

ECHO - LOG

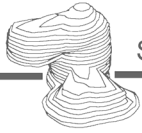
HARLINGEN BAS #1

12. Messung (Vollvermessung)

08.10.2004

041749





**Bericht über die Ergebnisse der
echometrischen Hohlraumvermessung
in der Kaverne**

HARLINGEN BAS #1

Datum: 08.10.2004

Berichtsnummer: 041749

Auftraggeber: FRISIA Zout b.v.

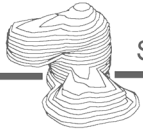
Verantwortlich für die Vermessung:

Messtechniker :

Truppleiter :

Auswertung :

Kontrolle:



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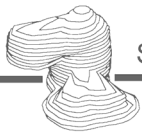
Maxplots (grundrisslich)

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Zusammenfassung der Ergebnisse

Angaben zur Bohrung

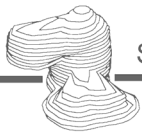
Alle Teufenangaben sind:	MD-Angaben
Bezugsebene der Teufenangaben:	Erdoberfläche
Zementierter Rohrschuh: 13 3/8":	2543.4 m
Rohrstand der 10 3/4"-Verrohrung während der Messung:	2587.4 m
Rohrstand der 7"-Verrohrung während der Messung:	2786.7 m
Bezugsteufe der Sonarvermessung:	2587.4 m
Angebrachte Teufenkorrektur:	-3.1 m
Teufe des Öl / Sole-Spiegels:	2573.4 m
Druck am Kavernenkopf:	150.0 bar

Angaben zum Messequipment

Eingesetztes Messfahrzeug:	L 102
Eingesetzte Messsonden:	Echosonde BSE 13, BSE 13 Dummysonde

Allgemeine Angaben zur Durchführung der Messung

Anzahl der Einfahrten:	2
Horizontal gemessene Echogramme:	26
Gekippt gemessene Echogramme:	14
Tiefster Messpunkt:	2789.0 m

**Ausdehnungen bezogen auf die Messachse****Richtungsbezug:****Magnetisch Nord**

Ermittlung aus 36 Vertikalschnitten, abgeleitet aus Horizontal- und Kippdaten in 5°-Schritten:

minimaler Radius:	0.0 m
Teufe:	2831.8 m
Richtung:	0°

maximaler Radius:	41.8 m
Teufe:	2618.7 m
Richtung:	325°

höchster Punkt:	2575.3 m
Entfernung:	18.6 m
Richtung:	10°

tiefster Punkt:	2835.6 m
Entfernung:	15.2 m
Richtung:	10°

tiefster Punkt in der Messachse:	2831.8 m
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Ermittlung aus 33 Horizontalschnitten zwischen 2576.0 m und 2835.0 m in 5°-Schritten:

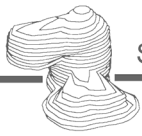
maximaler Radius:	41.9 m
Teufe:	2619.6 m
Richtung:	327°

maximaler Durchmesser:	83.3 m
Teufe:	2619.6 m
Richtung:	327 - 147°

Volumen

Volumen:	429 414 m³
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Teufenbereich:	2573.4 m <--> 2835.5 m
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Vermessung durch die Wandung der 10 3/4" und 7" Verrohrung

Im Bereich von 2576.0 m bis 2786.7 m wurde die Form der Kaverne durch die Wandung der Verrohrung/en ermittelt. Die Richtungsorientierung der gemessenen Schnitte in diesem Bereich erfolgte durch Eindrehen der Horizontalschnitte auf bestmögliche Übereinstimmung mit vorhergehenden Messungen, die zum Teil magnetisch orientiert waren..

Interpretation

Unter Voraussetzung eines geradlinigen Strahlenweges wurden die gemessenen Laufzeitdaten in Entfernungen mit der nachfolgend angegebenen Schallgeschwindigkeit umgerechnet:

1830.0 m/s in Sole (angenommen)

Wurden in einer Echospur mehrere Echos registriert, erfolgte die Auswahl des repräsentativen Echos entsprechend der Amplitudenhöhe, Laufzeit, Messpunktdichte und Kavernenform.

Horizontalschnitte

26 Horizontalschnitte in folgenden Messteufen sind dem Bericht als grafische Ausgaben beigelegt:

2576.0 m	2579.0 m	2581.0 m	2585.0 m	2590.0 m	2595.0 m	2600.0 m
2610.0 m	2619.6 m	2630.0 m	2640.0 m	2650.0 m	2660.0 m	2670.0 m
2680.0 m	2690.0 m	2700.0 m	2710.0 m	2720.0 m	2730.0 m	2735.0 m
2750.0 m	2760.0 m	2770.0 m	2780.0 m	2789.0 m		

Es wurden 7 Schnitte durch Konstruktion ermittelt:

2790.0 m	2800.0 m	2810.0 m	2820.0 m	2830.0 m	2832.5 m	2835.0 m
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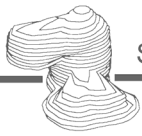
Kippschnitte

14 Kippschnitte in folgenden Messteufen sind in den Vertikalschnitten dargestellt:

14 Schnitte mit abwärts gerichtetem Ultraschallwandler:

Teufe / Kippwinkel

2789.0 / 5	2789.0 / 11	2789.0 / 17	2789.0 / 23	2789.0 / 29	2789.0 / 35
2789.0 / 41	2789.0 / 47	2789.0 / 53	2789.0 / 59	2789.0 / 65	2789.0 / 71
2789.0 / 77	2789.0 / 83				



Vertikalschnitte

Durch gemeinsame Interpretation aller richtungsbezogenen Daten wurde der Verlauf der Kavernenwand ermittelt und in 36 Vertikalschnitten dargestellt.

Maxplots (grundrisslich)

Die erste Abbildung im Abschnitt Horizontalschnitte zeigt die Flächen aller Horizontalschnitte und die durch die Vertikalschnitte gebildete Fläche (schraffiert). Die resultierende Gesamtfläche ist in der zweiten Abbildung dargestellt (Kreuzschraffur), wobei zur Übersicht die größte Einzelfläche miteingeblendet wird.

Der aus der Umhüllenden (Verbindungsline der größten horizontalen Kavernenausdehnung in jeder Messrichtung) ermittelte Gesamtschwerpunkt der Kaverne ist in beiden Abbildungen mit Entfernungs- und Richtungsangabe bezüglich der Messachse eingezeichnet.

Perspektivansichten

Zur besseren Übersicht enthält dieser Bericht diverse Perspektivansichten.

Einblendung von Daten aus älteren Messungen

Liegen für einzelne Messteufen Daten älterer Messungen vor, sind diese zur Hervorhebung von Veränderungen mit einer anderen Signatur in den entsprechenden Anlagen dargestellt.

Hintersolungen

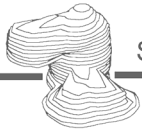
Mit geneigtem Messkopf festgestellte Hintersolungen wurden anhand der Vertikalschnitte in die entsprechenden Horizontalschnitte übertragen.

Die ermittelten Zusatzflächen sind zu den bereits erfassten Flächen addiert worden.

LOG - Daten

Am Ende des Berichtes sind die grafischen Ausgaben folgender LOG - Daten zusammengefasst:

Parameter	von	bis
Temperatur:	0.0 m	2789.9 m
CCL:	0.0 m	2789,7 m



LEGENDE

-  Messwert, ermittelt mit horizontal ausgerichtetem Ultraschallwandler
-  Messwert, ermittelt mit ausgekipptem Ultraschallwandler
-  konstruierter Wert, aus Vertikalschnitten abgeleitet
-
- Verbindungslinie zwischen zwei Messwerten zur Berechnung des Volumens
- angenommener Verlauf (in Bereichen, die nicht ausreichend durch Messwerte belegt sind)
-
- N** Magnetisch Nord mit Sondenkompass ermittelt
(Magnetkompass im unverrohrten Bereich)
(Faserkreiselkompass im verrohrten Bereich)
-
- (N)** Angenommene Nordrichtung (Messung im magnetisch gestörten Umfeld ohne Faserkreiselkompass)
-
- a** größte Ausdehnung im Schnitt
(ohne Berücksichtigung von Hintersolungsflächen)
-
- b** größte zu a senkrechte Ausdehnung
(ohne Berücksichtigung von Hintersolungsflächen)
-
- a/b** Verhältnis der größten zueinander senkrechten Ausdehnungen im Schnitt
-
- (xx m²)** Hintersolungsfläche im aktuellen Horizontalschnitt
-
- r~** mittlerer Radius

 021835 29.04.2002 Auftragsnummer und Messdatum



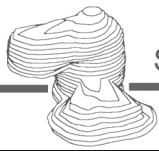
Volumenliste

Kaverne: HARLINGEN BAS #1

041749

08.10.2004

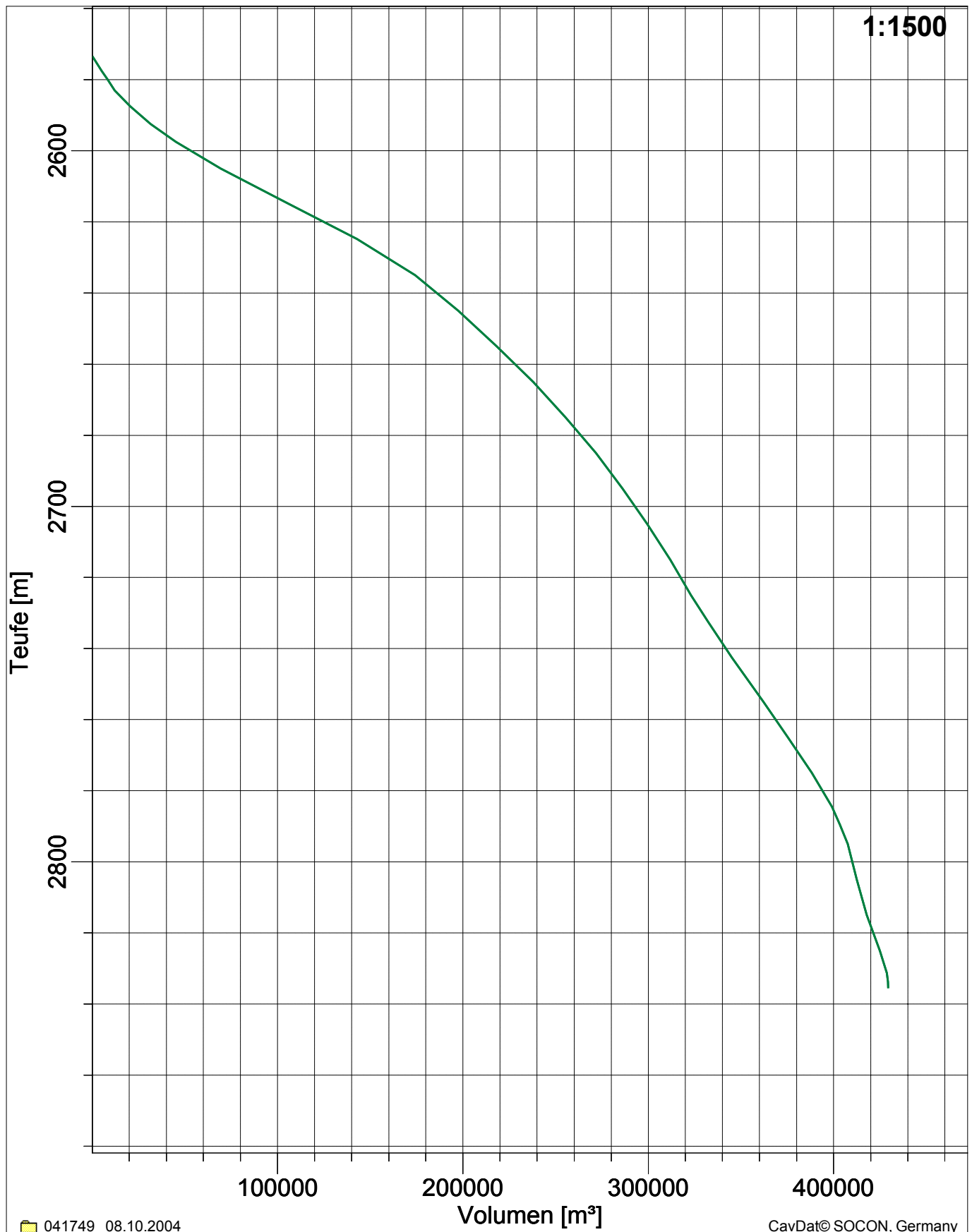
Tiefe [m]	Radius [m]	Fläche [m²]	Tiefenbereich [m]		Volumen [m³]	
			von	bis	partial	gesamt
2576.0	19.9	1249.0	2573.40	2577.50	5120.9	5120.9
2579.0	20.6	1339.1	2577.50	2580.00	3347.8	8468.7
2581.0	19.8	1234.8	2580.00	2583.00	3704.3	12173.0
2585.0	24.1	1828.5	2583.00	2587.50	8228.4	20401.4
2590.0	26.6	2220.2	2587.50	2592.50	11101.0	31502.4
2595.0	29.4	2714.1	2592.50	2597.50	13570.6	45073.1
2600.0	32.0	3220.2	2597.50	2605.00	24151.3	69224.4
2610.0	34.4	3719.5	2605.00	2614.80	36450.8	105675.1
2619.6	34.4	3713.5	2614.80	2624.80	37135.2	142810.3
2630.0	31.3	3071.0	2624.80	2635.00	31324.1	174134.4
2640.0	27.2	2328.6	2635.00	2645.00	23286.3	197420.7
2650.0	25.7	2081.5	2645.00	2655.00	20815.5	218236.2
2660.0	25.1	1977.5	2655.00	2665.00	19775.0	238011.2
2670.0	23.6	1745.2	2665.00	2675.00	17451.6	255462.8
2680.0	22.8	1632.5	2675.00	2685.00	16324.5	271787.3
2690.0	21.4	1439.0	2685.00	2695.00	14389.5	286176.8
2700.0	20.5	1322.9	2695.00	2705.00	13229.2	299406.0
2710.0	19.9	1249.2	2705.00	2715.00	12492.1	311898.1
2720.0	18.9	1121.7	2715.00	2725.00	11217.4	323115.5
2730.0	19.6	1211.0	2725.00	2732.50	9082.6	332198.2
2735.0	20.3	1288.8	2732.50	2742.50	12888.4	345086.6
2750.0	20.9	1367.7	2742.50	2755.00	17095.8	362182.3
2760.0	20.4	1310.8	2755.00	2765.00	13107.9	375290.2
2770.0	20.3	1293.4	2765.00	2775.00	12933.9	388224.1
2780.0	19.1	1143.3	2775.00	2784.50	10861.0	399085.1
2789.0	16.4	846.2	2784.50	2789.50	4231.1	403316.2
2790.0	15.5	757.6	2789.50	2795.00	4166.8	407483.0
2800.0	12.6	498.1	2795.00	2805.00	4980.7	412463.7
2810.0	13.1	535.4	2805.00	2815.00	5354.5	417818.1
2820.0	14.9	702.1	2815.00	2825.00	7021.0	424839.1
2830.0	14.1	626.0	2825.00	2831.25	3912.6	428751.7
2832.5	8.6	231.3	2831.25	2833.75	578.2	429329.9
2835.0	3.9	47.8	2833.75	2835.50	83.6	429413.5



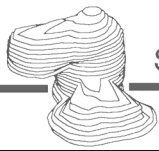
HARLINGEN BAS #1

GESAMTVOLUMEN

08.10.2004



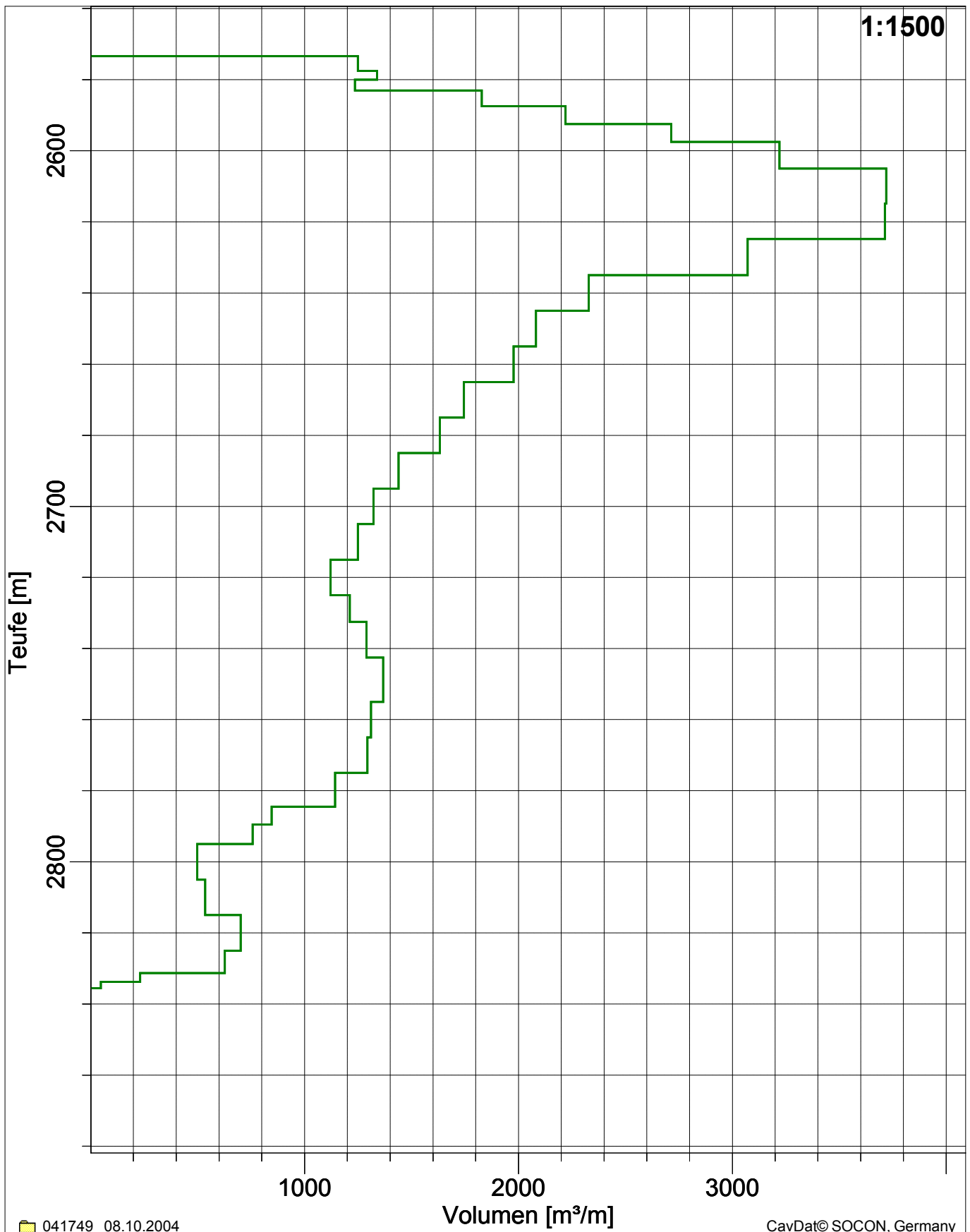
Gesamtvolumen = 429413.5 m³



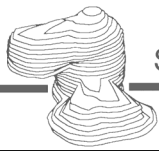
HARLINGEN BAS #1

PARTIALVOLUMEN

08.10.2004



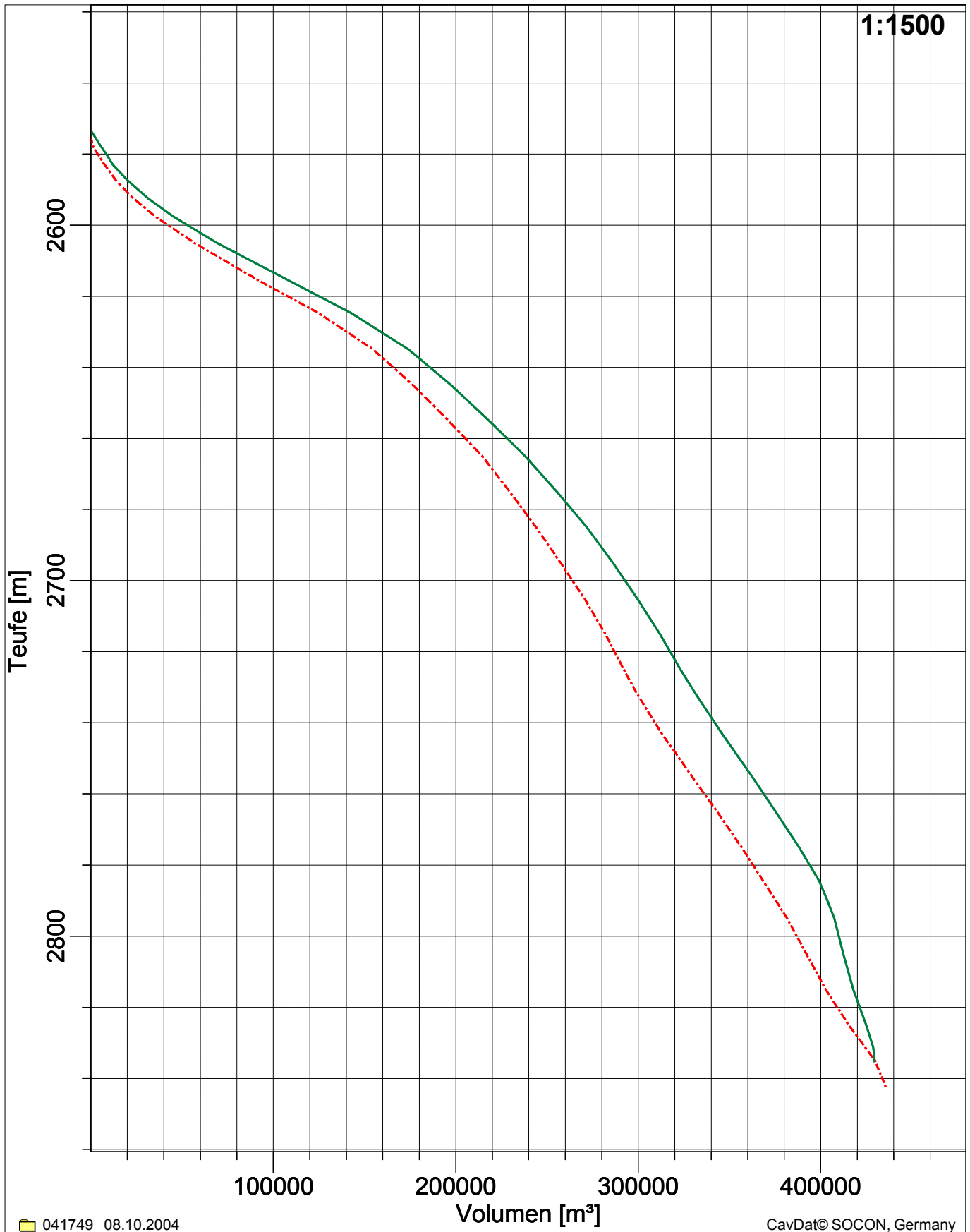
Partialvolumen



HARLINGEN BAS #1

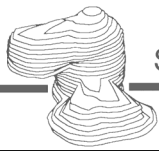
GESAMTVOLUMEN

08.10.2004



— Gesamt volumen = 429413.5 m³

- - - Gesamt volumen = 435932.4 m³ (16.10.2003)

