	2	161.4	141.1	
KA3566G01:2	12.30	19.80	16.71	28.32	0.5	2.67E+01	1.01E+00	8.0E-08	4.7E-08	7.9E-08	2	225	196.3	
KA3566G01:3	7.30	11.30	8.81	25.01	1.5	6.95E+00	3.15E-01	1.8E-06	6.6E-07	5.7E-06	2	-5.7	30.9	
KA3566G01:4	1.30	6.30	3.70	24.04	1.9	5.07E+00	2.40E-01	4.1E-06	1.0E-06	1.7E-05	1	-1.2	9.4	
KA3566G02:1	19.30	30.01	21.41	32.89	160	1.13E-01	1.65E-02	-	-	-	1	3.1	3.3	Not evaluable
KA3566G02:2	12.30	18.30	16.23	29.61	200	7.31E-02	1.14E-02	-	-	-	1	0.6	2.5	Not evaluable
KA3566G02:3	7.80	11.30	10.25	26.58	200	5.89E-02	9.17E-03	-	-	-	1	-1.7	3.9	Not evaluable
KA3566G02:4	1.30	6.80	3.99	24.59	230	4.38E-02	7.08E-03	-	-	-	1	-0.6	1.1	Not evaluable
KA3572G01:1	6.30	12.00	8.49	19.61	110	5.83E-02	7.67E-03	-	-	-	1	-3.9	9.6	Not evaluable
KA3572G01:2	1.30	5.30	3.82	18.31	250	2.24E-02	3.69E-03	-	-	-	1	0.2	1	Not evaluable
KA3573A:1	18.00	40.07	21.34	28.41	250	5.38E-02	8.88E-03	-	-	-	1	0.2	1.4	Not evaluable
KA3573A:2	4.50	17.00	9.16	20.55	30	2.35E-01	2.11E-02	-	-	-	1	1.6	3.7	Not evaluable
KA3574G01:1	8.80	12.00	10.25	18.38	85	6.62E-02	8.07E-03	-	-	-	2	-3.9	10.2	Not evaluable
KA3574G01:2	5.30	7.80	6.50	16.84	-	-	-	-	-	-	0	17	-45.4	No response
KA3574G01:3	1.30	4.30	2.50	16.03	-	-	-	-	-	-	0	0.6	-0.8	No response
KA3576G01:1	8.80	12.01	10.25	16.85	-	-	-	-	-	-	0	1.1	-3.4	No response
KA3576G01:2	3.80	7.80	5.86	14.93	-	-	-	-	-	-	0	0.4	-0.7	No response
KA3576G01:3	1.30	2.80	2.00	14.19	-	-	-	-	-	-	0	19.6	-50.5	No response
KA3578G01:1	6.80	12.58	9.14	14.51	65	5.40E-02	6.07E-03	-	-	-	2	-7.6	20.9	Not evaluable
KA3578G01:2	1.30	5.80	4.30	12.50	-	-	-	-	-	-	0	0.6	-0.2	No response
KA3579G01:1	9.30	22.65	14.02	16.97	190	2.53E-02	3.88E-03	-	-	-	1	-2.3	9	Not evaluable
KA3579G01:2	5.30	8.30	6.50	12.22	-	-	-	-	-	-	0	14.8	-38.2	No response
KA3579G01:3	1.30	4.30	2.50	11.03	-	-	-	-	-	-	0	9.4	-26.2	No response
KA3584G01:1	0.30	12.00	6.24	8.05	-	-	-	-	-	-	0	-0.2	0.2	No response
KA3590G01:1	17.30	30.06	22.70	20.94	0.1	7.31E+01	2.23E+00	-	-	-	1	0.8	3.3	Not evaluable
KA3590G01:2	7.80	16.30	8.56	6.80	0.05	1.54E+01	4.33E-01	-	-	-	2	-2010	16.8	Not evaluable
KA3590G01:3	**1.30**	**6.80**	**1.76**	**0.00**	**-**	**-**	**-**	**1.3E-07**	**-**	**-**		1743.8	1595.3	
KA3590G02:1	23.30	30.05	27.06	27.97	230	5.67E-02	9.16E-03	-	-	-	1	0.6	1.3	Not evaluable
KA3590G02:2	17.30	22.30	19.56	20.51	170	4.12E-02	6.14E-03	-	-	-	1	1.8	3.3	Not evaluable
KA3590G02:3	8.30	16.30	13.44	14.45	55	6.33E-02	6.77E-03	4.3E-08	6.9E-06	6.4E-06	2	61.4	45.4	
KA3590G02:4	1.20	7.20	4.00	5.39	-	-	-	-	-	-	0	4	-3.8	No response
KA3593G01:1	8.30	30.02	22.13	21.51	1.7	4.54E+00	2.10E-01	4.3E-08	1.6E-07	2.0E-07	2	238	206.3	
KA3593G01:2	1.30	7.30	5.24	5.35	12	3.98E-02	2.80E-03	-	-	-	2	76	59.7	Not evaluable
KA3600F:1	22.00	50.10	31.78	40.71	-	-	-	-	-	-	0	0	0.9	No response
KA3600F:2	4.50	21.00	12.51	21.86	250	3.19E-02	5.26E-03	-	-	-	1	-0.2	0.6	Not evaluable
KG0021A01:1	0.00	48.82	27.41	50.15	130	3.22E-01	4.45E-02	-	-	-	1	0.9	0.9	Not evaluable
KG0048A01:1	49.00	54.69	53.81	19.26	20	3.09E-01	2.48E-02	-	-	-	1	1.4	3.5	Not evaluable
KG0048A01:2	41.00	48.00	45.90	18.63	30	1.93E-01	1.73E-02	-	-	-	1	0.9	3.2	Not evaluable
KG0048A01:3	30.00	40.00	33.50	23.71	40	2.34E-01	2.28E-02	-	-	-	1	1.1	2.7	Not evaluable
KG0048A01:4	4.00	29.00	9.12	43.38	220	1.43E-01	2.28E-02	-	-	-	1	0.9	0.7	Not evaluable

4.4 Interference test 1:4

The test was carried out in KA3590G01, section 7.80 - 16.30 m . The flow period was for 10 minutes with a final flow of 0.398 l/min, while the pressure build-up time was 30 minutes. In *Figure 4-7* and *Figure 4-8* the pressure drawdown recordings are shown and in *Table 4-4* the interference test results are presented. Diagrams of evaluated bore hole sections are presented in *Appendix 5*.

This test was carried out as a function test due to the malfunction, of one of the packers during test 1:3.

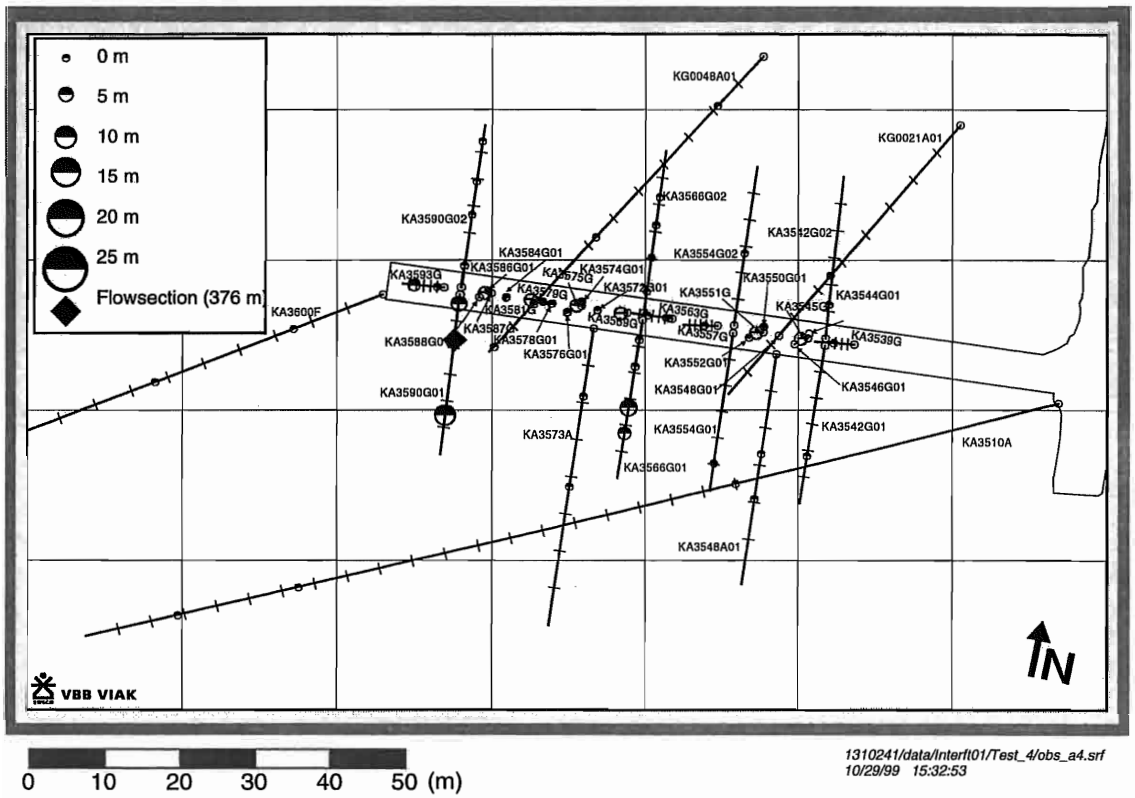

Figure 4-7 Drawdown during flowing of KA3590G01:2 (Interferencetest 1:4) - plan view

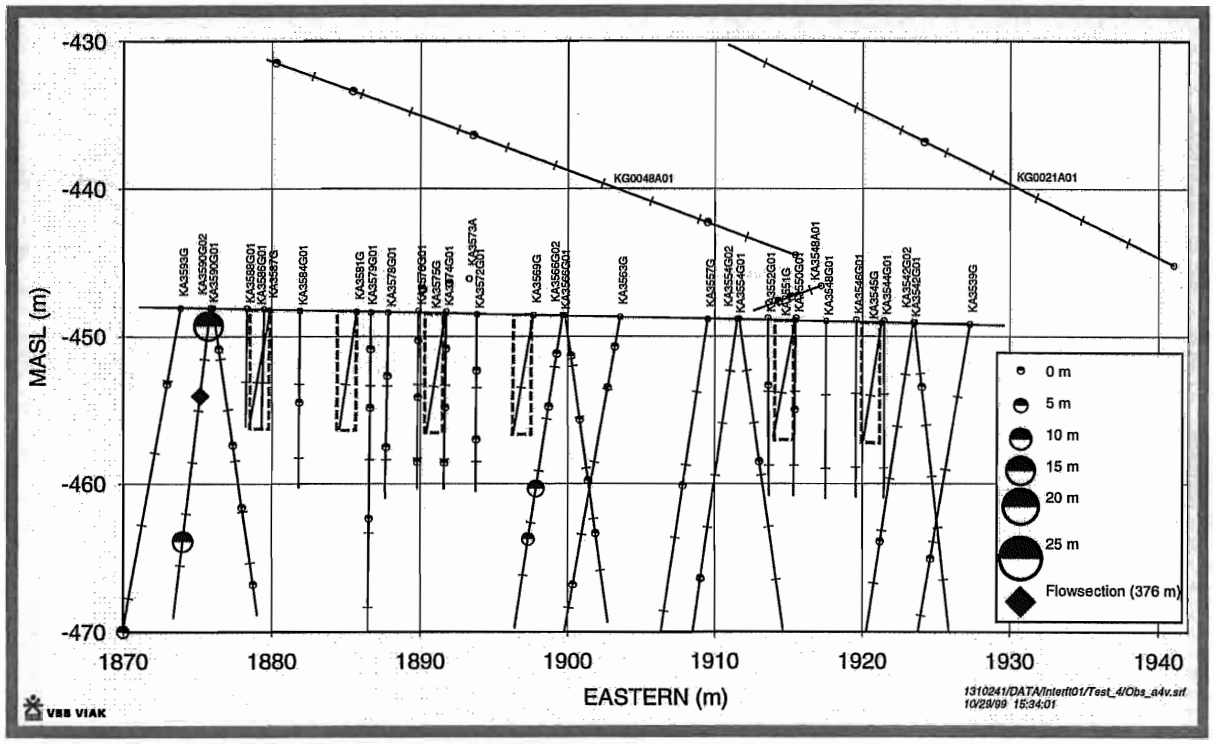

Figure 4-8 Drawdown during flowing of KA3590G01:2 (Interferencetest 1:4) - vertical view

This very short test still show the indication of the south feature indicated in test 1:1 and 1:3. The evaluated transmissivity of the test section is $1.4 \cdot 10^{-7}$ m^2/s, with the evaluation time for this section being 1 - 2 minutes. The evaluated transmissivity is in the same order of magnitude as the evaluated transmissivity of test 1:1, 1:3 and 1:6.

Table 4-4 **Interference test results for KA3590G01, 7.80 - 16.30 m. (r = aprox. distance from flowing bore hole section to observation bore hole section, t_L = time lag for a pressure response of 0.1 m to be registered in an observation section, T = transmissivity, S = storage coefficient, S^* = storage coefficient from diffusivity, η.) The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m).**

Observation borehole	Secup (m)	Seclow (m)	Hydraulic centre of borehole (m)	r (m)	t_L (recovery) (min)	r^2/t_L (m^2/s)	η (m^2/s)	T_{EVAL} (m^2/s)	S (-)	S^* (-)	Response (0 = no, 1 = some, 2 =good response	Po - Pp (kPa)	Pf - Pp (kPa)	Comments
KA3510A:1	122.02	150.00	136.00	80.91	-	-	-	-	-	-	0	0	0.2	No response
KA3510A:2	114.02	121.02	117.50	65.93	-	-	-	-	-	-	0	0	0.3	No response
KA3510A:3	4.52	113.02	50.00	45.86	-	-	-	-	-	-	0	2.3	0	No response
KA3539G:1	0.30	30.01	16.11	50.64	-	-	-	-	-	-	0	1.5	-0.8	No response
KA3542G01:1	0.30	30.04	21.05	49.53	-	-	-	-	-	-	0	0.2	-0.8	No response
KA3542G02:1	0.30	30.01	6.28	49.08	7	5.74E+00	9.51E-01	-	-	-	1	0	9	Not evaluable
KA3548A01:1	15.00	30.00	19.56	44.98	-	-	-	-	-	-	0	1.4	0	No response
KA3548A01:2	10.00	14.00	13.49	43.35	-	-	-	-	-	-	0	0.4	-0.4	No response
KA3550G01:1	0.30	12.03	6.21	40.29	-	-	-	-	-	-	0	-1.6	3.1	No response
KA3552G01:1	0.30	12.01	4.56	38.47	-	-	-	-	-	-	0	-3.5	-2.7	No response
KA3554G01:1	0.30	30.01	24.83	39.60	-	-	-	-	-	-	0	1.4	0.4	No response
KA3554G02:1	0.30	30.01	13.69	39.82	-	-	-	-	-	-	0	-0.2	0.4	No response
KA3557G:1	0.30	30.04	11.40	33.25	-	-	-	-	-	-	0	0.4	-0.2	No response
KA3563G01:1	9.30	30.00	18.42	28.42	-	-	-	-	-	-	0	0.2	0.4	No response
KA3563G01:2	3.80	8.30	4.87	27.67	-	-	-	-	-	-	0	-0.1	0.2	No response
KA3563G01:3	1.30	2.80	2.05	28.34	-	-	-	-	-	-	0	-0.3	0	No response
KA3566G01:1	20.80	30.01	21.57	27.18	3	4.10E+00	5.38E-01	1.6E-08	5.5E-08	3.0E-08	2	36.8	37.7	
KA3566G01:2	12.30	19.80	16.71	25.18	0.8	1.32E+01	1.18E+00	-	-	-	2	64.2	68.1	Not evaluable
KA3566G01:3	7.30	11.30	8.81	23.77	1.4	6.73E+00	7.04E-01	-	-	-	1	4.1	5.3	Not evaluable
KA3566G01:4	1.30	6.30	3.70	24.23	2	4.89E+00	5.69E-01	-	-	-	1	2.5	2.9	Not evaluable
KA3566G02:1	19.30	30.01	21.41	34.06	-	-	-	-	-	-	0	0	0.2	No response
KA3566G02:2	12.30	18.30	16.23	30.87	-	-	-	-	-	-	0	0.3	0	No response
KA3566G02:3	7.80	11.30	10.25	27.93	-	-	-	-	-	-	0	0	0	No response
KA3566G02:4	1.30	6.80	3.99	25.99	-	-	-	-	-	-	0	0.3	0.5	No response
KA3572G01:1	6.30	12.00	8.49	19.23	-	-	-	-	-	-	0	0	-0.6	No response
KA3572G01:2	1.30	5.30	3.82	19.11	-	-	-	-	-	-	0	0.4	0.4	No response
KA3573A:1	18.00	40.07	21.34	25.65	-	-	-	-	-	-	0	0.4	0	No response
KA3573A:2	4.50	17.00	9.16	19.89	-	-	-	-	-	-	0	0.8	0.3	No response
KA3574G01:1	8.80	12.00	10.25	17.79	-	-	-	-	-	-	0	0.2	-1	No response
KA3574G01:2	5.30	7.80	6.50	17.27	-	-	-	-	-	-	0	0.8	-3	No response
KA3574G01:3	1.30	4.30	2.50	17.60	-	-	-	-	-	-	0	0	-0.2	No response
KA3576G01:1	8.80	12.01	10.25	15.71	-	-	-	-	-	-	0	0.5	-1.6	No response
KA3576G01:2	3.80	7.80	5.86	15.11	-	-	-	-	-	-	0	0	0	No response
KA3576G01:3	1.30	2.80	2.00	15.61	-	-	-	-	-	-	0	0.4	-2.5	No response
KA3578G01:1	6.80	12.58	9.14	13.86	-	-	-	-	-	-	0	0.4	-0.3	No response
KA3578G01:2	1.30	5.80	4.30	13.57	-	-	-	-	-	-	0	0	0	No response
KA3579G01:1	9.30	22.65	14.02	15.01	-	-	-	-	-	-	0	-0.2	0	No response
KA3579G01:2	5.30	8.30	6.50	12.56	-	-	-	-	-	-	0	1.4	-0.7	No response
KA3579G01:3	1.30	4.30	2.50	12.96	-	-	-	-	-	-	0	1.1	-2	No response
KA3584G01:1	0.30	12.00	6.24	8.75	-	-	-	-	-	-	0	0	0	No response
KA3590G01:1	17.30	30.06	22.70	14.14	0.10	3.33E+01	1.79E+00	-	-	-	2	89.7	86.2	Not evaluable
KA3590G01:2	**7.80**	**16.30**	**8.56**	**0.00**	-	-	-	**1.4E-07**	-	-		**3759.7**	**1718.6**	
KA3590G01:3	1.30	6.80	1.76	6.80	0.1	7.71E+00	4.13E-01	-	-	-	2	1358.5	1487.4	Not evaluable
KA3590G02:1	23.30	30.05	27.06	29.55	-	-	-	-	-	-	0	0.1	-0.3	No response
KA3590G02:2	17.30	22.30	19.56	22.55	-	-	-	-	-	-	0	0.1	0	No response
KA3590G02:3	8.30	16.30	13.44	17.15	-	-	-	-	-	-	0	0.2	-0.6	No response
KA3590G02:4	1.20	7.20	4.00	10.52	5	3.69E-01	5.59E-02	-	-	-	2	0.2	-1.2	Not evaluable
KA3593G01:1	8.30	30.02	22.13	18.21	-	-	-	-	-	-	0	33.7	31.9	No response
KA3593G01:2	1.30	7.30	5.24	7.51	-	-	-	-	-	-	0	1.4	0	No response
KA3600F:1	22.00	50.10	31.78	39.82	-	-	-	-	-	-	0	0	0	No response
KA3600F:2	4.50	21.00	12.51	22.36	-	-	-	-	-	-	0	-0.2	-0.2	No response
KG0021A01:1	0.00	48.82	27.41	52.64	-	-	-	-	-	-	0	0	-0.9	No response
KG0048A01:1	49.00	54.69	53.81	23.16	-	-	-	-	-	-	0	2.2	0.4	No response
KG0048A01:2	41.00	48.00	45.90	23.57	-	-	-	-	-	-	0	1.6	0.5	No response
KG0048A01:3	30.00	40.00	33.50	28.93	-	-	-	-	-	-	0	0.3	0	No response
KG0048A01:4	4.00	29.00	9.12	47.82	-	-	-	-	-	-	0	-0.6	-0.6	No response

4.5 Interference test 1:5

The test was carried out in KA3590G02, section 23.30 - 30.05 m . The flow period was for 445 minutes with a final flow of 1.710 l/min, while the pressure build-up time was 3840 minutes. In *Figure 4-9* and *Figure 4-10* the pressure drawdown recordings are shown and in *Table 4-5* the interference test results are presented. Diagrams of evaluated bore hole sections are presented in *Appendix 6*.

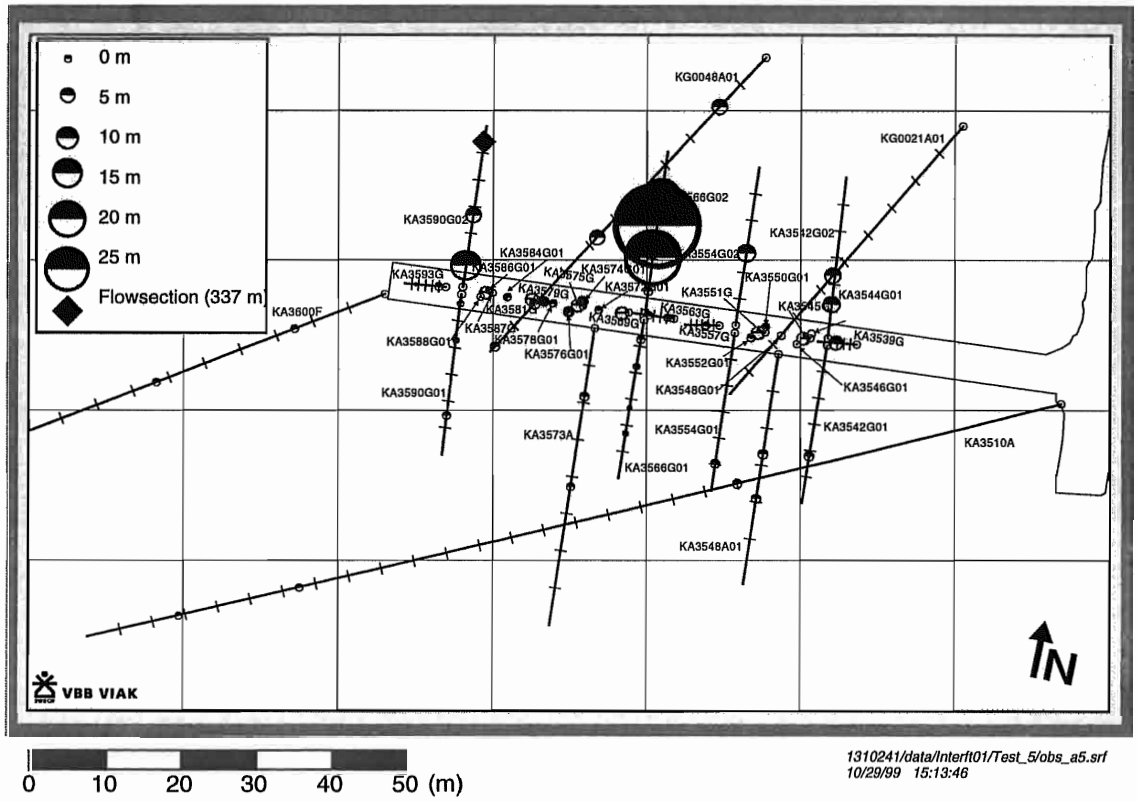

Figure 4-9 Drawdown during flowing of KA3590G02:1 (Interferencetest 1:5) - plan view

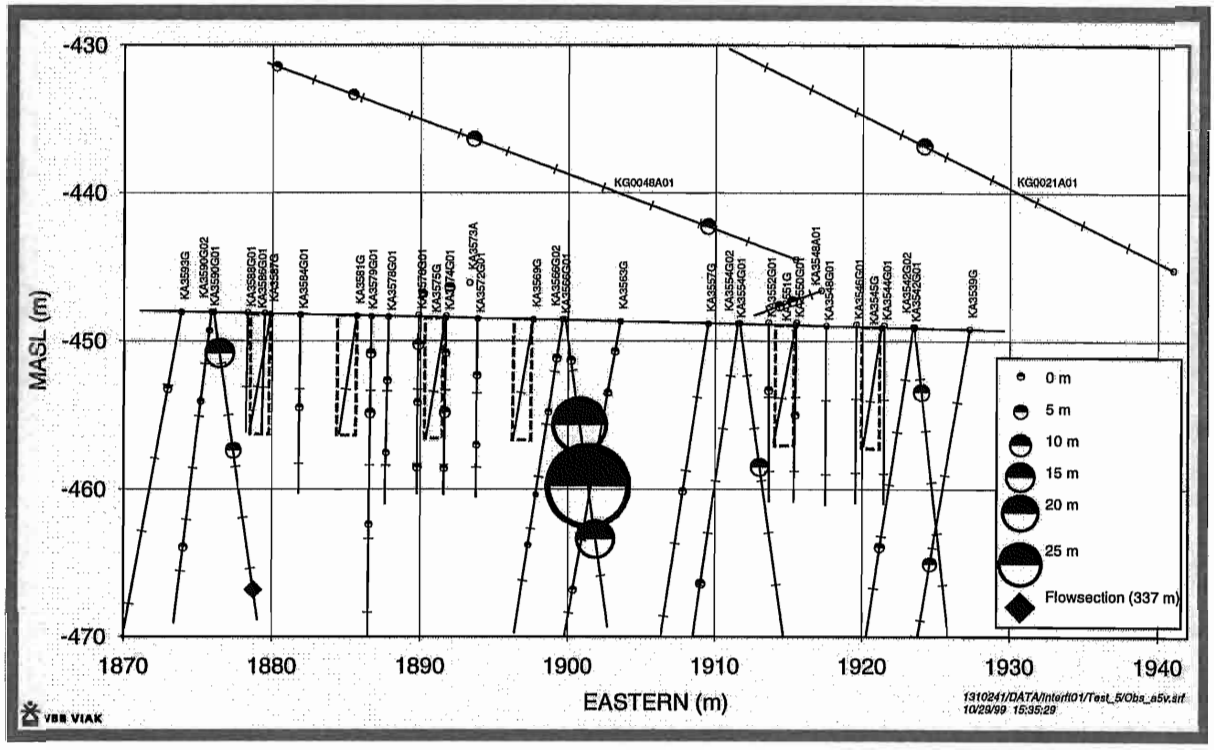

Figure 4-10 Drawdown during flowing of KA3590G02:1 (Interferencetest 1:5) - vertical view

This test indicates a hydraulic feature, striking WNW, north of the tunnel. The response time in KA3566G02 is almost as short as for the tests south of the tunnel. Further east the responses are again more diffuse as noted in test 1:2 but still there may exist a hydraulic feature or system of hydraulic features.

The evaluated transmissivity for the test section is $1.5 \cdot 10^{-7}$ m^2/s, with the evaluation time for this section being 0.5 - 1.8 minutes.

The evaluated transmissivity and storage coefficient of KA3566G02:2 are $5.8 \cdot 10^{-8}$ m^2/s and $1.5 \cdot 10^{-7}$ respectively.

Table 4-5 **Interference test results for KA3590G02, 23.30 - 30.05 m. (r = aprox. distance from flowing bore hole section to observation bore hole section, t_L = time lag for a pressure response of 0.1 m to be registered in an observation section, T = transmissivity, S = storage coefficient, S^* = storage coefficient from diffusivity, η.) The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m).**

Observation borehole	Secup (m)	Seclow (m)	Hydraulic centre of borehole (m)	r (m)	t_L (recovery) (min)	r^2/t_L (m^2/s)	η (m^2/s)	T_{EVAL} (m^2/s)	S (-)	S^* (-)	Response (0 = no, 1 = some, 2 =good response	Po - Pp (kPa)	Pf - Pp (kPa)	Comments
KA3510A:1	122.02	150.00	136.00	89.53	250	5.34E-01	8.37E-02	-	-	-	1	0.6	0.1	Not evaluable
KA3510A:2	114.02	121.02	117.50	75.77	250	3.83E-01	5.99E-02	-	-	-	1	1.8	2.3	Not evaluable
KA3510A:3	4.52	113.02	50.00	56.77	20	2.69E+00	2.04E-01	-	-	-	2	12.7	5.9	Not evaluable
KA3539G:1	0.30	30.01	16.11	53.13	35	1.34E+00	1.19E-01	5.7E-07	2.2E-06	4.8E-06	2	46.4	61.9	
KA3542G01:1	0.30	30.04	21.05	59.68	27	2.20E+00	1.81E-01	1.5E-06	4.4E-06	8.3E-06	2	16.2	17.2	
KA3542G02:1	0.30	30.01	6.28	51.95	10	4.50E+00	2.88E-01	6.3E-07	1.2E-06	2.2E-06	2	62.2	60.7	
KA3548A01:1	15.00	30.00	19.56	62.45	20	3.25E+00	2.47E-01	2.7E-06	4.5E-06	1.1E-05	2	12.3	14.1	
KA3548A01:2	10.00	14.00	13.49	58.66	28	2.05E+00	1.70E-01	1.3E-06	4.4E-06	7.6E-06	2	15.8	17.2	
KA3550G01:1	0.30	12.03	6.21	45.77	-	-	-	-	-	-	0	1.1	2.9	No response
KA3552G01:1	0.30	12.01	4.56	45.61	-	-	-	-	-	-	0	5.5	10.2	No response
KA3554G01:1	0.30	30.01	24.83	52.46	20	2.29E+00	1.74E-01	2.8E-06	8.5E-06	1.6E-05	2	11.7	13.3	
KA3554G02:1	0.30	30.01	13.69	38.28	7	3.49E+00	2.06E-01	4.8E-07	1.3E-06	2.3E-06	2	72.8	81.2	
KA3557G:1	0.30	30.04	11.40	38.57	-	-	-	-	-	-	0	1.3	3.9	No response
KA3563G01:1	9.30	30.00	18.42	31.63	7	2.38E+00	1.41E-01	-	-	-	2	1	31.2	Not evaluable
KA3563G01:2	3.80	8.30	4.87	36.05	8	2.71E+00	1.65E-01	-	-	-	2	1.1	31.3	Not evaluable
KA3563G01:3	1.30	2.80	2.05	37.53	300	7.82E-02	1.28E-02	-	-	-	1	0.5	0.2	Not evaluable
KA3566G01:1	20.80	30.01	21.57	43.16	30	1.03E+00	8.78E-02	-	-	-	1	-9.4	1.8	Not evaluable
KA3566G01:2	12.30	19.80	16.71	40.77	40	6.93E-01	6.37E-02	-	-	-	1	-14.5	-0.4	Not evaluable
KA3566G01:3	7.30	11.30	8.81	37.91	65	3.68E-01	3.90E-02	-	-	-	2	-5.7	39.6	Not evaluable
KA3566G01:4	1.30	6.30	3.70	36.85	7	3.23E+00	1.91E-01	-	-	-	2	6.1	21.9	Not evaluable
KA3566G02:1	19.30	30.01	21.41	24.54	3	3.35E+00	1.66E-01	2.0E-07	9.9E-07	1.2E-06	2	213.4	338.1	
KA3566G02:2	12.30	18.30	16.23	26.18	1.2	9.52E+00	4.01E-01	5.8E-08	1.5E-07	1.4E-07	2	528.4	679.8	
KA3566G02:3	7.80	11.30	10.25	29.13	55	2.57E-01	2.59E-02	2.7E-08	1.4E-06	1.0E-06	2	328.1	970.4	Slow II
KA3566G02:4	1.30	6.80	3.99	33.10	3.5	5.22E+00	2.67E-01	-	-	-	2	8.4	569	Not evaluable
KA3572G01:1	6.30	12.00	8.49	28.72	220	6.25E-02	9.45E-03	-	-	-	2	-2.9	31.3	Not evaluable
KA3572G01:2	1.30	5.30	3.82	30.63	100	1.56E-01	1.88E-02	-	-	-	1	0.6	7.1	Not evaluable
KA3573A:1	18.00	40.07	21.34	51.39	40	1.10E+00	1.01E-01	-	-	-	1	5.5	6.3	Not evaluable
KA3573A:2	4.50	17.00	9.16	41.72	18	1.61E+00	1.19E-01	2.9E-06	9.2E-06	2.4E-05	2	12.5	14.3	
KA3574G01:1	8.80	12.00	10.25	26.20	150	7.63E-02	1.04E-02	-	-	-	2	-2.6	32.5	Not evaluable
KA3574G01:2	5.30	7.80	6.50	27.62	-	-	-	-	-	-	0	23	-151.2	No response
KA3574G01:3	1.30	4.30	2.50	29.58	100	1.46E-01	1.76E-02	-	-	-	1	1.5	1.6	Not evaluable
KA3576G01:1	8.80	12.01	10.25	26.63	-	-	-	-	-	-	0	4.7	-17.6	No response
KA3576G01:2	3.80	7.80	5.86	28.28	-	-	-	-	-	-	0	0.2	-1.2	No response
KA3576G01:3	1.30	2.80	2.00	30.18	-	-	-	-	-	-	0	22.5	-138.6	No response
KA3578G01:1	6.80	12.58	9.14	25.14	50	2.11E-01	2.07E-02	-	-	-	2	-6	62.2	Not evaluable
KA3578G01:2	1.30	5.80	4.30	27.31	-	-	-	-	-	-	0	0.5	-1.4	No response
KA3579G01:1	9.30	22.65	14.02	23.07	90	9.86E-02	1.15E-02	-	-	-	2	-3.4	34.1	Not evaluable
KA3579G01:2	5.30	8.30	6.50	25.66	-	-	-	-	-	-	0	17.3	-237.7	No response
KA3579G01:3	1.30	4.30	2.50	27.77	-	-	-	-	-	-	0	14.7	-193.1	No response
KA3584G01:1	0.30	12.00	6.24	24.33	300	3.29E-02	5.40E-03	-	-	-	1	0.4	0	Not evaluable
KA3590G01:1	17.30	30.06	22.70	36.87	40	5.66E-01	5.21E-02	-	-	-	1	6	-494.9	Not evaluable
KA3590G01:2	7.80	16.30	8.56	29.55	60	2.43E-01	2.51E-02	-	-	-	1	-6.8	-0.4	Not evaluable
KA3590G01:3	1.30	6.80	1.76	27.97	60	2.17E-01	2.25E-02	-	-	-	1	-9.4	0.4	Not evaluable
KA3590G02:1	**23.30**	**30.05**	**27.06**	**0.00**	-	-	-	**1.5E-07**	-	-		**3368.9**	**3371.2**	
KA3590G02:2	17.30	22.30	19.56	7.50	0.1	9.37E+00	2.79E-01	-	-	-	2	1155.1	1167.1	Not evaluable
KA3590G02:3	8.30	16.30	13.44	13.62	0.1	3.09E+01	9.20E-01	-	-	-	2	56.4	64	Not evaluable
KA3590G02:4	1.20	7.20	4.00	23.06	-	-	-	-	-	-	0	150.8	152.6	No response
KA3593G01:1	8.30	30.02	22.13	21.16	35	2.13E-01	1.89E-02	-	-	-	1	-23.9	1.6	Not evaluable
KA3593G01:2	1.30	7.30	5.24	24.30	4	2.46E+00	1.29E-01	-	-	-	2	4.7	21.8	Not evaluable
KA3600F:1	22.00	50.10	31.78	56.76	200	2.68E-01	3.95E-02	-	-	-	1	2.7	3.3	Not evaluable
KA3600F:2	4.50	21.00	12.51	40.60	100	2.75E-01	3.31E-02	-	-	-	1	3	3.6	Not evaluable
KG0021A01:1	0.00	48.82	27.41	57.27	3	1.82E+01	9.04E-01	7.3E-07	5.9E-07	8.1E-07	2	58.6	62	
KG0048A01:1	49.00	54.69	53.81	44.69	17	1.96E+00	1.43E-01	3.1E-06	7.6E-06	2.2E-05	2	13.3	13.8	
KG0048A01:2	41.00	48.00	45.90	40.38	9	3.02E+00	1.89E-01	2.0E-06	4.5E-06	1.1E-05	2	20	19.3	
KG0048A01:3	30.00	40.00	33.50	36.16	5	4.36E+00	2.39E-01	-	-	-	2	51.9	53.1	Not evaluable
KG0048A01:4	4.00	29.00	9.12	39.62	5	5.23E+00	2.88E-01	6.7E-07	1.7E-06	2.3E-06	2	55.2	58	

4.6 Interference test 1:6

The test was carried out in KA3590G01, section 1.30 - 6.80 m . It was a repeat test for test 1:3. Before this all packers of KA3590G01 was checked and then reinstalled. The flow period was for 362 minutes with a final flow of 0.330 l/min, while the pressure build-up time was 840 minutes. In *Figure 4-11* and *Figure 4-12* the pressure drawdown recordings are shown and in *Table 4-6* the interference test results are presented. Diagrams of evaluated bore hole sections are presented in *Appendix 7.*

It is to be observed that KA3566G02:3 was opened for water-sampling on March 29 with a pressure drawdown of approximately 2700 kPa and with a flow rate of 0.006 l/min. It is also to be noted that less than an hour before the test start the bottom section of KA3578G01 and the upper section of KA3572G01 were opened for water sampling. The section pressures fell from c. 950 kPa and 250 kPa respectively. The flow rates were low (less than or equal to c. 1 ml/min). The sections were kept open during the whole test period. As a consequence of these activities the following sections show lower initial pressures, P_0, when compared with interference test 1:3 ; KA3566G02:3, KA3572G01:2, KA3574G01:2, KA3578G01:1, KA3579G01:2 and KA3579G01:3.

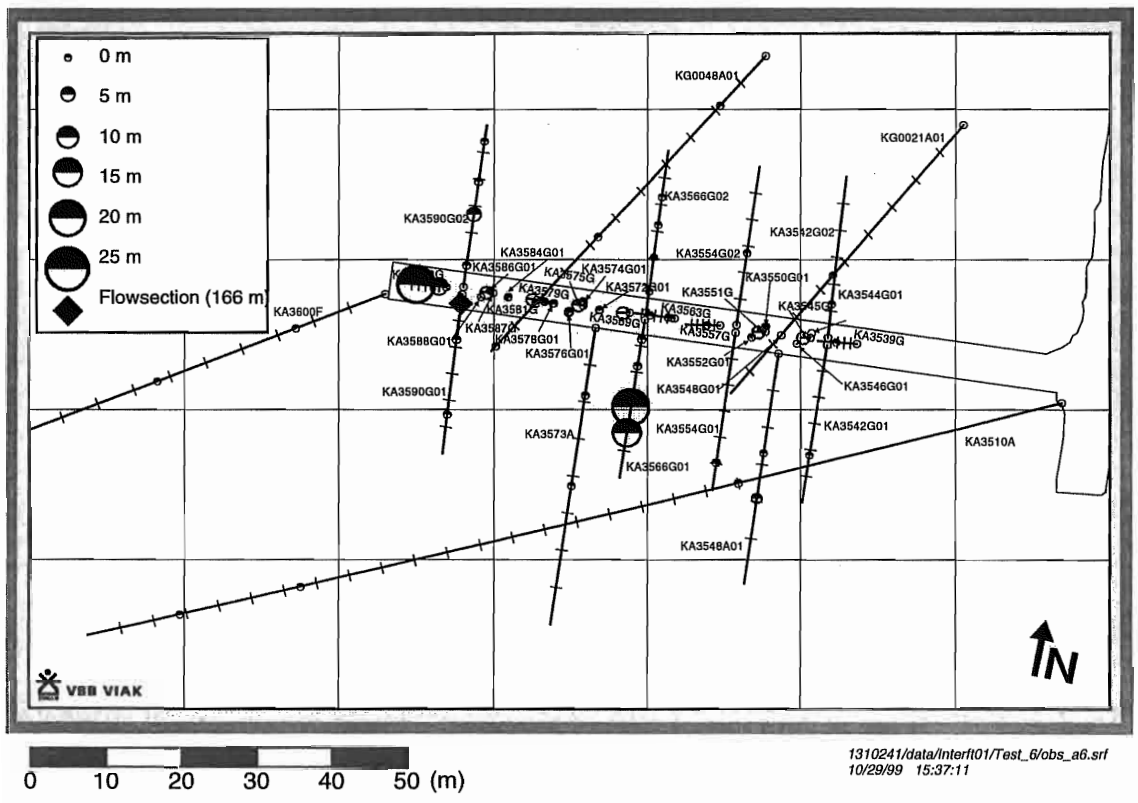

Figure 4-11 Drawdown during flowing of KA3590G01:3 (Interferencetest 1:6) - plan view

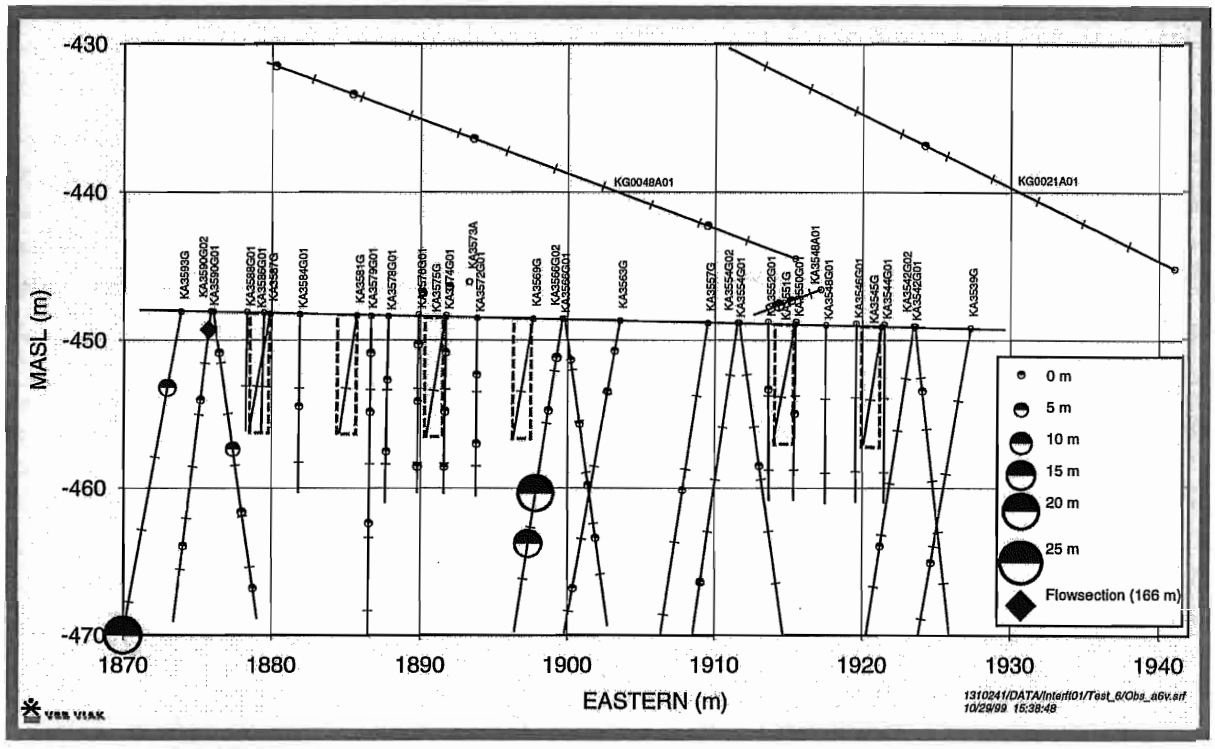

Figure 4-12 Drawdown during flowing of KA3590G01:3 (Interferencetest 1:6) - vertical view

The test gives a certain indication of the same hydraulic feature, observed during test 1:1, 1:3 and 1:4 located south of the tunnel. The response time in KA3566G01 is as short as the response time in KA3566G01 during test 1:3. The evaluated transmissivity for the test section is $1.3 \cdot 10^{-7}$ m^2/s, with the evaluation time for this section being 3 - 8 minutes. In most cases the evaluation time of the observation sections are within that time interval. The evaluated transmissivity is twice as high as the transmissivity from test 1:1 but the same as in test 1:3. The values are still within the same order of magnitude. It is noted that as during test 1:1 and 1:3 neither KG0048A01 nor KA3573A responds until very late. There does not exist a direct connection between these bore holes and KA3566G01 or KA3590G01.

The evaluated transmissivity and storage coefficient of KA3566G01:2 are $7.5 \cdot 10^{-8}$ m^2/s and $4.3 \cdot 10^{-8}$ respectively. These values are close to the parameters evaluated during test 1:1 and almost identical to the evaluated parameters of test 1:3.

Table 4-6 **Interference test results for KA3590G01, 1.30 - 6.80 m. (r = aprox. distance from flowing bore hole section to observation bore hole section, t_L = time lag for a pressure response of 0.1 m to be registered in an observation section, T = transmissivity, S = storage coefficient, S^* = storage coefficient from diffusivity, η.) The response is classified as 1 = no response (< 0.1 m), 2 = some response (0.1 m - 1.0 m) and 3 = good response (> 1.0 m).**

Observation borehole	Secup (m)	Seclow (m)	Hydraulic centre of borehole (m)	r (m)	t_L (recovery) (min)	r^2/t_L (m^2/s)	η (m^2/s)	T_{EVAL} (m^2/s)	S (-)	S^* (-)	Response (0 = no, 1 = some, 2 =good response	Po - Pp (kPa)	Pf - Pp (kPa)	Comments
KA3510A:1	122.02	150.00	136.00	87.08	-	-	-	-	-	-	0	0.9	0.6	No response
KA3510A:2	114.02	121.02	117.50	72.40	200	4.37E-01	6.81E-02	-	-	-	1	0.4	1	Not evaluable
KA3510A:3	4.52	113.02	50.00	49.81	10	4.13E+00	2.78E-01	1.5E-06	1.1E-06	5.4E-06	1	7.2	7	
KA3539G:1	0.30	30.01	16.11	51.61	-	-	-	-	-	-	0	1	0.2	No response
KA3542G01:1	0.30	30.04	21.05	51.87	35	1.28E+00	1.20E-01	-	-	-	2	-1.8	4.1	Not evaluable
KA3542G02:1	0.30	30.01	6.28	48.47	-	-	-	-	-	-	0	0.8	0.6	No response
KA3548A01:1	15.00	30.00	19.56	46.57	25	1.45E+00	1.23E-01	2.4E-06	3.2E-06	1.9E-05	1	24	24.4	
KA3548A01:2	10.00	14.00	13.49	44.30	-	-	-	-	-	-	0	1.3	-0.2	No response
KA3550G01:1	0.30	12.03	6.21	40.20	-	-	-	-	-	-	0	0.4	-0.8	No response
KA3552G01:1	0.30	12.01	4.56	38.37	-	-	-	-	-	-	0	0.6	-0.6	No response
KA3554G01:1	0.30	30.01	24.83	43.04	16	1.93E+00	1.46E-01	2.2E-06	2.7E-06	1.5E-05	1	4.8	4.4	
KA3554G02:1	0.30	30.01	13.69	38.99	150	1.69E-01	2.43E-02	-	-	-	1	0.8	1	Not evaluable
KA3557G:1	0.30	30.04	11.40	33.96	-	-	-	-	-	-	0	0.2	-0.8	No response
KA3563G01:1	9.30	30.00	18.42	30.25	-	-	-	-	-	-	0	1.4	-0.6	No response
KA3563G01:2	3.80	8.30	4.87	27.33	-	-	-	-	-	-	0	1.6	-0.5	No response
KA3563G01:3	1.30	2.80	2.05	27.53	-	-	-	-	-	-	0	0	-0.8	No response
KA3566G01:1	20.80	30.01	21.57	31.19	0.9	1.80E+01	7.49E-01	8.0E-08	7.9E-08	1.1E-07	2	144.2	146.7	
KA3566G01:2	12.30	19.80	16.71	28.32	0.5	2.67E+01	1.01E+00	7.5E-08	4.3E-08	7.4E-08	2	203.3	206.8	
KA3566G01:3	7.30	11.30	8.81	25.01	1.8	5.79E+00	2.71E-01	-	-	-	1	4.3	5.5	Not evaluable
KA3566G01:4	1.30	6.30	3.70	24.04	2.2	4.38E+00	2.13E-01	-	-	-	1	9	-2.2	Not evaluable
KA3566G02:1	19.30	30.01	21.41	32.89	130	1.39E-01	1.92E-02	-	-	-	1	1.1	1.5	Not evaluable
KA3566G02:2	12.30	18.30	16.23	29.61	120	1.22E-01	1.64E-02	-	-	-	1	1.2	1.8	Not evaluable
KA3566G02:3	7.80	11.30	10.25	26.58	-	-	-	-	-	-	0	0.4	-0.8	No response
KA3566G02:4	1.30	6.80	3.99	24.59	-	-	-	-	-	-	0	0.4	-3.7	No response
KA3572G01:1	6.30	12.00	8.49	19.61	-	-	-	-	-	-	0	3.7	-10.6	No response
KA3572G01:2	1.30	5.30	3.82	18.31	-	-	-	-	-	-	0	0.2	-1	No response
KA3573A:1	18.00	40.07	21.34	28.41	100	1.35E-01	1.72E-02	-	-	-	1	1.2	1.6	Not evaluable
KA3573A:2	4.50	17.00	9.16	20.55	25	2.82E-01	2.40E-02	-	-	-	1	3.4	3.6	Not evaluable
KA3574G01:1	8.80	12.00	10.25	18.38	150	3.75E-02	5.40E-03	-	-	-	1	0.4	3.2	Not evaluable
KA3574G01:2	5.30	7.80	6.50	16.84	-	-	-	-	-	-	0	4.5	-6.5	No response
KA3574G01:3	1.30	4.30	2.50	16.03	-	-	-	-	-	-	0	1.6	-2.3	No response
KA3576G01:1	8.80	12.01	10.25	16.85	-	-	-	-	-	-	0	8.6	-16.8	No response
KA3576G01:2	3.80	7.80	5.86	14.93	-	-	-	-	-	-	0	0.2	0.4	No response
KA3576G01:3	1.30	2.80	2.00	14.19	-	-	-	-	-	-	0	10.8	-21.9	No response
KA3578G01:1	6.80	12.58	9.14	14.51	-	-	-	-	-	-	0	0.2	-0.8	No response
KA3578G01:2	1.30	5.80	4.30	12.50	200	1.30E-02	2.03E-03	-	-	-	1	-1.2	1.1	Not evaluable
KA3579G01:1	9.30	22.65	14.02	16.97	-	-	-	-	-	-	0	3.4	-4.1	No response
KA3579G01:2	5.30	8.30	6.50	12.22	-	-	-	-	-	-	0	2.1	-2.6	No response
KA3579G01:3	1.30	4.30	2.50	11.03	-	-	-	-	-	-	0	3.7	-4.3	No response
KA3584G01:1	0.30	12.00	6.24	8.05	-	-	-	-	-	-	0	0	-0.9	No response
KA3590G01:1	17.30	30.06	22.70	20.94	0.1	7.31E+01	2.23E+00	-	-	-	2	3.2	3.7	Not evaluable
KA3590G01:2	7.80	16.30	8.56	6.80	0.1	7.71E+00	2.35E-01	-	-	-	2	4.1	4.5	Not evaluable
KA3590G01:3	**1.30**	**6.80**	**1.76**	**0.00**	-	-	-	**1.3E-07**	-	-		**1524.1**	**1527.8**	
KA3590G02:1	23.30	30.05	27.06	27.97	100	1.30E-01	1.67E-02	-	-	-	1	1	2	Not evaluable
KA3590G02:2	17.30	22.30	19.56	20.51	70	1.00E-01	1.15E-02	2.4E-07	5.6E-06	2.1E-05	1	8.2	9.2	
KA3590G02:3	8.30	16.30	13.44	14.45	48	7.25E-02	7.46E-03	4.4E-08	7.0E-06	5.9E-06	2	47.4	43.1	
KA3590G02:4	1.20	7.20	4.00	5.39	-	-	-	-	-	-	0	4.3	3.1	No response
KA3593G01:1	8.30	30.02	22.13	21.51	1.5	5.14E+00	2.33E-01	4.2E-08	1.5E-07	1.8E-07	2	207.5	210.6	Not evaluable
KA3593G01:2	1.30	7.30	5.24	5.35	10	4.77E-02	3.21E-03	-	-	-	2	68.1	62.8	Not evaluable
KA3600F:1	22.00	50.10	31.78	40.71	200	1.38E-01	2.15E-02	-	-	-	1	0.2	1	Not evaluable
KA3600F:2	4.50	21.00	12.51	21.86	140	5.69E-02	8.03E-03	-	-	-	1	1	1.4	Not evaluable
KG0021A01:1	0.00	48.82	27.41	50.15	100	4.19E-01	5.37E-02	-	-	-	1	-0.2	3	Not evaluable
KG0048A01:1	49.00	54.69	53.81	19.26	25	2.47E-01	2.11E-02	-	-	-	1	3.5	4.2	Not evaluable
KG0048A01:2	41.00	48.00	45.90	18.63	45	1.29E-01	1.30E-02	-	-	-	1	2.5	2.7	Not evaluable
KG0048A01:3	30.00	40.00	33.50	23.71	55	1.70E-01	1.83E-02	-	-	-	1	1.9	2.5	Not evaluable
KG0048A01:4	4.00	29.00	9.12	43.38	100	3.14E-01	4.01E-02	-	-	-	1	0.4	2.9	Not evaluable

4.7 Diffusivity

The diffusivity, η, versus the distance, r, and the timelag versus the distance, r, are shown in *Figures 4-13* below.

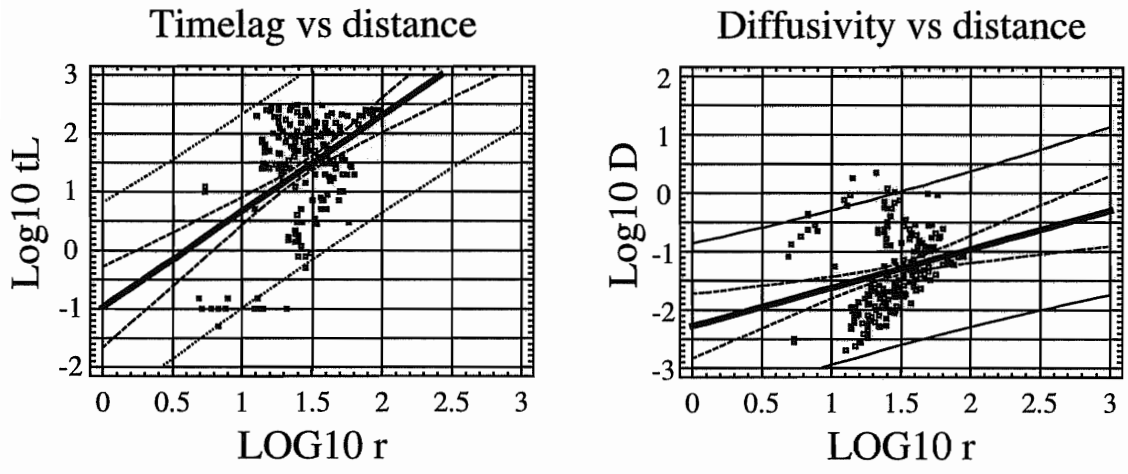

Figure 4-13 Linear regression plots of timelag and diffusivity versus distance

The equations of the regression lines in Figure 4-13 are

$\text{Log}_{10}\, t_L = 1.641 * \text{Log}_{10}\, r - 0.969$

$\text{Log}_{10}\, \eta = 0.658 * \text{Log}_{10}\, r - 2.275$

4.8 Storativity

The storativity is not always received from a hydraulic test. In order to estimate an approximate value of the parameter a relationship between the evaluated transmissivity T_{EVAL} and the evaluated storativity S is established from the evaluated interference tests 1:1-1:6. The results are shown in *Figure 4-14.*

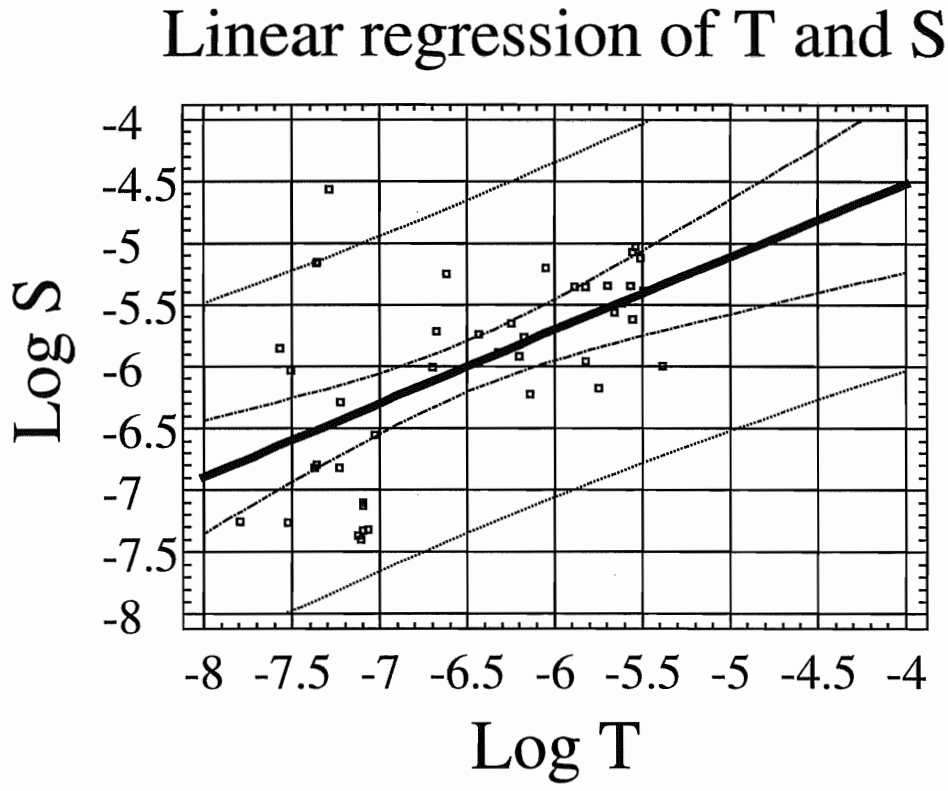

Figure 4-14 Linear regression of T_{EVAL} and S.

The equation of the regression line in *Figure 4-13* is

$$Log_{10} S = 0.595 * Log_{10} T_{EVAL} - 2.135$$

The relationship between T_{EVAL} and the storativity estimated from the diffusivity, η, is shown in *Figure 4-14*.

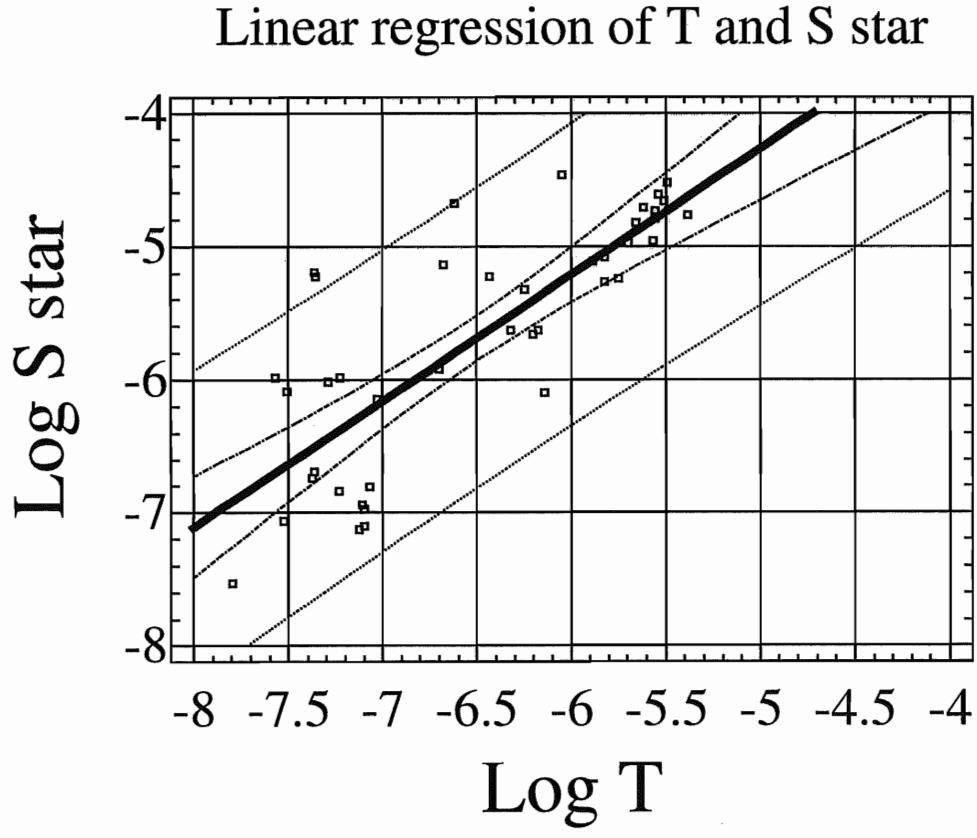

Figure 4-15 Linear regression of T_{EVAL} and S.*

The equation of the regression line in *Figure 4-14* is

$$\text{Log}_{10}\, S^* = 0.947 * \text{Log}_{10}\, T + 0.470$$

The relationship between T_{EVAL} and the storativity estimated from the interference tests made during drilling campaigns 1 - 3, *Rhén, Forsmark, 1998* and *Forsmark, Rhén, 1999,* is shown in *Figure 4-16.* In these cases the entire boreholes were flowed and a few boreholes nearby were used as observation sections. Most of the observation boreholes were more or less parallel to the flowing borehole.

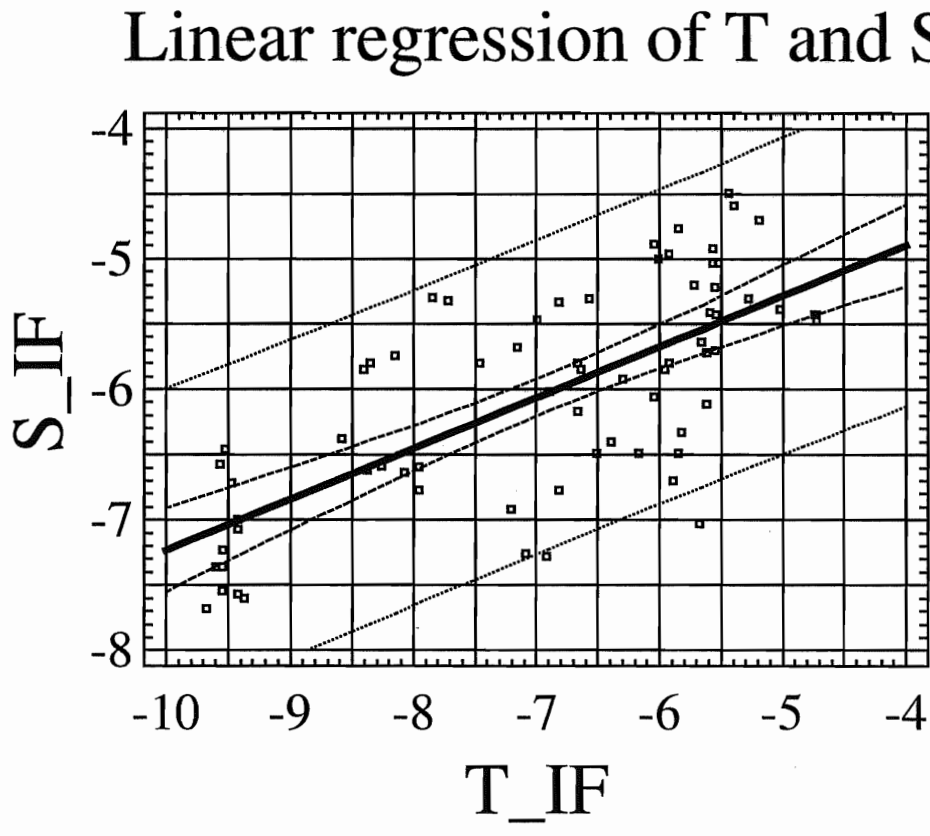

Figure 4-16 Linear regression of T and S. Flowing section equals all bore hole length.

The equation of the regression line in *Figure 4-16* is

$$Log_{10} S = 0.389 * Log_{10} T - 3.342$$

This estimation is based on tests using the whole bore hole as a flow section. It gives a somewhat less steep regression line compared to the regression shown in *Figure 4-14.*

The relationship between hydraulic conductivity and specific storativity estimated from the interference tests made during drilling campaigns 1 - 3, *Rhén, Forsmark, 1998* and *Forsmark, Rhén, 1999,* is shown in *Figure 4-17.*

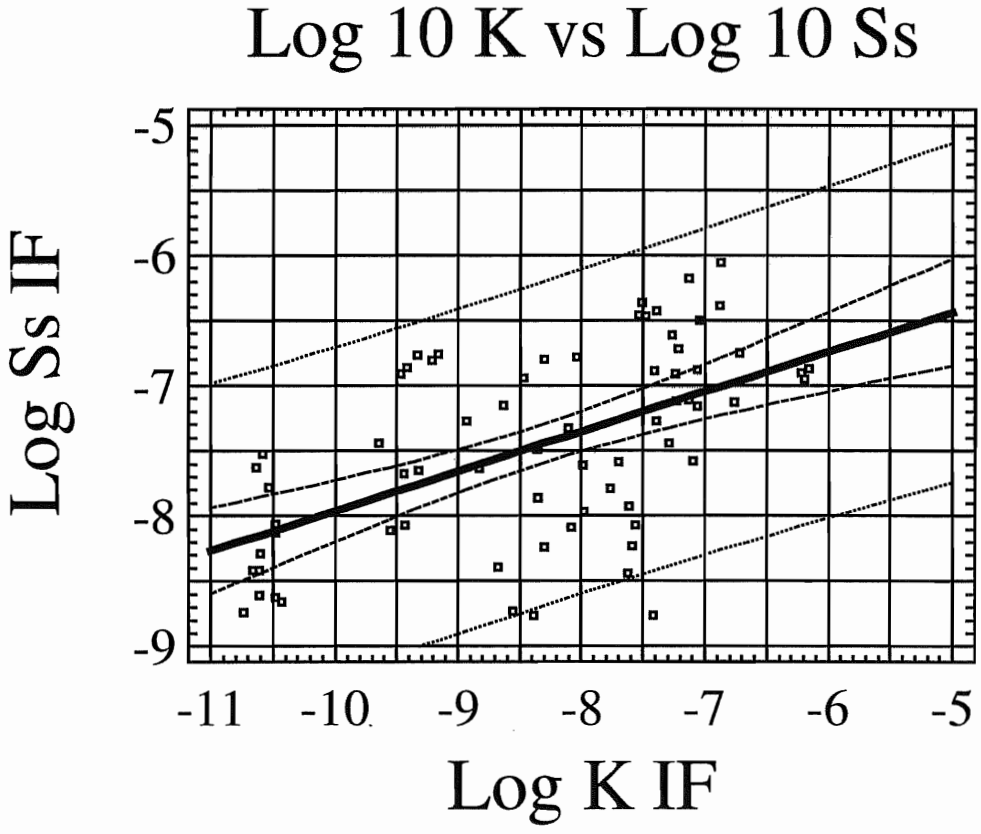

Figure 4-17 Linear regression of K and S_s. Flowing section equals all bore hole length.

The equation of the regression line in *Figure 4-17* is

$$\mathrm{Log_{10}}\ S_s = 0.305 * \mathrm{Log_{10}}\ K - 4.912$$

This estimation is based on tests using the whole bore hole as a flow section. The estimated value of S_s becomes fairly low (about 10 times lower) compared to the shown relationsship in *Rhén et al, 1997.* That relation was based on a few tests in large fracture zones and a estimated lower limit based on the bulk compressibility.

4.9 Transient – steady state

In *Figures 4-18* to *4-23* (P_0 – Pp) is plotted against the squared distance, r^2.

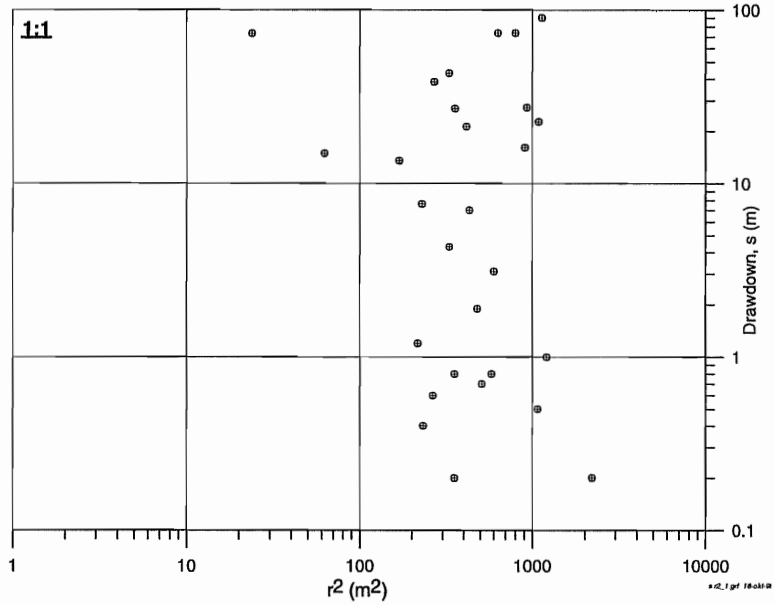

Figure 4-18 Interference test 1:1 ; (P_0 – Pp) versus r^2.

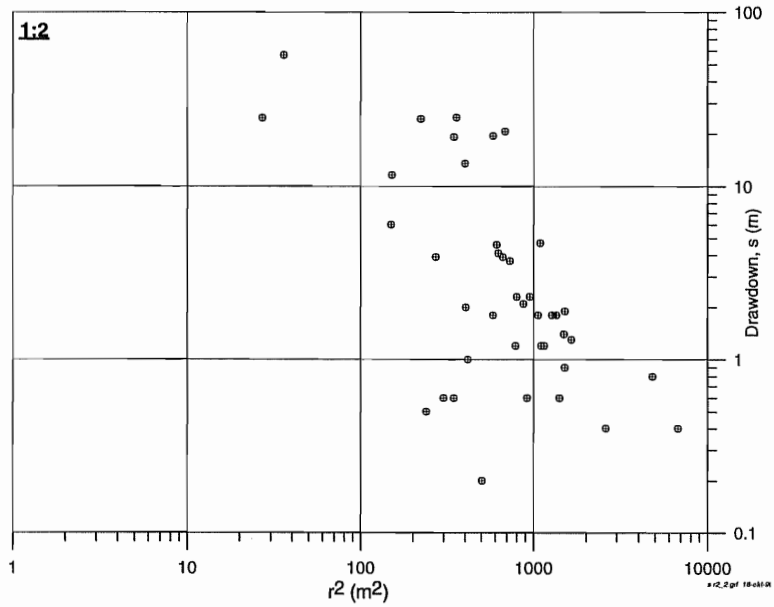

Figure 4-19 Interference test 1:2 ; (P_0 – Pp) versus r^2.

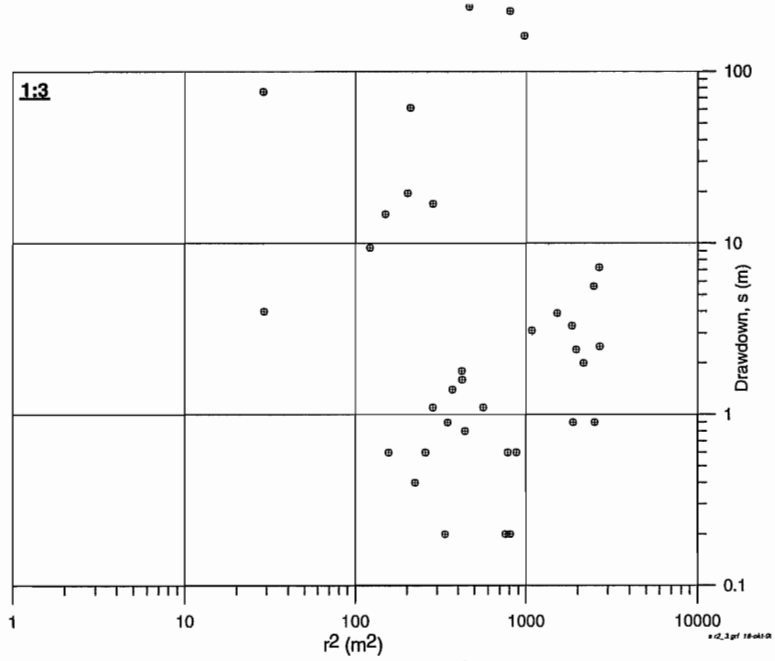

Figure 4-20 Interference test 1:3 ; (P_0 – Pp) versus r^2.

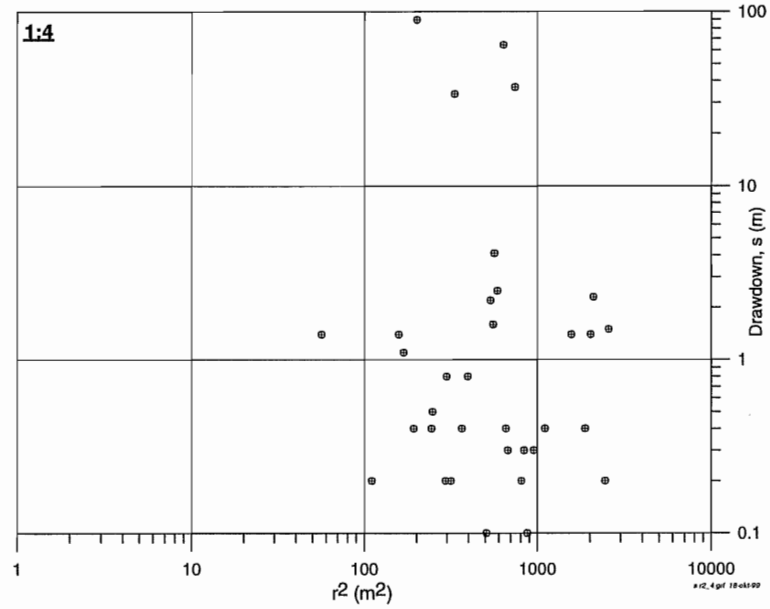

Figure 4-21 Interference test 1:4 ; (P_0 – Pp) versus r^2.

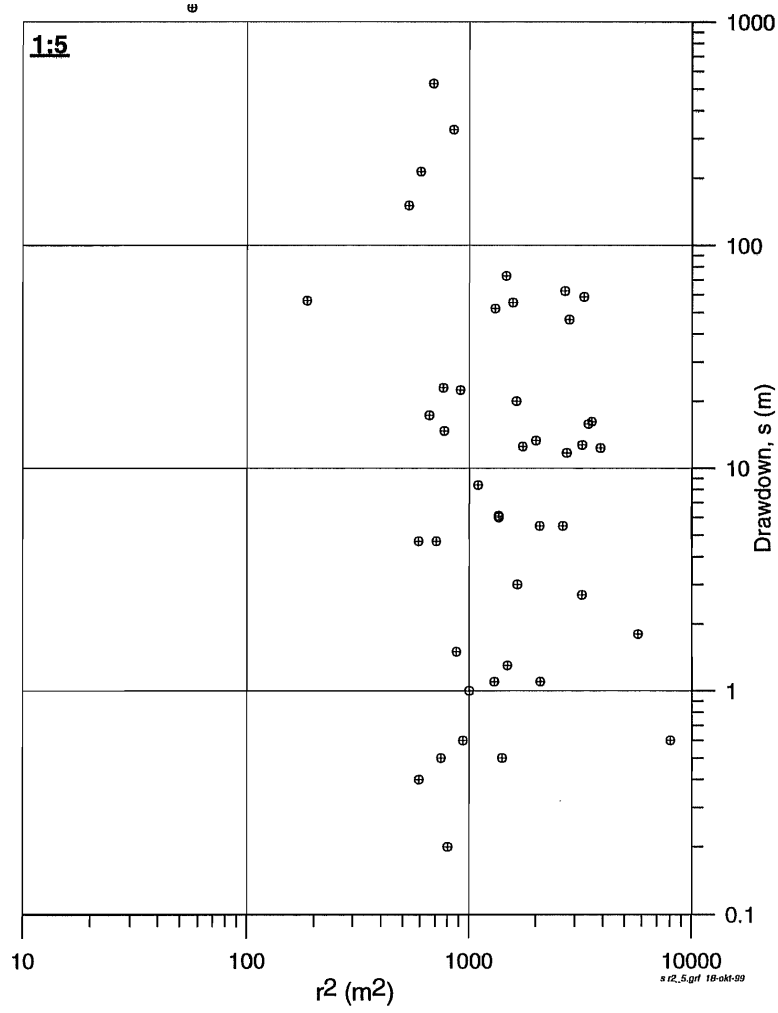

Figure 4-22 Interference test 1:5 ; (P_0 – Pp) versus r^2.

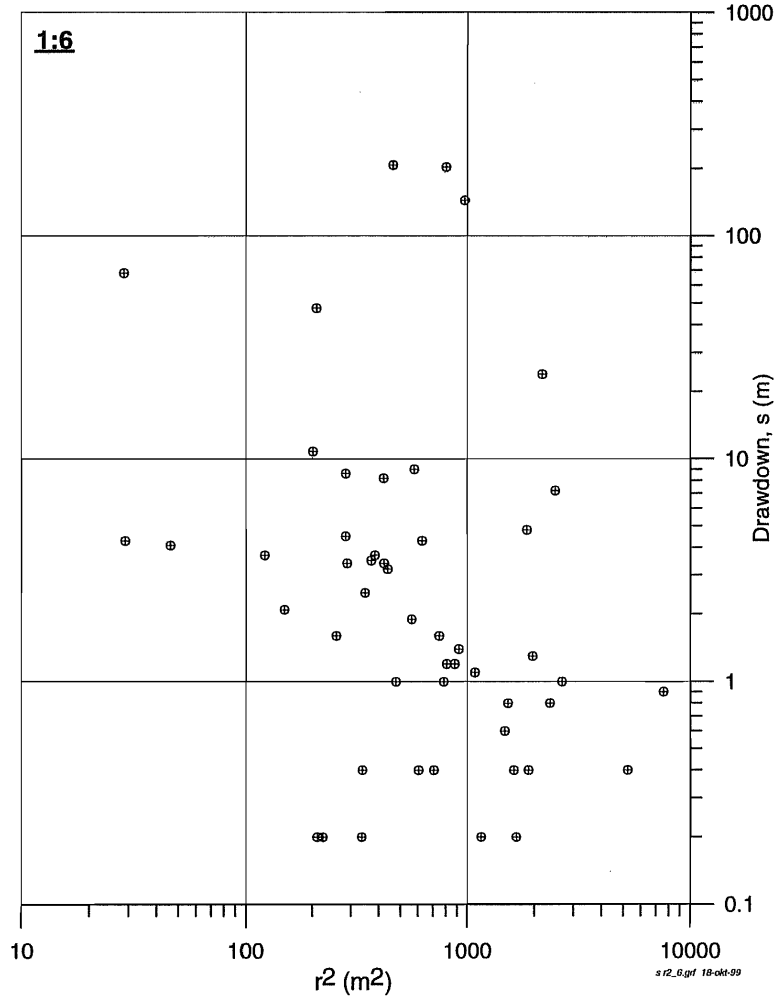

Figure 4-23 Interference test 1:6 ; (P_0 – Pp) versus r^2.

