Saxon State Institute for Agriculture

Department of Soil Culture and Plant Cultivation
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Bio-Aktiv Co
Mr. Barth
No. 67
06712 Wurchwitz

Leipzig, 10.04. 1995
Tel: (0341) 5939111
Editor: Dr. Greiner

Dear Mr. Barth,

Grethener Quality Meat Ltd agrees to handing over the report to you with the data recorded in their stables from 20.09.94 to 22.09.94.
You will receive a copy of the report as an attachment.

With kind regards

File number

Dr. Menge
Authority: FB- Director

Telephone: (0341) 59390
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Extension: 5939…

Saxon State Institute for Agriculture
Department of Soil Culture and Plant Cultivation
Editor: Dr. Greiner

Leipzig 01.11.1994

Measurement of ammonia (NH_3), nitrous-oxide (N_2O), carbon dioxide (CO_2) and Methane (CH_4) in the Stable system of Grethener Quality Meat Pty Ltd, 04668 Grethen

As part of the investigations to reduce greenhouse gas emissions due to the optimal designing of agricultural systems and the starting to use multi-gas monitor, type 1802 from Bñiel & Kjaer, the first measurements were carried out in the pig fattening plant of Grethener Quality Meat Ltd (GQF)

The GQF has 10 stables of the same size. The measurement was carried out in Stall 5, which houses approx. 550 pigs ready for slaughter. The measuring grid lay in the middle of the 2nd aisle of the shed. The height of the sensor was 0.3 m above the slatted floor. Measurements were taken for 2 hours in each case

1. Measuring cycle: Before the start of use 2 g / animal BioAktiv powder
2. Measuring cycle: 24 hours after administration (application was carried out by spraying the powder dissolved in water superficially onto the split floor)
3. Measuring cycle: 48 hours after administration of the BioAktiv powder

Be measured:

- Ammonia (NH_3): detection limit: 0.15 ppm (0.11 mg / m^3)
- Nitrous oxide (N_2O): detection limit: 0.05 ppm (0.09 mg / m^3)
- carbon dioxide (CO_2): detection limit: 3.0 ppm (5.4 mg / m^3)
- Methane (CH_4): detection limit: 0.25 ppm (0.16 mg / m^3)
-

Measurement results:

There were 3 rows each for ammonia, nitrous oxide, carbon dioxide and methane (20.09. 94, 21.09.94,

22.09.94) were recorded.

The series of measurements were shown graphically

- Original values
- linear regression
- 2nd degree polynomial function approach

The following results were shown:

- Ammonia, which cannot be detected in the atmospheric air, showed values between 13.60 and 25.70 ppm (mean value: 20.81 ppm) in the shed before the BioAktiv powder was introduced. 24 hours after the introduction of 2 g / animal BioAktiv powder, the ammonia content fell noticeably to values between 6.20 and 13.90 ppm (mean value: 10.38 ppm).

48 hours after the introduction of the BioAktiv powder, the ammonia content increased to values between 12.50 and 25.70 ppm (mean value: 17.51 ppm) but remained below the initial value before the introduction of the BioAktiv powder (see Tab. 1. I. - 1.5 and Figures 1. 1 to 1.3).

- Laughing gas, which occurs at 0.4 ppm in normal atmospheric air, showed values between 1.29 to 2.35 ppm (mean value: 1.86 ppm) before the powder was introduced. The values went down 24 hours after the BioAktiv was applied to 0.88 to 1.39 ppm (mean value: 1.12 ppm) and reached values between 1.11 and 2.16 ppm (mean value: 1.47 ppm) 48 hours after application. A positive effect of the powder was after 48 hours still detectable (see Tab. 2.1 - 2. 4 and Figures 2. 1 - 2.3).

- Carbon dioxide is present in the atmospheric air with 0.03%, i.e. 300 ppm; before the BioAktiv powder was introduced, greatly increased values between 1793 and 3573 ppm were found. (Mean value: 2856 ppm).

24 hours after application of the BioAktiv, the values decreased to 1220 to 1685 ppm (mean value: 1507 ppm) and increased visibility after 48 hours to 1508 to 2568 ppm (mean value 1916 ppm). Thus, the CO2 load is a power of 10 above the normal value of the atmospheric air. However, using the BioAktiv reduces the exposure to 50% (see Tab. 3 1 - 3.4 and Figures 3.1–3.3).

- Methane, which cannot be detected in the atmospheric air with the gas monitor, showed values between 53.80 and 114.00 ppm (mean value 88.4 l ppm) before treatment with BioAktiv powder. 24 hours after the treatment the values decreased to 35.80 to 58.90 ppm (mean value. 44.46 ppm) and increased 48 hours after the treatment to 36.80 to 105.00 (mean value: 64.20 ppm) back to; However, they were still approx. 25% below the initial values before treatment. (Tab. 4.1 to 4.4 and Figures 4.1 to 4.3).

Evaluation and proposal for further work:

The one-time introduction of BioAktiv powder (2 g / animal) into the stables to reduce environmentally relevant trace gases showed a positive effect after 24 hours, which was confirmed by the measurement results.
The air we breathed was noticeably better. Further systematic studies are necessary.
It is suggested that TG plans and carries out these investigations in two identical sheds with prolonged use of the gas monitor and repeated use of BioAktiv powder.

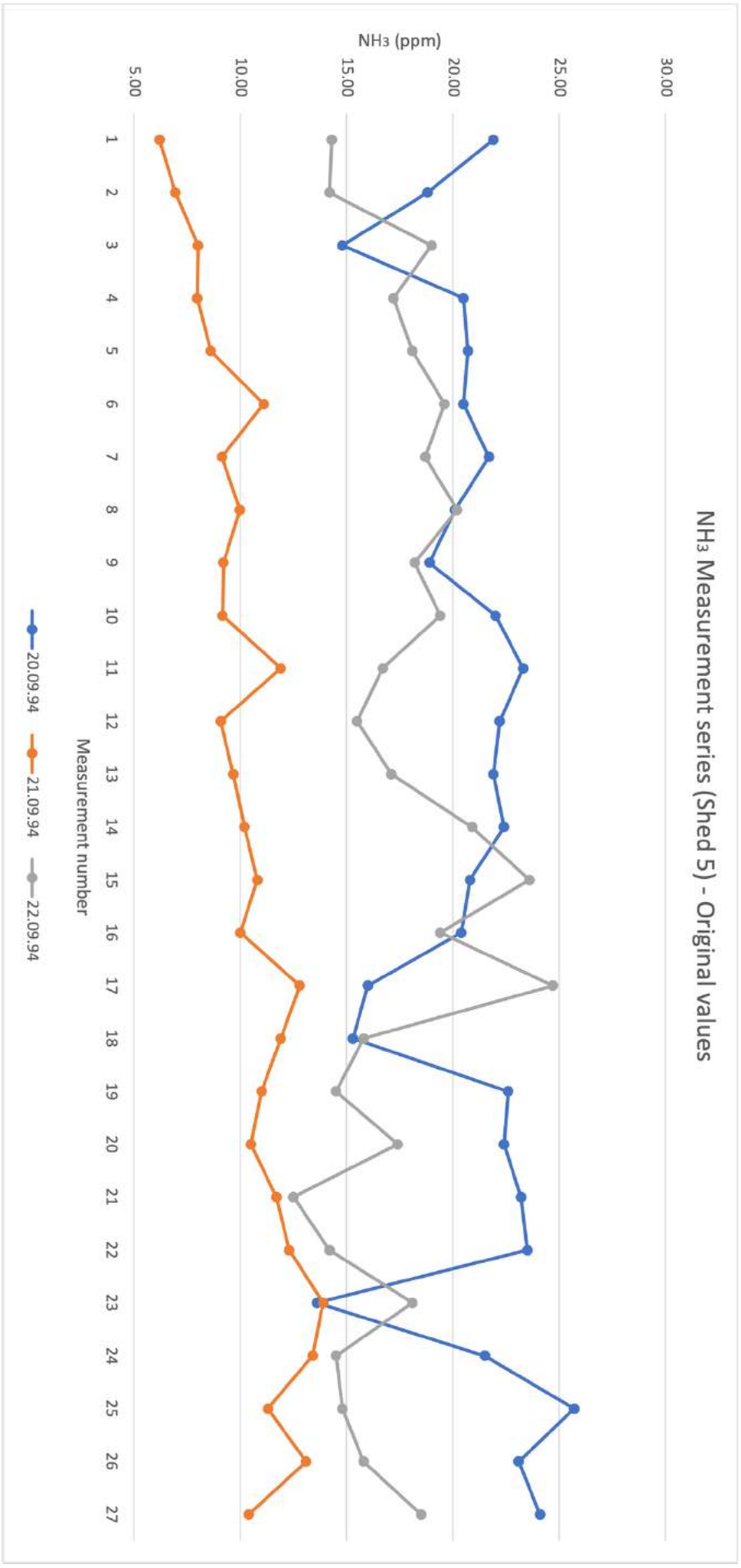
Investments:
Taboo. Images

NH_3 - Measurement Series Shed 5
Measured value (ppm)