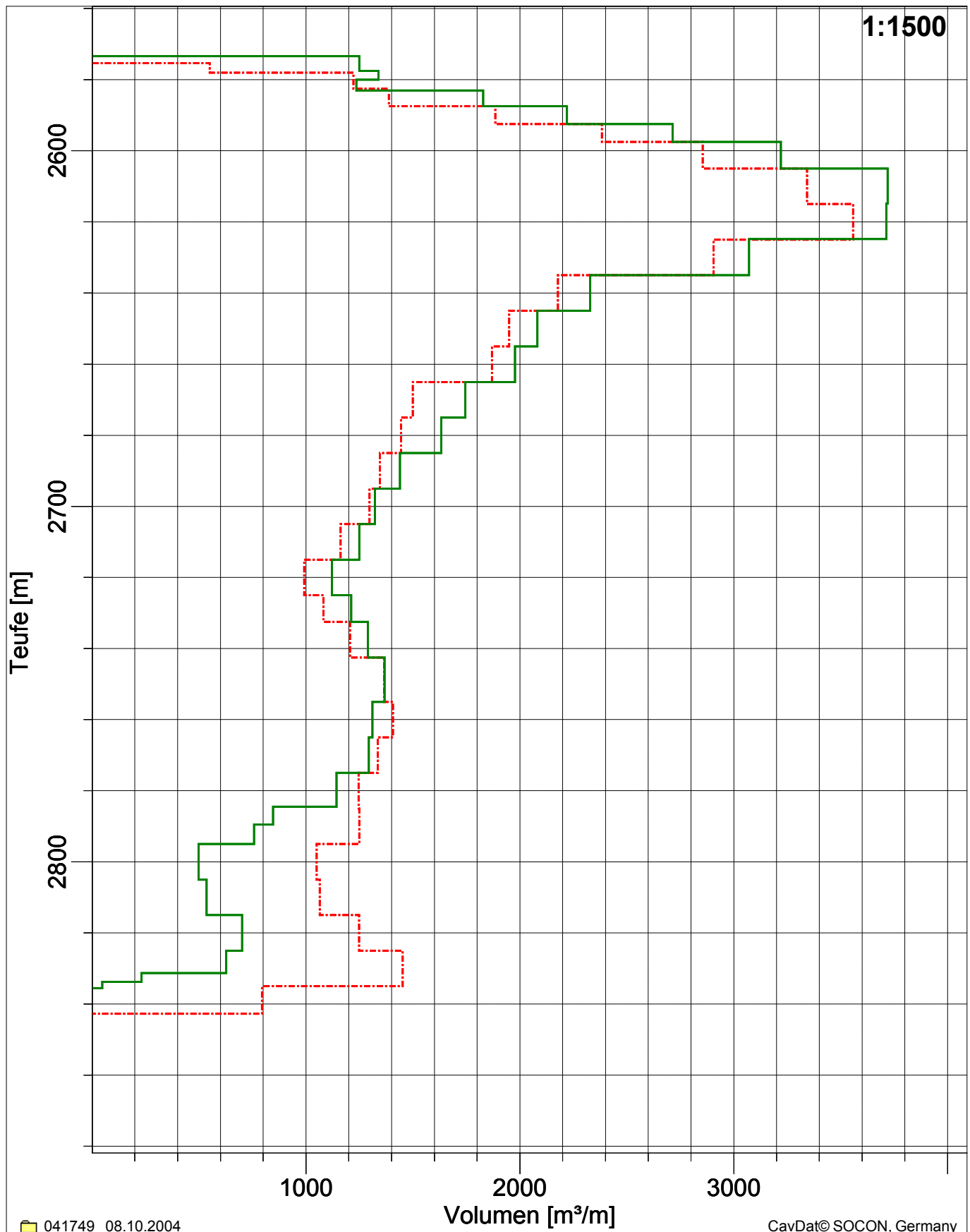


HARLINGEN BAS #1

PARTIALVOLUMEN

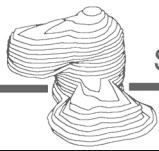
08.10.2004

1:1500



Partialvolumen

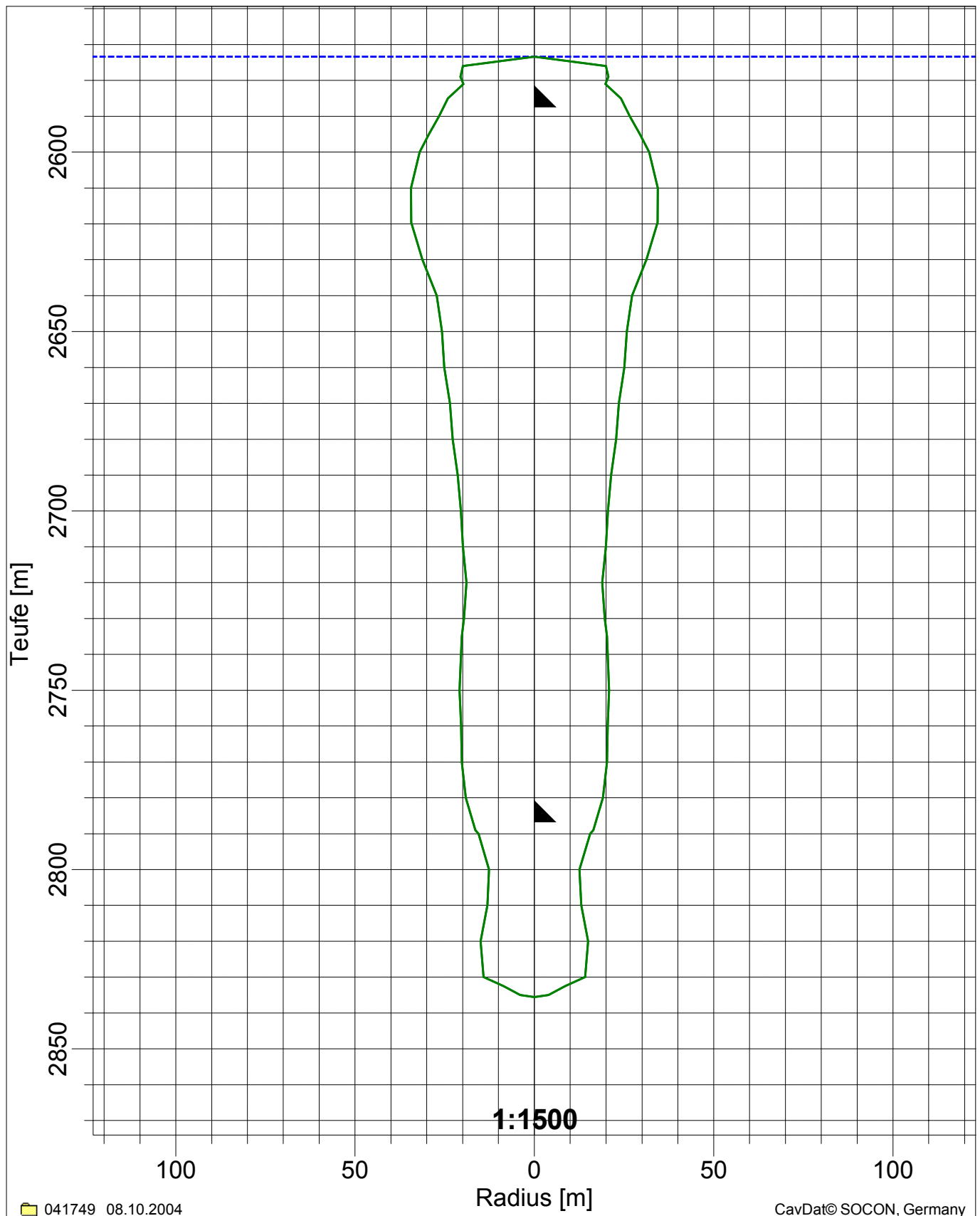
Partialvolumen (16.10.2003)



HARLINGEN BAS #1

MITTLERER RADIUS

08.10.2004



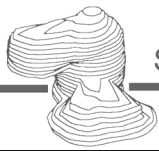
▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

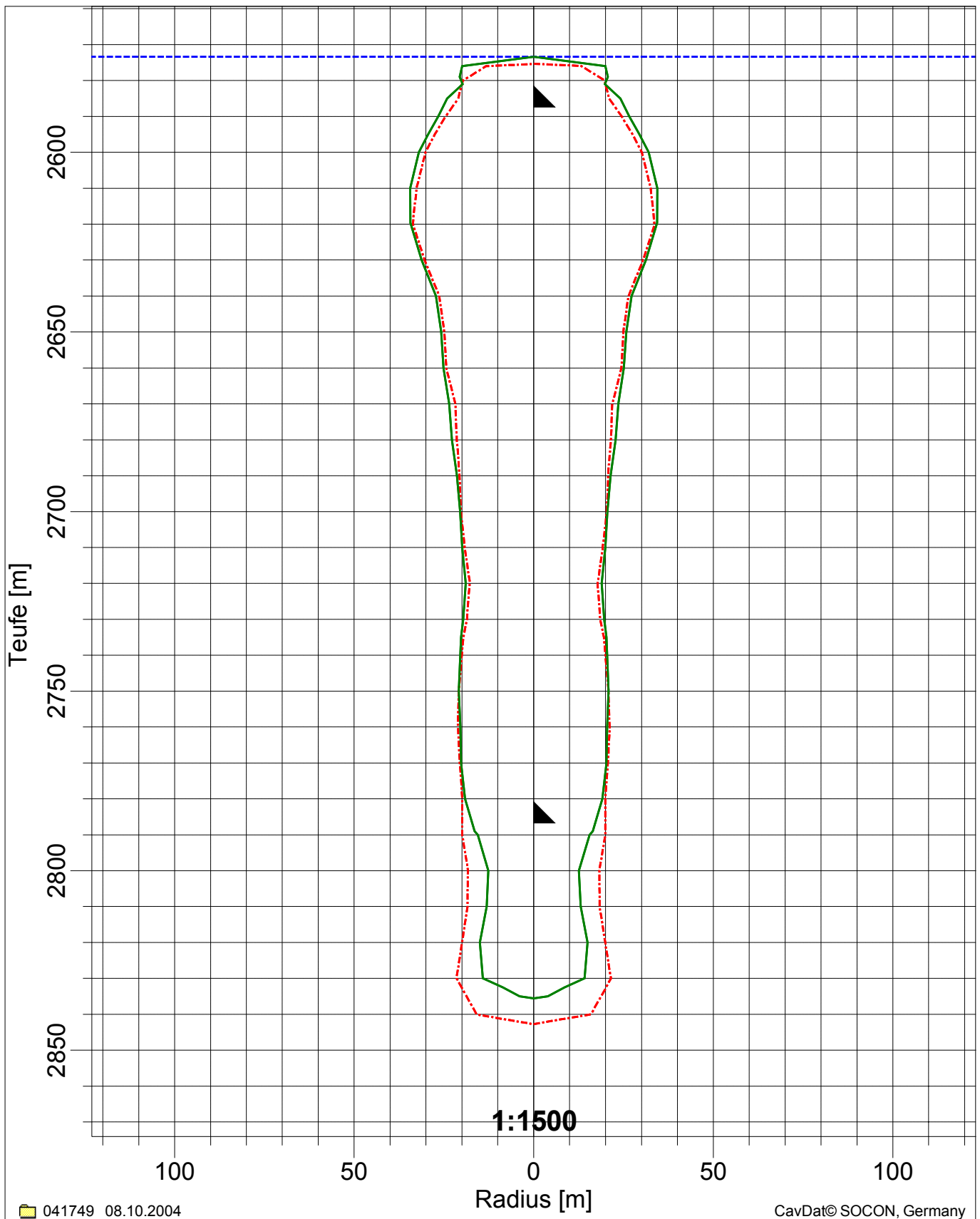
— Mittlerer Radius (08.10.2004)



HARLINGEN BAS #1

MITTLERER RADIUS

08.10.2004



— Mittlerer Radius (08.10.2004)

- - - Mittlerer Radius (16.10.2003)

▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

▲ 7" : 2786.7 m

- - - Spiegel 2573.4 m



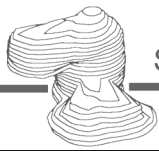
Radien- und Durchmesserertabelle

Kaverne: HARLINGEN BAS #1

041749

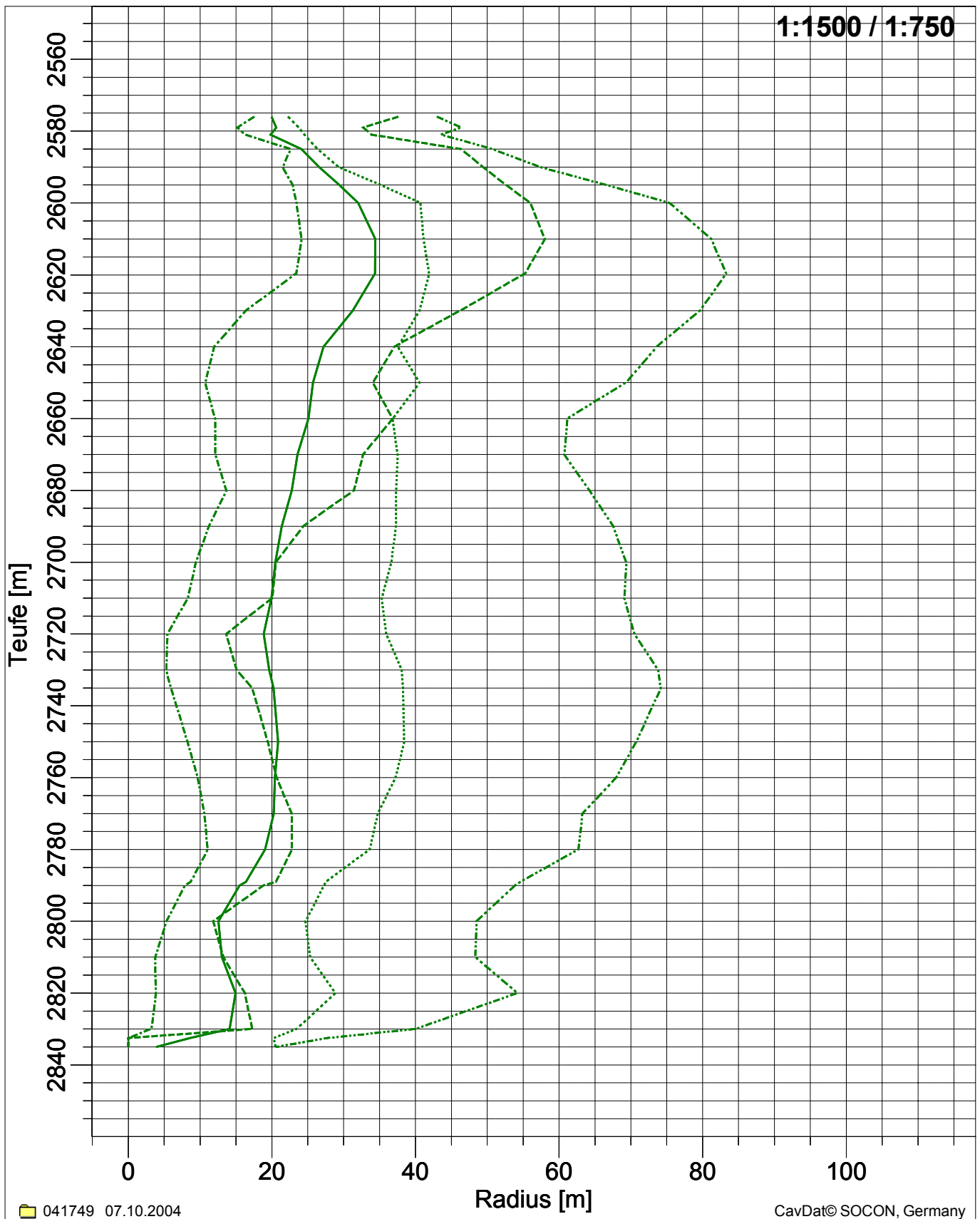
07.10.2004

Tiefe [m]	Radius [MIN]		Radius [MAX]		Durchmesser [MIN]		[MAX]	
	[m]	[°]	[m]	[°]	[m]	[°]	[m]	[°]
2576.0	17.6	56	22.3	261	37.6	46 <-> 226	43.0	81 <-> 261
2579.0	15.2	39	23.8	89	32.7	29 <-> 209	46.4	89 <-> 269
2581.0	16.3	40	24.6	295	33.9	40 <-> 220	43.6	115 <-> 295
2585.0	22.6	261	26.4	286	46.3	71 <-> 251	50.7	116 <-> 296
2590.0	21.5	223	29.3	307	49.4	60 <-> 240	57.4	127 <-> 307
2595.0	22.9	240	35.2	135	52.6	60 <-> 240	66.6	135 <-> 315
2600.0	23.5	239	40.7	129	56.0	39 <-> 219	75.4	134 <-> 314
2610.0	24.2	237	41.2	133	58.0	43 <-> 223	81.2	138 <-> 318
2619.6	23.4	252	41.9	327	55.3	52 <-> 232	83.3	147 <-> 327
2630.0	16.4	228	40.5	323	46.3	46 <-> 226	79.6	143 <-> 323
2640.0	11.9	220	37.5	150	37.0	45 <-> 225	73.6	145 <-> 325
2650.0	10.7	236	40.6	120	34.1	57 <-> 237	69.3	135 <-> 315
2660.0	12.1	247	36.8	117	36.8	33 <-> 213	61.2	137 <-> 317
2670.0	12.2	230	37.5	125	32.7	35 <-> 215	60.7	140 <-> 320
2680.0	13.7	225	37.3	125	31.4	20 <-> 200	64.2	135 <-> 315
2690.0	11.2	229	37.3	134	24.4	44 <-> 224	67.6	134 <-> 314
2700.0	9.4	43	36.6	131	20.5	46 <-> 226	69.4	131 <-> 311
2710.0	8.3	357	35.3	132	20.1	54 <-> 234	69.1	142 <-> 322
2720.0	5.4	49	35.9	134	13.6	49 <-> 229	70.5	134 <-> 314
2730.0	5.3	240	38.1	330	15.1	57 <-> 237	73.8	135 <-> 315
2735.0	6.0	255	38.3	330	17.3	55 <-> 235	74.2	140 <-> 320
2750.0	8.3	230	38.4	315	19.4	50 <-> 230	70.8	140 <-> 320
2760.0	9.7	230	37.2	315	20.7	65 <-> 245	67.9	135 <-> 315
2770.0	10.6	245	34.7	310	22.8	65 <-> 245	63.3	140 <-> 320
2780.0	11.1	202	33.6	312	22.8	57 <-> 237	62.7	132 <-> 312
2789.0	8.7	250	27.5	310	20.6	39 <-> 219	54.6	130 <-> 310
2790.0	7.9	249	27.2	310	18.8	20 <-> 200	53.9	130 <-> 310
2800.0	5.3	235	24.7	310	11.8	55 <-> 235	48.5	130 <-> 310
2810.0	3.7	215	25.4	135	13.3	55 <-> 235	48.3	135 <-> 315
2820.0	3.9	255	28.9	135	16.3	76 <-> 256	54.2	135 <-> 315
2830.0	3.2	255	23.5	120	17.3	80 <-> 260	40.0	115 <-> 295
2832.5	0.0	1	20.3	115	0.0	1 <-> 181	27.7	90 <-> 270
2835.0	0.0	1	20.5	90	0.0	1 <-> 181	20.5	90 <-> 270