5 MODEL OF DETERMINISTIC FEATURES AROUND THE PROTOTYPE TUNNEL

The six interference tests provide evidence of two major hydraulic features one to the north and one to the south of the prototype repository tunnel, see *Figure 5-1 to 5-3.*

There are also evidence in 5 of the subvertical bore holes of some minor features that have a probable extension of reaching into the deposition bore holes, see *Figure 5-4.*

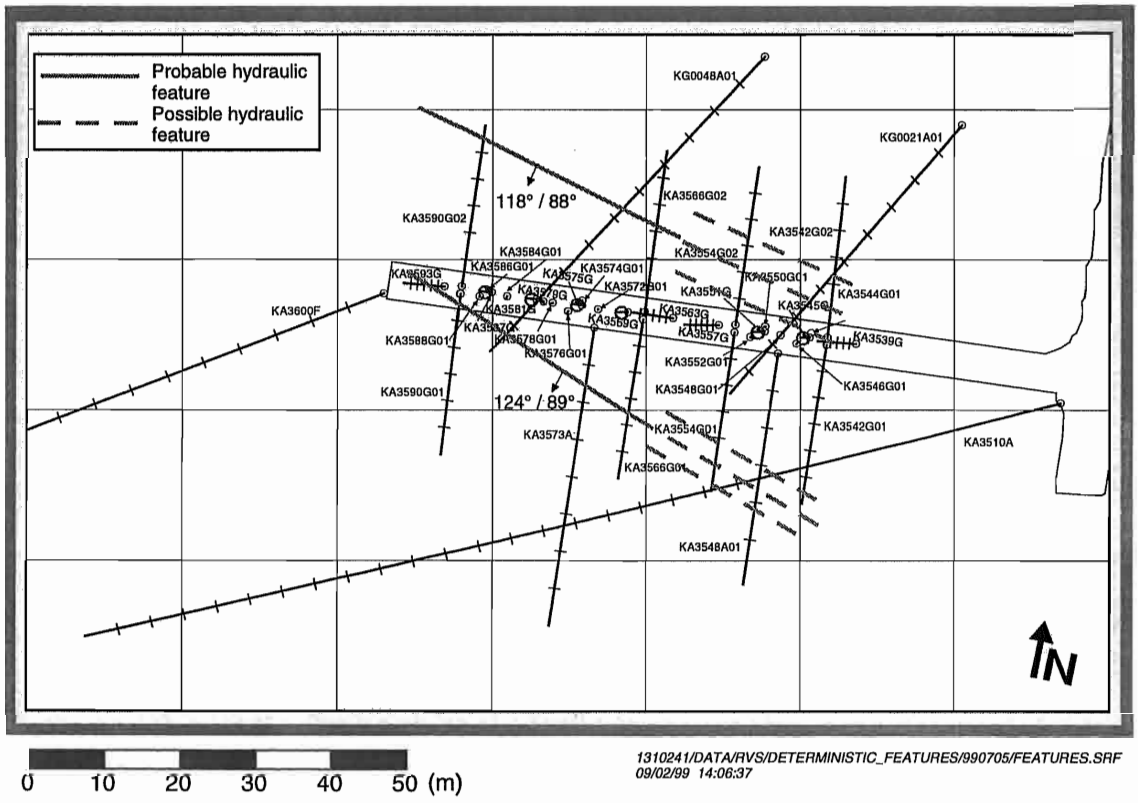

Figure 5-1 Hydraulic features located during interference tests 1:1 - 1:6.

North major feature

This feature is located north of the prototype repository, most notably observed in bore holes KA3566G02 and KA3590G02. The strike and dip of this feature is approximately 118 ° and 88 ° respectively. The location of the centre with an estimated hydraulic radius of 20 m, of this feature, is estimated to be at

X (East) = 1892 m

Y (North) = 7289 m

Z = -449 mamsl (meters above mean sea level)

This feature has a transmissivity of $5 - 10 \cdot 10^{-8}$ m^2/s and a storage coefficient of $1 - 3 \cdot 10^{-7}$.

In *Figure 5-2* the north hydraulic feature plane is visualised in conjunction with the mapped open fractures of the available core bore holes. In this context the hydraulic feature is presented as a continuous plane, however a feature such as this rather consists of a set of several minor fractures connected to each other trending in a more or less same direction and with a similar dip.

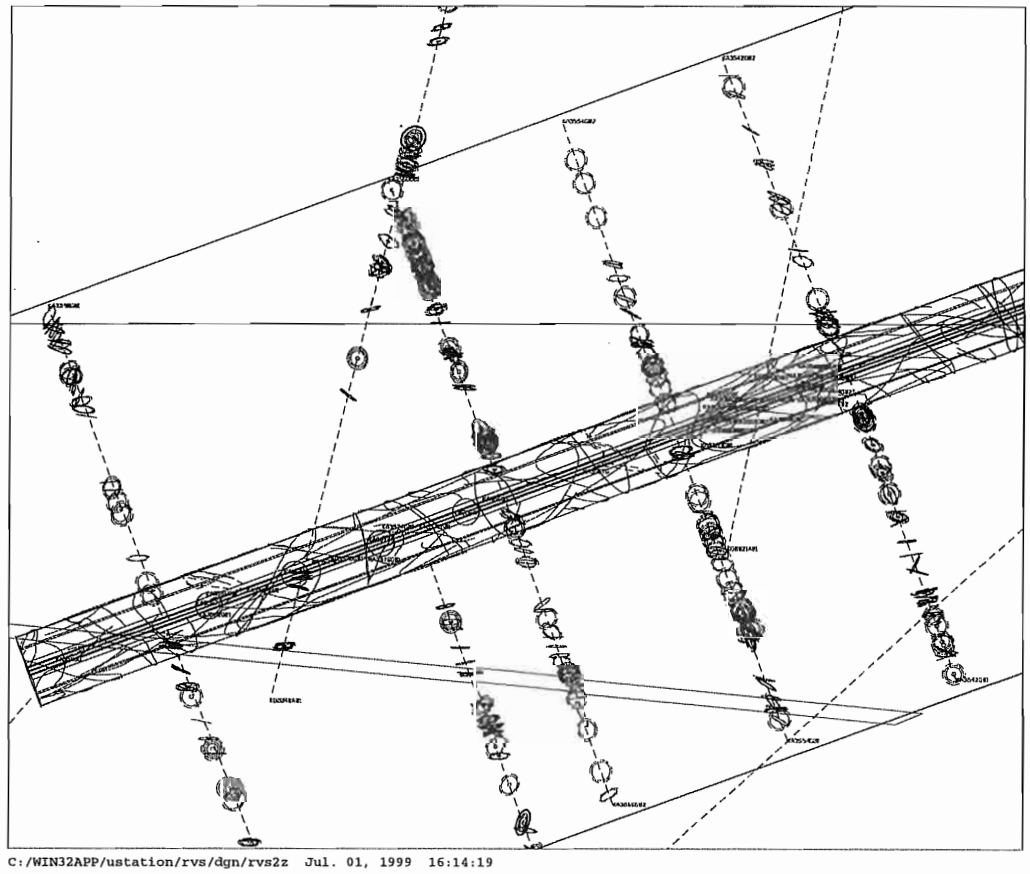

Figure 5-2 North hydraulic feature (visualisation from RVS)

South major feature

This feature is located south of the prototype repository, most notably observed in bore holes KA3566G01 and KA3590G01. It does not intersect KA3573A or KG0048A01. The strike and dip of this feature is approximately 124 ° and 89 ° respectively. The location of the centre, of this feature, with an estimated hydraulic radius of 20 m is estimated to be at

X (East) = 1887 m

Y (North) = 7266 m

Z = -449 mamsl (meters above mean sea level)

This feature has a transmissivity of $7 - 9 \cdot 10^{-8}$ m^2/s and a storage coefficient of $4 - 5 \cdot 10^{-8}$.

In *Figure 5-3* the south hydraulic feature plane is visualised in conjunction with the mapped open fractures of the available core bore holes. In this context the hydraulic feature is presented as a continuous plane, however a feature such as this rather consists of a set of several minor fractures connected to each other trending in a more or less same direction and with a similar dip.

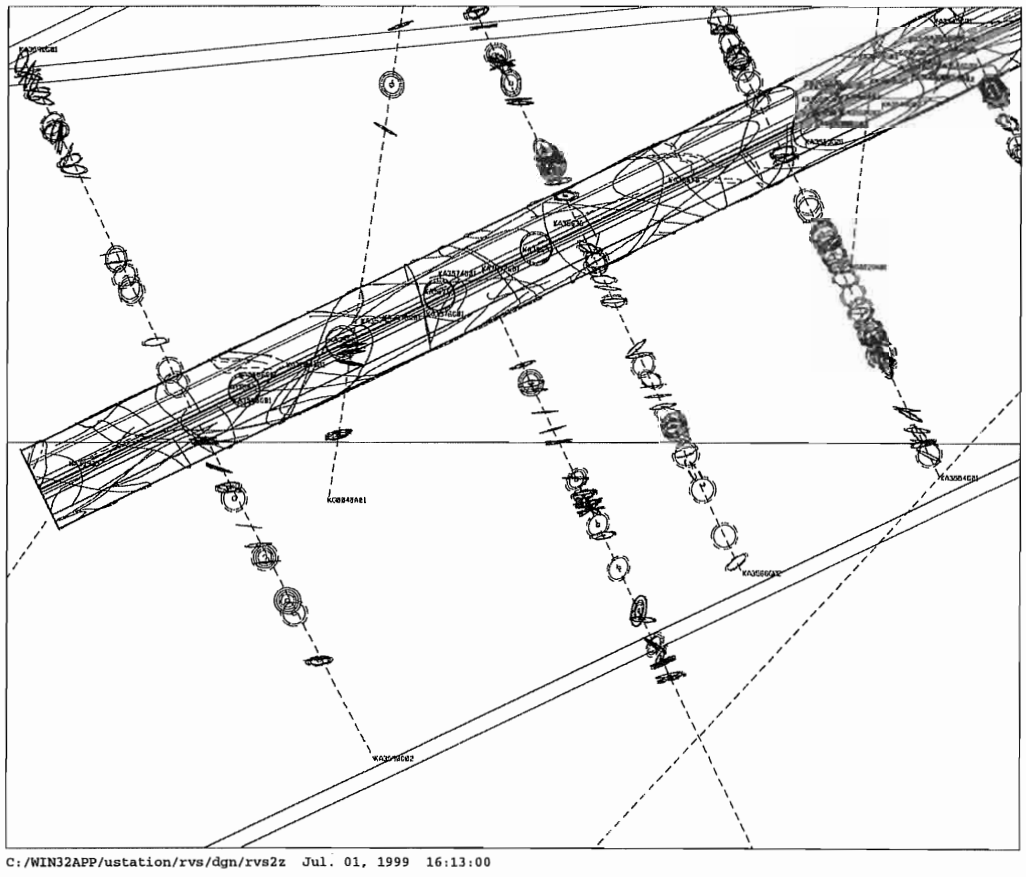

Figure 5-3 South hydraulic feature (visualisation from RVS)

Minor features

In addition to the above presented major features some minor features in a relative closeness to the deposition bore holes have been observed. In *Table 5-1* and *Figure 5-4* the approximate properties of these minor features are shown.

A hydraulic connection was identified between features 3551/1 and 3551/2, see *Figure 5-4*.

Table 5-1 Data of minor features. The co-ordinates indicate the centre of the feature plane

Feature	X (east) (m)	Y (north) (m)	Z (mamsl)	Strike (°)	Dip (°)	Radius (m)	T (m^2/s)	S (-)
3587/1	1878.28	7275.03	-453.53	354	79	2	$8.1 \cdot 10^{-9}$	$3 \cdot 10^{-7}$
3551/1	1915.42	7271.06	-455.24	312	40	2	$4.7 \cdot 10^{-9}$	$3 \cdot 10^{-7}$
3551/2	1917.50	7269.90	-455.56	271	38	2	$3.3 \cdot 10^{-9}$	$2 \cdot 10^{-7}$
3445/2	1919.55	7268.80	-456.66	278	24	2	$1.7 \cdot 10^{-9}$	$2 \cdot 10^{-7}$
3445/1	1919.55	7268.80	-453.54	164	64	2	$2.8 \cdot 10^{-10}$	$9 \cdot 10^{-8}$
3445/3	1921.45	7270.22	-453.14	298	64	2	$1.3 \cdot 10^{-8}$	$4 \cdot 10^{-7}$

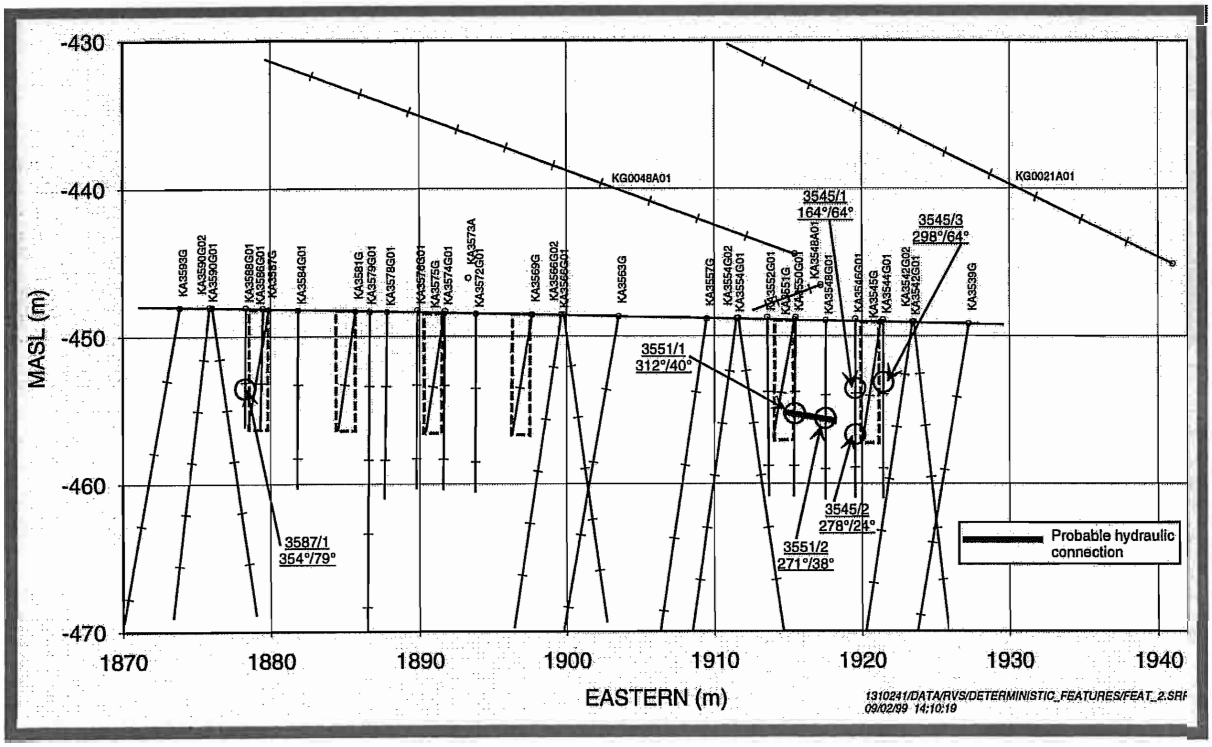

Figure 5-4 Minor identified features in the close vicinity of the deposition bore holes labelled with feature name and strike/dip.

6 SUGGESTED CALIBRATION CASES FOR NUMERICAL MODELLING

During interference test campaign 1 six interference tests were made. Of these six tests number 1:3 had some technical failure of the flow section during the test. Test number 1:4 is very short and is excluded for this reason while before test 1:6 water sampling were made in some of the observation bore holes shortly before the test commenced.

Accordingly three tests are most suitable for the task of being a calibration case for a numerical modelling, namely test 1:1, 1:2 and 1:5. In order to make estimation if some part of test 1:6 can be used together with test 1:3 a cross plot of the initial pressures, P_0, was made and is presented below in *Figure 6-1.*

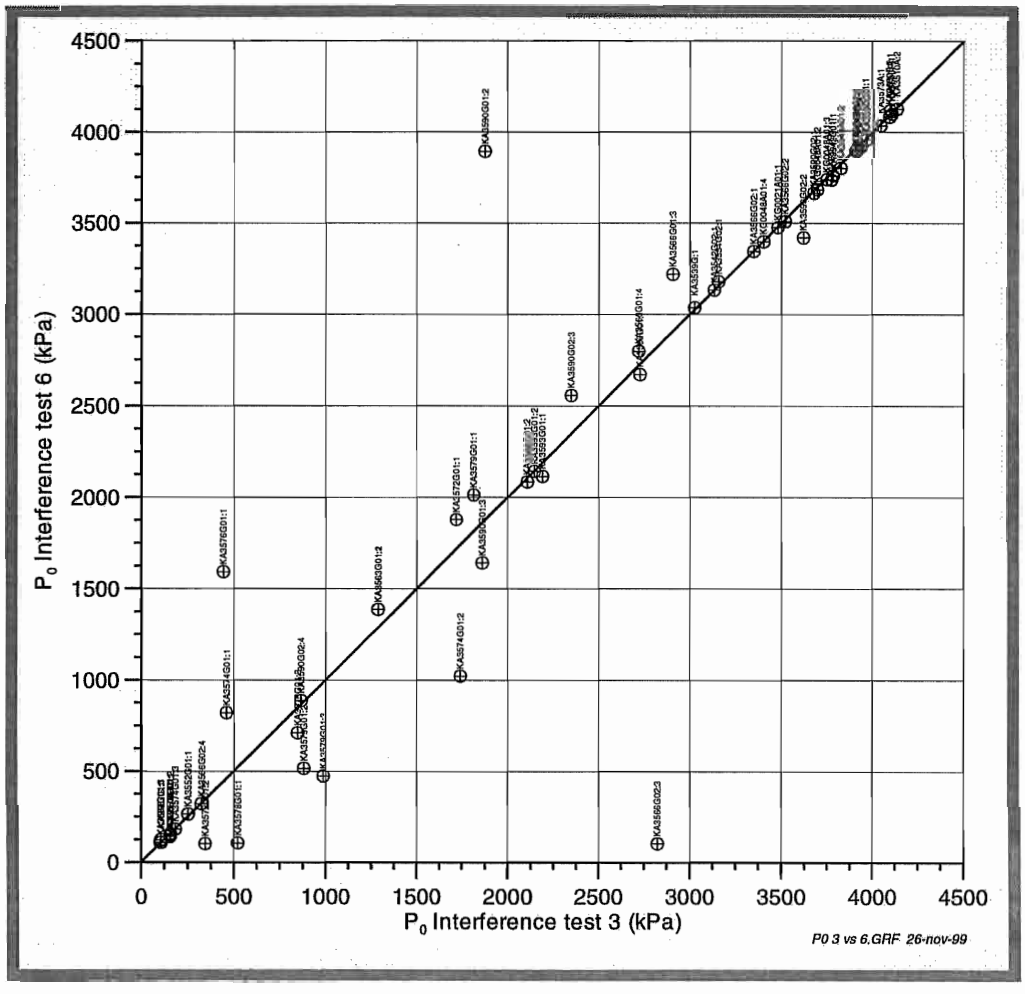

Figure 6-1 Cross plot of P_0 of test 1:3 and 1:6.

The cross plot show that some observation sections have considerably lower initial pressures during the 1:6 test sequence than during the 1:3 test sequence. Consequently it is clear that the

following sections should not be used if using test 1:6 as a calibration case; KA3566G02:3, KA3572G01:2, KA3574G01:2, KA3578G01:1, KA3579G01:2 and KA3579G01:3. For these sections the test 1:3 values of pressure heads should be applied. It is also to be observed that the section KA3590G01:2 of test 1:3 should not be used. Instead the data of the same section from test 1:6 should be used.

7 UNDISTURBED PRESSURES BEFORE THE DRILLING OF THE DEPOSITION BOREHOLES

An analysis of the undisturbed pressure in the rock has been done within this project for a limited period of time, namely between 1999-03-01 and the end of June 1999. The purpose of this has been to try detecting any time correlated trends of the levels of the hydraulic pressure in the rock. In *Appendix 8* plots of bore holes in the prototype repository area are shown. As a summary of these plots *Figure 7-1* is presented.

In *Figure 7-1* five different pressures are shown

- P_0, as reported in *Forsmark T, Rhén I, 1999* for sections of the interference test campaign 1 that coincide with sections of the drilling campaign 1 - 3 of pilot and exploratory bore holes of the prototype repository.
- Pressure 1999-03-01
- Pressure 1999-06-19
- Maximum pressure of a section during the time period 1999-03-01 and 1999-06-19
- Minimum pressure of a section during the time period 1999-03-01 and 1999-06-19

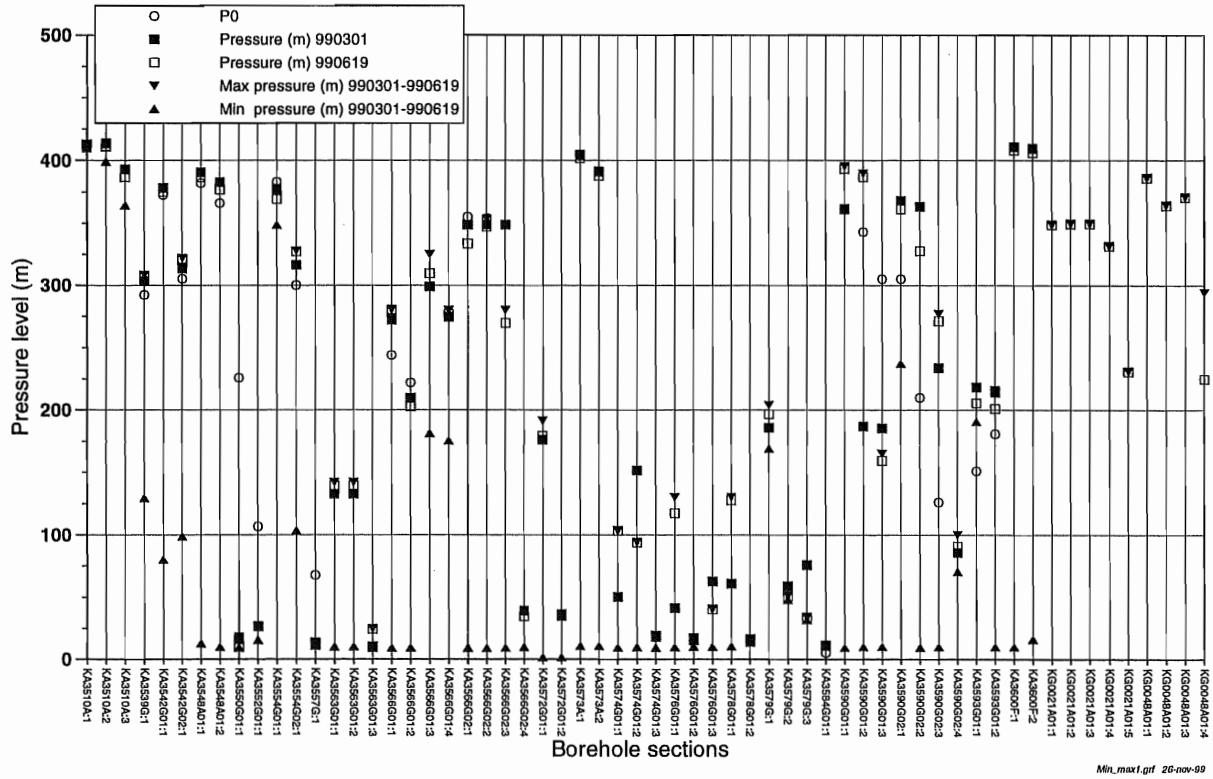

Figure 7-1 Undisturbed pressures

In Table 7-1 the pressures shown in Figure 7-1 are detailed.

Table 7-1 Undisturbed pressure. Estimated high pressures are marked with grey boxes and uncertain values are italicised.

Bh	Secup_P0	Seclow_P0	P0 (m)	Secup	Seclow	P_990301 (m)	P_990619 (m)	P_min (m)	P_max (m)	Comment
KA3510A:1	-	-	-	122.02	150.00	410.29	412.38	410.29	413.03	
KA3510A:2	-	-	-	114.02	121.02	413.68	411.27	399.09	413.79	
KA3510A:3	-	-	-	4.52	113.02	393.13	386.89	364.39	393.23	
KA3539G:1	0.39	30.01	292.18	0.30	30.01	303.26	307.61	129.32	308.20	
KA3542G01:1	0.39	30.04	372.75	0.30	30.04	378.34	375.35	80.24	378.44	
KA3542G02:1	0.39	30.01	305.16	0.30	30.01	313.72	321.47	98.67	321.90	
KA3548A01:1	24.00	27.00	382	15.00	30.00	390.67	386.60	12.86	*390.67*	
KA3548A01:2	12.00	15.00	366	10.00	14.00	382.72	377.01	9.98	*382.72*	
KA3550G01:1	0.50	12.03	225.91	0.30	12.03	15.97	9.71	9.59	18.14	
KA3552G01:1	0.50	12.01	106.67	0.30	12.01	26.73	26.43	15.58	*26.73*	
KA3554G01:1	0.39	30.01	383.14	0.30	30.01	377.54	369.32	348.86	377.62	
KA3554G02:1	0.39	30.01	300.04	0.30	30.01	316.41	327.37	103.65	327.80	
KA3557G:1	0.39	30.04	67.67	0.30	30.04	*11.12*	*13.41*	*10.87*	*13.51*	Low conductive section
KA3563G01:1	-	-	-	9.30	30.00	132.57	139.10	10.09	142.04	Short cut with KA3563G01:2
KA3563G01:2	-	-	-	3.80	8.30	132.61	139.16	10.15	142.08	Short cut with KA3563G01:1
KA3563G01:3	-	-	-	1.30	2.80	10.34	24.38	9.09	24.61	
KA3566G01:1	19.00	22.00	244	20.80	30.01	272.13	280.25	9.24	*280.25*	
KA3566G01:2	16.00	19.00	222	12.30	19.80	209.76	202.66	9.29	*209.76*	
KA3566G01:3	-	-	-	7.30	11.30	298.92	309.44	181.19	*325*	Low conductive section
KA3566G01:4	-	-	-	1.30	6.30	274.56	276.59	175.46	*280*	Low conductive section
KA3566G02:1	18.00	21.00	355	19.30	30.01	348.84	333.59	8.92	349.18	
KA3566G02:2	15.00	18.00	354	12.30	18.30	348.80	347.08	8.95	353.61	
KA3566G02:3	-	-	-	7.80	11.30	*348.67*	269.54	9.16	*280*	Low conductive section
KA3566G02:4	-	-	-	1.30	6.80	38.98	34.72	9.79	*38.98*	Low conductive section
KA3572G01:1	-	-	-	6.30	12.00	176.18	179.11	1.54	191.46	
KA3572G01:2	-	-	-	1.30	5.30	35.00	36.06	1.54	36.06	
KA3573A:1	-	-	-	18.00	40.07	404.78	401.94	10.58	404.86	
KA3573A:2	-	-	-	4.50	17.00	391.35	387.85	10.69	391.45	
KA3574G01:1	-	-	-	8.80	12.00	50.23	103.26	9.54	*103.26*	Low conductive section
KA3574G01:2	-	-	-	5.30	7.80	*151.52*	94.01	9.82	*94.01*	Low conductive section
KA3574G01:3	-	-	-	1.30	4.30	18.19	19.09	9.28	*19.09*	Low conductive section
KA3576G01:1	-	-	-	8.80	12.01	41.28	117.46	9.64	*130*	Low conductive section
KA3576G01:2	-	-	-	3.80	7.80	15.37	17.03	10.10	*17.03*	Low conductive section
KA3576G01:3	-	-	-	1.30	2.80	*62.66*	40.11	9.85	*40.11*	Low conductive section
KA3578G01:1	-	-	-	6.80	12.58	60.96	127.89	10.47	*130*	Low conductive section
KA3578G01:2	-	-	-	1.30	5.80	15.27	16.30	13.43	*16.30*	Low conductive section
KA3579G01:1	-	-	-	9.30	22.65	185.91	196.80	169.12	204.09	Low conductive section
KA3579G01:2	-	-	-	5.30	8.30	58.74	50.79	47.89	*50.79*	Low conductive section
KA3579G01:3	-	-	-	1.30	4.30	75.79	33.75	31.86	*33.75*	Low conductive section
KA3584G01:1	1.21	12.00	5.08	0.30	12.00	10.85	11.30	10.69	11.51	Low conductive section
KA3590G01:1	21.00	24.00	361	17.30	30.06	361.34	393.56	9.29	395.63	
KA3590G01:2	8.00	9.00	343	7.80	16.30	*186.93*	386.98	10.01	389.83	
KA3590G01:3	5.00	6.00	305	1.30	6.80	*185.23*	159.34	10.11	*165*	Reinstrumentation of borehole
KA3590G02:1	24.00	27.00	305	23.30	30.05	367.93	361.24	237.61	368.05	
KA3590G02:2	18.00	21.00	210	17.30	22.30	363.22	327.69	9.45	363.42	
KA3590G02:3	12.00	15.00	126	8.30	16.30	233.86	271.21	9.95	276.83	
KA3590G02:4	-	-	-	1.20	7.20	85.83	90.68	70.43	100.09	
KA3593G01:1	21.00	24.00	151	8.30	30.02	218.35	205.68	190.69	218.35	
KA3593G01:2	4.74	5.74	180.7	1.30	7.30	214.41	201.09	9.87	216.09	
KA3600F:1	-	-	-	22.00	50.10	410.87	408.40	9.85	410.87	
KA3600F:2	-	-	-	4.50	21.00	409.62	406.37	16.15	409.70	
KG0021A01:1	-	-	-	42.50	48.82	-	348.70	-	348.70	Low conductive section
KG0021A01:2	-	-	-	35.00	41.50	-	349.40	-	349.55	
KG0021A01:3	-	-	-	25.00	34.00	-	349.52	-	349.59	
KG0021A01:4	-	-	-	17.00	24.00	-	331.68	-	331.70	
KG0021A01:5	-	-	-	4.00	16.00	-	230.83	-	231.07	
KG0048A01:1			-	49.00	54.69	-	386.17	-	386.21	
KG0048A01:2			-	41.00	48.00	-	363.96	-	364.02	
KG0048A01:3			-	30.00	40.00	-	370.69	-	370.73	
KG0048A01:4			-	4.00	29.00	-	*225.01*	-	293.97	

Some boreholes have very low hydraulic conductivity, among them KA3576G01, KA3579G and the upper parts of KA3566G01 and KA3566G02. A consequence of this fact is that a very high pressure may be registered every time an activity occurs concerning a change in the hydraulic head around the tunnel.

In some cases the measured values of a pressure are believed to be uncertain and are indicated as such in the *Table 7-1*. The values in the column P_max have for a number of low conductive borehole sections been estimated instead of using the measured values during the timeperiod.

In *Figure 7-2* maximum pressures are plotted as function of the distance to the tunnel centre. The tunnel radius is estimated to be 2.5 meters. The equations for the different relationships (plotted lines) in the figure are shown below:

- All boreholes: $P_{max} = 317.71 * Log_{10}(D_t) - 128.92$
- Subvertical boreholes: $P_{max} = 187.62 * Log_{10}(D_t) - 80.82$
- Subhorizontal borehole: $P_{max} = 438.62 * Log_{10}(D_t) - 174.12$
- Southern boreholes: $P_{max} = 394.57 * Log_{10}(D_t) - 153.36$
- Northern boreholes: $P_{max} = 372.13 * Log_{10}(D_t) - 148.62$

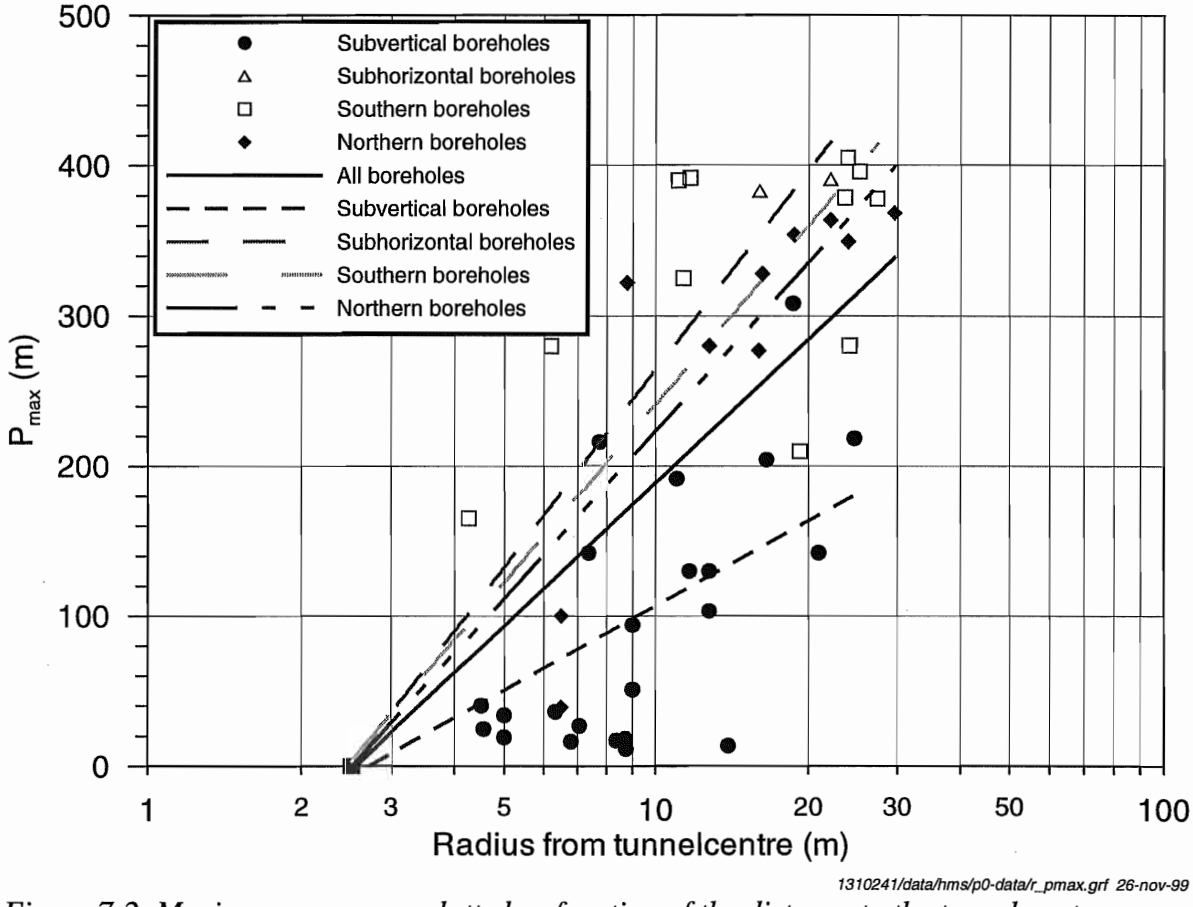

Figure 7-2 Maximum pressures plotted as function of the distance to the tunnel centre.

In *Table 7-1* P_0 may differ from the pressures measured during the period 1999-03-01 to 1999-06-19 due to the fact that some of the P_0 pressures were measured within 3 meters packer enclosure. In that case it is possible to isolate a single open fracture and thereby measuring a higher or lower pressure than measuring with longer packer distances.

During the period 1999-03-01 to 1999-06-19 different kinds of activities, such as water sampling, dilution tests and flow tests within the TRUE BLOCK SCALE, PROTOTYPE and GWCM projects, were on-going in the prototype repository area or in the vicinity of it. These activities include water sampling, packer installations etc. The logs of these activities are included in *Appendix 9*. It is to be noted that during the actual time period there are approximately only two short periods of no activities, namely 1999-03-01 to 1999-03-03 and 1999-03-30 to 1999-04-05.

The following bore holes have what appears to be a systematic pressure head change trend, see *Appendix 8*; KA3510A, KA3542G01, KA3548A01, KA3554G01, KA3557G01, KA3566G01, KA3579G01, KA3584G01, KA3590G01 and KA3593G01.

The levels of HAS04, 05, 11, 19 and 20 were studied for the period 1996 up to date (*Nyberg G, Jönsson S, Ekman L, 1997, 1998 and 1999).* It was noticed there still is a decreasing trend of levels of the rock mass above the Äspö Hard Rock Laboratory. HAS04 have a decreasing trend for the years 1996 and 1997, mainly during the first part of the year, but have stabilised during 1998. The other bore holes had no discernible trend of increasing or decreasing levels. When compared with the tunnel bore holes that have a pressure head change trend no direct correlation seem to exist.

The difference between the maximum registered pressures and start and stop values of the studied time period is plotted in *Figure 7-3*.

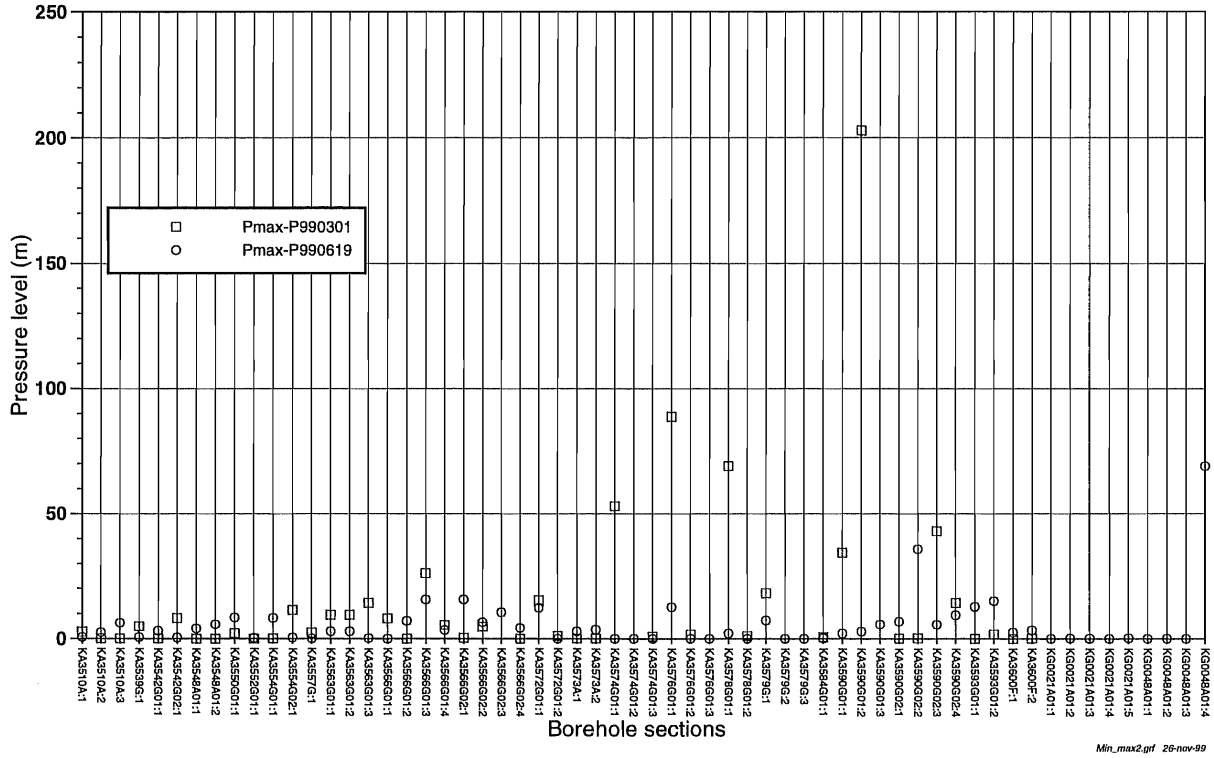

Figure 7-3 Difference between the maximum registered pressures and start and stop values of the studied time period, 1999-03-01 and 1999-06-19

As a guideline for values of undisturbed pressure the following is recommended ;

- For the use of numerical modelling without deposition bore holes P_max in *Table 7-1* is the best estimate. It is assumed to best represent the undisturbed conditions before the deposition boreholes were drilled.

- For the use of numerical modelling initial pressure as P_990619 in *Table 7-1* is an alternative to P_max to study the pressure change during drilling of the deposition boreholes.

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APPENDIX 1

Key pressure data from interference tests

- P_0 = Initial pressure before opening of the valve
- P_p = Pressure just before closing the valve
- P_f = Pressure at the end of the pressure build-up period

All pressure data is in kPa.

Table A-1 Key pressure data , draw-down and recovery respectively of each borehole section. Interference test in KA3566G01, section 12.30 – 19.80 m. Prototype Repository, February 1999

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Po – Pp	Pf - Pp
KA3510A:1	4095,4	4095,4	4098,2	0	2,8
KA3510A:2	4132,8	4132,8	4135,2	0	2,4
KA3510A:3	3925,6	3923,7	3928	1,9	4,3
KA3539G:1	3058	3062,9	3036,5	-4,9	-26,4
KA3542G01:1	3782,1	3779	3781,5	3,1	2,5
KA3542G02:1	3195	3196,1	3169,5	-1,1	-26,6
KA3548A01:1	3900,8	3900	3903,3	0,8	3,3
KA3548A01:2	3821,9	3821,2	3823,7	0,7	2,5
KA3550G01:1	147,9	148,9	152,8	-1	3,9
KA3552G01:1	246	250,3	235,9	-4,3	-14,4
KA3554G01:1	3769,9	3768,7	3771,7	1,2	3
KA3554G02:1	3198,6	3202,3	3181,4	-3,7	-20,9
KA3557G:1	98,7	98,9	94,4	-0,2	-4,5
KA3563G01:1	1238,8	1242,5	1273	-3,7	30,5
KA3563G01:2	1239,4	1243,1	1273,4	-3,7	30,3
KA3563G01:3	102,1	102,5	103,1	-0,4	0,6
KA3566G01:1	2726,5	2653,5	2727,8	73	74,3
KA3566G01:2	**2123,1**	**103,3**	**2106,4**	**2019,8**	**2003**
KA3566G01:3	2757,5	2742,6	2859,3	14,9	116,7
KA3566G01:4	2678,9	2665,4	2705,7	13,5	40,3
KA3566G02:1	3364,9	3367,4	3356,3	-2,5	-11,1
KA3566G02:2	3520,7	3521,5	3521,1	-0,8	-0,4
KA3566G02:3	2808	2801	2818,6	7	17,6
KA3566G02:4	312,8	313,6	317,5	-0,8	3,9
KA3572G01:1	1635,5	1641	1690,3	-5,5	49,3
KA3572G01:2	336,3	336,5	340,4	-0,2	3,9
KA3573A:1	4042,7	4042,5	4045	0,2	2,5
KA3573A:2	3906,9	3906,5	3909,8	0,4	3,3
KA3574G01:1	408,5	413,2	440,2	-4,7	27
KA3574G01:2	2029,2	1990,7	1817,6	38,5	-173,1
KA3574G01:3	143,9	139,6	140,4	4,3	0,8

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Po – Pp	Pf - Pp
KA3576G01:1	483,2	475,6	446,6	7,6	-29
KA3576G01:2	160,7	160,1	157	0,6	-3,1
KA3576G01:3	1168,2	1125,1	934,5	43,1	-190,6
KA3578G01:1	437,8	444,3	486,5	-6,5	42,2
KA3578G01:2	161,1	160,3	156,8	0,8	-3,5
KA3579G01:1	1738,7	1743,6	1788,7	-4,9	45,1
KA3579G01:2	1110,3	1083,2	647,6	27,1	-435,6
KA3579G01:3	1149,4	1128,1	1029,7	21,3	-98,4
KA3584G01:1	105,7	106,1	106,7	-0,4	0,6
KA3590G01:1	3954,8	3954	3958,5	0,8	4,5
KA3590G01:2	1881,4	1807,9	1877,9	73,5	70
KA3590G01:3	1866	1792,5	1863	73,5	70,5
KA3590G02:1	3662,5	3663,5	3666,8	-1	3,3
KA3590G02:2	3600,1	3601,7	3609,3	-1,6	7,6
KA3590G02:3	2345	2322,3	2346	22,7	23,7
KA3590G02:4	912,9	896,8	866,3	16,1	-30,5
KA3593G01:1	2191,7	2101,8	2189,9	89,9	88,1
KA3593G01:2	2138,6	2111,2	2141,9	27,4	30,7
KA3600F:1	4104,9	4105	4107,1	-0,1	2,1
KA3600F:2	4091,8	4091,6	4094	0,2	2,4
KG0021A01:1	3450,1	3451,2	3457,2	-1,1	6
KG0048A01:1	3899,5	3898,5	3903,1	1	4,6
KG0048A01:2	3690,4	3689,9	3694,5	0,5	4,6
KG0048A01:3	3738,2	3738,7	3742,8	-0,5	4,1
KG0048A01:4	3374,7	3376,3	3382,8	-1,6	6,5

Table A-2 Key pressure data , draw-down and recovery respectively of each borehole section. Interference test in KA3566G02, section 12.30 – 18.30 m. Prototype Repository, February 1999.

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Po – Pp	Pf - Pp
KA3510A:1	4098	4098,4	4099,5	-0,4	1,1
KA3510A:2	4135,2	4134,8	4136,4	0,4	1,6
KA3510A:3	3928	3926,6	3929,9	1,4	3,3
KA3539G:1	3036,3	3038,3	3023,8	-2	-14,5
KA3542G01:1	3781,3	3779,5	3783,4	1,8	3,9
KA3542G02:1	3169,5	3165,6	3136,8	3,9	-28,8
KA3548A01:1	3903,3	3902	3905,7	1,3	3,7
KA3548A01:2	3823,9	3822,1	3826,2	1,8	4,1
KA3550G01:1	150,9	148,9	155	2	6,1
KA3552G01:1	241,9	240,9	251,9	1	11
KA3554G01:1	3771,9	3770,7	3773,8	1,2	3,1
KA3554G02:1	3181,4	3169,8	3156,3	11,6	-13,5
KA3557G:1	98,3	100,7	109,7	-2,4	9
KA3563G01:1	1273,2	1275,6	1285,9	-2,4	10,3
KA3563G01:2	1273,6	1276,3	1286,3	-2,7	10
KA3563G01:3	103,2	102,7	103,4	0,5	0,7
KA3566G01:1	2727,6	2725,3	2728	2,3	2,7
KA3566G01:2	2106,2	2106,2	2106,6	0	0,4
KA3566G01:3	2859,9	2871,3	2906,9	-11,4	35,6
KA3566G01:4	2706,1	2708,4	2720,7	-2,3	12,3
KA3566G02:1	3356,3	3331,6	3349	24,7	17,4
KA3566G02:2	**3520,9**	**103**	**3520,9**	**3417,9**	**3417,9**
KA3566G02:3	2818,8	2762,1	2824,3	56,7	62,2
KA3566G02:4	317,5	311,5	323,4	6	11,9
KA3572G01:1	1690,1	1696,2	1718,1	-6,1	21,9
KA3572G01:2	340,12	340,6	343,7	-0,48	3,1
KA3573A:1	4045	4044,1	4046,8	0,9	2,7
KA3573A:2	3909,8	3908,6	3912	1,2	3,4
KA3574G01:1	440	442,6	459	-2,6	16,4
KA3574G01:2	1815,4	1791	1742,1	24,4	-48,9
KA3574G01:3	140,2	140,2	182,1	0	41,9
KA3576G01:1	446	442,1	441,3	3,9	-0,8
KA3576G01:2	157	156,4	156,2	0,6	-0,2

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Po – Pp	Pf - Pp
KA3576G01:3	932,5	907,6	848,5	24,9	-59,1
KA3578G01:1	486,9	494	520,4	-7,1	26,4
KA3578G01:2	156,6	156	155,8	0,6	-0,2
KA3579G01:1	1788,9	1795,2	1813,8	-6,3	18,6
KA3579G01:2	946	926,8	881,6	19,2	-45,2
KA3579G01:3	1028,3	1014,8	957,8	13,5	-57
KA3584G01:1	106,9	106,7	106,9	0,2	0,2
KA3590G01:1	3958,5	3957,9	3963	0,6	5,1
KA3590G01:2	1878,1	1875,8	1875,8	2,3	0
KA3590G01:3	1863,4	1861,3	1861,1	2,1	-0,2
KA3590G02:1	3666,6	3645,9	3677,4	20,7	31,5
KA3590G02:2	3609,3	3589,8	3620,7	19,5	30,9
KA3590G02:3	2346	2344,2	2349,3	1,8	5,1
KA3590G02:4	865,9	862,2	865,7	3,7	3,5
KA3593G01:1	2189,7	2188,5	2189,9	1,2	1,4
KA3593G01:2	2141,9	2141,3	2145,5	0,6	4,2
KA3600F:1	4106,9	4106,1	4108,9	0,8	2,8
KA3600F:2	4094	4093,6	4095,8	0,4	2,2
KG0021A01:1	3457,5	3452,8	3481,4	4,7	28,6
KG0048A01:1	3902,7	3900,8	3904,5	1,9	3,7
KG0048A01:2	3694,3	3692,5	3696,6	1,8	4,1
KG0048A01:3	3742,3	3737,7	3749,9	4,6	12,2
KG0048A01:4	3382,3	3378,2	3402,7	4,1	24,5

Table A-3 Key pressure data , draw-down and recovery respectively of each borehole section. Interference test in KA3566G01, section 1.30 – 6.80 m. Prototype Repository, February 1999.

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Po – Pp	Pf – Pp
KA3510A:1	4099,7	4099,9	4100,9	-0,2	1
KA3510A:2	4136,6	4136,6	4137,3	0	0,7
KA3510A:3	3930,1	3924,5	3931,1	5,6	6,6
KA3539G:1	3025,9	3018,7	3020,7	7,2	2
KA3542G01:1	3783,6	3781,1	3784,6	2,5	3,5
KA3542G02:1	3133,1	3136,8	3140,4	-3,7	3,6
KA3548A01:1	3905,7	3903,7	3907,3	2	3,6
KA3548A01:2	3826,2	3823,8	3827,8	2,4	4
KA3550G01:1	154,8	154,8	155,2	0	0,4
KA3552G01:1	251,7	252,5	257,7	-0,8	5,2
KA3554G01:1	3773,8	3770,5	3775,4	3,3	4,9
KA3554G02:1	3156,3	3152,4	3156,3	3,9	3,9
KA3557G:1	105,6	110,7	111,3	-5,1	0,6
KA3563G01:1	1286,1	1289,1	1298,8	-3	9,7
KA3563G01:2	1286,6	1289,5	1299,4	-2,9	9,9
KA3563G01:3	103,2	103	103	0,2	0
KA3566G01:1	2727,8	2566,4	2707,5	161,4	141,1
KA3566G01:2	2106,4	1881,4	2077,7	225	196,3
KA3566G01:3	2907,5	2913,2	2944,1	-5,7	30,9
KA3566G01:4	2720,9	2722,1	2731,5	-1,2	9,4
KA3566G02:1	3349,4	3346,3	3349,6	3,1	3,3
KA3566G02:2	3521,1	3520,5	3523	0,6	2,5
KA3566G02:3	2824,7	2826,4	2830,3	-1,7	3,9
KA3566G02:4	323,6	324,2	325,3	-0,6	1,1
KA3572G01:1	1718,3	1722,2	1731,8	-3,9	9,6
KA3572G01:2	343,7	343,5	344,5	0,2	1
KA3573A:1	4047	4046,8	4048,2	0,2	1,4
KA3573A:2	3912	3910,4	3914,1	1,6	3,7
KA3574G01:1	459	462,9	473,1	-3,9	10,2
KA3574G01:2	1740,9	1723,9	1678,5	17	-45,4
KA3574G01:3	182,3	181,7	180,9	0,6	-0,8
KA3576G01:1	441,1	440	436,6	1,1	-3,4

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Po – Pp	Pf – Pp
KA3576G01:2	156,2	155,8	155,1	0,4	-0,7
KA3576G01:3	847,2	827,6	777,1	19,6	-50,5
KA3578G01:1	521	528,6	549,5	-7,6	20,9
KA3578G01:2	155,8	155,2	155	0,6	-0,2
KA3579G01:1	1814	1816,3	1825,3	-2,3	9
KA3579G01:2	880,6	865,8	827,6	14,8	-38,2
KA3579G01:3	987	977,6	951,4	9,4	-26,2
KA3584G01:1	107,1	107,3	107,5	-0,2	0,2
KA3590G01:1	3963	3962,2	3965,5	0,8	3,3
KA3590G01:2	1876	3886,2	3903	-2010,2	16,8
KA3590G01:3	**1861,1**	**117,3**	**1712,6**	**1743,8**	**1595,3**
KA3590G02:1	3677,6	3677	3678,3	0,6	1,3
KA3590G02:2	3620,7	3618,9	3622,2	1,8	3,3
KA3590G02:3	2349,3	2287,9	2333,3	61,4	45,4
KA3590G02:4	865,5	861,5	857,7	4	-3,8
KA3593G01:1	2189,7	1951,7	2158	238	206,3
KA3593G01:2	2145,5	2069,5	2129,2	76	59,7
KA3600F:1	4108,7	4108,7	4109,6	0	0,9
KA3600F:2	4095,8	4096	4096,6	-0,2	0,6
KG0021A01:1	3481,2	3480,3	3481,2	0,9	0,9
KG0048A01:1	3904,7	3903,3	3906,8	1,4	3,5
KG0048A01:2	3696,6	3695,7	3698,9	0,9	3,2
KG0048A01:3	3749,6	3748,5	3751,2	1,1	2,7
KG0048A01:4	3402,7	3401,8	3402,5	0,9	0,7

Table A-4 Key pressure data , draw-down and recovery respectively of each borehole section. Interference test in KA3590G01, section 7.80–16.30m. Prototype Repository, February 1999.

Borehole section	Po (Kpa)	Pp (Kpa)	Pf (Kpa)	Po - Pp	Pf - Pp
KA3510A:1	4100,7	4100,7	4100,9	0	0,2
KA3510A:2	4137	4137	4137,3	0	0,3
KA3510A:3	3931,8	3929,5	3929,5	2,3	0
KA3539G:1	3022	3020,5	3019,7	1,5	-0,8
KA3542G01:1	3784,4	3784,2	3783,4	0,2	-0,8
KA3542G02:1	3138,4	3138,4	3147,4	0	9
KA3548A01:1	3907,3	3905,9	3905,9	1,4	0
KA3548A01:2	3827,4	3827	3826,6	0,4	-0,4
KA3550G01:1	153	154,6	157,7	-1,6	3,1
KA3552G01:1	256,6	260,1	257,4	-3,5	-2,7
KA3554G01:1	3775,4	3774	3774,4	1,4	0,4
KA3554G02:1	3156,1	3156,3	3156,7	-0,2	0,4
KA3557G:1	110,9	110,5	110,3	0,4	-0,2
KA3563G01:1	1299,2	1299	1299,4	0,2	0,4
KA3563G01:2	1299,5	1299,6	1299,8	-0,1	0,2
KA3563G01:3	102,7	103	103	-0,3	0
KA3566G01:1	2707,3	2670,5	2708,2	36,8	37,7
KA3566G01:2	2077,7	2013,5	2081,6	64,2	68,1
KA3566G01:3	2944,1	2940	2945,3	4,1	5,3
KA3566G01:4	2731,7	2729,2	2732,1	2,5	2,9
KA3566G02:1	3349,6	3349,6	3349,8	0	0,2
KA3566G02:2	3522,8	3522,5	3522,5	0,3	0
KA3566G02:3	2830,3	2830,3	2830,3	0	0
KA3566G02:4	325,3	325	325,5	0,3	0,5
KA3572G01:1	1731,6	1731,6	1731	0	-0,6
KA3572G01:2	344,3	343,9	344,3	0,4	0,4
KA3573A:1	4048	4047,6	4047,6	0,4	0
KA3573A:2	3913,2	3912,4	3912,7	0,8	0,3
KA3574G01:1	472,5	472,3	471,3	0,2	-1
KA3574G01:2	1676,6	1675,8	1672,8	0,8	-3
KA3574G01:3	180,9	180,9	180,7	0	-0,2
KA3576G01:1	435,8	435,3	433,7	0,5	-1,6

Borehole section	Po (Kpa)	Pp (Kpa)	Pf (Kpa)	Po - Pp	Pf - Pp
KA3576G01:2	154,9	154,9	154,9	0	0
KA3576G01:3	775,7	775,3	772,8	0,4	-2,5
KA3578G01:1	549,7	549,3	549	0,4	-0,3
KA3578G01:2	154,8	154,8	154,8	0	0
KA3579G01:1	1825,5	1825,7	1825,7	-0,2	0
KA3579G01:2	826,4	825	824,3	1,4	-0,7
KA3579G01:3	950	948,9	946,9	1,1	-2
KA3584G01:1	107,5	107,5	107,5	0	0
KA3590G01:1	3965,3	3875,6	3961,8	89,7	86,2
KA3590G01:2	**3903**	**143,3**	**1861,9**	**3759,7**	**1718,6**
KA3590G01:3	1712,8	354,3	1841,7	1358,5	1487,4
KA3590G02:1	3678,2	3678,1	3677,8	0,1	-0,3
KA3590G02:2	3622,1	3622	3622	0,1	0
KA3590G02:3	2333,5	2333,3	2332,7	0,2	-0,6
KA3590G02:4	856,5	856,3	855,1	0,2	-1,2
KA3593G01:1	2158	2124,3	2156,2	33,7	31,9
KA3593G01:2	2129,2	2127,8	2127,8	1,4	0
KA3600F:1	4109,4	4109,4	4109,4	0	0
KA3600F:2	4096,4	4096,6	4096,4	-0,2	-0,2
KG0021A01:1	3481	3481	3480,1	0	-0,9
KG0048A01:1	3907,2	3905	3905,4	2,2	0,4
KG0048A01:2	3699,3	3697,7	3698,2	1,6	0,5
KG0048A01:3	3750,8	3750,5	3750,5	0,3	0
KG0048A01:4	3401,8	3402,4	3401,8	-0,6	-0,6

Table A-5 Key pressure data , draw-down and recovery respectively of each borehole section. Interference test in KA3590G02, section 23.30–30.05 m. Prototype Repository, February 1999.

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Pf2 (Kpa)	Po – Pp	Pf - Pp
KA3510A:1	4100,9	4100,3	4100,4	4109,3	0,6	0,1
KA3510A:2	4137,2	4135,4	4137,7	4135,4	1,8	2,3
KA3510A:3	3930,1	3917,4	3923,3	3927,2	12,7	5,9
KA3539G:1	3022	2975,6	3037,5	3053,0	46,4	61,9
KA3542G01:1	3783,2	3767	3784,2	3774,4	16,2	17,2
KA3542G02:1	3141,3	3079,1	3139,8	3145,6	62,2	60,7
KA3548A01:1	3905,7	3893,4	3907,5	3902,4	12,3	14,1
KA3548A01:2	3826,6	3810,8	3828	3823,1	15,8	17,2
KA3550G01:1	157,3	156,2	159,1	166,3	1,1	2,9
KA3552G01:1	260,5	255	265,2	268,9	5,5	10,2
KA3554G01:1	3774,4	3762,7	3776	3768,5	11,7	13,3
KA3554G02:1	3156,5	3083,7	3164,9	3179.8	72,8	81,2
KA3557G:1	111,8	110,5	114,4	116,7	1,3	3,9
KA3563G01:1	1299,4	1298,4	1329,6	1370,9	1	31,2
KA3563G01:2	1299,8	1298,7	1330	1371,5	1,1	31,3
KA3563G01:3	103	102,5	102,7	104,8	0,5	0,2
KA3566G01:1	2709,4	2718,8	2720,6	2798,2	-9,4	1,8
KA3566G01:2	2083,1	2097,6	2097,2	2151,8	-14,5	-0,4
KA3566G01:3	2945,5	2951,2	2990,8	3008,8	-5,7	39,6
KA3566G01:4	2732,1	2726	2747,9	2758,7	6,1	21,9
KA3566G02:1	3349,6	3136,2	3474,3	3376,1	213,4	338,1
KA3566G02:2	3322,5	2794,1	3473,9	3535,6	528,4	679,8
KA3566G02:3	2830,3	2502,2	3472,6	2843,8	328,1	970,4
KA3566G02:4	325,5	317,1	886,1	322,2	8,4	569
KA3572G01:1	1731,1	1734	1765,3	1820,1	-2,9	31,3
KA3572G01:2	344,3	343,7	350,8	359,2	0,6	7,1
KA3573A:1	4047,6	4042,1	4048,4	4044,1	5,5	6,3
KA3573A:2	3912,7	3900,2	3914,5	3909,8	12,5	14,3
KA3574G01:1	471,3	473,9	506,4	580,9	-2,6	32,5
KA3574G01:2	1672,8	1649,8	1498,6	1262,3	23	-151,2
KA3574G01:3	180,7	179,2	180,8	184,1	1,5	1,6
KA3576G01:1	433,7	429	411,4	421,8	4,7	-17,6

Borehole section	Po (KPa)	Pp (KPa)	Pf (KPa)	Pf2 (Kpa)	Po – Pp	Pf - Pp
KA3576G01:2	154,9	154,7	153,5	153,1	0,2	-1,2
KA3576G01:3	772,8	750,3	611,7	414,2	22,5	-138,6
KA3578G01:1	549	555	617,2	748,0	-6	62,2
KA3578G01:2	154,8	154,3	152,9	152,1	0,5	-1,4
KA3579G01:1	1825,7	1829,1	1863,2	1912,7	-3,4	34,1
KA3579G01:2	824,3	807	569,3	1487,3	17,3	-237,7
KA3579G01:3	946,9	932,2	739,1	739,7	14,7	-193,1
KA3584G01:1	107,7	107,3	107,3	109,5	0,4	0
KA3590G01:1	3962	3956	3461,1	3955,8	6	-494,9
KA3590G01:2	1863,1	1869,9	1869,5	1862,9	-6,8	-0,4
KA3590G01:3	1842,7	1852,1	1852,5	1844,2	-9,4	0,4
KA3590G02:1	**3678**	**309,1**	**3680,3**	**3679,5**	**3368,9**	**3371,2**
KA3590G02:2	3622	2466,9	3634	3632,8	1155,1	1167,1
KA3590G02:3	2332,7	2276,3	2340,3	2340,3	56,4	64
KA3590G02:4	855,3	704,5	857,1	863,0	150,8	152,6
KA3593G01:1	2158	2181,9	2183,5	2172,7	-23,9	1,6
KA3593G01:2	2128	2123,3	2145,1	2142,3	4,7	21,8
KA3600F:1	4109,6	4106,9	4110,2	4107,1	2,7	3,3
KA3600F:2	4096,4	4093,4	4097	4092,6	3	3,6
KG0021A01:1	3481	3422,4	3484,4	3421,2	58,6	62
KG0048A01:1	3905,4	3892,1	3905,9	3902,2	13,3	13,8
KG0048A01:2	3698,2	3678,2	3697,5	3692,9	20	19,3
KG0048A01:3	3750,5	3698,6	3751,7	3748,9	51,9	53,1
KG0048A01:4	3402	3346,8	3404,8	3406,4	55,2	58

Table A-6 Key pressure data , draw-down and recovery respectively of each borehole section. Interference test in KA3590G01, section 1.3 – 6.80 m (test #6). Prototype Repository, April 1999.

Borehole section	Po (Kpa)	Pp (Kpa)	Pf (Kpa)	Po - Pp	Pf – Pp
KA3510A:1	4118,1	4117,2	4117,8	0,9	0,6
KA3510A:2	4126	4125,6	4126,6	0,4	1
KA3510A:3	3913,3	3906,1	3913,1	7,2	7
KA3539G:1	3035,8	3034,8	3035	1	0,2
KA3542G01:1	3758,1	3759,9	3764	-1,8	4,1
KA3542G02:1	3132,4	3131,6	3132,2	0,8	0,6
KA3548A01:1	3890,1	3866,1	3890,5	24	24,4
KA3548A01:2	3799,9	3798,6	3798,4	1,3	-0,2
KA3550G01:1	142,2	141,8	141	0,4	-0,8
KA3552G01:1	265,1	264,5	263,9	0,6	-0,6
KA3554G01:1	3735,1	3730,3	3734,7	4,8	4,4
KA3554G02:1	3178,6	3177,8	3178,8	0,8	1
KA3557G:1	122,6	122,4	121,6	0,2	-0,8
KA3563G01:1	1387,1	1385,7	1385,1	1,4	-0,6
KA3563G01:2	1387,7	1386,1	1385,6	1,6	-0,5
KA3563G01:3	108,7	108,7	107,9	0	-0,8
KA3566G01:1	2669,9	2525,7	2672,4	144,2	146,7
KA3566G01:2	2084,5	1881,2	2088	203,3	206,8
KA3566G01:3	3218,4	3214,1	3219,6	4,3	5,5
KA3566G01:4	2796,1	2787,1	2784,9	9	-2,2
KA3566G02:1	3344,7	3343,6	3345,1	1,1	1,5
KA3566G02:2	3507,4	3506,2	3508	1,2	1,8
KA3566G02:3	103,7	103,3	102,5	0,4	-0,8
KA3566G02:4	322,1	321,7	318	0,4	-3,7
KA3572G01:1	1878	1874,3	1863,7	3,7	-10,6
KA3572G01:2	102,5	102,3	101,3	0,2	-1
KA3573A:1	4034,5	4033,3	4034,9	1,2	1,6
KA3573A:2	3898,9	3895,5	3899,1	3,4	3,6
KA3574G01:1	821	820,6	823,8	0,4	3,2
KA3574G01:2	1021,7	1017,2	1010,7	4,5	-6,5
KA3574G01:3	182,3	180,7	178,4	1,6	-2,3
KA3576G01:1	1592	1583,4	1566,6	8,6	-16,8

Borehole section	Po (Kpa)	Pp (Kpa)	Pf (Kpa)	Po - Pp	Pf – Pp
KA3576G01:2	158,2	158	158,4	0,2	0,4
KA3576G01:3	711,9	701,1	679,2	10,8	-21,9
KA3578G01:1	106,5	106,3	105,5	0,2	-0,8
KA3578G01:2	151,9	153,1	154,2	-1,2	1,1
KA3579G01:1	2012,8	2009,4	2005,3	3,4	-4,1
KA3579G01:2	516,3	514,2	511,6	2,1	-2,6
KA3579G01:3	474,3	470,6	466,3	3,7	-4,3
KA3584G01:1	109,8	109,8	108,9	0	-0,9
KA3590G01:1	3951,5	3948,3	3952	3,2	3,7
KA3590G01:2	3891,9	3887,8	3892,3	4,1	4,5
KA3590G01:3	**1641,4**	**117,3**	**1645,1**	**1524,1**	**1527,8**
KA3590G02:1	3662,5	3661,5	3663,5	1	2
KA3590G02:2	3419,1	3410,9	3420,1	8,2	9,2
KA3590G02:3	2556	2508,6	2551,7	47,4	43,1
KA3590G02:4	888,2	883,9	887	4,3	3,1
KA3593G01:1	2114,8	1907,3	2117,9	207,5	210,6
KA3593G01:2	2142,9	2074,8	2137,6	68,1	62,8
KA3600F:1	4098,3	4098,1	4099,1	0,2	1
KA3600F:2	4082,3	4081,3	4082,7	1	1,4
KG0021A01:1	3474,8	3475	3478	-0,2	3
KG0048A01:1	3889,6	3886,1	3890,3	3,5	4,2
KG0048A01:2	3681,7	3679,2	3681,9	2,5	2,7
KG0048A01:3	3737,1	3735,2	3737,7	1,9	2,5
KG0048A01:4	3397,2	3396,8	3399,7	0,4	2,9

APPENDIX 2

Interference test 1:1 in borehole KA3566G01, section 12.30 m – 19.80 m

Date: 99-02-22 Field Crew: Bengt Gentzschein
Borehole length: 30.01 m Borehole diameter: 76 mm

Flowing borehole: KA3566G01, section #2: 12.30 – 19.80 m

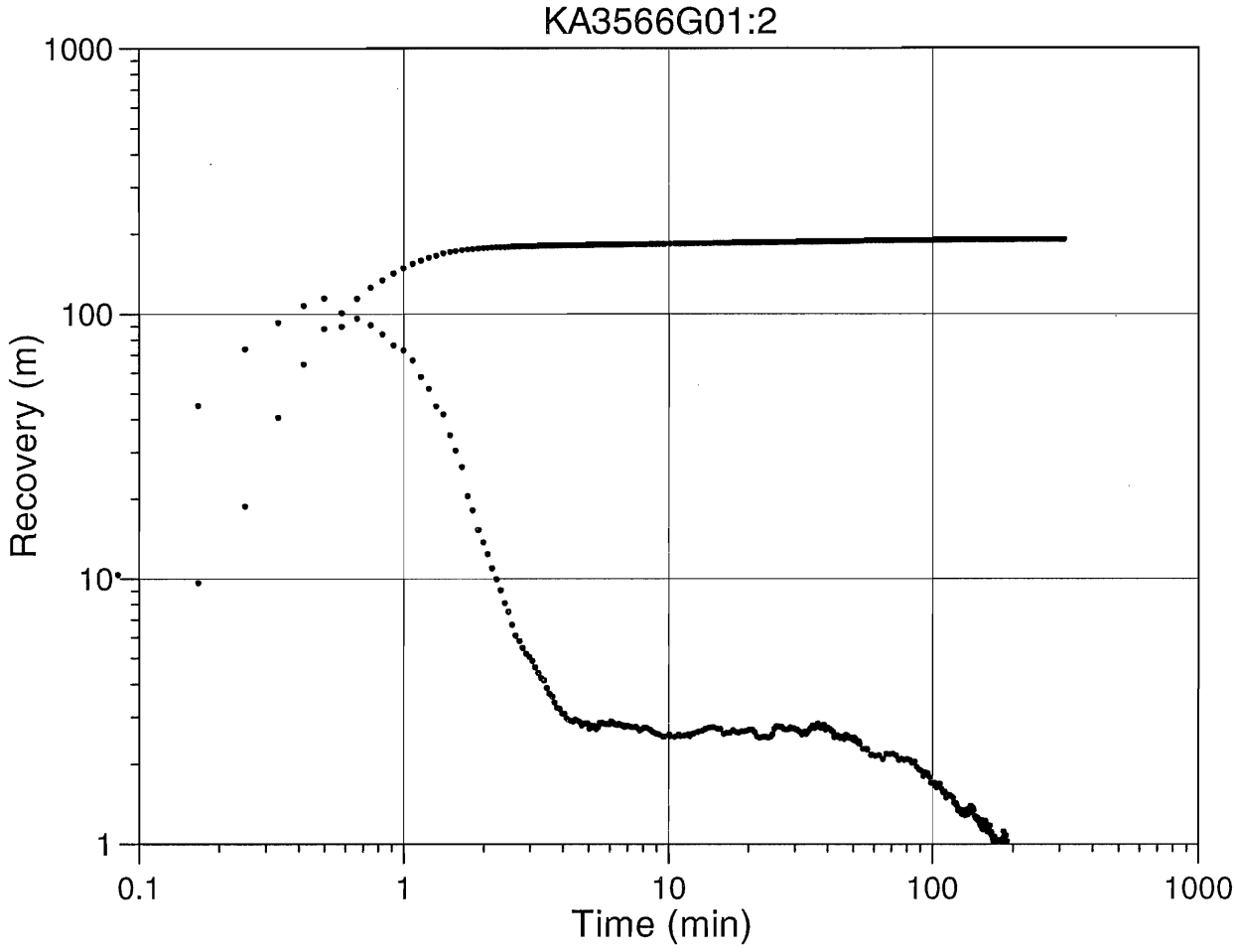
Valve opened: 990222 14:01.10 Valve closed: 990222 20:05.10
End of Test: 990224 08:00
Total flowing time : 364 min Tot. Pr. Build-up time: 2155 min.

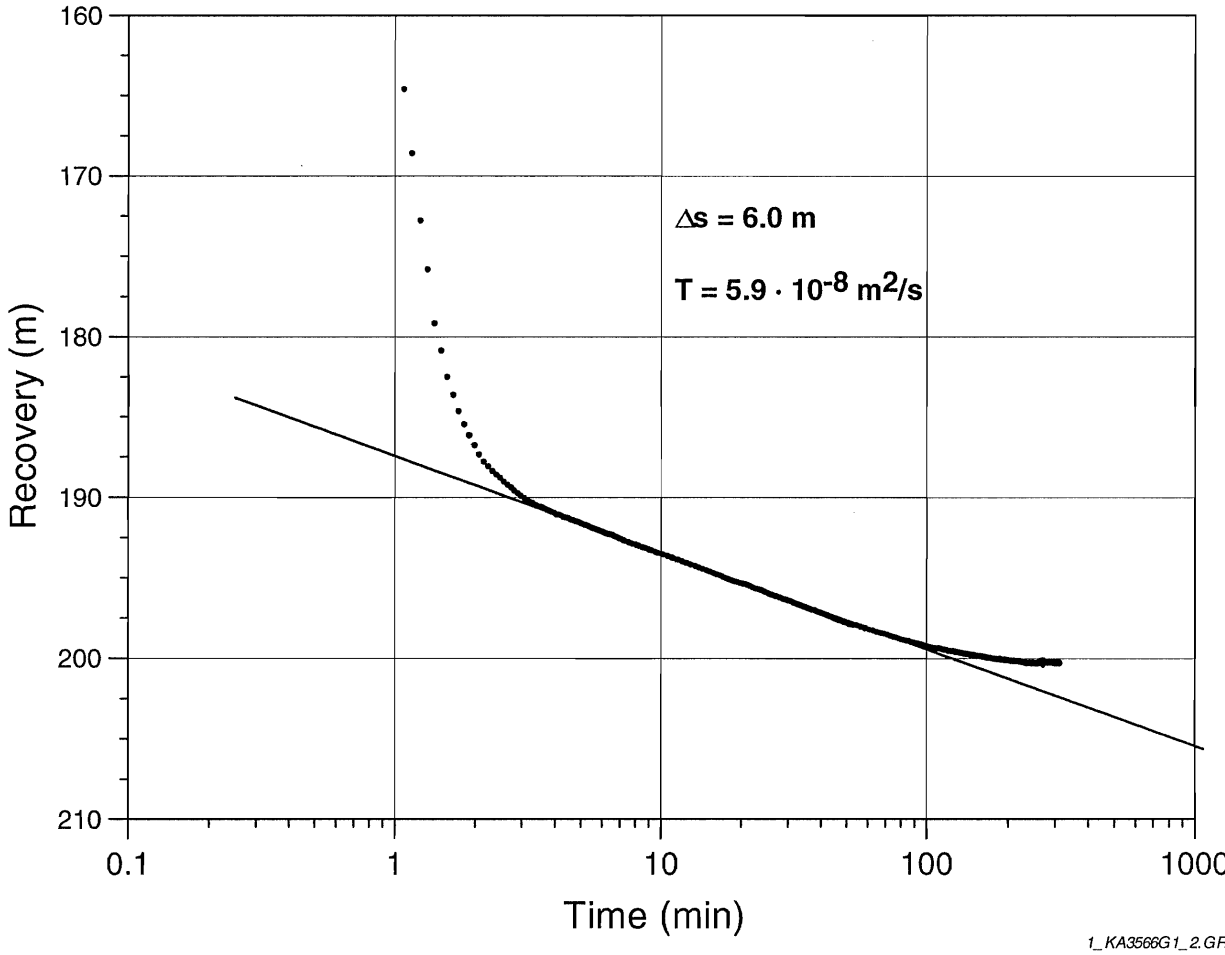
The test was performed as an Interference test. Pressure responses were monitored in 56 borehole sections.