Date of Measurements

No.	**20.09.94**	**21.09.94**	**22.09.94**
1	21.90	6.20	14.30
2	18.80	6.94	14.20
3	14.80	8.01	19.00
4	20.50	7.97	17.20
5	20.70	8.61	18.10
6	20.50	11.10	19.60
7	21.70	9.14	18.70
8	20.10	9.98	20.20
9	18.90	9.21	18.20
10	22.00	9.17	19.40
11	23.30	11.90	16.70
12	22.20	9.08	15.50
13	21.90	9.67	17.10
14	22.40	10.20	20.90
15	20.80	10.80	23.60
16	20.40	10.00	19.40
17	16.00	12.80	24.70
18	15.30	11.90	15.80
19	22.60	11.00	14.50
20	22.40	10.50	17.40
21	23.20	11.70	12.50
22	23.50	12.30	14.20
23	13.60	13.90	18.10
24	21.50	13.40	14.50
25	25.70	11.30	14.80
26	23.10	13.10	15.80
27	24.10	10.40	18.50

Image 1.1


NH3 Measurement series (Shed 5) - Original values
NH3 (ppm)
30.00
25.00
20.00
15.00
10.00
5.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

Tab. 1.2

NH3 - Measurement series Shed 5

	20.09.94	**21.09.94**	**22 09.94**
Average	20.81	10.38	17. 51
Spread	2.94	1.94	2.90
Median	21.70	10.40	17.40
Minimum	13.60	6.20	12.50
Maximum	25.70	13.90	24.70

20.09.94 to 21.09.94

Biserial correlation R = 1.1350 P (R <> 0) = 1.0000

20.09.94 to 22.09.94

Biserial correlation R = -0.6251 P (R <> 0) = 0.9999

21.09.94 to 22.09.94

Biserial correlation R = + 1.0373 P (R <> 0) -1 0000

NH3 - Measurement series Shed 5

20.09.94
Linear Regression (from random sample 2 to random sample 1)
Equation: y = a + b * x
With: a = 19.44701
  b = 0.09744
Correlation: R = + 0.2632 Standard estimation error: s = 2.8913

21.09.94
Linear regression (from sample 3 to random sample 1)
Equation: y = a + b * x
With: a = 7. 62177
  b = 0.19707
Correlation: R = + 0.8077 Standard estimation error: s = 1.1646

22.09.94
Linear regression (from sample 4 to random sample 1)
Equation: y - a + b * x
With: a = 18.34729
  b = -0. 05946
Correlation: R = + 0.1628 Standard estimation error: s = 2.9163

20.09.94
Polynomial regression 2. Ord. (from sample 2 to random sample 1)
Equation: y = a + b*x + c*x^2
With: a = 2.0036752136E + 01
  b = - 2. 4580017658E - 02
  c = 4. 3577112537E - 03
Correlation: R = + 0.2756 Standard estimation error: s = 2.9403

21.09.94
Polynomial regression 2. Ord. (from sample 3 to random sample 1)
Equation: y = a + b*x + c*x^2
With: a = 6.5992478629E + 00
  b = - 4.0862515268E - 01
  c = - 7.5555555572E - 03
Correlation: R = + 0.8359 Standard estimation error: s = 1.1066

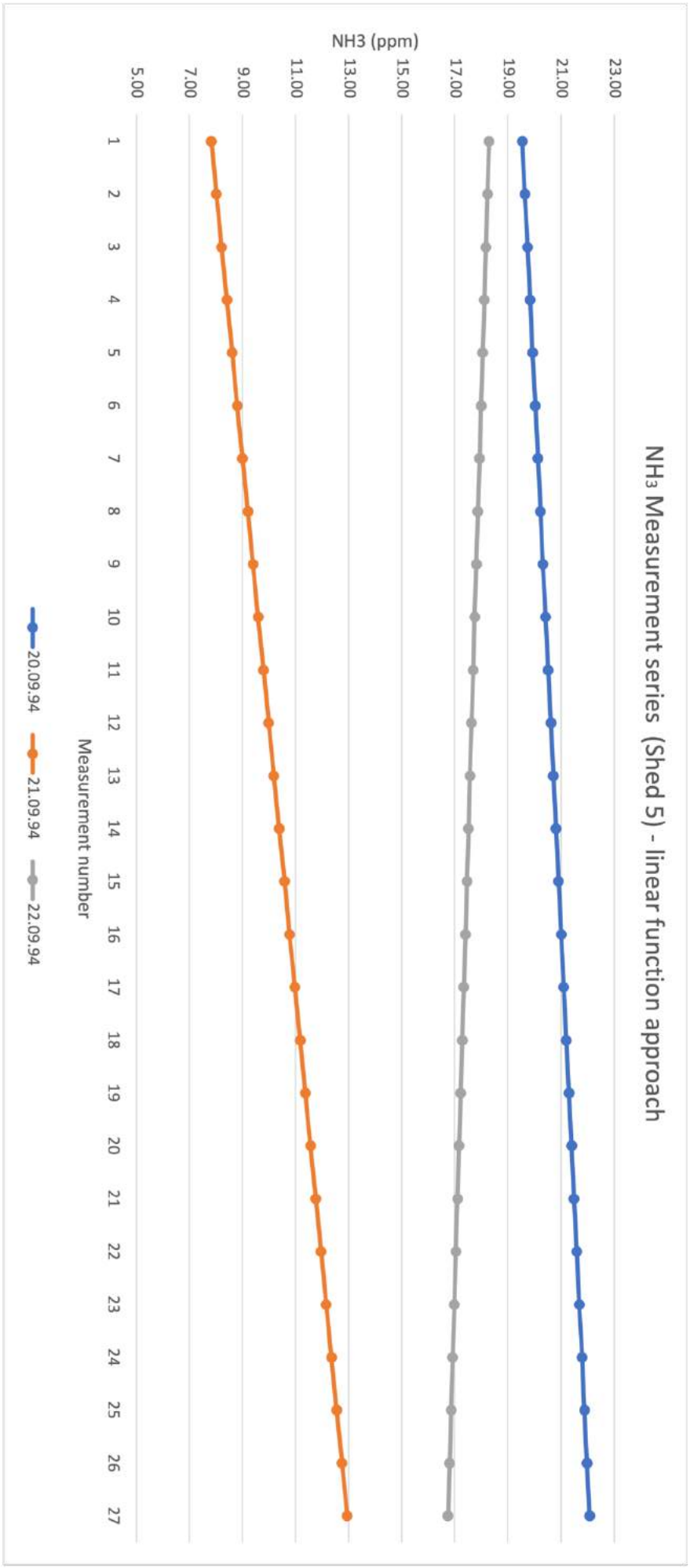
22.09.94
Polynomial regression (from sample 4 to random sample 1)
Equation: y = a + b*x + c*x^2
With: a = 1.5518461539E - 01
  b = 5.2581280784E - 01
  c = 2.0902698832E - 02
Correlation: R = + 0.4300 Standard estimation error: s = 2.7236

NH_3 - Measurement series Shed 5
Linear functions theorem

Date of Measurements

No.	20.09.94	21.09.94	22.09.94
1	19.54	7.82	18.29
2	19.64	8.02	18.23
3	19.74	8.21	18.17
4	19.84	8.41	18.11
5	19.93	8.61	18.05
6	20.03	8.80	17.99
7	20.13	9.00	17.93
8	20.23	9.20	17.87
9	20.32	9.40	17.81
10	20.42	9.59	17.75
11	20.52	9.79	17.69
12	20.62	9.99	17.63
13	20.71	10.18	17.57
14	20.81	10.38	17.51
15	20.91	10.58	17.46
16	21.01	10.77	17.40
17	21.10	10.97	17.34
18	21.20	11.17	17.28
19	21.30	11.37	17.22
20	21.40	11.56	17.16
21	21.49	11.76	17.10
22	21.59	11.96	17.04
23	21.69	12.15	16.98
24	21.79	12.35	16.92
25	21.88	12.55	16.86
26	21.98	12.75	16.80
27	22.08	12.94	16.74