HARLINGEN BAS #1 RADIEN / DURCHMESSER

07.10.2004



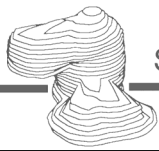
— Mittlerer Radius

- - - Minimaler Radius

... Maximaler Radius

- - - Minimaler Durchmesser

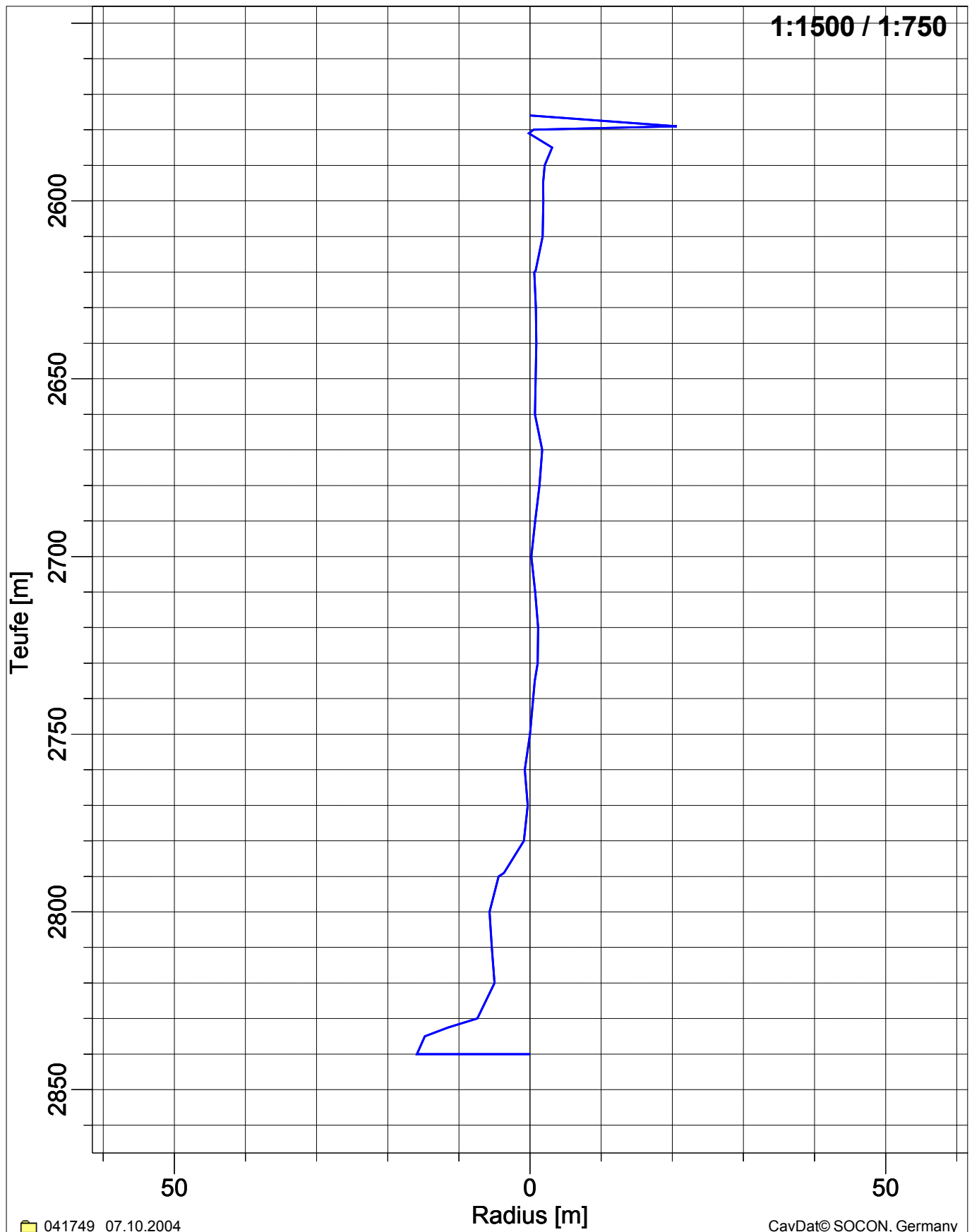
... Maximaler Durchmesser



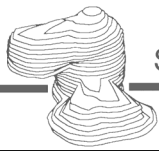
HARLINGEN BAS #1

Radiendifferenzen

07.10.2004

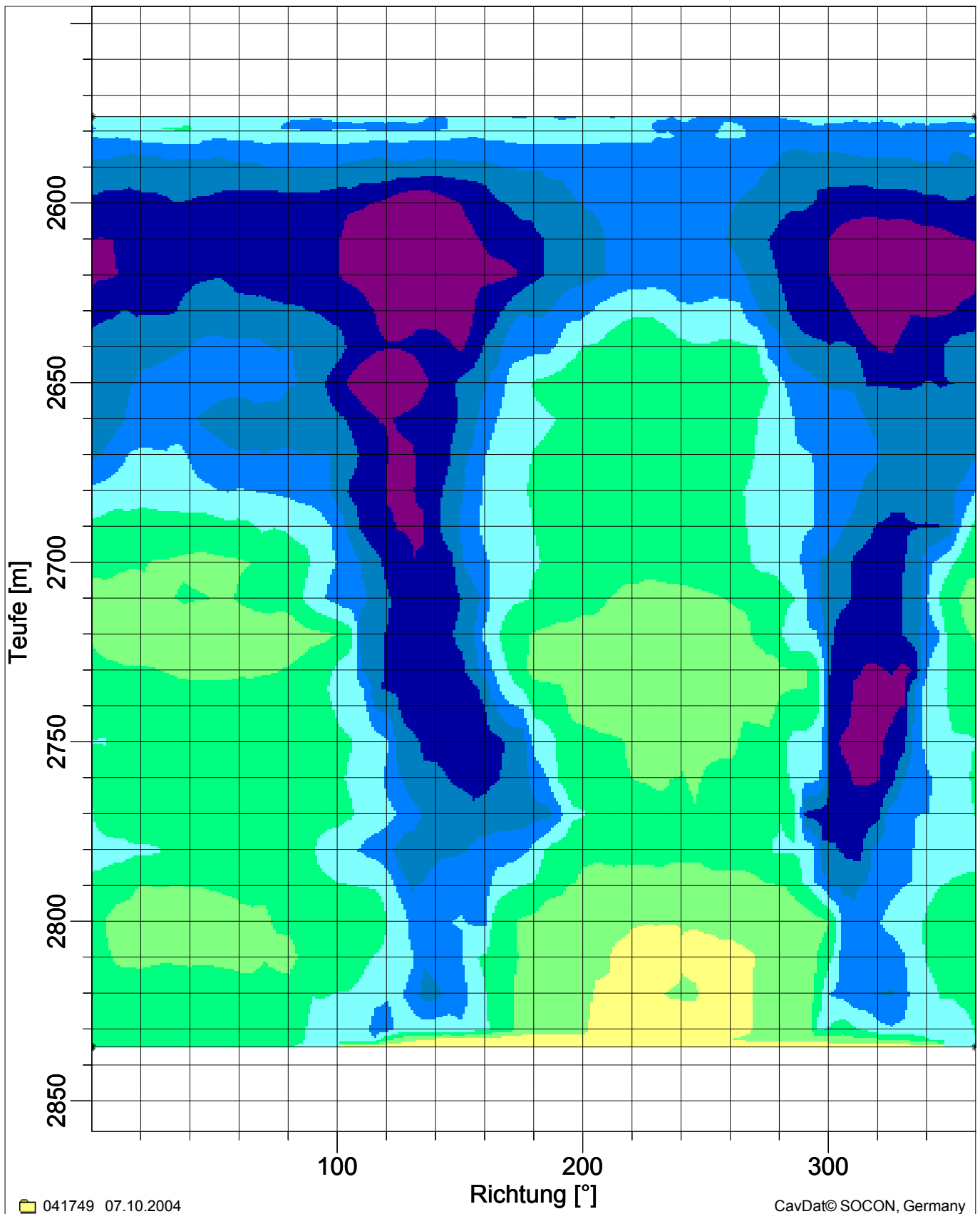


— Differenz - Mittlerer Radius (07.10.2004/16.10.2003)

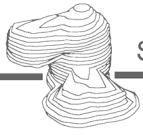


HARLINGEN BAS #1 RADIENABWICKLUNG

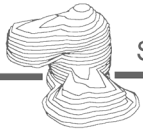
07.10.2004



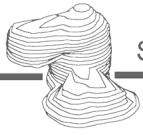
0.00 - 5.24 m	5.24 - 10.48 m	10.48 - 15.72 m	15.72 - 20.96 m	20.96 - 26.20 m
26.20 - 31.44 m	31.44 - 36.68 m	36.68 - 41.92 m		



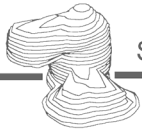
HARLINGEN BAS #1 --> 0° <--



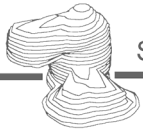
HARLINGEN BAS #1 --> 60° <--



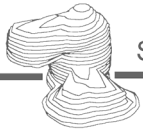
HARLINGEN BAS #1 --> 120° <--



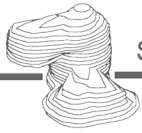
HARLINGEN BAS #1 --> 180° <--



HARLINGEN BAS #1 --> 240° <--



HARLINGEN BAS #1 --> 300° <--



HORIZONTALSCHNITTE

Kaverne: HARLINGEN BAS #1

Berichts-Nr.: 041749

Rechengeschw.: 1830.0 m/s

Messdatum : 07.10.2004

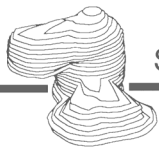
Maßstab: 1 : 500

Horizontalschnitte in folgenden Teufen:

2576.0 m	2579.0 m	2581.0 m	2585.0 m	2590.0 m	2595.0 m	2600.0 m
2610.0 m	2619.6 m	2630.0 m	2640.0 m	2650.0 m	2660.0 m	2670.0 m
2680.0 m	2690.0 m	2700.0 m	2710.0 m	2720.0 m	2730.0 m	2735.0 m
2750.0 m	2760.0 m	2770.0 m	2780.0 m	2789.0 m		

Es wurden 7 Schnitte durch Konstruktion ermittelt:

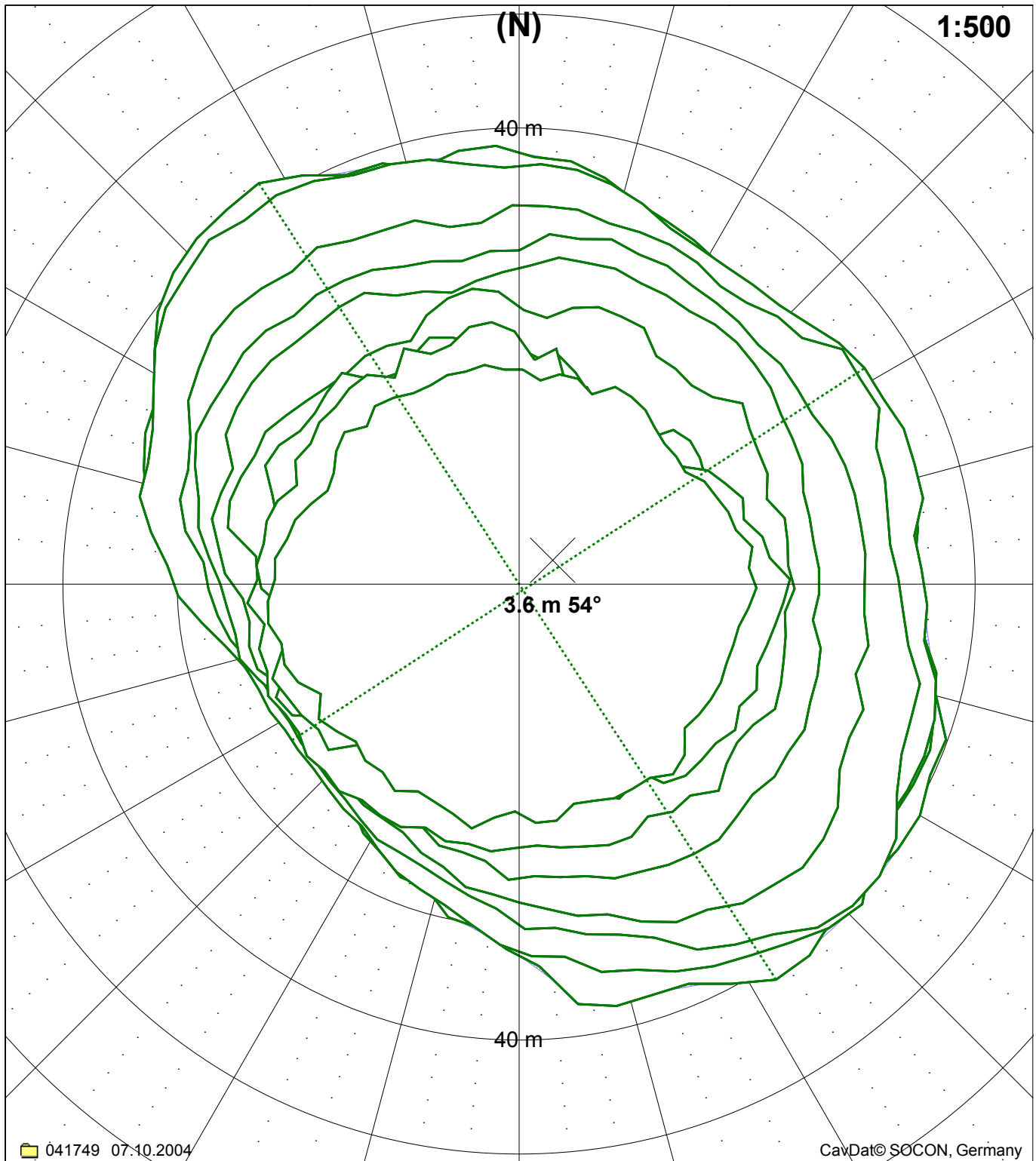
2790.0 m	2800.0 m	2810.0 m	2820.0 m	2830.0 m	2832.5 m	2835.0 m
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HARLINGEN BAS #1

MAXPLOT

07.10.2004



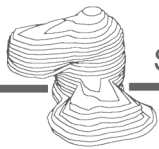
Vertikal-Maxplot

Horizontalschnitte

a/b

Schwerpunkt

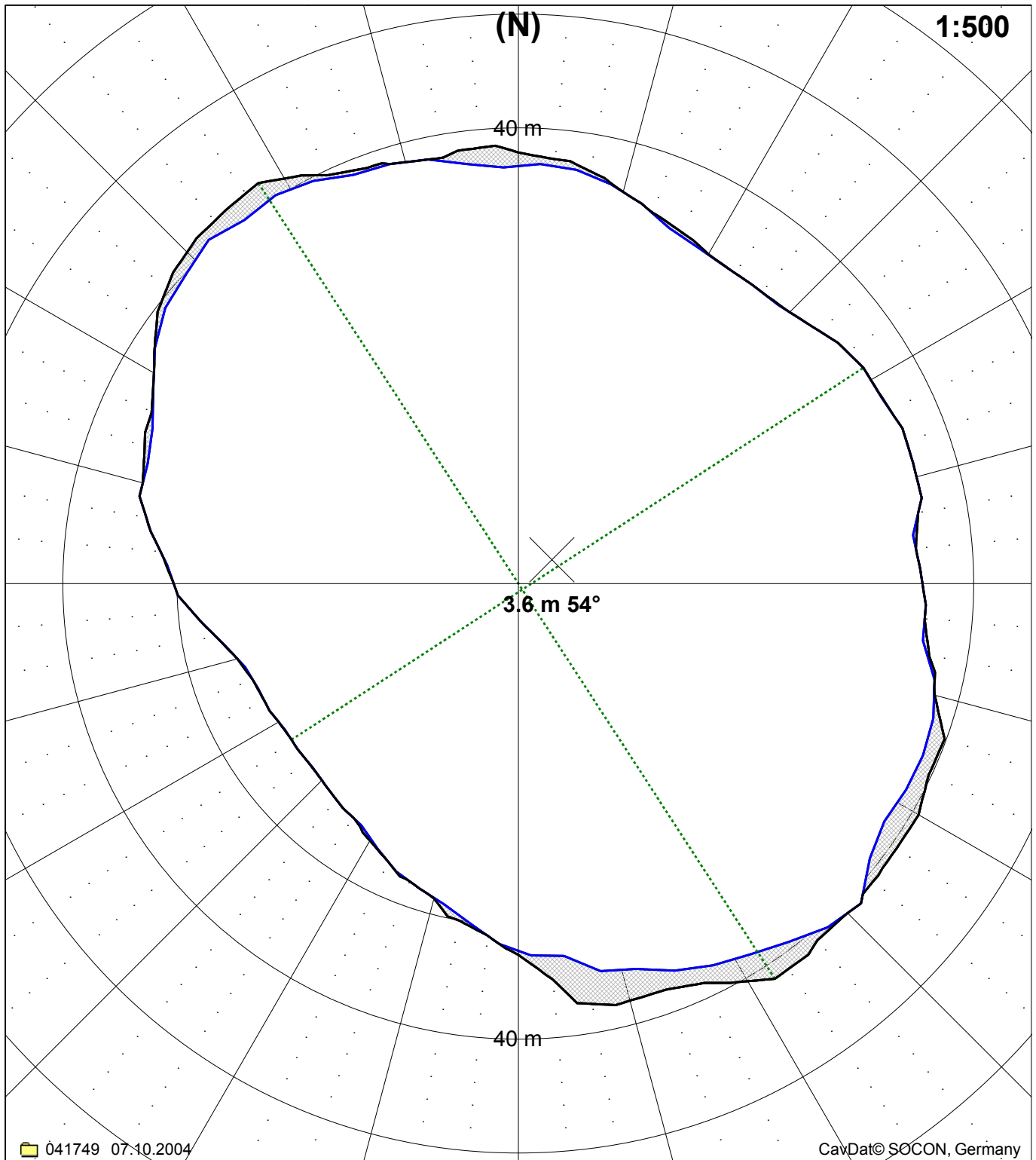
 $d_{\max}: 83.3 \text{ m } 327^\circ \leftrightarrow 147^\circ$ $r_{\min}: 24.2 \text{ m } \rightarrow 235^\circ$ $r_{\sim}: 35.0 \text{ m}$ $r_{\max}: 41.9 \text{ m } \rightarrow 327^\circ$ $a/b = 1.390$ $a = 83.28 \text{ m } (146^\circ - 327^\circ)$ $b = 59.90 \text{ m } (57^\circ - 235^\circ)$ Fläche aus Vertikalschnitten: 3829.0 m², Fläche aus Horizontal- u. Vertikalschnitten: 3843.6 m²



HARLINGEN BAS #1

MAXPLOT

07.10.2004



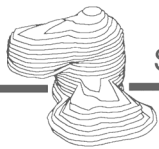
..... a/b

X Schwerpunkt

Horizontal/Vertikal-Maxplot

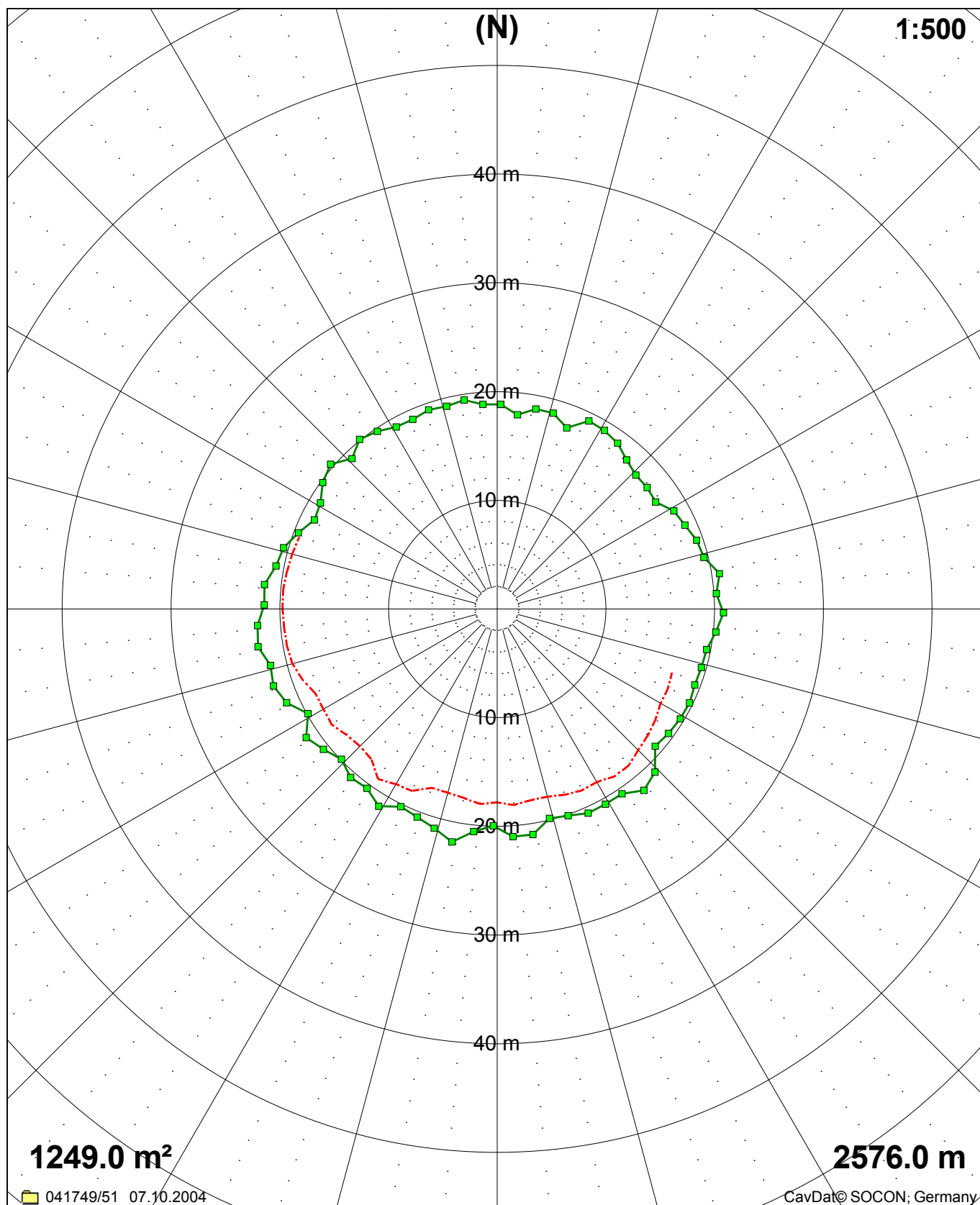
□ Größte Einzelfläche

 $d_{\max}: 83.3 \text{ m } 327^\circ \leftrightarrow 147^\circ$ $r_{\min}: 24.2 \text{ m } \rightarrow 235^\circ$ $r_{\sim}: 35.0 \text{ m}$ $r_{\max}: 41.9 \text{ m } \rightarrow 327^\circ$ $a/b = 1.390$ $a = 83.28 \text{ m } (146^\circ - 327^\circ)$ $b = 59.90 \text{ m } (57^\circ - 235^\circ)$ Größte Einzelfläche: 3719.5 m² in Teufe: 2610.0 m, Fläche aus Horizontal- u. Vertikalschnitten: 3843.6 m²