Flow data
Manually measured flow rates of KA3566G01, section 12.30– 19.80 m are presented in the table below

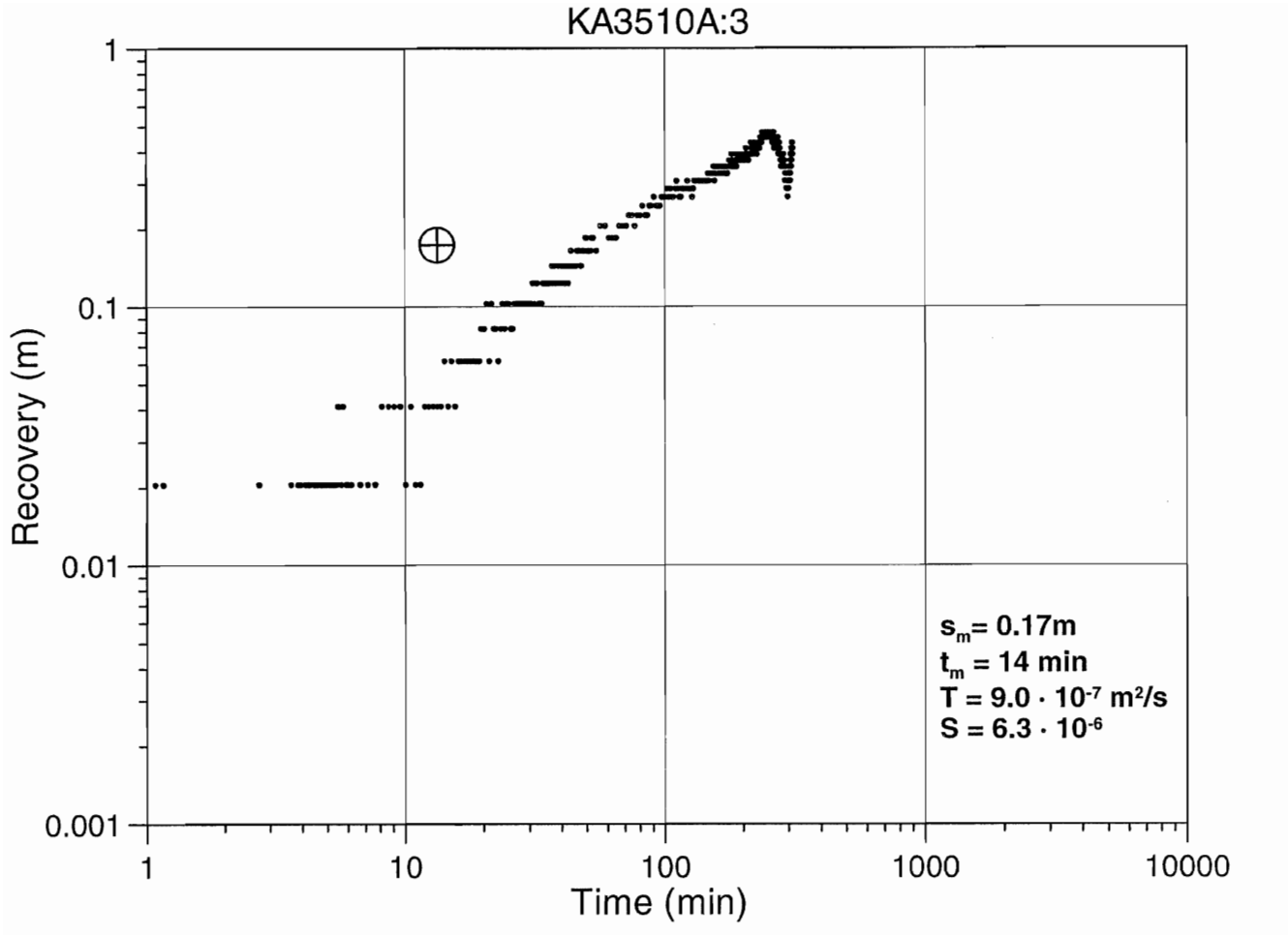
Table **Manually measured flow rates, Interference test in KA3566G01, section 12.30 – 19.80 m**

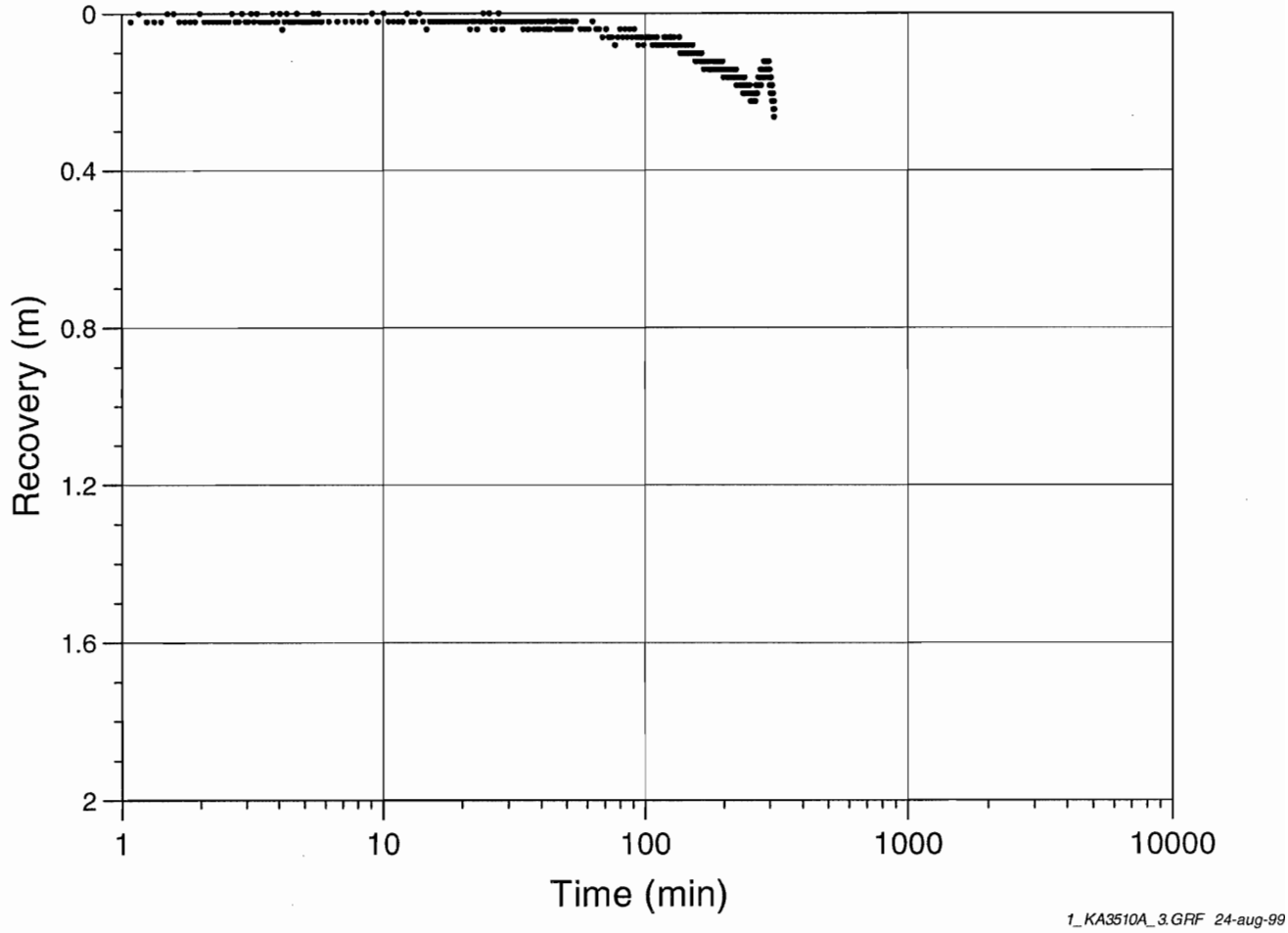
Time	Flow rate (l/min)
14:02.30	0.135
14:05:30	0.128
14:09	0.1275
14:12.40	0.127
14:24	0.122
14:43.30	0.1205
15:12	0.1195
19:48	0.115
19:54	0.115
20:03.30	0.1155



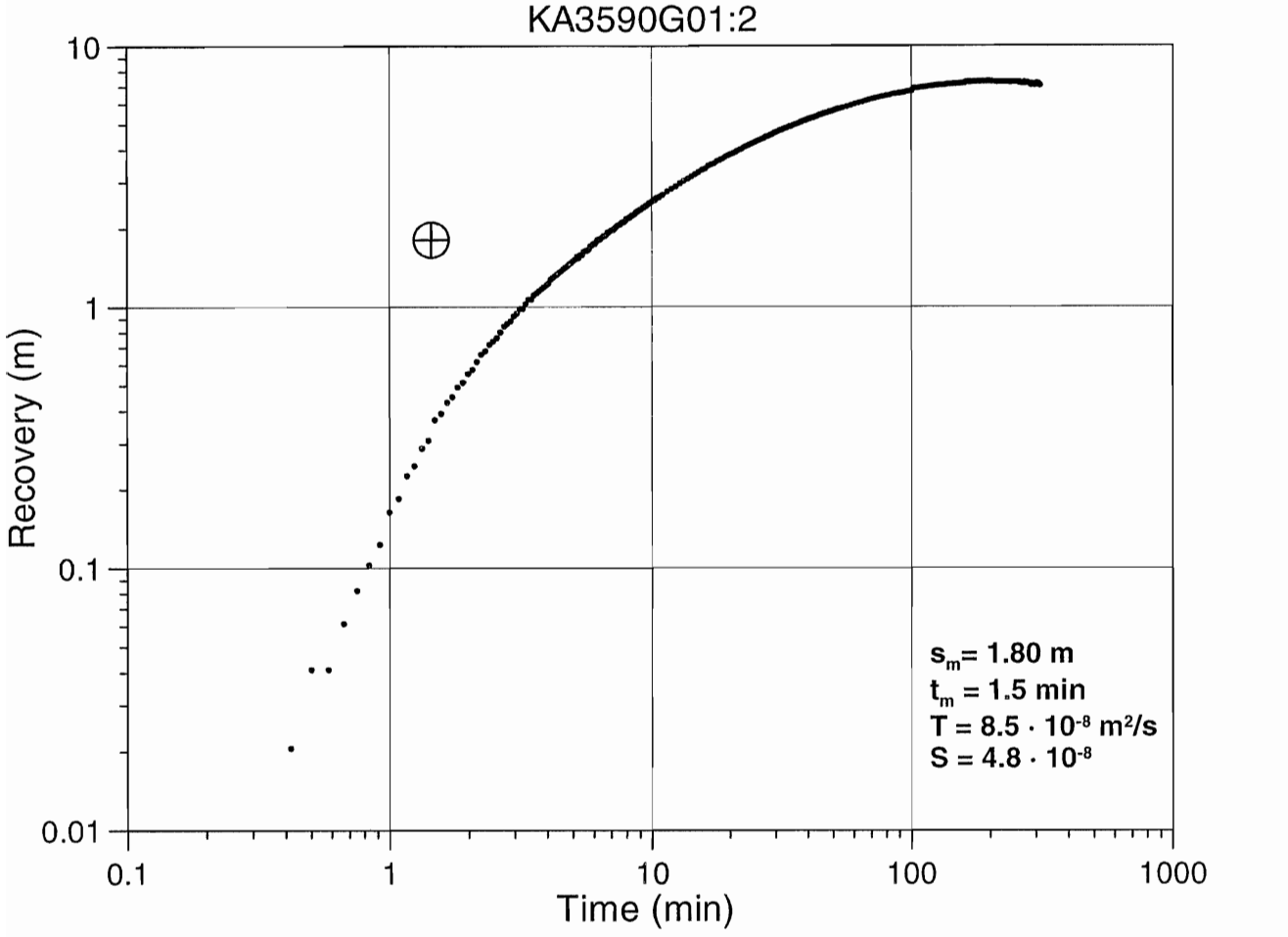


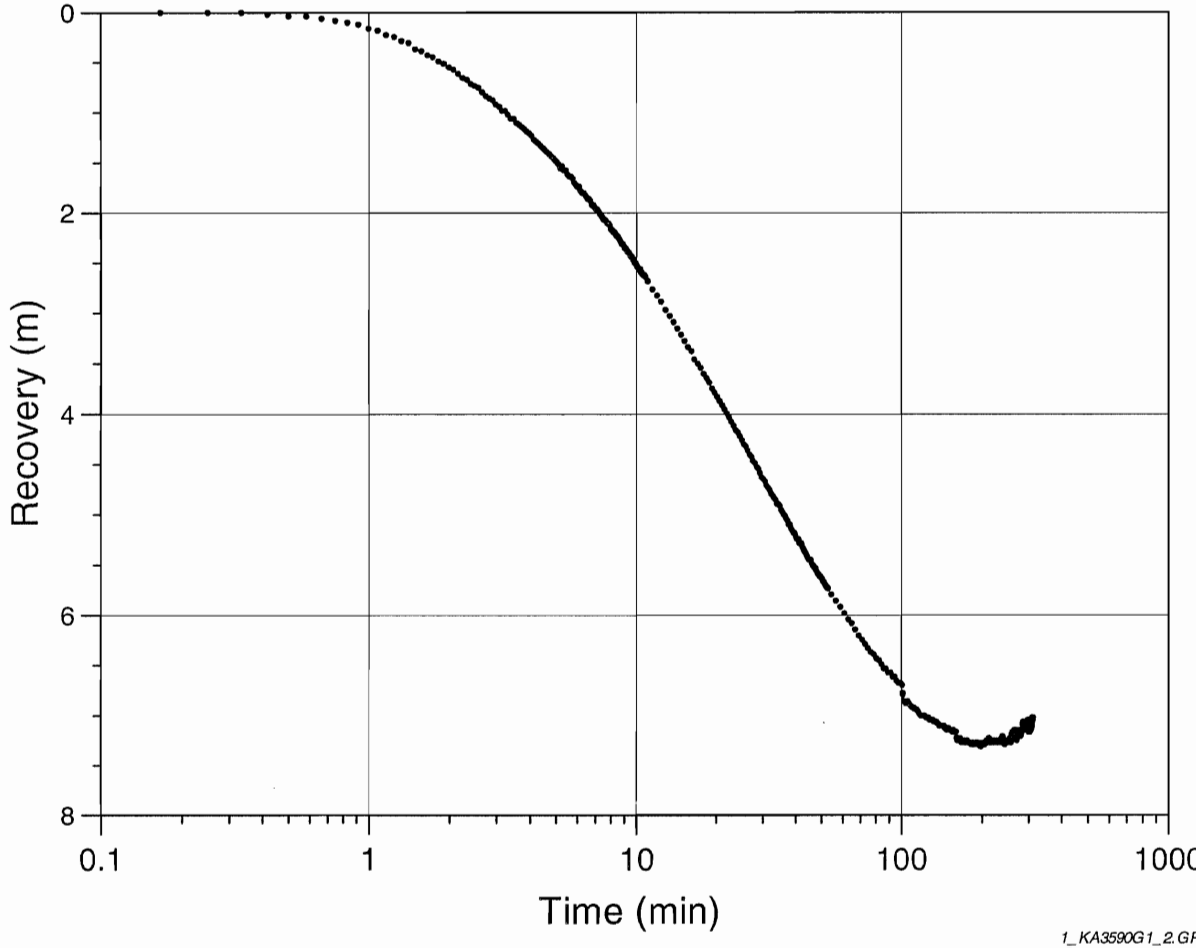
1_KA3566G1_2.GRF 24-aug-99



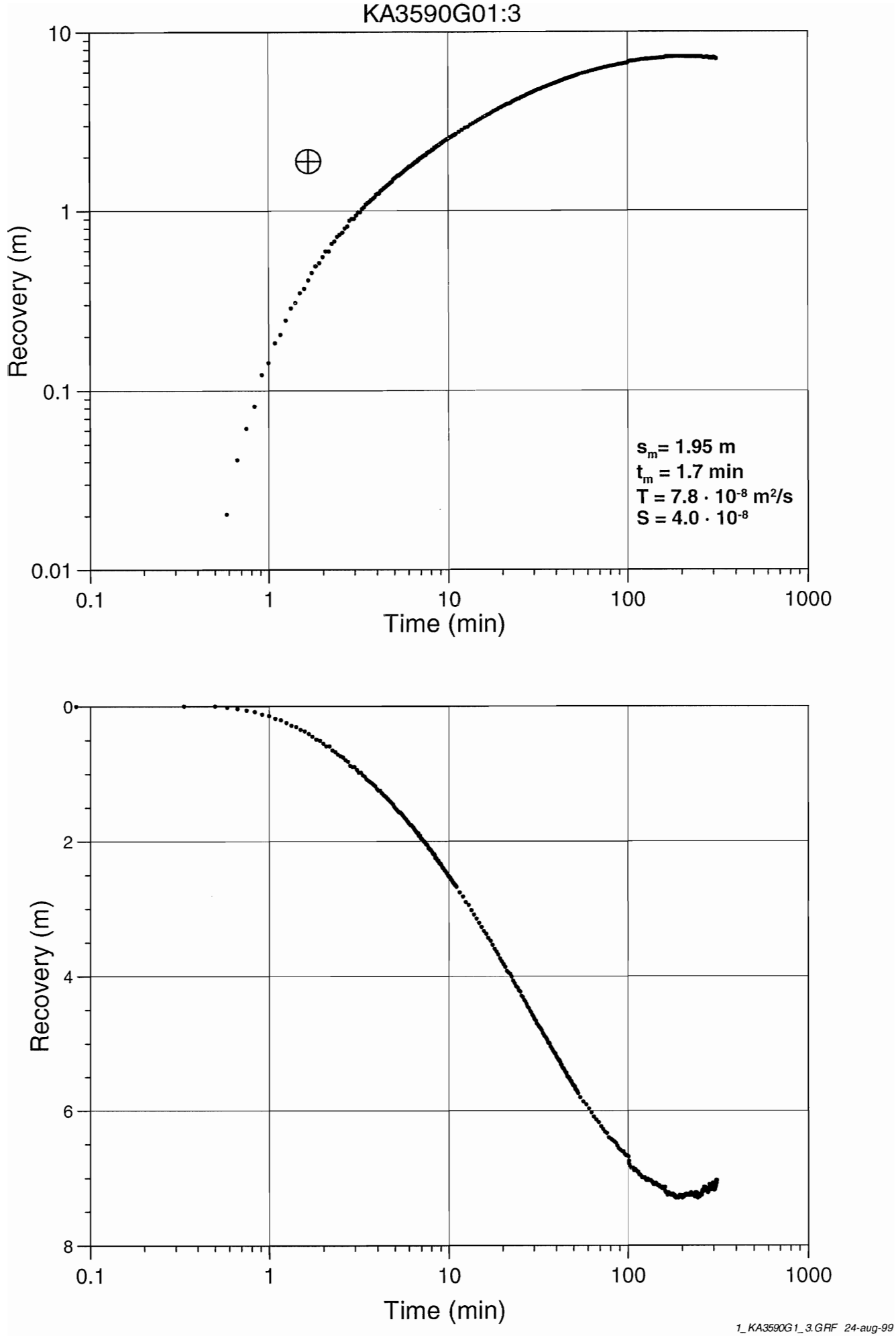


1_KA3510A_3.GRF 24-aug-99

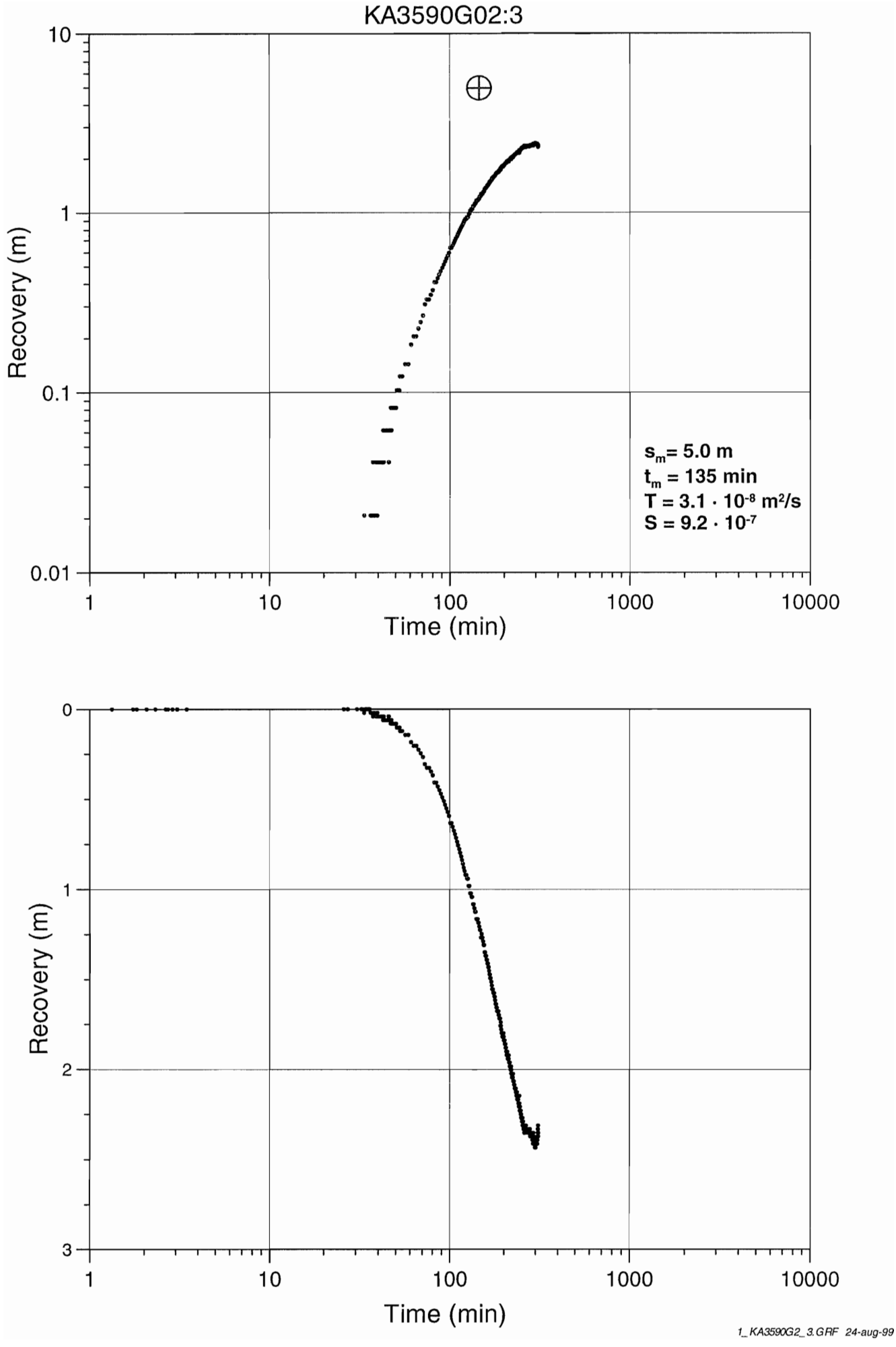


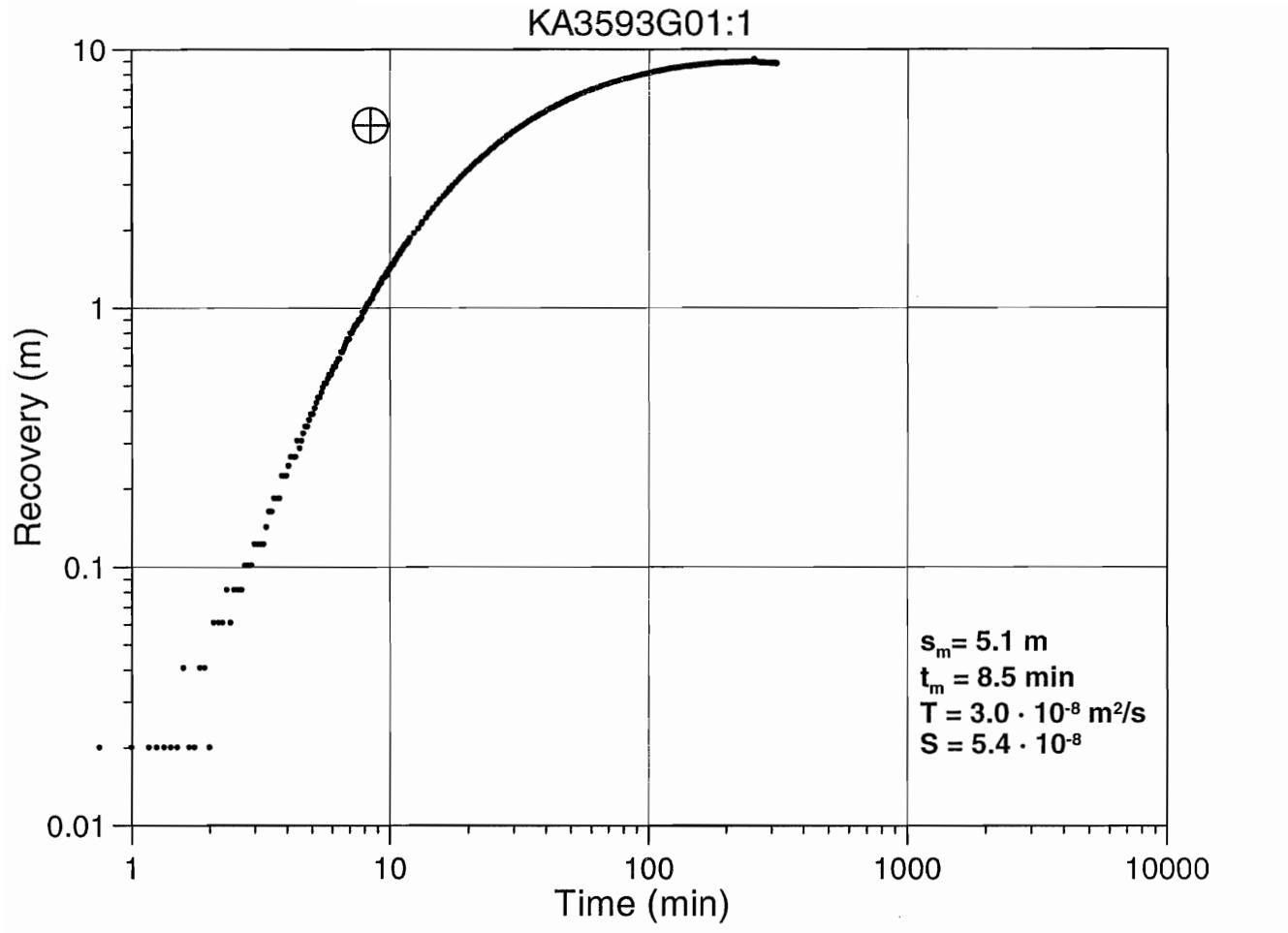


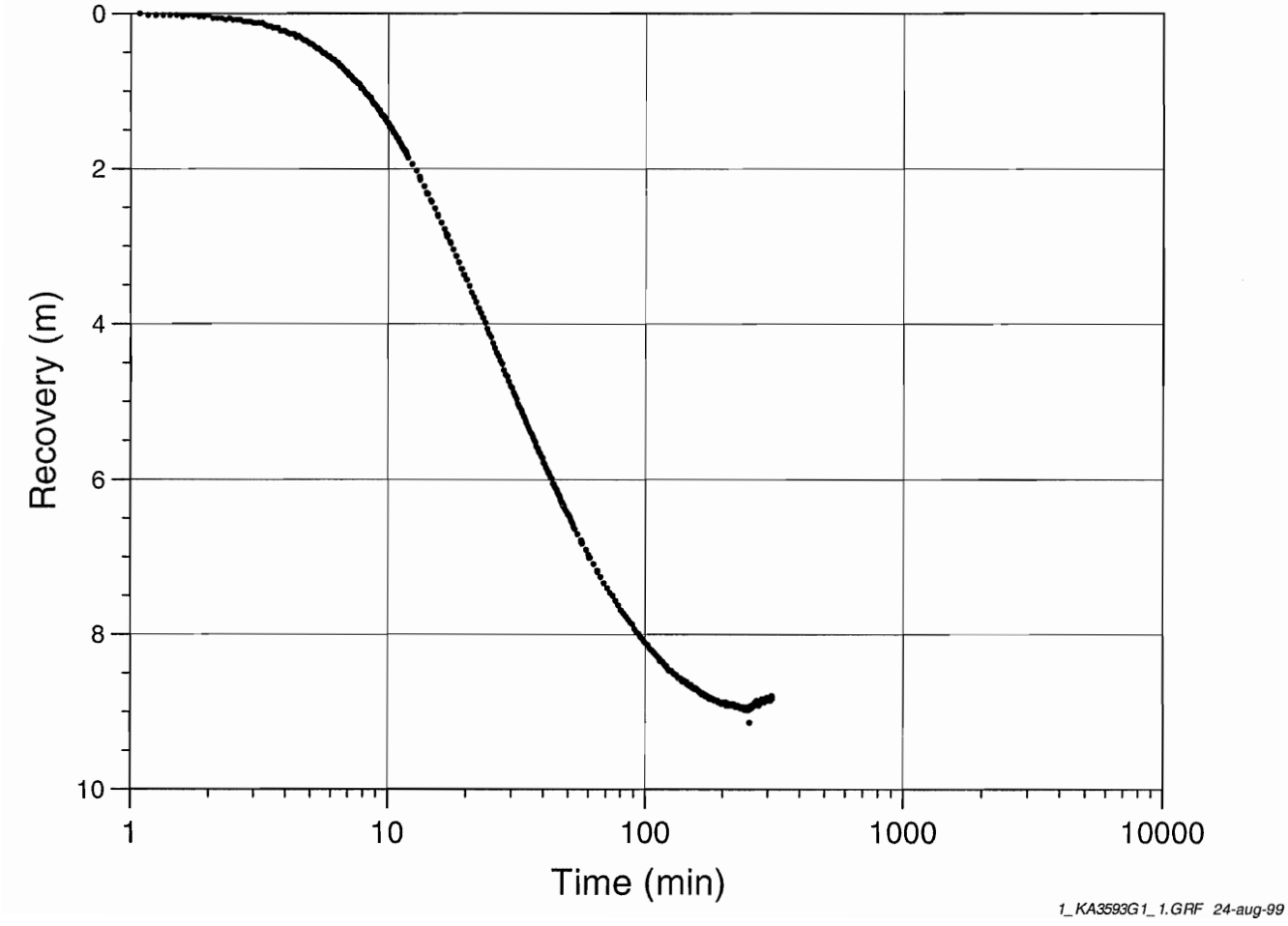
1_KA3590G1_2.GRF 24-aug-99



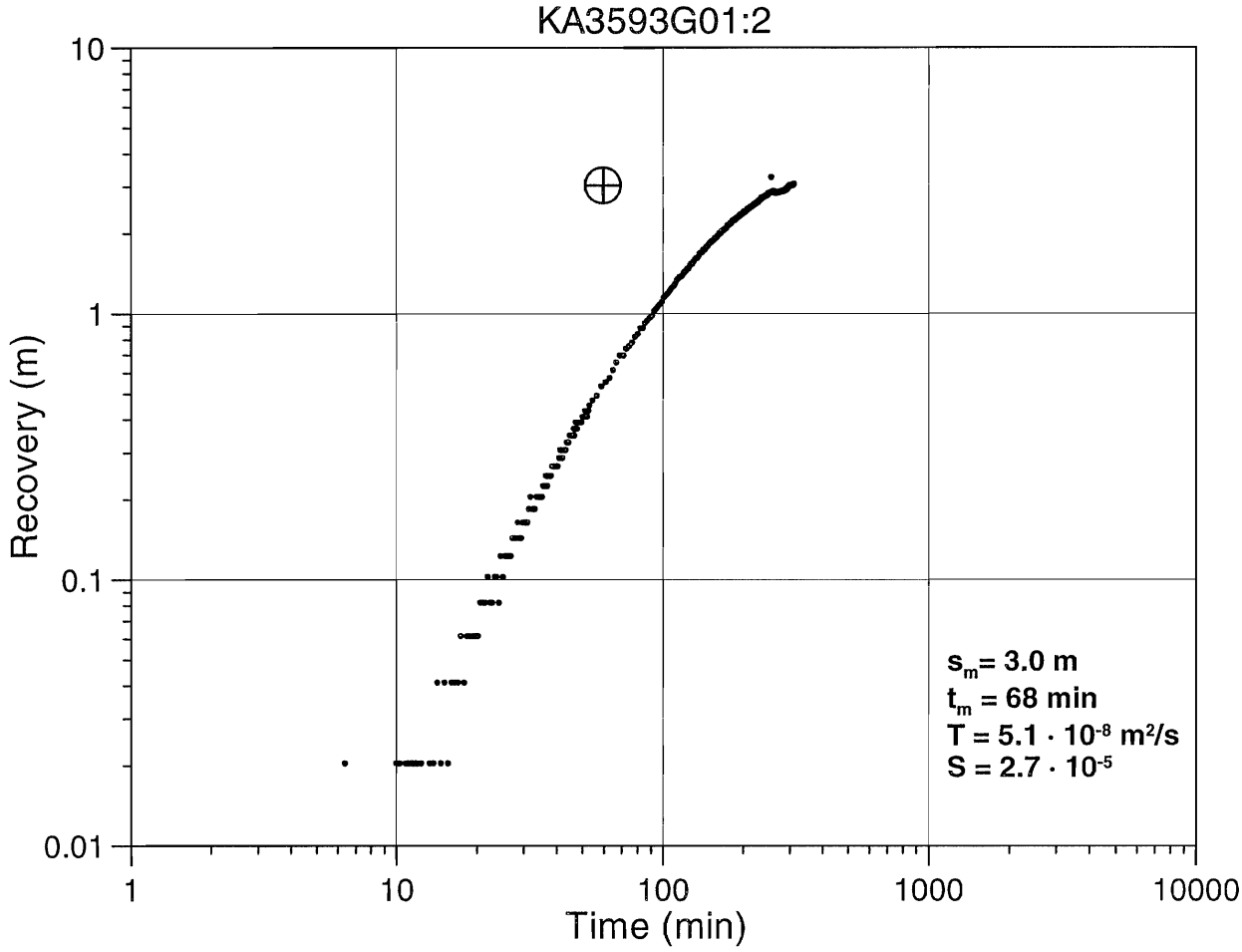
1_KA3590G1_3.GRF 24-aug-99

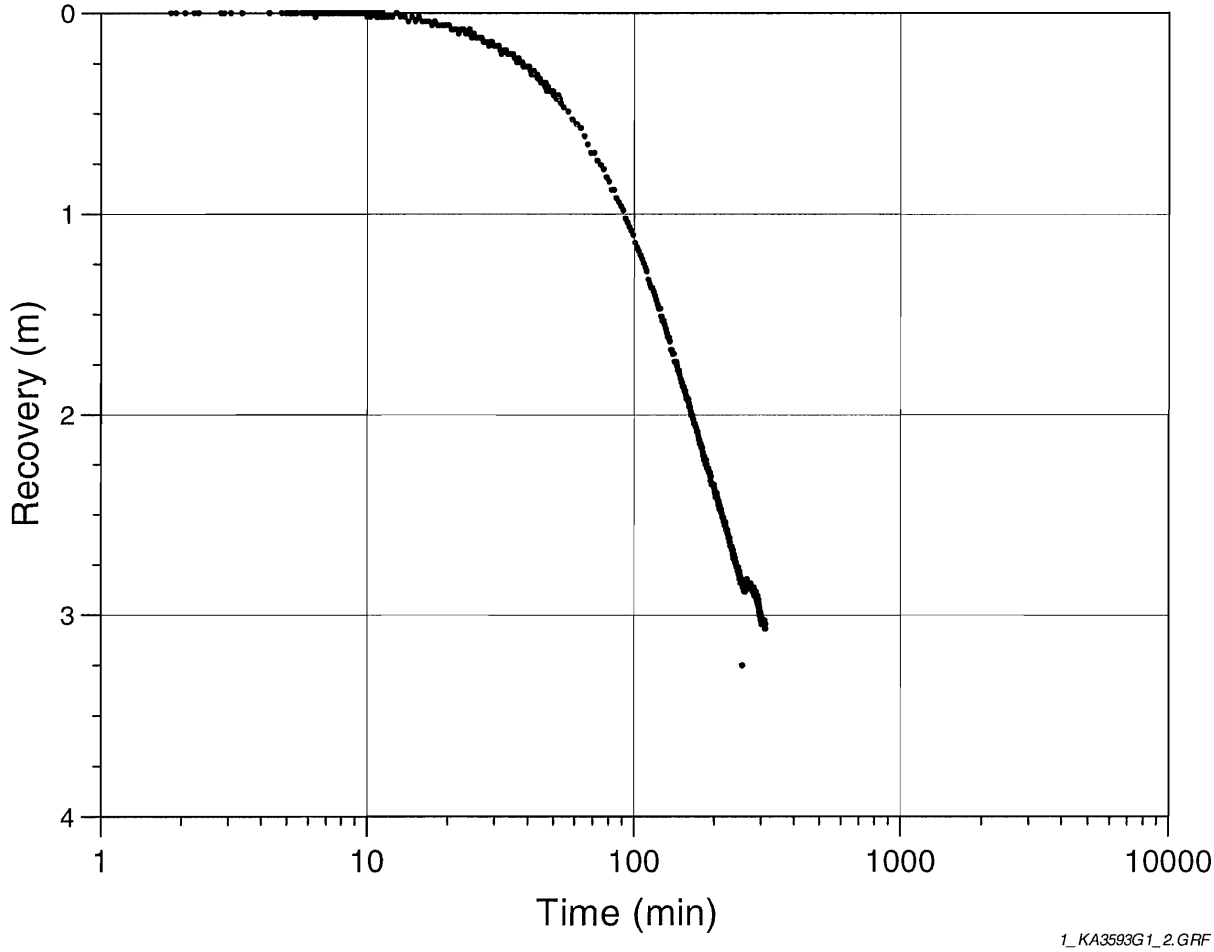

KA3590G02:3
Recovery (m)
Time (min)
10
1
0.1
0.01
1
10
100
1000
10000
s_m= 5.0 m
t_m = 135 min
T = 3.1 · 10^{-8} m²/s
S = 9.2 · 10^{-7}
Recovery (m)
Time (min)
0
1
2
3
1
10
100
1000
10000
1_KA3590G2_3.GRF 24-aug-99





1_KA3593G1_1.GRF 24-aug-99





1_KA3593G1_2.GRF 24-aug-99

APPENDIX 3

Interference test 1:2 in borehole KA3566G02, section 12.30 m –18.30 m

Date: 99-02-24 Field Crew: Bengt Gentzschein
Borehole length: 30.01 m Borehole diameter: 76 mm

Flowing borehole: KA3566G02, section #2: 12.3 – 18.3 m

Valve opened: 990224 08:26.05 Valve closed: 990224 14:43.11
End of Test: 990225 08:00
Total flowing time : 377 min Tot. Pr. Build-up time 1037 min.

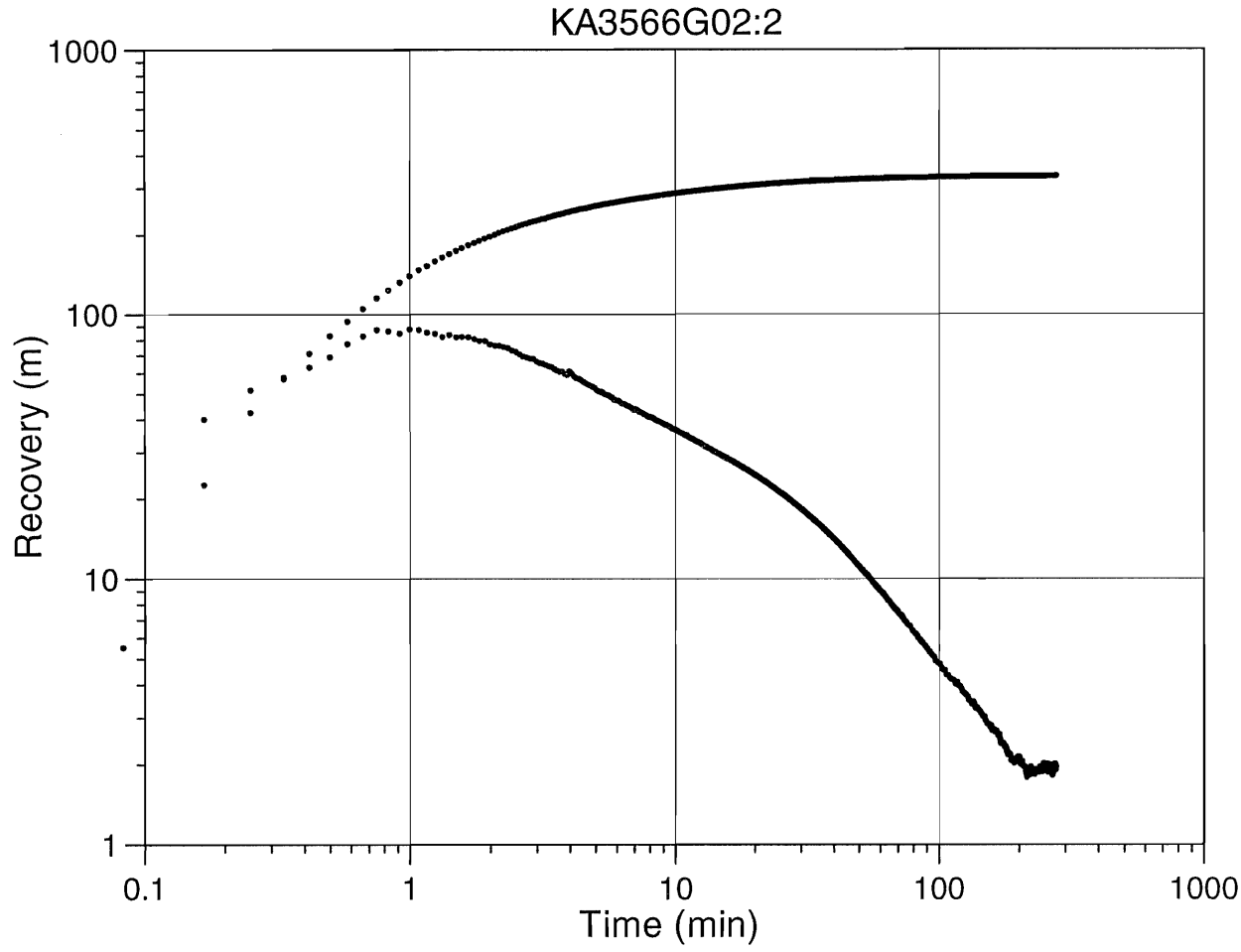
The test was performed as an Interference test. Pressure responses were monitored in 56 borehole sections.

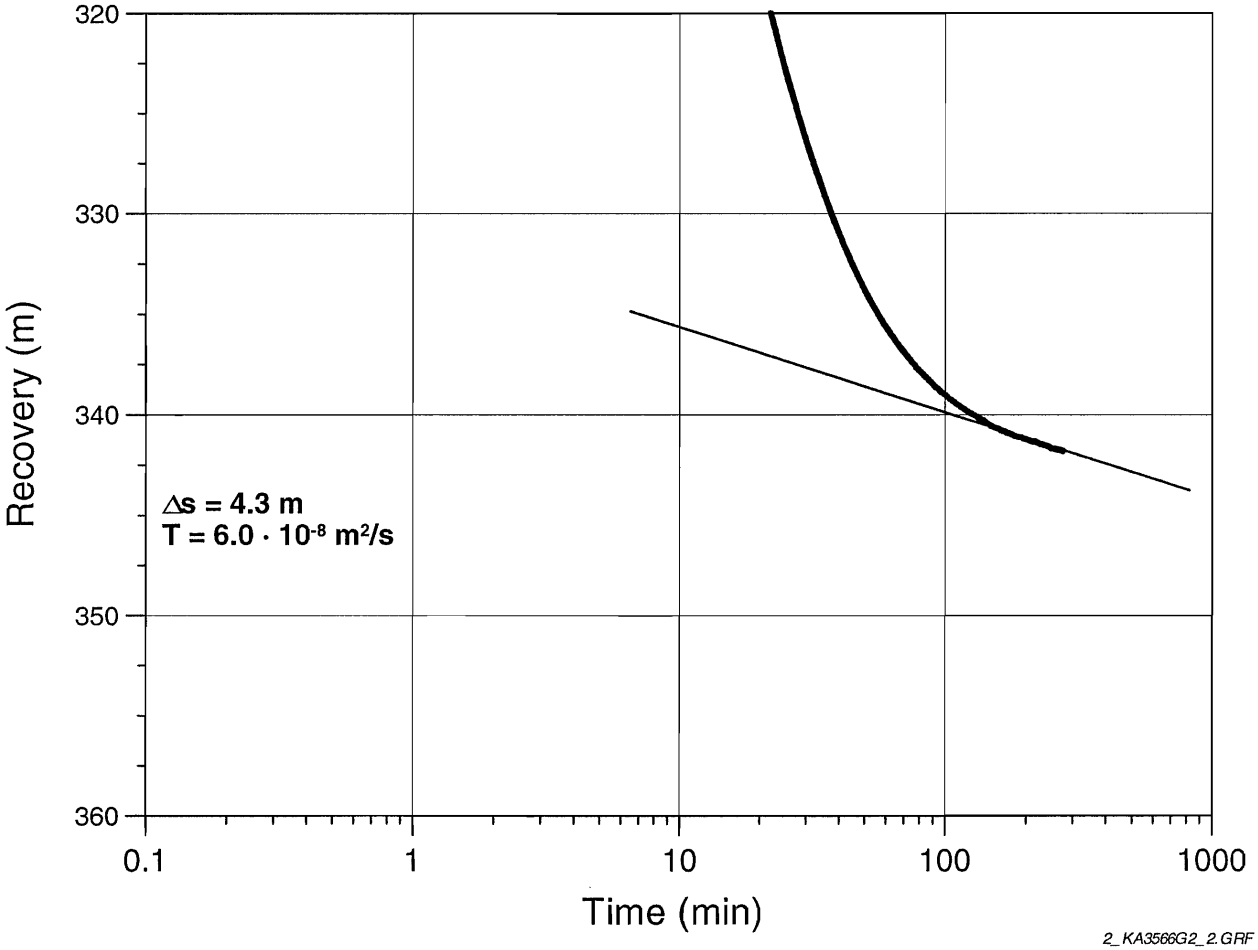
Flow data

Manually measured flow rates of KA3566G02, section 12.30 – 18.30 m are presented in the table below

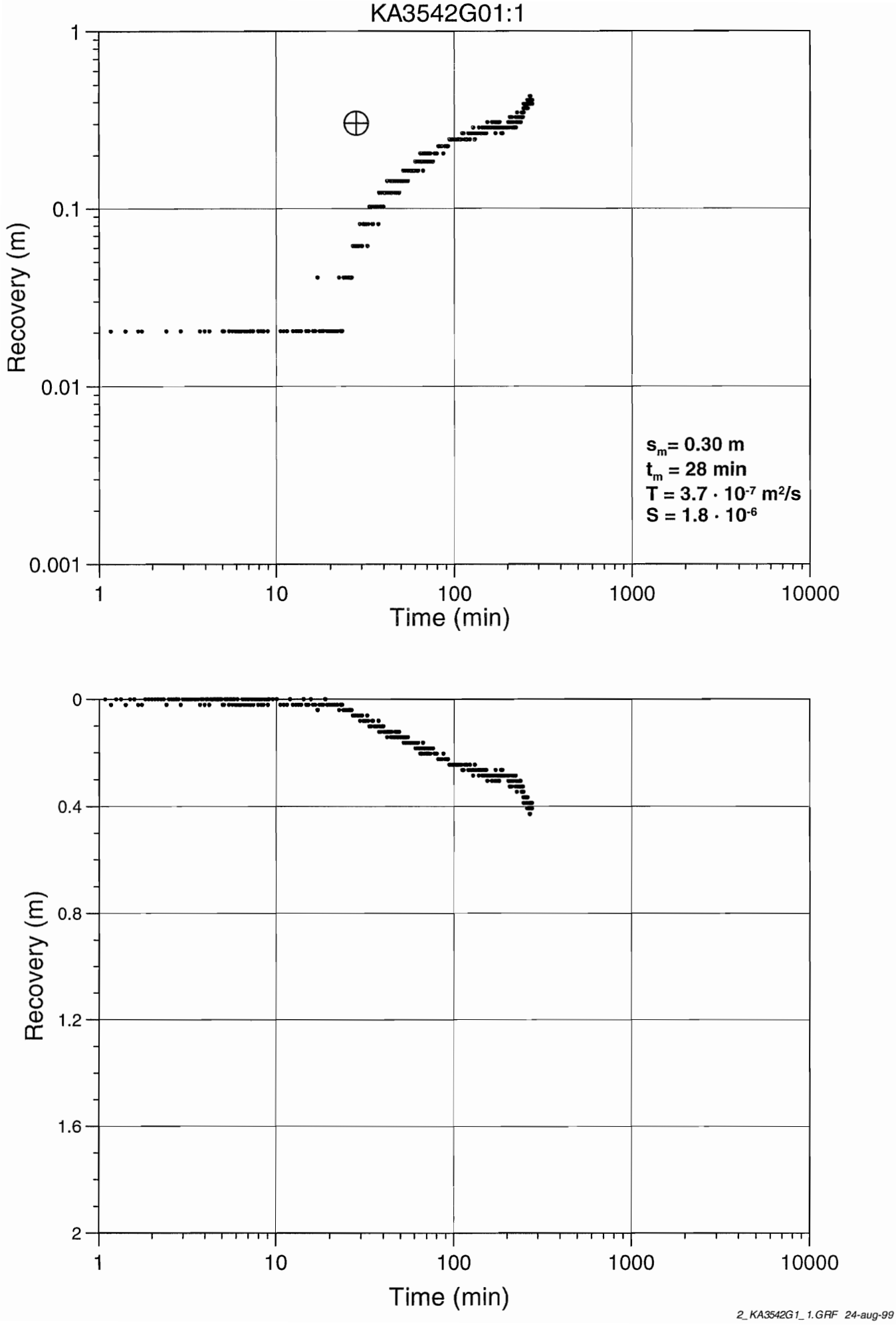
Table **Manually measured flow rates, Interference test in KA3566G02, section, 12.30 – 18.30 m**

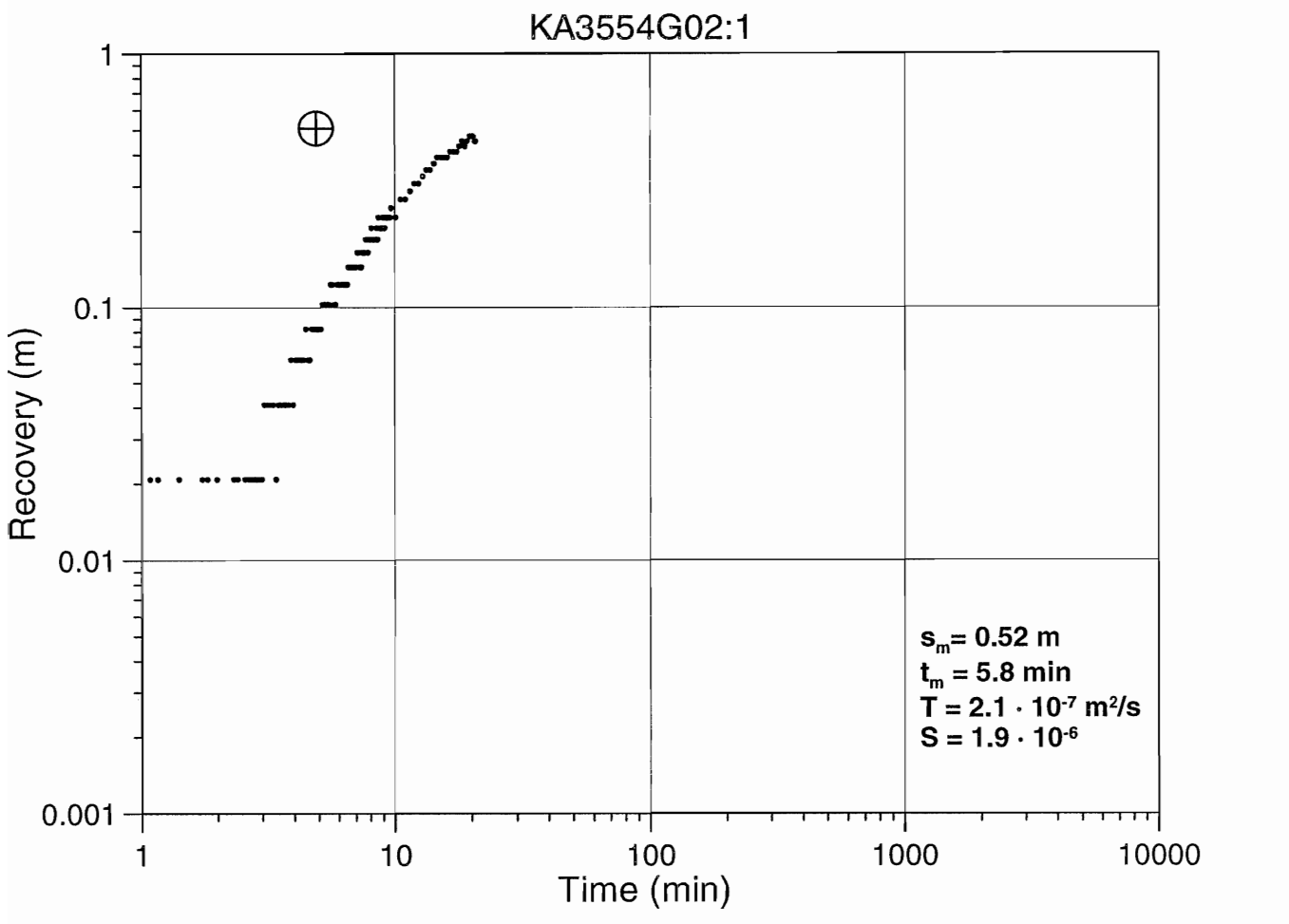
Time	Flow rate (l/min)
08:27.30	0.130
08:29:30	0.113
08:31	0.107
08:40	0.096
08:55	0.091
09:12	0.087
09:25	0.0865
14:32	0.084
14:34.30	0.084
14:41	0.0845

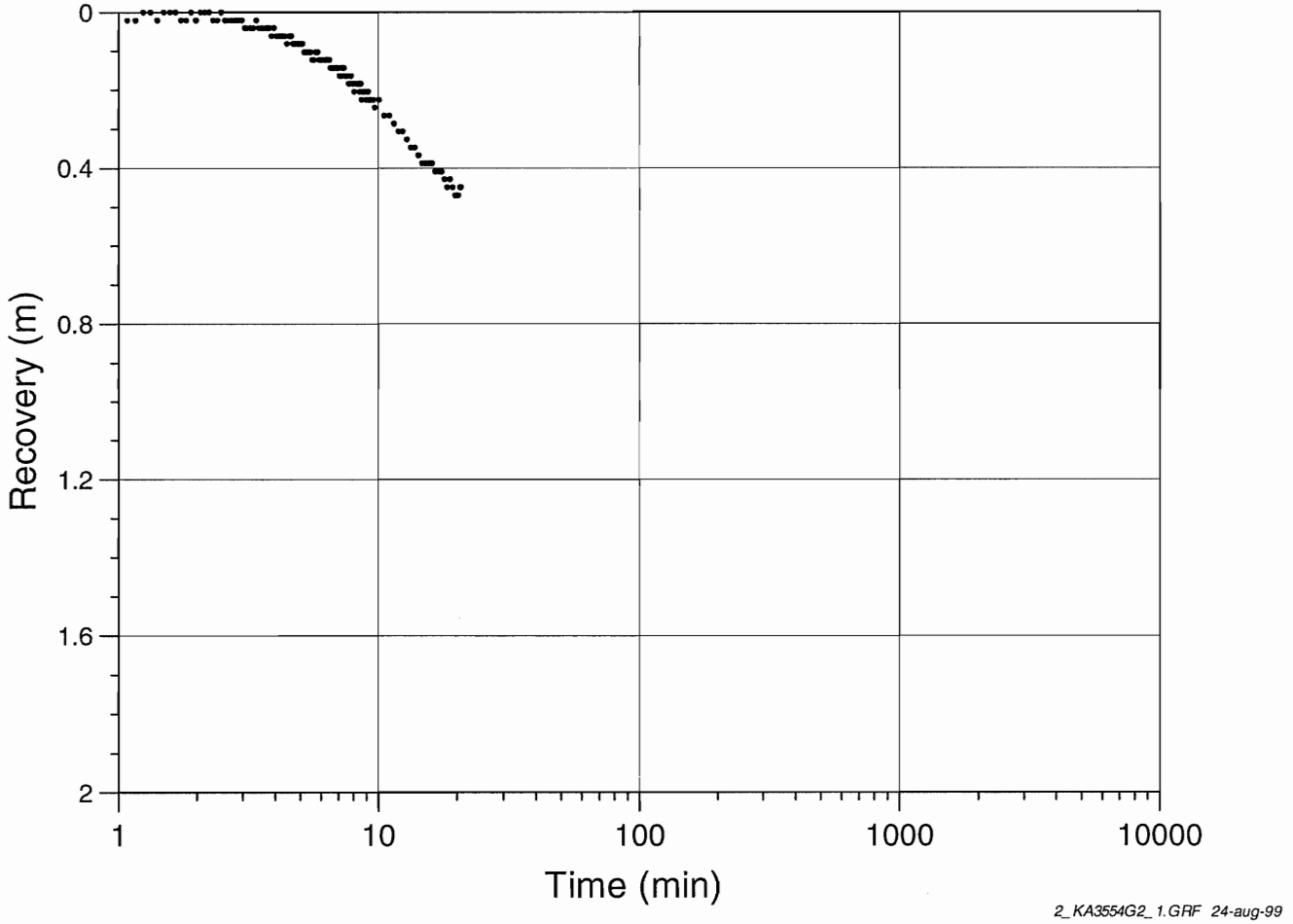




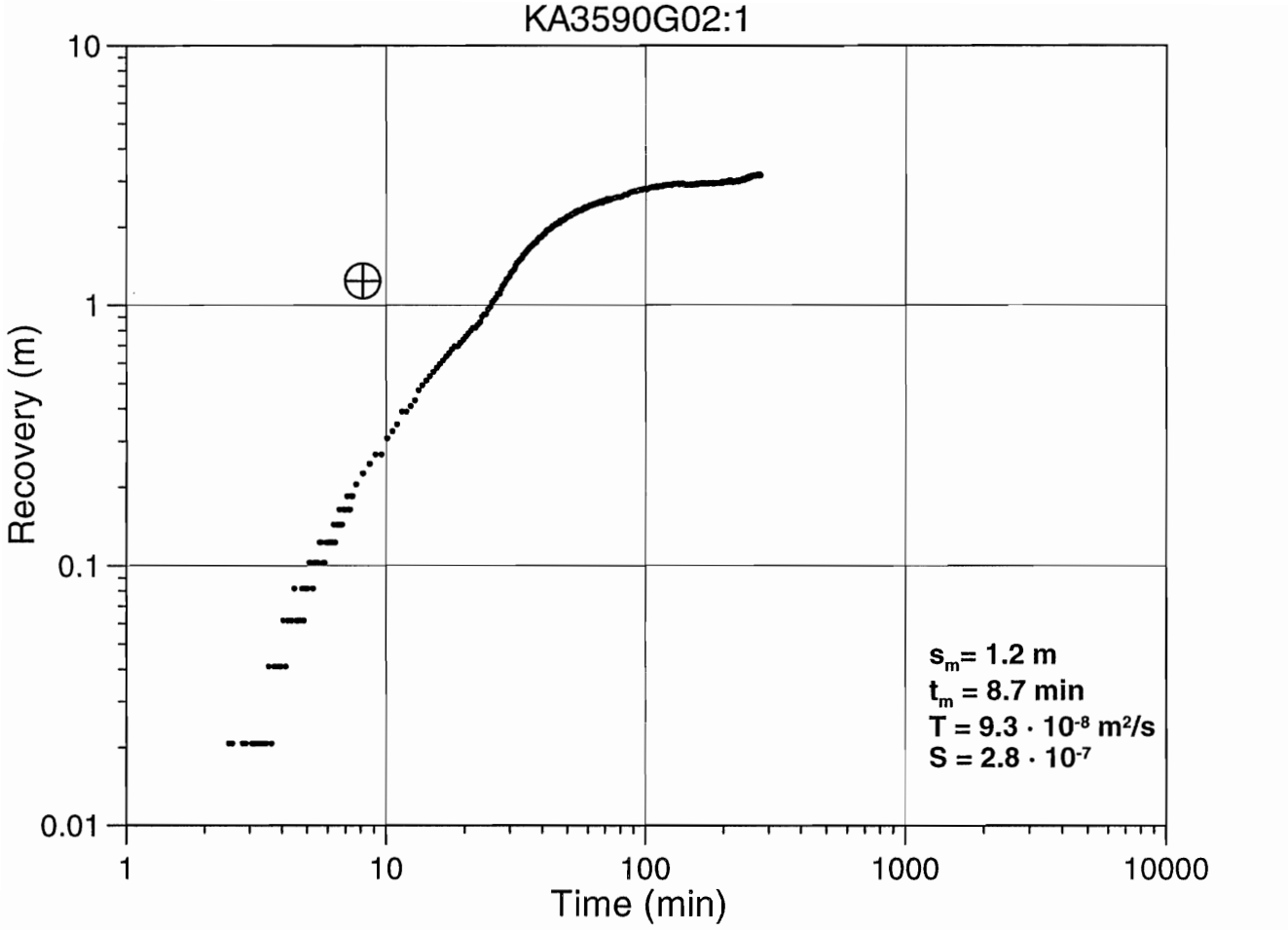
2_KA3566G2_2.GRF 25-aug-99

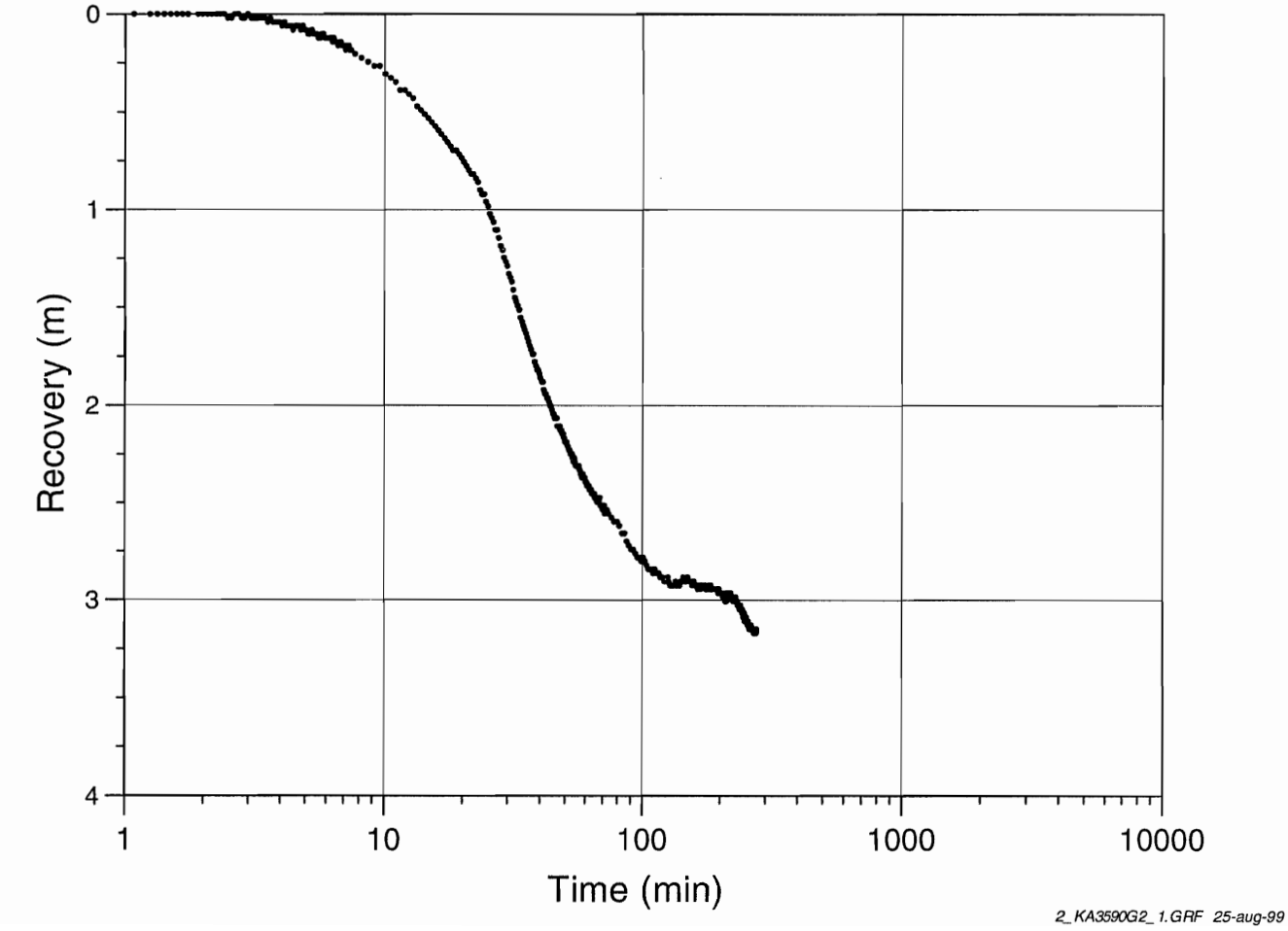

KA3542G01:1
Recovery (m)
1
0.1
0.01
0.001
1
10
100
1000
10000
Time (min)
s_m= 0.30 m
t_m = 28 min
T = 3.7 · 10^{-7} m^2/s
S = 1.8 · 10^{-6}
Recovery (m)
0
0.4
0.8
1.2
1.6
2
1
10
100
1000
10000
Time (min)
2_KA3542G1_1.GRF 24-aug-99



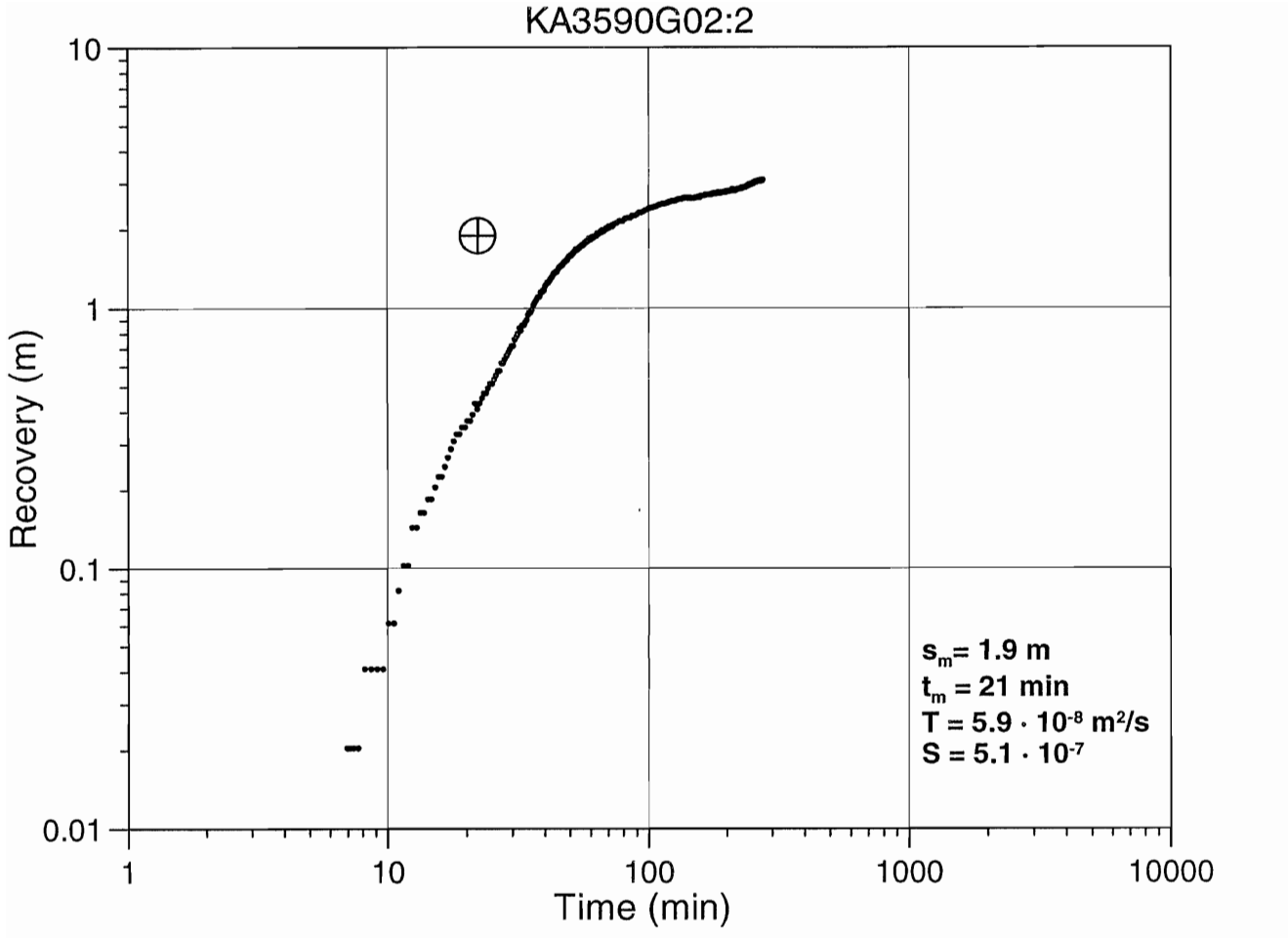


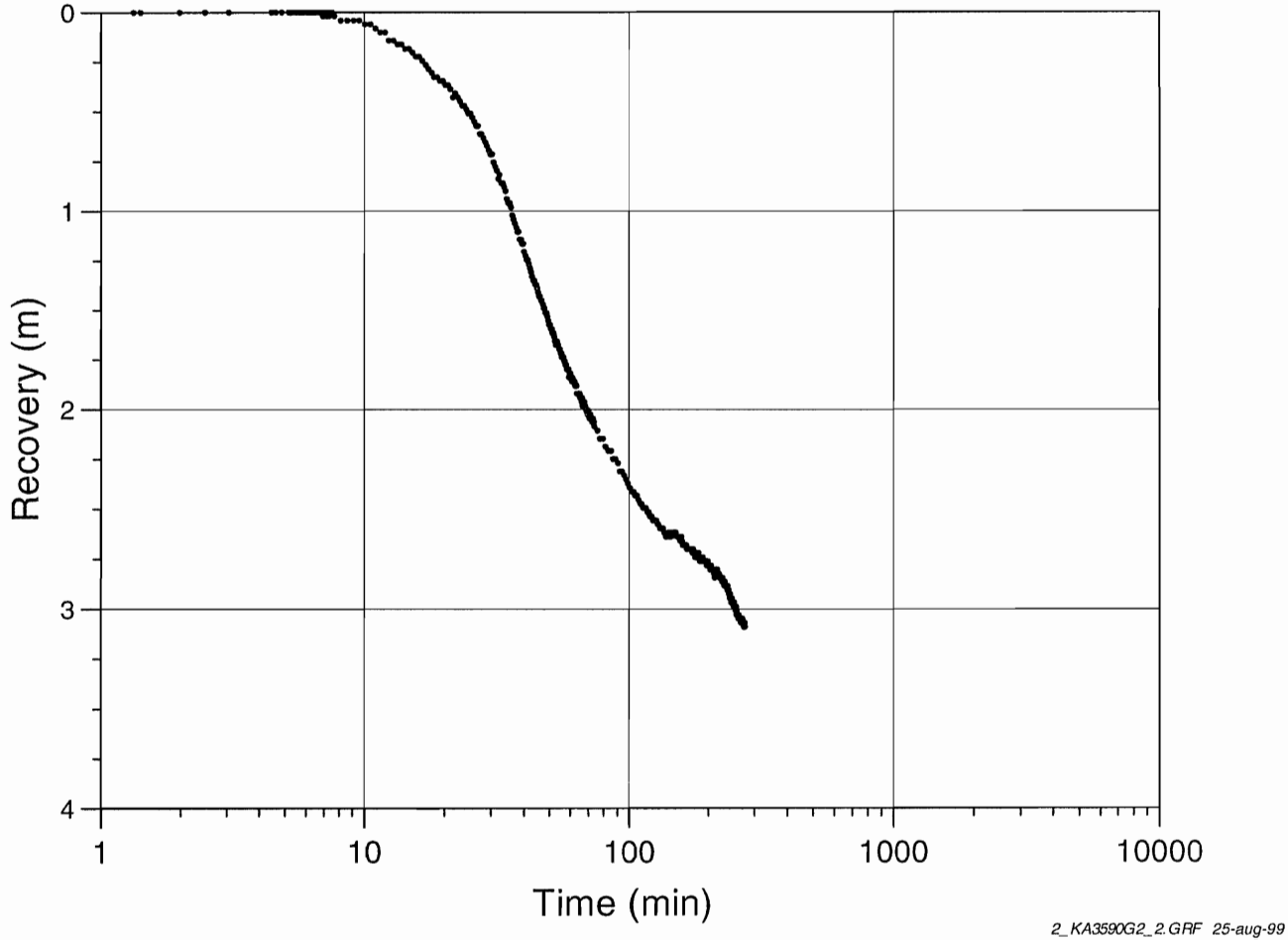
2_KA3554G2_1.GRF 24-aug-99





2_KA3590G2_1.GRF 25-aug-99





2_KA3590G2_2.GRF 25-aug-99

APPENDIX 4

Interference test 1:3 in borehole KA3590G01, section 1.30 m – 6.80 m

Date: 99-02-25 Field Crew: Bengt Gentzschein
Borehole length: 30.06 m Borehole diameter: 76 mm

Flowing borehole: KA3590G01, section #3: 1.30 – 6.80 m

Valve opened: 990225 08:20.05 Valve closed: 990225 14:23.05
End of Test: 990226 07:30
Total flowing time : 363 min Tot. Pr. Build-up time 1027 min.

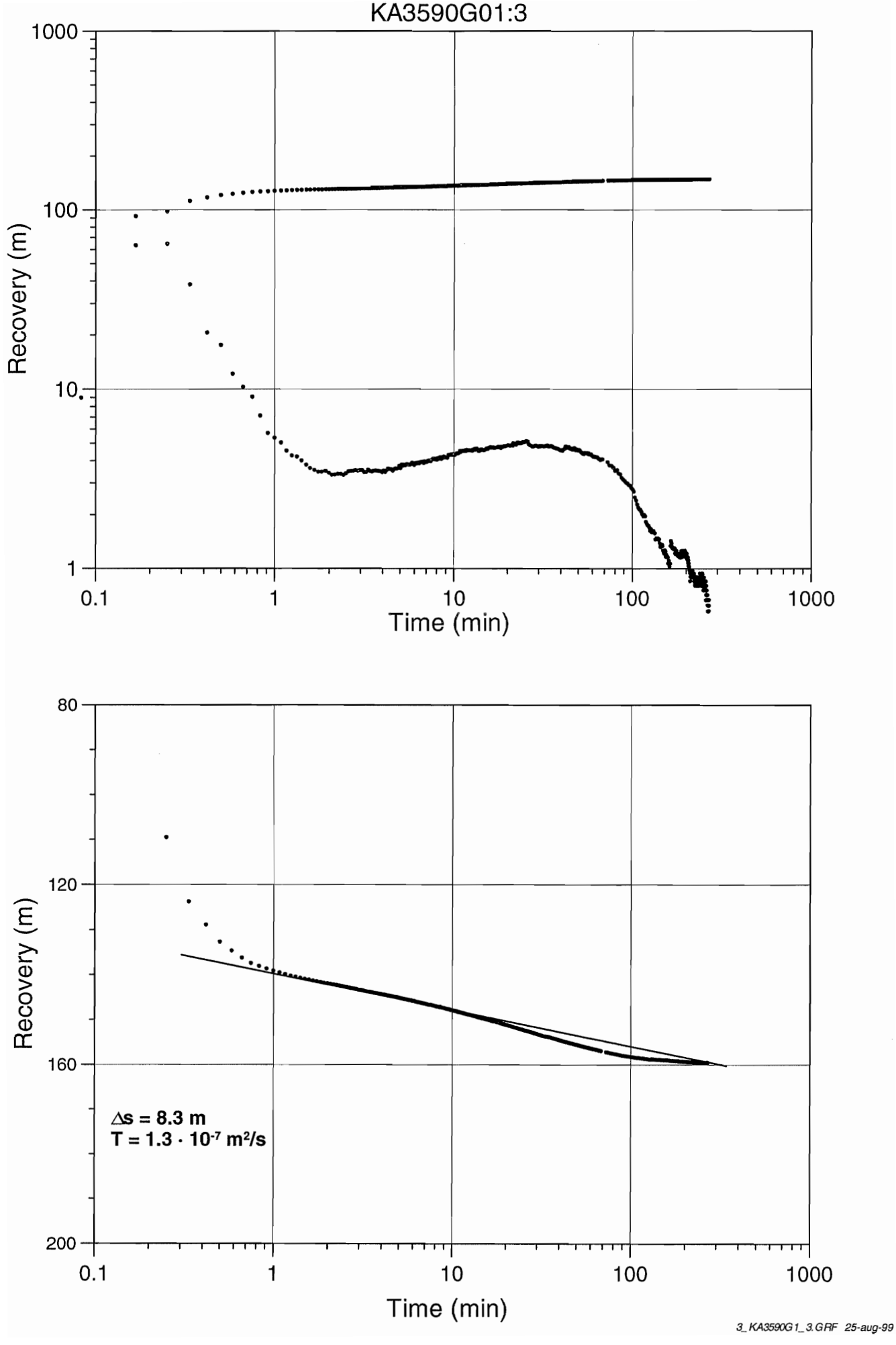
The test was performed as an Interference test. Pressure responses were monitored in 56 borehole sections.

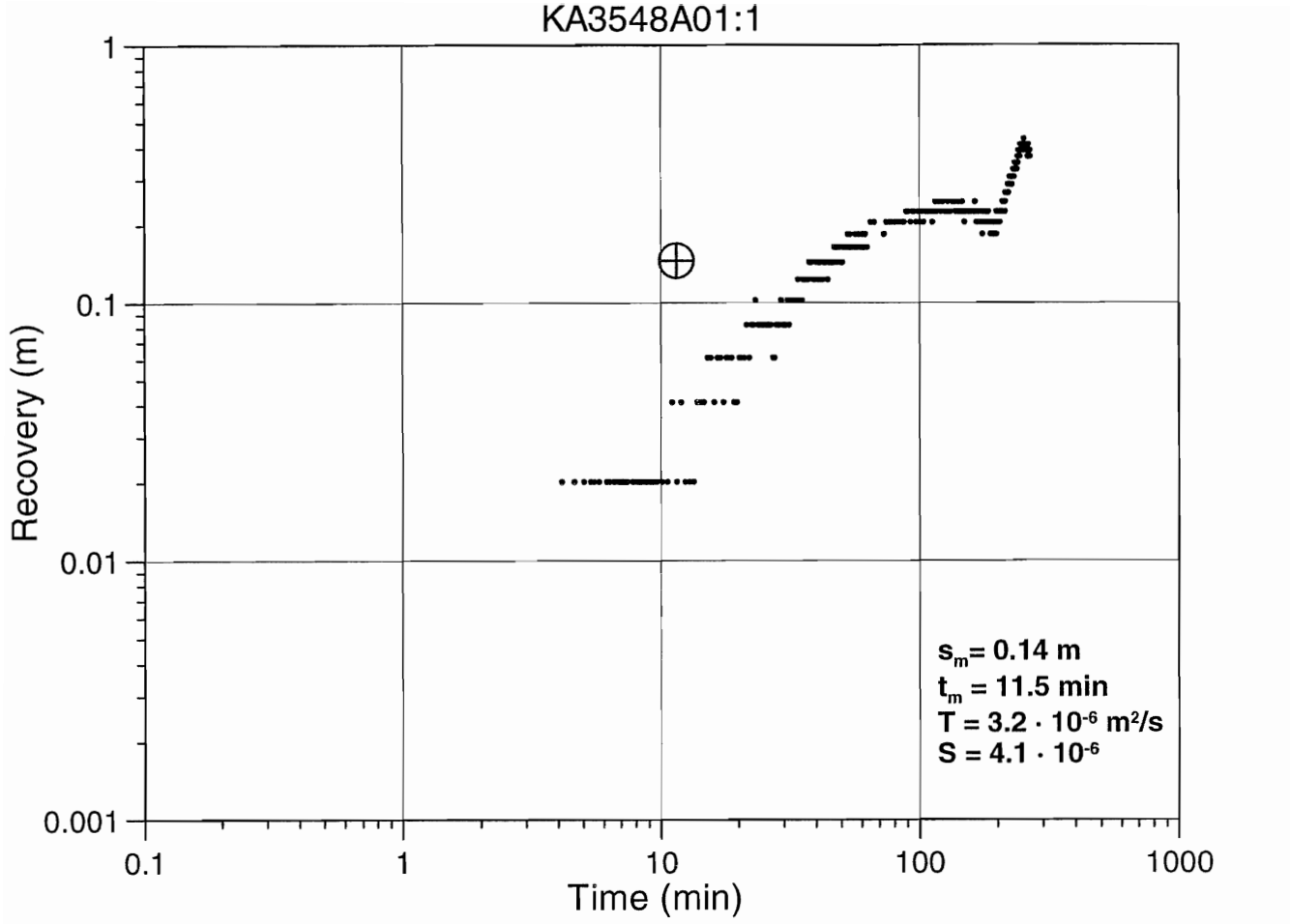
Flow data

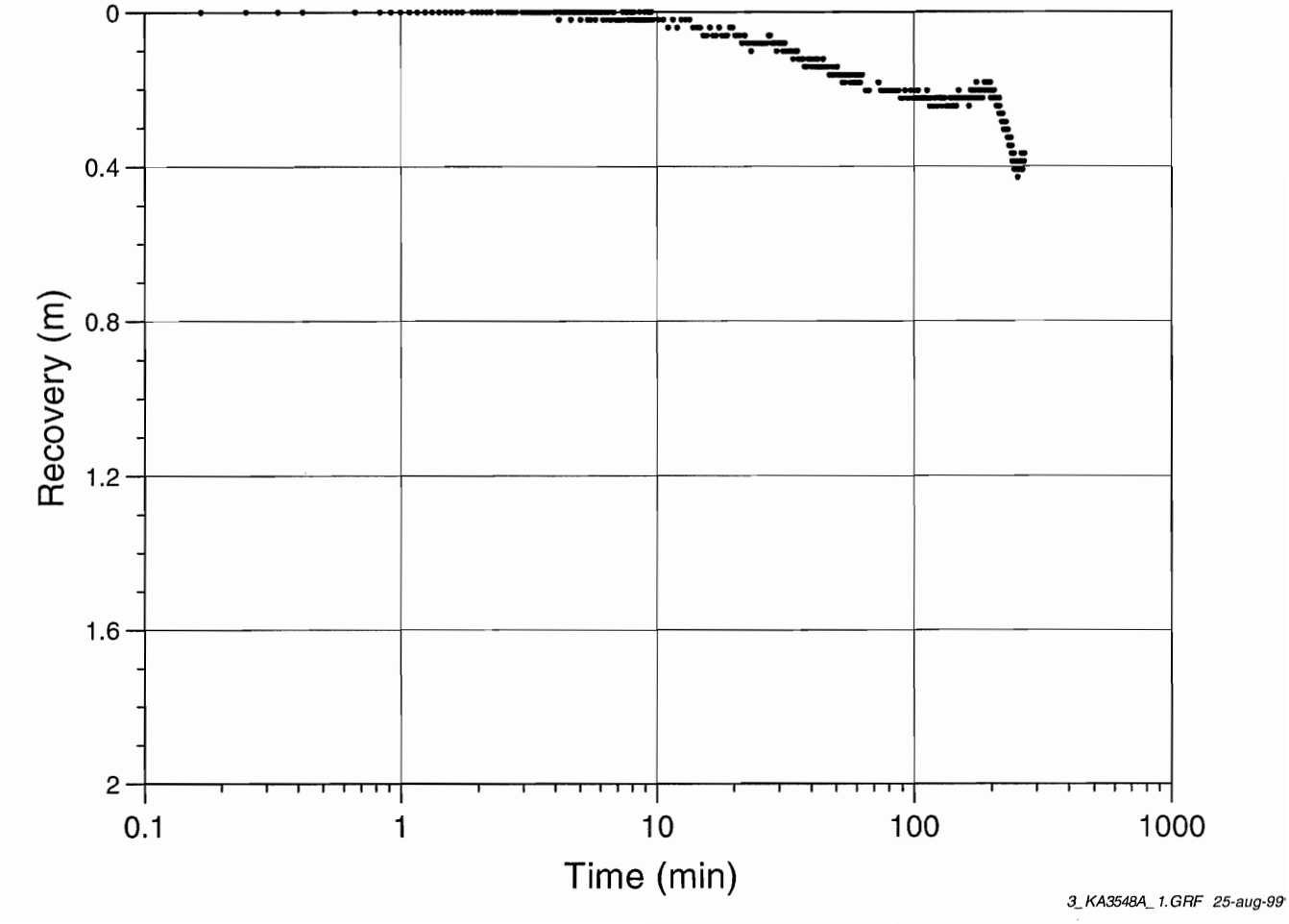
Manually measured flow rates of KA3590G01, section 1.30 – 6.80 m are presented in the table below.