Image 1.4

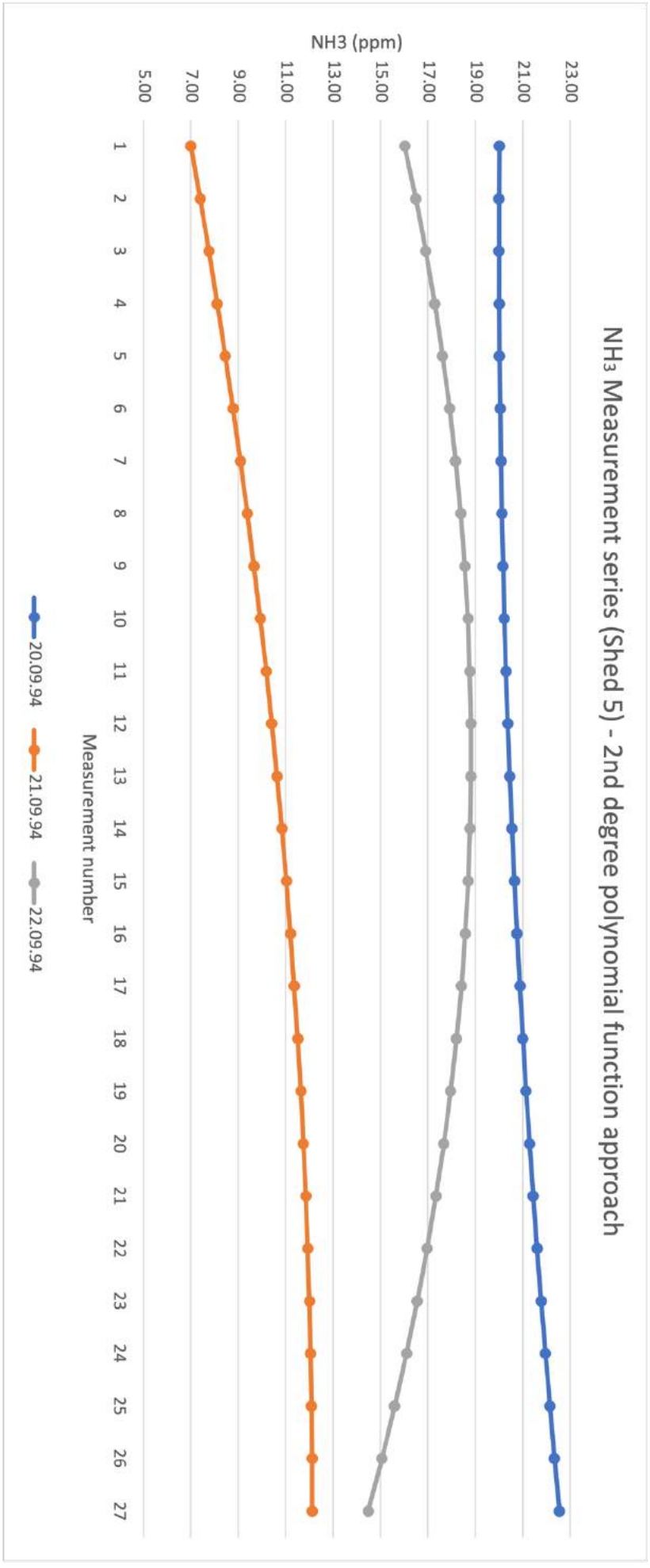

NH3 Measurement series (Shed 5) - linear function approach
NH3 (ppm)
23.00
21.00
19.00
17.00
15.00
13.00
11.00
9.00
7.00
5.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

NH_3 - Measurement series Shed 5
2nd degree polynomial function approach

Date of Measurements

No.	**20.09.94**	**21.09.94**	**22.09.94**
1	19.54	7.82	18.29
2	19.64	8.02	18.23
3	19.74	8.21	18.17
4	19.84	8.41	18.11
5	19.93	8.61	18.05
6	20.03	8.80	17.99
7	20.13	9.00	17.93
8	20.23	9.20	17.87
9	20.32	9.40	17.81
10	20.42	9.59	17.75
11	20.52	9.79	17.69
12	20.62	9.99	17.63
13	20.71	10.18	17.57
14	20.81	10.38	17.51
15	20.91	10.58	17.46
16	21.01	10.77	17.40
17	21.10	10.97	17.34
18	21.20	11.17	17.28
19	21.30	11.37	17.22
20	21.40	11.56	17.16
21	21.49	11.76	17.10
22	21.59	11.96	17.04
23	21.69	12.15	16.98
24	21.79	12.35	16.92
25	21.88	12.55	16.86
26	21.98	12.75	16.80
27	22.08	12.94	16.74

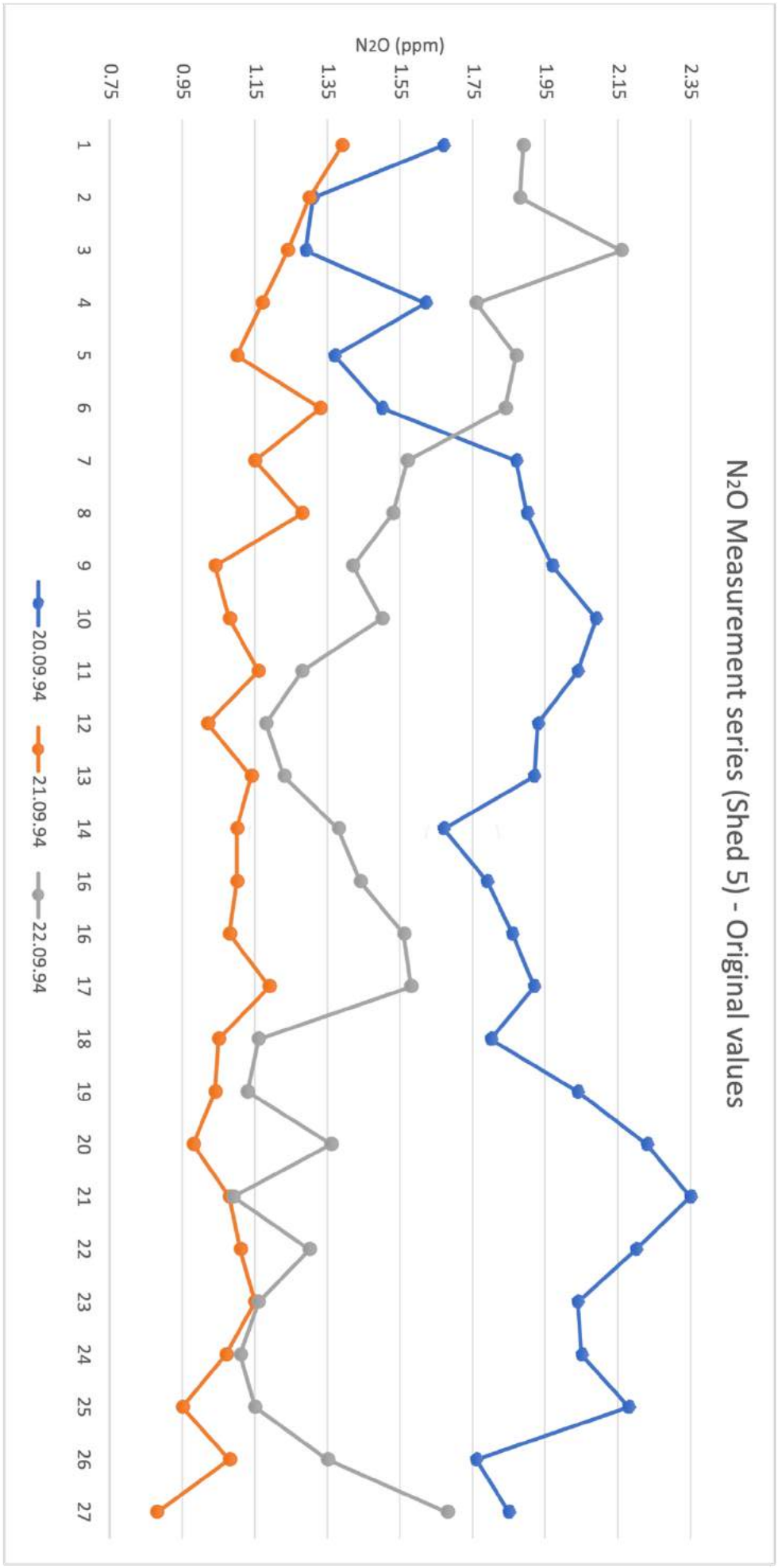
Image 1.5


NH3 (ppm)
23.00
21.00
19.00
17.00
15.00
13.00
11.00
9.00
7.00
5.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94
NH3 Measurement series (Shed 5) - 2nd degree polynomial function approach

N_2O - Measurement series Shed 5
Measured values (ppm)