HARLINGEN BAS #1

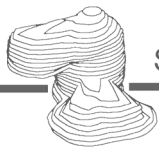
07.10.2004



—■— (07.10.2004)

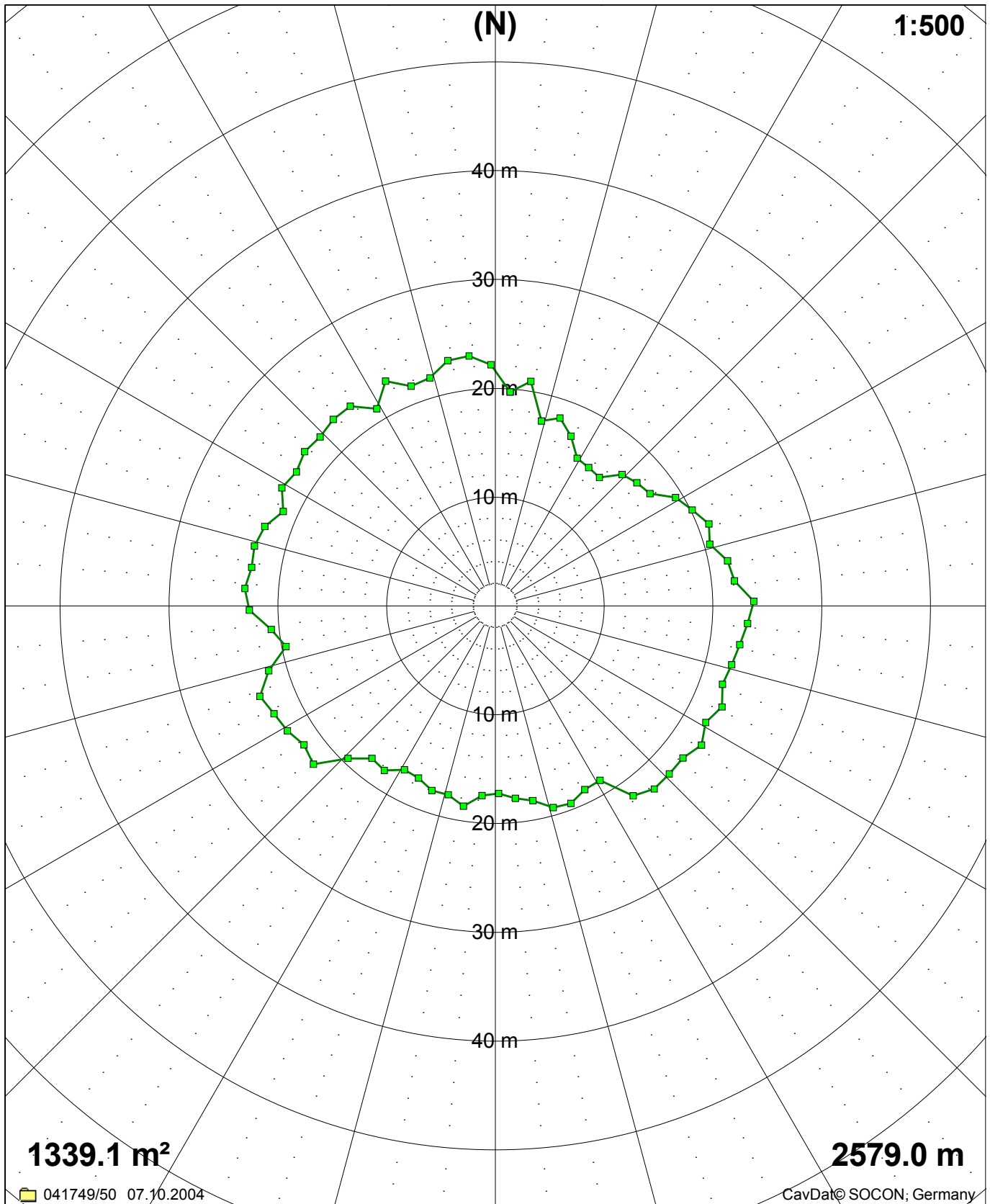
--- (16.10.2003)

d_{max}: 43.0 m 261° <--> 81° r_{min}: 17.6 m -> 56° r~: 19.9 m r_{max}: 22.3 m -> 261°



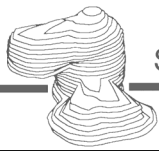
HARLINGEN BAS #1

07.10.2004



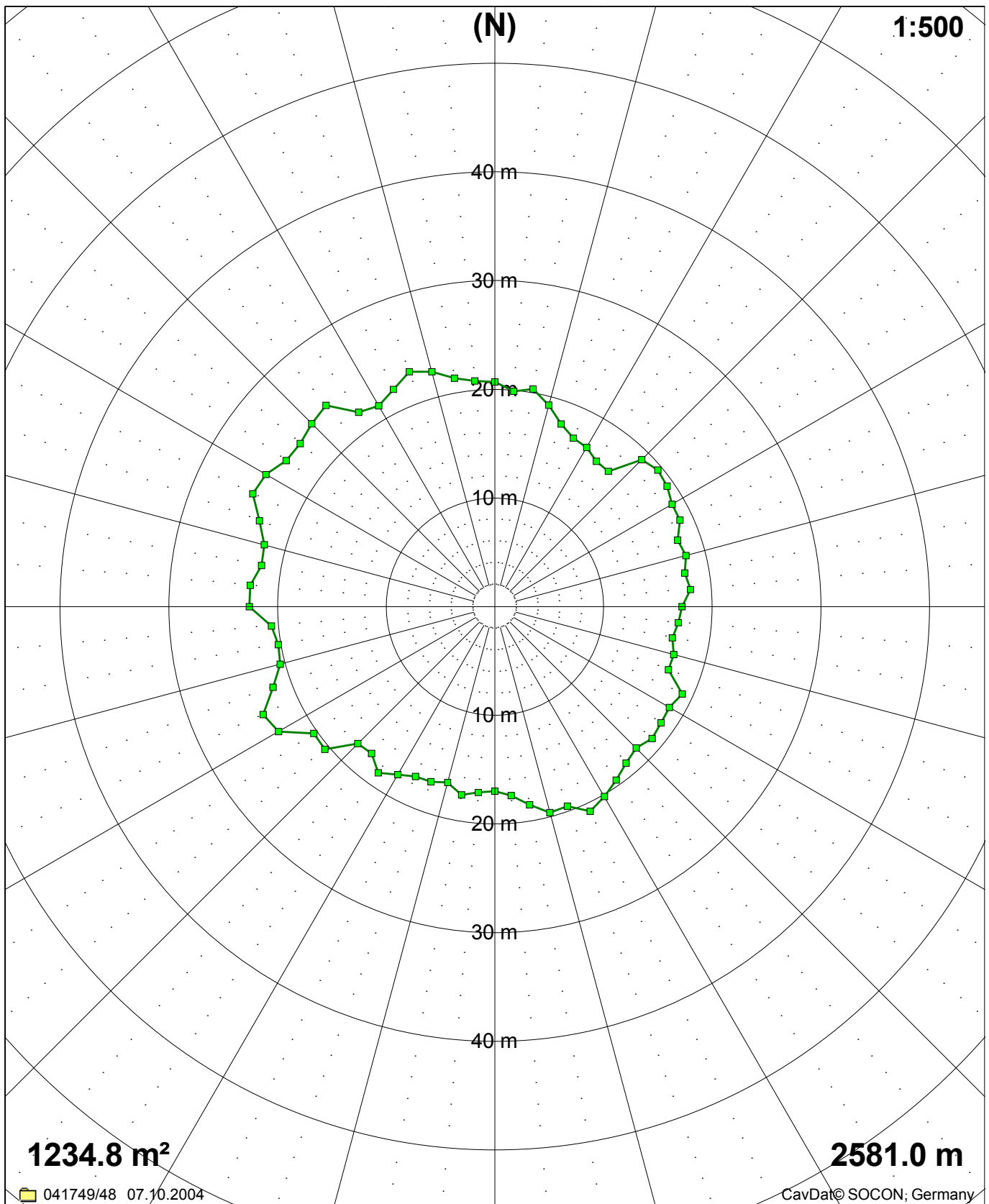
—■— (07.10.2004)

$d_{\max}$: 46.4 m 269° <--> 89° $r_{\min}$: 15.2 m -> 39° $r_{\sim}$: 20.6 m $r_{\max}$: 23.8 m -> 89°



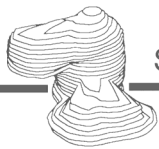
HARLINGEN BAS #1

07.10.2004



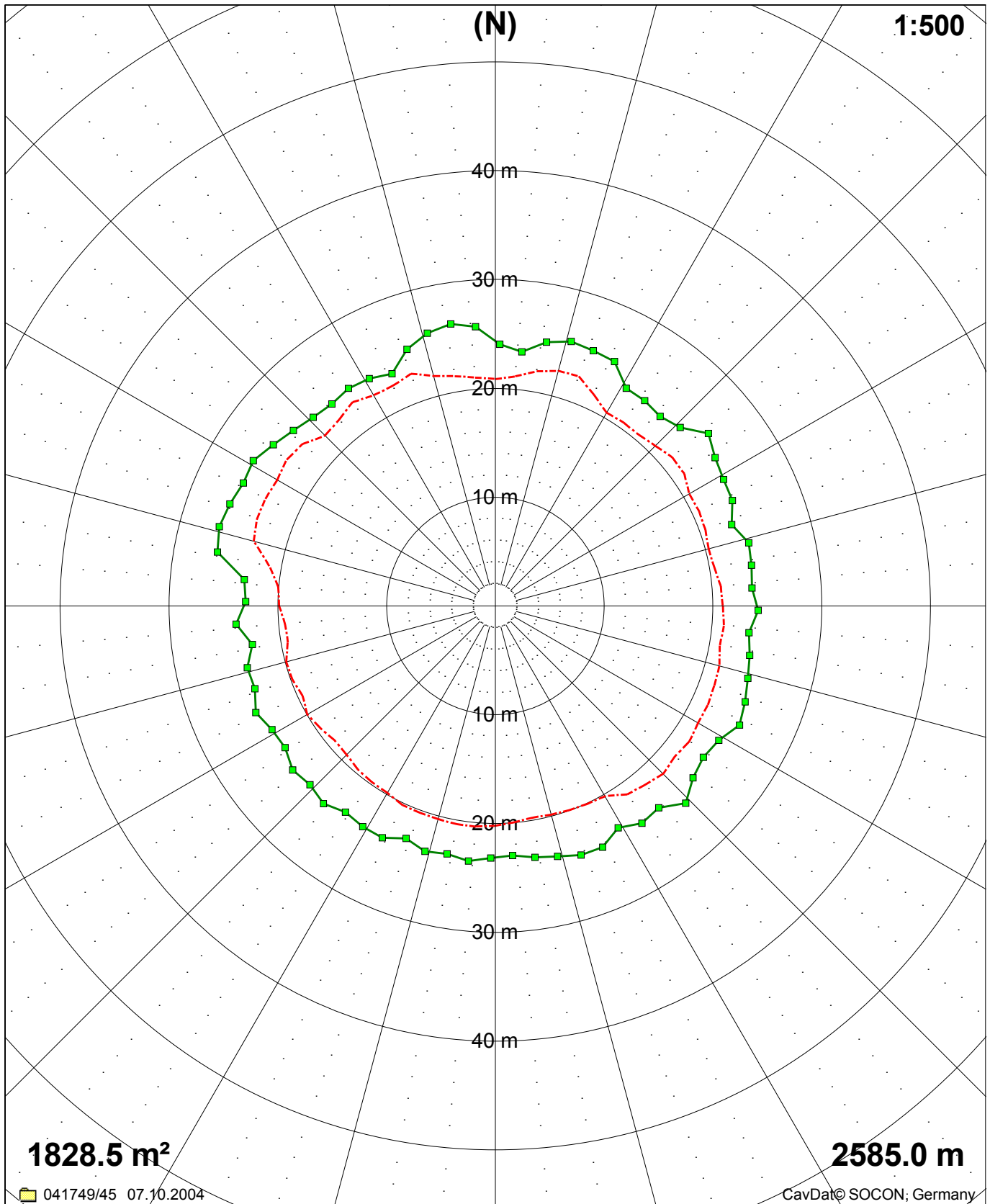
—■— (07.10.2004)

$d_{\max}$: 43.6 m 295° <--> 115° $r_{\min}$: 16.3 m -> 40° $r_{\sim}$: 19.8 m $r_{\max}$: 24.6 m -> 295°



HARLINGEN BAS #1

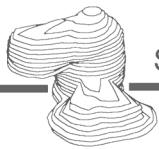
07.10.2004



—■— (07.10.2004)

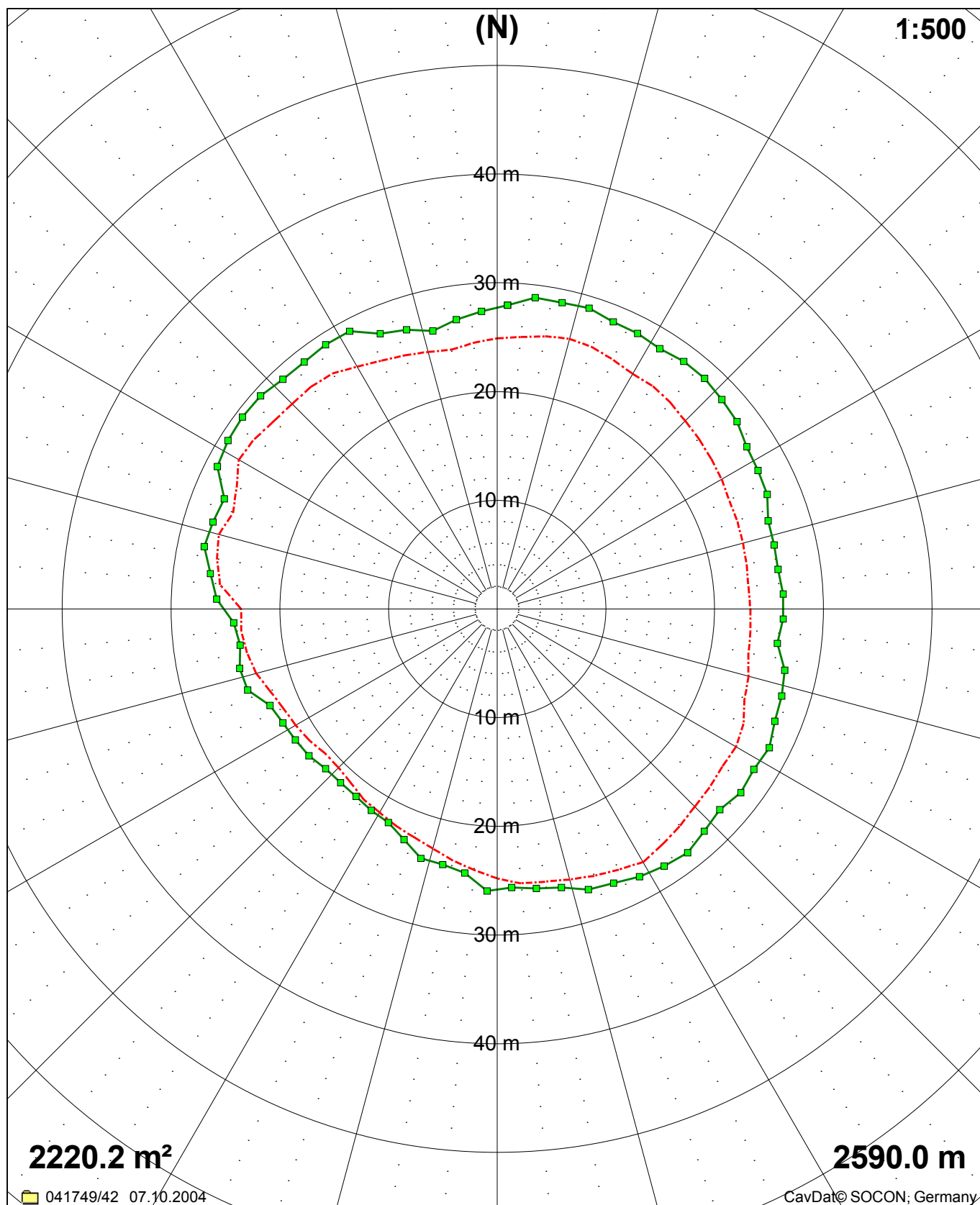
--- (16.10.2003)

d_{max}: 50.7 m 296° <--> 116° r_{min}: 22.6 m -> 261° r~: 24.1 m r_{max}: 26.4 m -> 286°



HARLINGEN BAS #1

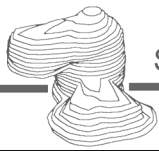
07.10.2004



—■— (07.10.2004)

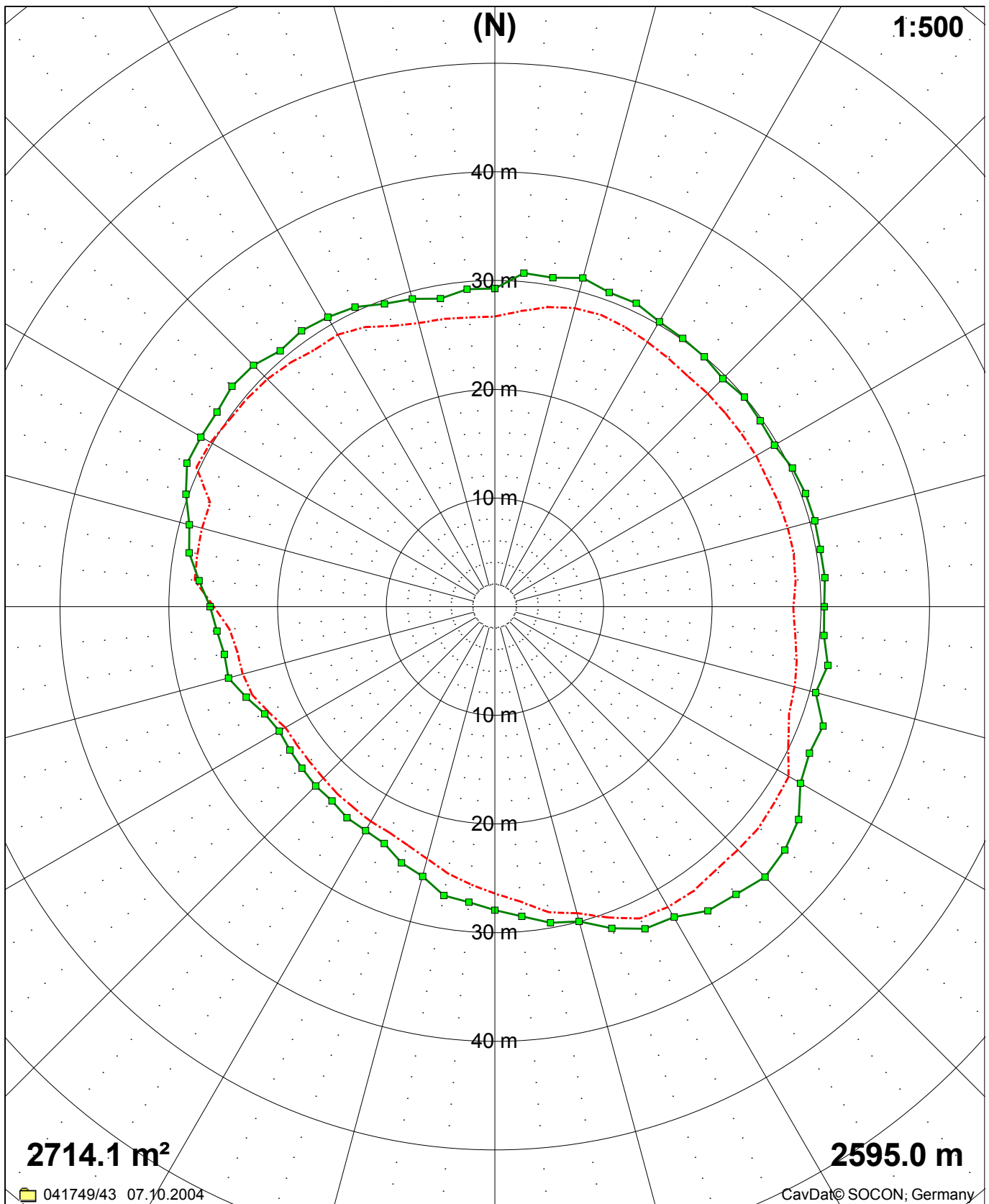
- - - (16.10.2003)