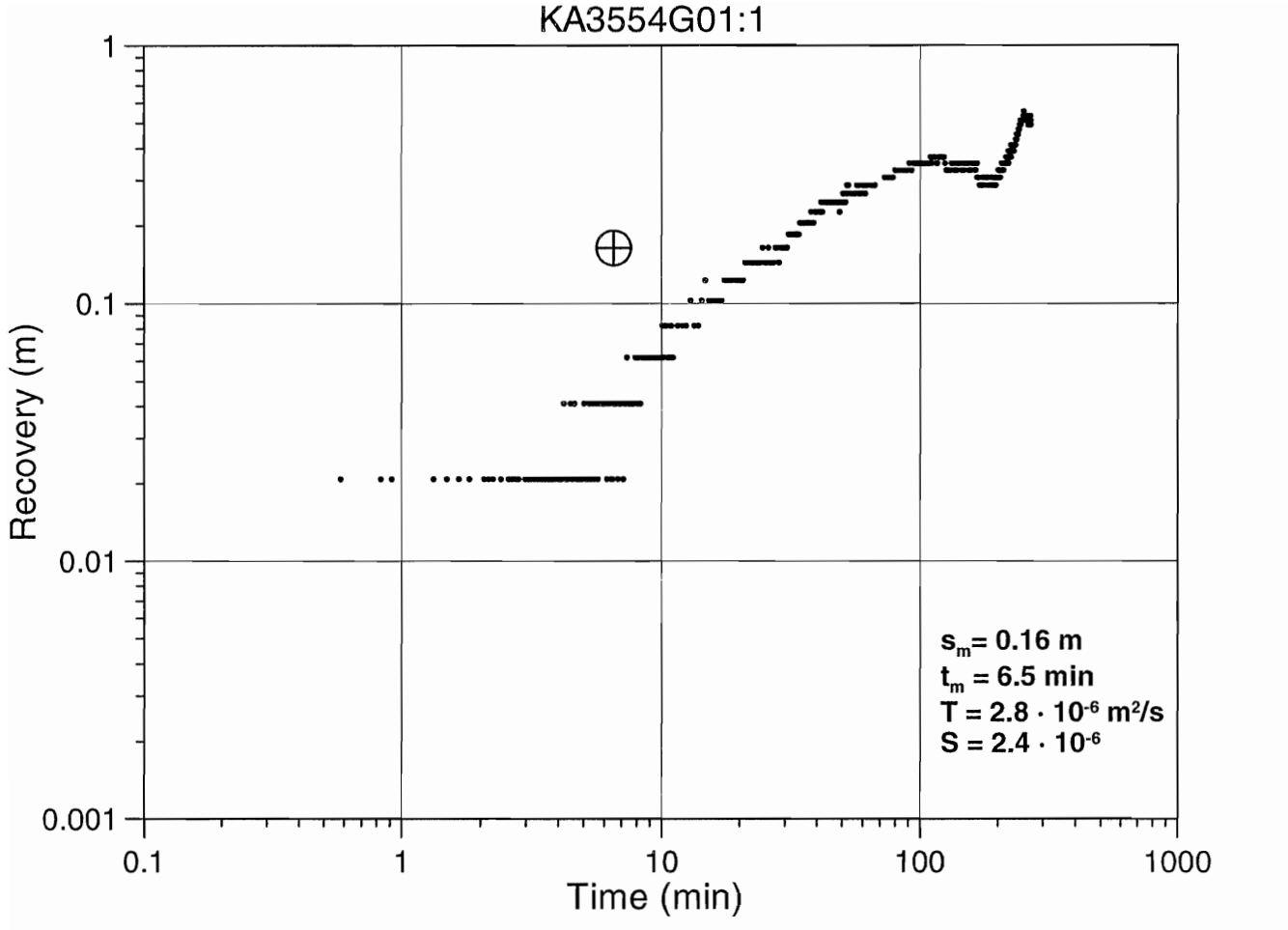
Table **Manually measured flow rates, Interference test in KA3590G01, section 1.30 – 6.80 m**

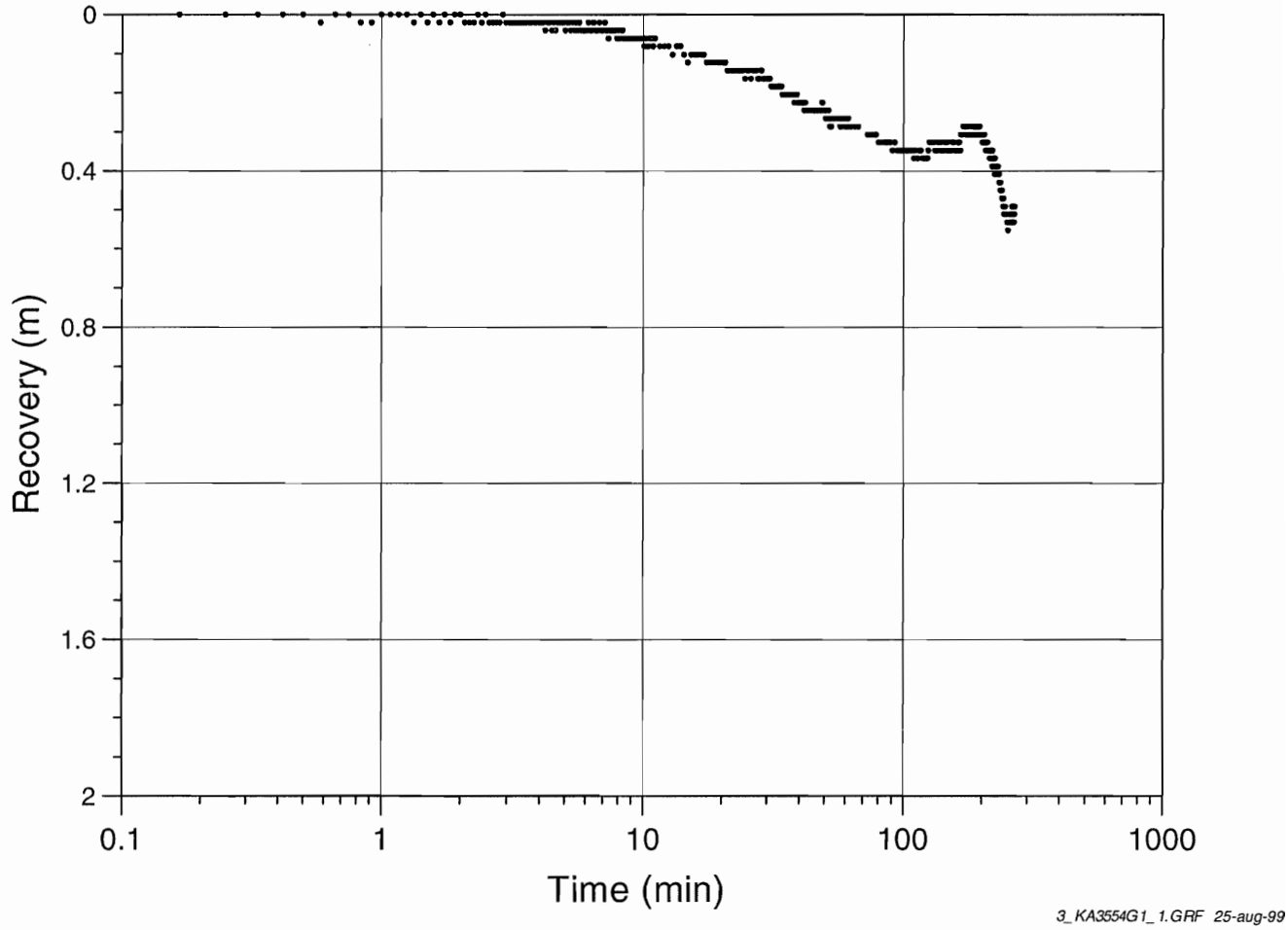
Time	Flow rate (l/min)
08:20.45	0.398
08:22:55	0.377
08:25.30	0.370
08:35	0.360
08:50	0.350
09:05	0.349
09:20	0.346
14:14	0.339
14:16	0.341
14:21.40	0.340


KA3590G01:3
1000
100
10
1
Recovery (m)
0.1
1
10
100
1000
Time (min)
80
120
160
200
Recovery (m)
Δs = 8.3 m
T = 1.3 · 10-7 m2/s
0.1
1
10
100
1000
Time (min)
3_KA3590G1_3.GRF 25-aug-99

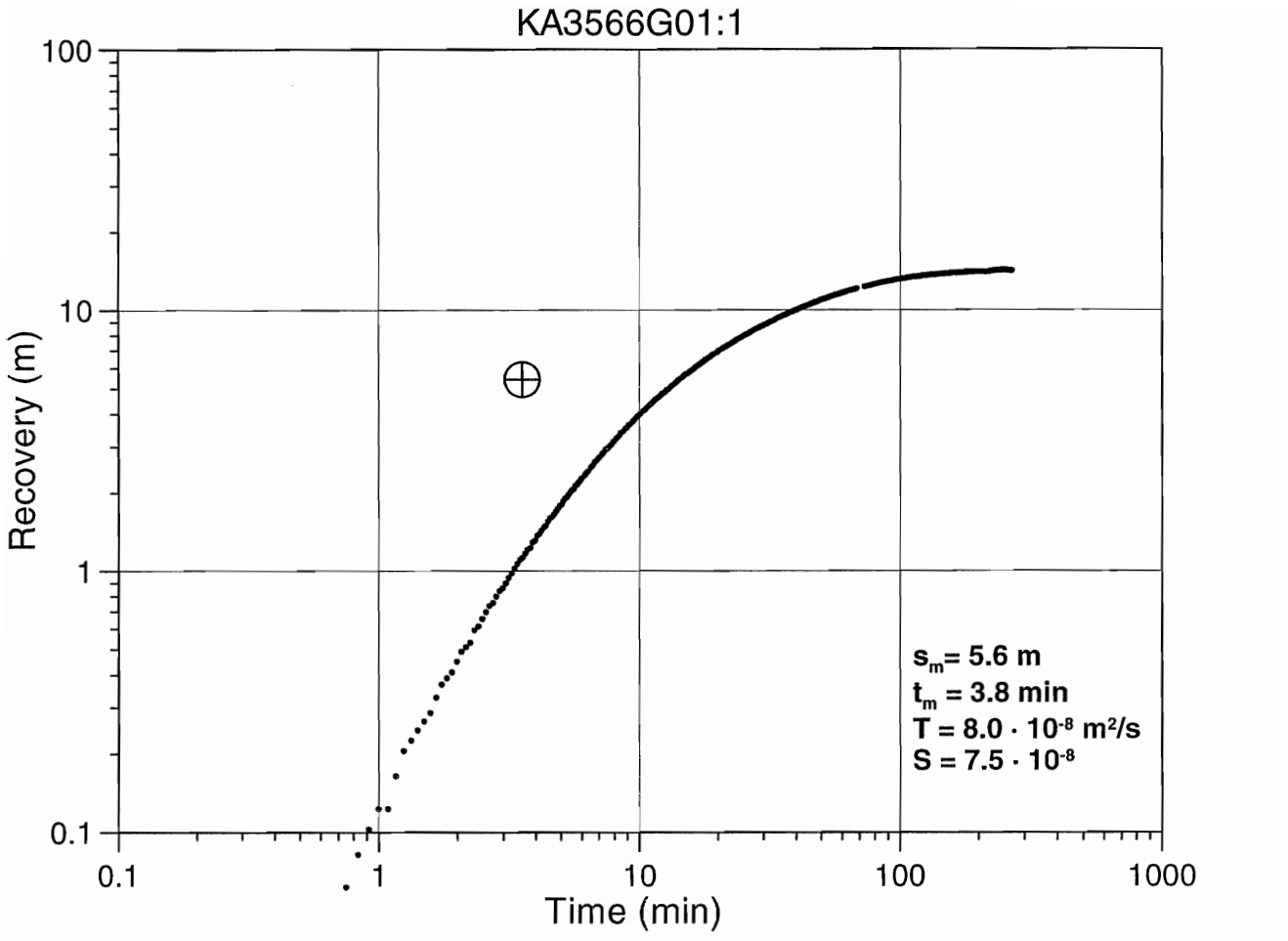

KA3548A01:1
Recovery (m)
1
0.1
0.01
0.001
0.1
1
10
100
1000
Time (min)
s_m= 0.14 m
t_m = 11.5 min
T = 3.2 · 10^{-6} m^2/s
S = 4.1 · 10^{-6}

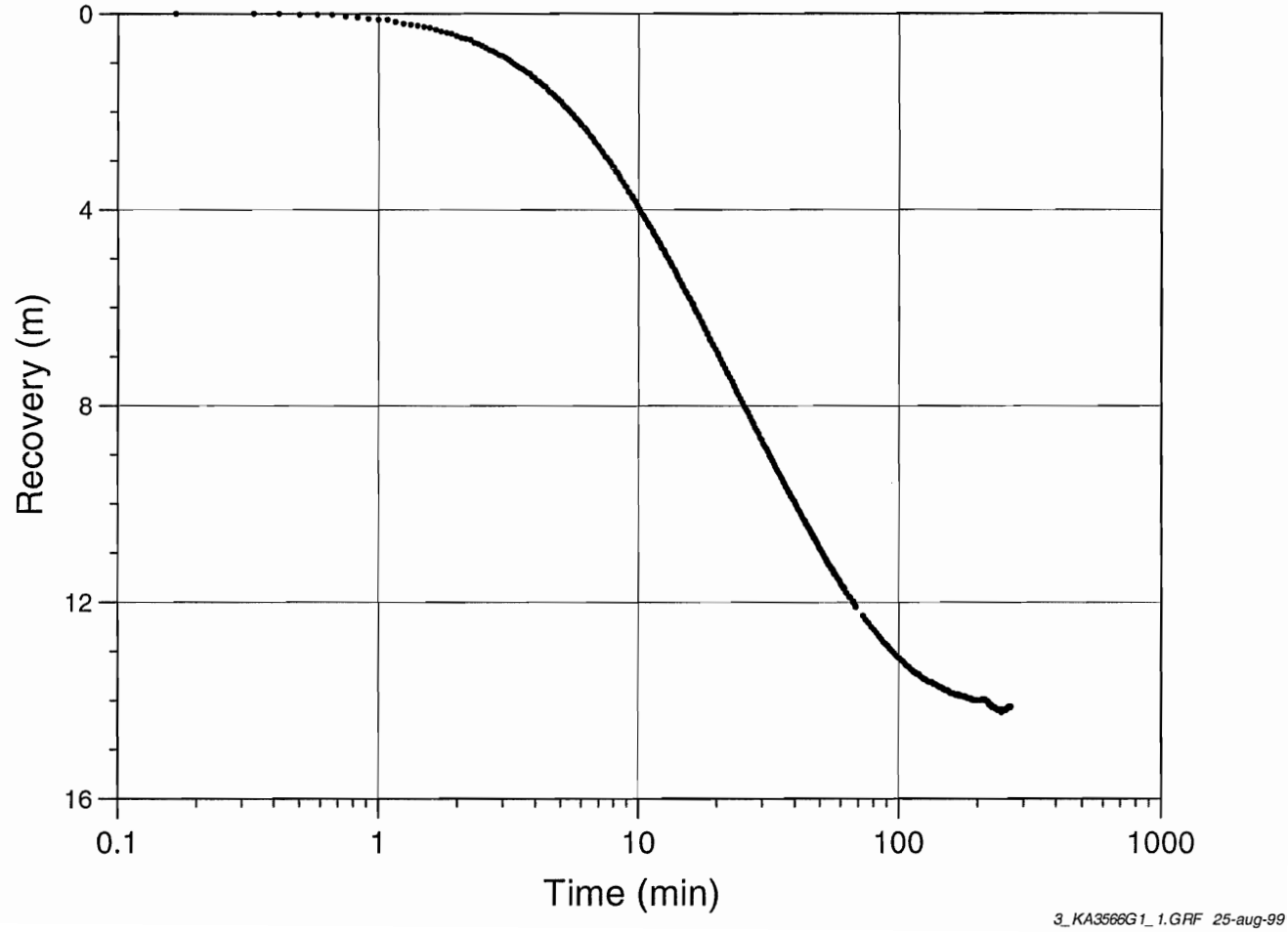

Recovery (m)
0
0.4
0.8
1.2
1.6
2
0.1
1
10
100
1000
Time (min)
3_KA3548A_1.GRF 25-aug-99



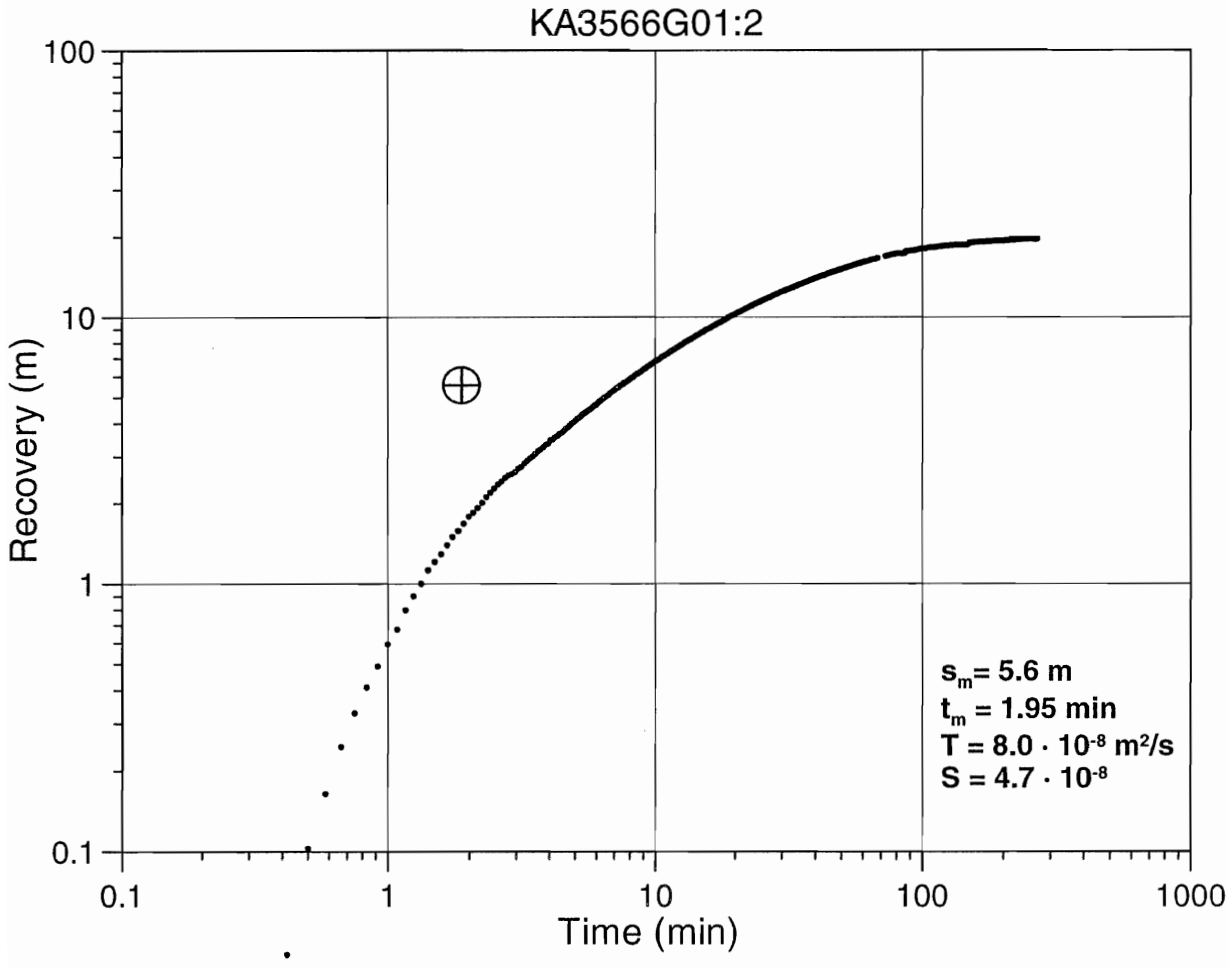


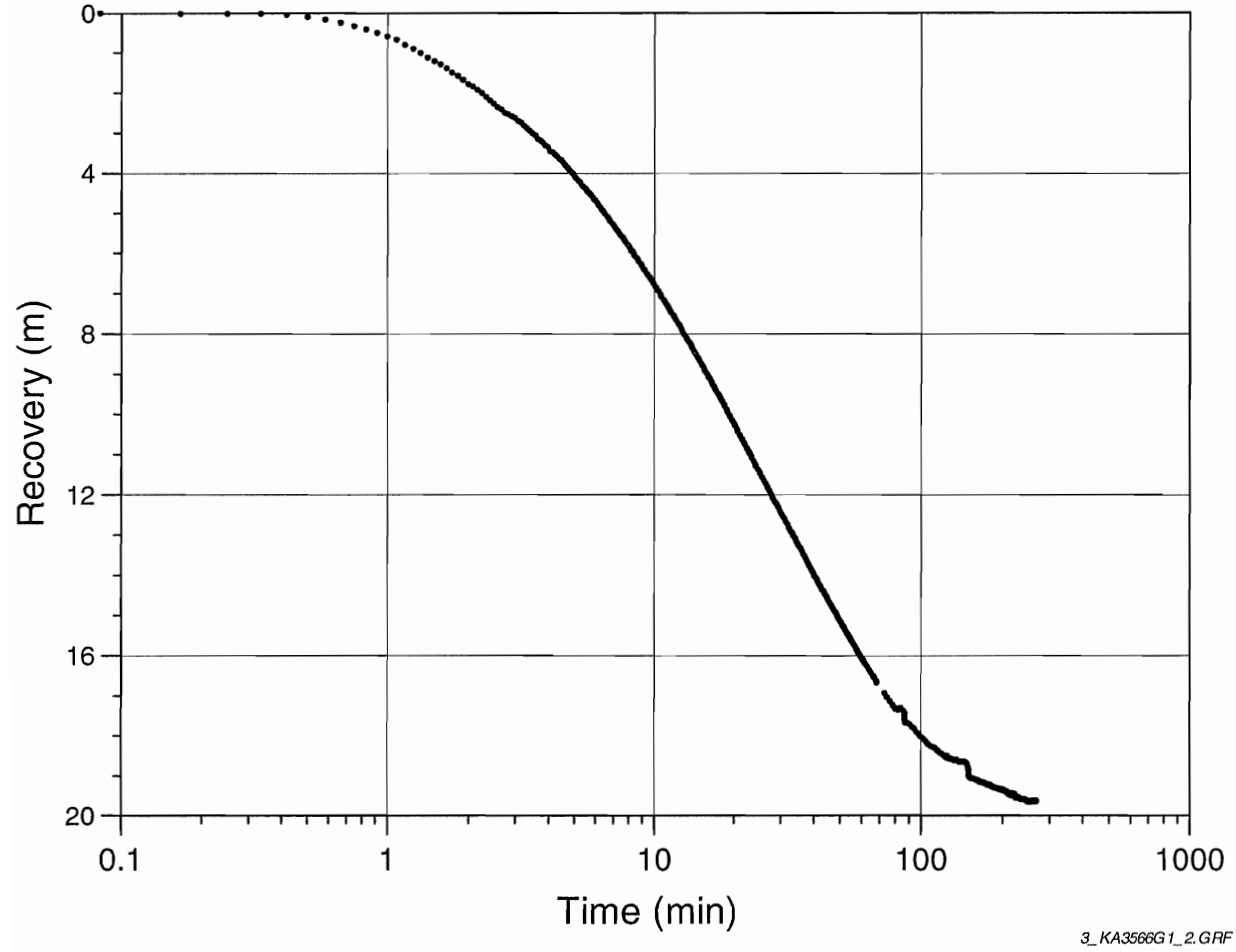
3_KA3554G1_1.GRF 25-aug-99



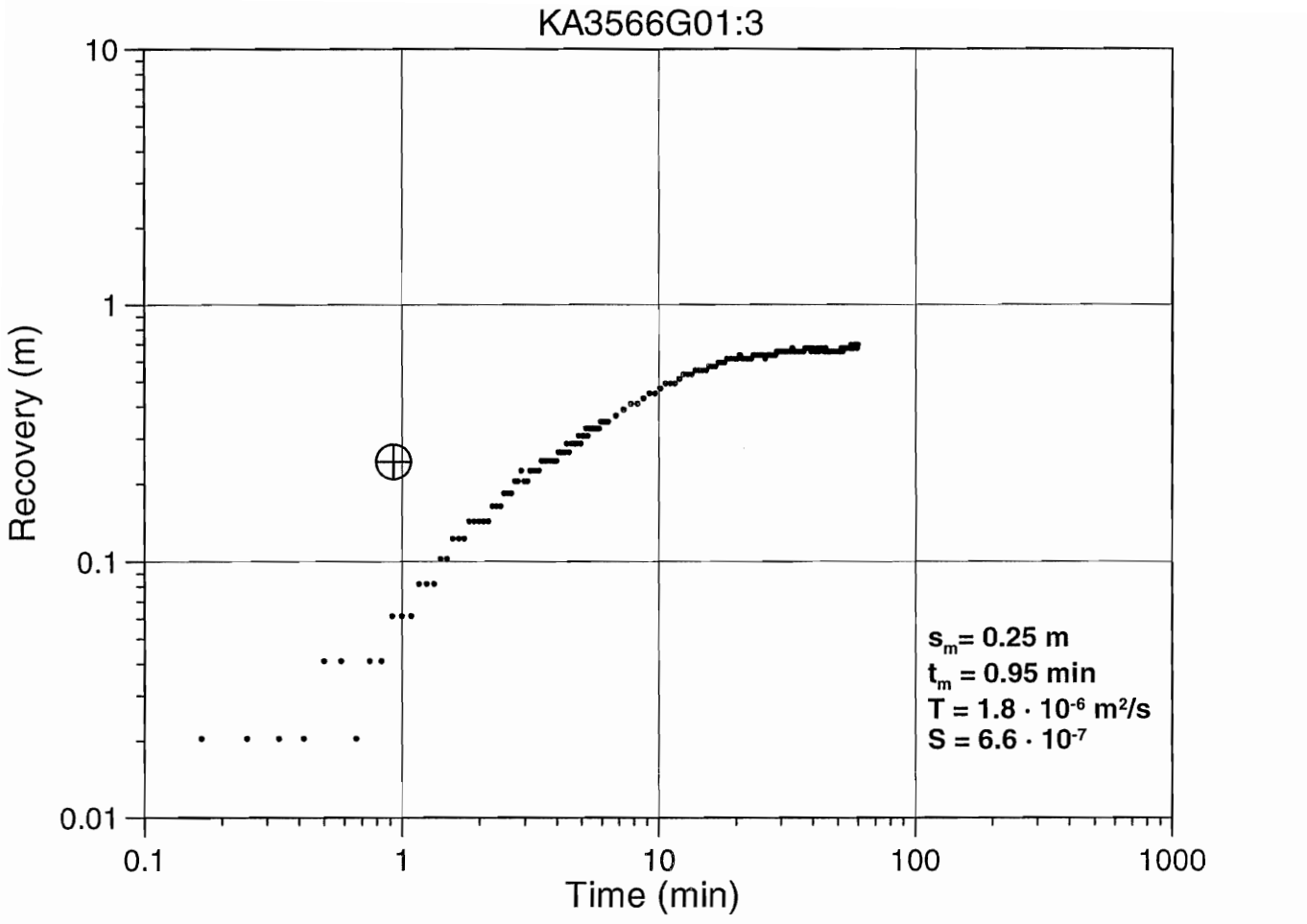


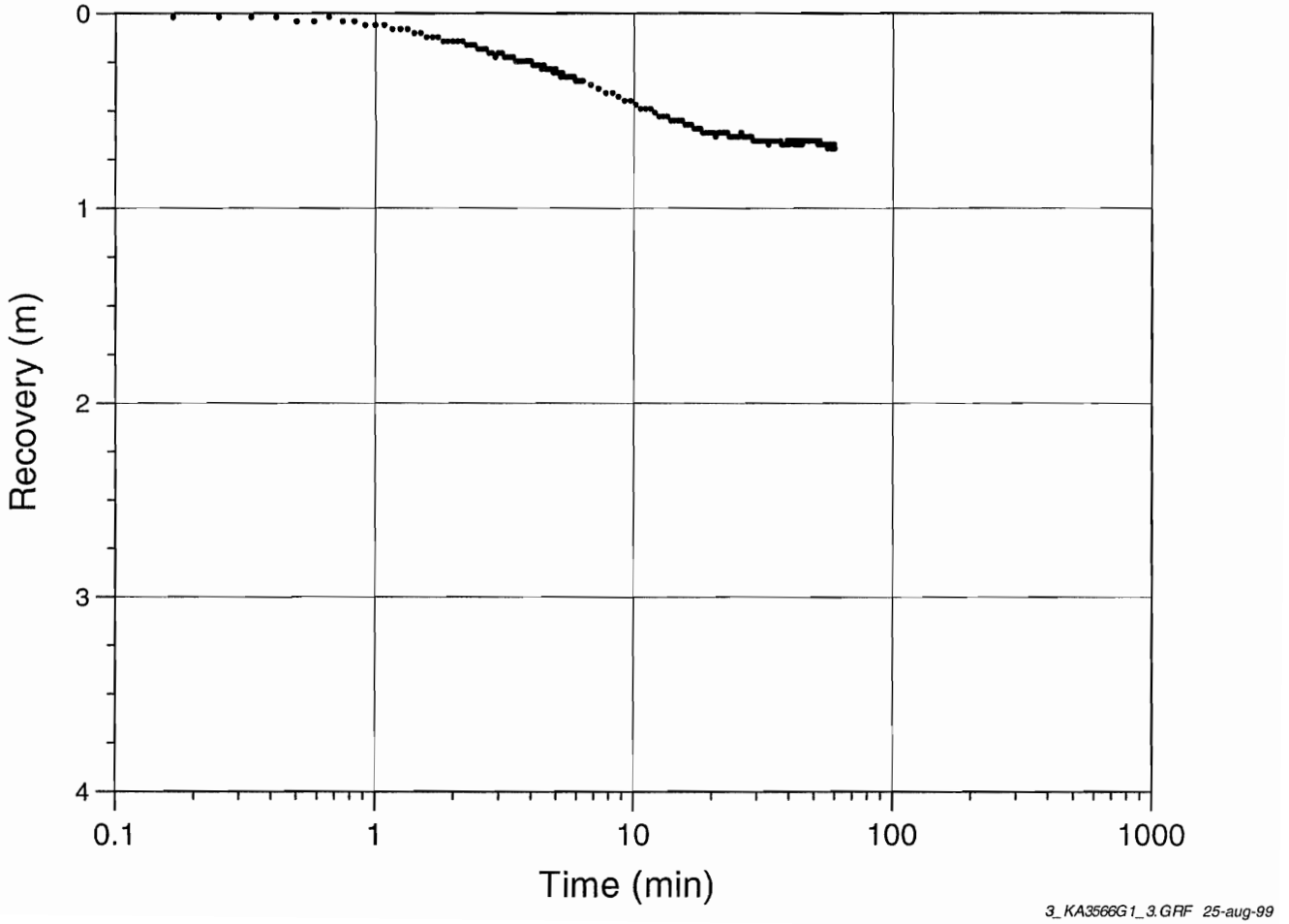
3_KA3566G1_1.GRF 25-aug-99



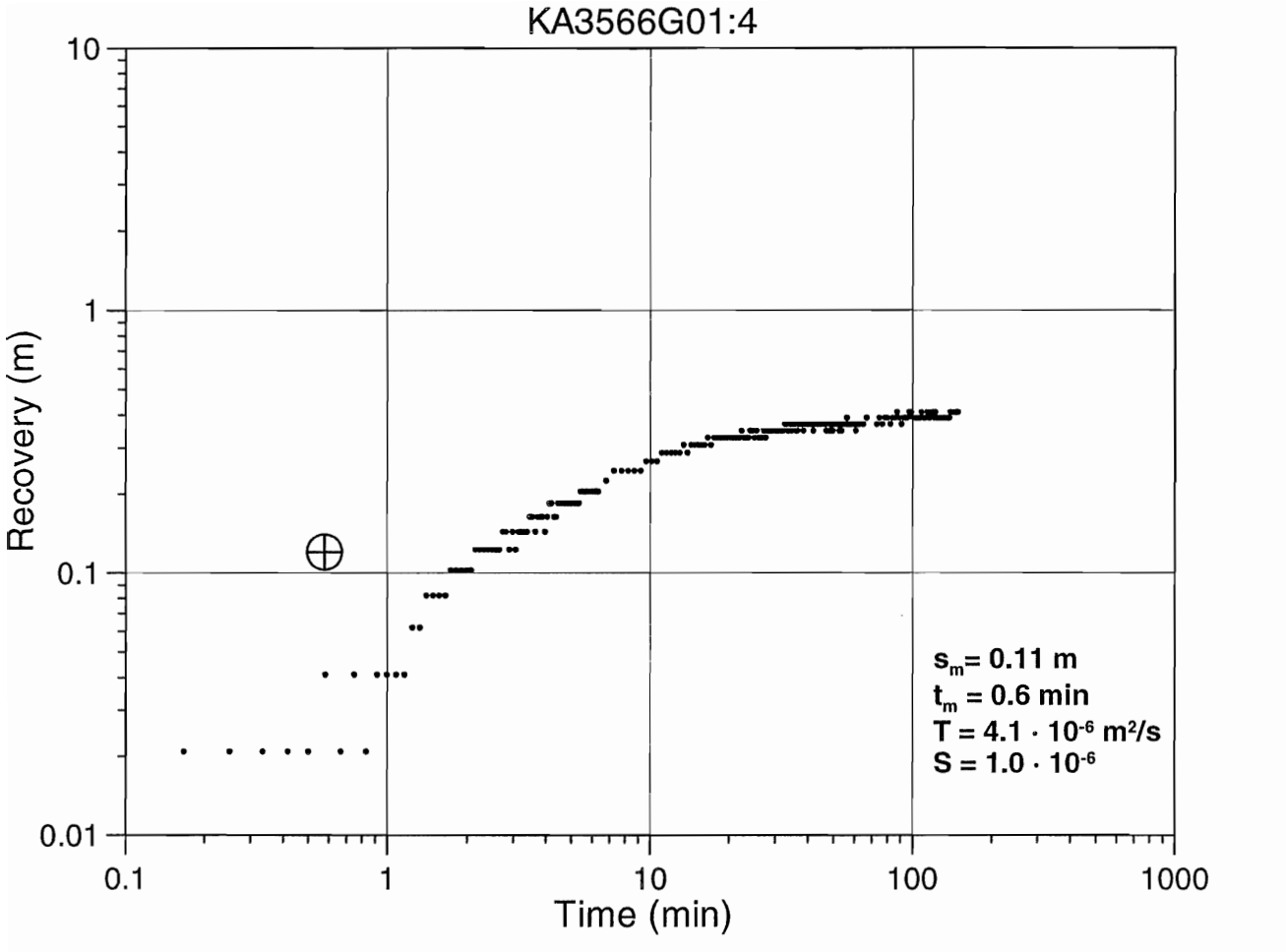


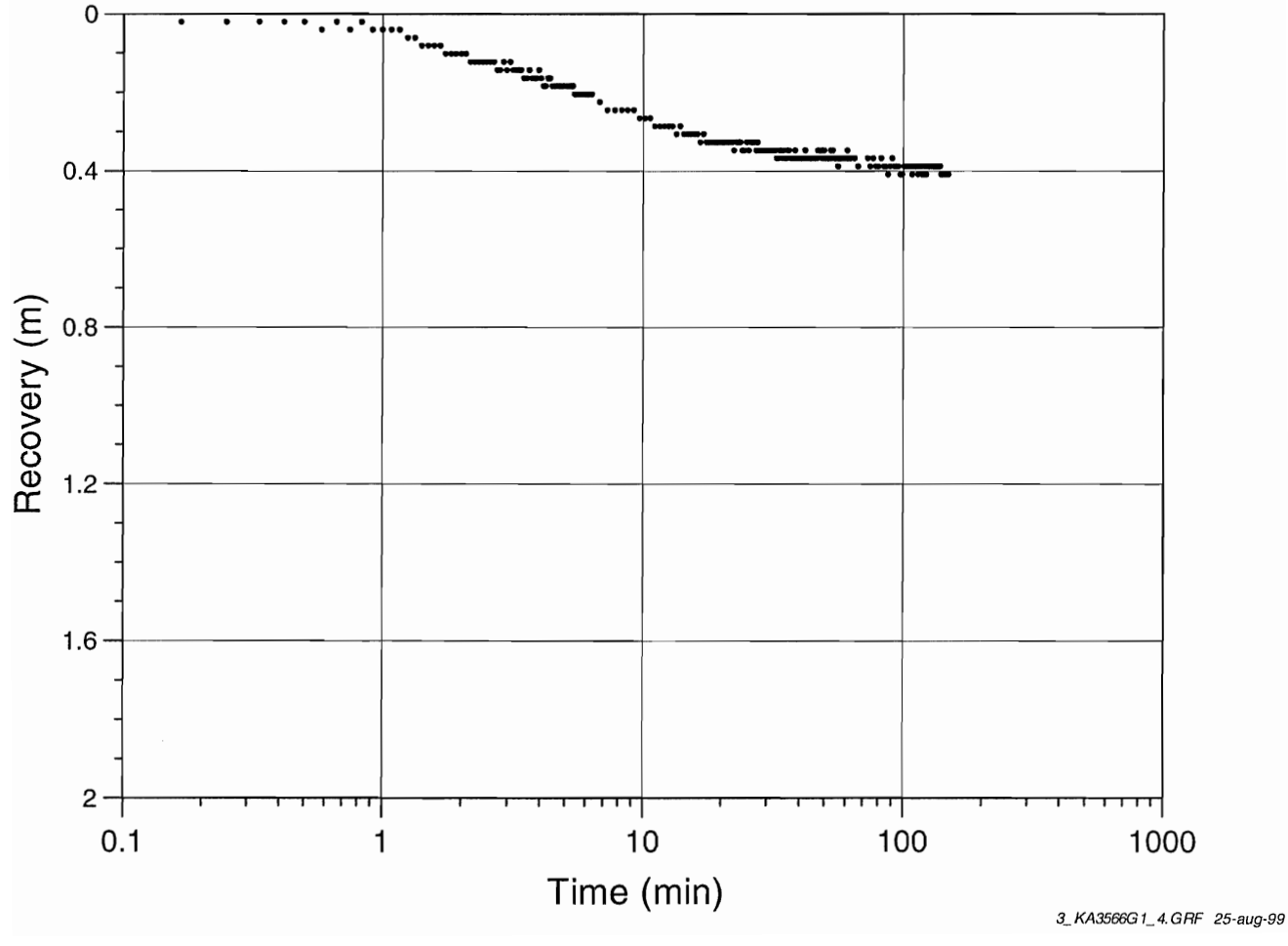
3_KA3566G1_2.GRF 25-aug-99



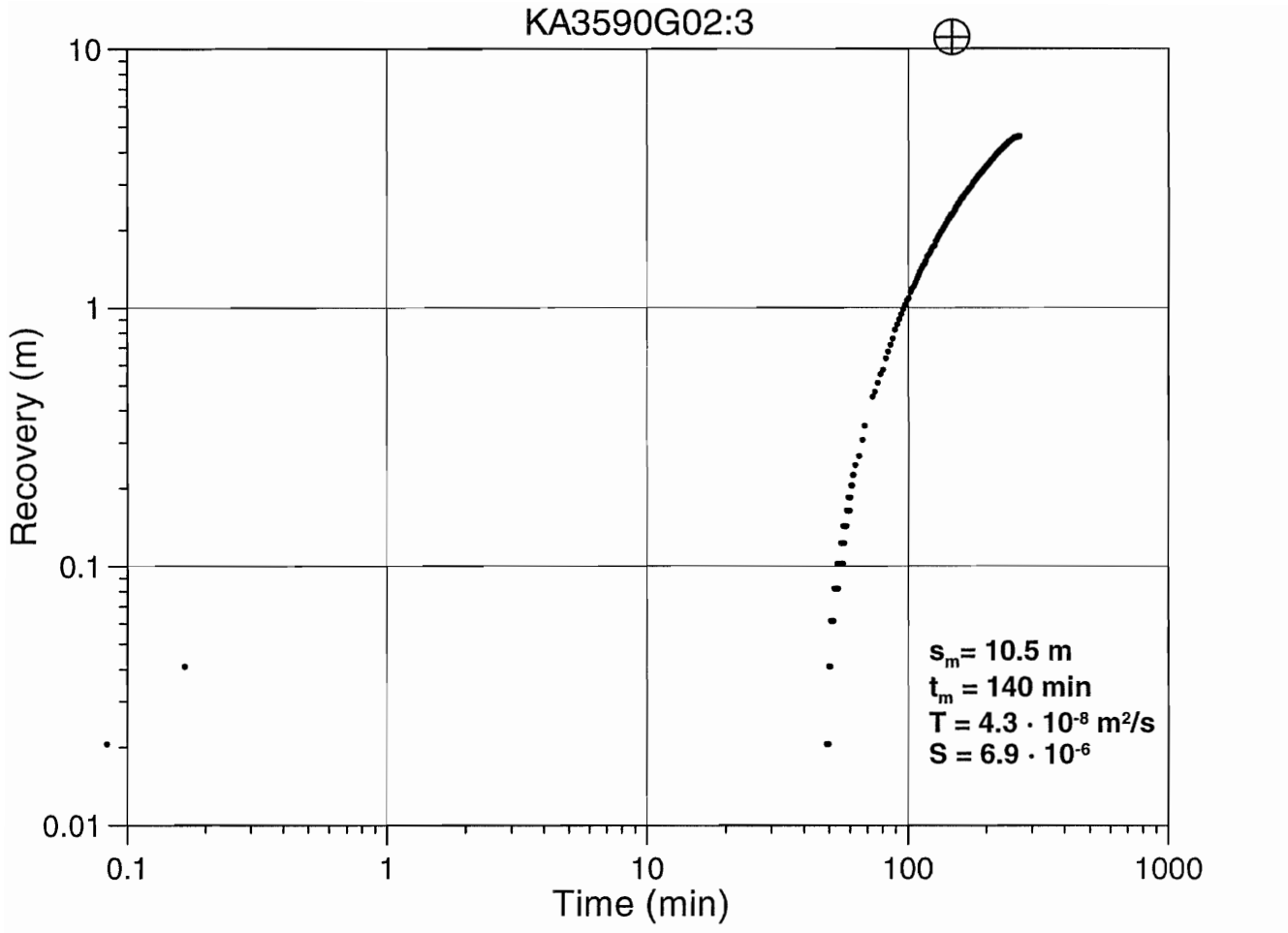


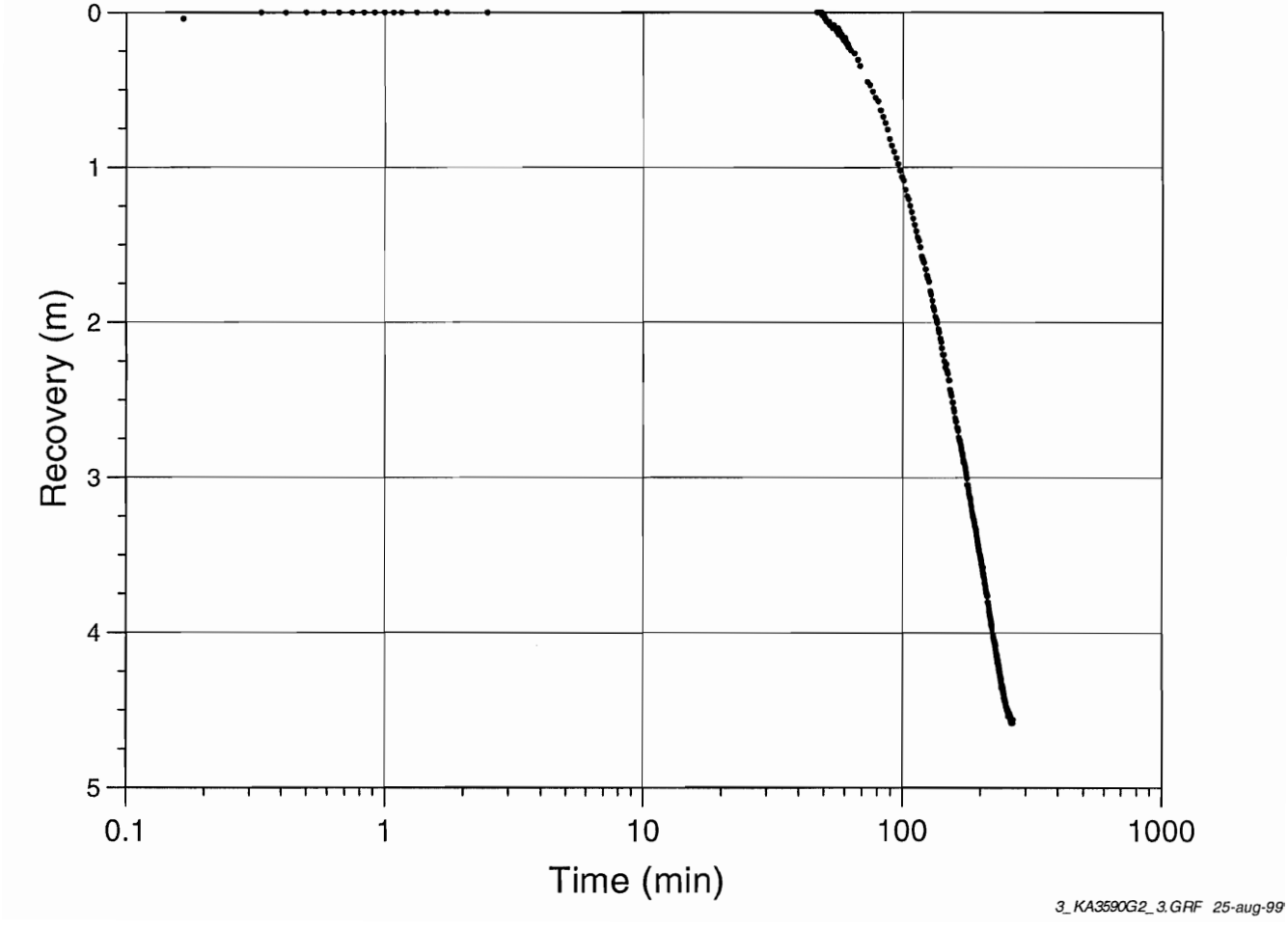
3_KA3566G1_3.GRF 25-aug-99



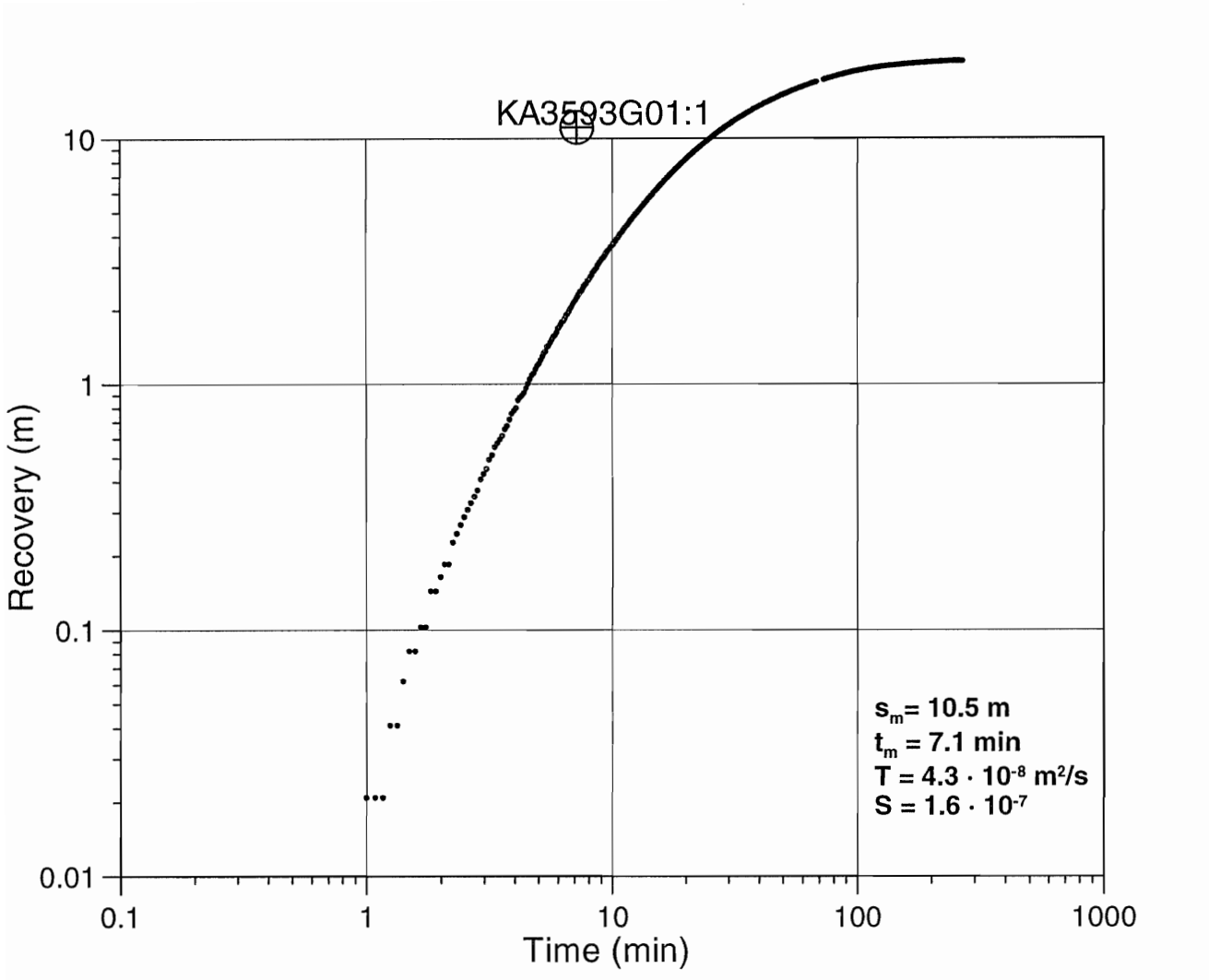


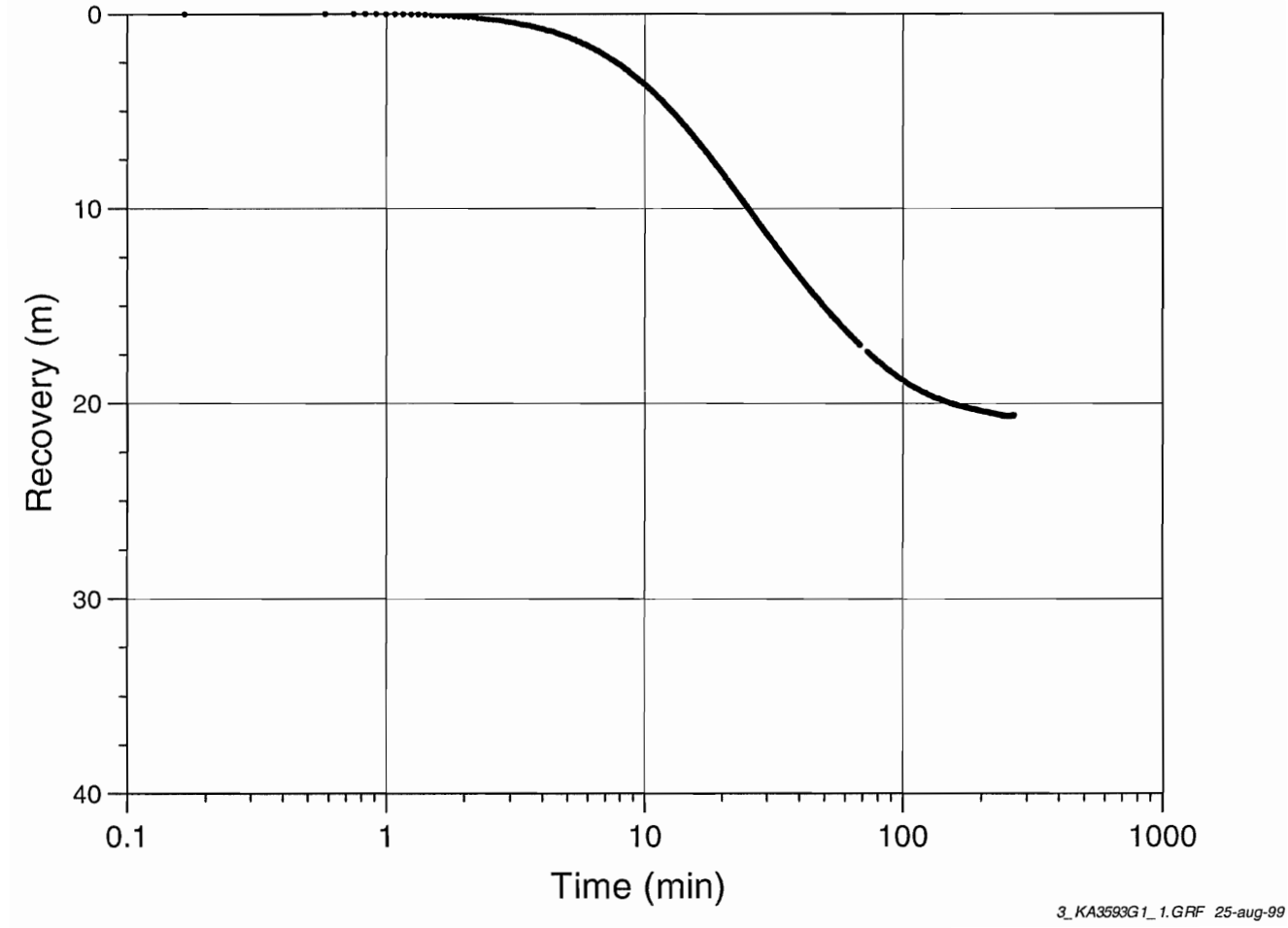
3_KA3566G1_4.GRF 25-aug-99





3_KA3590G2_3.GRF 25-aug-99





3_KA3593G1_1.GRF 25-aug-99

APPENDIX 5

Interference test 1:4 in Borehole KA3590G01, section 7.80 m –16.30 m

Date: 99-02-26 Field Crew: Bengt Gentzschein
Borehole length: 30.06 m Borehole diameter: 76 mm

Flowing borehole: KA3590G01, section #2: 7.80 – 16.30 m

Valve opened: 990226 07:53.05 Valve closed: 990226 08:03.05
End of Test: 990226 08:33
Total flowing time : 10 min Tot. Pr. Build-up time 30 min.

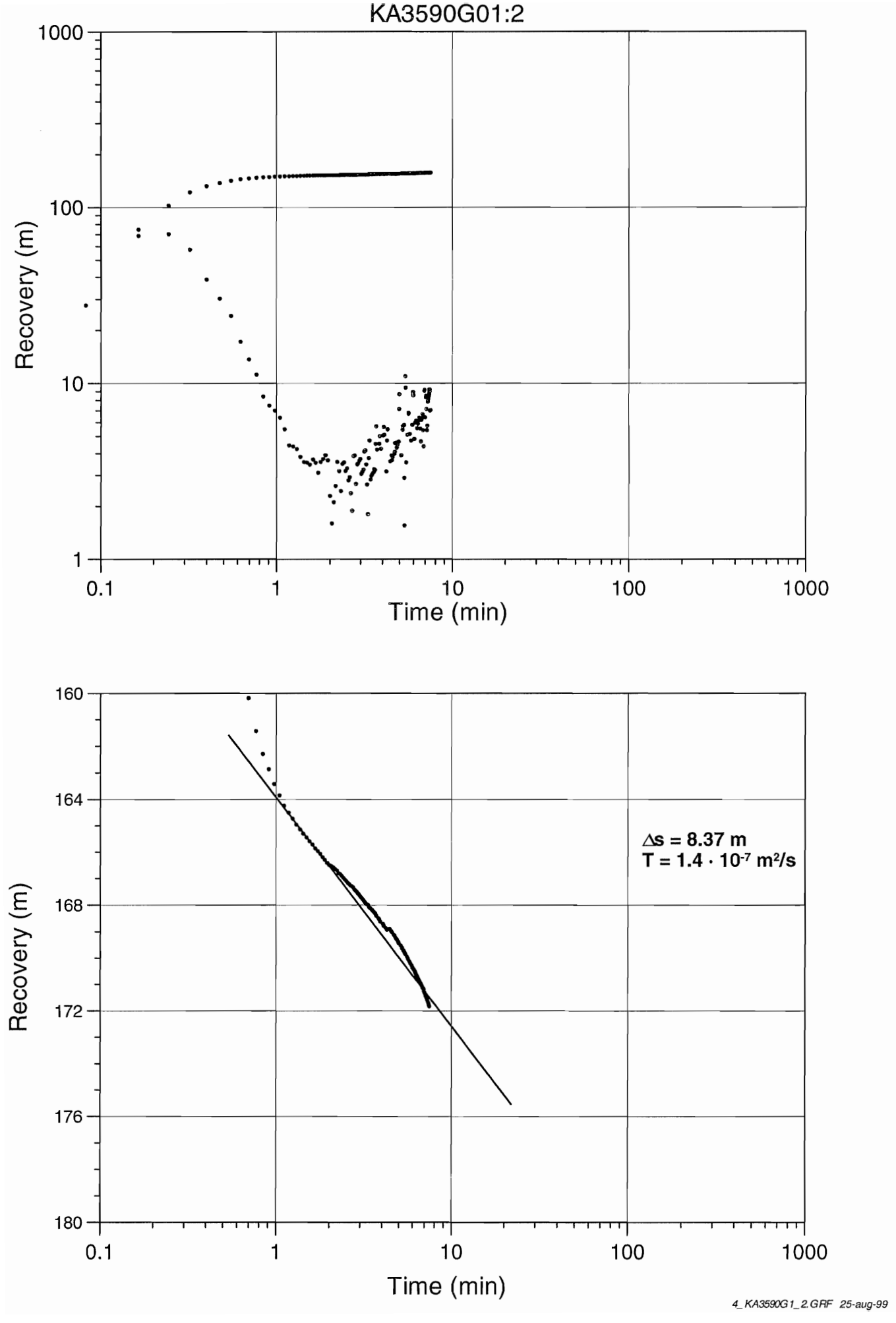
The test was performed as an Interference test. Pressure responses were monitored in 56 borehole sections.

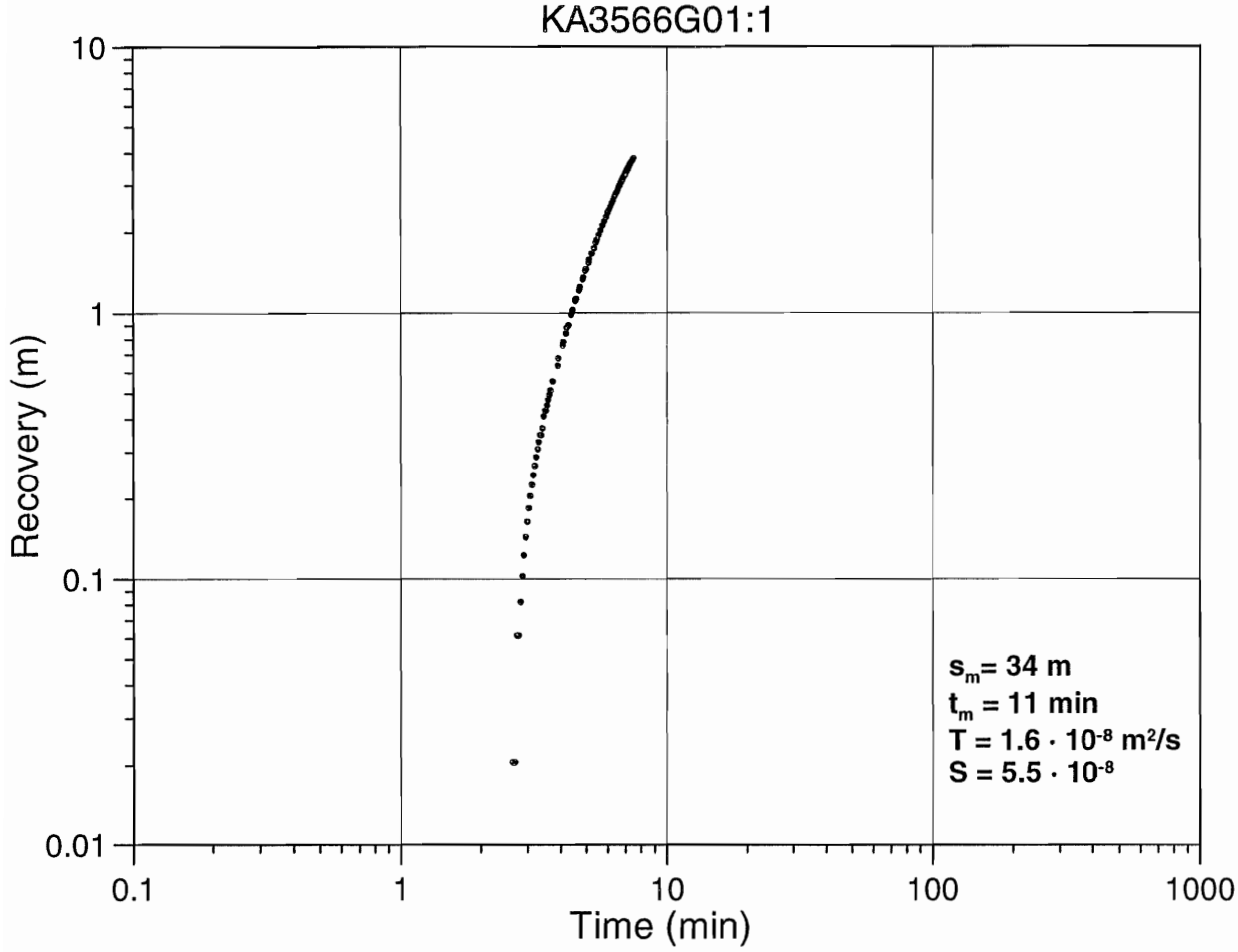
Flow data

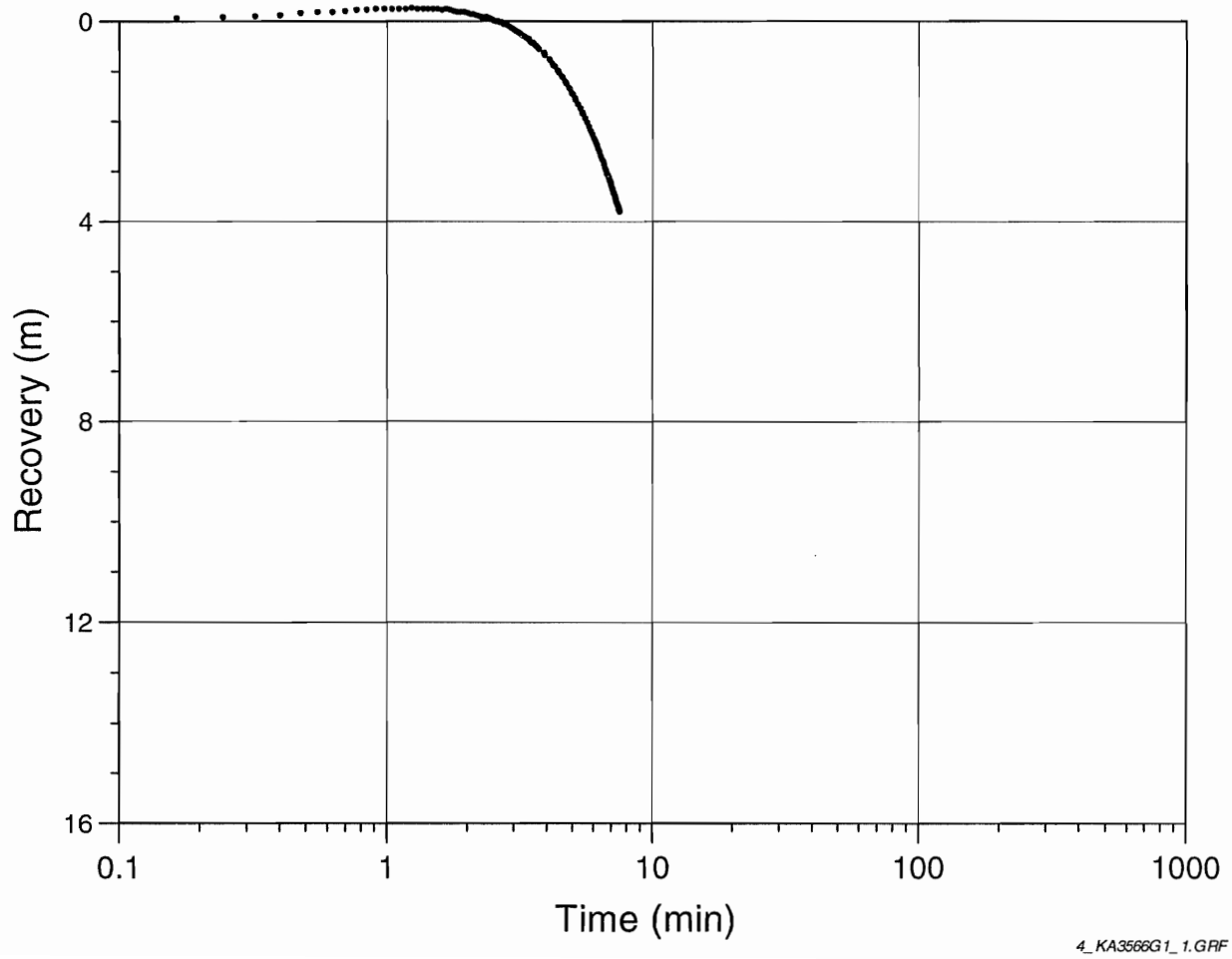
Manually measured flow rates of KA3590G01, section 7.80 m –16.30 m, are presented in the table below.

Table **Manually measured flow rates, Interference test in KA3590G01, section 7.80 m –16.30 m,**

Time	Flow rate (l/min)
07:54.15	0.414
07:56:30	0.403
07:58	0.400
08:01	0.398


KA3590G01:2
1000
100
10
1
Recovery (m)
0.1
1
10
100
1000
Time (min)
160
164
168
172
176
180
Recovery (m)
Δs = 8.37 m
T = 1.4 · 10-7 m2/s
0.1
1
10
100
1000
Time (min)
4_KA3590G1_2.GRF 25-aug-99





4_KA3566G1_1.GRF 25-aug-99

APPENDIX 6

Interference test 1:5 in borehole KA3590G02, section 23.30 m – 30.05 m

Date: 99-02-26 Field Crew: Bengt Gentzschein
Borehole length: 30.05 m Borehole diameter: 76 mm

Flowing borehole: KA3590G02, section #1: 23.3 – 30.05m

Valve opened: 990226 08:35.05 Valve closed: 990226 16:00.05
End of Test: 990301 08.000
Total flowing time : 445 min Tot. Pr. Build-up time 3840 min.

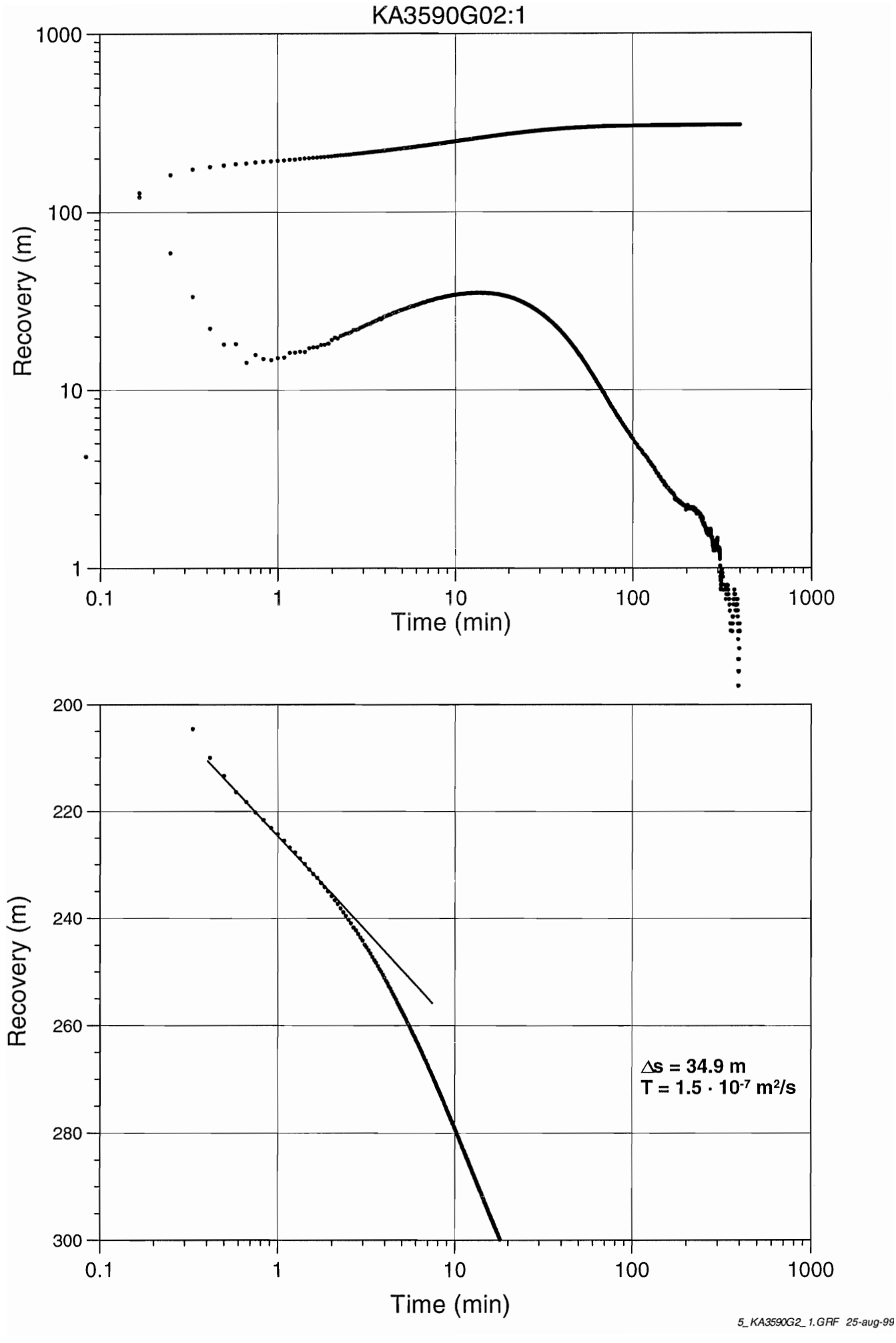
The test was performed as an Interference test. Pressure responses were monitored in 56 borehole sections.

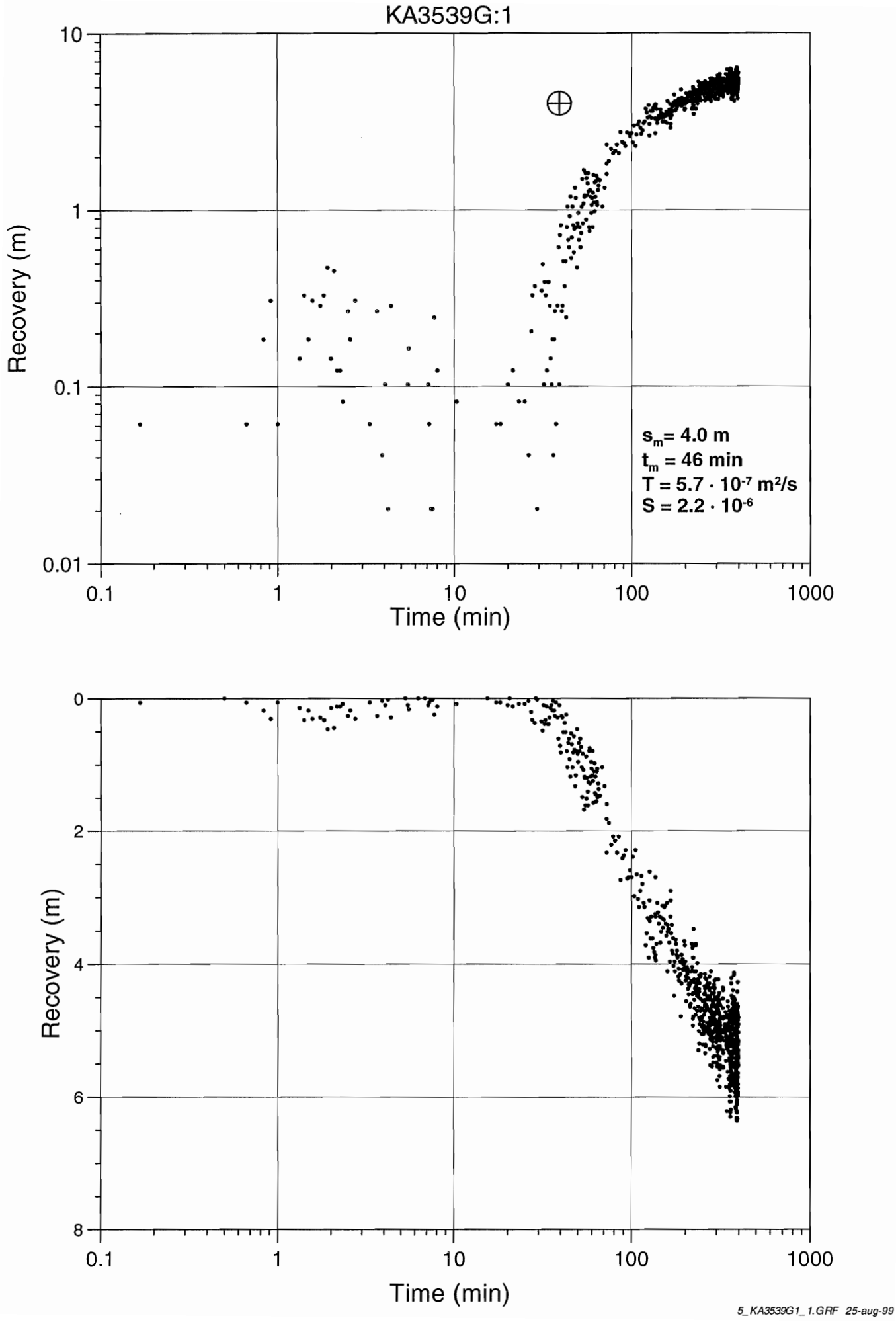
Flow data

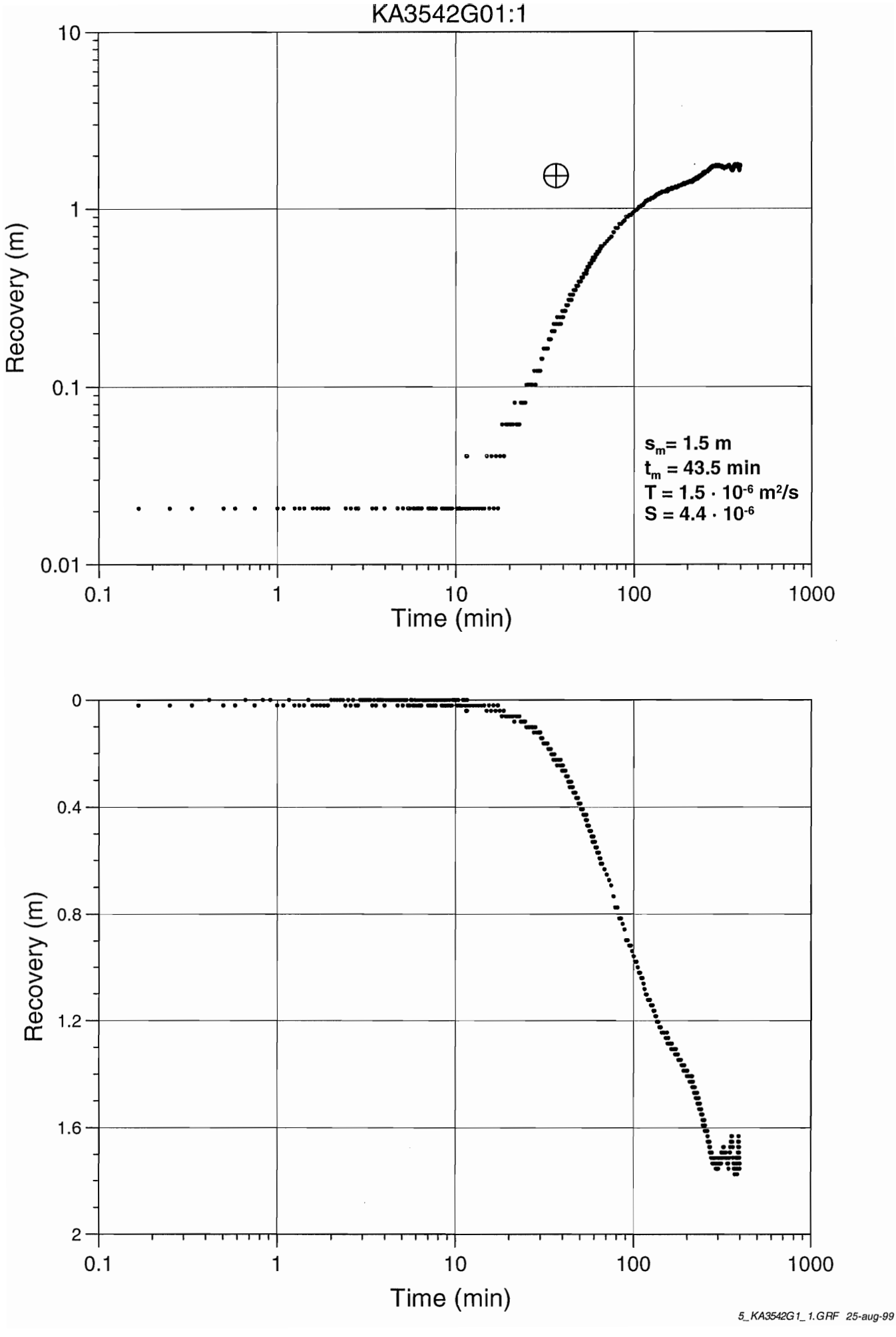
Manually measured flow rates of KA3590G02, section 23.30– 30.05 m are presented in the table below.