	Date of Measurements		
No.	**20.09.94**	**21.09.94**	**22.09.94**
1	1.67	1.39	1.89
2	1.31	1.30	1.88
3	1.29	1.24	2.16
4	1.62	1.17	1.76
5	1.37	1.10	1.87
6	1.50	1.33	1.84
7	1.87	1.15	1.57
8	1.90	1.28	1.53
9	1.97	1.04	1.42
10	2.09	1.08	1.50
11	2.04	1.16	1.28
12	1.93	1.02	1.18
13	1.92	1.14	1.23
14	1.67	1.10	1.38
16	1.79	1.10	1.44
16	1.86	1.08	1.56
17	1.92	1.19	1.58
18	1.80	1.05	1.16
19	2.04	1.04	1.13
20	2.23	0.98	1.36
21	2.35	1.08	1.09
22	2.20	1.11	1.30
23	2.04	1.15	1.16
24	2.05	1.07	1.11
25	2.18	0.95	1.15
26	1.76	1.08	1.35
27	1.85	0.88	1.68

Image 2.1


N2O Measurement series (Shed 5) - Original values
N2O (ppm)
2.35
2.15
1.95
1.75
1.55
1.35
1.15
0.95
0.75
1 2 3 4 5 6 7 8 9 10 11 12 13 14 16 16 17 18 19 20 21 22 23 24 25 26 27
20.09.94
21.09.94
22.09.94

Tab. 2.2

----------// Data file: "N_2O.QST" //

	Grp.1	Grp.2	Grp.3	Grp.4
Average	7.94	0.27	0.12	0.29
Spread	7.94	0.27	0.12	0.29
Minimum	1.00	1.29	0.88	1.09
Maximum	27.00	2.35	1.39	2.16

Linear Regression (from random sample.2 random sample.1)
Equation: y = a + b*x
with: a = 1.54068
b = 0.02281
Correlation: R = +0.6606 Standard estimation error: s = 0.2098

Linear Regression (from random sample.3 random sample.1)
Equation: y = a + b*x
mit: a = 1. 26613
b = —0.01038
Correlation: R = +0.7160 Standard estimation error: s = 0.0820

Linear Regression (from random sample.4 random sample.1)
Equation: y = a + b*x
with: a = 1.83040
b = -0.02609
Correlation: R = +0.7104 Standard estimation error: s = 0.2092

Polynomial Regression 2. Ord. (from random sample.2 random sample.1)
Equation: y = a + b*x + c*x^2
with a = 1. 3058461538E+00
b = 7.1395393877E-02
c = -1.7352532524E 03
Correlation: R = +0.7473 Standard estimation error: s = 0.1895

Polynomial Regression 2. Ord. (from random sample.3 random sample.1)
Equation: y = a + b*x + c*x^2
With a = 1.3113846154E+00
b = -1.9748600061E-02
c = 3.3442802417E-04
Correlation: R = +0.7337 Standard estimation error: s = 0.0814

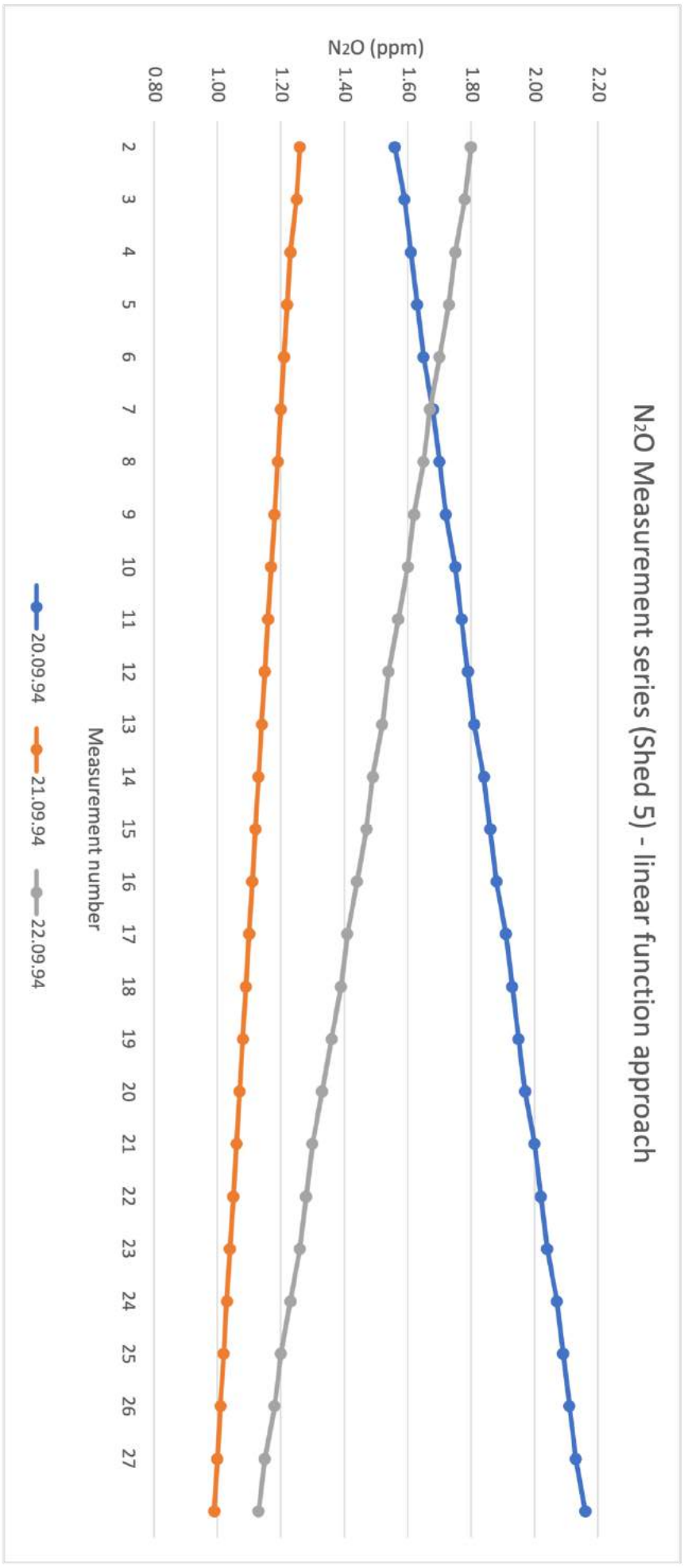
Polynomial Regression 2. Ord. (from random sample.4 random sample.1)
Equation: y = a + b*x + c*x^2
With a= 2. 1422564103E+00
B = -9.068942787E-02
c — 2.3043661322E-03
Correlation: R = + 0. 8337 Standard estimation error: s = 0.1675

N_2O - Measurement series Shed 5
Linear functions approach

Date of Measurements

Nr	**20.09.94**	**21.09.94**	**22.09.94**
1	1.56	1.26	1.80
2	1.59	1.25	1.78
3	1.61	1.23	1.75
4	1.63	1.22	1.73
5	1.65	1.21	1.70
6	1.68	1.20	1.67
7	1.70	1.19	1.65
8	1.72	1.18	1.62
9	1.75	1.17	1.60
10	1.77	1.16	1.57
11	1.79	1.15	1.54
12	1.81	1.14	1.52
13	1.84	1.13	1.49
14	1.86	1.12	1.47
15	1.88	1.11	1.44
16	1.91	1.10	1.41
17	1.93	1.09	1.39
18	1.95	1.08	1.36
19	1.97	1.07	1.33
20	2.00	1.06	1.30
21	2.02	1.05	1.28
22	2.04	1.04	1.26
23	2.07	1.03	1.23
24	2.09	1.02	1.20
25	2.11	1.01	1.18
26	2.13	1.00	1.15
27	2.16	0.99	1.13