$d_{\max}$: 57.4 m 307° <--> 127° $r_{\min}$: 21.5 m -> 223° $r_{\sim}$: 26.6 m $r_{\max}$: 29.3 m -> 307°



HARLINGEN BAS #1

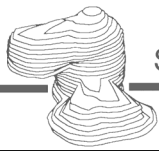
07.10.2004



—■— (07.10.2004)

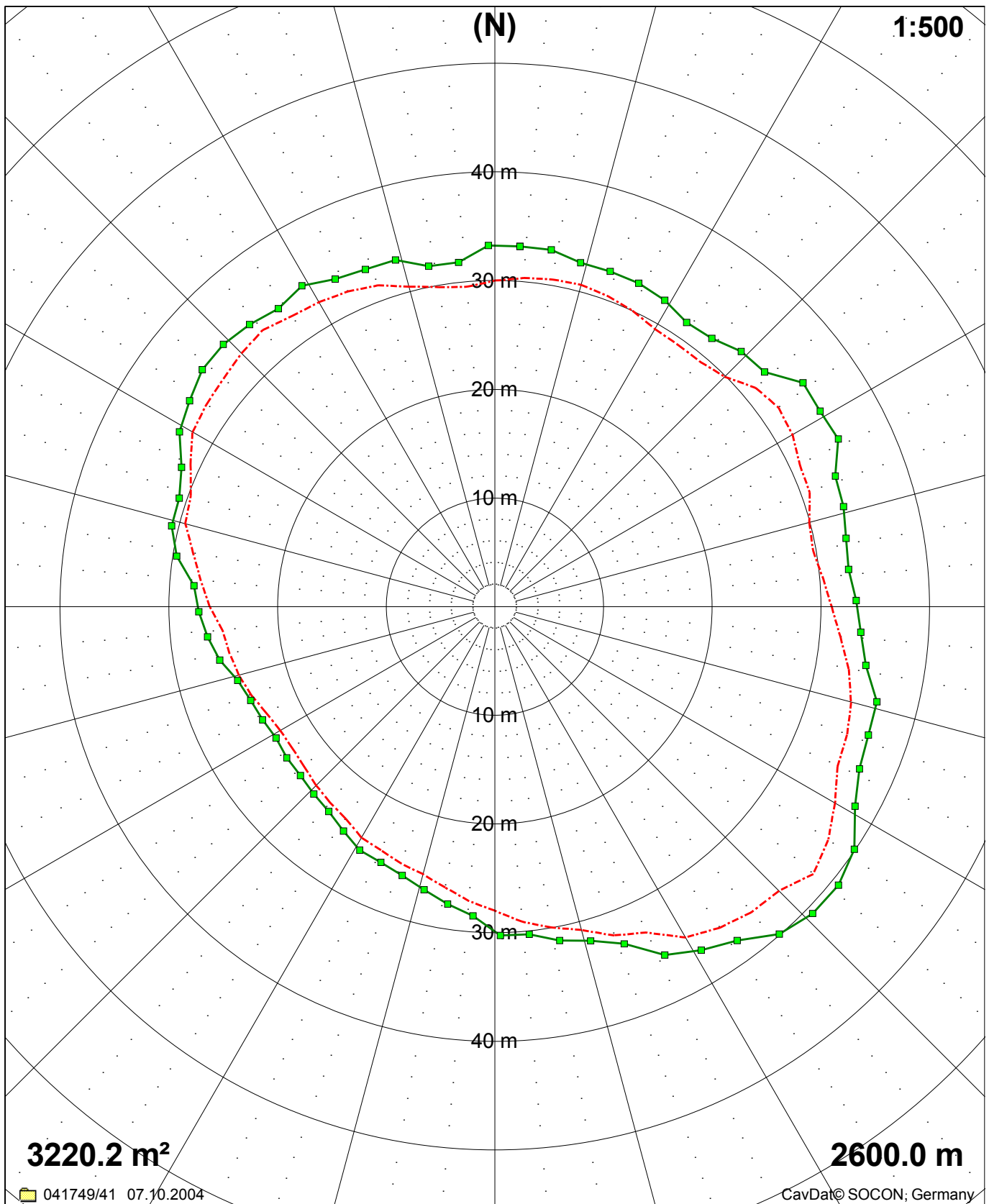
- - - (16.10.2003)

d_{max}: 66.6 m 135° <--> 315° r_{min}: 22.9 m -> 240° r~: 29.4 m r_{max}: 35.2 m -> 135°



HARLINGEN BAS #1

07.10.2004



3220.2 m²

2600.0 m

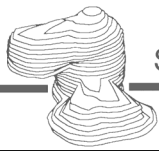
041749/41 07.10.2004

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(07.10.2004)

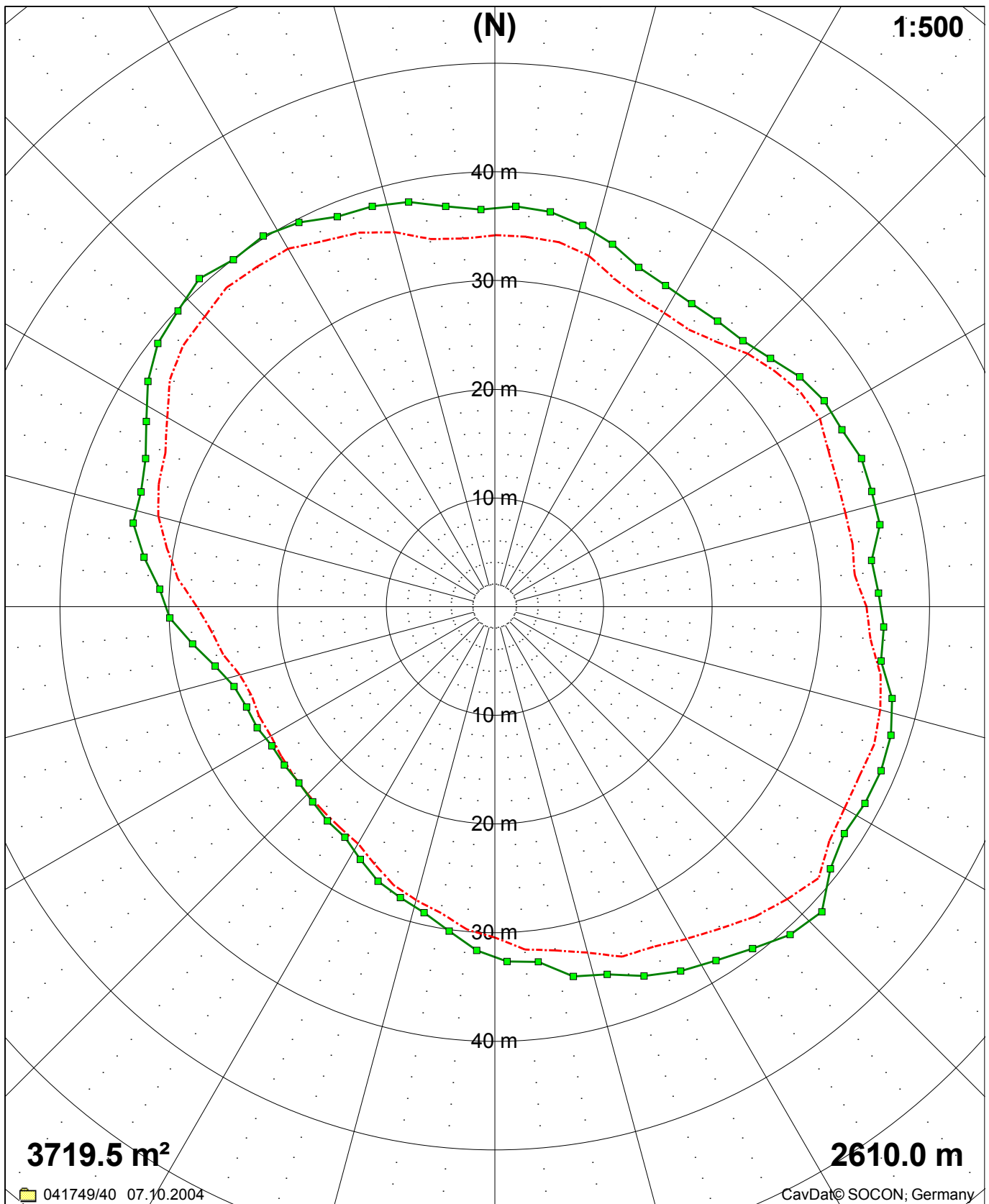
(16.10.2003)

d_{max}: 75.4 m 314° <--> 134° r_{min}: 23.5 m -> 239° r~: 32.0 m r_{max}: 40.7 m -> 129°



HARLINGEN BAS #1

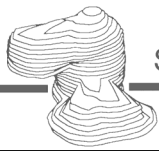
07.10.2004



(07.10.2004)

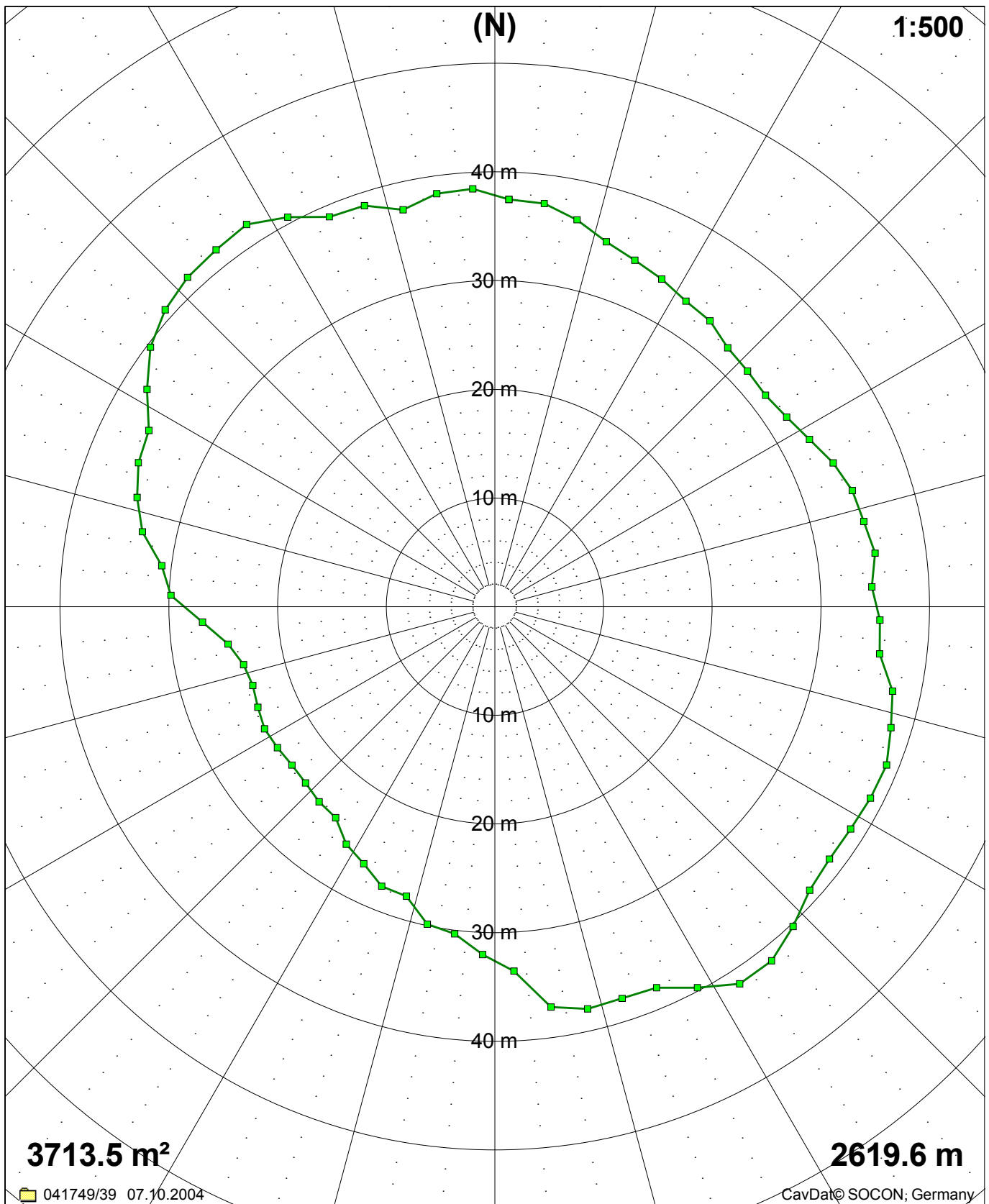
(16.10.2003)

$d_{\max}$: 81.2 m 318° <--> 138° $r_{\min}$: 24.2 m -> 237° $r_{\sim}$: 34.4 m $r_{\max}$: 41.2 m -> 133°



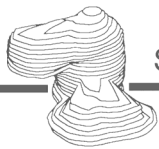
HARLINGEN BAS #1

07.10.2004



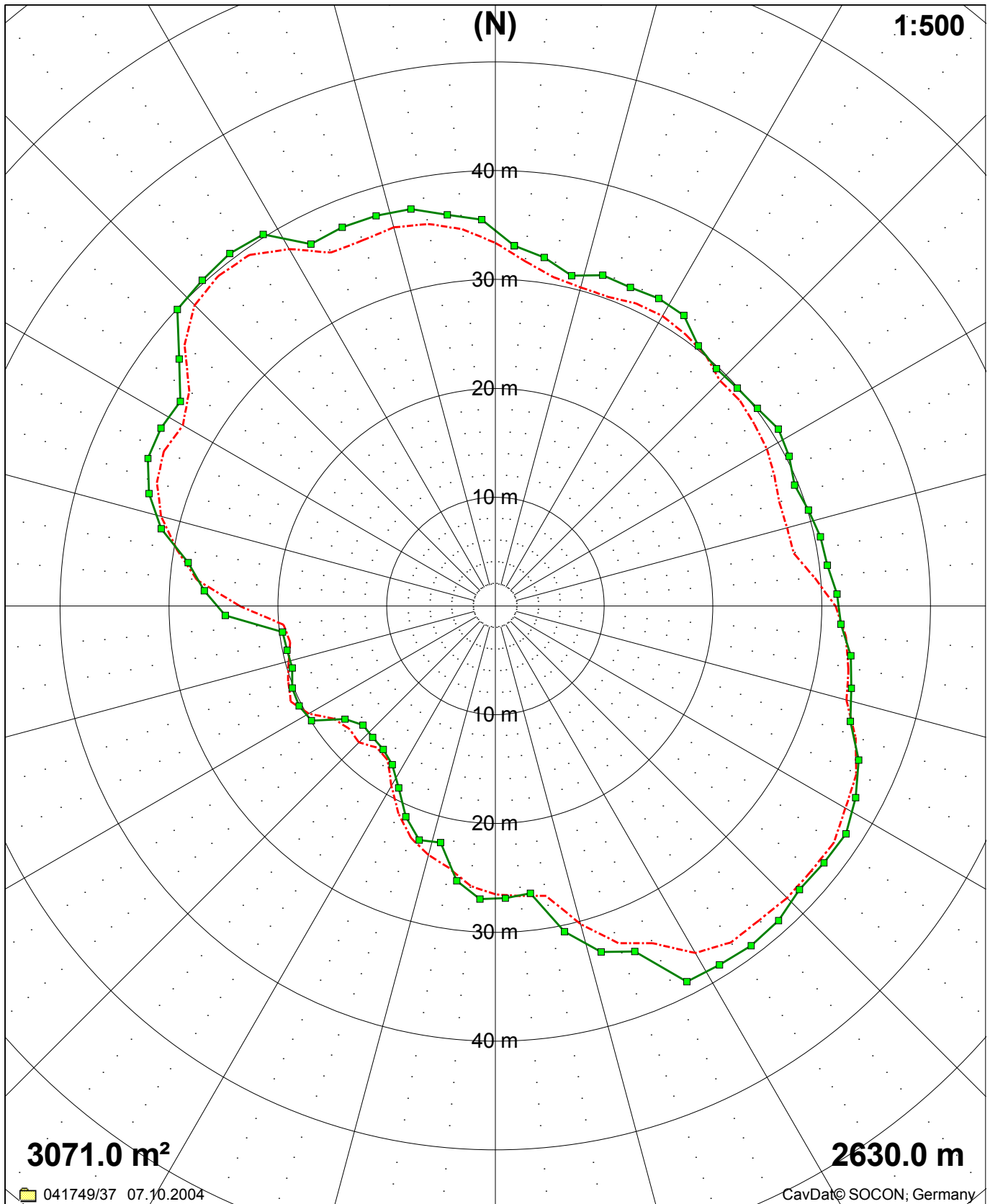
—■— (07.10.2004)

d_{max}: 83.3 m 327° <--> 147° r_{min}: 23.4 m -> 252° r~: 34.4 m r_{max}: 41.9 m -> 327°



HARLINGEN BAS #1

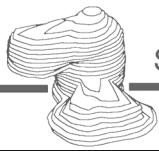
07.10.2004



—■— (07.10.2004)

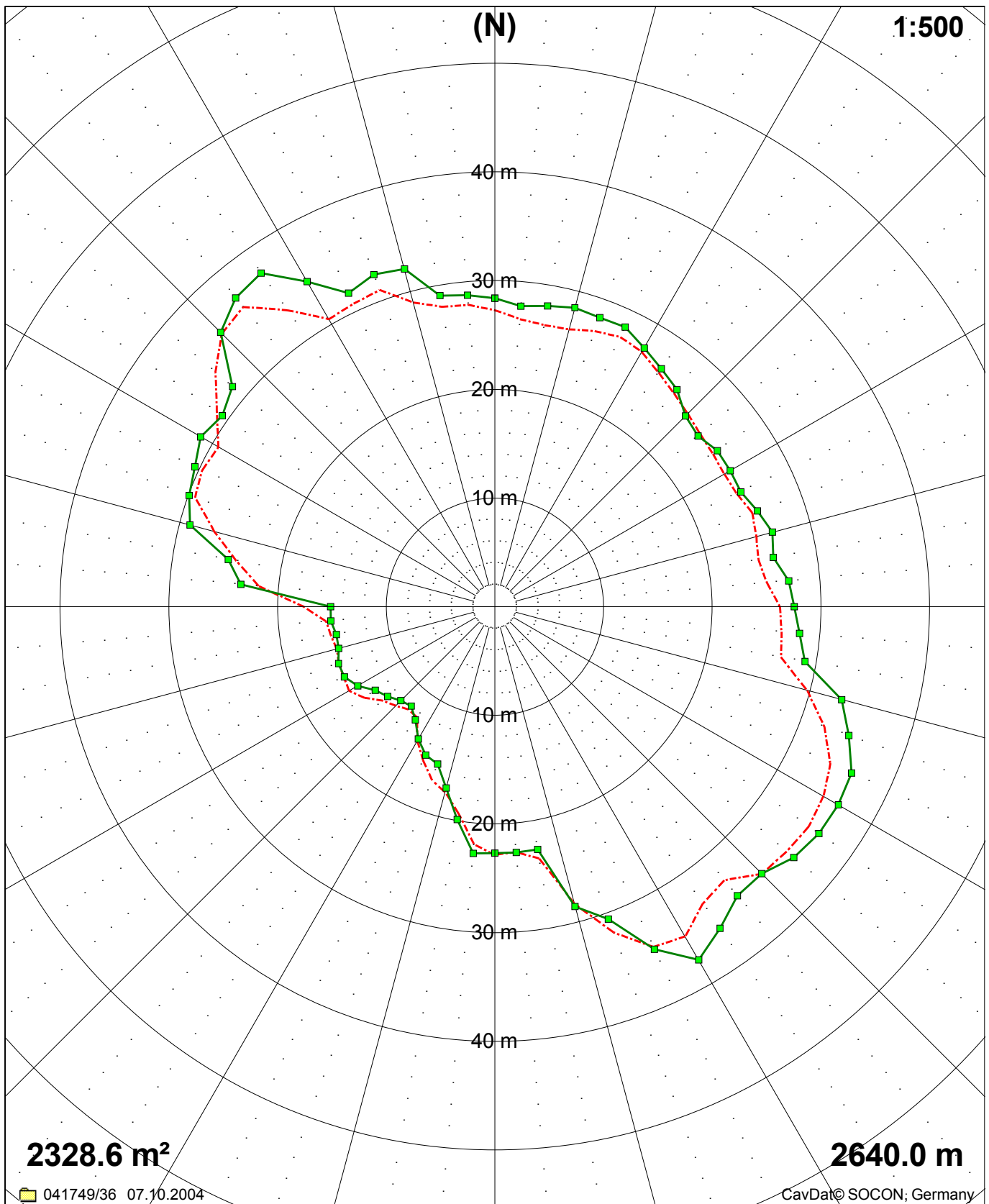
- - - (16.10.2003)

d_{max}: 79.6 m 143° <--> 323° r_{min}: 16.4 m -> 228° r~: 31.3 m r_{max}: 40.5 m -> 323°