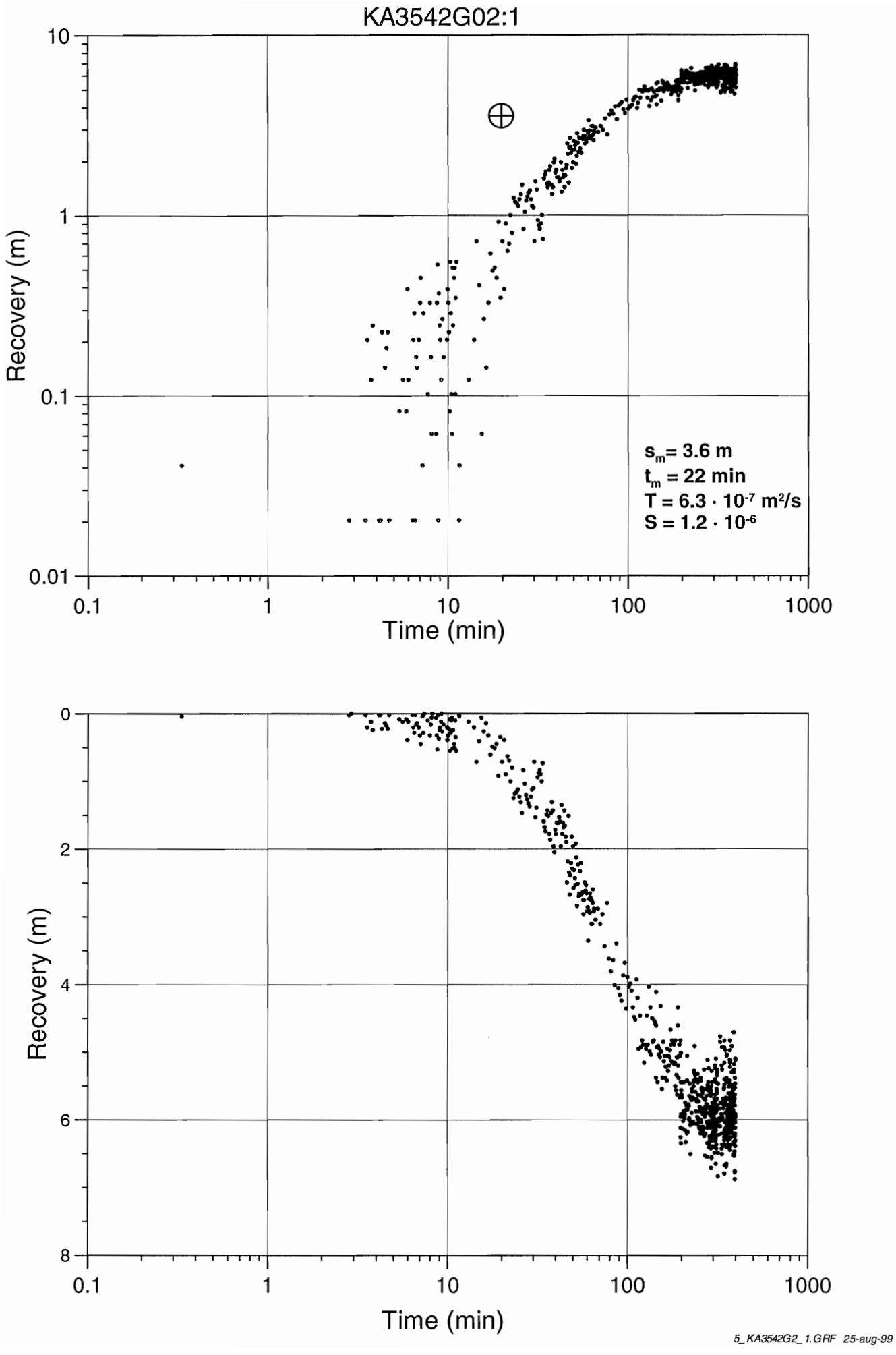
Table **Manually measured flow rates, Interference test in KA3590G02, section 23.30 – 30.05 m**

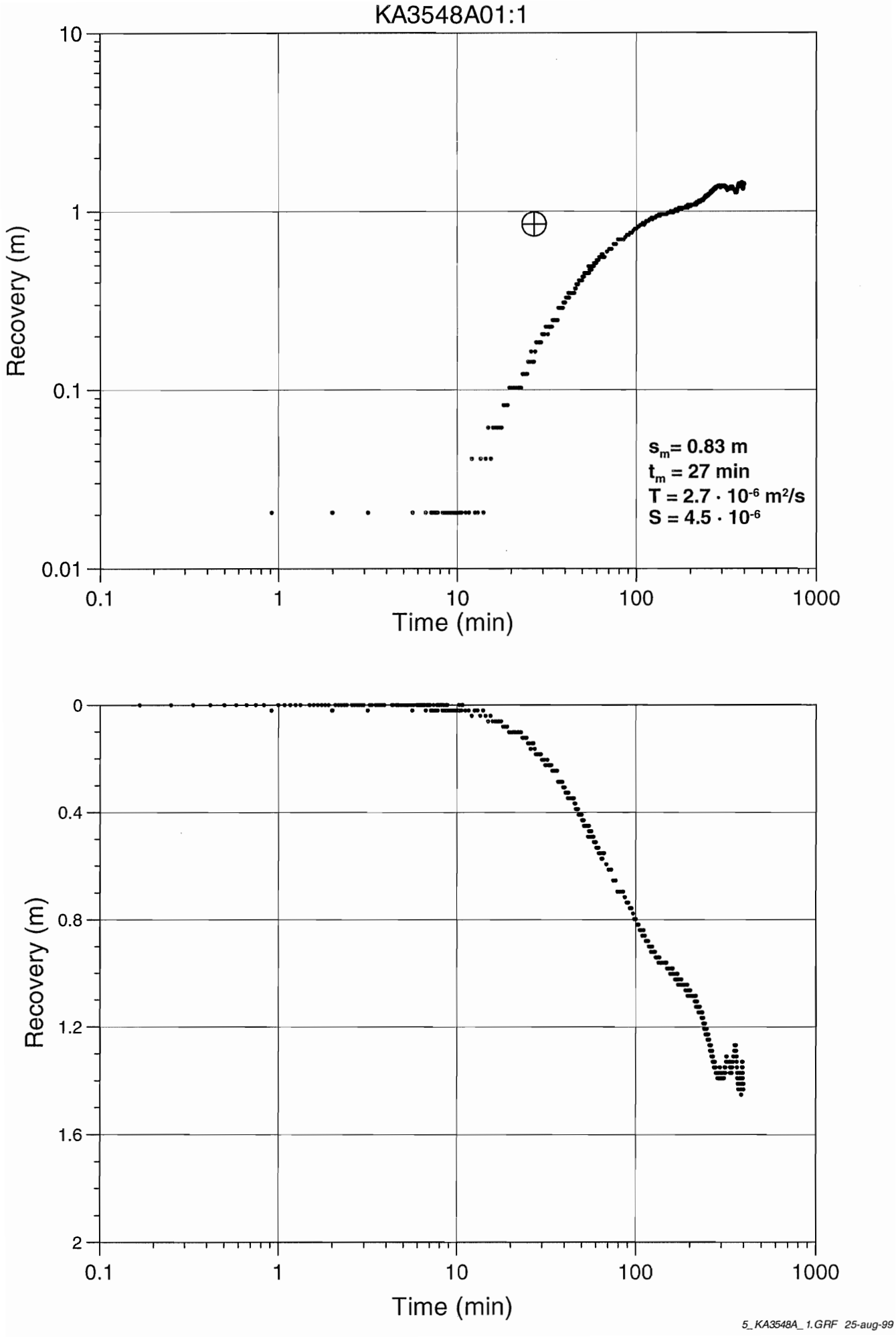
Time	Flow rate (l/min)
08:35.50	2.453
08:37:20	2.306
08:39.22	2.234
08:51	1.971
09:05	1.862
09:21	1.810
09:35	1.789
15:49.30	1.712
15:52	1.718
15:58.30	1.710

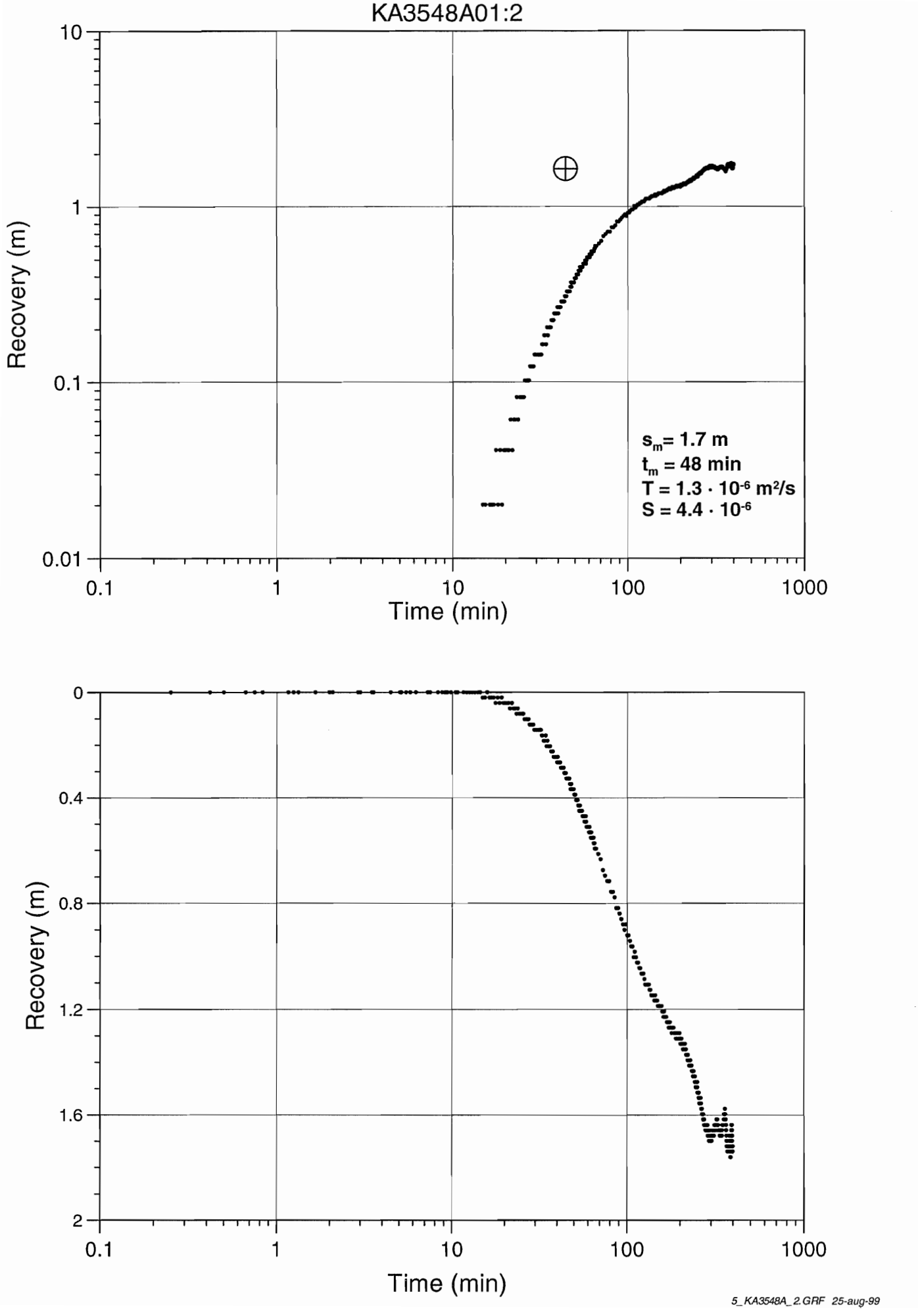

KA3590G02:1
Recovery (m)
1000
100
10
1
0.1
1
10
100
1000
Time (min)
Recovery (m)
200
220
240
260
280
300
0.1
1
10
100
1000
Time (min)
Δs = 34.9 m
T = 1.5 · 10-7 m²/s
5_KA3590G2_1.GRF 25-aug-99

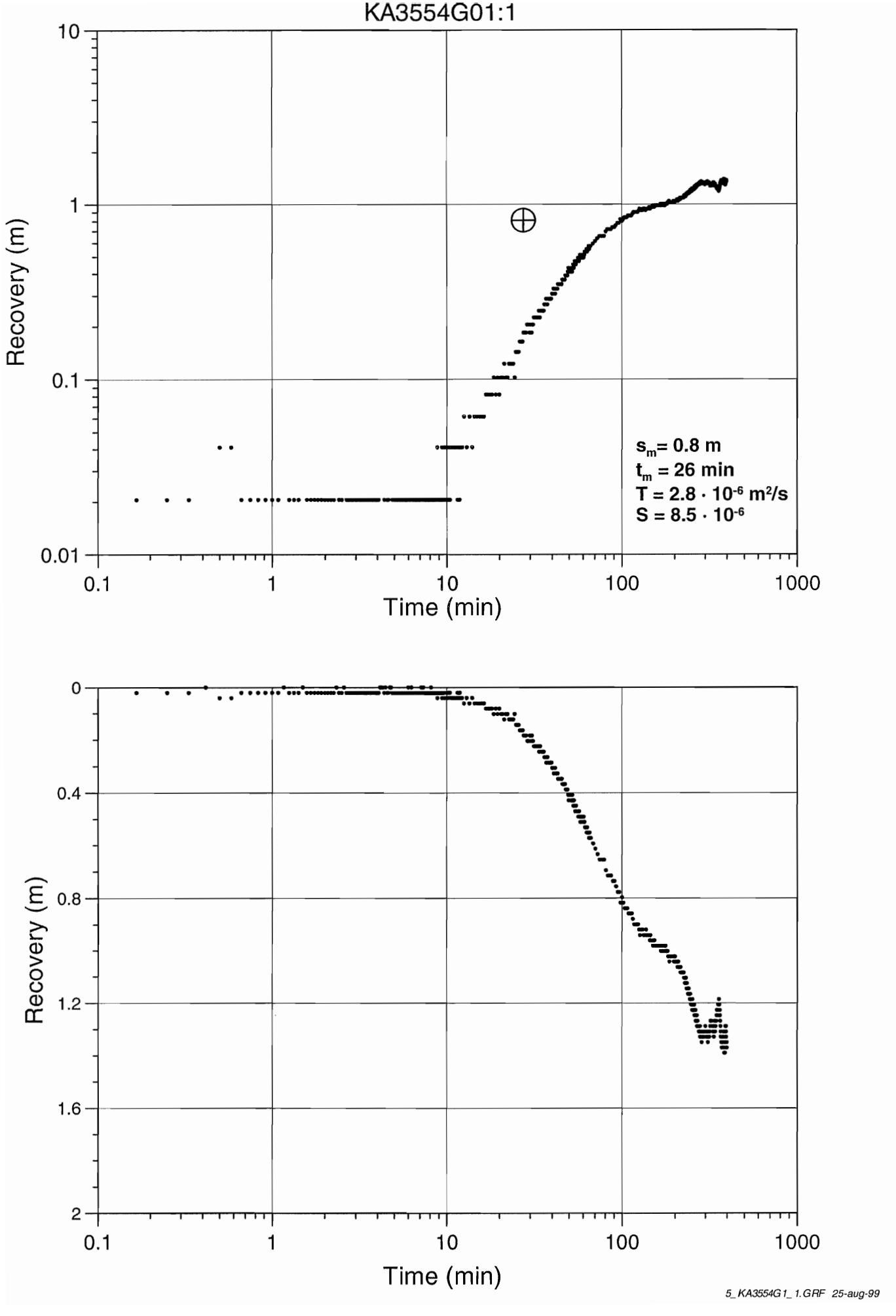

KA3539G:1
Recovery (m)
Time (min)
s_m= 4.0 m
t_m = 46 min
T = 5.7 · 10^{-7} m^2/s
S = 2.2 · 10^{-6}
5_KA3539G1_1.GRF 25-aug-99

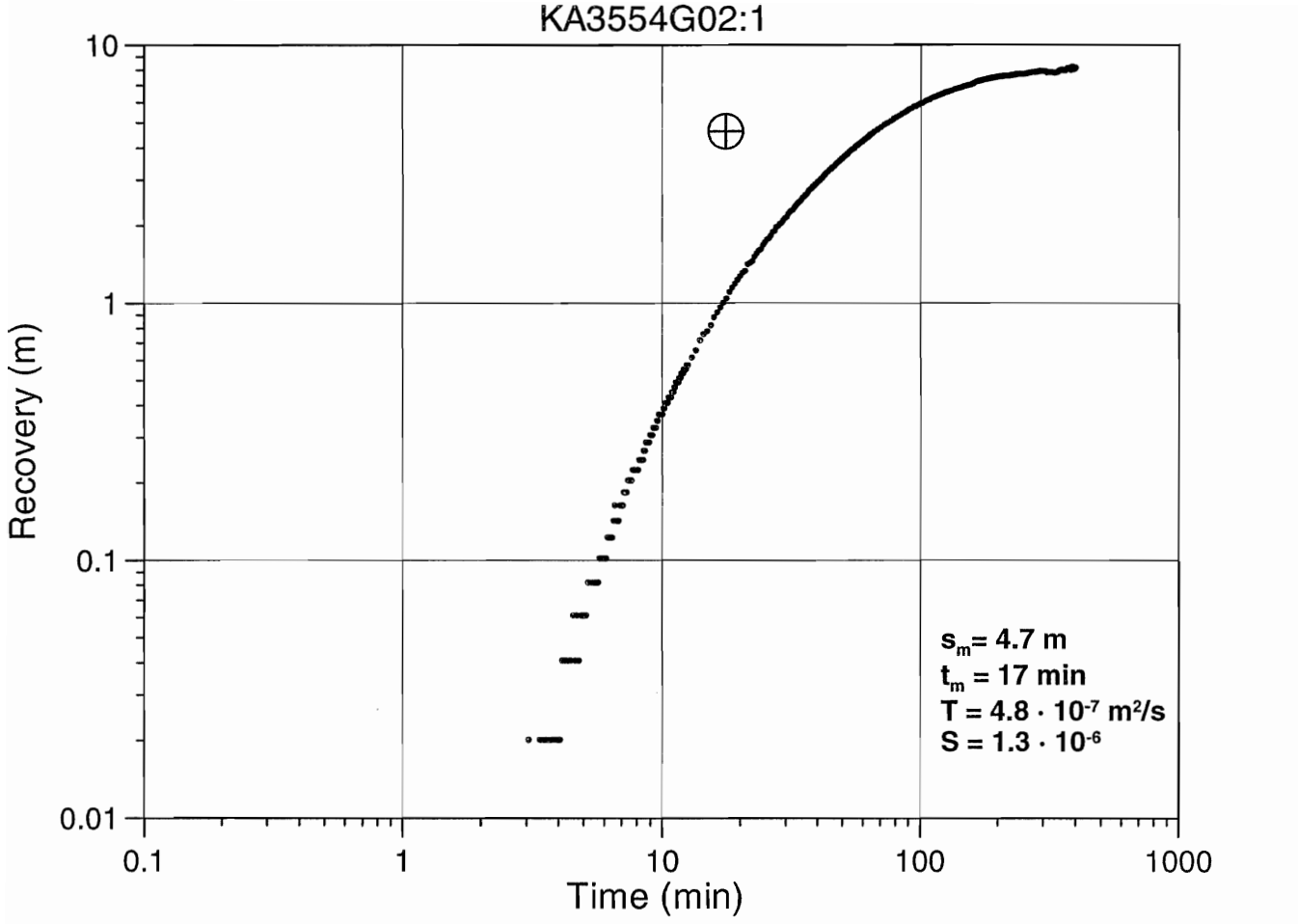

KA3542G01:1
Recovery (m)
Time (min)
10
1
0.1
0.01
0.1
1
10
100
1000
s_m= 1.5 m
t_m = 43.5 min
T = 1.5 · 10^{-6} m^2/s
S = 4.4 · 10^{-6}
0
0.4
0.8
1.2
1.6
2
5_KA3542G1_1.GRF 25-aug-99

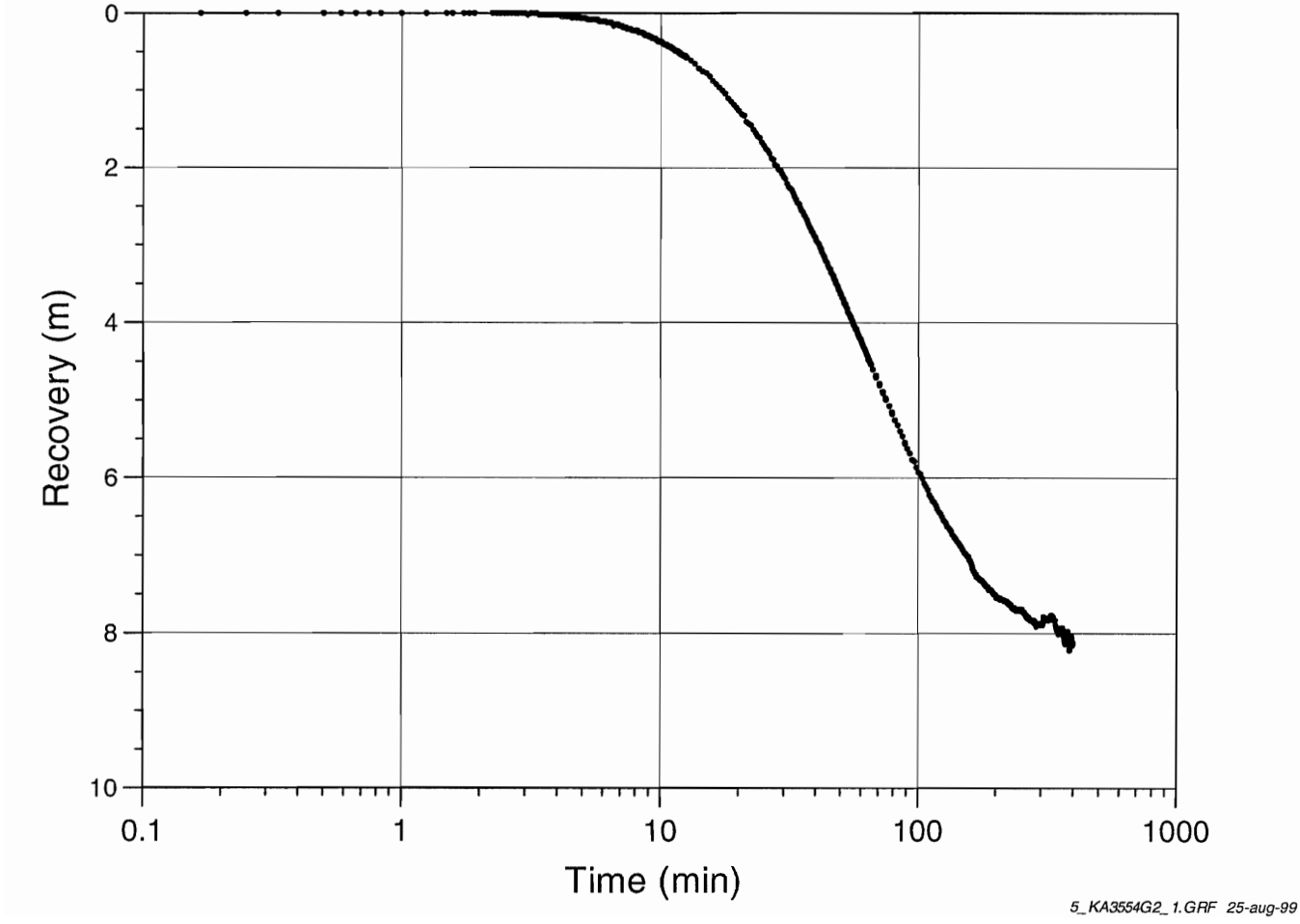

KA3542G02:1
Recovery (m)
Time (min)
10
1
0.1
0.01
0.1
1
10
100
1000
s_m= 3.6 m
t_m = 22 min
T = 6.3 · 10^{-7} m^2/s
S = 1.2 · 10^{-6}
0
2
4
6
8
5_KA3542G2_1.GRF 25-aug-99


KA3548A01:1
Recovery (m)
Time (min)
10
1
0.1
0.01
0.1
1
10
100
1000
s_m= 0.83 m
t_m = 27 min
T = 2.7 · 10^{-6} m^2/s
S = 4.5 · 10^{-6}
Recovery (m)
Time (min)
0
0.4
0.8
1.2
1.6
2
0.1
1
10
100
1000
5_KA3548A_1.GRF 25-aug-99

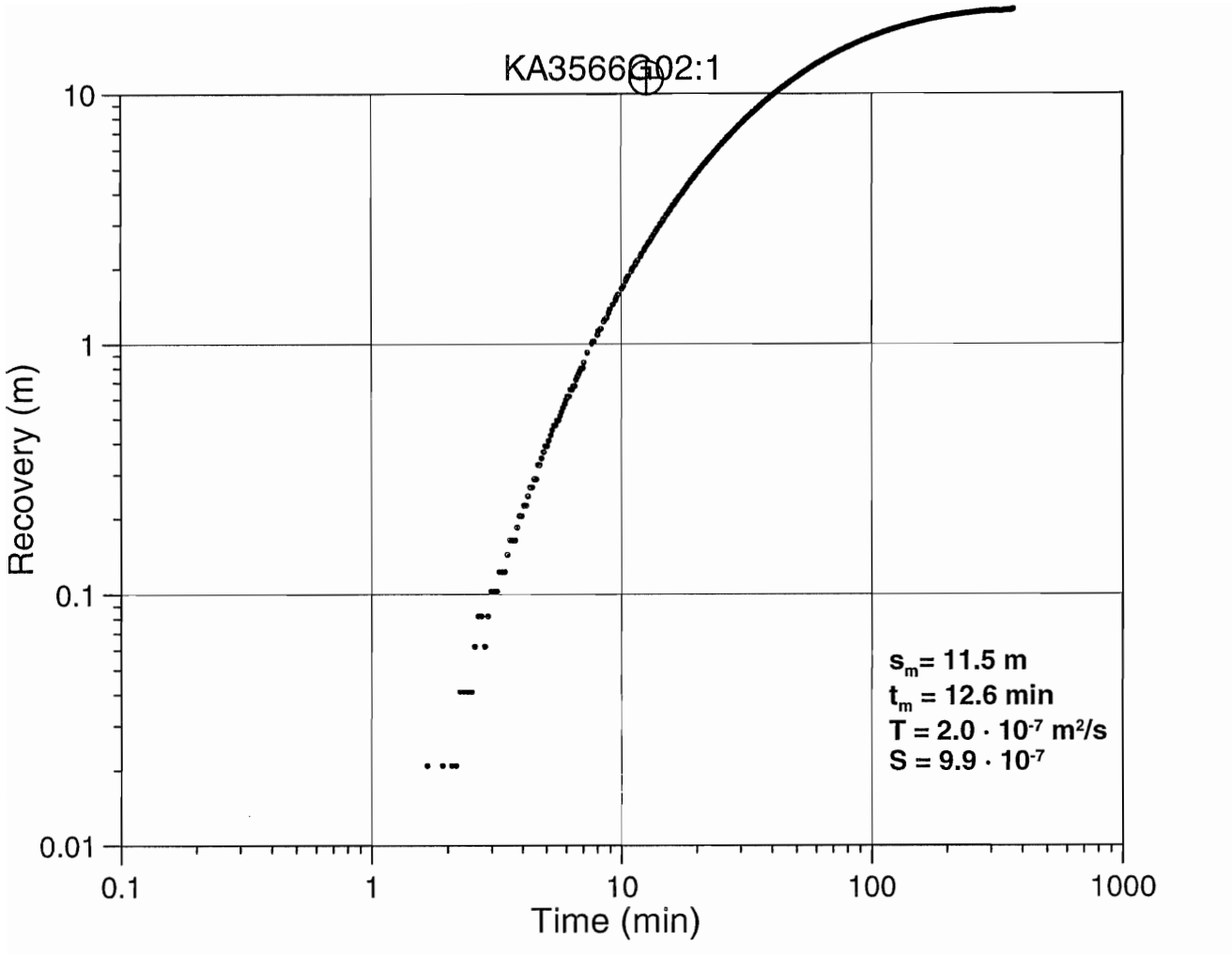

KA3548A01:2
Recovery (m)
Time (min)
10
1
0.1
0.01
0.1
1
10
100
1000
s_m= 1.7 m
t_m = 48 min
T = 1.3 · 10^{-6} m^2/s
S = 4.4 · 10^{-6}
Recovery (m)
Time (min)
0
0.4
0.8
1.2
1.6
2
0.1
1
10
100
1000
5_KA3548A_2.GRF 25-aug-99

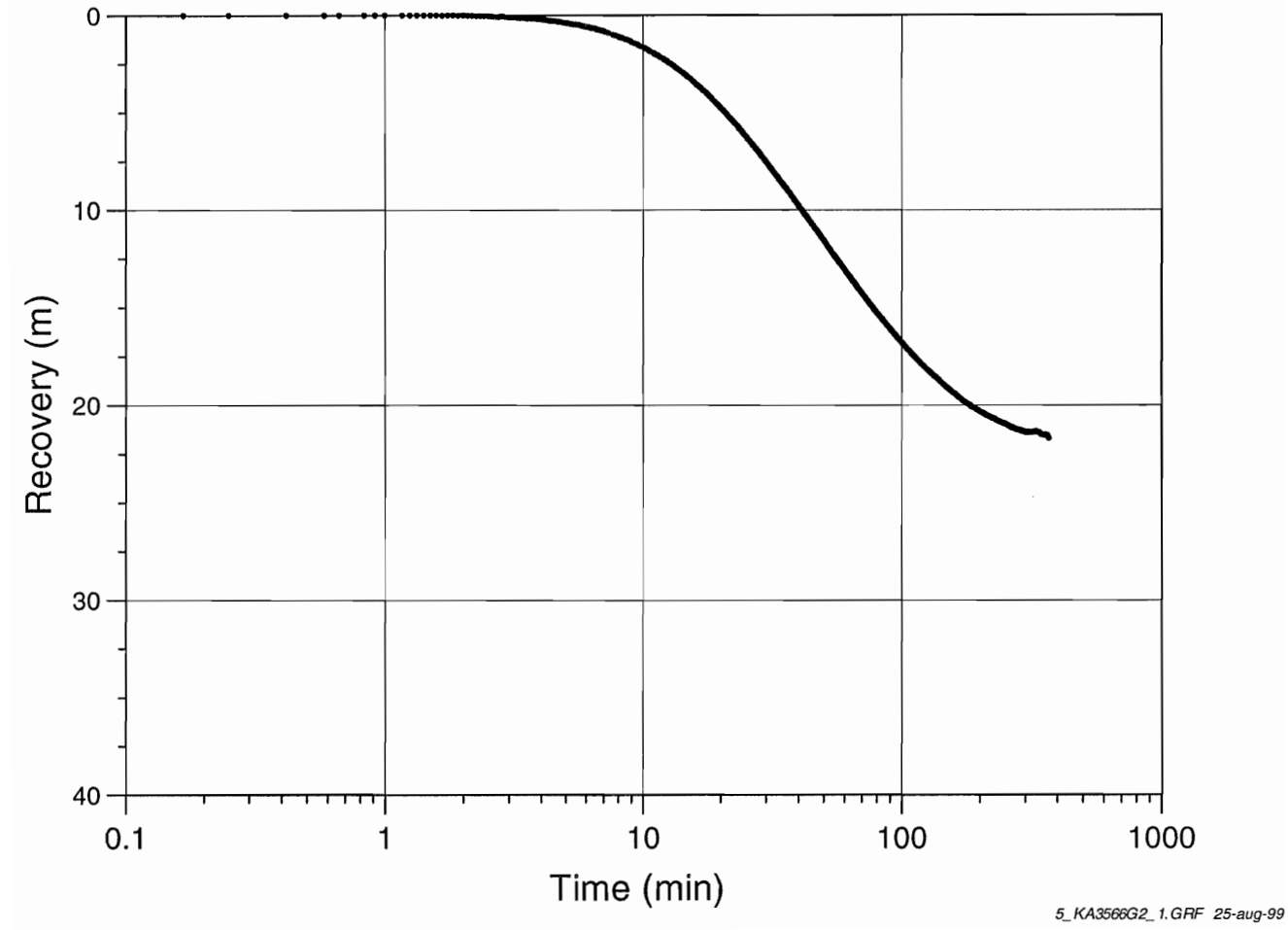

KA3554G01:1
Recovery (m)
Time (min)
10
1
0.1
0.01
0.1
1
10
100
1000
s_m= 0.8 m
t_m = 26 min
T = 2.8 · 10^{-6} m^2/s
S = 8.5 · 10^{-6}
0
0.4
0.8
1.2
1.6
2
5_KA3554G1_1.GRF 25-aug-99



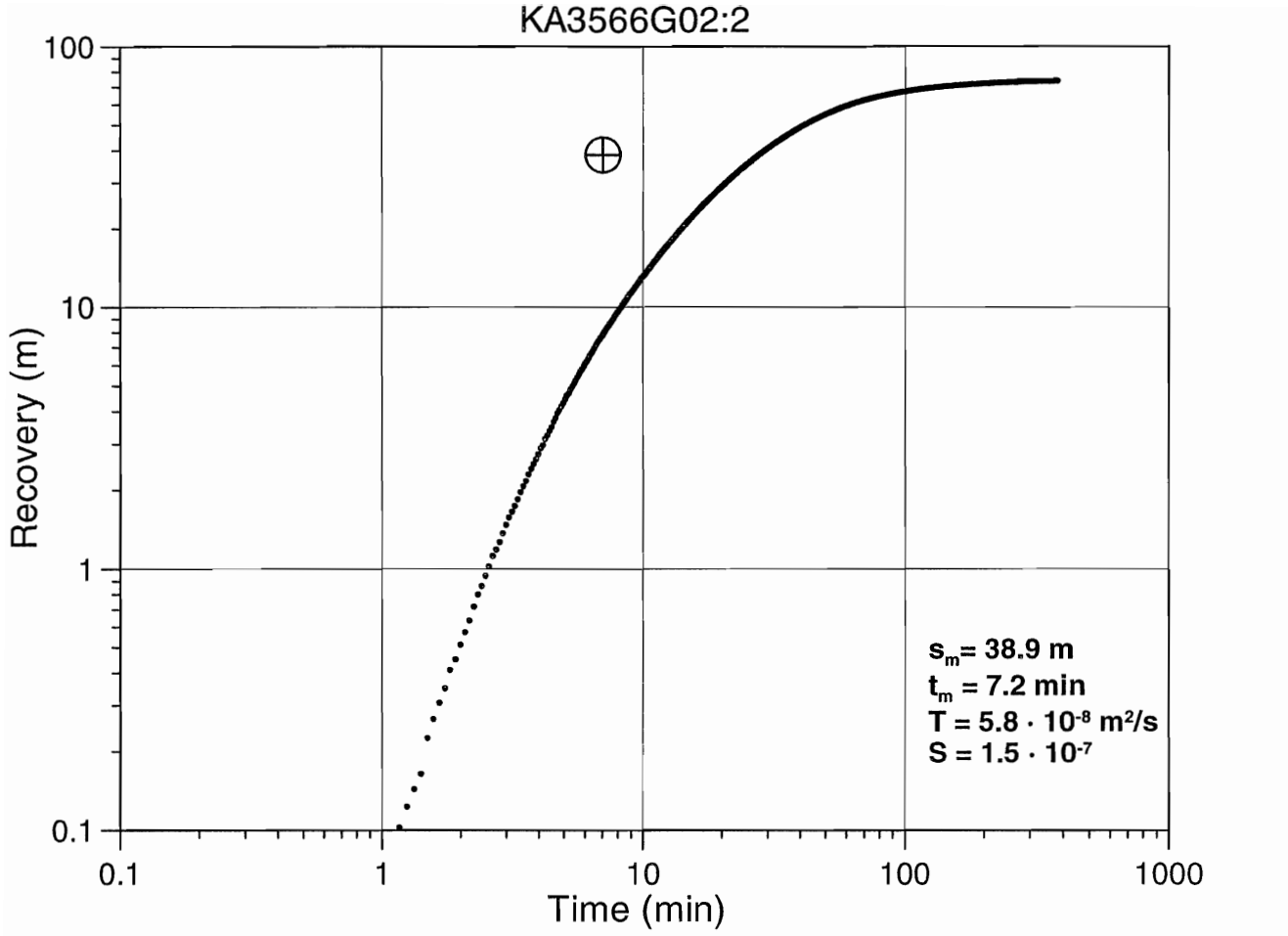


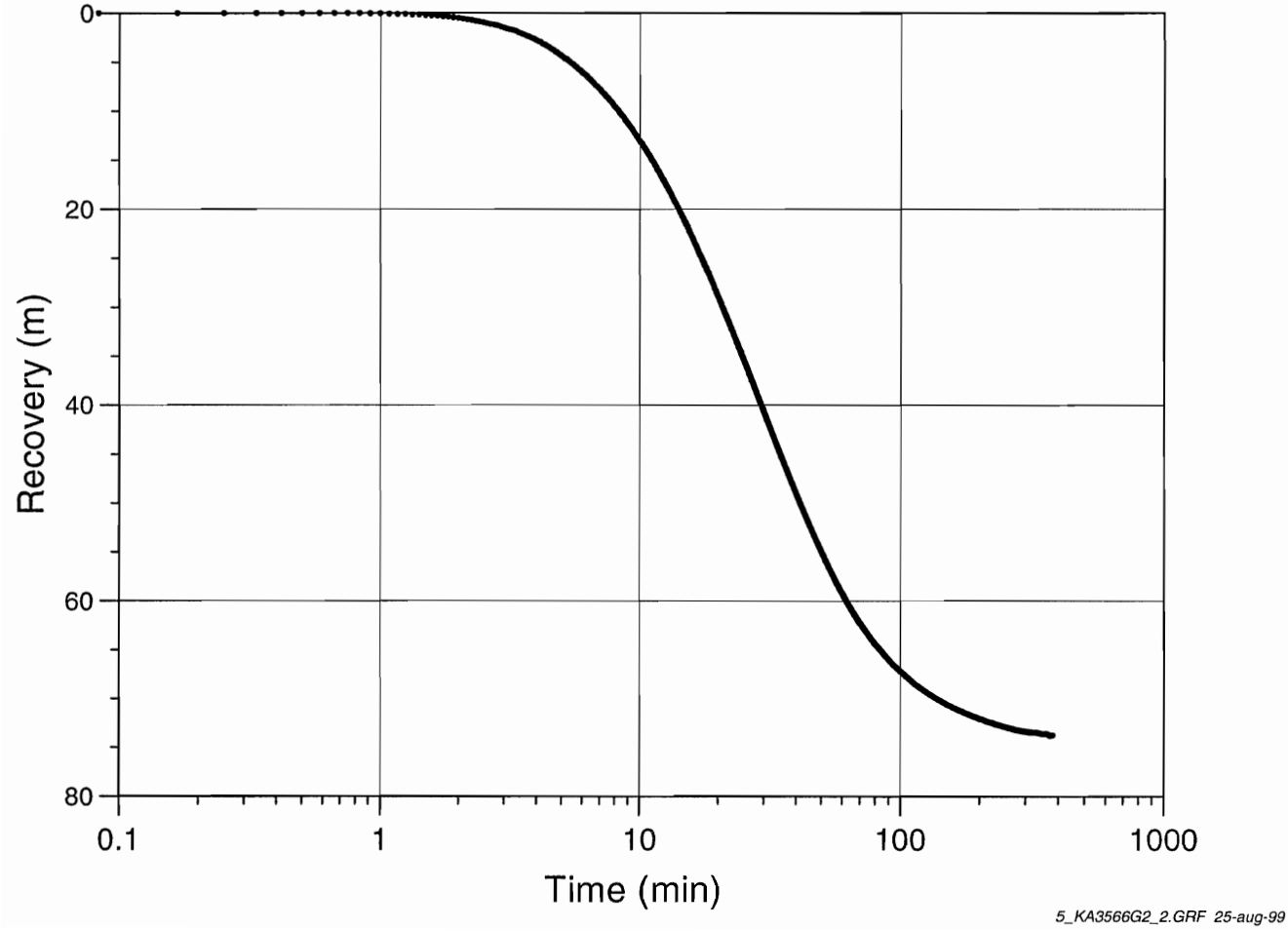
5_KA3554G2_1.GRF 25-aug-99



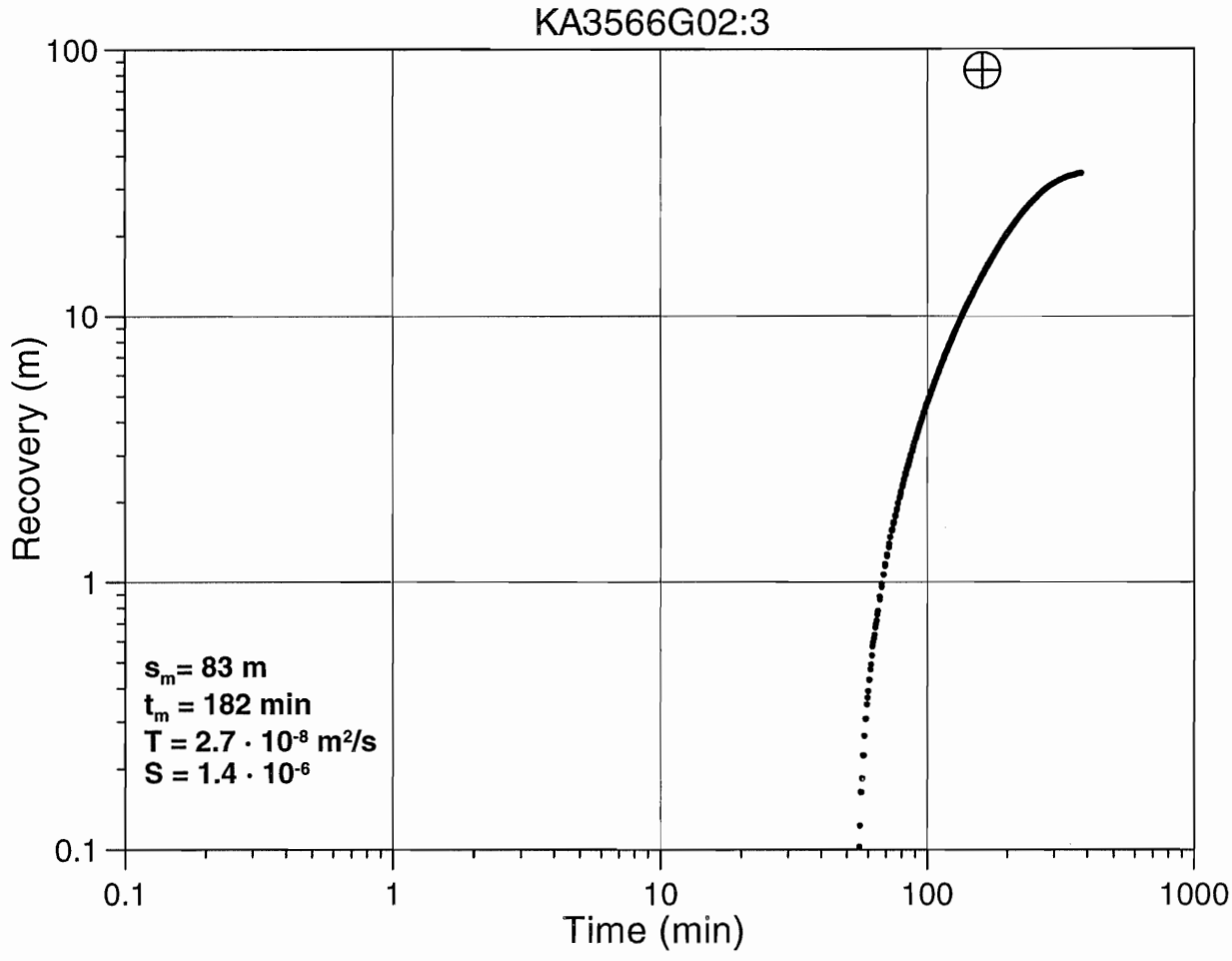


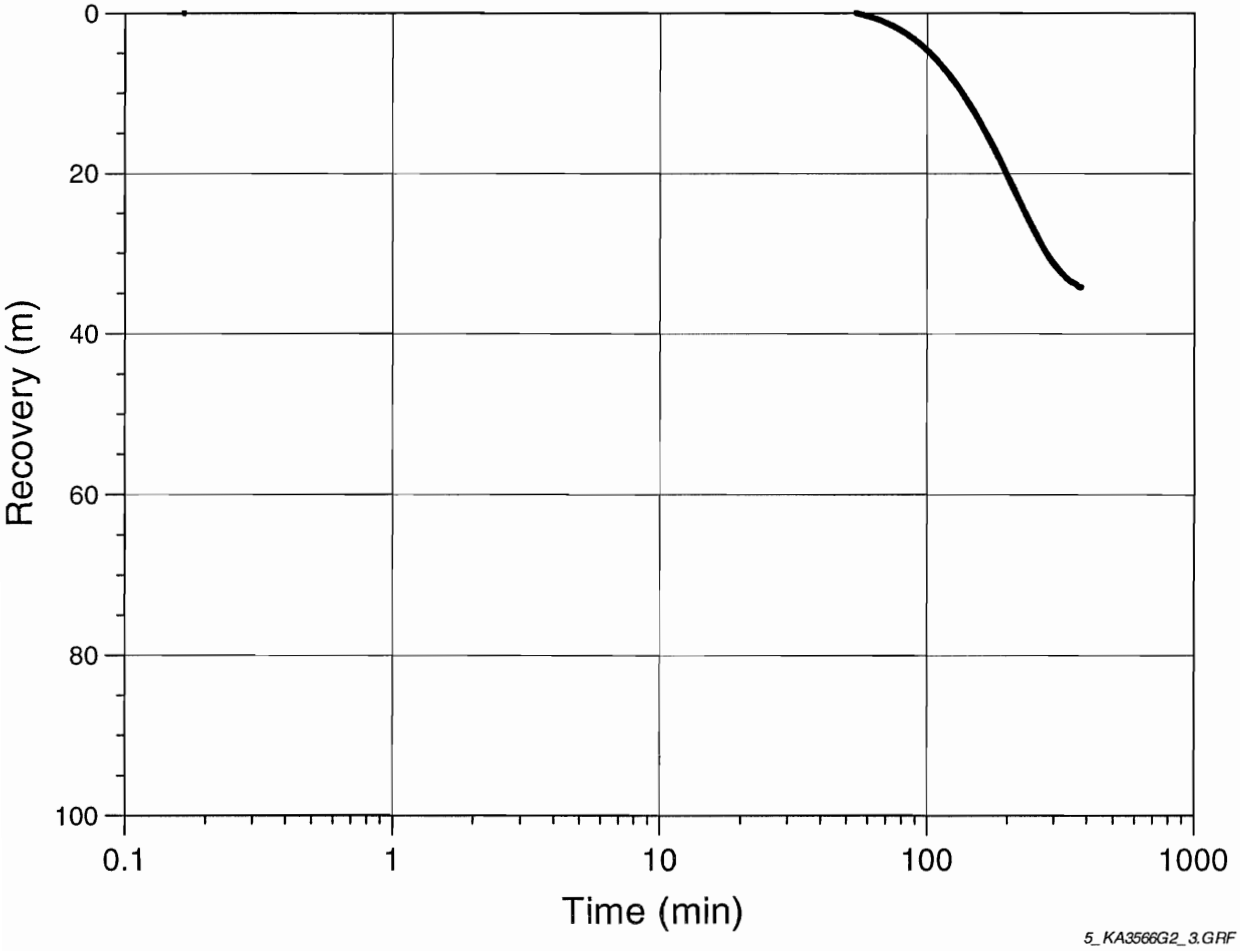
5_KA3566G2_1.GRF 25-aug-99



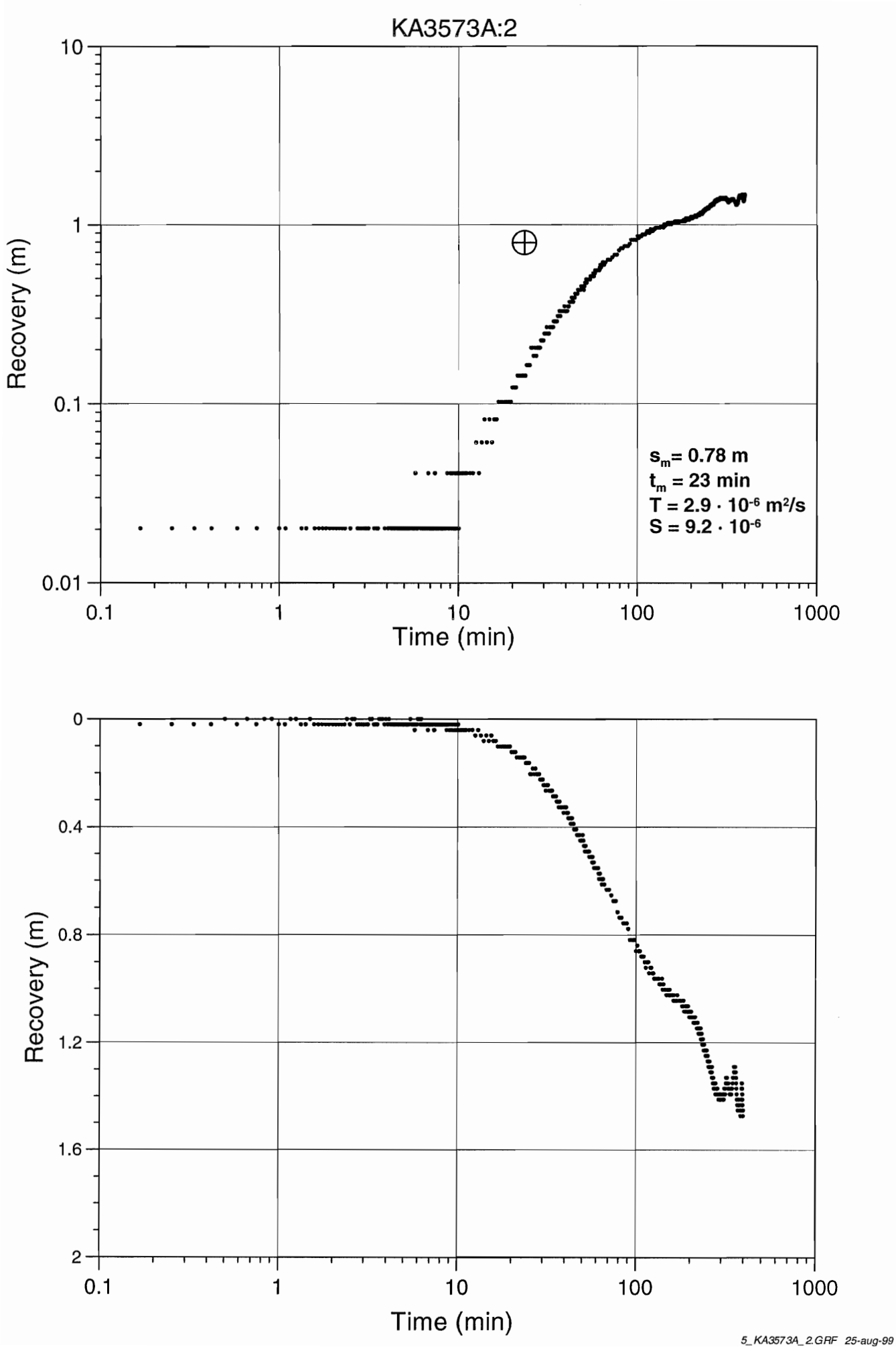


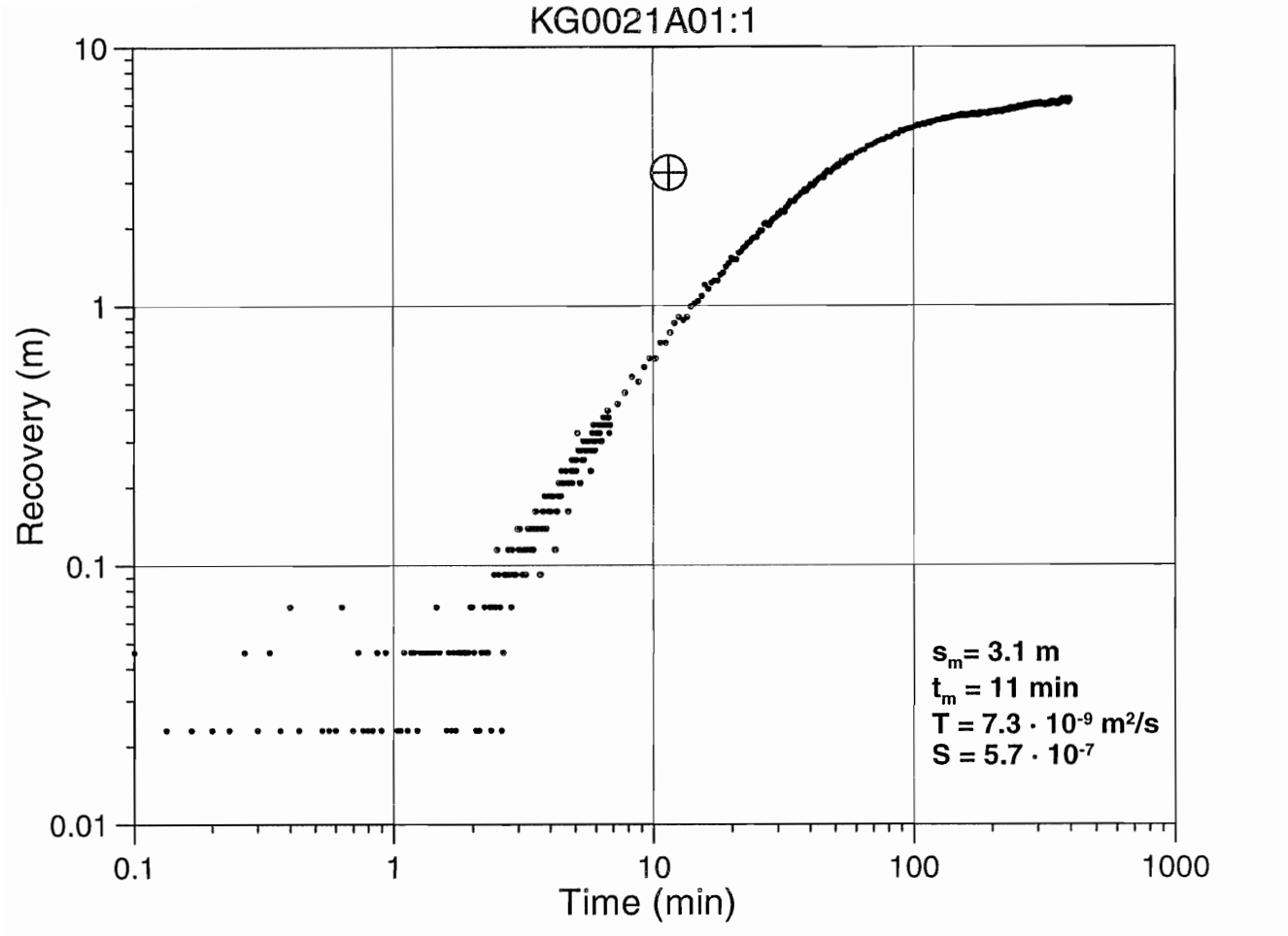
5_KA3566G2_2.GRF 25-aug-99

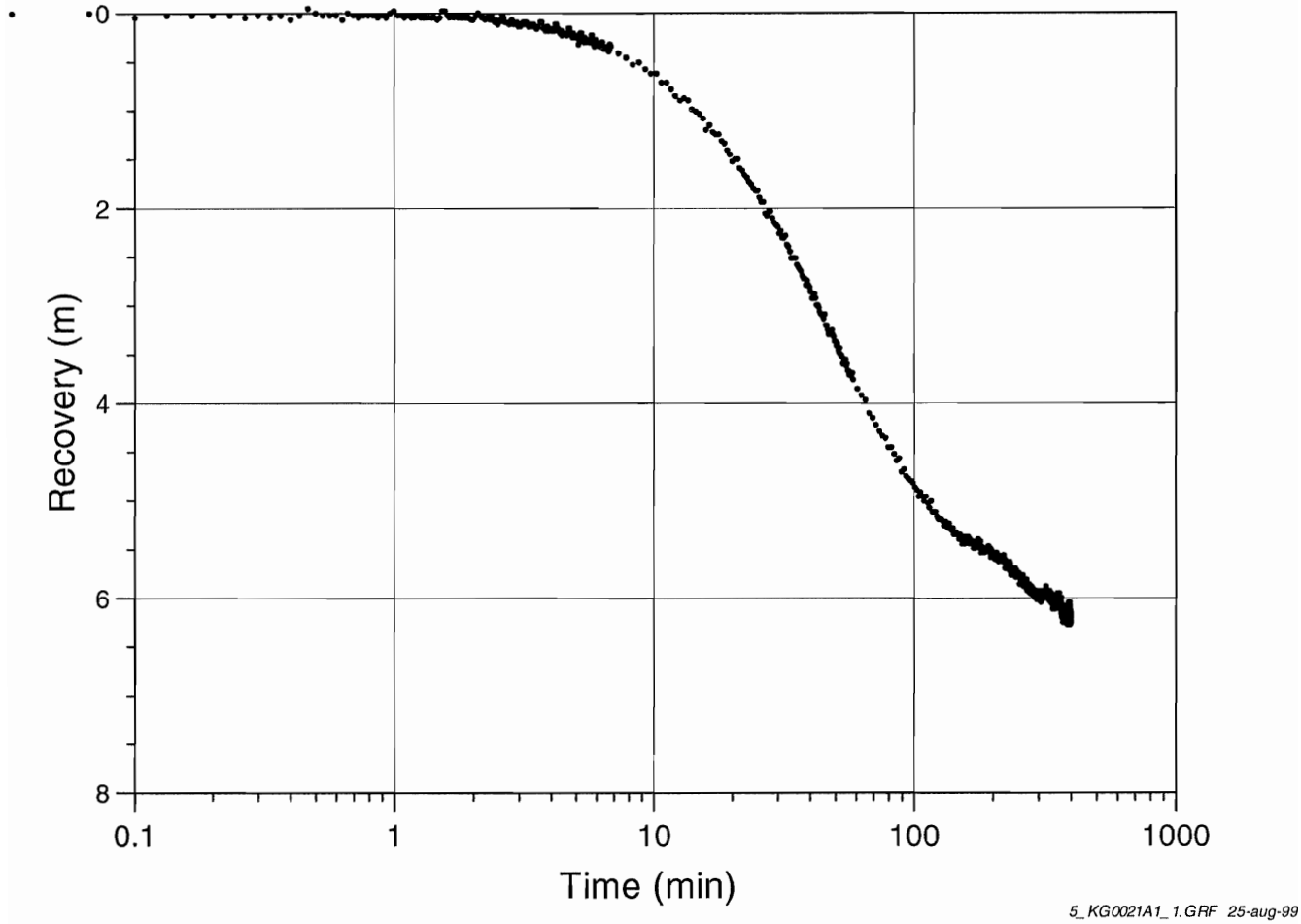




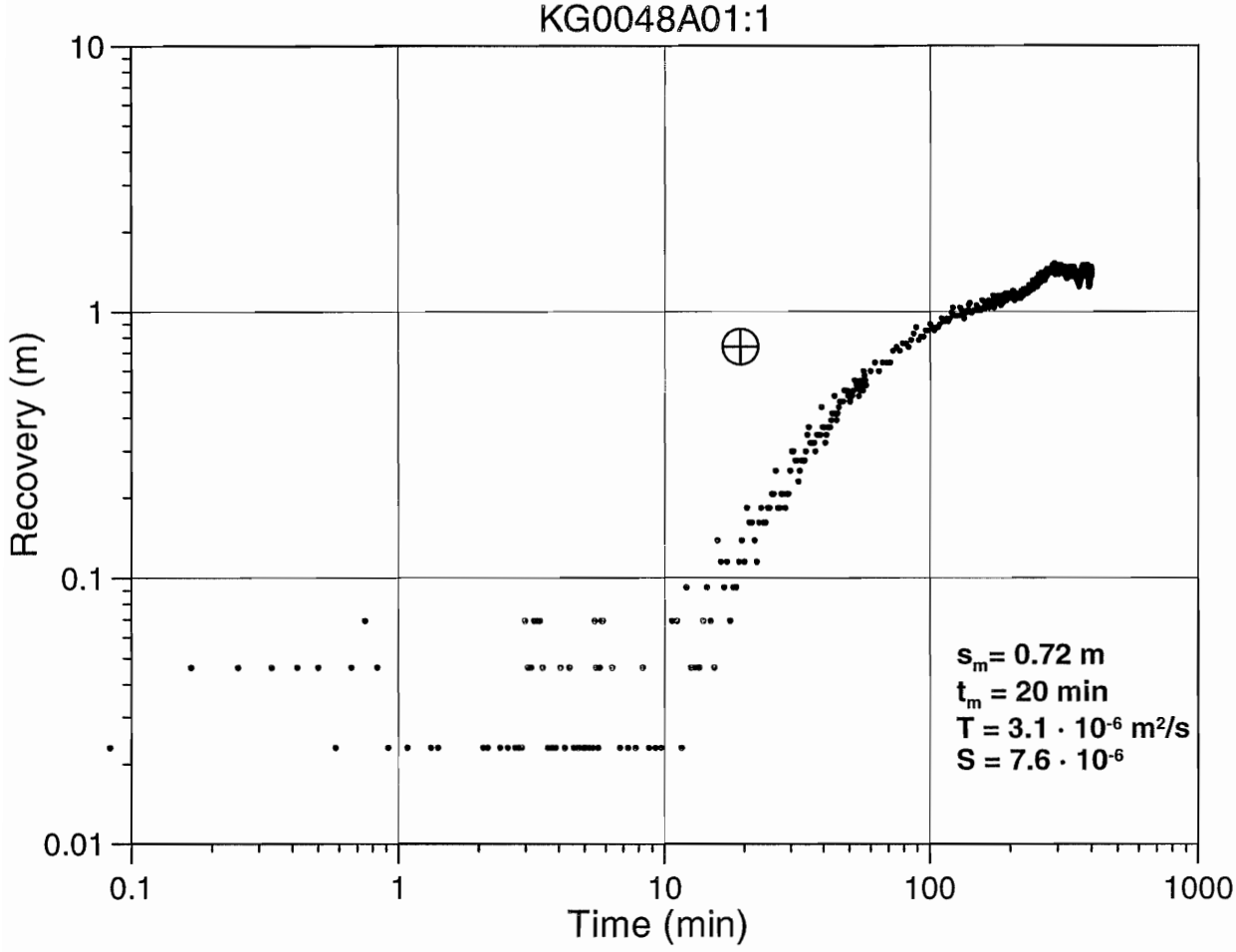
5_KA3566G2_3.GRF 25-aug-99

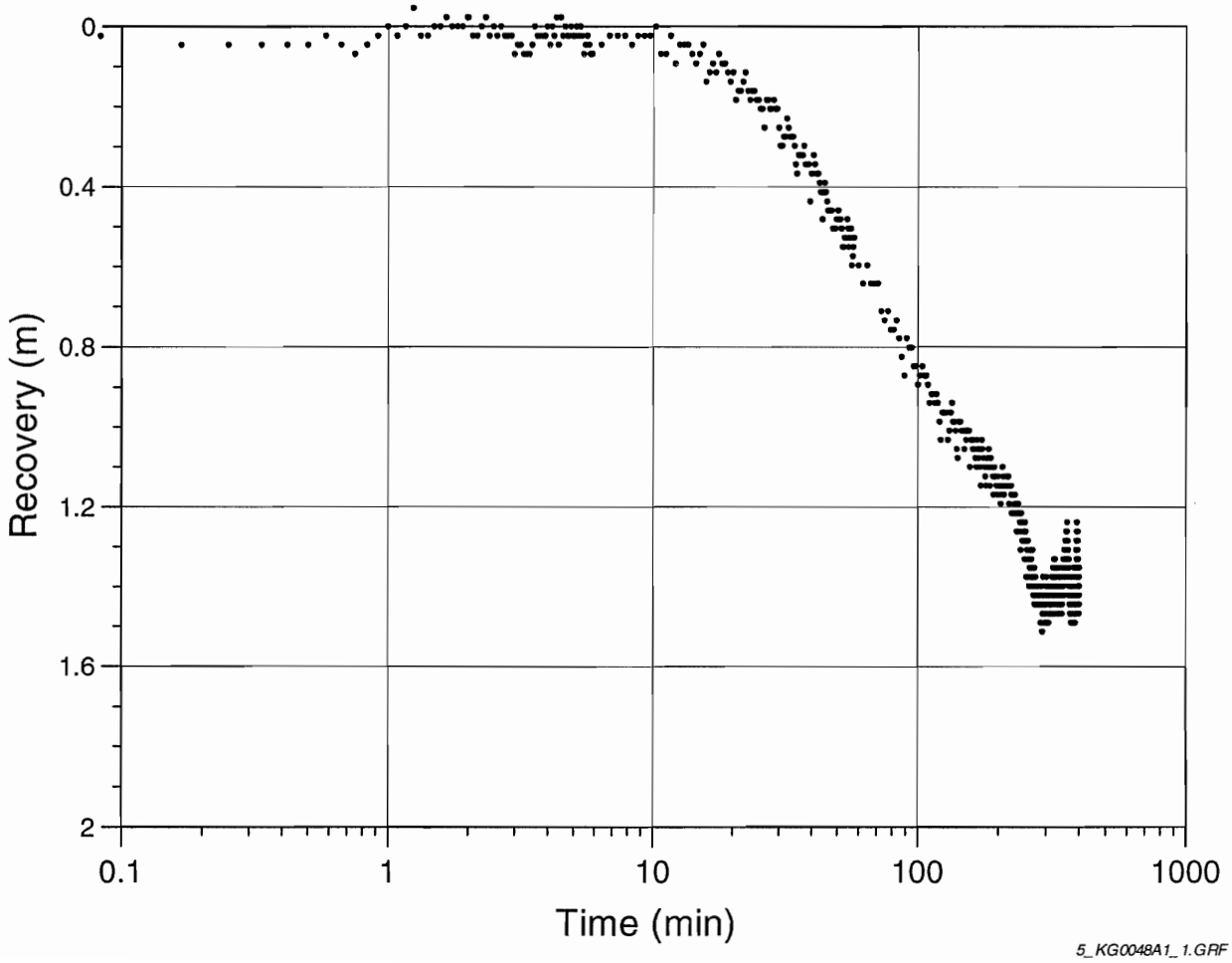

KA3573A:2
Recovery (m)
Time (min)
10
1
0.1
0.01
0.1
1
10
100
1000
s_m= 0.78 m
t_m = 23 min
T = 2.9 · 10^{-6} m^2/s
S = 9.2 · 10^{-6}
0
0.4
0.8
1.2
1.6
2
5_KA3573A_2.GRF 25-aug-99



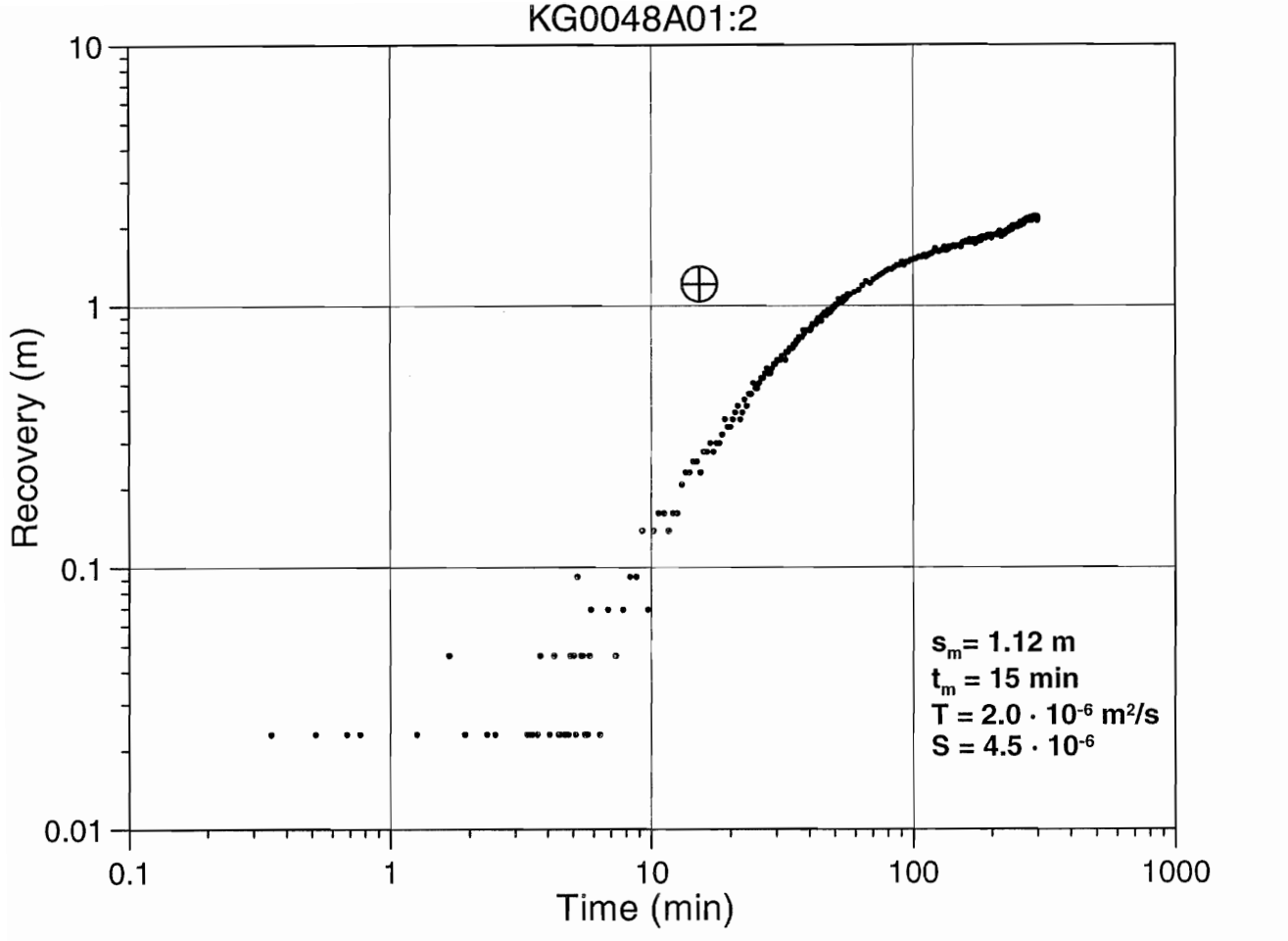


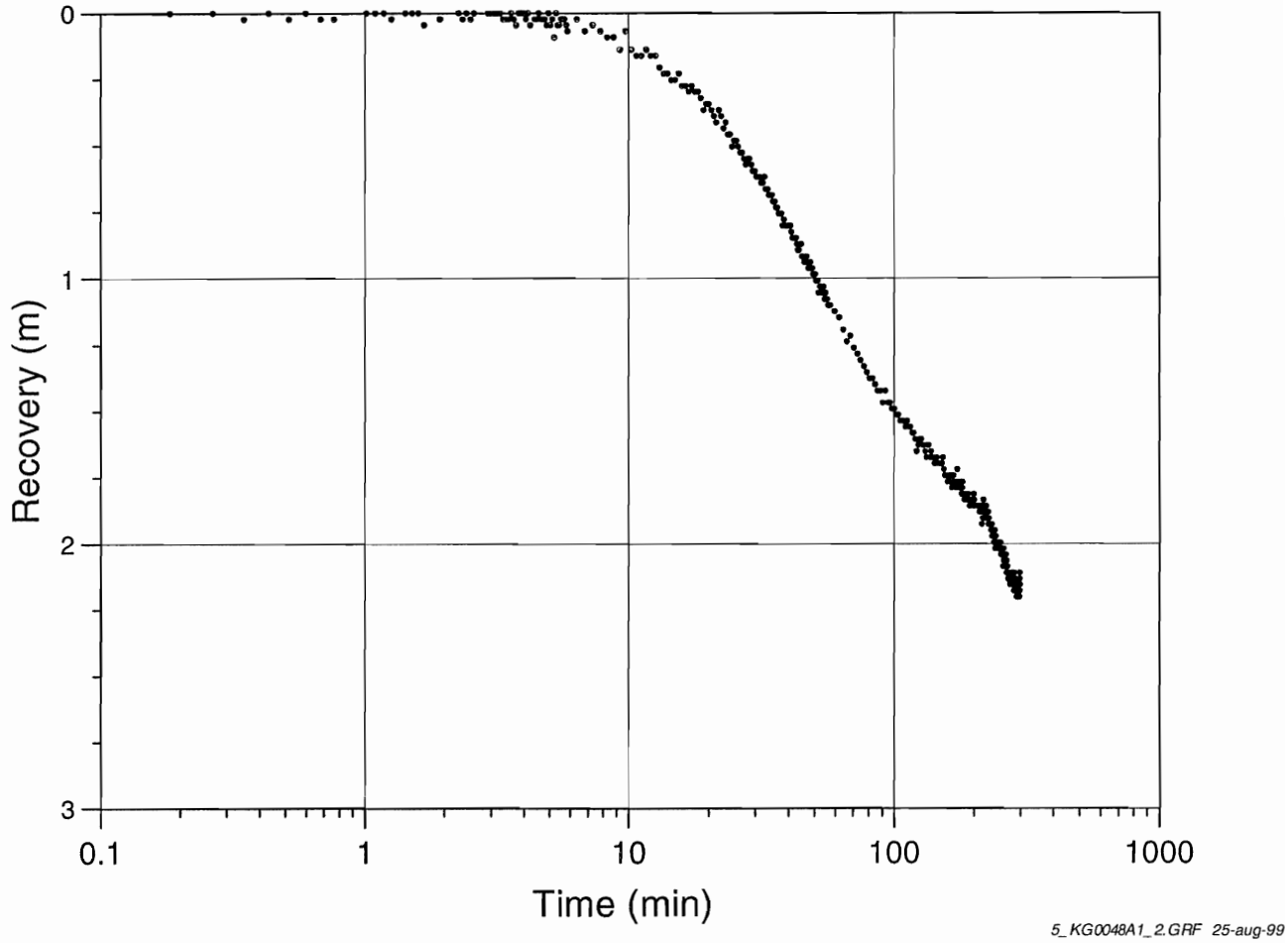
5_KG0021A1_1.GRF 25-aug-99



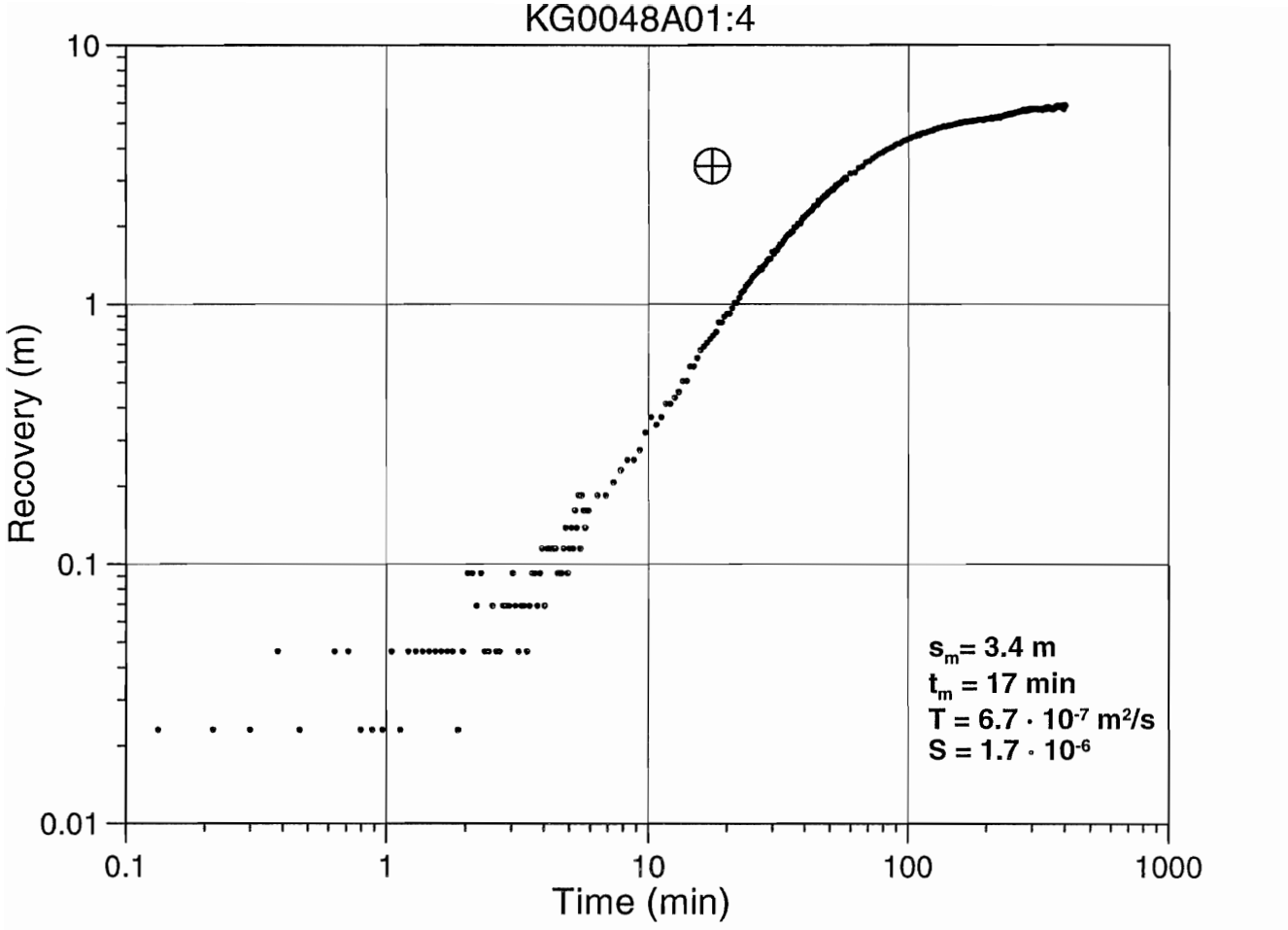


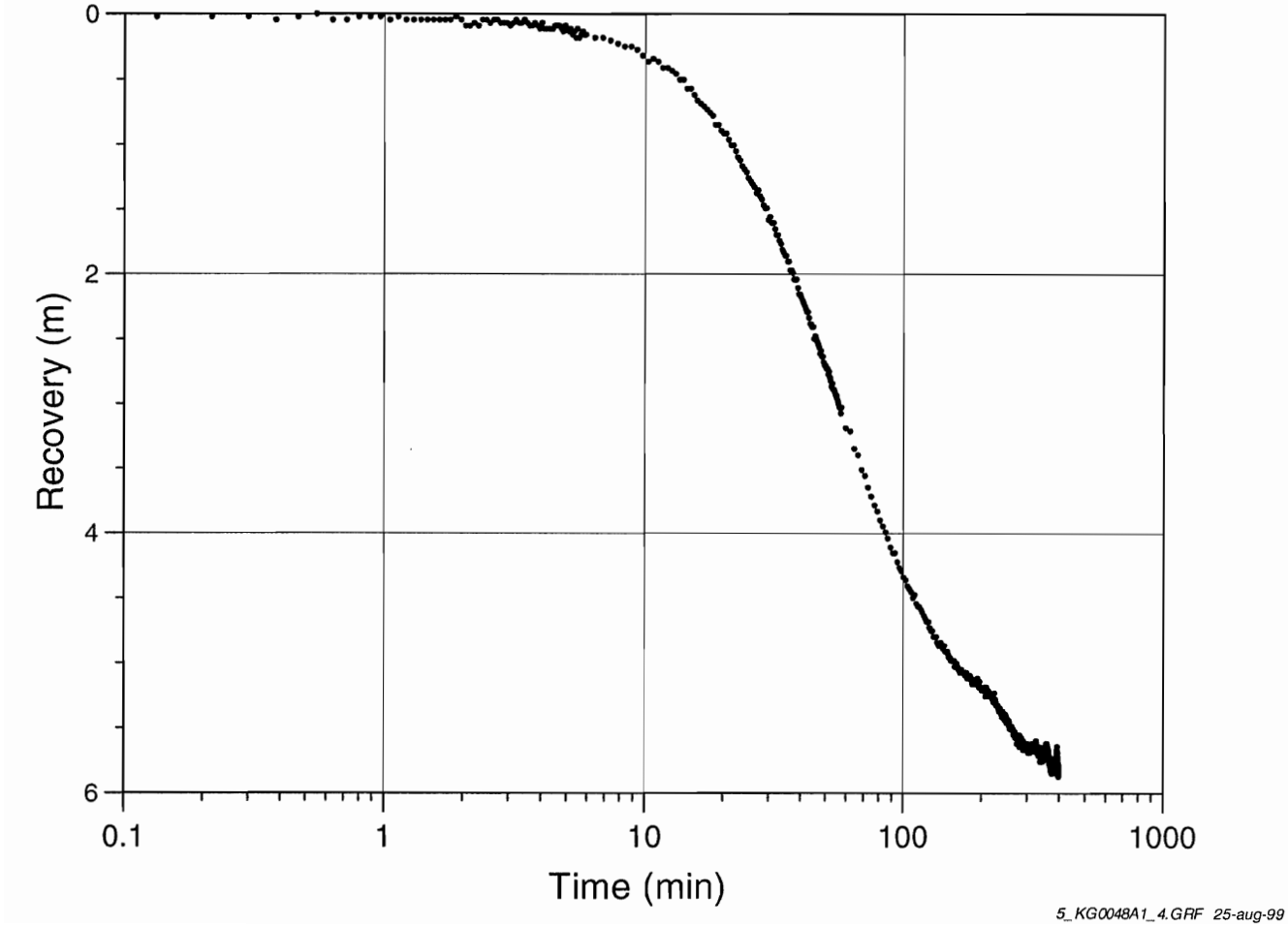
5_KG0048A1_1.GRF 25-aug-99





5_KG0048A1_2.GRF 25-aug-99





5_KG0048A1_4.GRF 25-aug-99

APPENDIX 7

Interference test 1:6 in borehole KA3590G01, section 1.30 m – 6.80 m

Date: 99-04-06 Field Crew: Bengt Gentzschein
Borehole length: 30.06 m Borehole diameter: 76 mm

Flowing borehole: KA3590G01, section #3: 1.30 – 6.80 m

Valve opened: 990406 09:59.05 Valve closed: 990406 16:01.05
End of Test: 990407 06:30
Total flowing time : 362 min Tot. Pr. Build-up time 840 min.