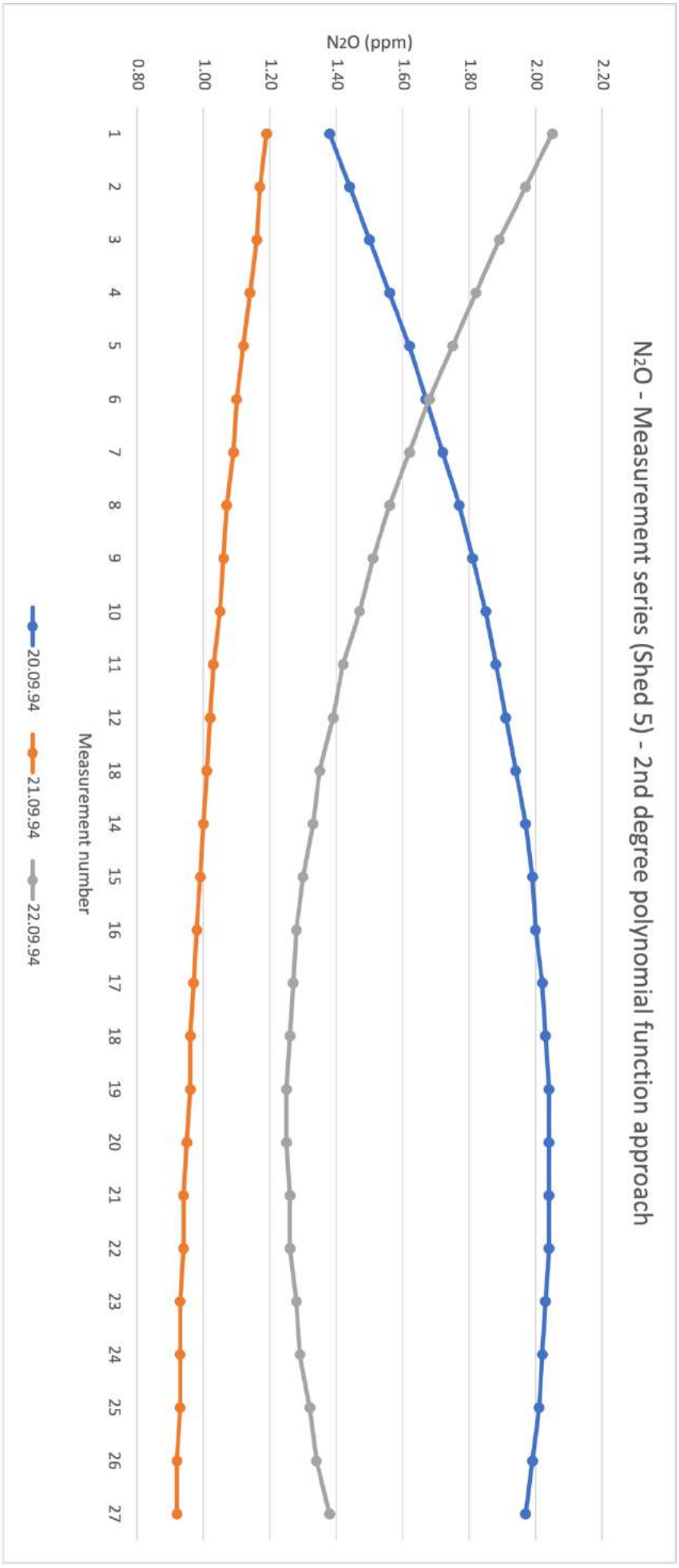
Image 2.3


N2O Measurement series (Shed 5) - linear function approach
N2O (ppm)
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

N_2O - Measurement series Shed 5
2nd degree polynomial function approach

	Date of measurement		
Nr	**20.09.94**	**21.09.94**	**22.09.94**
1	1.38	1.19	2.05
2	1.44	1.17	1.97
3	1.50	1.16	1.89
4	1.56	1.14	1.82
5	1.62	1.12	1.75
6	1.67	1.10	1.68
7	1.72	1.09	1.62
8	1.77	1.07	1.56
9	1.81	1.06	1.51
10	1.85	1.05	1.47
11	1.88	1.03	1.42
12	1.91	1.02	1.39
18	1.94	1.01	1.35
14	1.97	1.00	1.33
15	1.99	0.99	1.30
16	2.00	0.98	1.28
17	2.02	0.97	1.27
18	2.03	0.96	1.26
19	2.04	0.96	1.25
20	2.04	0.95	1.25
21	2.04	0.94	1.26
22	2.04	0.94	1.26
23	2.03	0.93	1.28
24	2.02	0.93	1.29
25	2.01	0.93	1.32
26	1.99	0.92	1.34
27	1.97	0.92	1.38

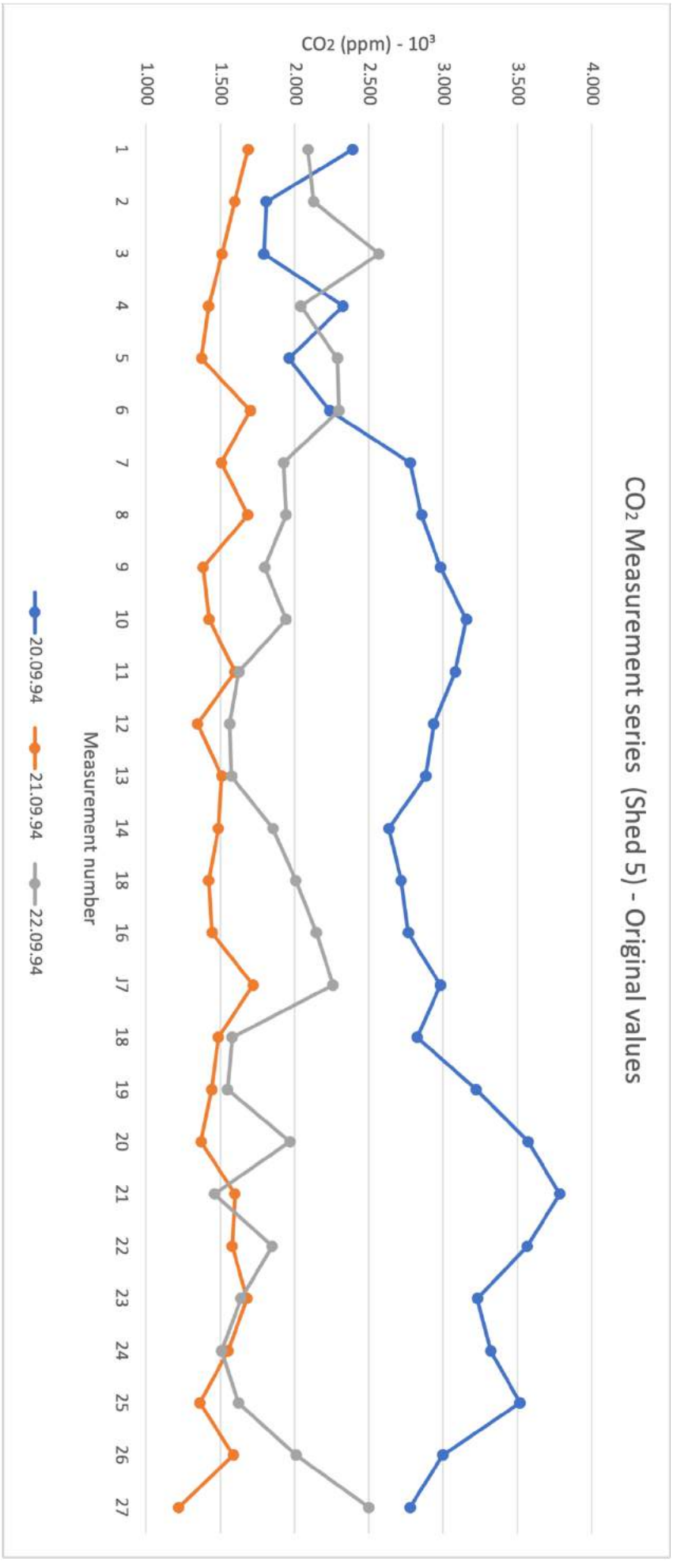
Image 2.4


N2O - Measurement series (Shed 5) - 2nd degree polynomial function approach
N2O (ppm)
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
1 2 3 4 5 6 7 8 9 10 11 12 18 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

CO_2 - Measurement series Shed 5
Measured values (10^3ppm)

	Date of measurement		
No.	**20.09.94**	**21.09.94**	**22.09.94**
1	2.392	1.687	2.090
2	1.809	1.597	2.128
3	1.793	1.512	2.568
4	2.326	1.421	2.042
5	1.962	1.374	2.288
6	2.235	1.702	2.299
7	2.778	1.507	1.925
8	2.855	1.685	1.943
9	2.983	1.384	1.798
10	3.156	1.424	1.943
11	3.081	1.598	1.624
12	2.938	1.347	1.562
13	2.883	1.510	1.575
14	2.635	1.487	1.854
18	2.718	1.421	2.008
16	2.766	1.445	2.147
17	2.983	1.720	2.259
18	2.826	1.486	1.580
19	3.223	1.441	1.549
20	3.573	1.370	1.968
21	3.785	1.598	1.460
22	3.566	1.580	1.850
23	3.230	1.679	1.638
24	3.320	1.551	1.508
25	3.517	1.363	1.621
26	2.998	1.588	2.010
27	2.778	1.220	2.500

Image 3.1


CO2 Measurement series (Shed 5) - Original values
CO2 (ppm) - 10³
4.000
3.500
3.000
2.500
2.000
1.500
1.000
1 2 3 4 5 6 7 8 9 10 11 12 13 14 18 16 J7 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

Tab 3.2

Data file: CO_2. QST

	Group.1	Group.2	Group.3	Group.4
Mean	14.000	2.856	1.507	1.916
Spread	7.937	0.519	0.128	0.308
Minimum	1.000	1.793	1.220	1.460
Maximum	27.000	3.785	1.720	2.568

Linear Regression (from random sample 2 to random sample 1)
Equation: y = a + b * x
With: a = 2.16628
b = 0.04926
Correlation: R = + 0.7532 Standard estimation error: s = 0.3482