HARLINGEN BAS #1

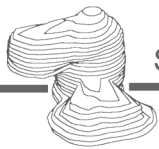
07.10.2004



—■— (07.10.2004)

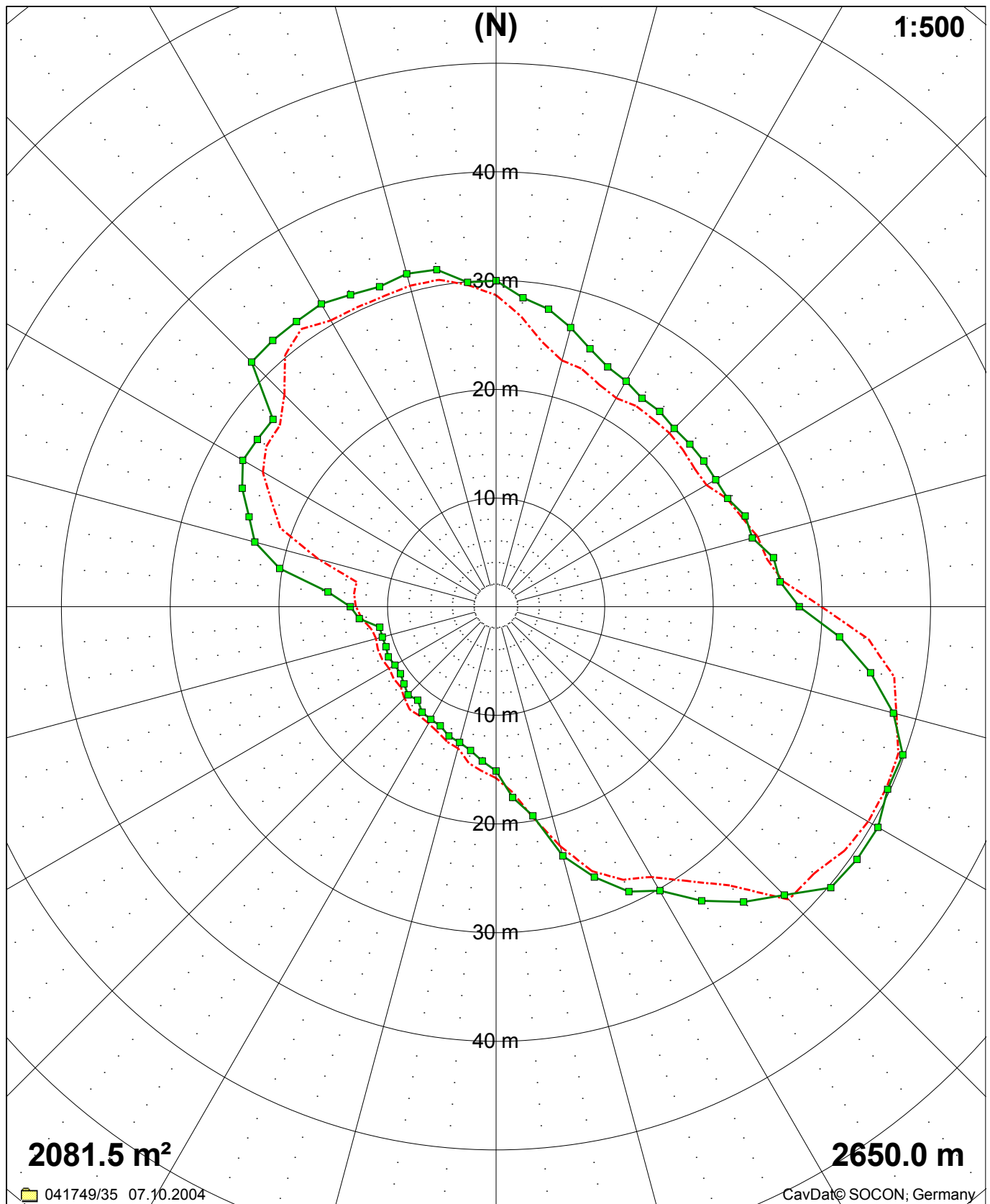
- - - (16.10.2003)

$d_{\max}$: 73.6 m 145° <--> 325° $r_{\min}$: 11.9 m -> 220° $r_{\sim}$: 27.2 m $r_{\max}$: 37.5 m -> 150°



HARLINGEN BAS #1

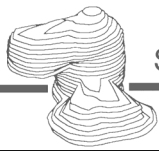
07.10.2004



—■— (07.10.2004)

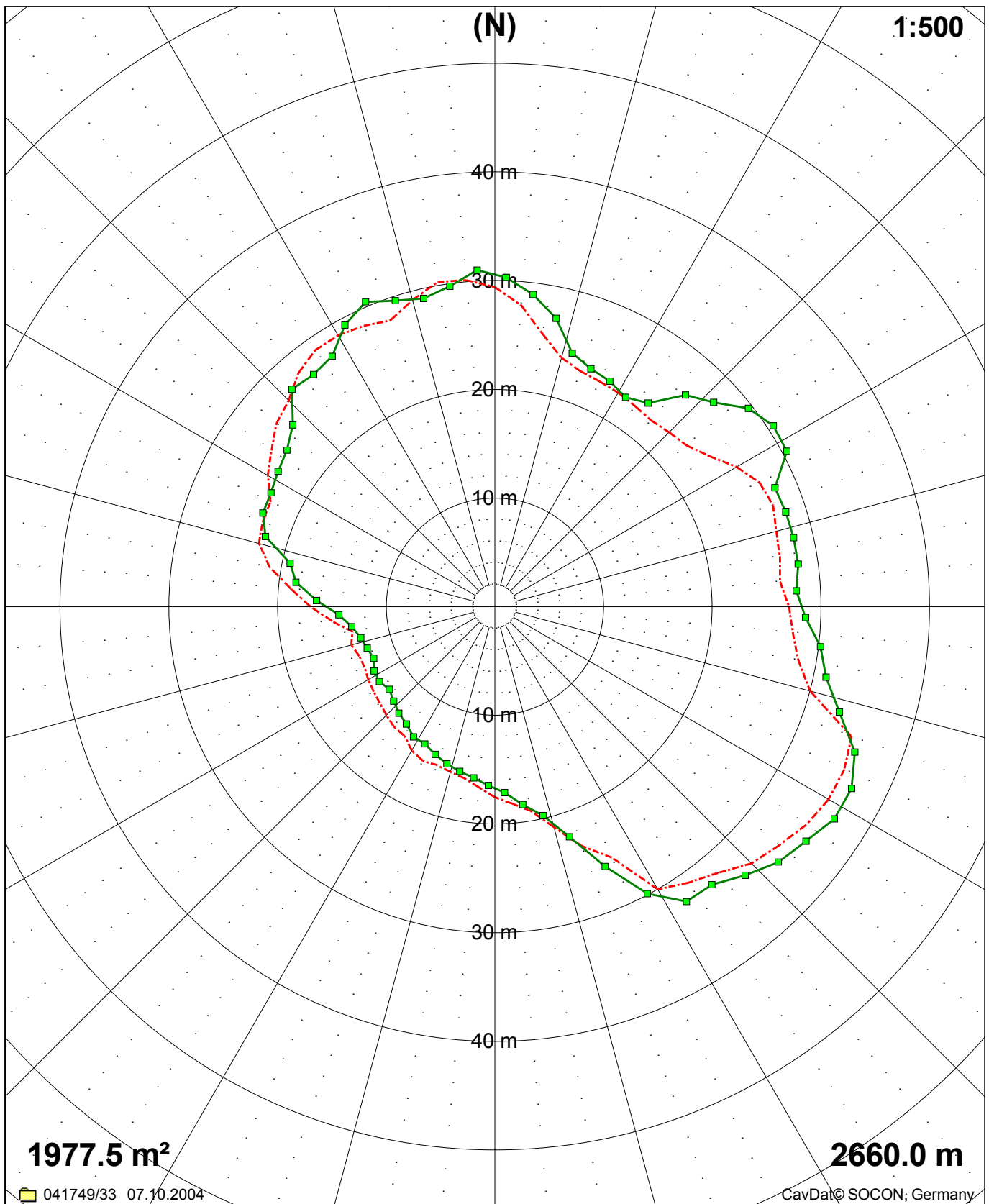
- - - (16.10.2003)

d_{max}: 69.3 m 135° <--> 315° r_{min}: 10.7 m -> 236° r~: 25.7 m r_{max}: 40.6 m -> 120°



HARLINGEN BAS #1

07.10.2004



1977.5 m²

2660.0 m

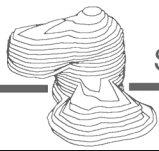
041749/33 07.10.2004

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—■— (07.10.2004)

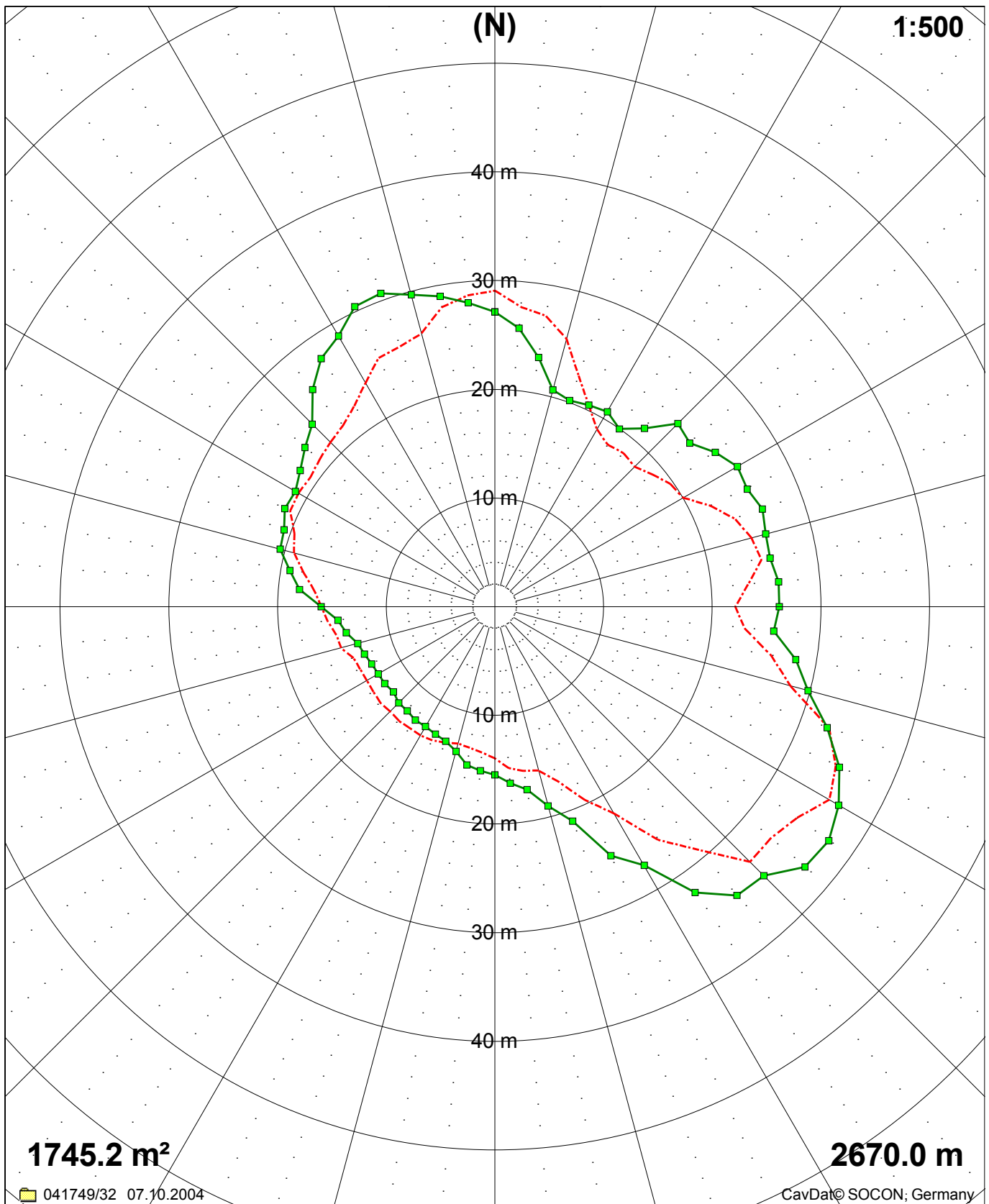
- - - (16.10.2003)

d_{max}: 61.1 m 317° <--> 137° r_{min}: 12.1 m -> 247° r~: 25.1 m r_{max}: 36.8 m -> 117°



HARLINGEN BAS #1

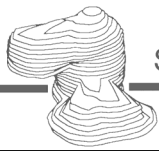
07.10.2004



—■— (07.10.2004)

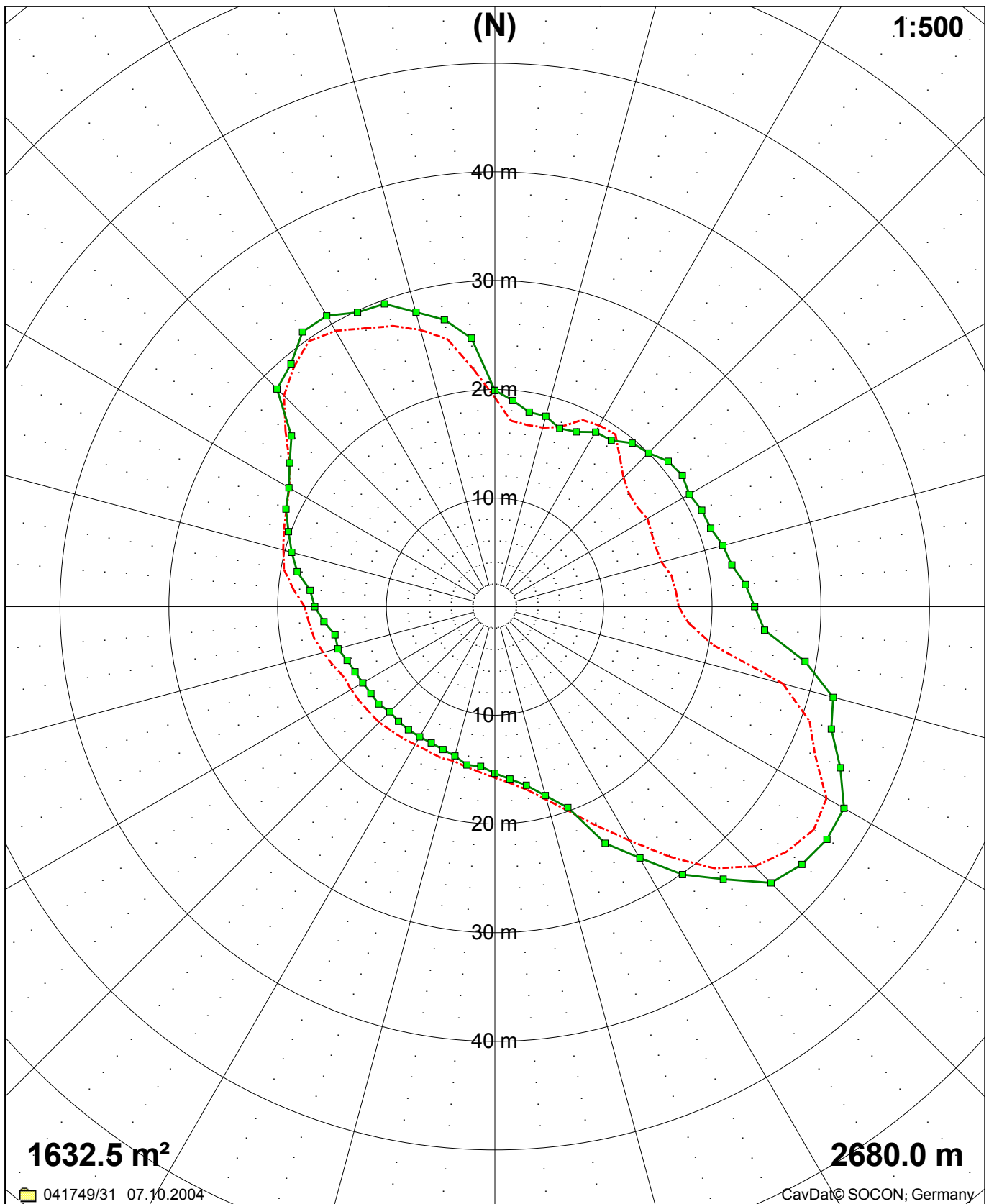
- - - (16.10.2003)

$d_{\max}$: 60.7 m 320° <--> 140° $r_{\min}$: 12.2 m -> 230° $r_{\sim}$: 23.6 m $r_{\max}$: 37.5 m -> 125°



HARLINGEN BAS #1

07.10.2004



1632.5 m²

2680.0 m

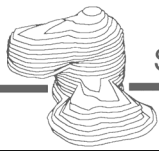
041749/31 07.10.2004

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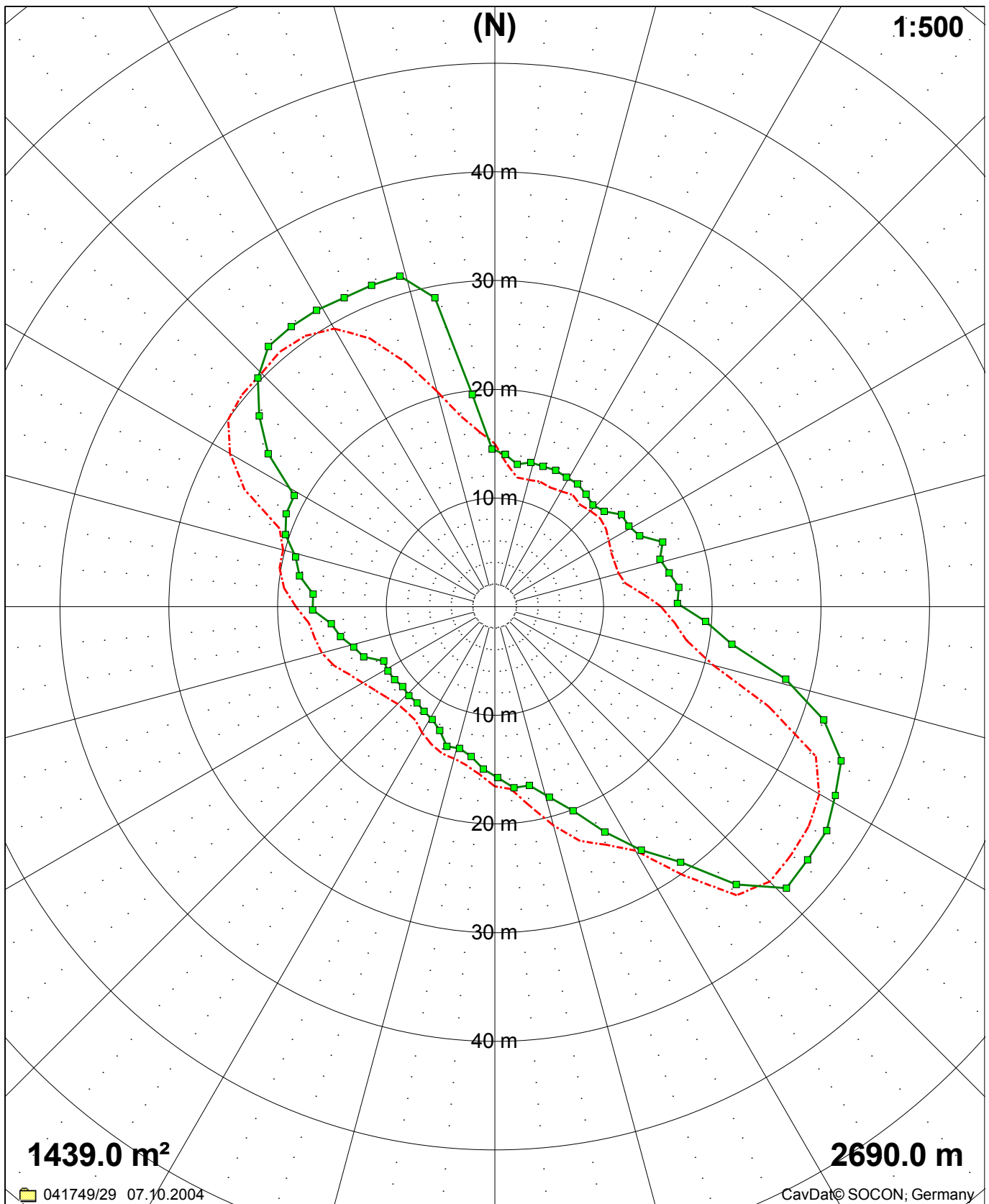
- - - (16.10.2003)

d_{max}: 64.2 m 135° <--> 315° r_{min}: 13.7 m -> 225° r~: 22.8 m r_{max}: 37.3 m -> 125°