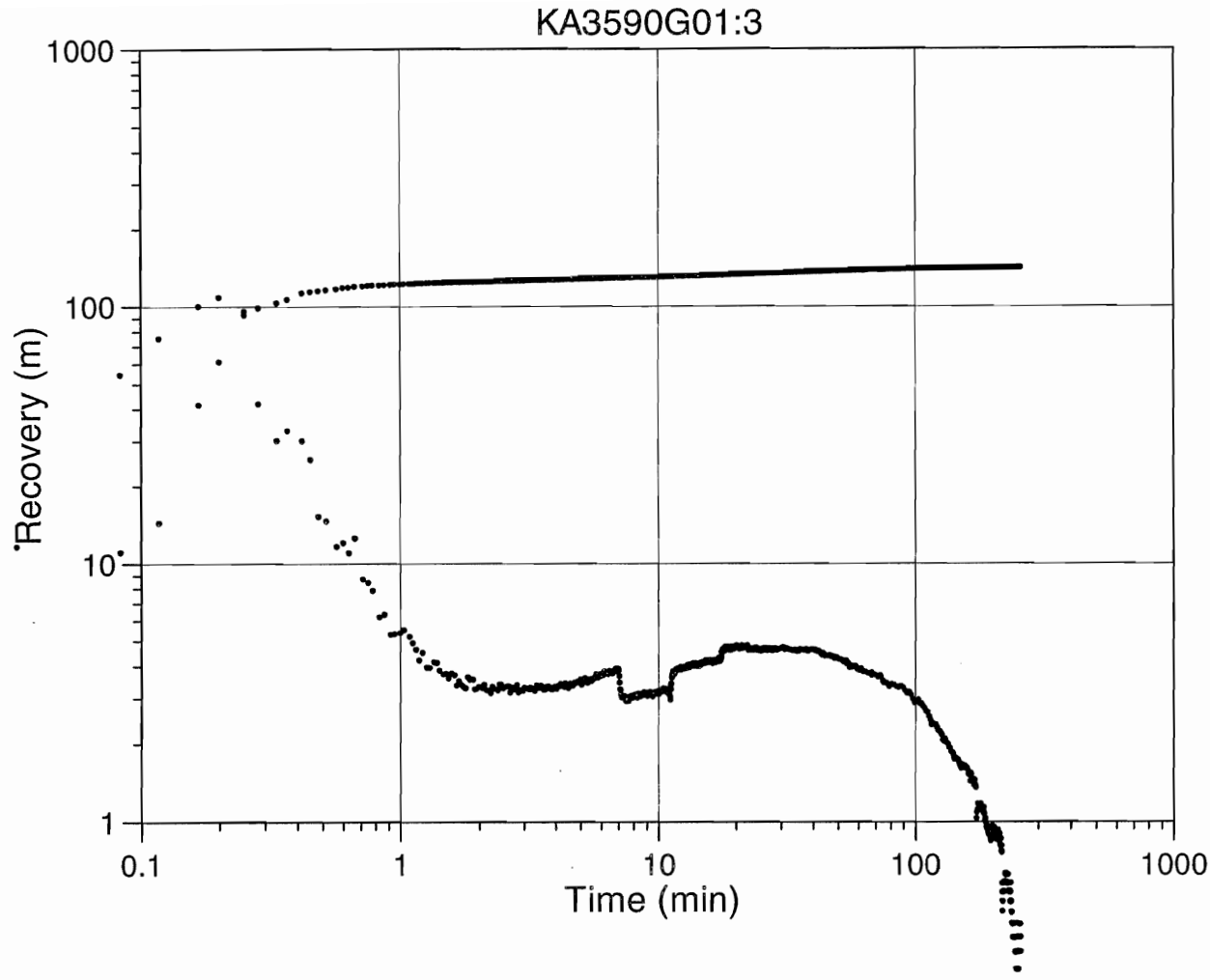
The test was performed as an Interference test. Pressure responses were monitored in 56 borehole sections.

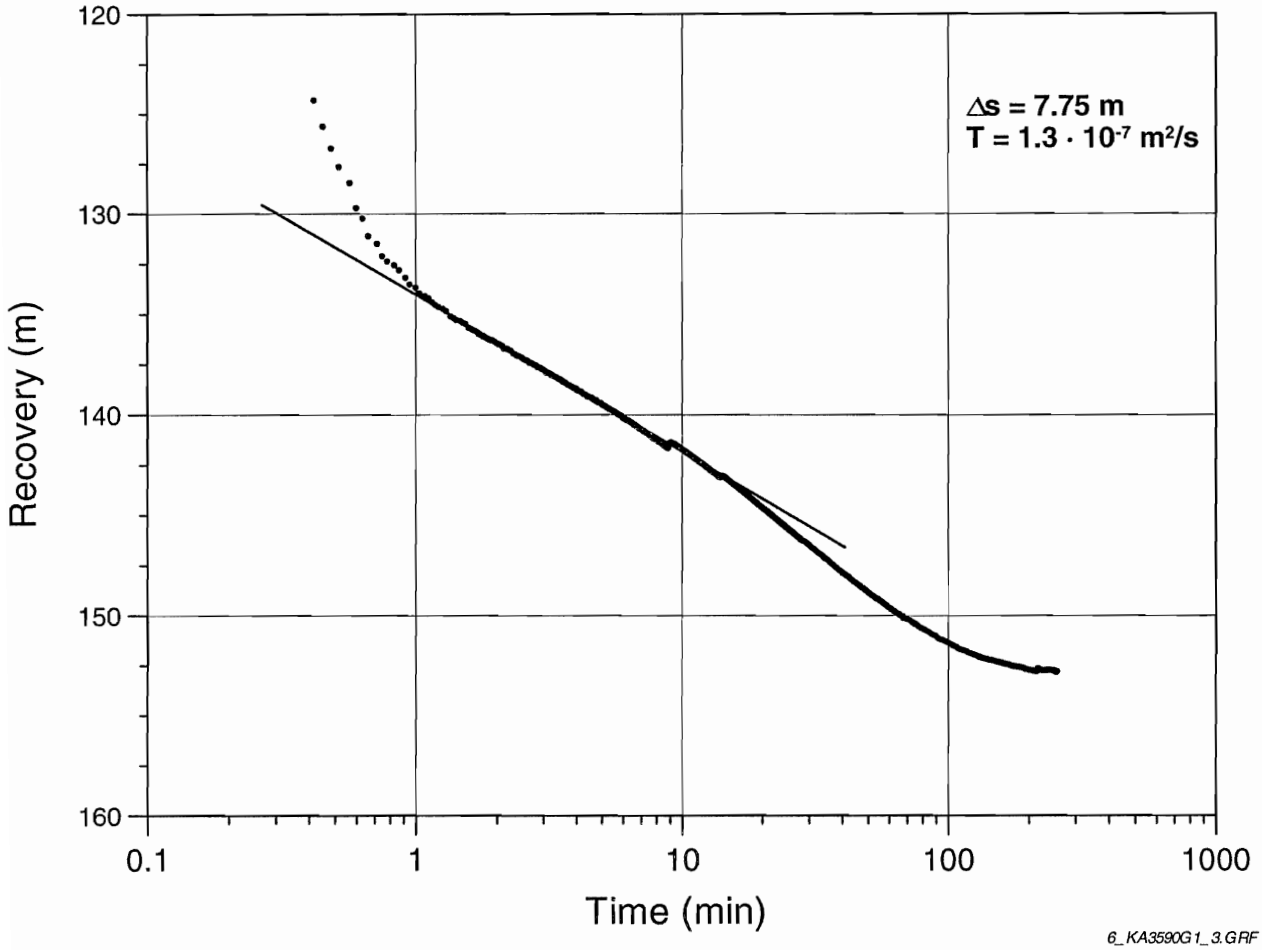
Flow data

Manually measured flow rates of KA3590G01, section 1.30 – 6.80 m are presented in the table below

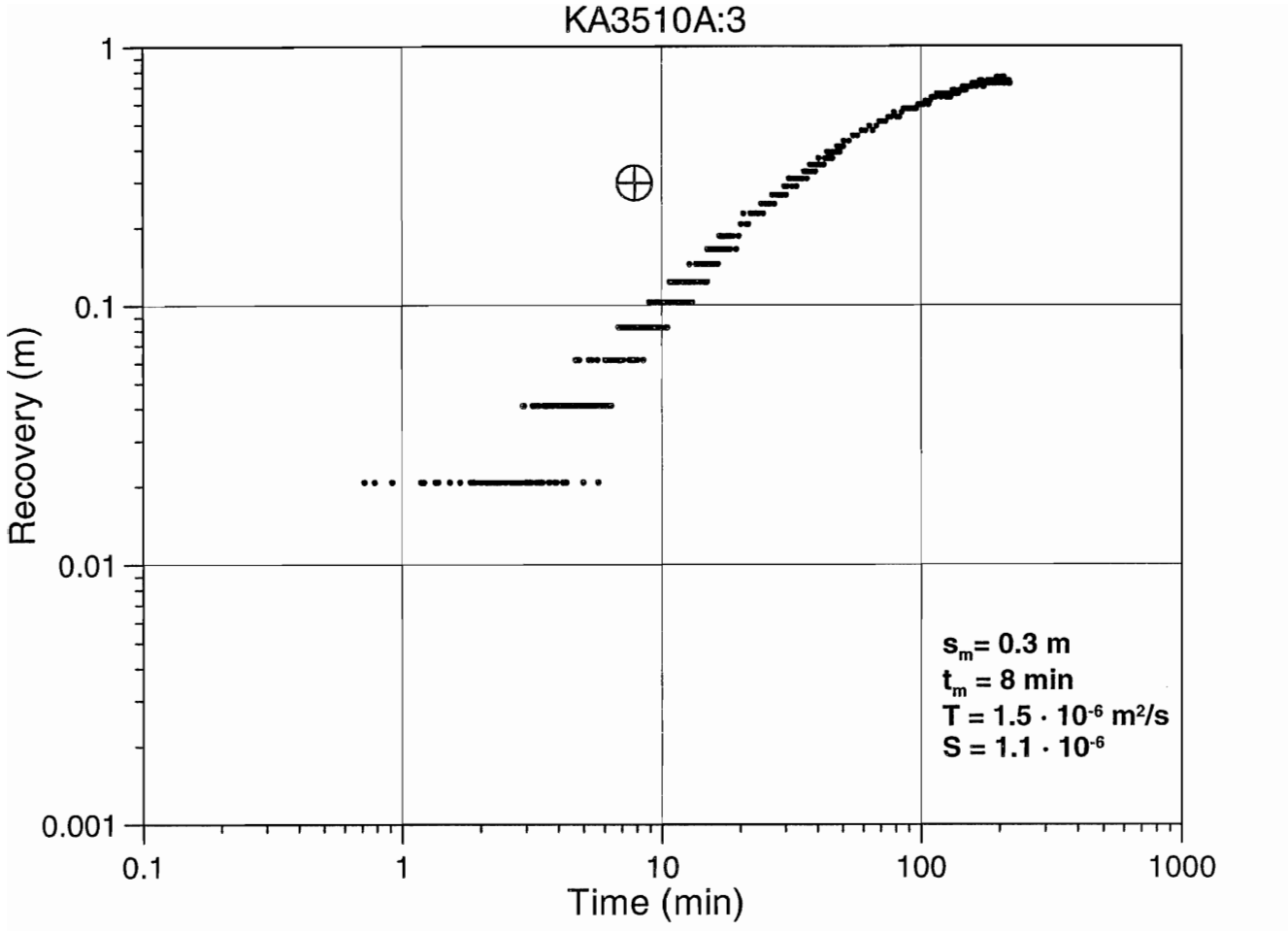
Table **Manually measured flow rates, Interference test in KA3590G01, section 1.30 – 6.80 m (test #6)**

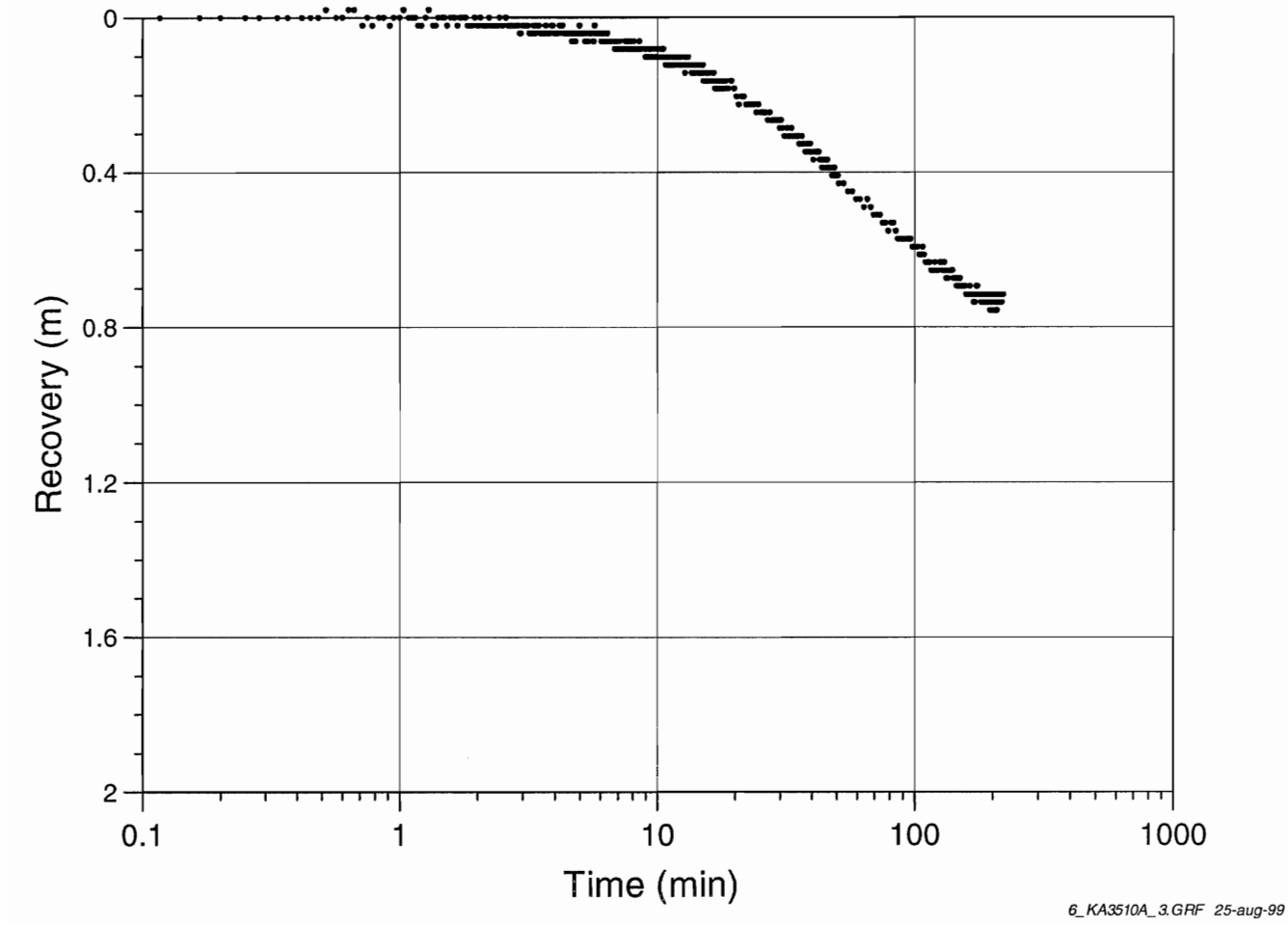
Time	Flow rate (l/min)
09:59.30	0.432
10:02	0.369
10:04.30	0.352
10:15	0.350
10:30	0.344
10:45	0.341
11:00	0.340
15:50	0.329
15:52	0.330
15:59.30	0.330



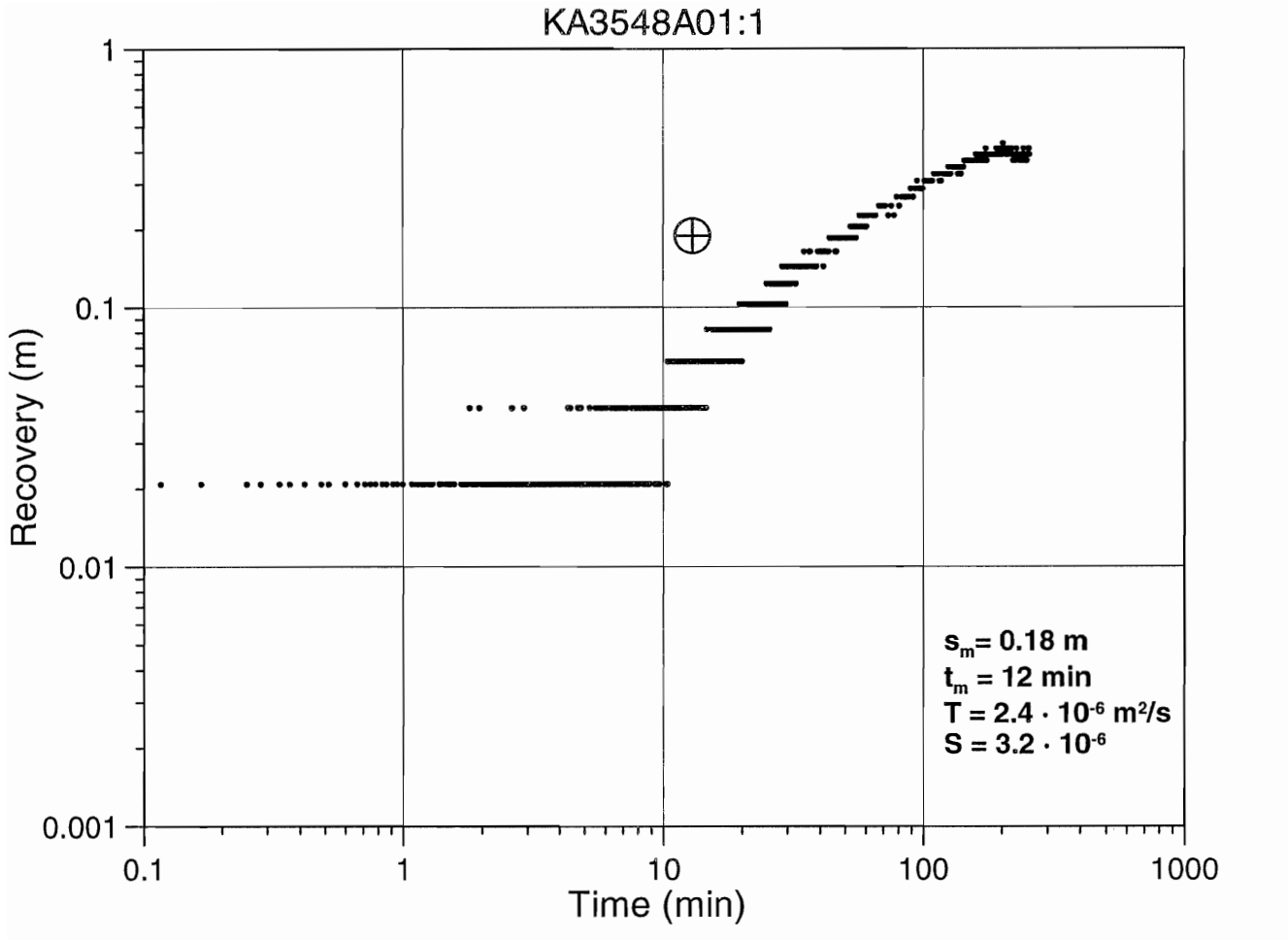


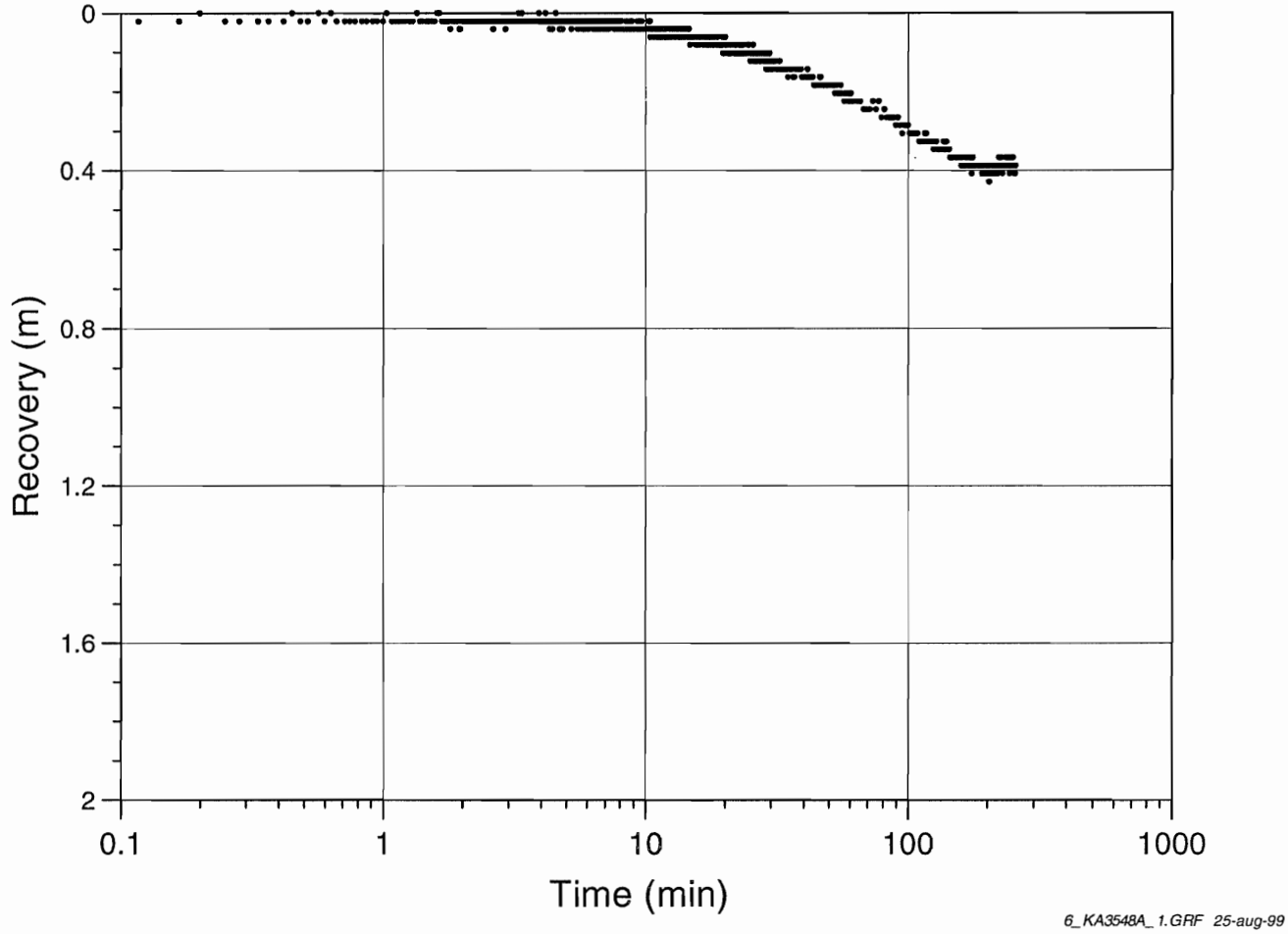
6_KA3590G1_3.GRF 25-aug-99



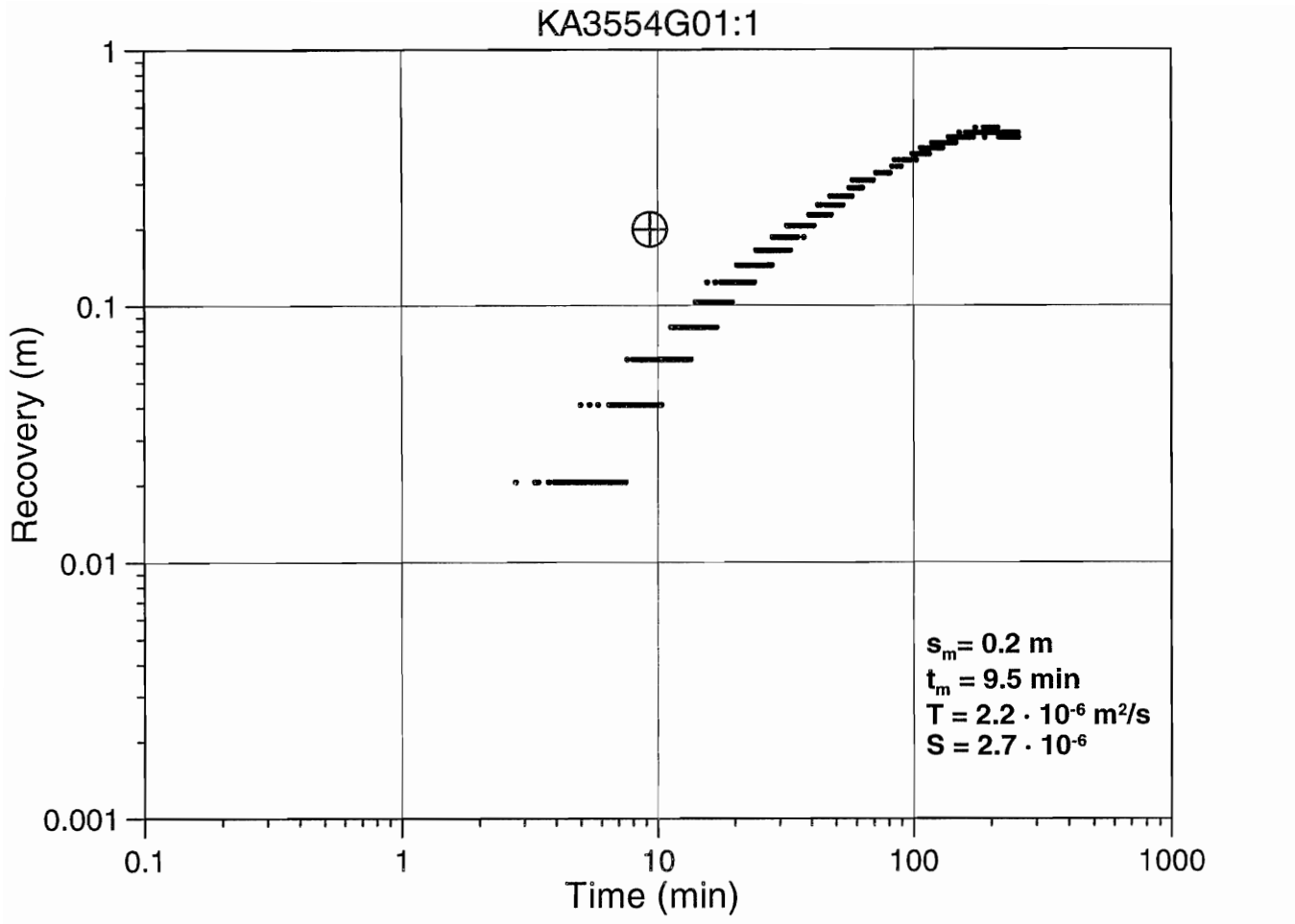


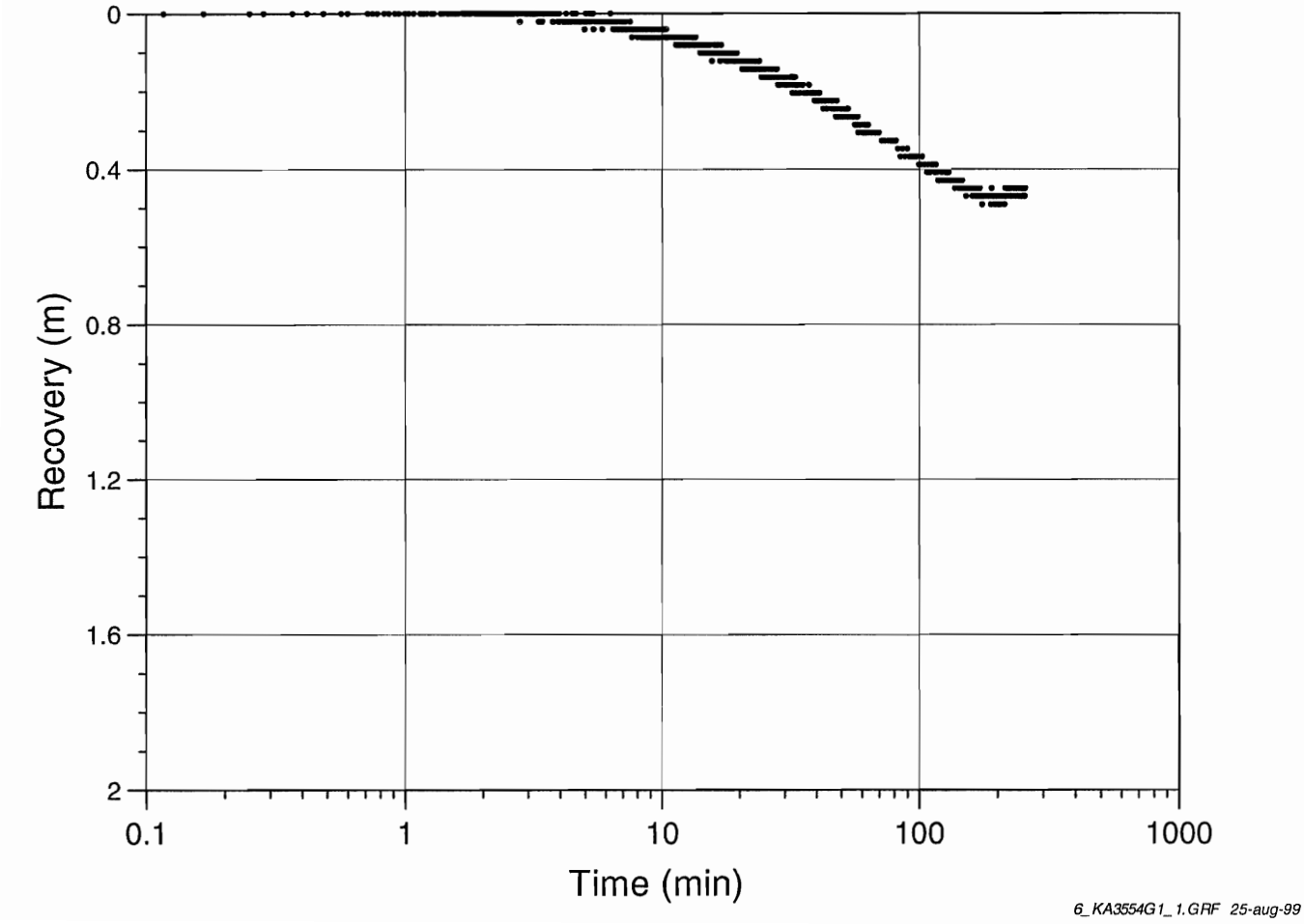
6_KA3510A_3.GRF 25-aug-99



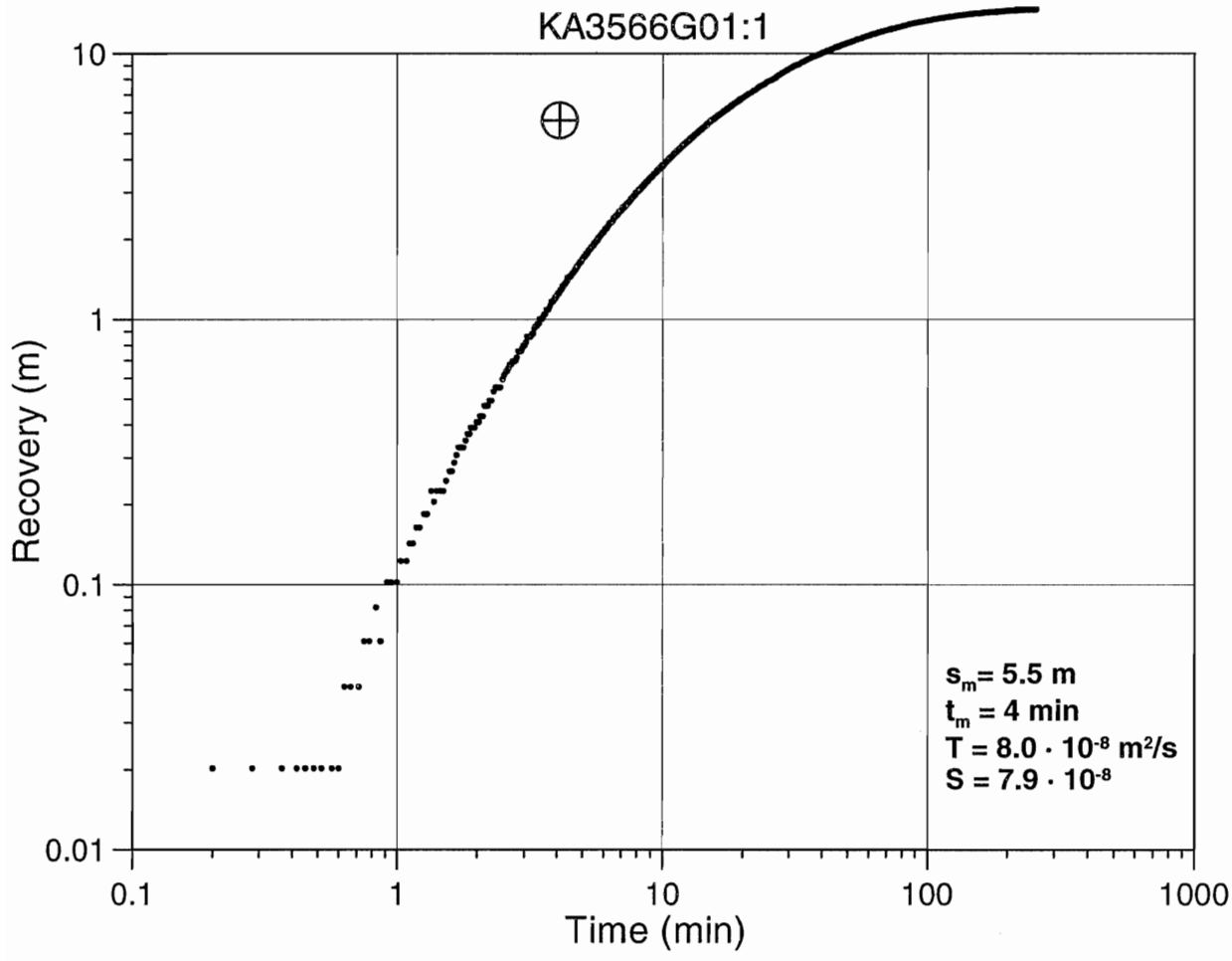


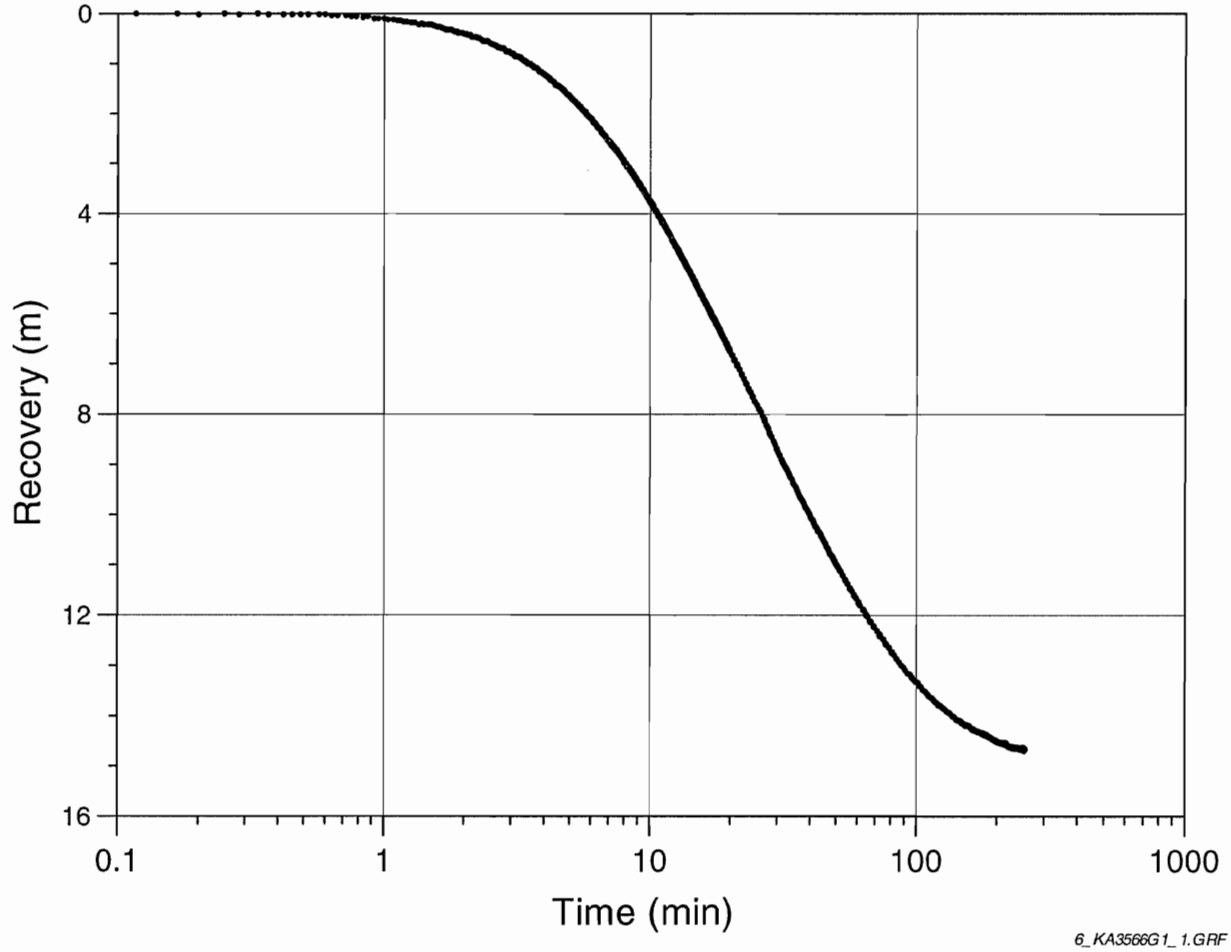
6_KA3548A_1.GRF 25-aug-99



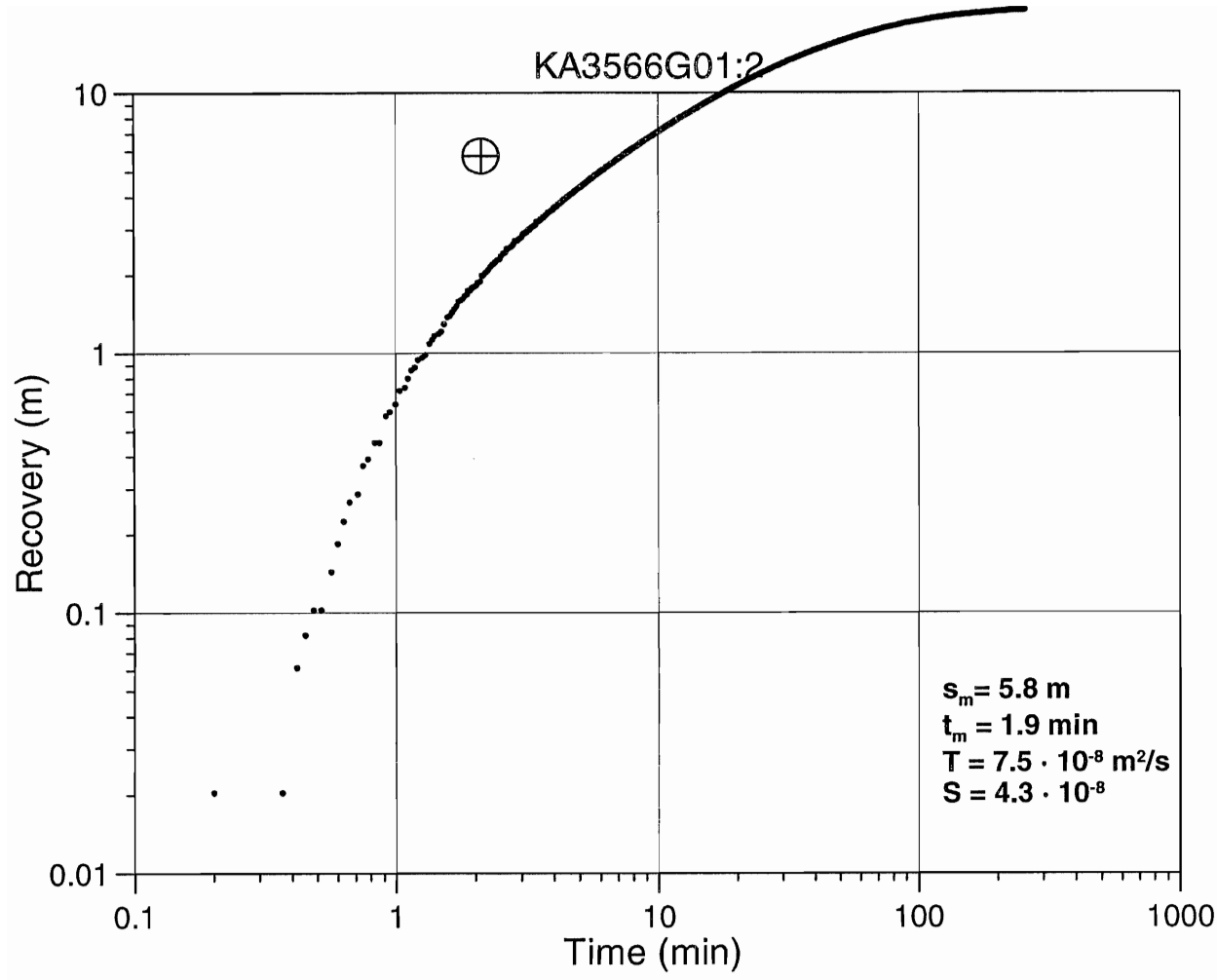


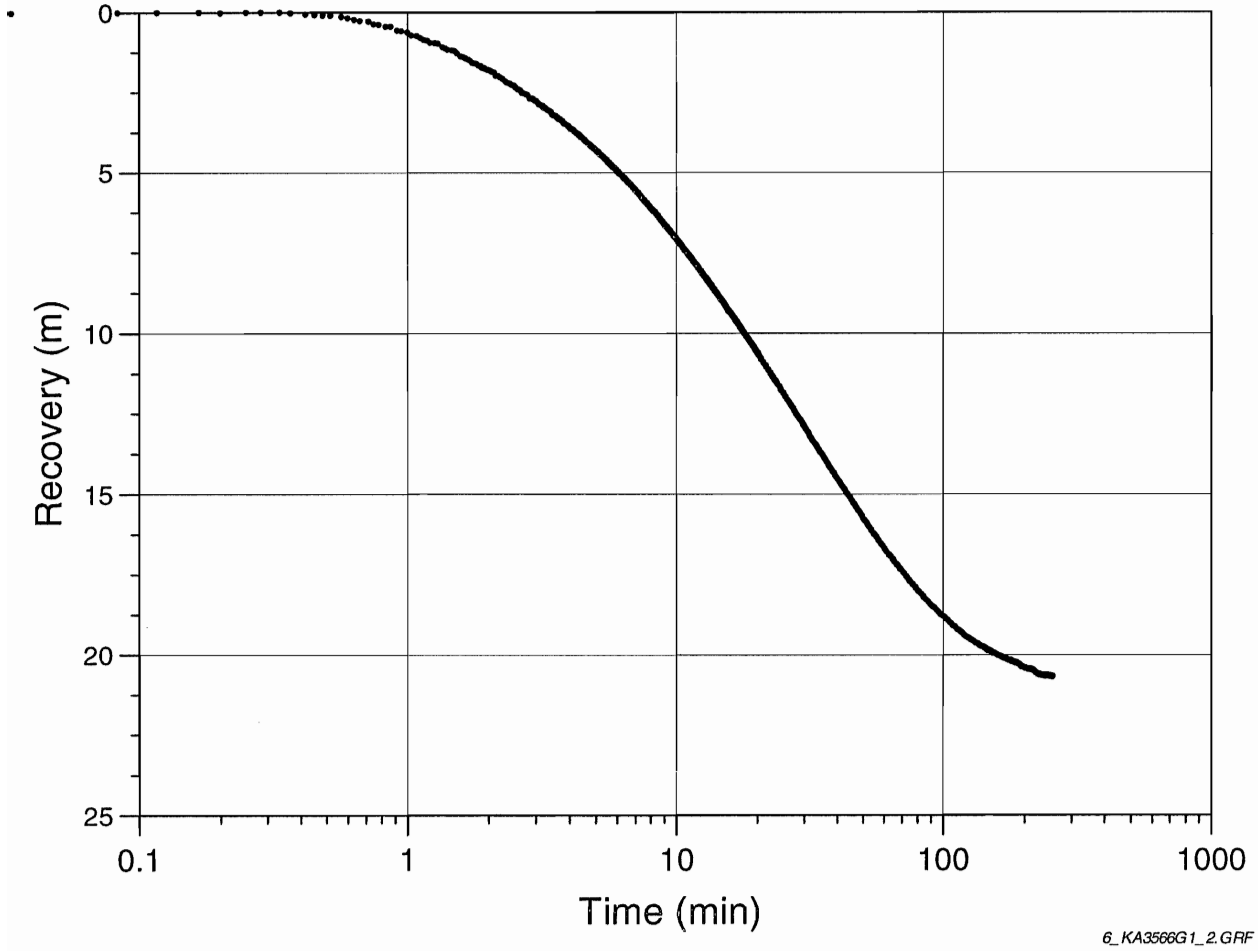
6_KA3554G1_1.GRF 25-aug-99



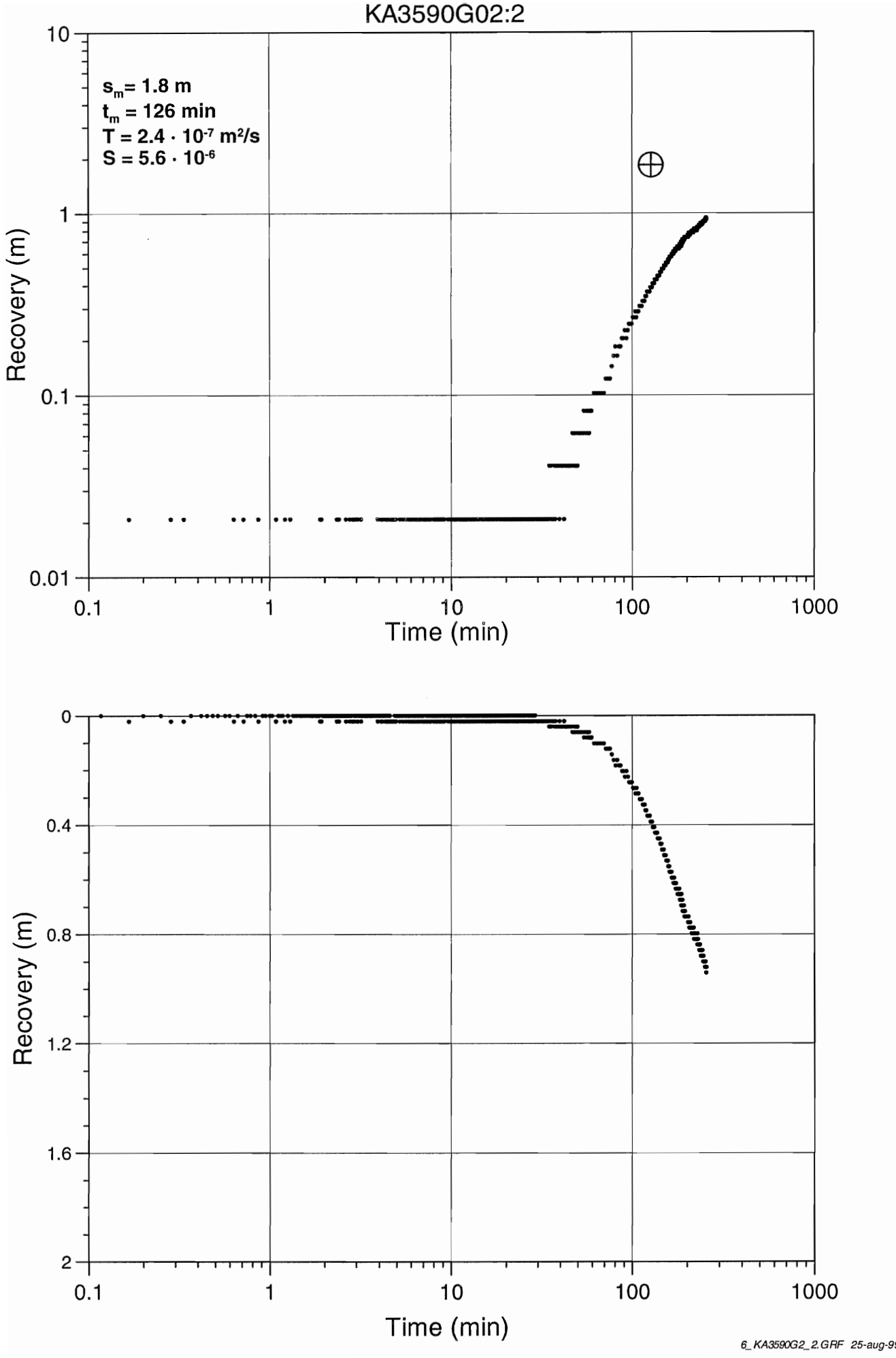


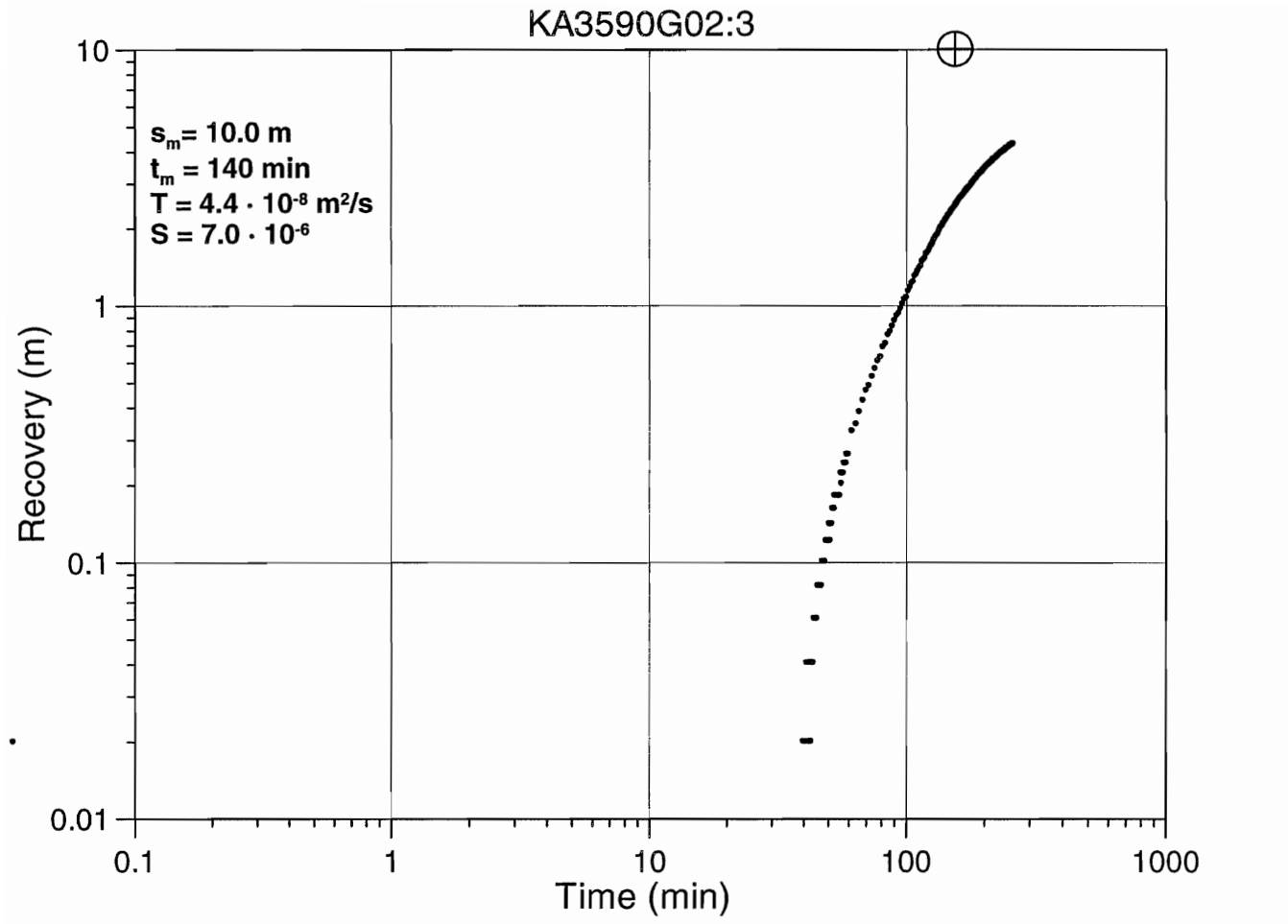
6_KA3566G1_1.GRF 25-aug-99

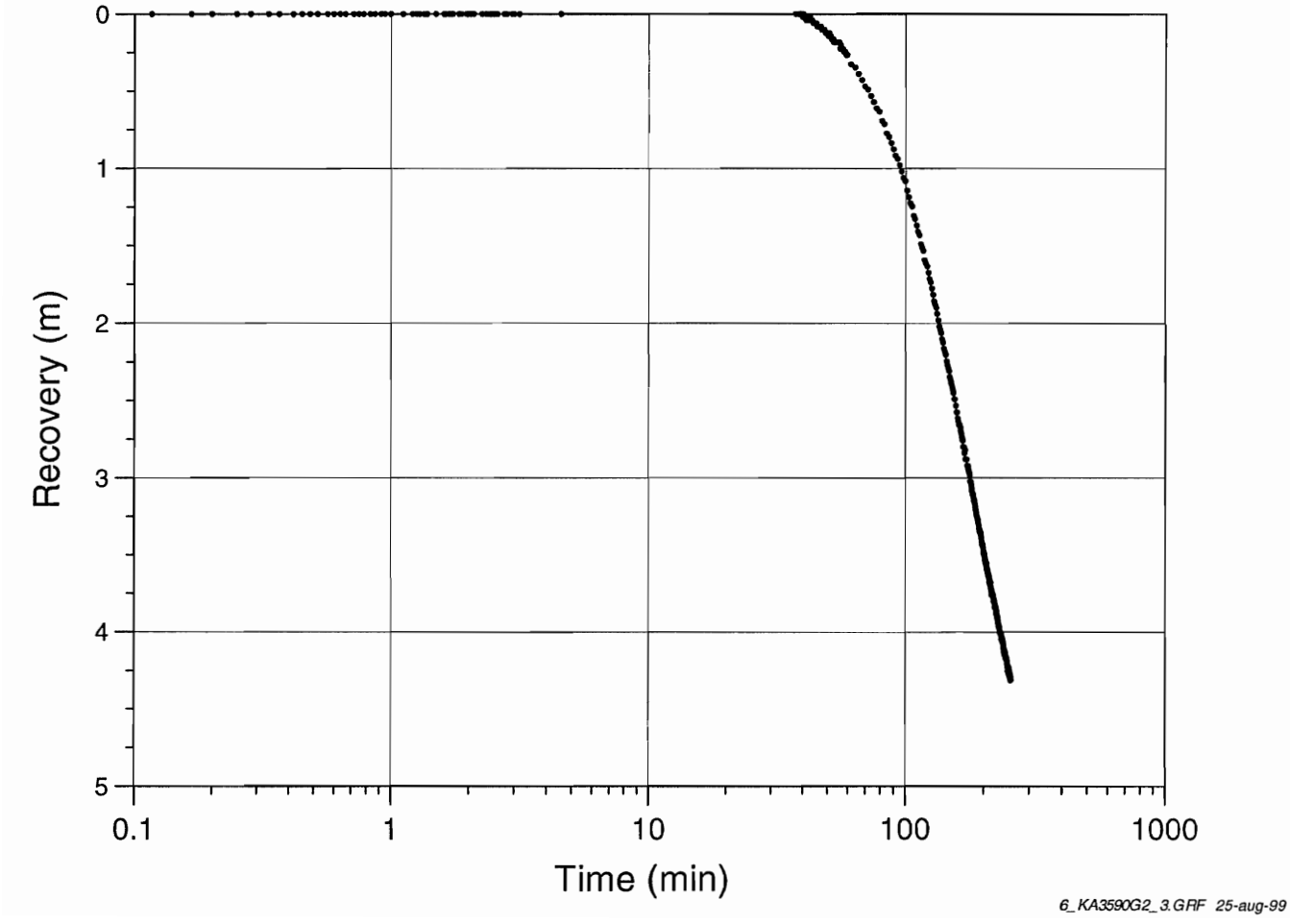




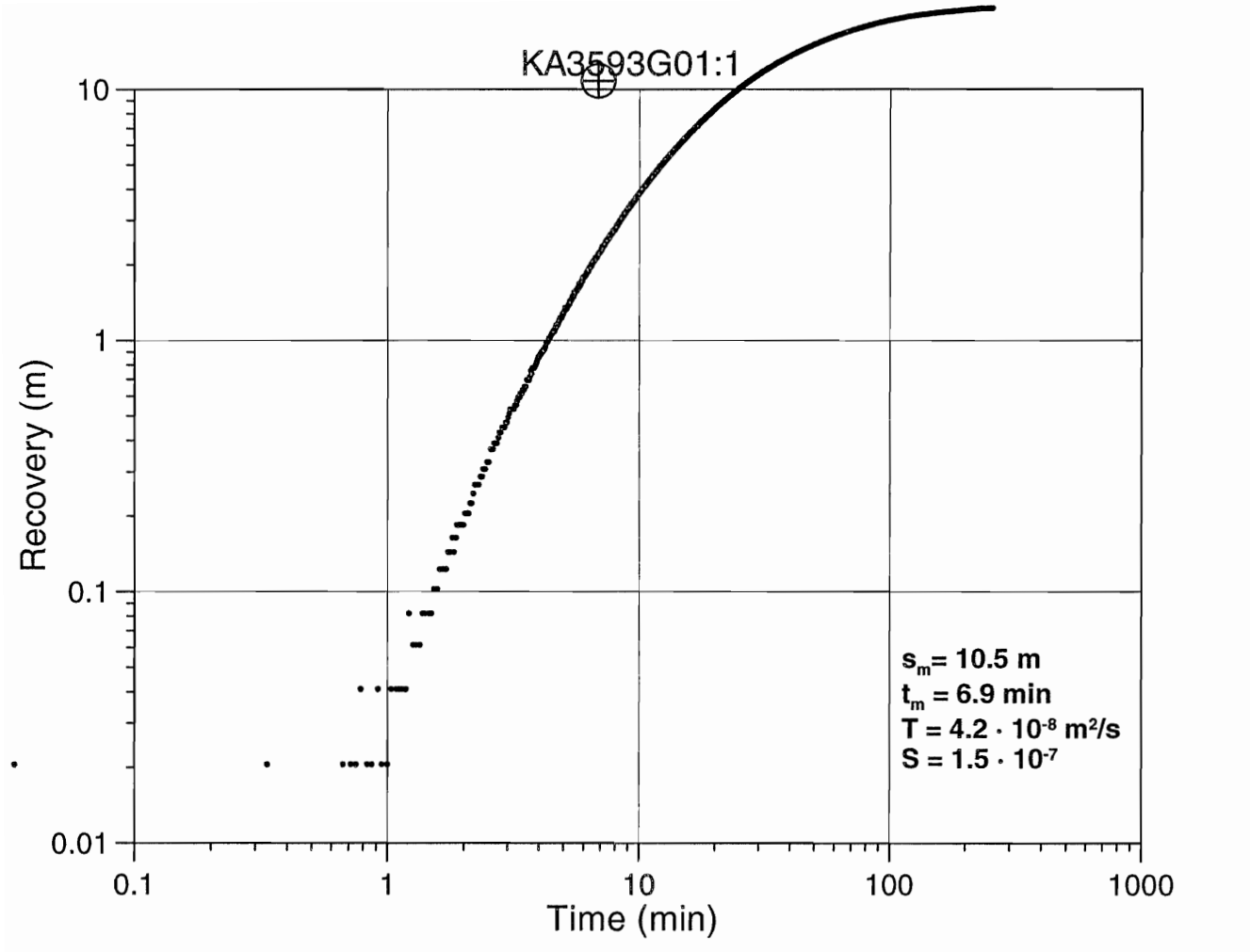
6_KA3566G1_2.GRF 25-aug-99

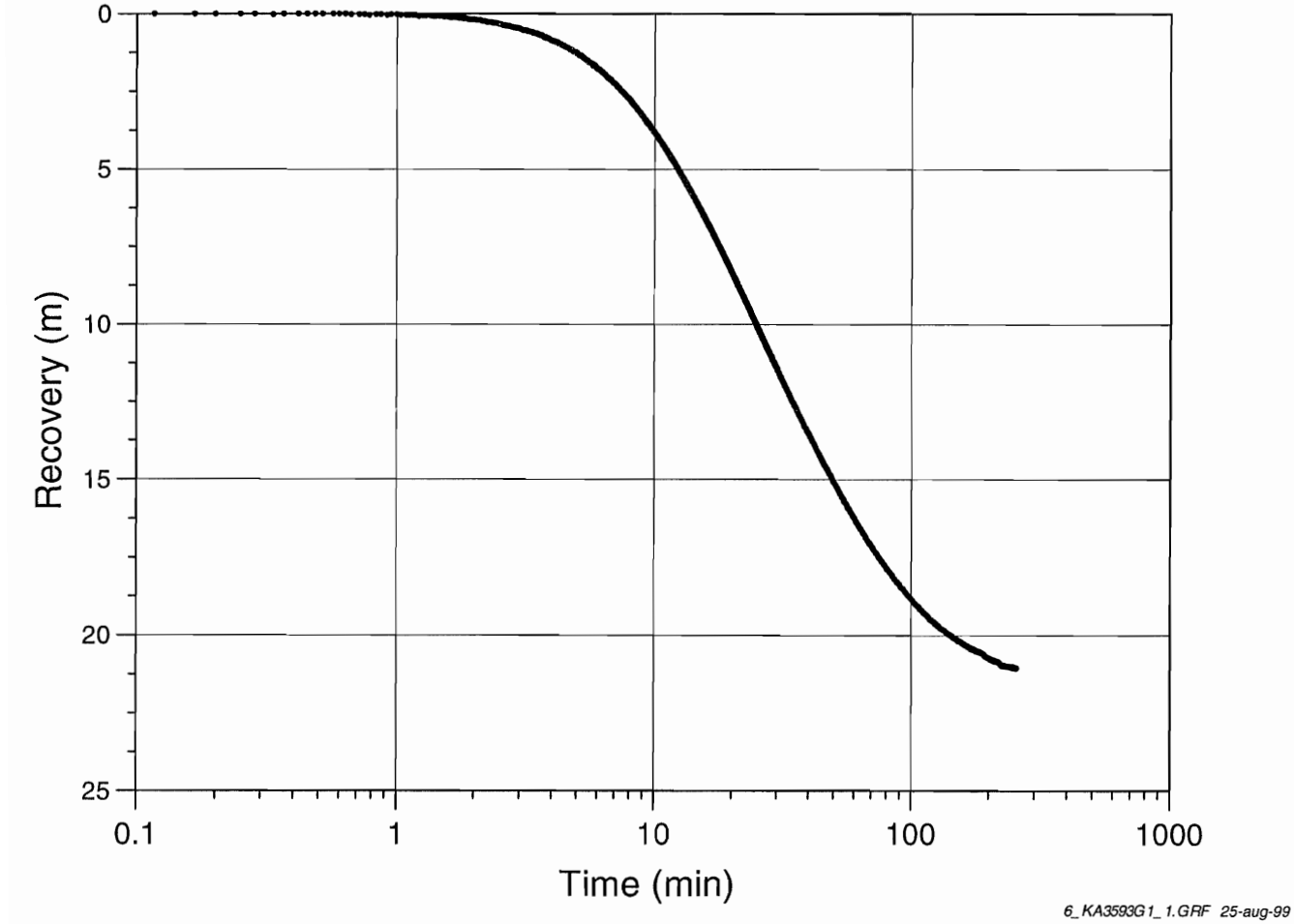

KA3590G02:2
s_m= 1.8 m
t_m = 126 min
T = 2.4 · 10^{-7} m^2/s
S = 5.6 · 10^{-6}
Recovery (m)
Time (min)
6_KA3590G2_2.GRF 25-aug-99





6_KA3590G2_3.GRF 25-aug-99





6_KA3593G1_1.GRF 25-aug-99

APPENDIX 8

Pressure head plots of boreholes within the repository area showing the levels between the beginning of March 1999 and the end of June 1999.