Linear regression (from sample 3 to random sample 1)
Equation: y = a + b * x
With: a = 1.55000
b = −0.00305
Correlation: R = + 0.1890 Standard estimation error: s = 0.1283

Linear regression (from sample 4 to random sample 1)
Equation: y - a + b * x
With: a = 2.11772
b = -0.01439
Correlation: R = +0.3707 Standard estimation error: s = 0.2919

Polynomial regression 2. Ord. (from sample 2 to random sample 1)
Equation: y = a + b*x + c*x ^2
With: a = 1.7795606387E + 00
b = 1.2926894868E - 01
c = - 2.8575470507E - 03
Correlation: R = +0.8122 Standard estimation error: s = 0.3152

Polynomial regression 2. Ord. (from sample 3 to random sample 1)
Equation: y = a + b*x + c*x ^2
With: a = 1.5613794871E + 00
b = -5.4050271489E - 03
c = 8.4105932156E - 05
Correlation: R = +0.1924 Standard estimation error: s = -0.1308

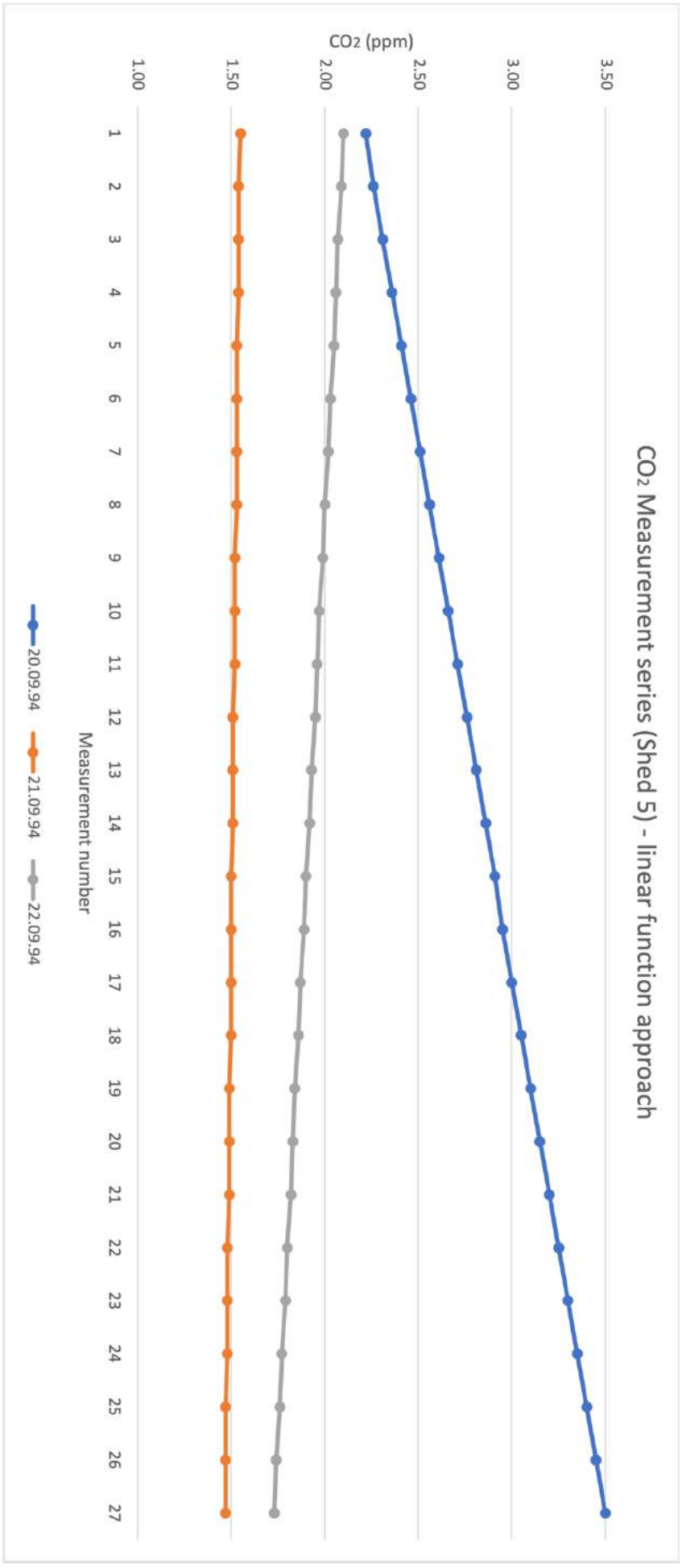
Polynomial regression (from sample 4 to random sample 1)
Equation: y = a + b*x + c*x ^2
With: a = 2.4225897435E + 00
b = -7.7472506417E - 02
c = 2.2527683044E - 03
Correlation: R = +0.5478 Standard estimation error: s = 0.2684

CO_2 - Measurement series Shed 5
linear function approach

Date of measurement

No.	**20.09.94**	**21.09.94**	**22.09.94**
1	2.22	1.55	2.10
2	2.26	1.54	2.09
3	2.31	1.54	2.07
4	2.36	1.54	2.06
5	2.41	1.53	2.05
6	2.46	1.53	2.03
7	2.51	1.53	2.02
8	2.56	1.53	2.00
9	2.61	1.52	1.99
10	2.66	1.52	1.97
11	2.71	1.52	1.96
12	2.76	1.51	1.95
13	2.81	1.51	1.93
14	2.86	1.51	1.92
15	2.91	1.50	1.90
16	2.95	1.50	1.89
17	3.00	1.50	1.87
18	3.05	1.50	1.86
19	3.10	1.49	1.84
20	3.15	1.49	1.83
21	3.20	1.49	1.82
22	3.25	1.48	1.80
23	3.30	1.48	1.79
24	3.35	1.48	1.77
25	3.40	1.47	1.76
26	3.45	1.47	1.74
27	3.50	1.47	1.73

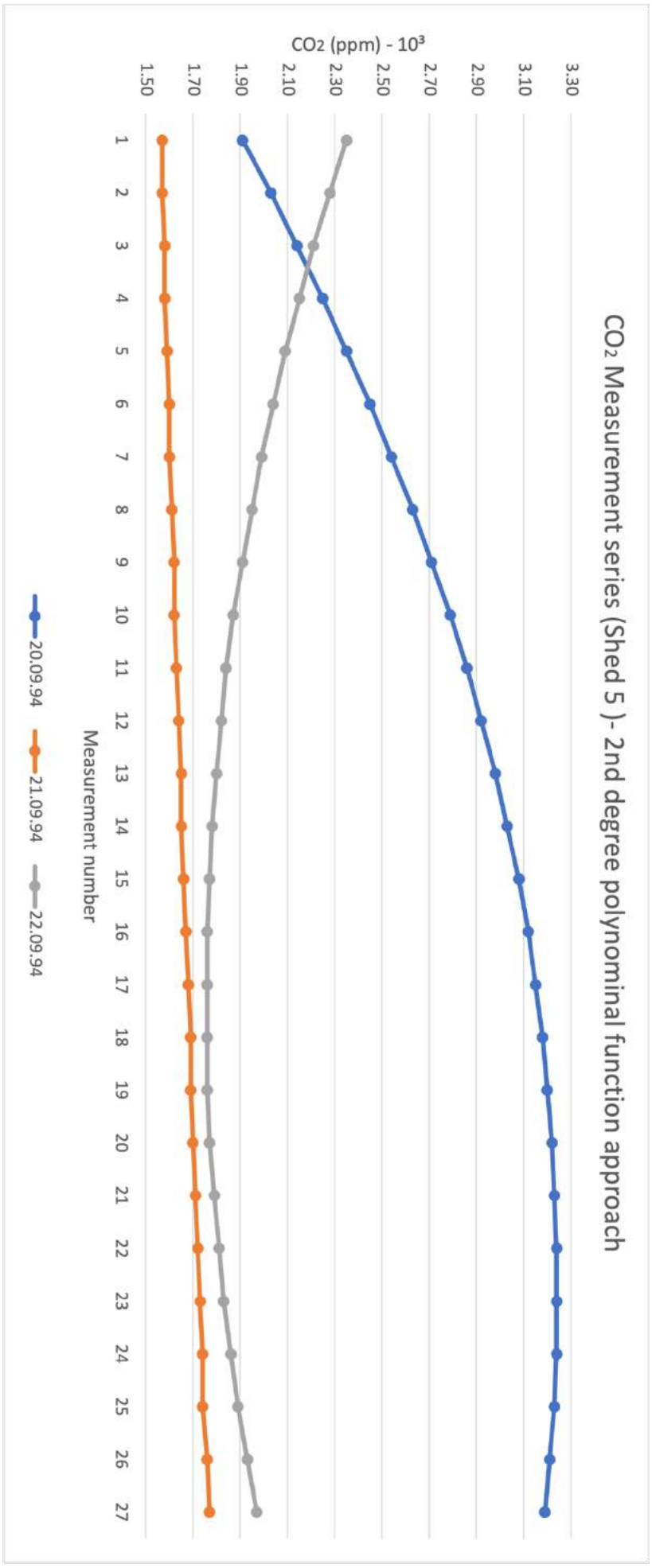
Image 3.3


CO2 Measurement series (Shed 5) - linear function approach
CO2 (ppm)
1.00
1.50
2.00
2.50
3.00
3.50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