HARLINGEN BAS #1

07.10.2004



1439.0 m²

2690.0 m

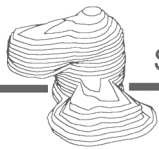
041749/29 07.10.2004

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—■— (07.10.2004)

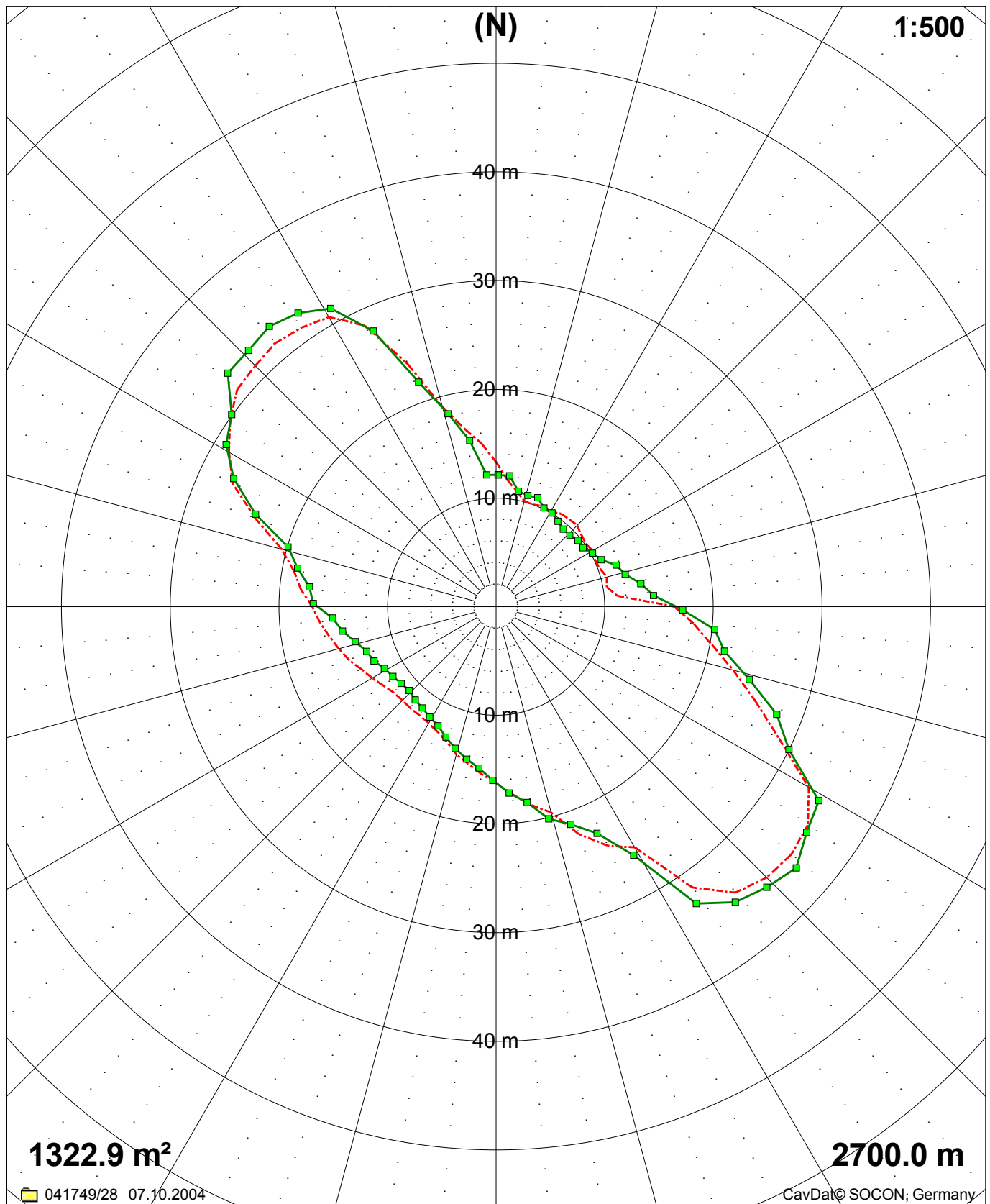
- - - (16.10.2003)

d_{max}: 67.6 m 134° <--> 314° r_{min}: 11.2 m -> 229° r~: 21.4 m r_{max}: 37.3 m -> 134°



HARLINGEN BAS #1

07.10.2004



1322.9 m²

2700.0 m

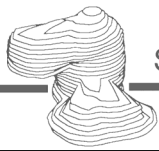
041749/28 07.10.2004

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—■— (07.10.2004)

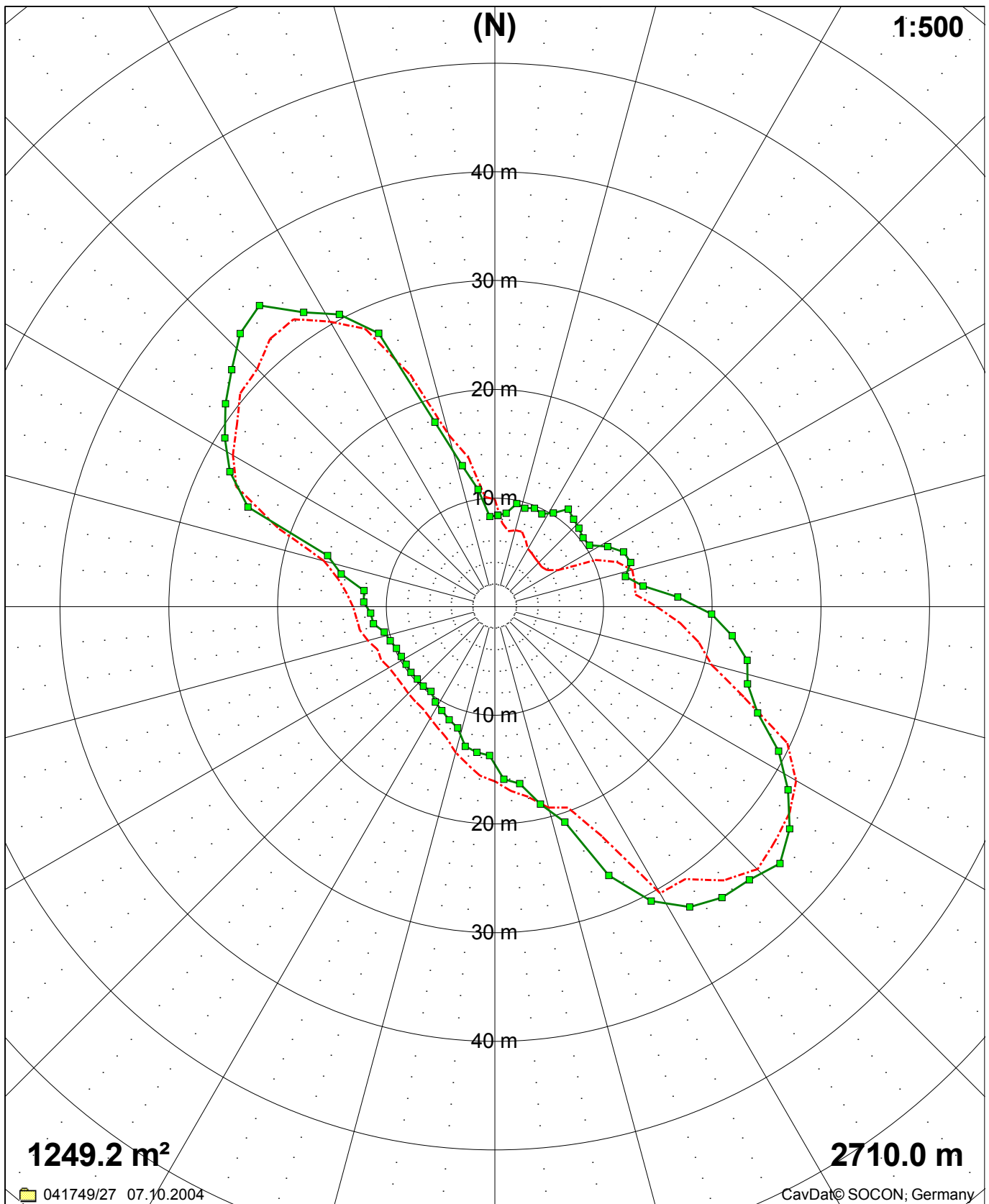
- - - (16.10.2003)

d_{max}: 69.4 m 131° <--> 311° r_{min}: 9.4 m -> 43° r~: 20.5 m r_{max}: 36.6 m -> 131°



HARLINGEN BAS #1

07.10.2004



1249.2 m²

2710.0 m

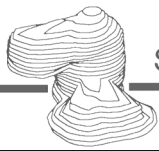
041749/27 07.10.2004

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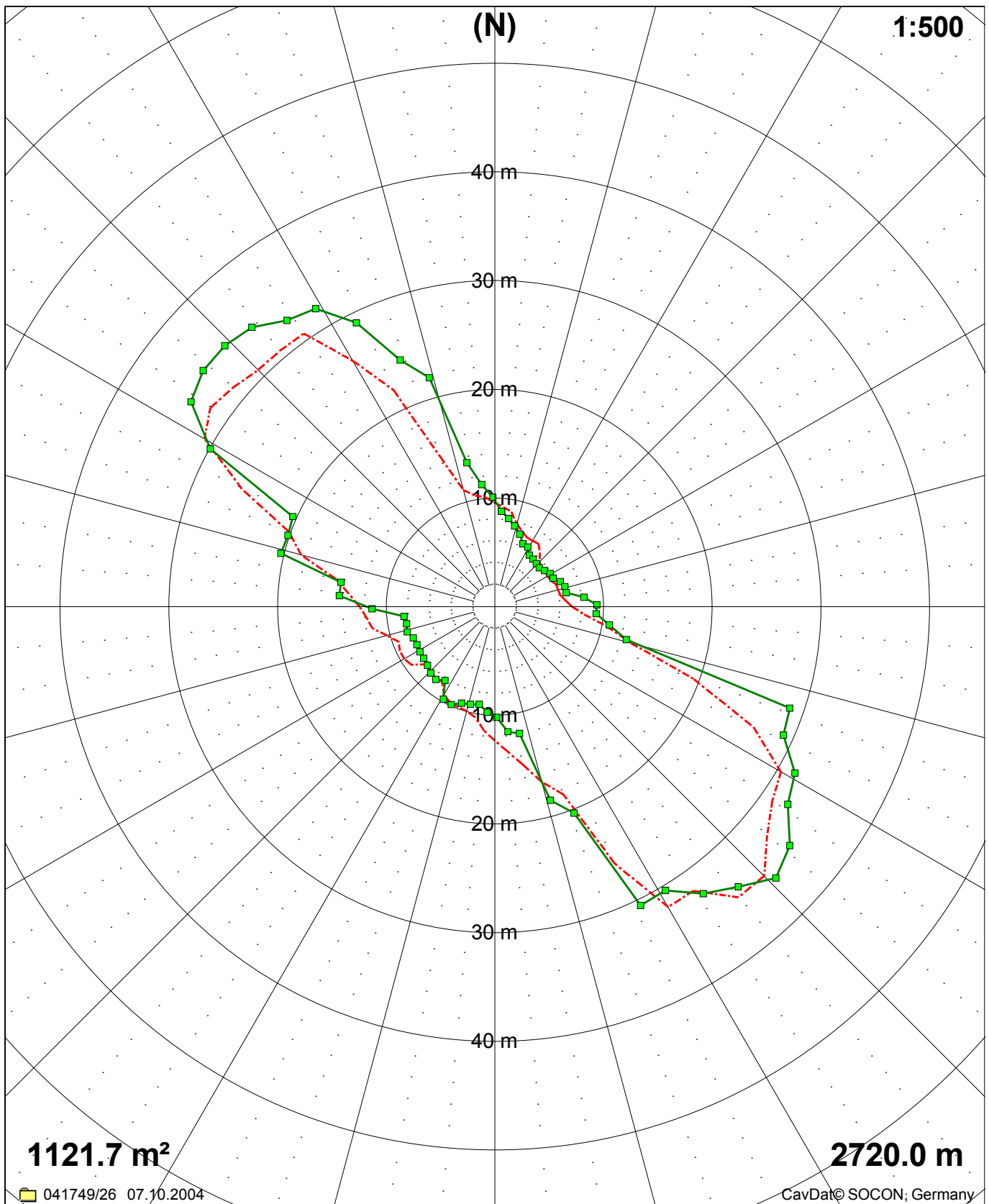
- - - (16.10.2003)

d_{max}: 69.1 m 322° <--> 142° r_{min}: 8.3 m -> 357° r~: 19.9 m r_{max}: 35.3 m -> 132°



HARLINGEN BAS #1

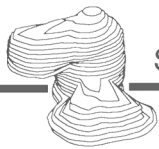
07.10.2004



—■— (07.10.2004)

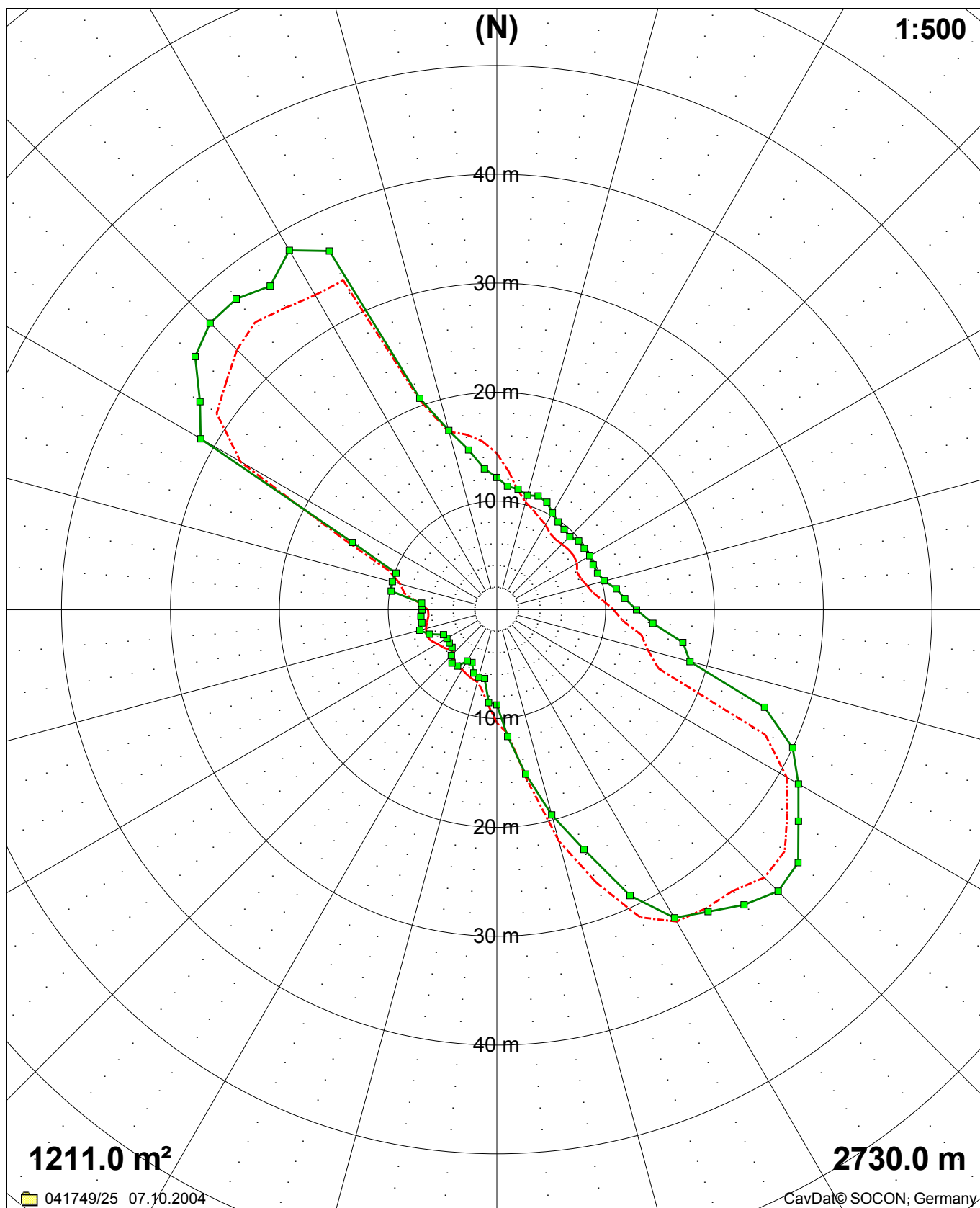
- - - (16.10.2003)

$d_{\max}$: 70.5 m 134° <--> 314° $r_{\min}$: 5.4 m -> 49° $r_{\sim}$: 18.9 m $r_{\max}$: 35.9 m -> 134°



HARLINGEN BAS #1

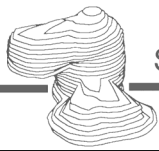
07.10.2004



—■— (07.10.2004)

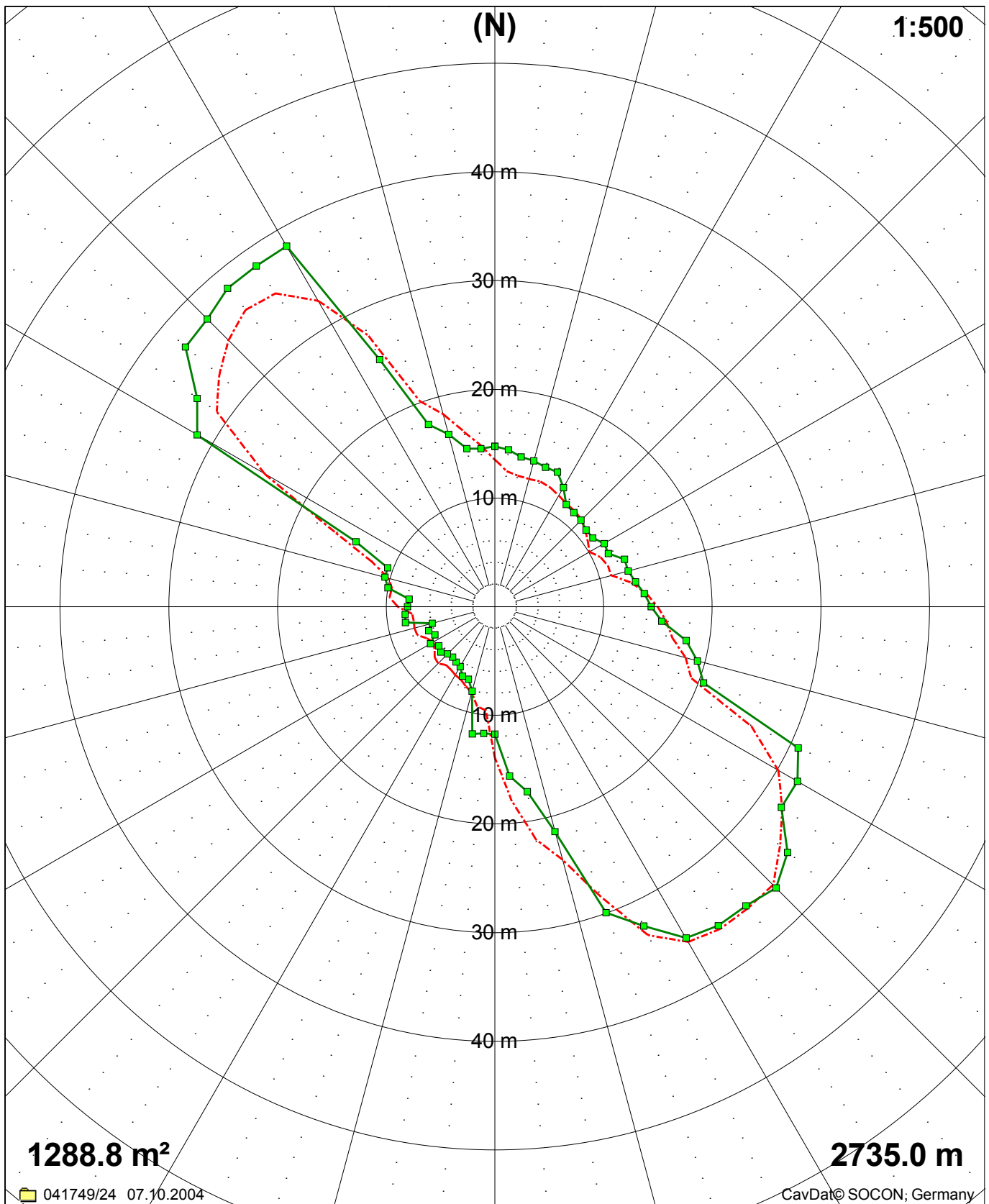
- - - (16.10.2003)