PLOT TIME :99/06/23 07:52:32

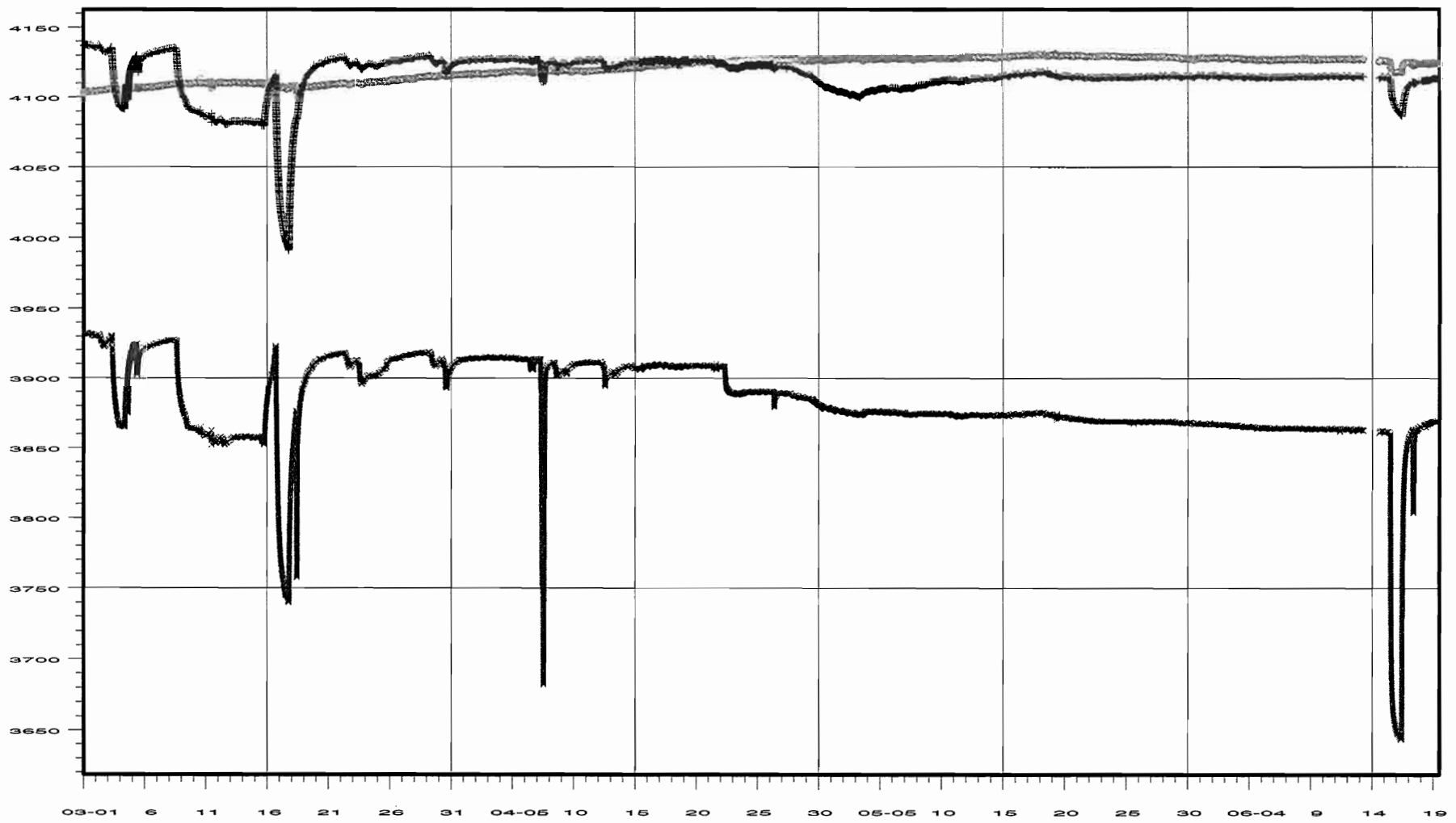
PLOT FILE :KA3510A

ÄSPÖ HRL

MD51 KA3510A1
122.02 - 150 m
kPa

MD52 KA3510A2
114.02 - 121.02
kPa

MD53 KA3510A3
4.52 - 113.02 m
kPa



START :99/03/01 00:00:00

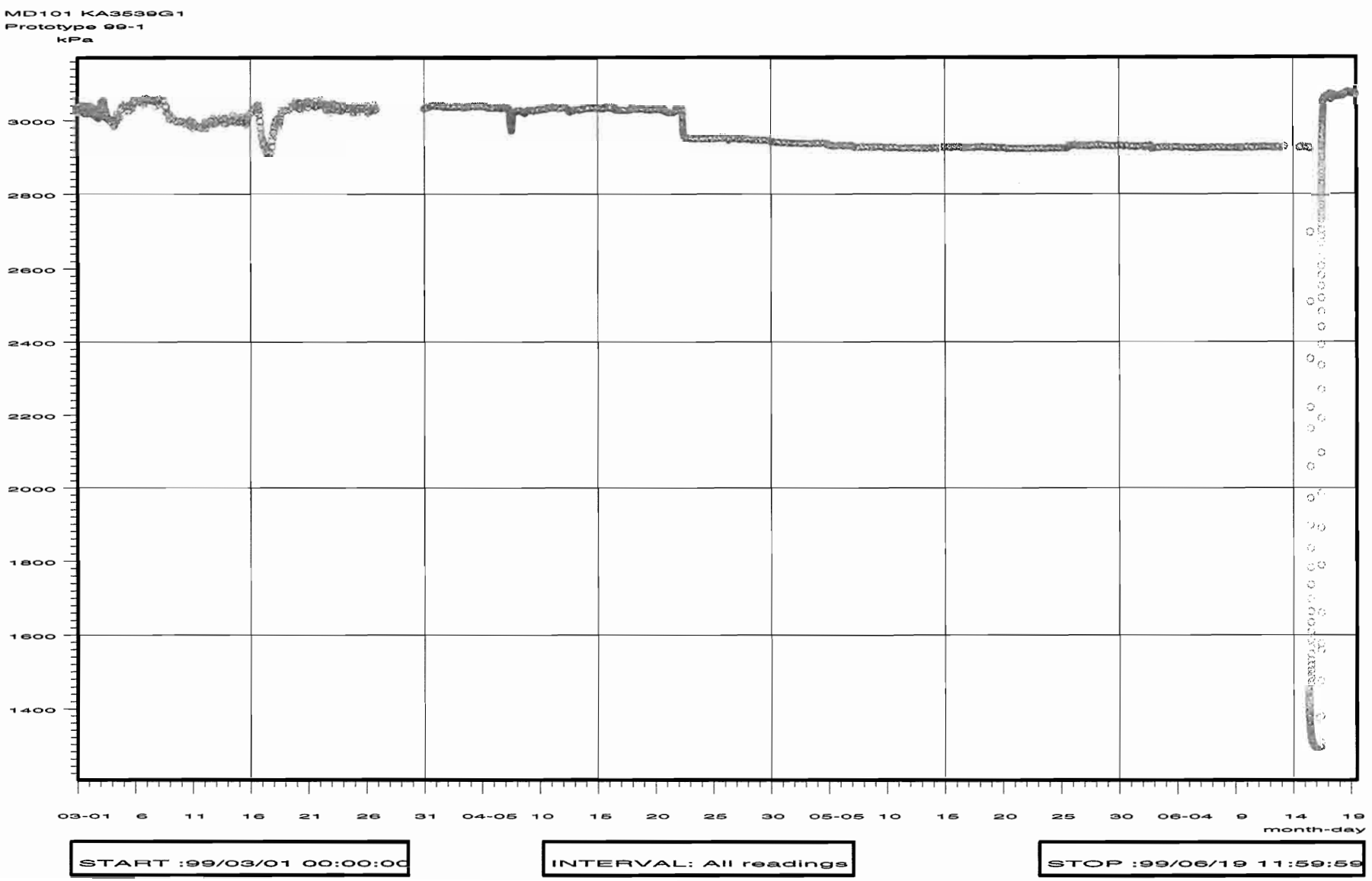
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:54:18

PLOT FILE :KA3539G

ÄSPÖ HRL



START :99/03/01 00:00:00

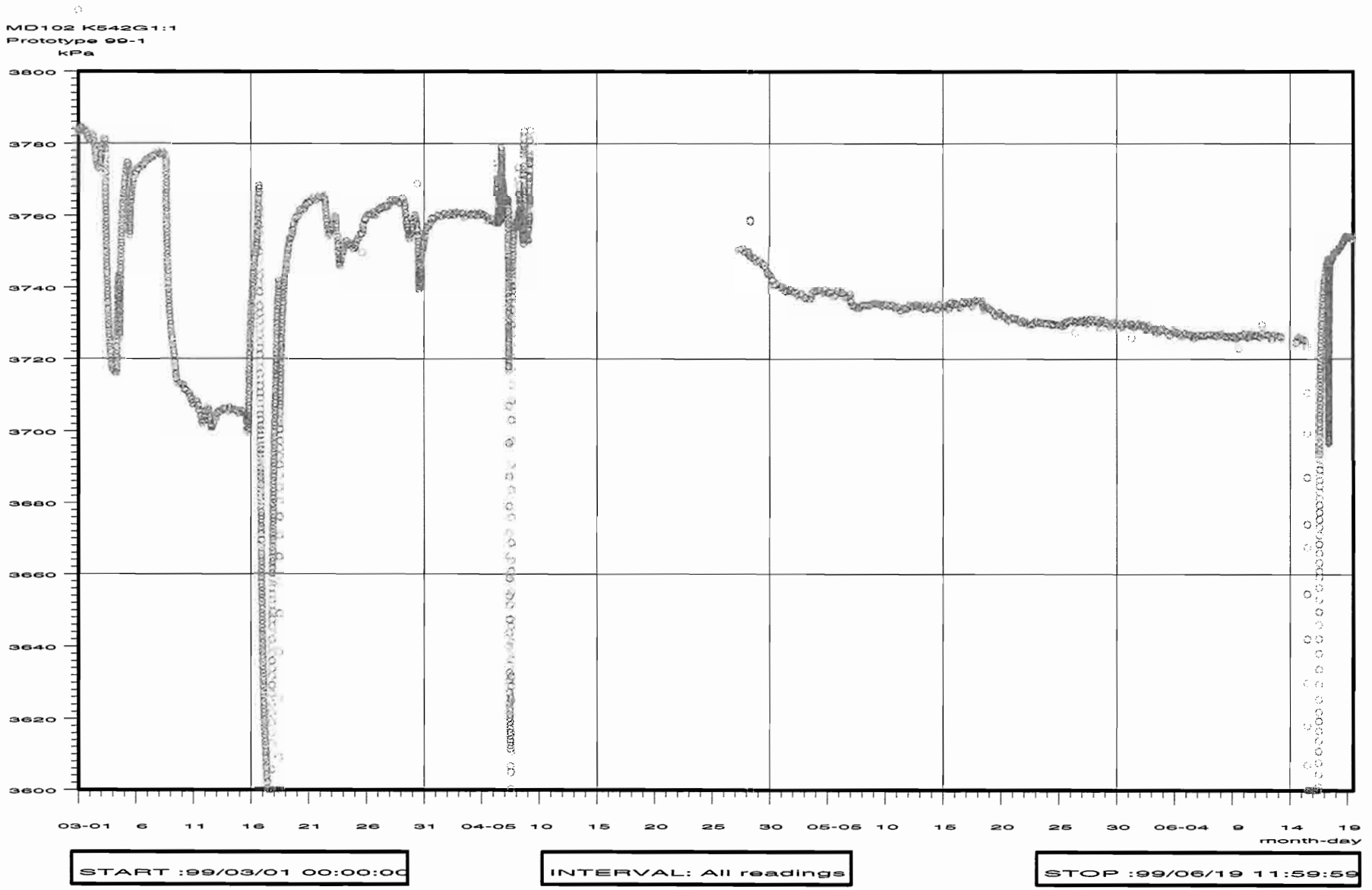
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:54:26

PLOT FILE :KA3542G01

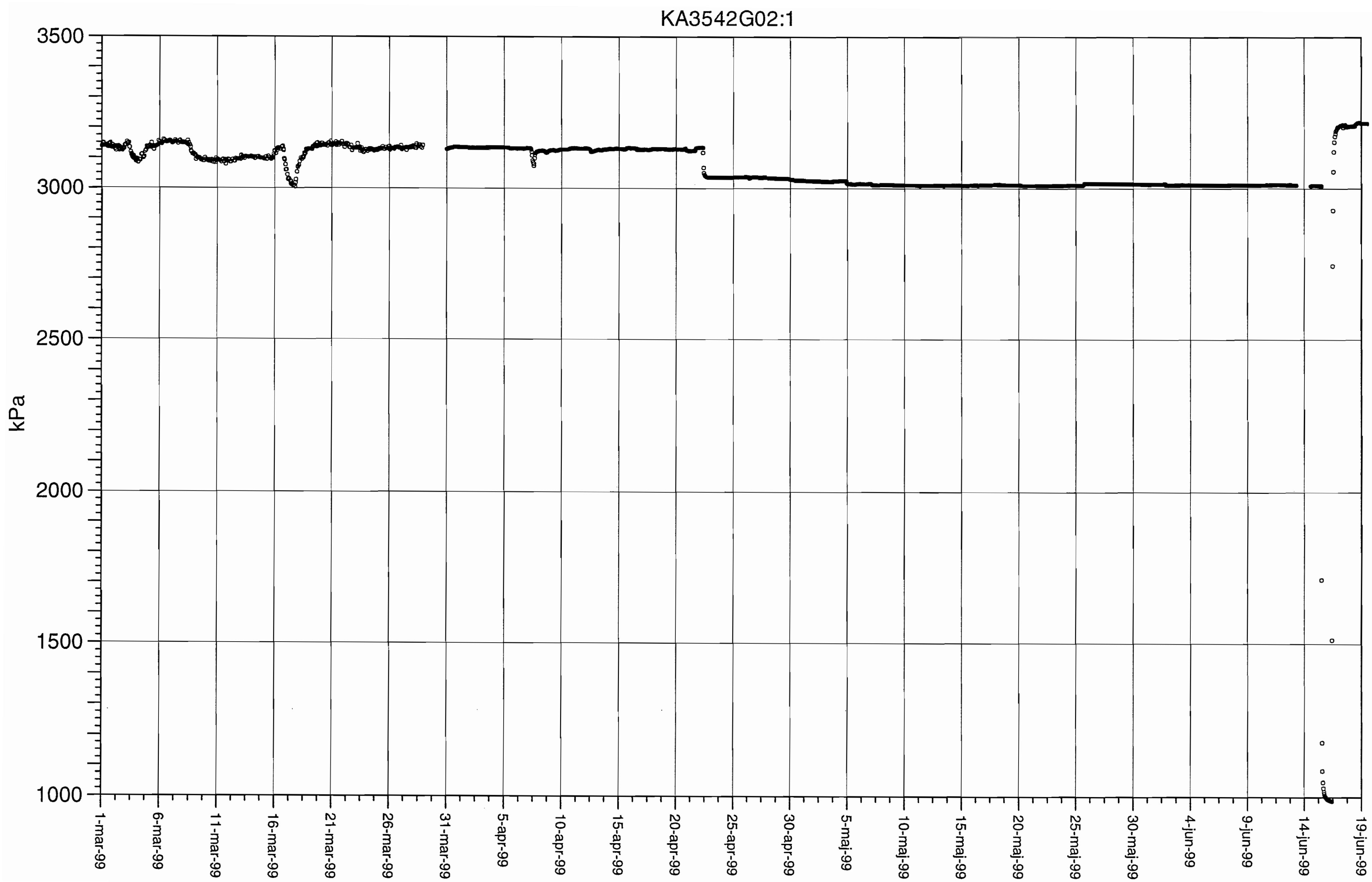
ÄSPÖ HRL



START :99/03/01 00:00:00

INTERVAL: All readings

STOP :99/06/19 11:59:59



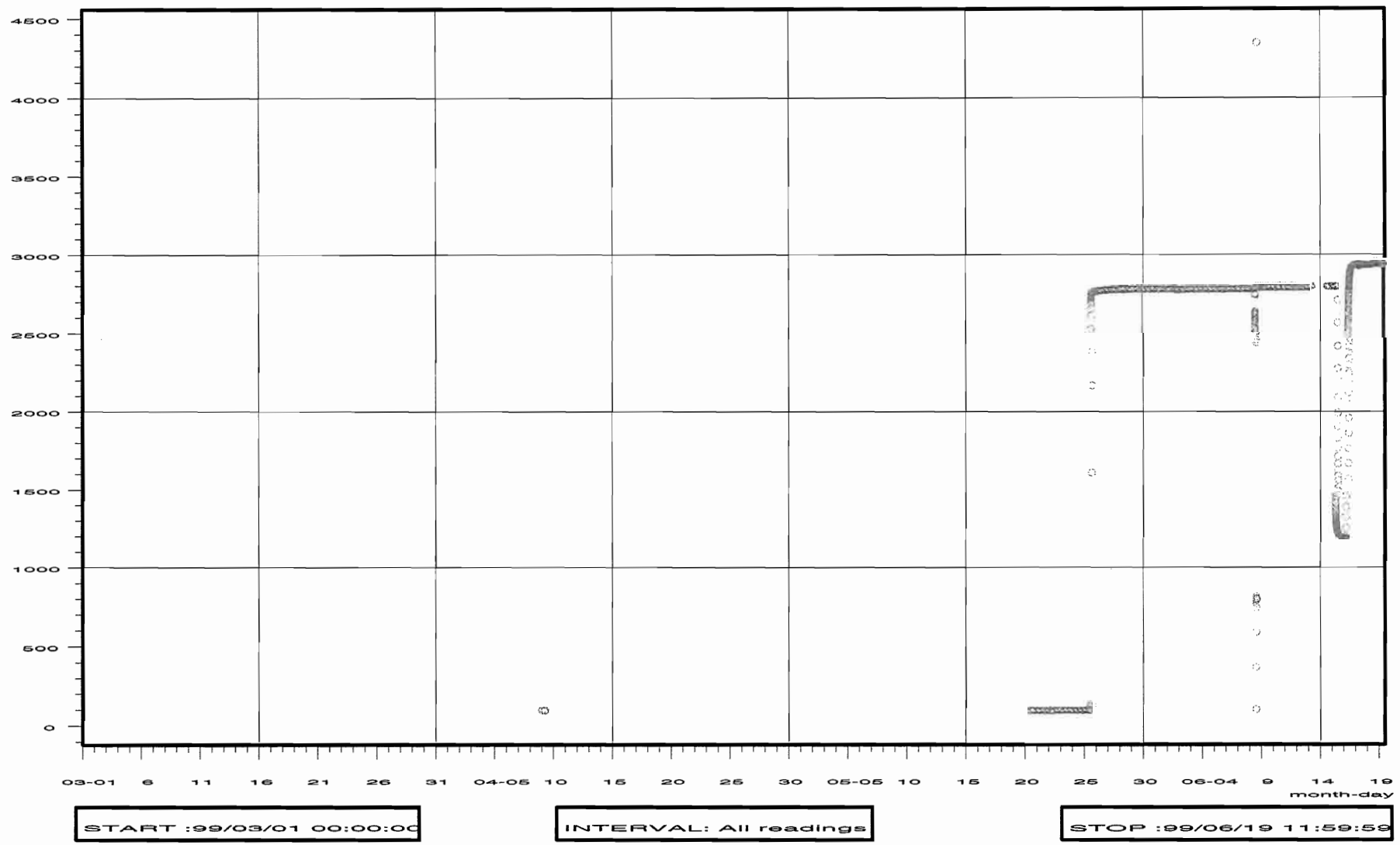
KA3542G02:1
kPa
3500
3000
2500
2000
1500
1000
1-mar-99
6-mar-99
11-mar-99
16-mar-99
21-mar-99
26-mar-99
31-mar-99
5-apr-99
10-apr-99
15-apr-99
20-apr-99
25-apr-99
30-apr-99
5-maj-99
10-maj-99
15-maj-99
20-maj-99
25-maj-99
30-maj-99
4-jun-99
9-jun-99
14-jun-99
19-jun-99

PLOT TIME :99/06/23 07:54:47

PLOT FILE :KA3544G01

ÄSPÖ HRL

MD104 K544G1:1
Prototype 99-1
kPa



START :99/03/01 00:00:00

INTERVAL: All readings

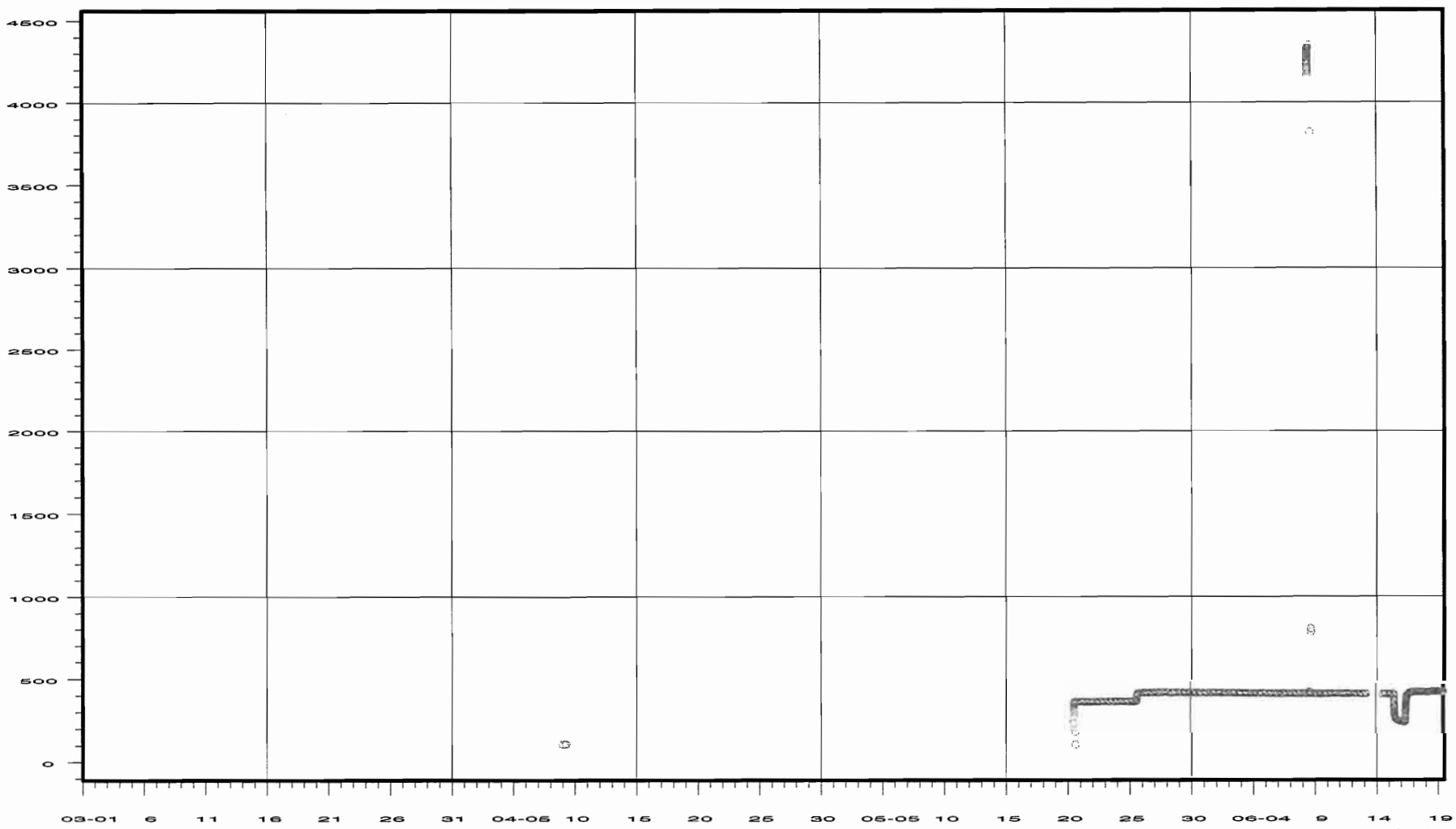
STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:54:52

PLOT FILE :KA3546G01

ÄSPÖ HRL

MD105 K546G1:1
Prototype 99-1
kPa



START :99/03/01 00:00:00

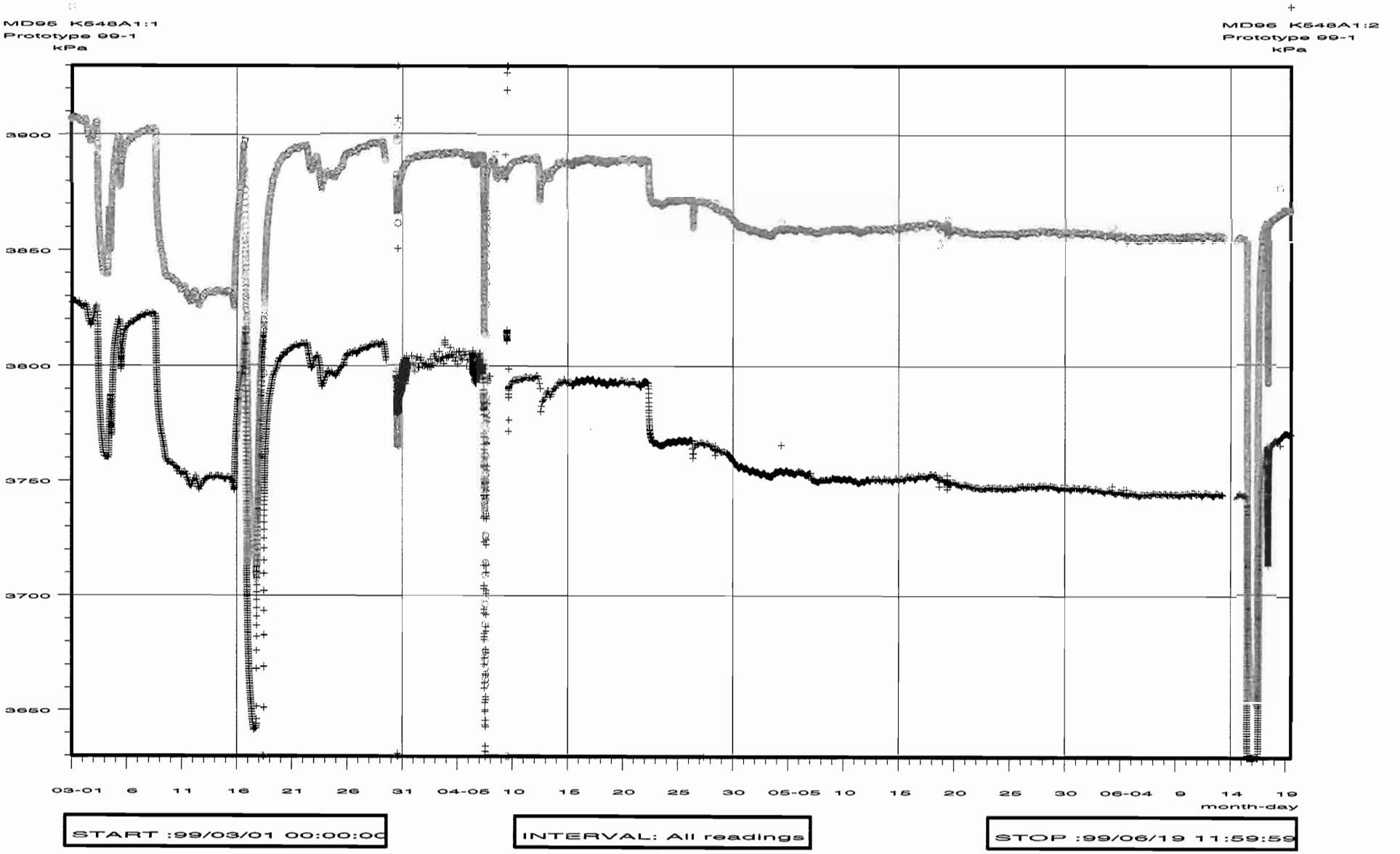
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:54:58

PLOT FILE :KA3548A01

ÄSPÖ HRL



START :99/03/01 00:00:00

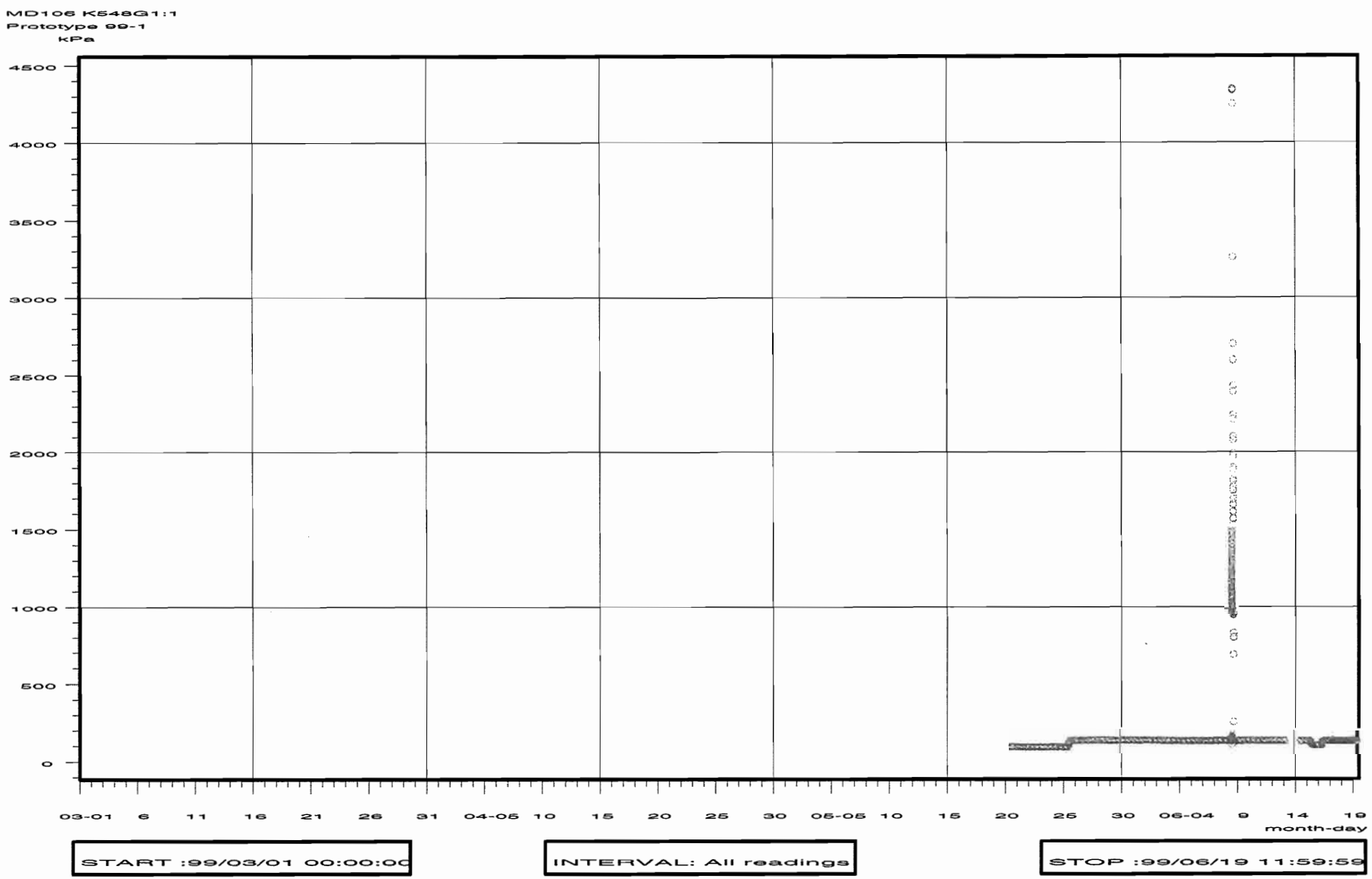
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:56:09

PLOT FILE :KA3548G01

ÄSPÖ HRL



START :99/03/01 00:00:00

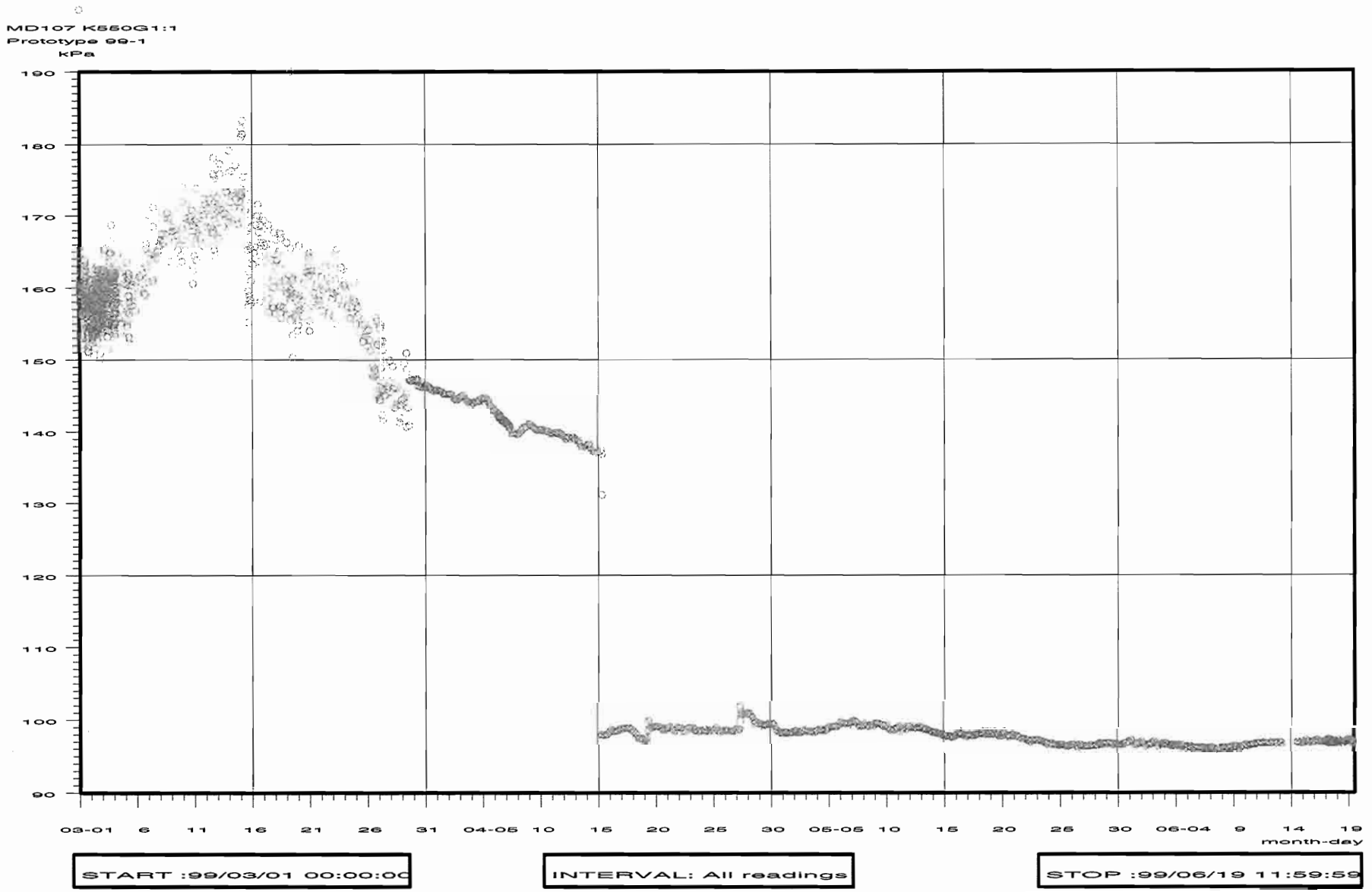
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:56:14

PLOT FILE :KA3550G01

ÄSPÖ HRL



START :99/03/01 00:00:00

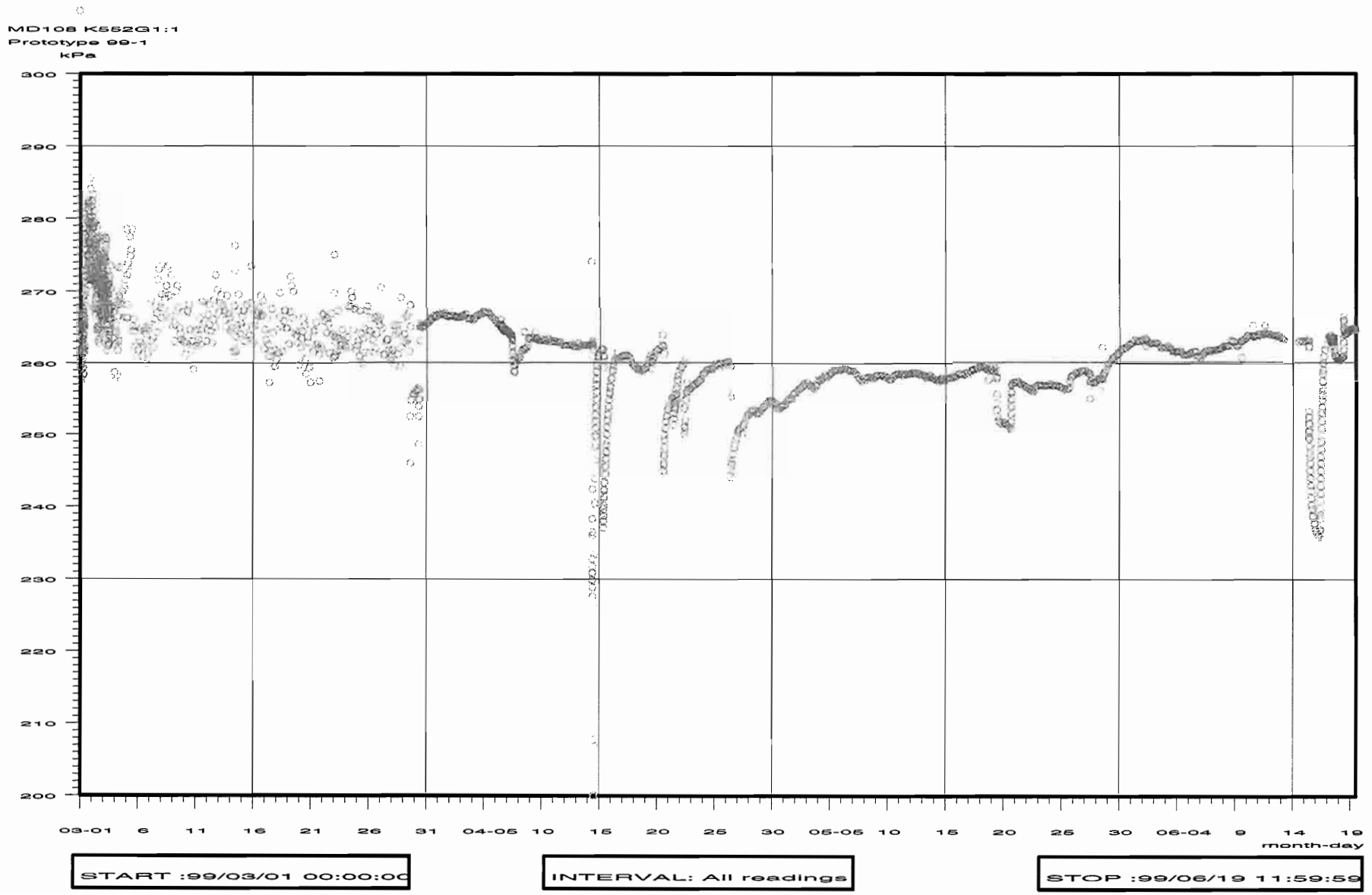
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:56:27

PLOT FILE :KA3552G01

ÄSPÖ HRL



START :99/03/01 00:00:00

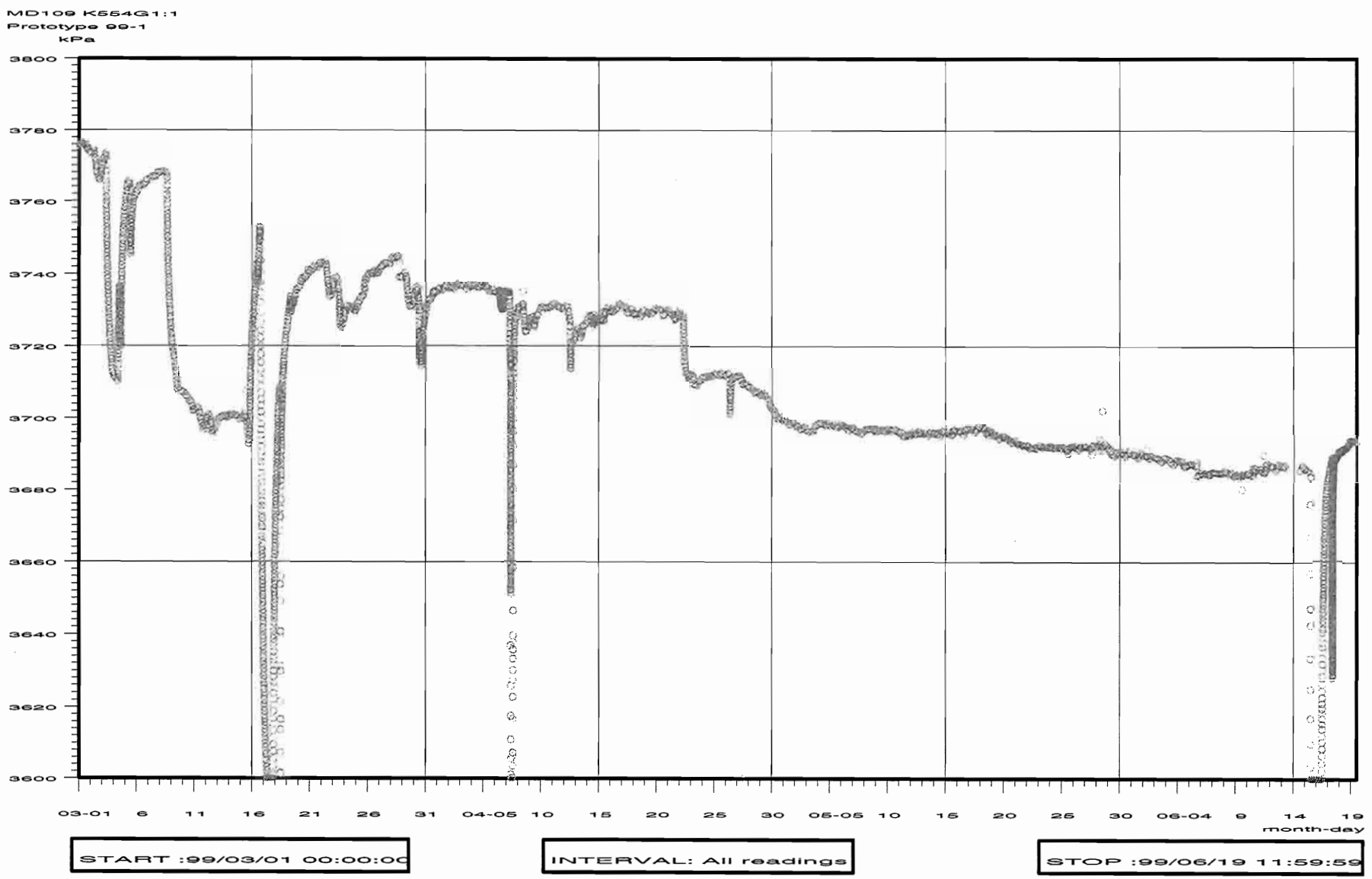
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:56:38

PLOT FILE :KA3554G01

ÄSPÖ HRL



START :99/03/01 00:00:00

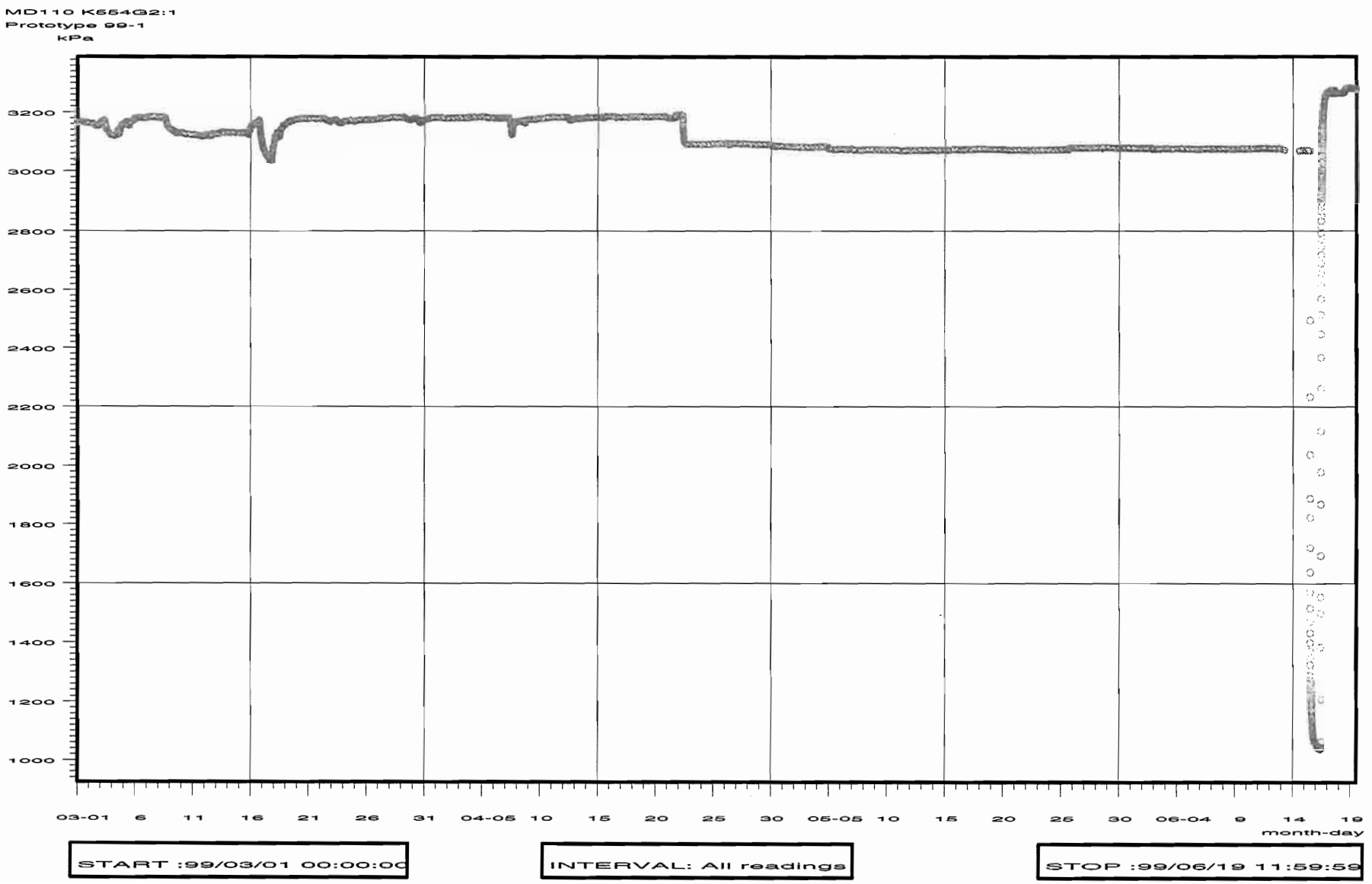
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:56:52

PLOT FILE :KA3554G02

ÄSPÖ HRL



START :99/03/01 00:00:00

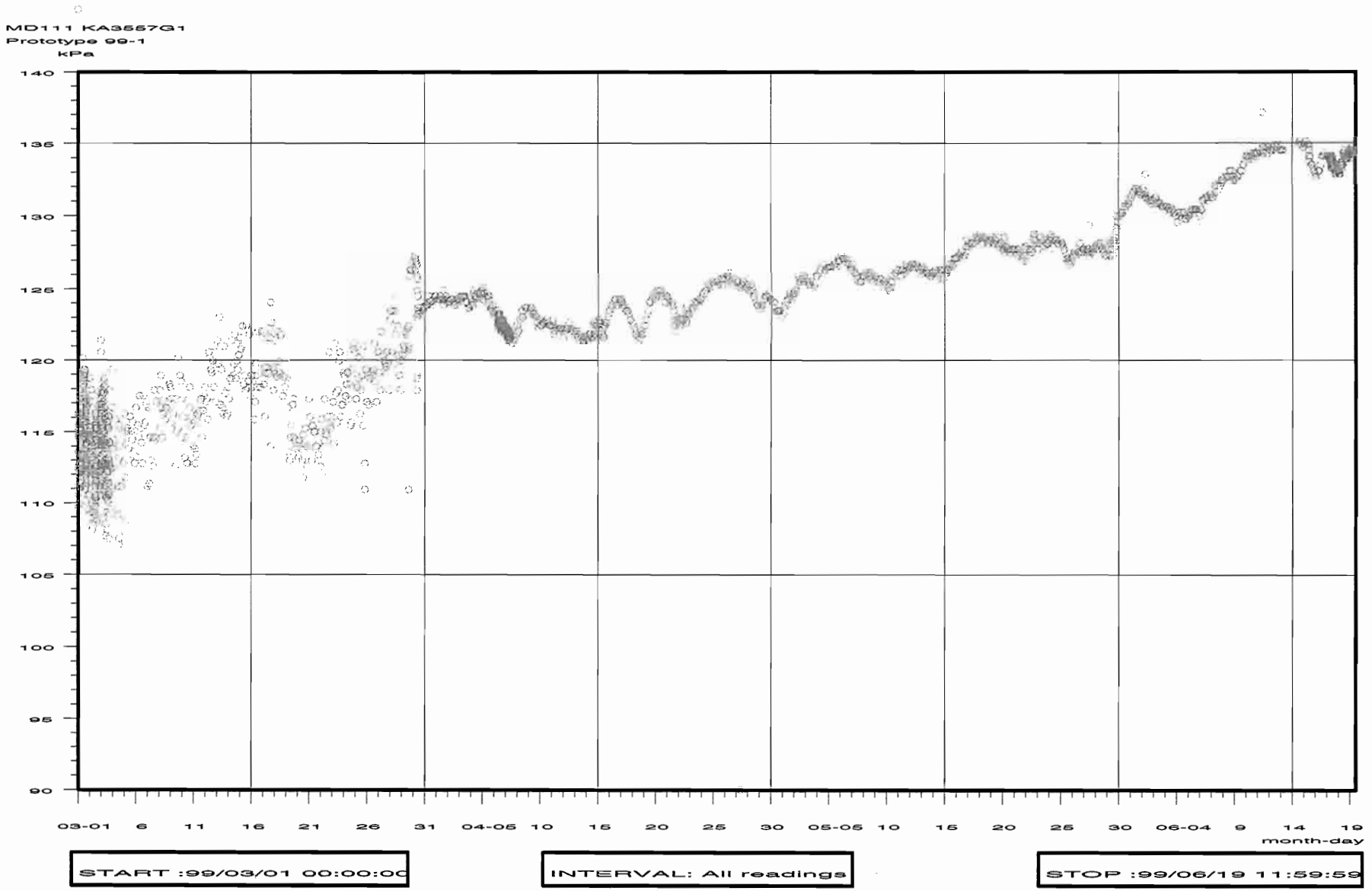
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:57:04

PLOT FILE :KA3557G

ÄSPÖ HRL



START :99/03/01 00:00:00

INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:57:13

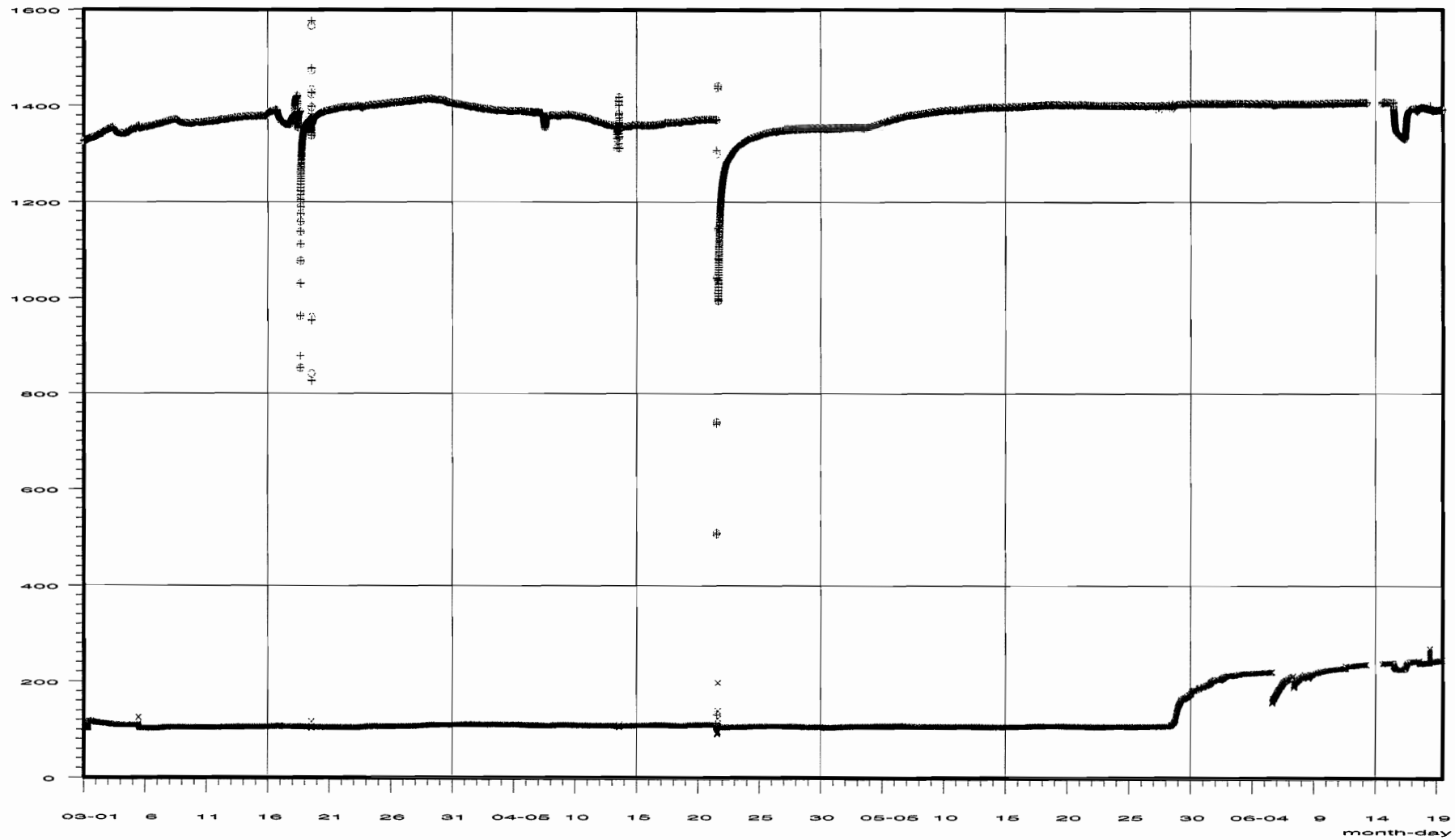
PLOT FILE :KA3563G

ÄSPÖ HRL

MD62 KA3563G1
Prototype 99-1
kPa

MD63 KA3563G2
Prototype 99-1
kPa

MD64 KA3563G3
Prototype 99-1
kPa



START :99/03/01 00:00:00

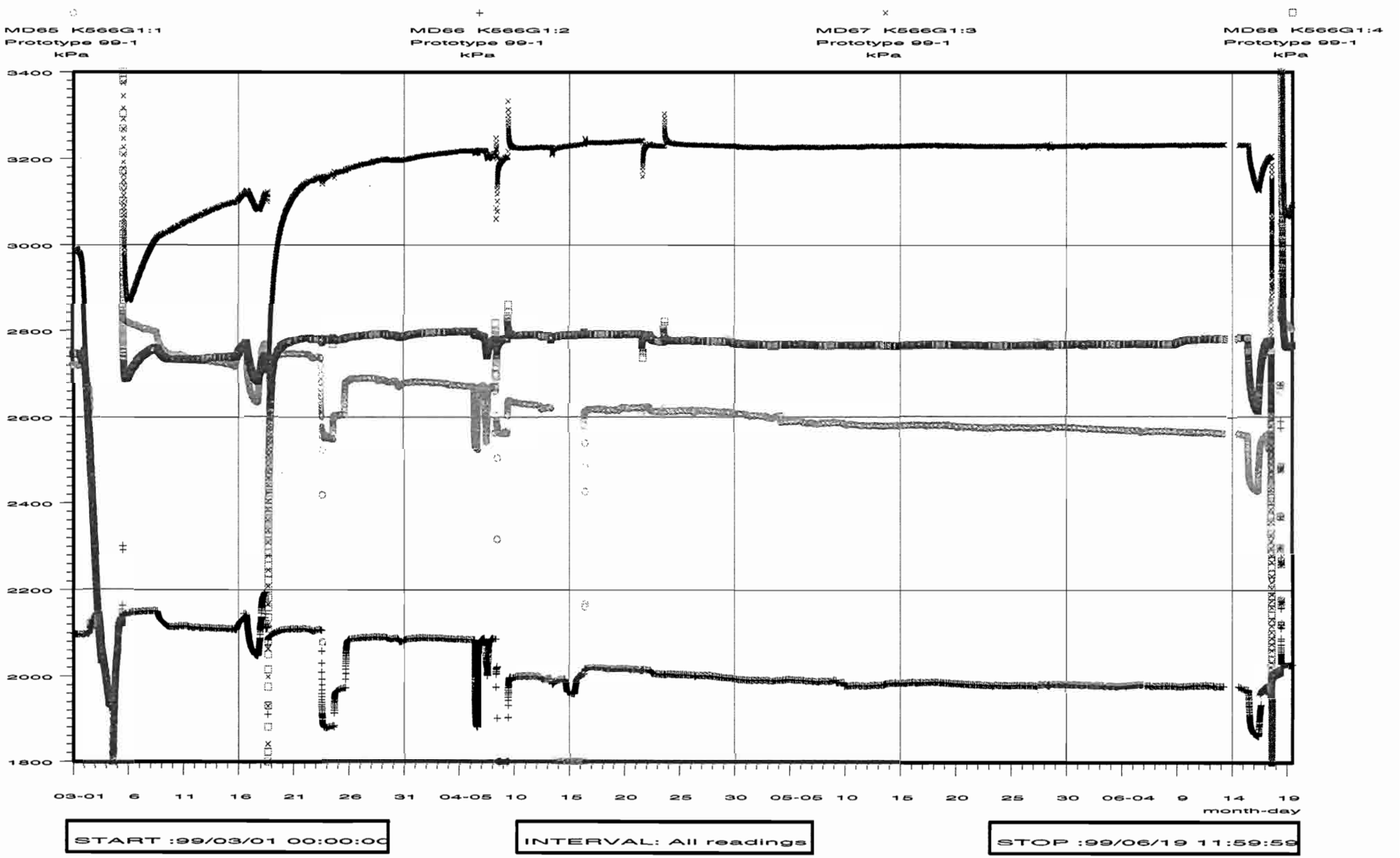
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:57:44

PLOT FILE :KA3566G01

ÄSPÖ HRL



START :99/03/01 00:00:00

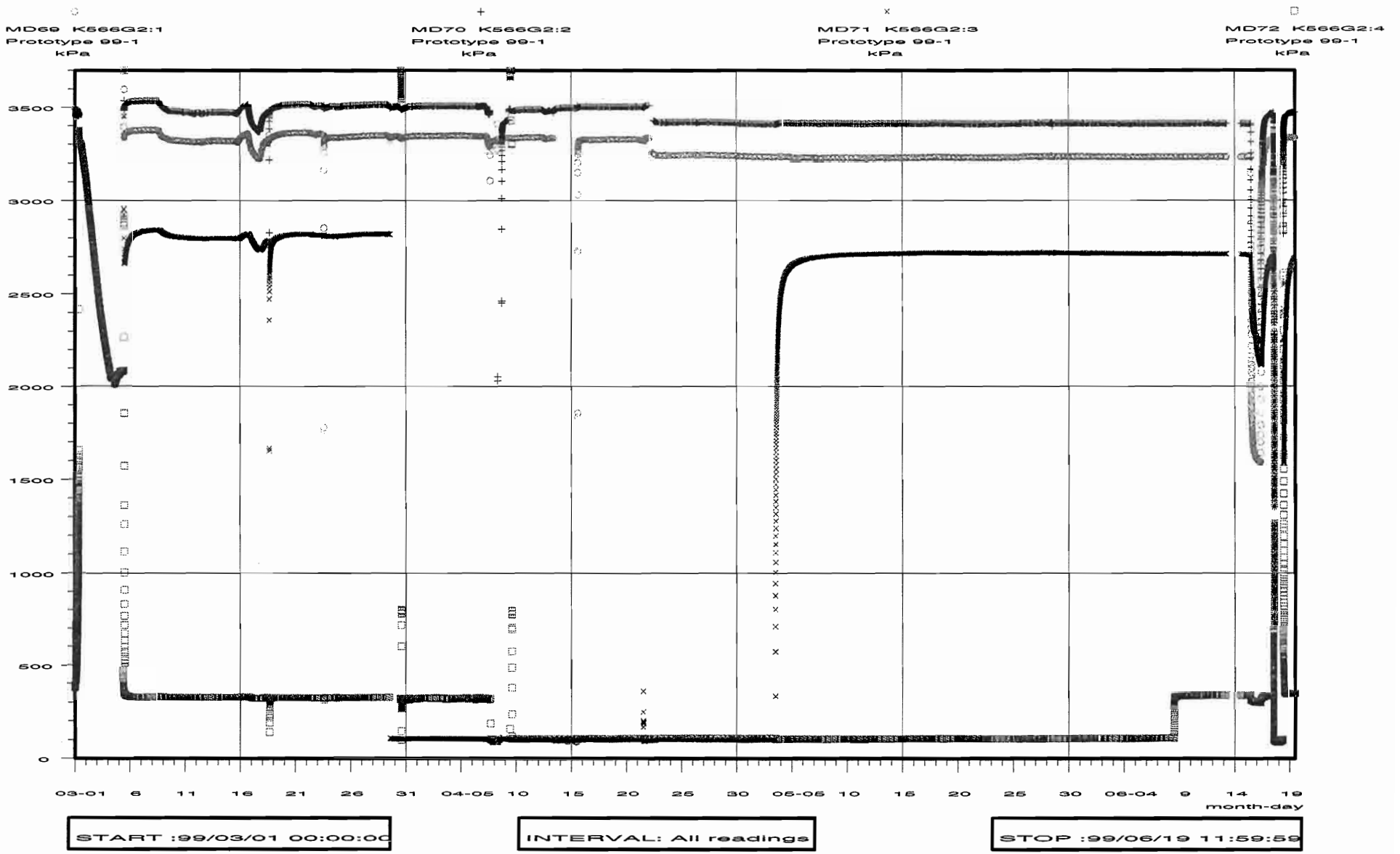
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:58:32

PLOT FILE :KA3566G02

ÄSPÖ HRL



START :99/03/01 00:00:00

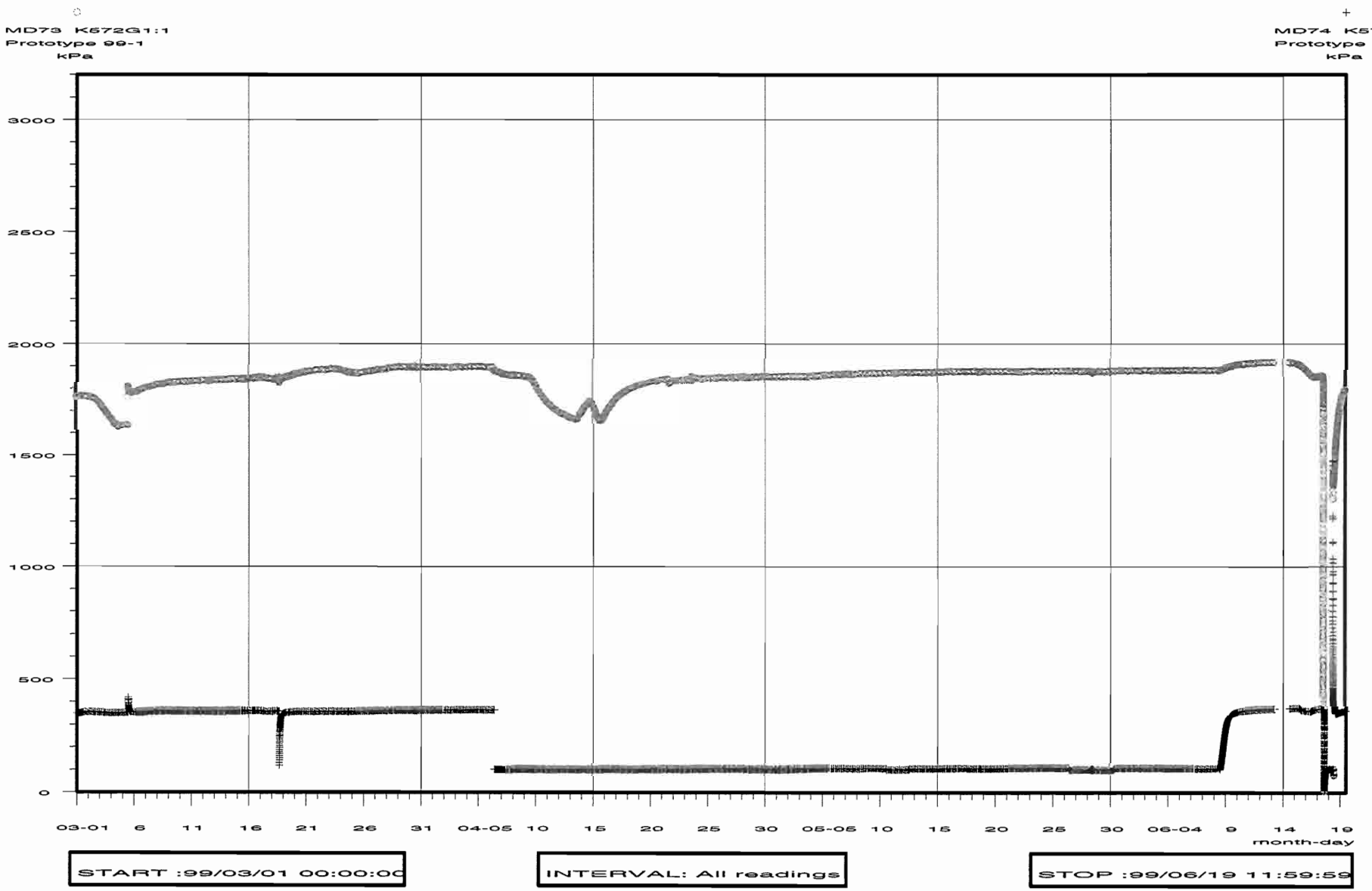
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:59:28

PLOT FILE :KA3572G01

ÄSPÖ HRL



START :99/03/01 00:00:00

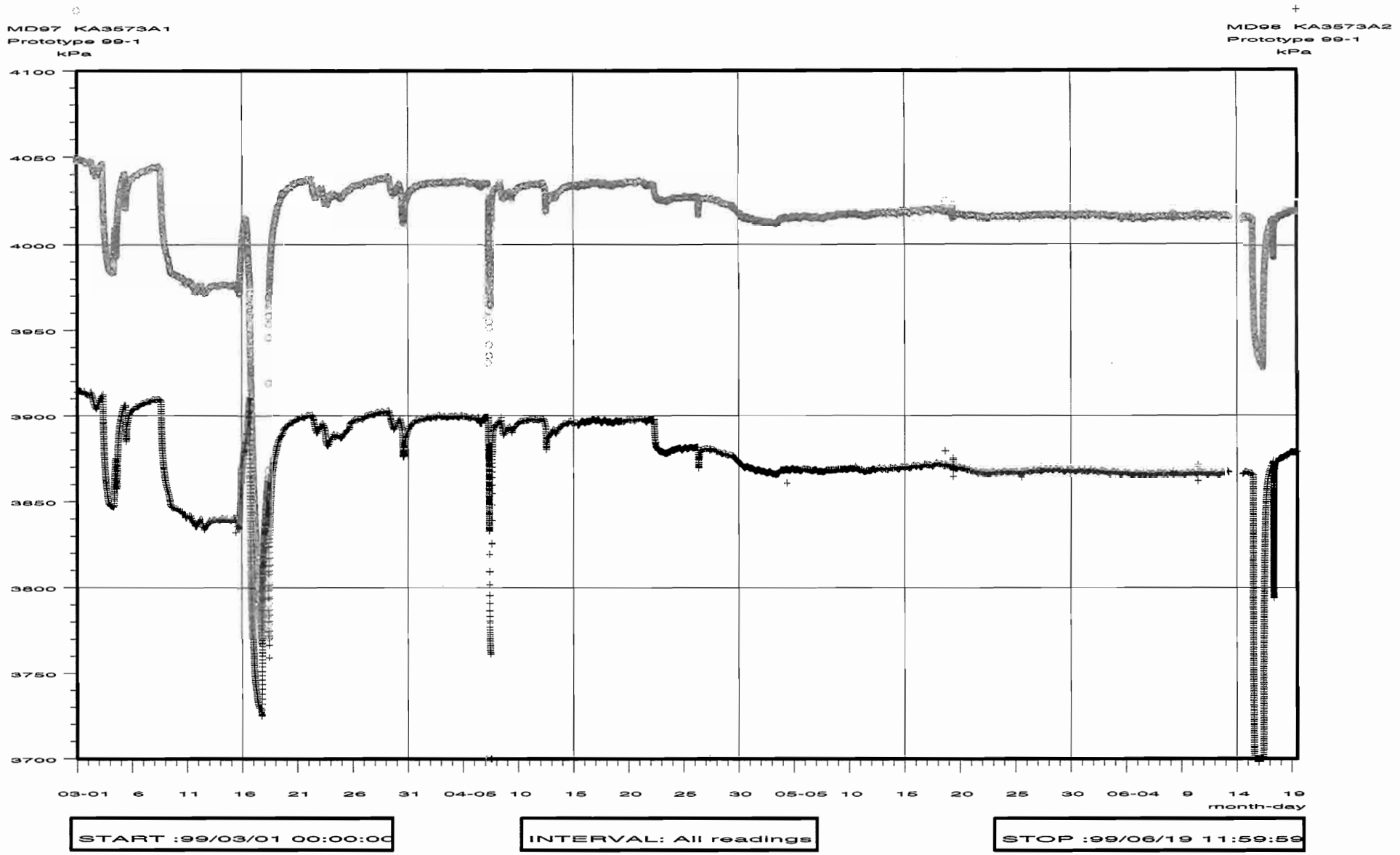
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:59:46

PLOT FILE :KA3573A

ÄSPÖ HRL



START :99/03/01 00:00:0C

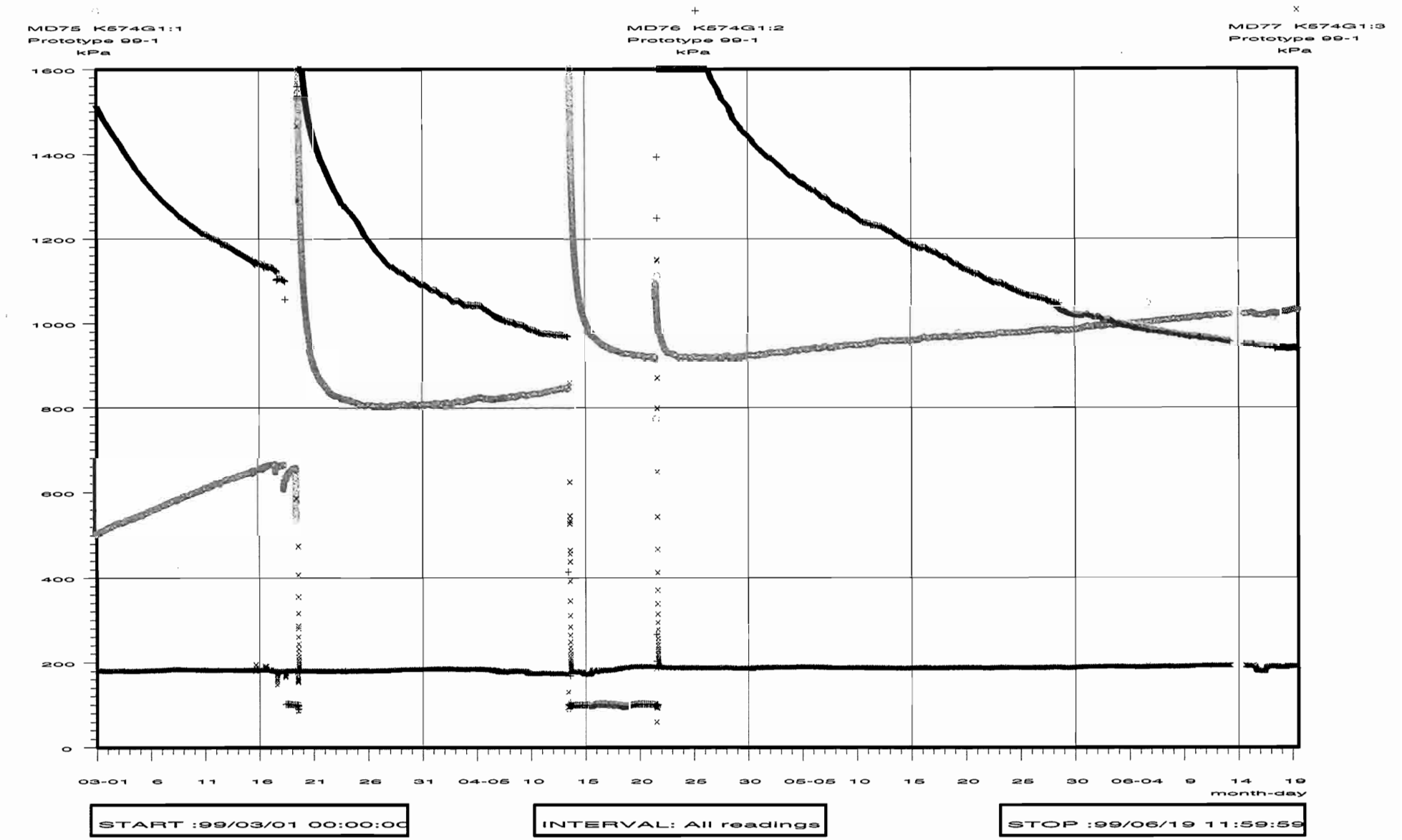
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:00:39

PLOT FILE :KA3574G01

ÄSPÖ HRL



START :99/03/01 00:00:00

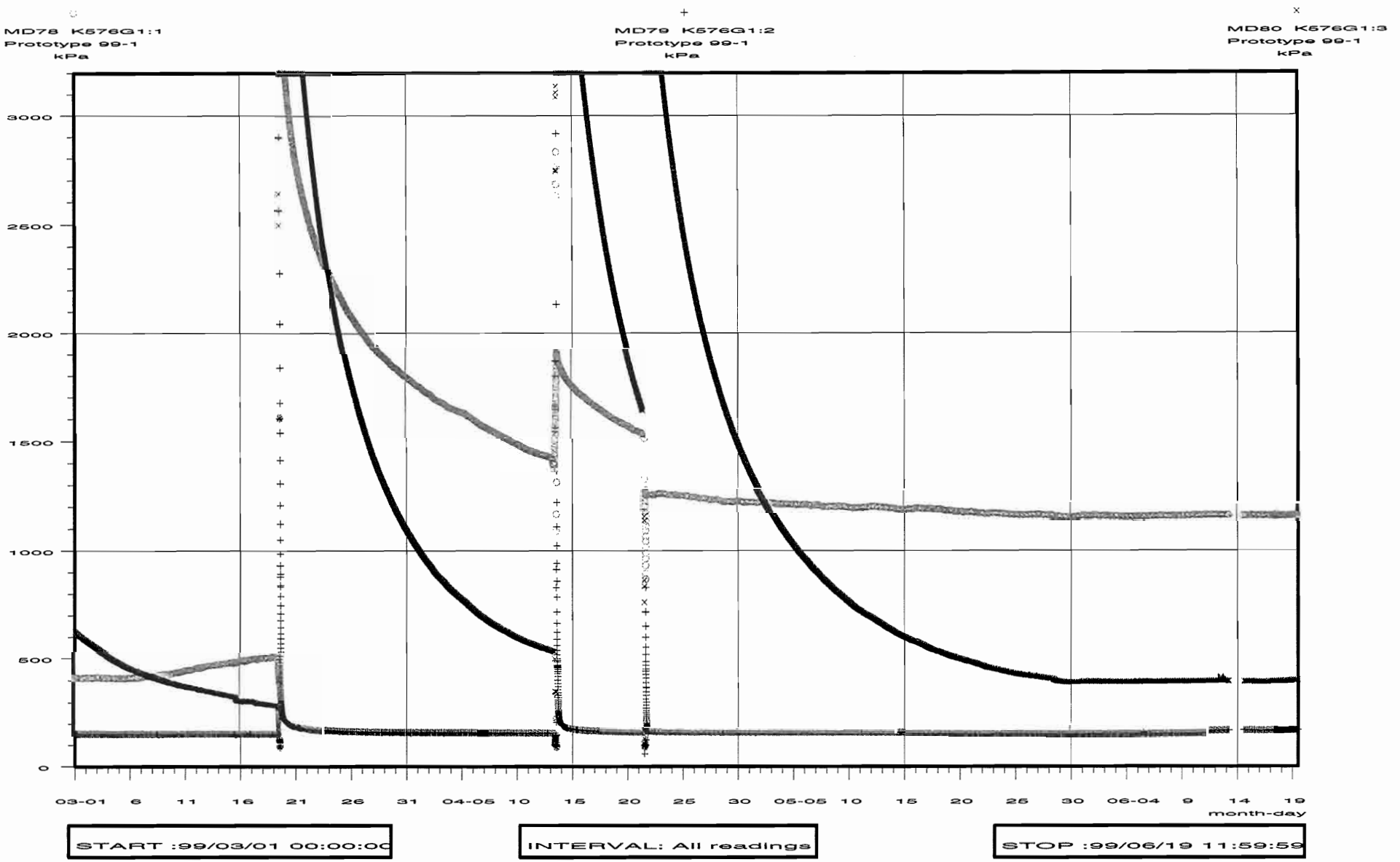
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:01:05

PLOT FILE :KA3576G01

ÄSPÖ HRL



START :99/03/01 00:00:00

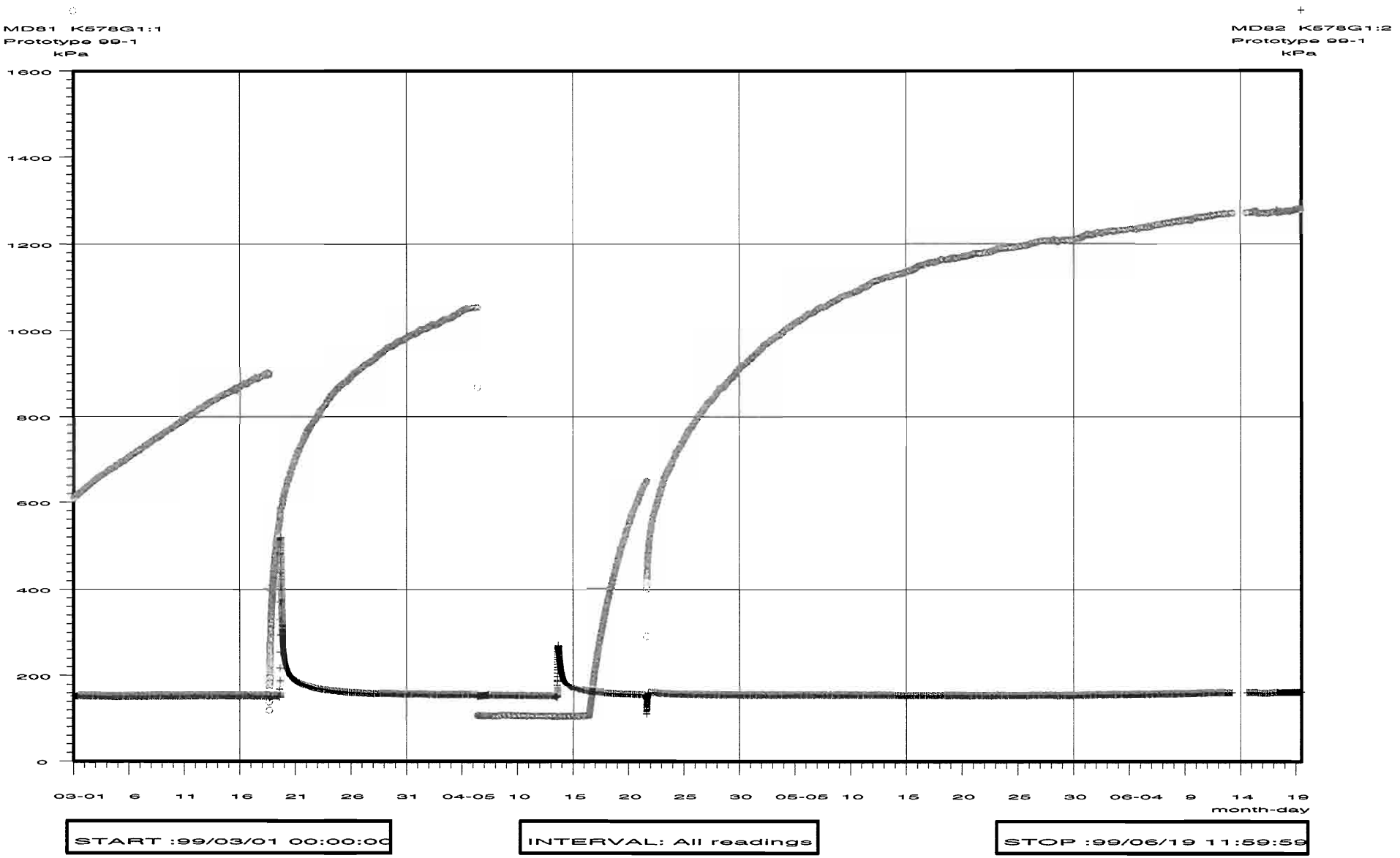
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:01:40

PLOT FILE :KA3578G01

ÄSPÖ HRL



START :99/03/01 00:00:00

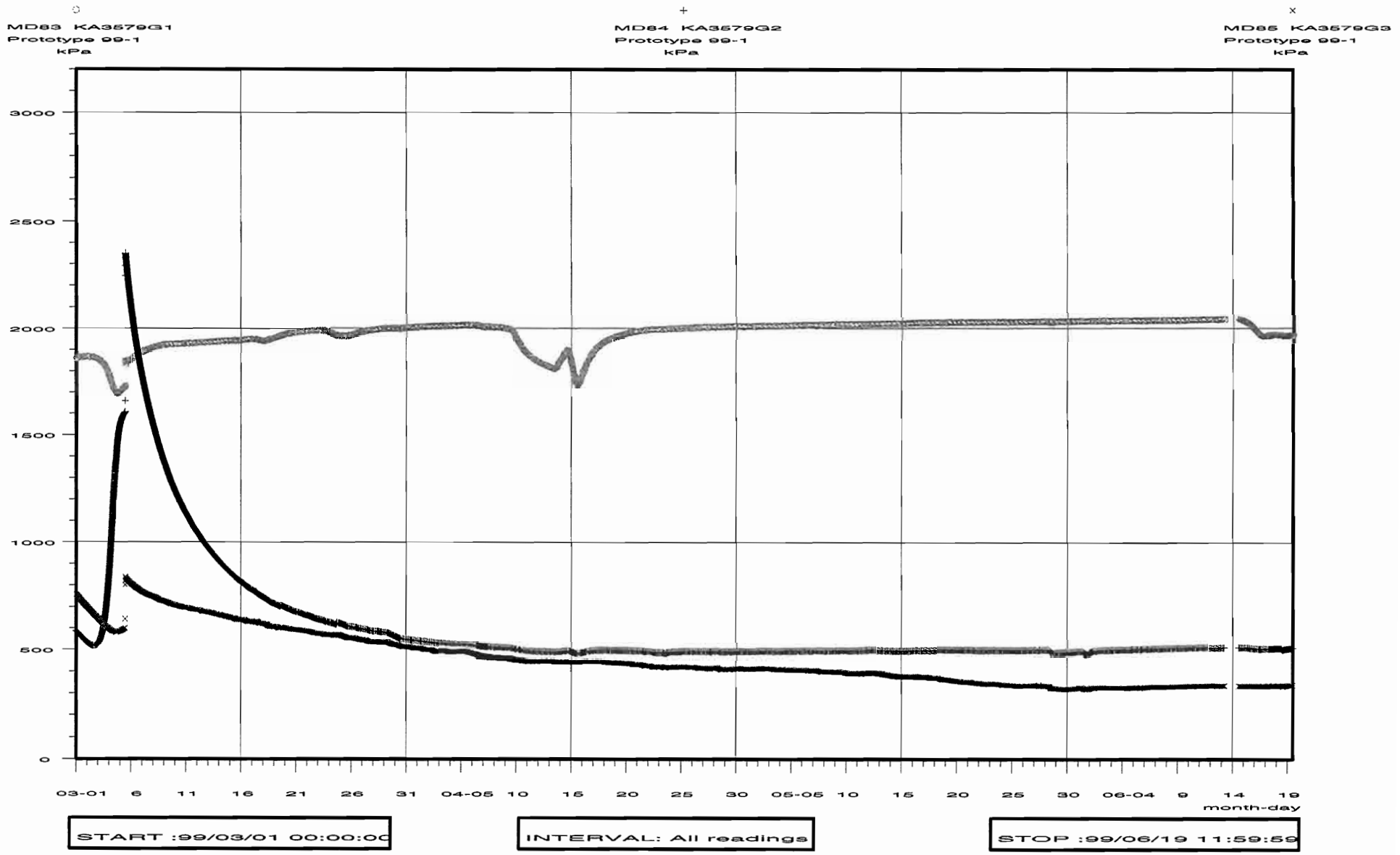
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:01:57

PLOT FILE :KA3579G

ÄSPÖ HRL



START :99/03/01 00:00:00

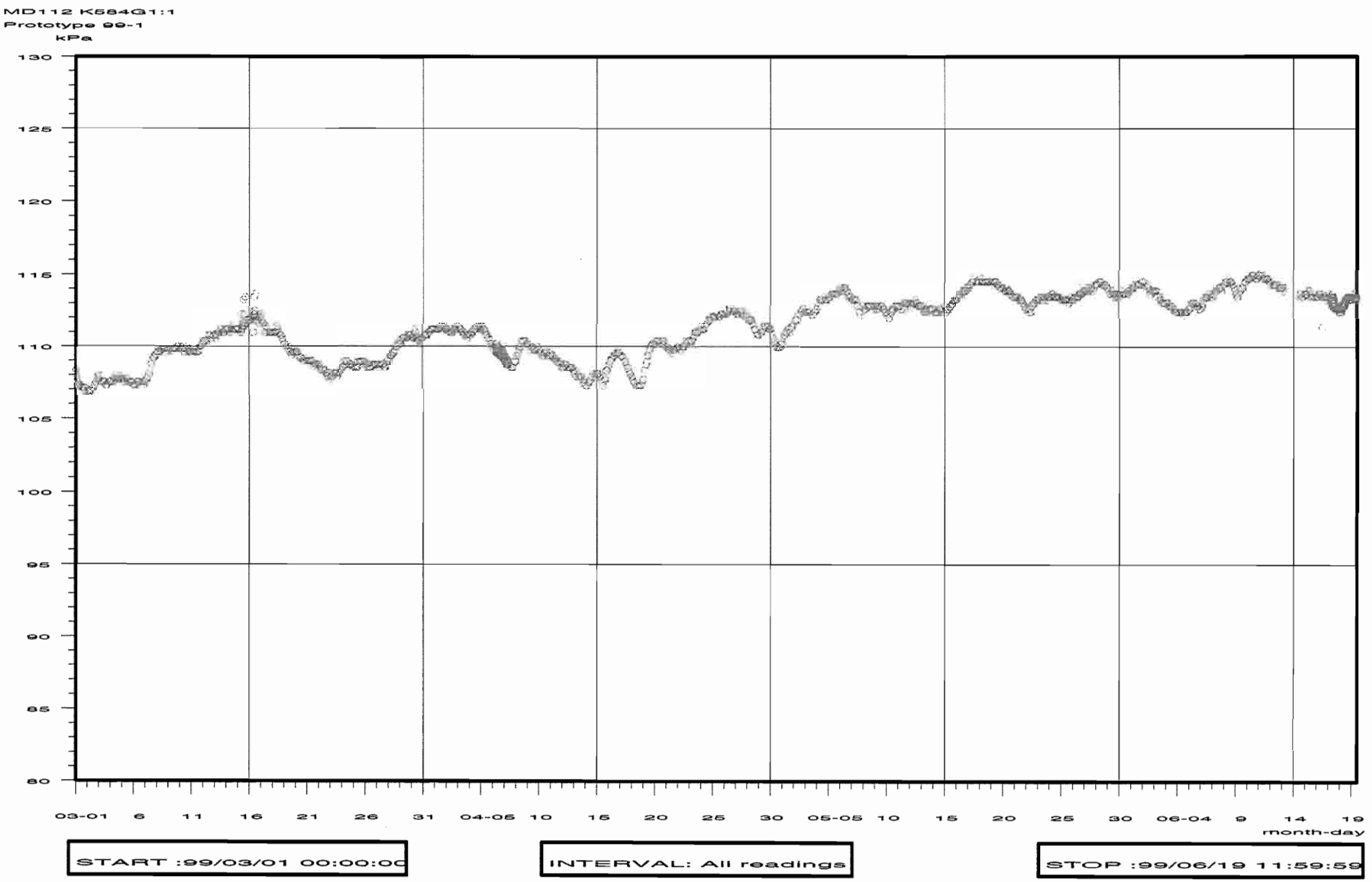
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:02:27