CO_2 - Measurement series Shed 5
2nd degree polynomial function approach (10^3ppm)

	Date of measurement		
No.	**20.09.94**	**21.09.94**	**22.09.94**
1	1.91	1.57	2.35
2	2.03	1.57	2.28
3	2.14	1.58	2.21
4	2.25	1.58	2.15
5	2.35	1.59	2.09
6	2.45	1.60	2.04
7	2.54	1.60	1.99
8	2.63	1.61	1.95
9	2.71	1.62	1.91
10	2.79	1.62	1.87
11	2.86	1.63	1.84
12	2.92	1.64	1.82
13	2.98	1.65	1.80
14	3.03	1.65	1.78
15	3.08	1.66	1.77
16	3.12	1.67	1.76
17	3.15	1.68	1.76
18	3.18	1.69	1.76
19	3.20	1.69	1.76
20	3.22	1.70	1.77
21	3.23	1.71	1.79
22	3.24	1.72	1.81
23	3.24	1.73	1.83
24	3.24	1.74	1.86
25	3.23	1.74	1.89
26	3.21	1.76	1.93
27	3.19	1.77	1.97

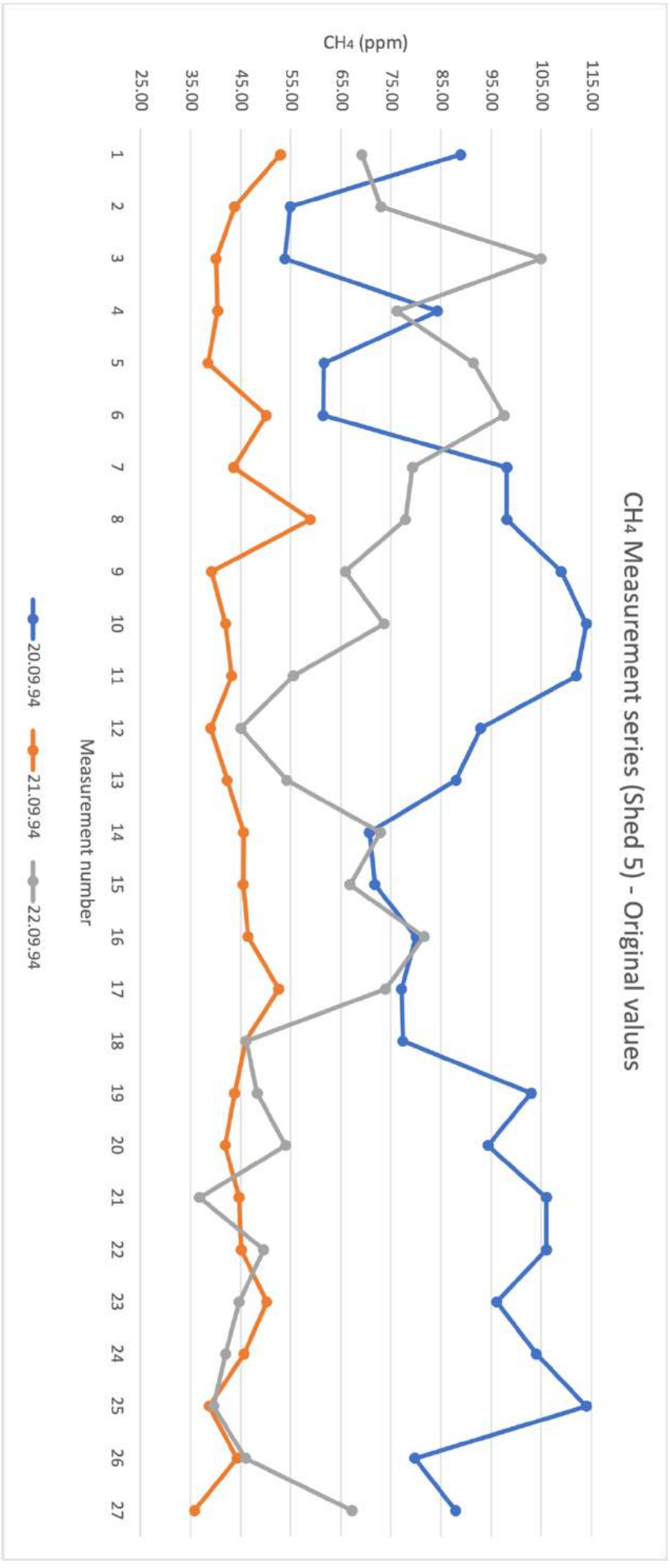
Image 3.4


CO2 Measurement series (Shed 5)- 2nd degree polynominal function approach
CO2 (ppm) - 10³
3.30
3.10
2.90
2.70
2.50
2.30
2.10
1.90
1.70
1.50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

CH_4 - Measurement series Shed 5
Measured values (ppm)

	Date of measurement		
Nr	**20.09.94**	**21.09.94**	**22.09.94**
1	88.90	52.90	69.20
2	54.90	43.80	73.00
3	*53.80*	40.10	105.00
4	84.30	40.40	76.20
5	61.60	38.50	91.50
6	61.50	50.10	97.60
7	98.10	43.60	79.30
8	98.10	58.90	77.90
9	109.00	39.20	65.90
10	114.00	42.00	73.60
11	112.00	43.20	55.50
12	92.90	39.00	45.00
13	88.00	42.30	54.20
14	70.70	45.60	72.90
15	71.80	45.50	66.80
16	80.00	46.50	81.60
17	77.10	52.60	73.90
18	77.40	46.00	46.10
19	103.00	43.80	48.30
20	94.40	41.90	54.00
21	106.00	44.70	36.80
22	106.00	45.10	49.60
23	96.10	50.20	44.70
24	104.00	45.70	42.00
25	114.00	38.70	39.60
26	79.80	44.30	46.00
27	87.90	35.80	67.20

Image 4.1


CH4 Measurement series (Shed 5) - Original values
CH4 (ppm)
115.00
105.00
95.00
85.00
75.00
65.00
55.00
45.00
35.00
25.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

Tab 4.2

----------//Data file: CH4. QST //

	Grp.1	Grp.2	Grp.3	Grp.4
Mean	14.00	88.41	44.46	64.20
Spread	7.94	18.01	5.11	18.37
Minimum	1.00	53.80	35.80	36.80
Maximum	27.00	114.00	58.90	105.00

Linear Regression (from random sample 2 to random sample 1)
Equation: y = a + x
With: a =
75.20684
b = 0.94316
Correlation: R = + 0.4156 Standard estimation error: s = 16.7056

Linear regression (from sample 3 to random sample 1)
Equation: y = a + b*x
With: a =
45.50456
b = —
0.07466
Correlation: R = + 0.1160 Standard estimation error: s = 5.1758

Linear regression (from sample 4 to random sample 1)
Equation: y - a + b*x
With: a =
87.40085
b = -1.65720
Correlation: R = +0.7162 Standard estimation error: s = 13.0704

Polynomial regression 2. Ord. (from sample 2 to random sample 1)
Equation: y = a + b*x + c*x^2
With: a = 6.7064786322E + 01
b = 2.6277247277E + 00
c = -6.016294.0519E -
02
Correlation: R = +0.4547 Standard estimation error: s = 16.6963

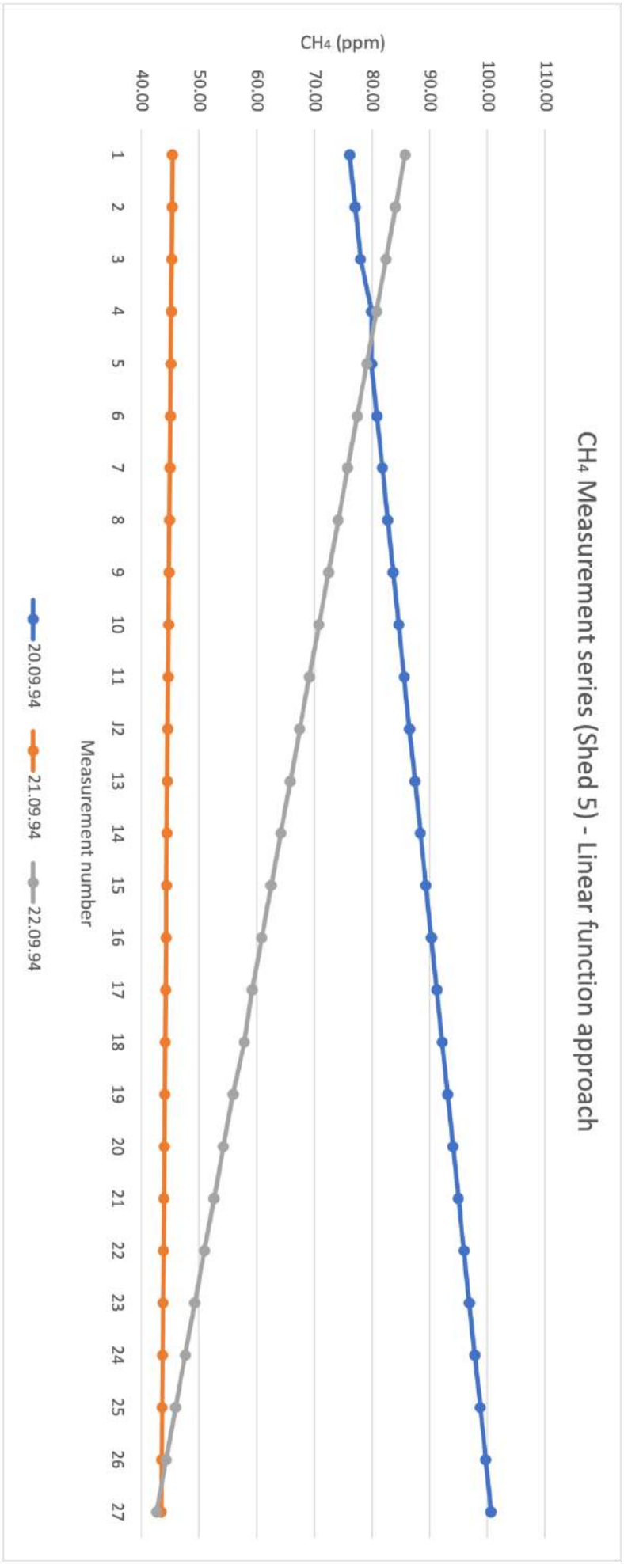
Polynomial regression 2. Ord. (from sample 3 to random sample 1)
Equation: y = a + b*x + c*x^2
With: a = 4.3804102565E + 01
b = 2.7715422488E - 01
c = -1.2564944626E - 02
Correlation: R = +0.1785 Standard estimation error: s = 5.2330

Polynomial regression (from sample 4 to random sample 1)
Equation: y = a + b*x + c*x^2
With: a = 9.0472820514E + 01
b = -2.2927830412E + 00
c = 2.2699254786E - 02
Correlation: R = +0.7195 Standard estimation error: s = 13.2761

CH_4 - Measurement series Shed 5
linear function approach

	Date of measurement		
Nr	**20.09.94**	**21.09.94**	**22.09.94**
1	76.15	45.43	85.74
2	77.09	45.36	84.09
3	78.04	45.28	82.43
4	79.98	45.21	80.77
5	79.92	45.13	79.11
6	80.87	45.06	77.46
7	81.81	44.98	75.80
8	82.75	44.91	74.14
9	83.70	44.83	72.49
10	84.64	44.76	70.83
11	85.58	44.68	69.17
J2	86.52	44.61	67.51
13	87.47	44.53	65.86
14	88.41	44.46	64.20
15	89.35	44.38	62.54
16	90.30	44.31	60.89
17	91.24	44.24	59.23
18	92.18	44.16	57.87
19	93.13	44.09	55.91
20	94.07	44.01	54.26
21	95.01	43.94	52.60
22	95.96	43.86	50.94
23	96.90	43.79	49.29
24	97.84	43.71	47.63
25	98.79	43.64	45.97
26	99.73	43.56	44.31
27	100.67	43.49	42.66

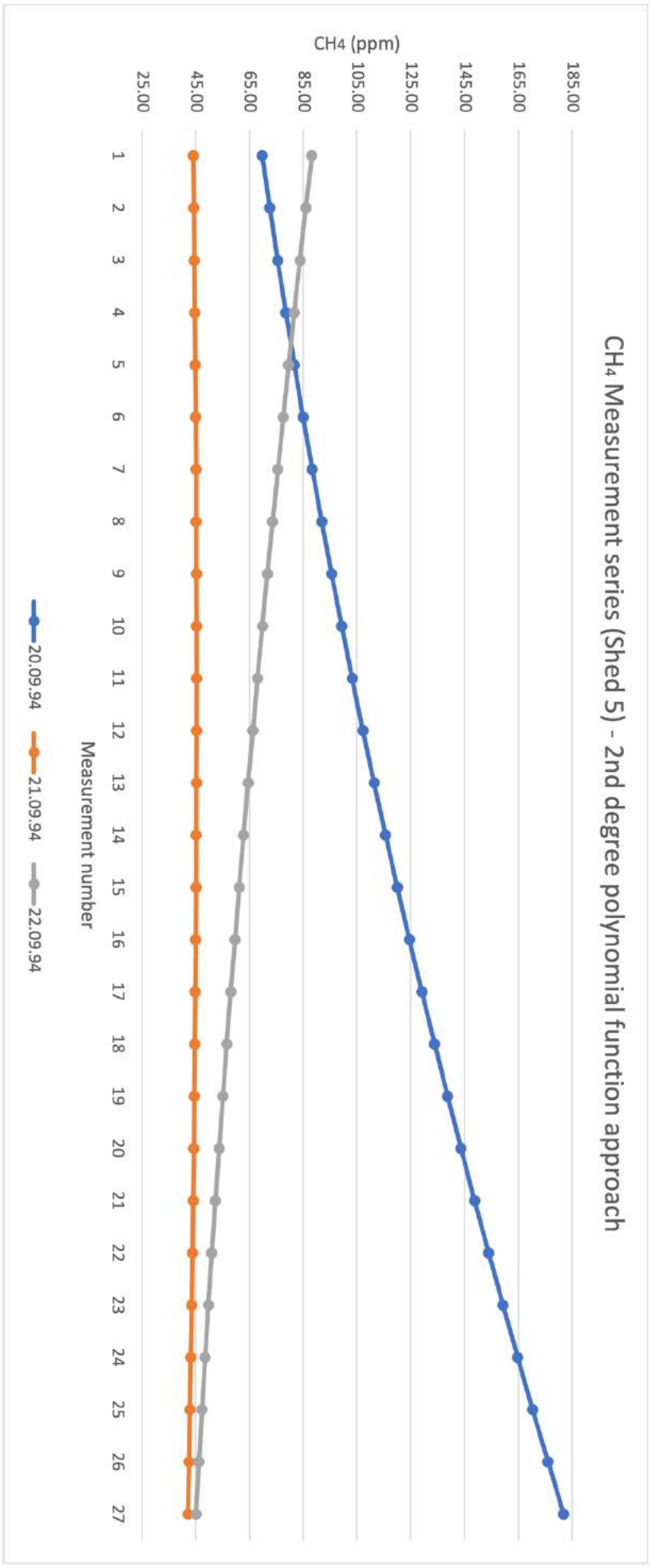
Image 4.3


CH4 Measurement series (Shed 5) - Linear function approach
CH4 (ppm)
110.00
100.00
90.00
80.00
70.00
60.00
50.00
40.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94

CH4 - Measurement series Shed 5
2nd degree polynomial function approach

	Date of measurement		
Nr	**20.09.94**	**21.09.94**	**22.09.94**
1	69.75	44.07	88.20
2	72.56	44.31	85.98
3	75.49	44.52	83.80
4	78.54	44.71	81.66
5	81.71	44.88	79.58
6	85.00	45.01	77.53
7	88.41	45.13	75.54
8	91.94	45.22	73.58
9	95.59	45.28	71.68
10	99.36	45.32	69.81
11	103.25	45.33	68.00
12	107.26	45.32	66.23
13	111.39	45.28	64.50
14	115.65	45.22	62.82
15	120.02	45.13	61.19
16	124.51	45.02	59.60
17	129.12	44.88	58.06
18	133.86	44.72	56.56
19	138.71	44.53	55.10
20	143.68	44.32	53.70
21	148.78	44.08	52.33
22	153.99	43.82	51.02
23	159.33	43.53	49.75
24	164.78	43.22	48.52
25	170.36	42.88	47.34
26	176.06	42.52	46.20
27	181.87	42.13	45.12

Image 4.4


CH4 Measurement series (Shed 5) - 2nd degree polynomial function approach
CH4 (ppm)
185.00
165.00
145.00
125.00
105.00
85.00
65.00
45.00
25.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Measurement number
20.09.94
21.09.94
22.09.94