PLOT FILE :KA3584G01

ÄSPÖ HRL



START :99/03/01 00:00:00

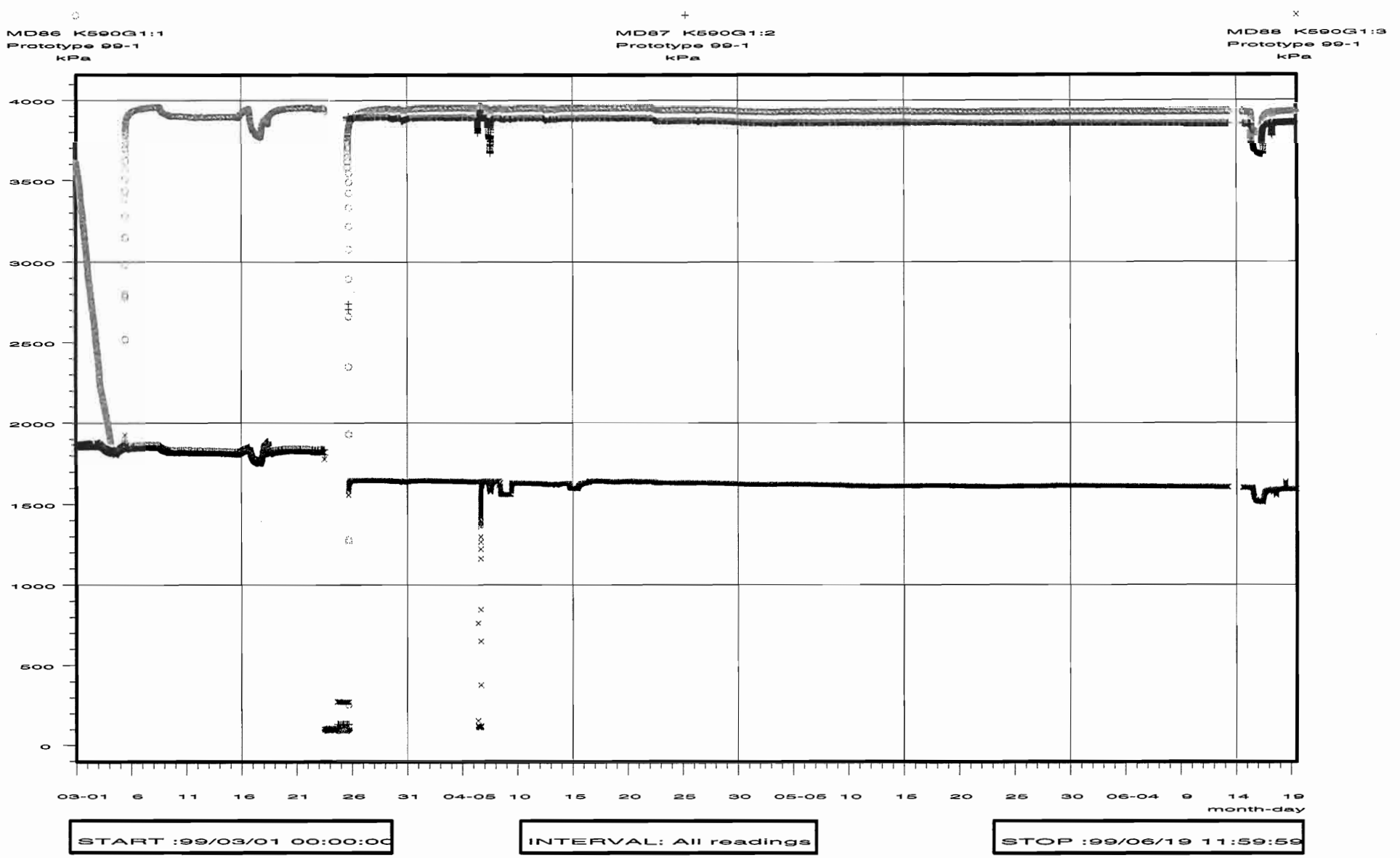
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:02:41

PLOT FILE :KA3590G01

ÄSPÖ HRL



START :99/03/01 00:00:00

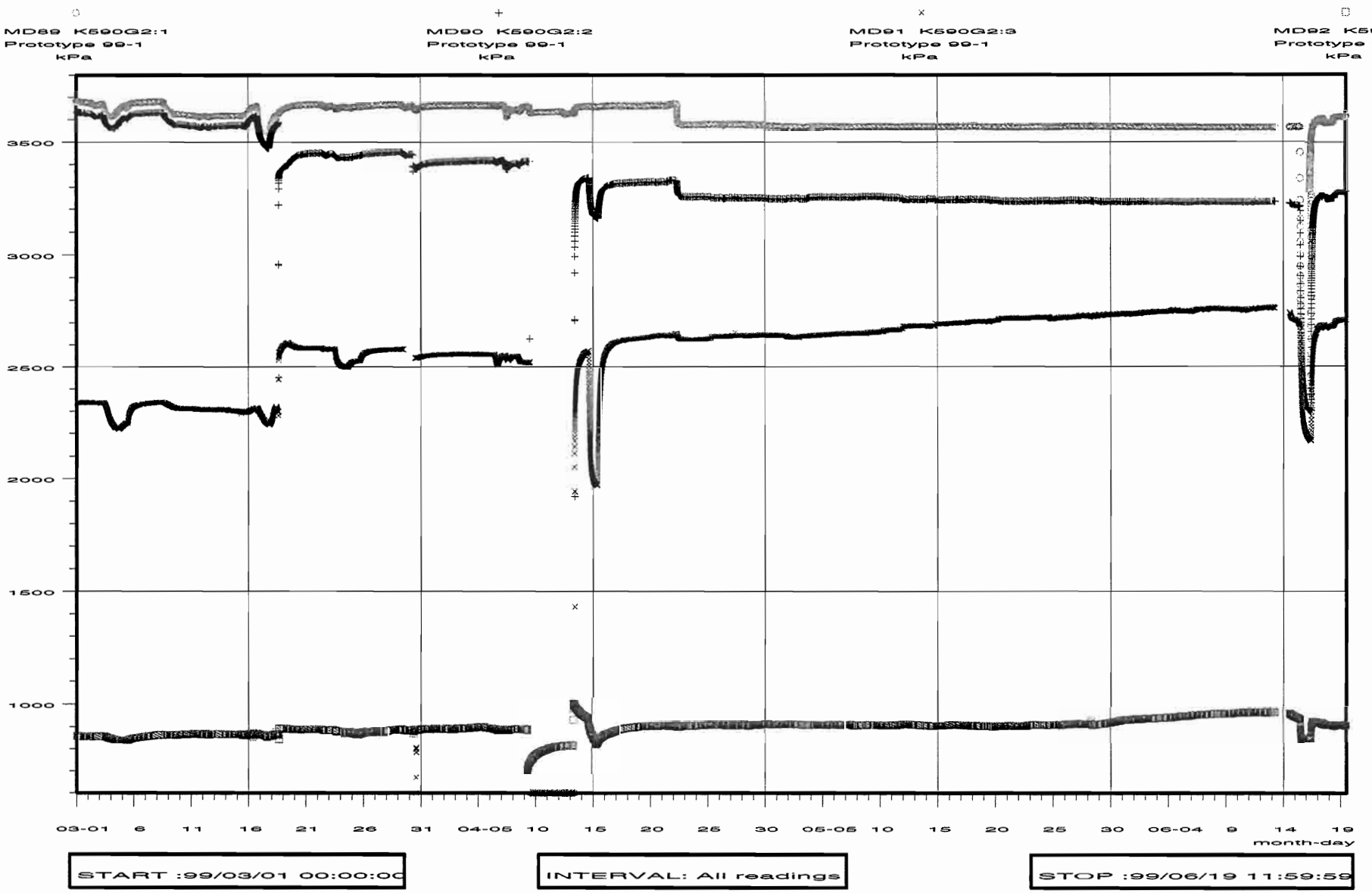
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:03:12

PLOT FILE :KA3590G02

ÄSPÖ HRL



START :99/03/01 00:00:00

INTERVAL: All readings

STOP :99/06/19 11:59:59

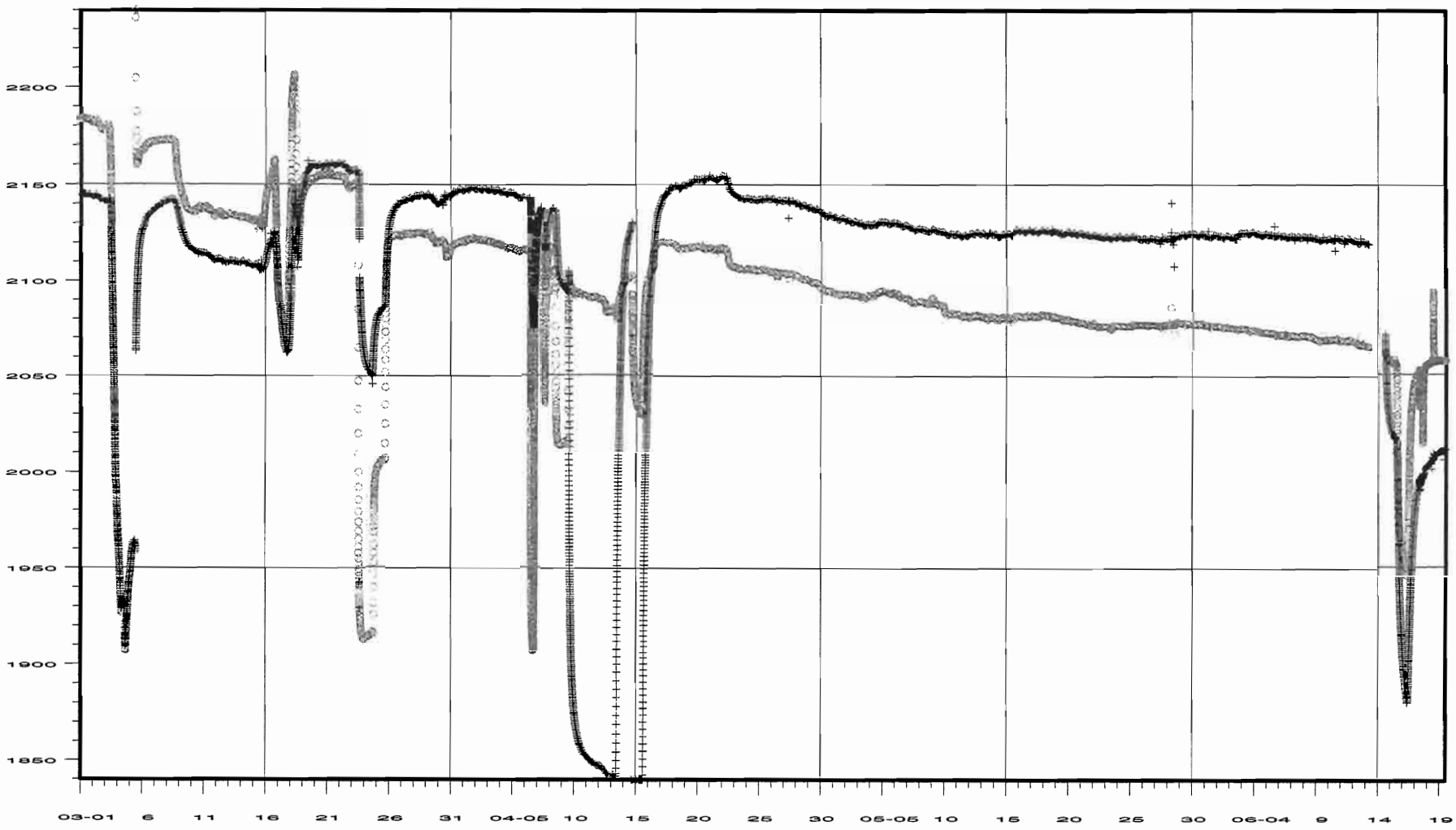
PLOT TIME :99/06/23 08:03:52

PLOT FILE :KA3593G

ÄSPÖ HRL

MD93 KA3593G1
Prototype 99-1
kPa

MD94 KA3593G2
Prototype 99-1
kPa



START :99/03/01 00:00:00

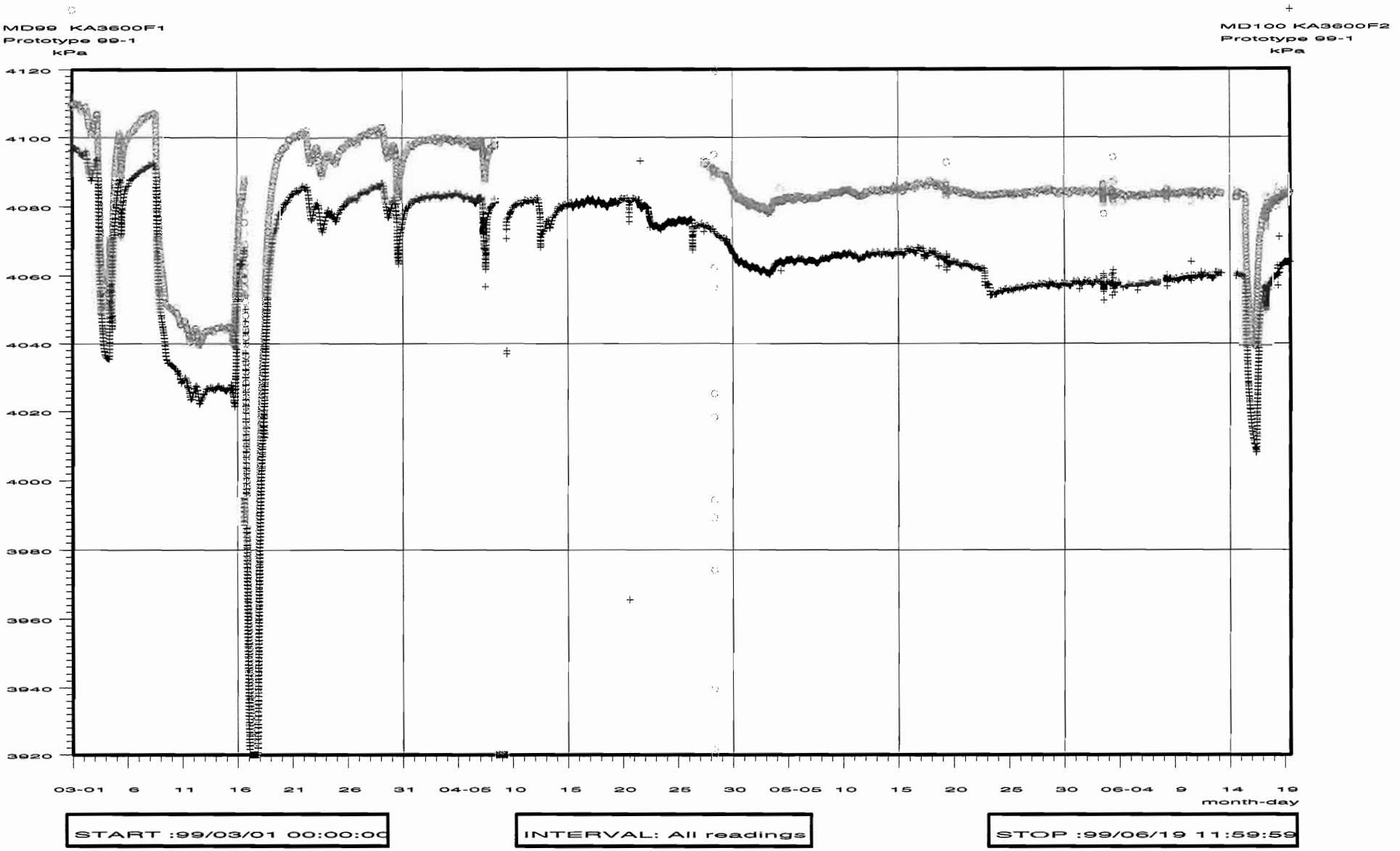
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:04:12

PLOT FILE :KA3600F

ÄSPÖ HRL



START :99/03/01 00:00:00

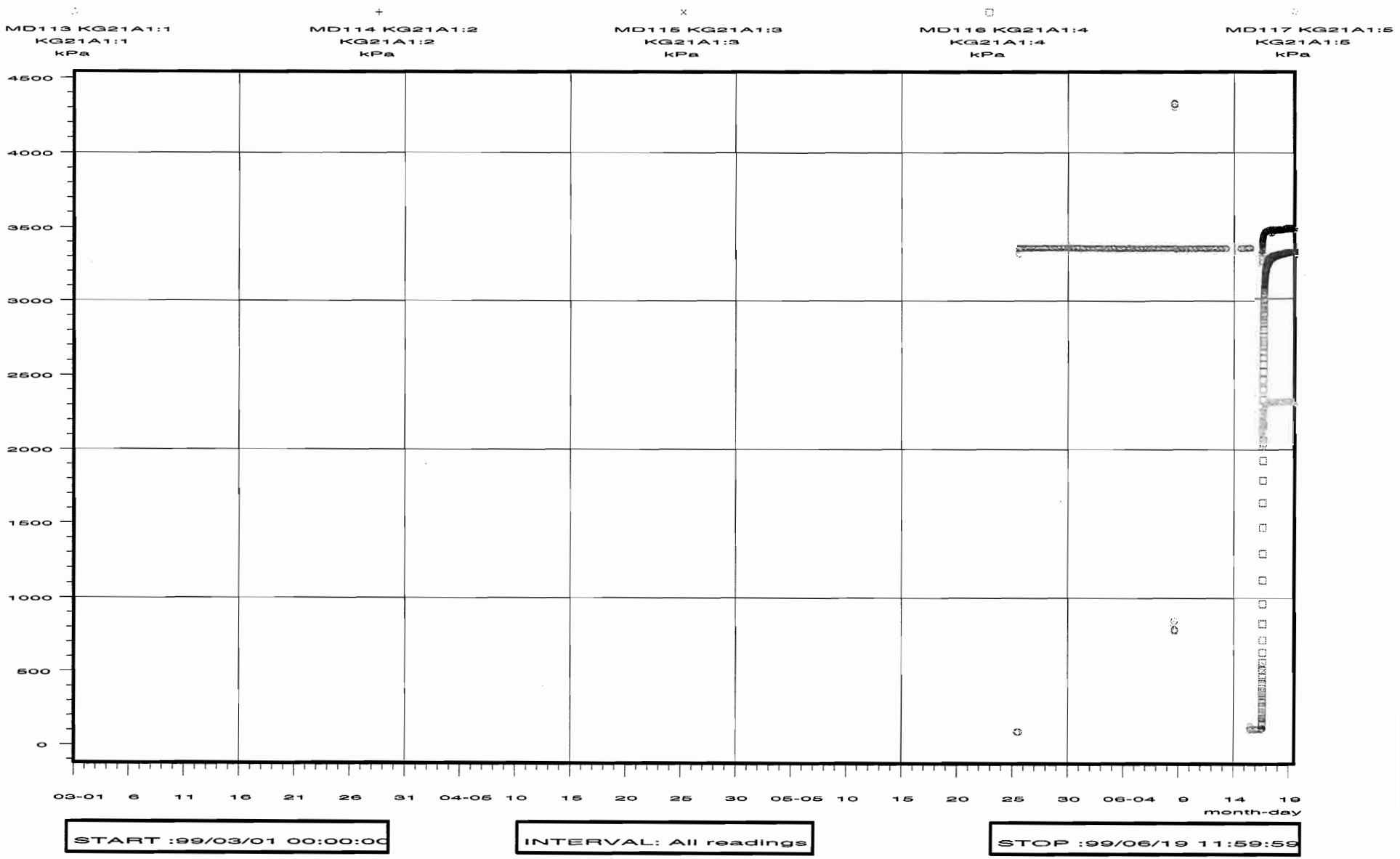
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:05:00

PLOT FILE :KG0021A01

ÄSPÖ HRL



START :99/03/01 00:00:00

INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 08:05:15

PLOT FILE :KG0048A01

ÄSPÖ HRL

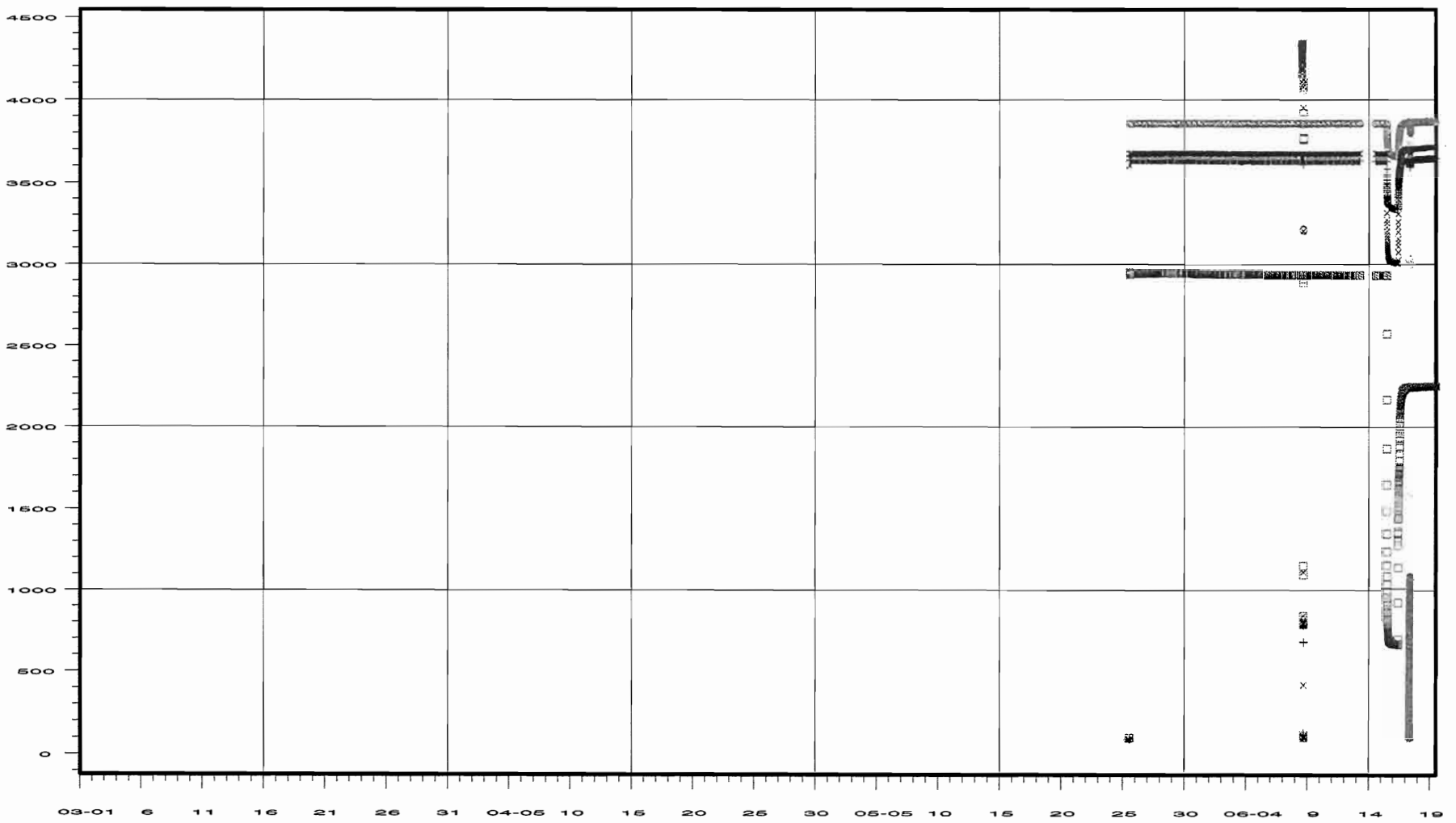
MD118 KG48A1:1
KG48A1:1
kPa

MD119 KG48A1:2
KG48A1:2
kPa

MD120 KG48A1:3
KG48A1:3
kPa

MD121 KG48A1:4
KG48A1:4
kPa

MD122 KG48A1:5
KG48A1:5
kPa



START :99/03/01 00:00:00

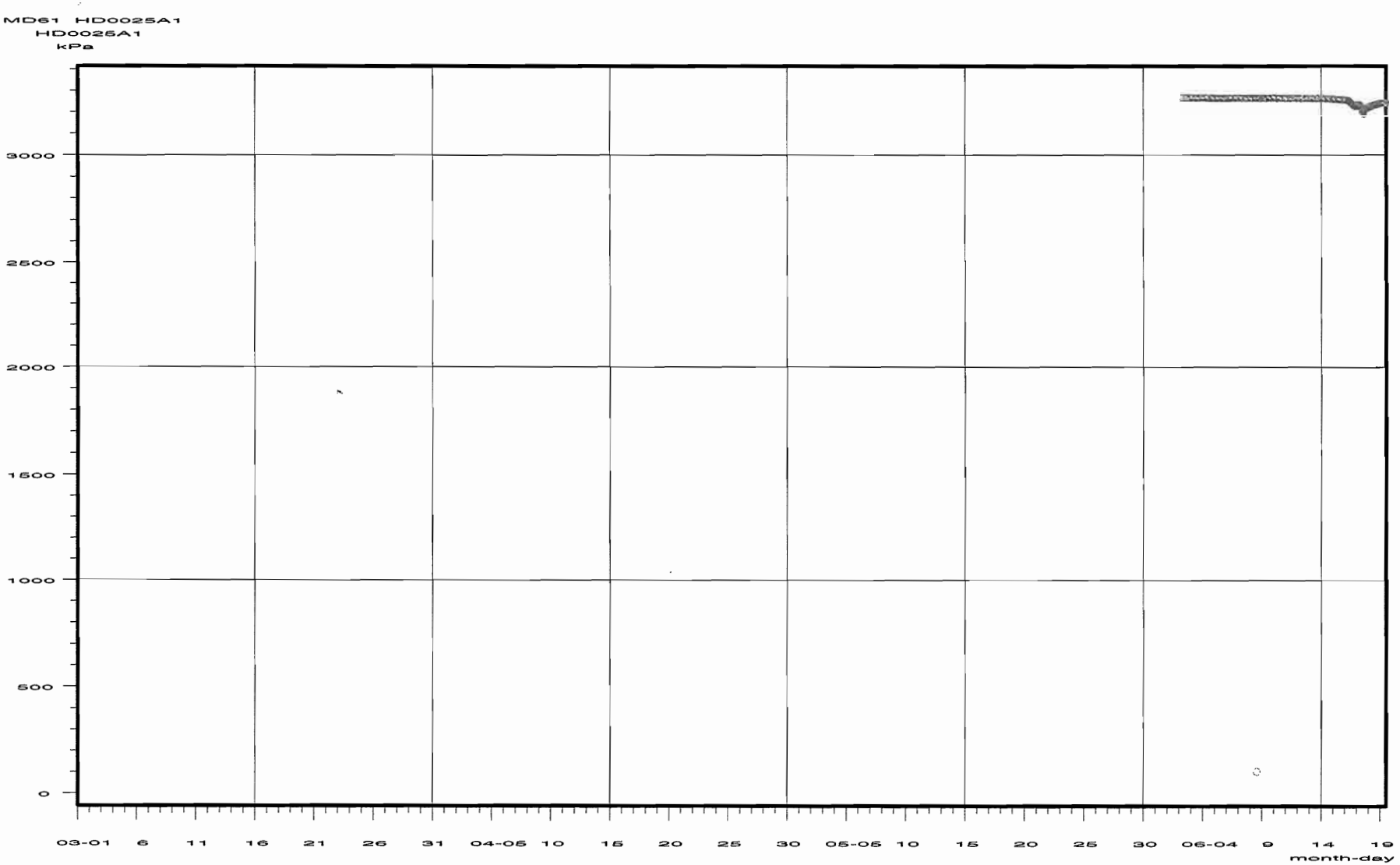
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:52:21

PLOT FILE :HD0025A

ÄSPÖ HRL



START :99/03/01 00:00:00

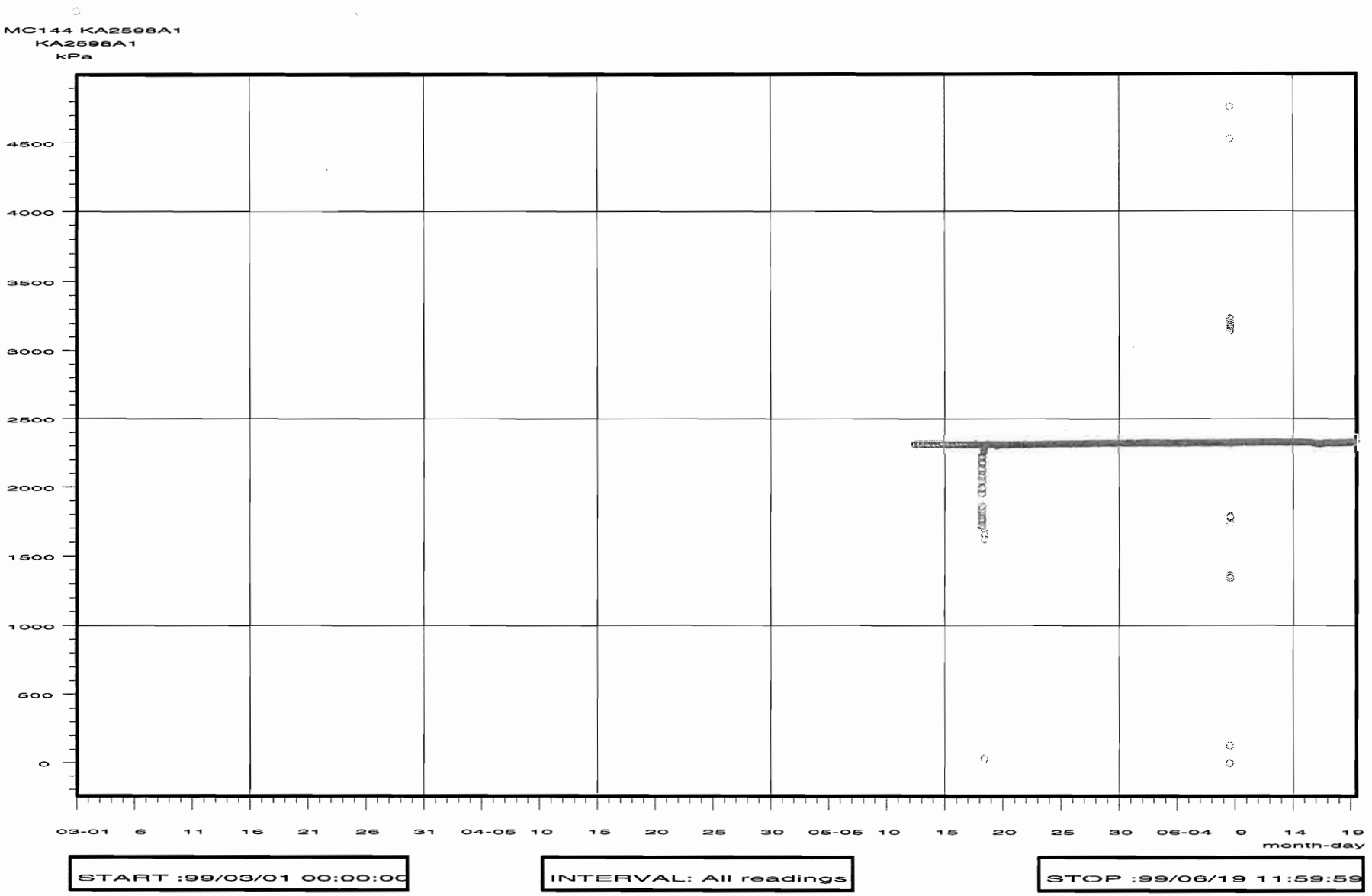
INTERVAL: All readings

STOP :99/06/19 11:59:59

PLOT TIME :99/06/23 07:52:25

PLOT FILE :KA2598A

ÄSPÖ HRL



START :99/03/01 00:00:00

INTERVAL: All readings

STOP :99/06/19 11:59:59

APPENDIX 9

Activity logs of events, in the viscinity of the prototype repository, between the beginning of March 1999 and the end of June 1999.

Activity Log

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Open pressure valve	990303 08:05	990303 08:05	TRUE_BS	KA2563A			
Packer installation	990303 08:30	990303 18:00	TRUE_BS	KA2563A	2	191	261
Packer installation	990303 08:30	990303 18:00	TRUE_BS	KA2563A	4	4	186
Packer installation	990303 08:30	990303 18:00	TRUE_BS	KA2563A	1	262	362.48
Packer installation	990303 08:30	990303 18:00	TRUE_BS	KA2563A	3	187	190
Instant pressure and flow measurements	990304 08:43	990304 12:07	TRUE_BS	KA2563A	4	4	186
Instant pressure and flow measurements	990304 08:43	990304 12:07	TRUE_BS	KA2563A	3	187	190
Instant pressure and flow measurements	990304 08:43	990304 12:07	TRUE_BS	KA2563A	1	262	362.48
Expand packer/packers	990304 08:43	990304 08:43	TRUE_BS	KA2563A			
Instant pressure and flow measurements	990304 08:43	990304 12:07	TRUE_BS	KA2563A	2	191	261
Release packer/packers	990304 12:07	990304 12:07	TRUE_BS	KA2563A			
Packer installation	990304 12:30	990304 14:45	TRUE_BS	KA2563A	1	303	362.48
Packer installation	990304 12:30	990304 14:45	TRUE_BS	KA2563A	3	228	231
Packer installation	990304 12:30	990304 14:45	TRUE_BS	KA2563A	4	45	227
Packer installation	990304 12:30	990304 14:45	TRUE_BS	KA2563A	2	232	302
Expand packer/packers	990304 14:57	990304 14:57	TRUE_BS	KA2563A			
Instant pressure and flow measurements	990305 08:57	990305 09:46	TRUE_BS	KA2563A	4	45	227
Instant pressure and flow measurements	990305 08:57	990305 09:46	TRUE_BS	KA2563A	3	228	231
Instant pressure and flow measurements	990305 08:57	990305 09:46	TRUE_BS	KA2563A	2	232	302
Instant pressure and flow measurements	990305 08:57	990305 09:46	TRUE_BS	KA2563A	1	303	362.48
Release packer/packers	990305 09:46	990305 09:46	TRUE_BS	KA2563A			
Packer installation	990305 09:47	990305 11:10	TRUE_BS	KA2563A	3	187	190
Packer installation	990305 09:47	990305 11:10	TRUE_BS	KA2563A	4	4	186
Packer installation	990305 09:47	990305 11:10	TRUE_BS	KA2563A	1	262	362.48
Packer installation	990305 09:47	990305 11:10	TRUE_BS	KA2563A	2	191	261
Expand packer/packers	990305 11:13	990305 11:13	TRUE_BS	KA2563A			
Release packer/packers	990308 14:42	990308 14:42	TRUE_BS	KA2563A			
Packer installation	990309 12:30	990311 10:30	TRUE_BS	KA2563A			
Packer installation	990315 12:00	990315 18:00	TRUE_BS	KA2563A			
Expand packer/packers	990315 17:31	990315 17:31	TRUE_BS	KA2563A			
Water inflow measurements from boreholes	990316 07:30	990316 11:30	TRUE_BS	KA2563A	3	206	208
Water inflow measurements from boreholes	990316 07:30	990316 11:30	TRUE_BS	KA2563A	2	236	241
Water inflow measurements from boreholes	990316 07:30	990316 11:30	TRUE_BS	KA2563A	1	242	246
Packer installation	990316 15:55	990317 17:25	TRUE_BS	KA2511A			
Open pressure valve	990316 15:55	990316 15:55	TRUE_BS	KA2511A			
Expand packer/packers	990317 17:25	990317 17:25	TRUE_BS	KA2511A			
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	8	6	64
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	1	239	293
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	6	96	102
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	4	111	138
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	5	103	110
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	3	139	170
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	7	65	95
Water inflow measurements from boreholes	990318 08:00	990318 17:00	TRUE_BS	KA2511A	2	171	238
Open pressure valve	990407 07:35	990407 07:35	GWCM	KI0025F02	7	56.1	63
Open pressure valve	990407 09:28	990407 09:28	GWCM	KI0023B	6	70.95	71.95
Open pressure valve	990407 09:28	990407 09:28	GWCM	KI0023B	4	84.75	86.2
Open pressure valve	990407 09:28	990407 09:28	GWCM	KI0023B	9	4.6	40.45
Open pressure valve	990407 09:28	990407 09:28	GWCM	KI0023B	8	41.45	42.45
Open pressure valve	990407 10:00	990407 10:00	GWCM	KI0025F	2	164	168
Open pressure valve	990407 10:00	990407 10:00	GWCM	KI0025F	4	86	88
Water sampling, class 4	990407 10:45	990407 11:00	GWCM	KI0025F	2	164	168
Close pressure valve	990407 11:00	990407 11:00	GWCM	KI0025F	2	164	168
Water sampling, class 4	990407 11:05	990407 11:25	GWCM	KI0023B	8	41.45	42.45
Close pressure valve	990407 11:25	990407 11:25	GWCM	KI0023B	8	41.45	42.45
Water sampling, class 4	990407 13:00	990407 13:20	GWCM	KI0025F	4	86	88
Close pressure valve	990407 13:20	990407 13:20	GWCM	KI0025F	4	86	88
Water sampling, class 4	990407 13:50	990407 14:00	GWCM	KI0023B	6	70.95	71.95
Water sampling, class 4	990407 14:00	990407 14:10	GWCM	KI0023B	4	84.75	86.2
Close pressure valve	990407 14:10	990407 14:10	GWCM	KI0023B	4	84.75	86.2
Water sampling, class 4	990407 14:20	990407 14:40	GWCM	KI0023B	9	4.6	40.45
Close pressure valve	990407 14:43	990407 14:43	GWCM	KI0023B	9	4.6	40.45
Water sampling, class 4	990407 16:30	990407 17:00	GWCM	KI0025F02	7	56.1	63
Close pressure valve	990407 17:00	990407 17:00	GWCM	KI0025F02	7	56.1	63

Activity Log

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Open pressure valve	990407 17:05	990407 17:05	GWCM	KA2563A	4	187	190
Open pressure valve	990407 17:10	990407 17:10	GWCM	KA2511A	4	111	138
Open pressure valve	990408 09:21	990408 09:21	GWCM	KA2563A	3	206	208
Open valve of circulation line	990408 09:23	990408 15:45	TRUE_BS	KA2563A	1	242	246
Open valve of flow line	990408 09:23	990408 09:23	TRUE_BS	KA2563A	1	242	246
Close valve of flow line	990408 09:25	990408 09:25	TRUE_BS	KI0025F02	2	100.25	134.15
Open valve of flow line	990408 09:25	990408 09:25	TRUE_BS	KI0025F02	2	100.25	134.15
Open valve of circulation line	990408 09:25	990408 09:25	TRUE_BS	KI0025F02	2	100.25	134.15
Close valve of circulation line	990408 09:25	990408 09:25	TRUE_BS	KI0025F02	2	100.25	134.15
Open valve of circulation line	990408 09:27	990408 09:27	TRUE_BS	KI0025F02	2	100.25	134.15
Open valve of flow line	990408 09:27	990408 09:27	TRUE_BS	KI0025F02	2	100.25	134.15
Close valve of circulation line	990408 09:27	990408 09:27	TRUE_BS	KA2563A	1	242	246
Close valve of flow line	990408 09:27	990408 09:27	TRUE_BS	KA2563A	1	242	246
Water sampling, class 5	990408 10:00	990408 10:30	GWCM	KA2563A	4	187	190
Close valve of flow line	990408 10:07	990408 10:07	TRUE_BS	KI0025F02	2	100.25	134.15
Close valve of circulation line	990408 10:07	990408 10:07	TRUE_BS	KI0025F02	2	100.25	134.15
Open valve of flow line	990408 10:14	990408 10:14	TRUE_BS	KI0025F02	3	93.35	99.25
Open valve of circulation line	990408 10:14	990408 10:14	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of circulation line	990408 10:16	990408 10:16	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of flow line	990408 10:16	990408 10:16	TRUE_BS	KI0025F02	3	93.35	99.25
Open valve of circulation line	990408 10:17	990408 10:17	TRUE_BS	KI0025F02	5	73.3	77.25
Open valve of flow line	990408 10:17	990408 10:17	TRUE_BS	KI0025F02	5	73.3	77.25
Close valve of circulation line	990408 10:18	990408 10:18	TRUE_BS	KI0025F02	5	73.3	77.25
Close valve of flow line	990408 10:18	990408 10:18	TRUE_BS	KI0025F02	5	73.3	77.25
Open valve of circulation line	990408 10:19	990408 10:19	TRUE_BS	KI0025F02	6	64	72.3
Open valve of flow line	990408 10:19	990408 10:19	TRUE_BS	KI0025F02	6	64	72.3
Open valve of circulation line	990408 10:20	990408 10:20	TRUE_BS	KI0025F02	7	56.1	63
Close valve of circulation line	990408 10:20	990408 10:20	TRUE_BS	KI0025F02	6	64	72.3
Open valve of flow line	990408 10:20	990408 10:20	TRUE_BS	KI0025F02	7	56.1	63
Close valve of flow line	990408 10:20	990408 10:20	TRUE_BS	KI0025F02	6	64	72.3
Close valve of flow line	990408 10:27	990408 10:27	TRUE_BS	KI0025F02	7	56.1	63
Close valve of circulation line	990408 10:27	990408 10:27	TRUE_BS	KI0025F02	7	56.1	63
Open valve of flow line	990408 10:27	990408 10:27	TRUE_BS	KI0025F02	8	51.7	55.1
Open valve of circulation line	990408 10:27	990408 10:27	TRUE_BS	KI0025F02	8	51.7	55.1
Close valve of flow line	990408 10:31	990408 10:31	TRUE_BS	KI0025F02	8	51.7	55.1
Close valve of circulation line	990408 10:31	990408 10:31	TRUE_BS	KI0025F02	8	51.7	55.1
Open valve of circulation line	990408 10:33	990408 10:33	TRUE_BS	KI0023B	2	111.25	112.7
Open valve of flow line	990408 10:33	990408 10:35	TRUE_BS	KI0023B	2	111.25	112.7
Close valve of flow line	990408 10:34	990408 10:34	TRUE_BS	KI0023B	2	111.25	112.7
Close valve of circulation line	990408 10:34	990408 10:34	TRUE_BS	KI0023B	2	111.25	112.7
Open valve of circulation line	990408 10:35	990408 10:35	TRUE_BS	KI0023B	4	84.75	86.2
Open valve of flow line	990408 10:35	990408 10:35	TRUE_BS	KI0023B	4	84.75	86.2
Open valve of flow line	990408 10:38	990408 10:38	TRUE_BS	KI0023B	5	72.95	83.75
Close valve of flow line	990408 10:38	990408 10:38	TRUE_BS	KI0023B	4	84.75	86.2
Open valve of circulation line	990408 10:38	990408 10:38	TRUE_BS	KI0023B	5	72.95	83.75
Close valve of circulation line	990408 10:38	990408 10:38	TRUE_BS	KI0023B	4	84.75	86.2
Close pressure valve	990408 10:38	990408 10:38	GWCM	KA2563A	4	187	190
Close valve of flow line	990408 10:39	990408 10:39	TRUE_BS	KI0023B	5	72.95	83.75
Close valve of circulation line	990408 10:39	990408 10:39	TRUE_BS	KI0023B	5	72.95	83.75
Open valve of flow line	990408 10:40	990408 10:40	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990408 10:40	990408 10:40	TRUE_BS	KI0023B	6	70.95	71.95
Close valve of circulation line	990408 10:41	990408 10:41	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of flow line	990408 10:41	990408 10:41	TRUE_BS	KI0023B	7	43.45	69.95
Close valve of flow line	990408 10:41	990408 10:41	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990408 10:41	990408 11:41	TRUE_BS	KI0023B	7	43.45	69.95
Close valve of flow line	990408 10:42	990408 10:42	TRUE_BS	KI0023B	7	43.45	69.95
Close valve of circulation line	990408 10:42	990408 10:42	TRUE_BS	KI0023B	7	43.45	69.95
Open valve of flow line	990408 10:50	990408 10:50	TRUE_BS	KI0025F	2	164	168
Open valve of circulation line	990408 10:50	990408 10:50	TRUE_BS	KI0025F	2	164	168
Water sampling, class 5	990408 10:50	990408 11:10	GWCM	KA2563A	3	206	208
Close valve of circulation line	990408 10:55	990408 10:55	TRUE_BS	KI0025F	2	164	168
Close valve of flow line	990408 10:55	990408 10:55	TRUE_BS	KI0025F	2	164	168
Open valve of flow line	990408 11:00	990408 11:00	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990408 11:00	990408 11:00	TRUE_BS	KI0023B	6	70.95	71.95

Activity Log

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Close valve of circulation line	990408 11:05	990408 11:05	TRUE_BS	KI0023B	6	70.95	71.95
Close valve of flow line	990408 11:05	990408 11:05	TRUE_BS	KI0023B	6	70.95	71.95
Close pressure valve	990408 11:10	990408 11:10	GWCM	KA2563A	3	206	208
Open valve of flow line	990408 11:30	990408 11:30	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990408 11:30	990408 11:30	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990408 11:35	990408 11:45	TRUE_BS	KI0025F	2	164	168
Open valve of flow line	990408 11:35	990408 11:35	TRUE_BS	KI0025F	2	164	168
Close valve of flow line	990408 11:44	990408 11:44	TRUE_BS	KI0025F	2	164	168
Close valve of circulation line	990408 11:44	990408 11:44	TRUE_BS	KI0025F	2	164	168
Open valve of flow line	990408 11:45	990408 11:45	TRUE_BS	KI0025F	4	86	88
Open valve of circulation line	990408 11:45	990408 11:45	TRUE_BS	KI0025F	4	86	88
Open valve of flow line	990408 11:45	990408 11:45	TRUE_BS	KA2563A	3	206	208
Open valve of circulation line	990408 11:45	990408 11:45	TRUE_BS	KA2563A	3	206	208
Close valve of flow line	990408 11:47	990408 11:47	TRUE_BS	KA2563A	3	206	208
Close valve of circulation line	990408 11:47	990408 11:47	TRUE_BS	KA2563A	3	206	208
Close valve of circulation line	990408 11:49	990408 11:49	TRUE_BS	KI0025F	4	86	88
Close valve of flow line	990408 11:49	990408 11:49	TRUE_BS	KI0025F	4	86	88
Open valve of circulation line	990408 11:51	990408 11:51	TRUE_BS	KI0025F02	3	93.35	99.25
Open valve of flow line	990408 11:51	990408 11:51	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of circulation line	990408 11:52	990408 11:52	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of flow line	990408 11:52	990408 11:52	TRUE_BS	KI0025F02	3	93.35	99.25
Open valve of circulation line	990408 11:58	990408 11:58	TRUE_BS	KI0025F02	3	93.35	99.25
Open valve of flow line	990408 11:58	990408 11:58	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of circulation line	990408 11:59	990408 11:59	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of flow line	990408 11:59	990408 11:59	TRUE_BS	KI0025F02	3	93.35	99.25
Open pressure valve	990408 13:37	990408 13:37	GWCM	KI0025F02	5	73.3	77.25
Open pressure valve	990408 13:45	990408 13:45	GWCM	KA2511A	5	103	110
Water sampling, class 4	990408 13:50	990408 14:10	GWCM	KA2511A	4	111	138
Close pressure valve	990408 14:10	990408 14:10	GWCM	KA2511A	4	111	138
Open pressure valve	990408 14:17	990408 14:17	GWCM	KI0025F02	3	93.35	99.25
Open pressure valve	990408 14:17	990408 14:17	GWCM	KI0025F02	6	64	72.3
Water sampling, class 5	990408 14:20	990408 14:35	GWCM	KI0025F02	5	73.3	77.25
Close valve of flow line	990408 14:30	990408 14:30	TRUE_BS	KI0023B	6	70.95	71.95
Close valve of circulation line	990408 14:30	990408 14:30	TRUE_BS	KI0023B	6	70.95	71.95
Close pressure valve	990408 14:38	990408 14:38	GWCM	KI0025F02	5	73.3	77.25
Close pressure valve	990408 14:38	990408 14:38	GWCM	KI0025F02	5	73.3	77.25
Open pressure valve	990408 14:43	990408 14:43	GWCM	KI0025F02	5	73.3	77.25
Close pressure valve	990408 14:45	990408 14:45	GWCM	KI0025F02	5	73.3	77.25
Water sampling, class 4	990408 15:30	990408 16:10	GWCM	KA2511A	5	103	110
Water sampling, class 4	990408 15:30	990408 15:50	GWCM	KI0025F02	6	64	72.3
Open valve of flow line	990408 15:45	990408 15:45	TRUE_BS	KA2563A	4	187	190
Open valve of circulation line	990408 15:45	990408 15:45	TRUE_BS	KA2563A	4	187	190
Close pressure valve	990408 15:50	990408 15:50	GWCM	KI0025F02	6	64	72.3
Water sampling, class 4	990408 15:50	990408 16:05	GWCM	KI0025F02	3	93.35	99.25
Close valve of circulation line	990408 15:56	990408 15:56	TRUE_BS	KA2563A	4	187	190
Close valve of flow line	990408 15:56	990408 15:56	TRUE_BS	KA2563A	4	187	190
Close pressure valve	990408 16:05	990408 16:05	GWCM	KI0025F02	3	93.35	99.25
Close pressure valve	990408 16:10	990408 16:10	GWCM	KA2511A	5	103	110
Dilution test	990413 15:19	990416 10:10	TRUE_BS	KI0023B	6	70.95	71.95
Dilution test	990413 16:50	990416 10:15	TRUE_BS	KI0025F	4	86	88
Dilution test	990413 18:17	990416 10:25	TRUE_BS	KI0025F02	5	73.3	77.25
Dilution test	990414 08:35	990416 10:20	TRUE_BS	KI0025F02	3	93.35	99.25
Dilution test	990414 10:20	990416 10:58	TRUE_BS	KA2563A	3	206	208
Dilution test	990414 11:18	990416 11:05	TRUE_BS	KA2563A	4	187	190
Open valve of circulation line	990415 10:00	990415 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Open valve of flow line	990415 10:00	990415 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Start pumping	990415 10:00	990415 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Interference test	990415 10:00	990416 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Stop pumping	990416 10:00	990416 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Close valve of circulation line	990416 10:00	990416 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Close valve of flow line	990416 10:00	990416 10:00	TRUE_BS	KI0023B	4	84.75	86.2
Dilution test	990419 09:50	990420 09:15	TRUE_BS	KA2563A	3	206	208
Dilution test	990419 09:55	990420 15:06	TRUE_BS	KA2563A	1	242	246
Dilution test	990419 11:07	990420 11:20	TRUE_BS	KI0025F	4	86	88

Activity Log

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Dilution test	990419 11:11	990420 13:04	TRUE_BS	KI0025F02	3	93.35	99.25
Dilution test	990419 11:14	990420 12:27	TRUE_BS	KI0025F02	5	73.3	77.25
Dilution test	990419 11:35	990420 13:55	TRUE_BS	KI0023B	4	84.75	86.2
Dilution test	990420 09:52	990422 12:05	TRUE_BS	KI0023B	7	43.45	69.95
Dilution test	990420 12:33	990422 11:42	TRUE_BS	KI0025F02	8	51.7	55.1
Dilution test	990420 13:14	990422 11:15	TRUE_BS	KI0025F02	7	56.1	63
Dilution test	990420 15:09	990422 12:57	TRUE_BS	KA2563A	4	187	190
Interference test	990421 13:00	990423 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of flow line	990421 13:00	990421 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990421 13:00	990421 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Start pumping	990421 13:00	990421 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Dilution test	990422 10:35	990423 13:14	TRUE_BS	KI0025F	4	86	88
Dilution test	990422 11:00	990423 13:11	TRUE_BS	KI0023B	4	84.75	86.2
Dilution test	990422 11:25	990423 13:08	TRUE_BS	KI0025F02	3	93.35	99.25
Dilution test	990422 11:49	990423 13:05	TRUE_BS	KI0025F02	5	73.3	77.25
Dilution test	990422 12:34	990423 13:46	TRUE_BS	KA2563A	3	206	208
Dilution test	990422 13:02	990423 13:41	TRUE_BS	KA2563A	1	242	246
Close valve of flow line	990423 13:00	990423 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Close valve of circulation line	990423 13:00	990423 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Stop pumping	990423 13:00	990423 13:00	TRUE_BS	KI0023B	6	70.95	71.95
Dilution test	990427 08:55	990428 14:05	TRUE_BS	KA2563A	3	206	208
Dilution test	990427 09:35	990428 09:21	TRUE_BS	KI0023B	4	84.75	86.2
Dilution test	990427 09:42	990428 11:55	TRUE_BS	KI0025F	4	86	88
Dilution test	990427 10:05	990428 12:30	TRUE_BS	KI0025F02	8	51.7	55.1
Dilution test	990427 10:26	990428 10:06	TRUE_BS	KI0025F02	3	93.35	99.25
Dilution test	990427 12:37	990428 12:09	TRUE_BS	KI0023B	6	70.95	71.95
Dilution test	990428 09:43	990430 11:23	TRUE_BS	KI0023B	7	43.45	69.95
Dilution test	990428 11:07	990430 12:08	TRUE_BS	KI0025F02	6	64	72.3
Dilution test	990428 12:00	990430 11:08	TRUE_BS	KI0023B	5	72.95	83.75
Dilution test	990428 12:40	990430 12:19	TRUE_BS	KI0025F02	7	56.1	63
Dilution test	990428 12:54	990430 11:54	TRUE_BS	KI0023B	2	111.25	112.7
Dilution test	990428 14:18	990430 12:46	TRUE_BS	KA2563A	4	187	190
Open valve of circulation line	990429 13:00	990429 13:00	TRUE_BS	KI0025F02	5	73.3	77.25
Interference test	990429 13:00		TRUE_BS	KI0025F02	5	73.3	77.25
Open valve of flow line	990429 13:00	990429 13:00	TRUE_BS	KI0025F02	5	73.3	77.25
Start pumping	990429 13:00	990429 13:00	TRUE_BS	KI0025F02	5	73.3	77.25
Dilution test	990430 11:10	990501 09:31	TRUE_BS	KI0025F	4	86	88
Dilution test	990430 11:43	990501 09:47	TRUE_BS	KI0023B	4	84.75	86.2
Dilution test	990430 12:00	990501 09:08	TRUE_BS	KI0023B	6	70.95	71.95
Dilution test	990430 12:11	990501 09:18	TRUE_BS	KI0025F02	3	93.35	99.25
Dilution test	990430 12:24	990501 09:33	TRUE_BS	KI0025F02	8	51.7	55.1
Dilution test	990430 12:50	990501 10:02	TRUE_BS	KA2563A	3	206	208
Dilution test	990517 19:05	990519 08:54	TRUE_BS	KI0023B	5	72.95	83.75
Dilution test	990517 20:02	990519 08:47	TRUE_BS	KI0025F02	7	56.1	63
Dilution test	990517 20:21	990519 09:10	TRUE_BS	KI0025F02	8	51.7	55.1
Open valve of flow line	990517 21:05	990517 21:05	TRUE_BS	KI0023B	7	43.45	69.95
Open valve of circulation line	990517 21:05	990517 21:05		KI0023B	7	43.45	69.95
Dilution test	990518 09:05	990519 09:00	TRUE_BS	KI0023B	7	43.45	69.95
Start pumping	990518 19:00	990518 19:00	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of circulation line	990518 19:00	990518 19:00	TRUE_BS	KI0023B	6	70.95	71.95
Open valve of flow line	990518 19:00	990518 19:00	TRUE_BS	KI0023B	6	70.95	71.95
Close valve of flow line	990518 21:07	990518 21:07	TRUE_BS	KI0023B	7	43.45	69.95
Close valve of circulation line	990518 21:07	990518 21:07	TRUE_BS	KI0023B	7	43.45	69.95
Radially converging	990519 14:40	990520 09:41	TRUE_BS	KI0023B	7	43.45	69.95
Radially converging	990519 14:40	990520 09:41	TRUE_BS	KI0023B	6	70.95	71.95
Radially converging	990526 09:05	990604 08:35	TRUE_BS	KI0023B	6	70.95	71.95
Radially converging	990526 12:10		TRUE_BS	KI0023B	6	70.95	71.95
Dilution test	990526 16:09		TRUE_BS	KI0023B	7	43.45	69.95
Radially converging	990527 09:05	990527 09:05	TRUE_BS	KI0023B	6	70.95	71.95
Radially converging	990602 09:57		TRUE_BS	KI0023B	6	70.95	71.95
Radially converging	990615 10:30	990615 10:30	TRUE_BS	KI0025F02	6	64	72.3
Radially converging	990615 10:30	990615 10:30	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of circulation line	990615 10:30	990615 10:30	TRUE_BS	KI0023B	6	70.95	71.95
Stop pumping	990615 10:30	990615 10:30	TRUE_BS	KI0023B	6	70.95	71.95

Activity Log

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Close valve of flow line	990615 10:30	990615 10:30	TRUE_BS	KI0023B	6	70.95	71.95
Radially converging	990615 10:30	990615 10:30	TRUE_BS	KA2563A	1	242	246
Flushing water	990615 10:33	990615 11:03	TRUE_BS	KI0025F02	3	93.35	99.25
Flushing water	990615 10:42	990615 13:26	TRUE_BS	KI0025F02	6	64	72.3
Close valve of flow line	990615 11:08	990615 11:08	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of circulation line	990615 11:08	990615 11:08	TRUE_BS	KI0025F02	3	93.35	99.25
Close valve of flow line	990615 11:10	990615 11:10	TRUE_BS	KI0023B	7	43.45	69.95
Close valve of circulation line	990615 11:10	990615 11:10	TRUE_BS	KI0023B	7	43.45	69.95
Dilution test	990615 11:10	990615 11:10	TRUE_BS	KI0023B	7	43.45	69.95
Close valve of flow line	990615 13:26	990615 13:26	TRUE_BS	KI0025F02	6	64	72.3
Close valve of circulation line	990615 13:26	990615 13:26	TRUE_BS	KI0025F02	6	64	72.3
Flushing water	990615 14:03	990615 16:03	TRUE_BS	KA2563A	1	242	246
Open valve of flow line	990615 14:06	990615 14:06	TRUE_BS	KA2563A	4	187	190
Open valve of circulation line	990615 14:06	990615 14:06	TRUE_BS	KA2563A	4	187	190
Flushing water	990615 14:07	990615 15:43	TRUE_BS	KA2563A	4	187	190
Close valve of flow line	990615 15:44	990615 15:44	TRUE_BS	KA2563A	4	187	190
Close valve of circulation line	990615 15:44	990615 15:44	TRUE_BS	KA2563A	4	187	190
Close valve of flow line	990615 16:04	990615 16:04	TRUE_BS	KA2563A	1	242	246
Close valve of circulation line	990615 16:04	990615 16:04	TRUE_BS	KA2563A	1	242	246

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Open pressure valve	990318 15:08	990318 15:08	PROTOTYPE	KA3590G02	2	17.3	22.3
Close pressure valve	990318 15:13	990318 15:13	PROTOTYPE	KA3590G02	2	17.3	22.3
Open pressure valve	990318 15:16	990318 15:16	PROTOTYPE	KA3590G02	3	8.3	16.3
Close pressure valve	990318 15:17	990318 15:17	PROTOTYPE	KA3590G02	3	8.3	16.3
Open pressure valve	990318 15:18	990318 15:18	PROTOTYPE	KA3563G	2	3.8	8.3
Close pressure valve	990318 15:20	990318 15:20	PROTOTYPE	KA3563G	2	3.8	8.3
Open pressure valve	990318 15:21	990318 15:21	PROTOTYPE	KA3563G	3	1.3	2.8
Close pressure valve	990318 15:22	990318 15:22	PROTOTYPE	KA3563G	3	1.3	2.8
Open pressure valve	990318 15:23	990318 15:23	PROTOTYPE	KA3566G01	2	12.3	19.8
Close pressure valve	990318 15:24	990318 15:24	PROTOTYPE	KA3566G01	2	12.3	19.8
Open pressure valve	990318 15:25	990318 15:25	PROTOTYPE	KA3566G01	3	7.3	11.3
Close pressure valve	990318 15:26	990318 15:26	PROTOTYPE	KA3566G01	3	7.3	11.3
Open pressure valve	990318 15:27	990318 15:27	PROTOTYPE	KA3566G01	4	1.3	6.3
Close pressure valve	990318 15:28	990318 15:28	PROTOTYPE	KA3566G01	4	1.3	6.3
Open pressure valve	990318 15:29	990318 15:29	PROTOTYPE	KA3566G02	2	12.3	18.3
Close pressure valve	990318 15:30	990318 15:30	PROTOTYPE	KA3566G02	2	12.3	18.3
Open pressure valve	990318 15:31	990318 15:31	PROTOTYPE	KA3566G02	3	7.8	11.3
Close pressure valve	990318 15:32	990318 15:32	PROTOTYPE	KA3566G02	3	7.8	11.3
Open pressure valve	990318 15:33	990318 15:33	PROTOTYPE	KA3566G02	4	1.3	6.8
Close pressure valve	990318 15:34	990318 15:34	PROTOTYPE	KA3566G02	4	1.3	6.8
Open pressure valve	990318 15:35	990318 15:35	PROTOTYPE	KA3572G01	2	1.3	5.3
Close pressure valve	990318 15:36	990318 15:36	PROTOTYPE	KA3572G01	2	1.3	5.3
Open pressure valve	990318 15:37	990318 15:37	PROTOTYPE	KA3578G01	1	6.8	12.58
Close pressure valve	990318 15:38	990318 15:38	PROTOTYPE	KA3578G01	1	6.8	12.58
Open pressure valve	990323 14:12	990323 14:12	PROTOTYPE	KA3566G01	1	20.8	30.01
Close pressure valve	990323 14:14	990323 14:14	PROTOTYPE	KA3566G01	1	20.8	30.01
Open pressure valve	990323 14:15	990323 14:15	PROTOTYPE	KA3566G02	1	19.3	30.01
Close pressure valve	990323 14:17	990323 14:17	PROTOTYPE	KA3566G02	1	19.3	30.01
Open pressure valve	990323 14:18	990323 14:18	PROTOTYPE	KA3593G	2	1.3	7.3
Close pressure valve	990323 14:20	990323 14:20	PROTOTYPE	KA3593G	2	1.3	7.3
Open pressure valve	990329 11:00	990329 11:00	GWCM	KA3566G02	3	7.8	11.3
Open pressure valve	990406 09:56	990406 09:56	GWCM	KA3578G01	1	6.8	12.58
Open pressure valve	990406 09:57	990406 09:57	GWCM	KA3572G01	2	1.3	5.3
Open pressure valve	990406 10:59	990406 10:59	PROTOTYPE	KA3590G01	3	1.3	6.8
Close pressure valve	990406 17:01	990407 17:01	PROTOTYPE	KA3590G01	3	1.3	6.8
Open pressure valve	990407 07:40	990407 07:40	GWCM	KA3573A	1	18	40.07
Water sampling, class 4	990407 09:10	990407 09:20	GWCM	KA3573A	1	18	40.07
Close pressure valve	990407 09:25	990407 09:25	GWCM	KA3573A	1	18	40.07
Open pressure valve	990407 13:15	990407 13:15	GWCM	KA3573A	2	4.5	17
Water sampling, class 4	990407 15:00	990407 15:20	GWCM	KA3573A	2	4.5	17
Close pressure valve	990407 15:20	990407 15:20	GWCM	KA3573A	2	4.5	17
Open pressure valve	990407 16:50	990407 16:50	GWCM	KA3566G02	4	1.3	6.8
Open pressure valve	990407 16:50	990407 16:50	GWCM	KA3566G02	2	12.3	18.3
Open pressure valve	990408 09:10	990408 09:10	GWCM	KA3566G02	2	12.3	18.3
Water sampling, class 5	990408 16:00	990408 17:50	GWCM	KA3566G02	2	12.3	18.3
Close pressure valve	990408 17:52	990408 17:52	GWCM	KA3566G02	2	12.3	18.3
Water sampling, class 4	990409 10:00	990409 11:15	GWCM	KA3566G01	2	12.3	19.8
Close pressure valve	990409 11:20	990409 11:20	GWCM	KA3566G01	2	12.3	19.8
Close pressure valve	990409 11:20	990409 11:20	GWCM	KA3566G01	2	12.3	19.8
Open pressure valve	990409 12:56	990409 12:56	GWCM	KA3590G02	3	8.3	16.3
Open pressure valve	990409 12:56	990409 12:56	GWCM	KA3590G02	2	17.3	22.3
Water sampling, class 4	990413 08:00	990413 10:55	GWCM	KA3590G02	3	8.3	16.3
Water sampling, class 5	990413 08:00	990413 10:55	GWCM	KA3590G02	2	17.3	22.3
Close pressure valve	990413 10:58	990413 10:58	GWCM	KA3590G02	3	8.3	16.3
Close pressure valve	990413 10:58	990413 10:58	GWCM	KA3590G02	2	17.3	22.3
Open pressure valve	990414 16:20	990414 16:20	GWCM	KA3593G	2	1.3	7.3
Close pressure valve	990415 01:31	990415 11:31	GWCM	KA3593G	2	1.3	7.3
Water sampling, class 5	990415 08:00	990415 15:15	GWCM	KA3566G02	1	19.3	30.01
Water sampling, class 4	990415 08:00	990415 11:30	GWCM	KA3593G	2	1.3	7.3
Close pressure valve	990415 15:18	990415 15:18	GWCM	KA3566G02	1	19.3	30.01
Water sampling, class 5	990416 08:00	990416 10:45	GWCM	KA3566G01	1	20.8	30.01
Close pressure valve	990416 10:47	990416 10:47	GWCM	KA3566G01	1	20.8	30.01
Close pressure valve	990416 10:50	990416 10:50	GWCM	KA3578G01	1	6.8	12.58
Water sampling, class 5	990503 08:00	990503 13:25	GWCM	KA3566G02	3	7.8	11.3

Activity	Start Date	Stop Date	Project	Idcode	Section No	Secup (m)	Seclow (m)
Close pressure valve	990503 13:25	990503 13:25	GWCM	KA3566G02	3	7.8	11.3
Water sampling, class 4	990517 13:10	990608 13:10	PROTOTYPE	KA3566G01	4	1.3	6.3
Water sampling, class 5	990517 13:10	990608 13:10	PROTOTYPE	KA3572G01	2	1.3	5.3
Open pressure valve	990519 10:11	990519 10:11		KA3544G01	1	0.3	12
Open pressure valve	990519 10:11	990519 10:11		KA3546G01	1	0.3	12
Open pressure valve	990519 10:11	990519 10:11		KA3548G01	1	0.3	12.01
Close pressure valve	990520 15:20	990520 15:20		KA3546G01	1	0.3	12
Close pressure valve	990525 12:55	990525 12:55		KA3548G01	1	0.3	12.01
Close pressure valve	990525 16:45	990525 16:45		KA3544G01	1	0.3	12
Close pressure valve	990608 13:10	990608 13:10	PROTOTYPE	KA3566G01	4	1.3	6.3
Close pressure valve	990608 13:10	990608 13:10	PROTOTYPE	KA3572G01	2	1.3	5.3
Open pressure valve	990408 11:35	990408 11:35	GWCM	KA3600F	1	22	50.1
Open pressure valve	990408 11:35	990408 11:35	GWCM	KA3600F	2	4.5	21
Water sampling, class 4	990409 09:00	990409 11:20	GWCM	KA3600F	2	4.5	21
Water sampling, class 4	990409 09:00	990409 09:50	GWCM	KA3600F	1	22	50.1
Close pressure valve	990409 09:54	990409 09:54	GWCM	KA3600F	1	22	50.1
Close pressure valve	990409 11:20	990409 11:20	GWCM	KA3600F	2	4.5	21
Open pressure valve	990525 14:51	990525 14:51		KG0021A01	1		
Close pressure valve	990525 14:52	990525 14:52		KG0021A01	1		
Open pressure valve	990615 12:42	990615 12:42	PROTOTYPE	KG0021A01		0	48.8
Open pressure valve	990525 14:29	990525 14:29		KG0048A01	1	49	64.69
Open pressure valve	990525 14:29	990525 14:29		KG0048A01	2	41	48
Open pressure valve	990525 14:29	990525 14:29		KG0048A01	3	30	40
Open pressure valve	990525 14:29	990525 14:29		KG0048A01	4	4	29
Close pressure valve	990525 14:30	990525 14:30		KG0048A01	1	49	64.69
Close pressure valve	990525 14:30	990525 14:30		KG0048A01	2	41	48
Close pressure valve	990525 14:30	990525 14:30		KG0048A01	3	30	40
Close pressure valve	990525 14:30	990525 14:30		KG0048A01	4	4	29
Close pressure valve	990617 09:00	990617 10:25	PROTOTYPE	KG0048A01			

APPENDIX 10

Level of flow outlet of flowing boreholes during interference test campaign 1, 2, 3a and 3b.

Table Outflow level above the floor.
Tests in pilot holes and exploratory holes, November 1997 - July 1999.

Prototype repository, drill campaigns 1, 2, 3a and 3b.

Borehole	Section (m)	Date	Test Cam-paign	Test No	Test type	Outflow level above floor (m)	Comment
KA3593G	0.70-8.04	971105	1	1	I	1.40	
KA3587G	0.70-8.04	971106	1	2	PBT	1.40	
KA3581G	0.70-8.04	971106	1	3	PBT	1.40	
KA3575G	0.70-8.04	971106	1	4	PBT	1.40	
KA3569G	0.70-8.04	971106	1	5	PBT	1.40	
KA3563G	0.70-8.04	971106	1	6	PBT	1.40	
KA3557G	0.70-8.04	971106	1	7	PBT	1.40	
KA3551G	0.70-8.04	971106	1	8	PBT	1.40	
KA3545G	0.70-8.04	971107	1	9	I	1.40	
KA3539G	0.70-8.04	971107	1	10	I	1.40	
KA3539G	5.74-6.74	971108	1	11	PBT	0.85	
KA3539G	6.74-8.04	971109	1	12	PBT	0.85	
KA3545G	5.74-6.74	971109	1	13	PBT	0.85	
KA3545G	6.74-8.04	971110	1	14	PBT	0.85	
KA3593G	4.74-5.74	971118	1	15	PBT	0.85	
KA3588G01	0.50-8.00	980401	2	1	I	1.60	
KA3586G01	0.50-8.00	980401	2	2	PBT	1.60	
KA3572G01	0.50-12.00	980402	2	3	PBT	1.60	
KA3552G01	0.50-12.01	980402	2	4	I	1.60	
KA3550G01	0.50-12.03	980403	2	5	I	1.60	
KA3544G01	0.50-12.00	980403	2	6	I	1.60	
KA3548G01	0.50-12.01	980403	2	7	I	1.60	
KA3546G01	0.50-12.00	980404	2	8	I	1.60	
KA3578G01	0.50-12.58	980404	2	9	PBT	1.60	
KA3584G01	1.21-12.00	980405	2	10	PBT	0.89	
KA3544G01	9.70-10.70	980407	2	11	PBT	0.93	
KA3548G01	5.70- 6.70	980414	2	12	PBT	0.93	
KA3550G01	5.70- 6.70	980415	2	13	PBT	0.97	
KA3552G01	4.70- 5.70	980416	2	14	PBT	0.97	
KA3588G01	4.70- 5.70	980421	2	15	PBT	0.75	
KA3590G02	12.0 – 15.0	980625	3a	1	PBT	0,90	
KA3590G02	18.0 – 21.0	980625	3a	2	PBT	0.93	
KA3590G02	24.0 – 27.0	980625	3a	3	PBT	0.93	
KA3590G02	27.0 – 30.0	980626	3a	4	PBT	0.93	
KA3590G02	0.39 – 30.0	980701	3a	5	I	1.02	
KA3590G01	0.39 – 30.0	980701	3a	6	I	1.03	
KA3593G	0.39 – 30.0	980701	3a	7	I	1,55	
KA3566G02	0.39 – 30.0	980701	3a	8	I	1.02	
KA3566G01	0.39 – 30.0	980702	3a	9	I	0.98	
KA3554G01	0.39 – 30.0	980702	3a	10	I	0.96	
KA3554G02	0.39 – 30.0	980702	3a	11	I	1.01	
KA3542G02	0.39 – 30.0	980703	3a	12	I	1.01	
KA3542G01	0.39 – 30.0	980703	3a	13	I	1.01	
KA3539G	0.39 – 30.0	980703	3a	14	I	1.55	
KA3557G	0.39 – 30.0	980704	3a	15	PBT	1.57	

Borehole	Section (m)	Date	Test Cam-paign	Test No	Test type	Outflow level above floor (m)	Comment
KA3574G01	0.39-12.0	980704	3a	16	PBT	1.55	
KA3576G01	0.39-12.0	980705	3a	17	PBT	1.55	
KA3548A01	0.39–30.00	980705	3a	18	I		The borehole is positioned c. 2.45 m above floor
KA3563G	0.39– 30.00	980706	3a	19	PBT	1.55	
KA3590G01	1.0 – 2.0	980706	3a	20	PBT	0.93	
KA3590G01	2.0 – 3.0	980706	3a	21	PBT	0.90	
KA3590G01	5.0 – 6.0	980707	3a	22	PBT	0.90	
KA3590G01	8.0 – 9.0	980707	3a	23	PBT	0.93	
KA3590G01	9.0 – 10.0	980708	3a	24	PBT	0.93	
KA3593G	11.0 – 12.0	980708	3a	25	PBT	0.93	
KA3590G01	21.0 – 24.0	980709	3a	26	PBT	0.93	
KA3566G01	13.0 – 16.0	980714	3a	27	PBT	0.90	
KA3566G01	16.0 – 19.0	980714	3a	28	PBT	0.86	
KA3566G01	19.0 – 22.0	980714	3a	29	PBT	0.86	
KA3566G02	15.0 – 18.0	980716	3a	30	PBT	0,87	
KA3566G02	18.0 – 21.0	980716	3a	31	PBT	0,86	
KA3566G02	21.0 – 24.0	980716	3a	32	PBT	0,86	
KA3554G02	8.0 – 9.0	980720	3a	33	PBT	0,86	
KA3554G02	11.0 – 12.0	980720	3a	34	PBT	0,86	
KA3554G02	12.0 – 15.0	980721	3a	35	PBT	0,86	
KA3554G02	15.0 – 18.0	980721	3a	36	PBT	0,86	
KA3554G02	27.0 – 30.0	980722	3a	37	PBT	0,86	Failed,
KA3554G02	27.0 – 30.0	980724	3a	37b	PBT	0,86	Failed,
KA3554G01	18.0 – 21.0	980723	3a	38	PBT	0,86	
KA3554G01	21.0 – 24.0	980723	3a	39	PBT	0,86	
KA3554G01	24.0 – 27.0	980723	3a	40	PBT	0,79	
KA3554G01	27.0 – 30.0	980724	3a	41	PBT	0,86	
KA3542G02	3.0 – 4.0	980727	3a	42	PBT	0,97	
KA3542G02	5.0 – 6.0	980727	3a	43	PBT	0,97	
KA3542G02	4.0 – 5.0	980727	3a	44	PBT	0,97	
KA3542G02	10.0 – 11.0	980728	3a	45	PBT	0,96	
KA3542G02	11.0 – 12.0	980728	3a	46	PBT	0,96	
KA3542G02	12.0 – 15.0	980728	3a	47	PBT	0,96	
KA3542G02	15.0 – 18.0	980729	3a	48	PBT	0,96	
KA3542G02	18.0 – 21.0	980729	3a	49	PBT	0,96	
KA3542G02	24.0 – 27.0	980729	3a	50	PBT	0,96	
KA3542G01	12.0 – 15.0	980730	3a	51	PBT	0,96	
KA3542G01	15.0 – 18.0	980730	3a	52	PBT	0,96	
KA3542G01	18.0 – 21.0	980731	3a	53	PBT	0,96	
KA3542G01	21.0 – 24.0	980731	3a	54	PBT	0,96	
KA3542G01	27.0 – 30.0	980731	3a	55a	PBT	0,96	Failed,
KA3542G01	27.0 – 30.0	980731	3a	55b	PBT	0,96	Failed
KA3539G	11.0 – 12.0	980801	3a	56	PBT	0,85	
KA3539G	12.0 – 15.0	980801	3a	57	PBT	0,85	
KA3539G	15.0 – 18.0	980801	3a	58	PBT	0,85	
KA3539G	18.0 – 21.0	980802	3a	59	PBT	0,85	
KA3539G	21.0 – 24.0	980802	3a	60	PBT	0,90	
KA3548A01	5.0 – 6.0	980804	3a	61	PBT	2,40	The borehole is positioned c. 2.45 m above floor
KA3548A01	6.0 – 7.0	980805	3a	62	PBT	2,40	xxxxxxxxxxxx "
KA3548A01	9.0 – 10.0	980805	3a	63	PBT	2,40	xxxxxxxxxxxx "
KA3548A01	12.0 – 15.0	980806	3a	64	PBT	2,40	xxxxxxxxxxxx "
KA3548A01	15.0 – 18.0	980806	3a	65	PBT	2,40	xxxxxxxxxxxx "

Borehole	Section (m)	Date	Test Cam-paign	Test No	Test type	Outflow level above floor (m)	Comment
KA3548A01	18.0 – 21.0	980807	3a	66	PBT	2,40	xxxxxxxxxxxx "
KA3548A01	21.0 – 24.0	980807	3a	67	PBT	2,40	xxxxxxxxxxxx "
KA3548A01	24.0 – 27.0	980808	3a	68	PBT	2,40	xxxxxxxxxxxx "
KG0048A01	0.0 – 54.69	981007	3b	1	I	c. 2	
KG0048A01	5.0 – 8.0	981008	3b	2	PBT	c. 2	
KG0048A01	17.0 – 20.0	981009	3b	3	PBT	c. 2	
KG0048A01	20.0 – 23.0	981009	3b	4	PBT	c. 2	
KG0048A01	23.0 – 24.0	981009	3b	5	PBT	c. 2	
KG0048A01	24.0 – 25.0	981010	3b	6	PBT	c. 2	
KG0048A01	27.0 – 28.0	981010	3b	7	PBT	c. 2	
KG0048A01	33.0 – 34.0	981011	3b	8	PBT	c. 2	
KG0048A01	41.0 – 42.0	981012	3b	9	PBT	c. 2	
KG0048A01	43.0 – 44.0	981013	3b	10	PBT	c. 2	
KG0048A01	44.0 – 45.0	981013	3b	11	PBT	c. 2	
KG0048A01	45.0 – 46.0	981013	3b	12	PBT	c. 2	
KG0048A01	46.0 – 47.0	981014	3b	13	PBT	c. 2	
KG0048A01	47.0 – 48.0	981014	3b	14	PBT	c. 2	
KG0048A01	50.0 – 51.0	981014	3b	15	PBT	c. 2	
KG0048A01	53.0 – 54.69	981015	3b	16	PBT	c. 2	
KG0021A01	0.0 – 48.82	981130	3b	18	I	c. 1.5	
KG0021A01	7.0 – 10.0	981202	3b	19	PBT	c. 1.5	
KG0021A01	10.0 – 13.0	981202	3b	20	PBT	c. 1.5	
KG0021A01	19.0 – 20.0	981204	3b	21	PBT	c. 1.5	
KG0021A01	20.0 – 21.0	981204	3b	22	PBT	c. 1.5	
KG0021A01	21.0 – 22.0	981205	3b	23	PBT	c. 1.5	
KG0021A01	22.0 – 23.0	981205	3b	24	PBT	c. 1.5	
KG0021A01	23.0 – 24.0	981205	3b	25	PBT	c. 1.5	
KG0021A01	24.0 – 25.0	981206	3b	26	PBT	c. 1.5	
KG0021A01	25.0 – 26.0	981206	3b	27	PBT	c. 1.5	
KG0021A01	26.0 – 27.0	981206	3b	28	PBT	c. 1.5	
KG0021A01	27.0 – 28.0	981207	3b	29	PBT	c. 1.5	
KG0021A01	28.0 – 29.0	981207	3b	30	PBT	c. 1.5	
KG0021A01	29.0 – 30.0	981207	3b	31	PBT	c. 1.5	
KG0021A01	30.0 – 31.0	981208	3b	32	PBT	c. 1.5	
KG0021A01	31.0 – 32.0	981208	3b	33	PBT	c. 1.5	
KG0021A01	32.0 – 33.0	981208	3b	34	PBT	c. 1.5	
KG0021A01	33.0 – 34.0	981209	3b	35	PBT	c. 1.5	
KG0021A01	35.0 – 36.0	981209	3b	36	PBT	c. 1.5	
KG0021A01	36.0 – 37.0	981209	3b	37	PBT	c. 1.5	
KG0021A01	37.0 – 38.0	981210	3b	38	PBT	c. 1.5	
KG0021A01	38.0 – 39.0	981210	3b	39	PBT	c. 1.5	
KG0021A01	40.0 – 41.0	981210	3b	40	PBT	c. 1.5	
KG0021A01	42.0 – 43.0	981211	3b	41	PBT	c. 1.5	
KG0021A01	43.0 – 44.0	981214	3b	42	PBT	c. 1.5	
KG0021A01	44.0 – 45.0	981214	3b	43	PBT	c. 1.5	
KG0021A01	45.0 – 46.0	981215	3b	44	PBT	c. 1.5	