$d_{\max}$: 73.8 m 135° <--> 315° $r_{\min}$: 5.3 m -> 240° $r_{\sim}$: 19.6 m $r_{\max}$: 38.1 m -> 330°



HARLINGEN BAS #1

07.10.2004



1288.8 m²

2735.0 m

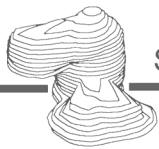
041749/24 07.10.2004

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—■— (07.10.2004)

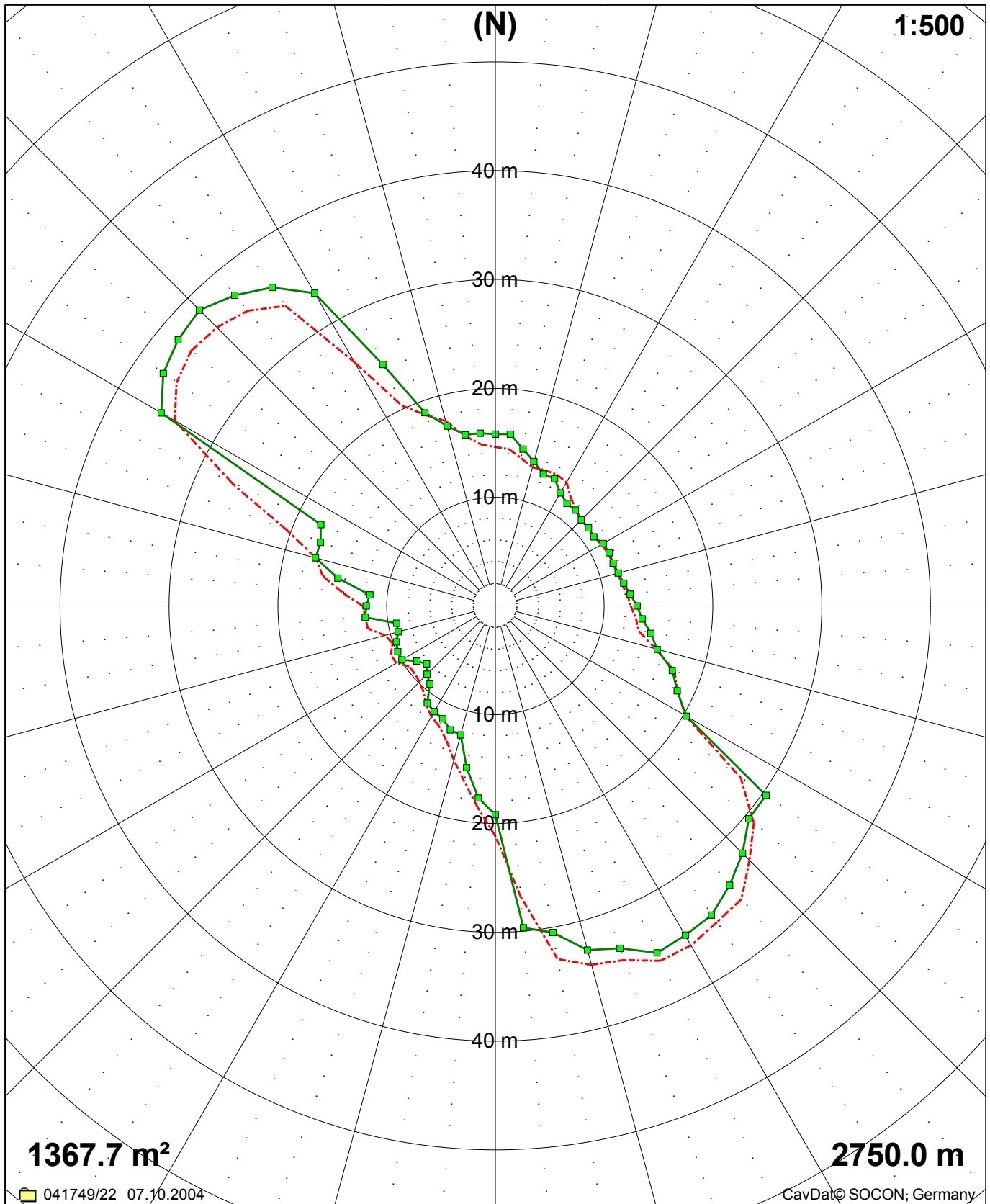
- - - (16.10.2003)

d_{max}: 74.2 m 140° <--> 320° r_{min}: 6.0 m -> 255° r~: 20.3 m r_{max}: 38.3 m -> 330°



HARLINGEN BAS #1

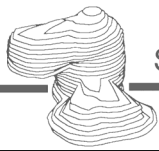
07.10.2004



—■— (07.10.2004)

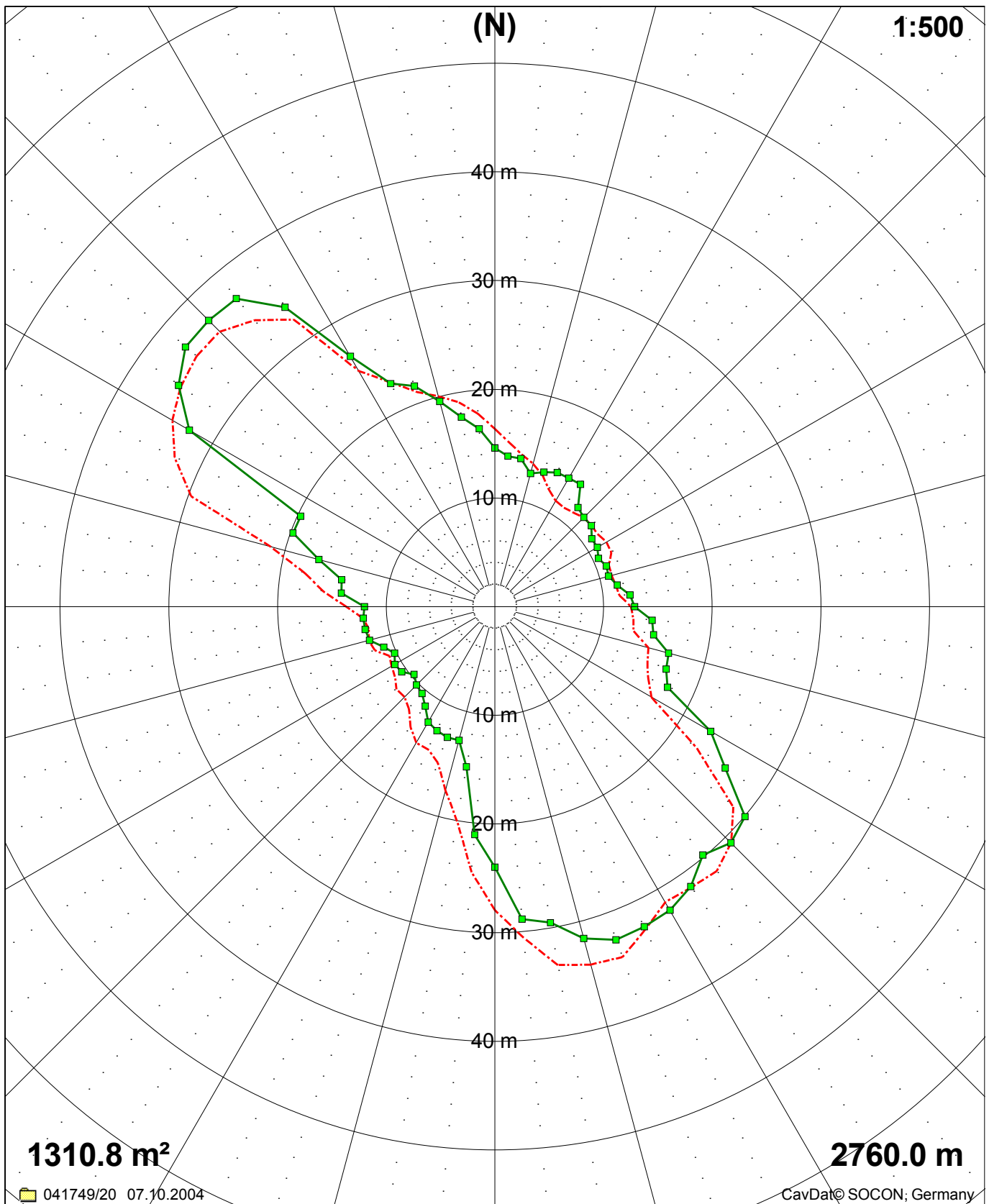
- - - (16.10.2003)

$d_{\max}$: 70.8 m 140° <--> 320° $r_{\min}$: 8.3 m -> 230° $r_{\sim}$: 20.9 m $r_{\max}$: 38.4 m -> 315°



HARLINGEN BAS #1

07.10.2004



1310.8 m²

2760.0 m

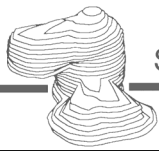
041749/20 07.10.2004

CavDat© SOCON, Germany

—■— (07.10.2004)

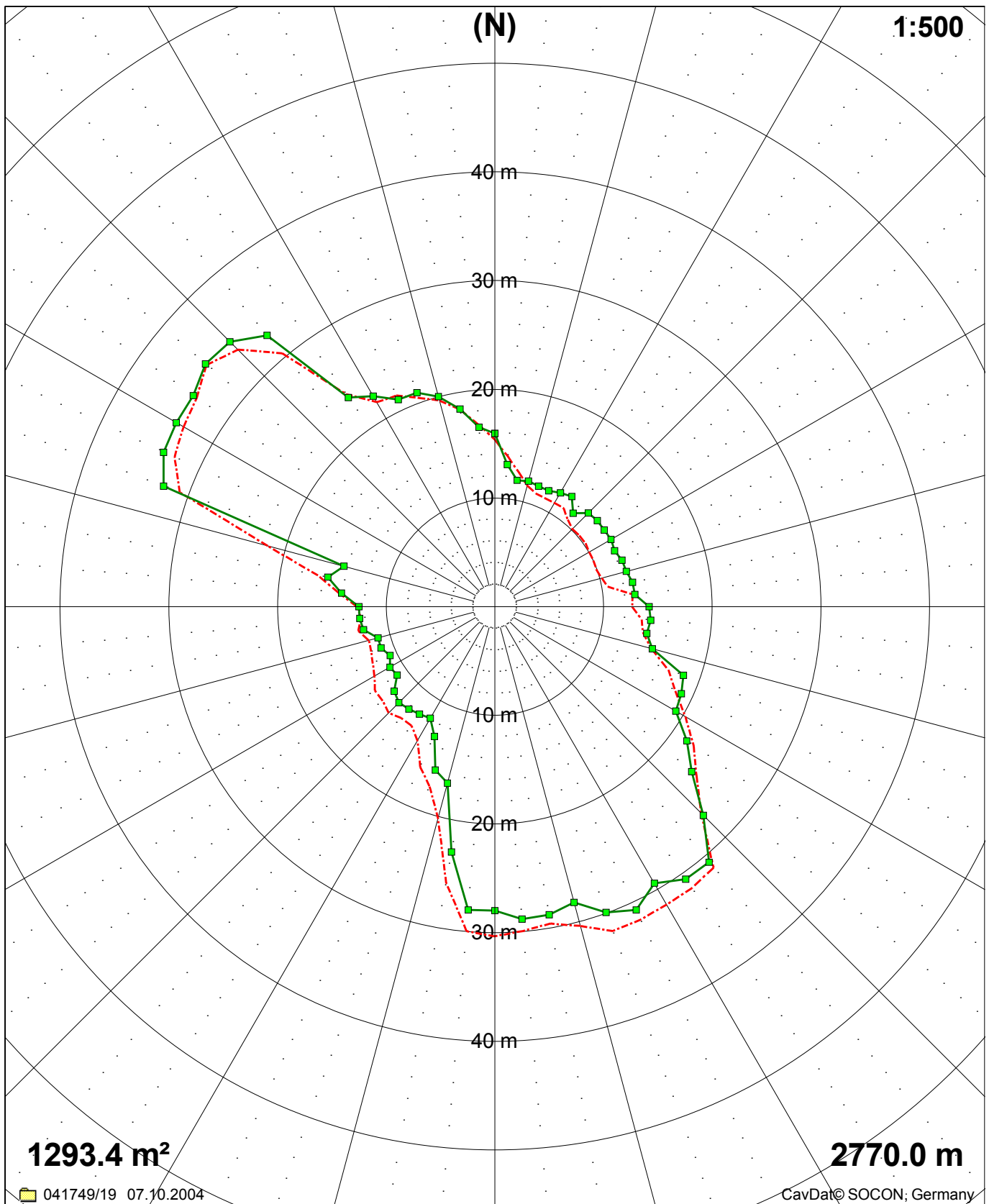
- - - (16.10.2003)

d_{max}: 67.9 m 135° <--> 315° r_{min}: 9.7 m -> 230° r~: 20.4 m r_{max}: 37.2 m -> 315°



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07.10.2004



1293.4 m²

2770.0 m

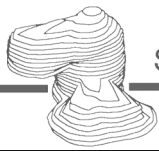
041749/19 07.10.2004

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—■— (07.10.2004)

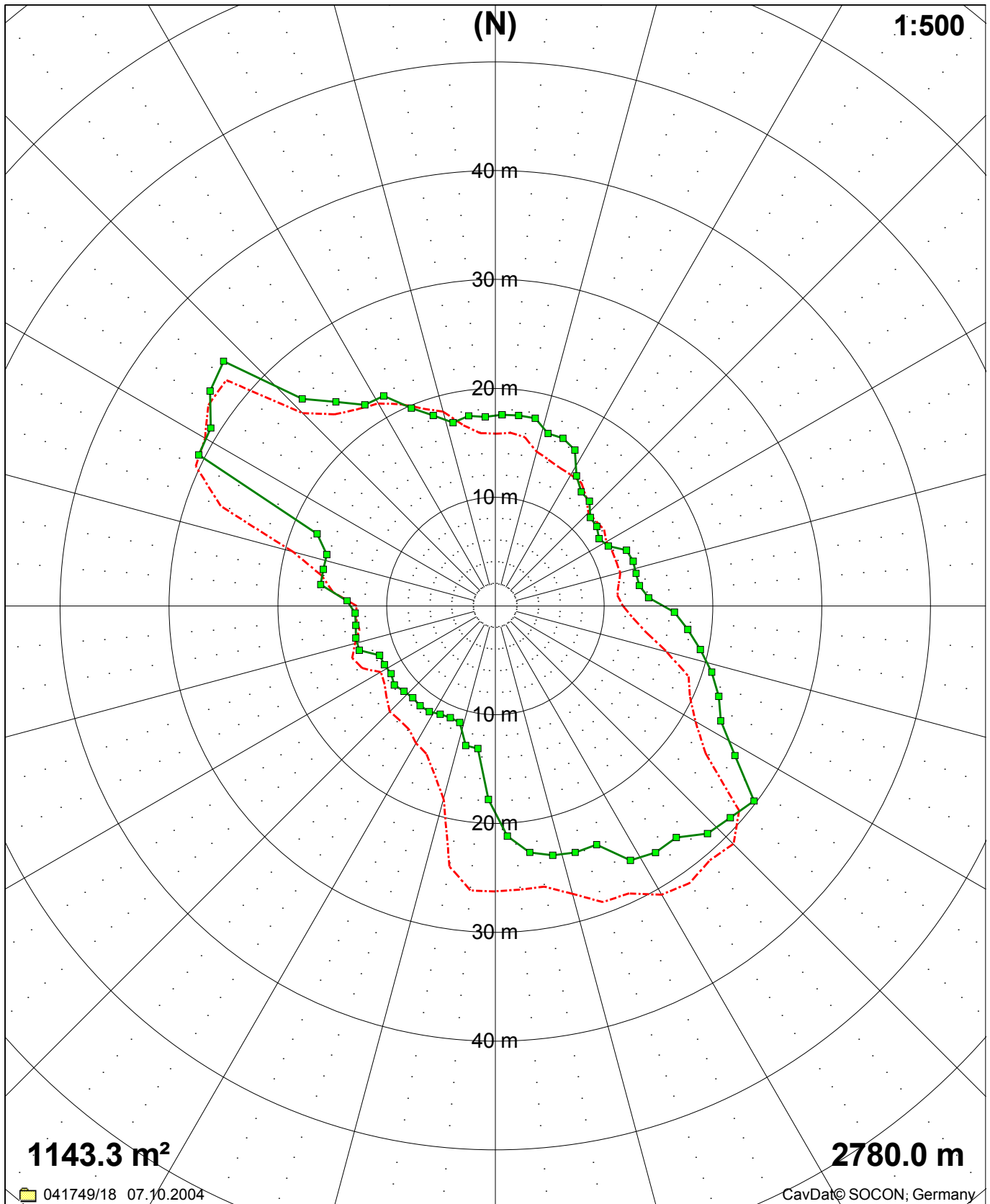
- - - (16.10.2003)

d_{max}: 63.3 m 320° <--> 140° r_{min}: 10.6 m -> 245° r~: 20.3 m r_{max}: 34.7 m -> 310°



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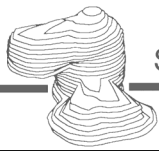
07.10.2004



(07.10.2004)

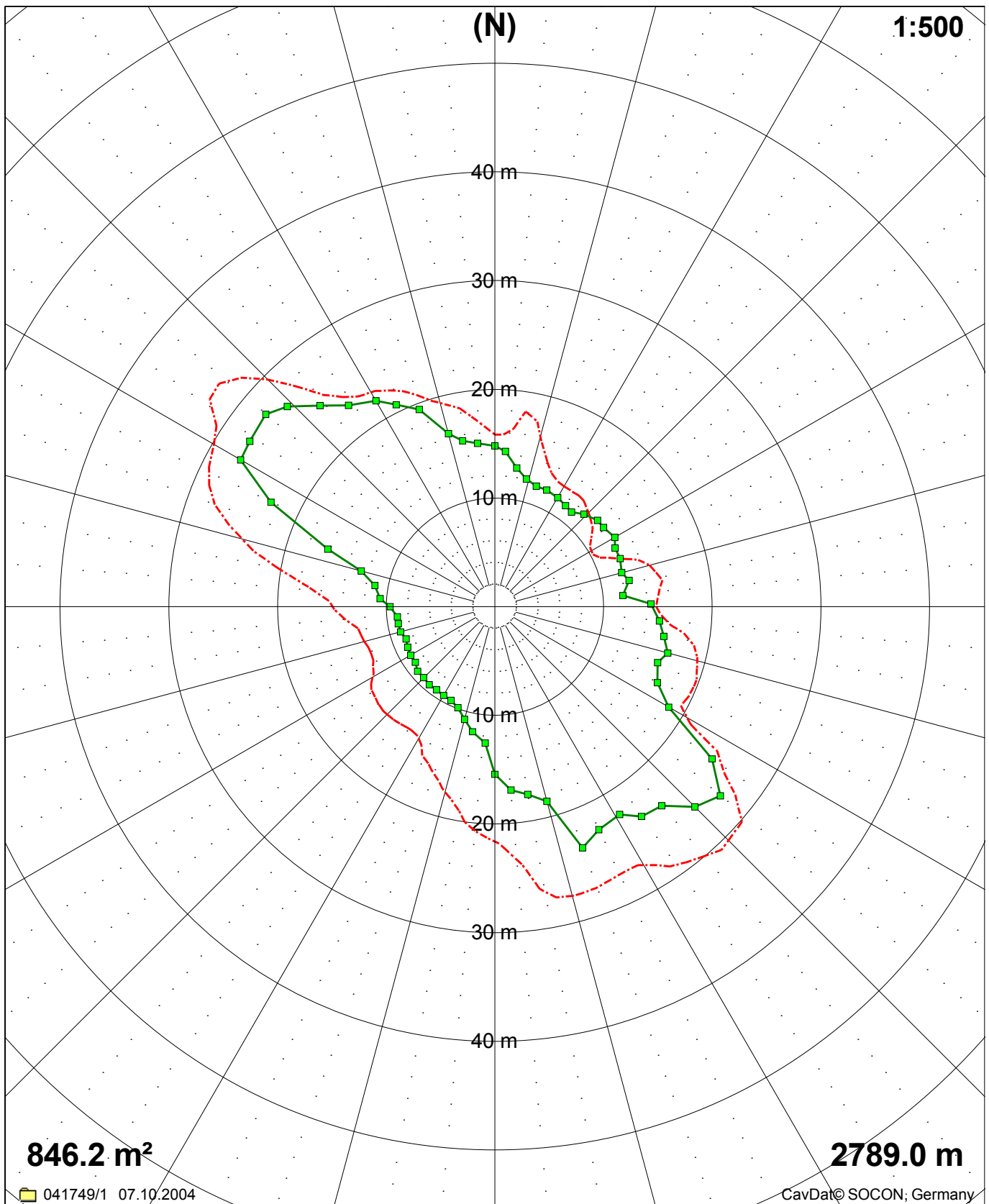
(16.10.2003)

$d_{\max}$: 62.7 m 312° <--> 132° $r_{\min}$: 11.1 m -> 202° $r_{\sim}$: 19.1 m $r_{\max}$: 33.6 m -> 312°



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846.2 m²

2789.0 m

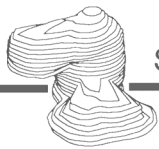
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—■— (07.10.2004)

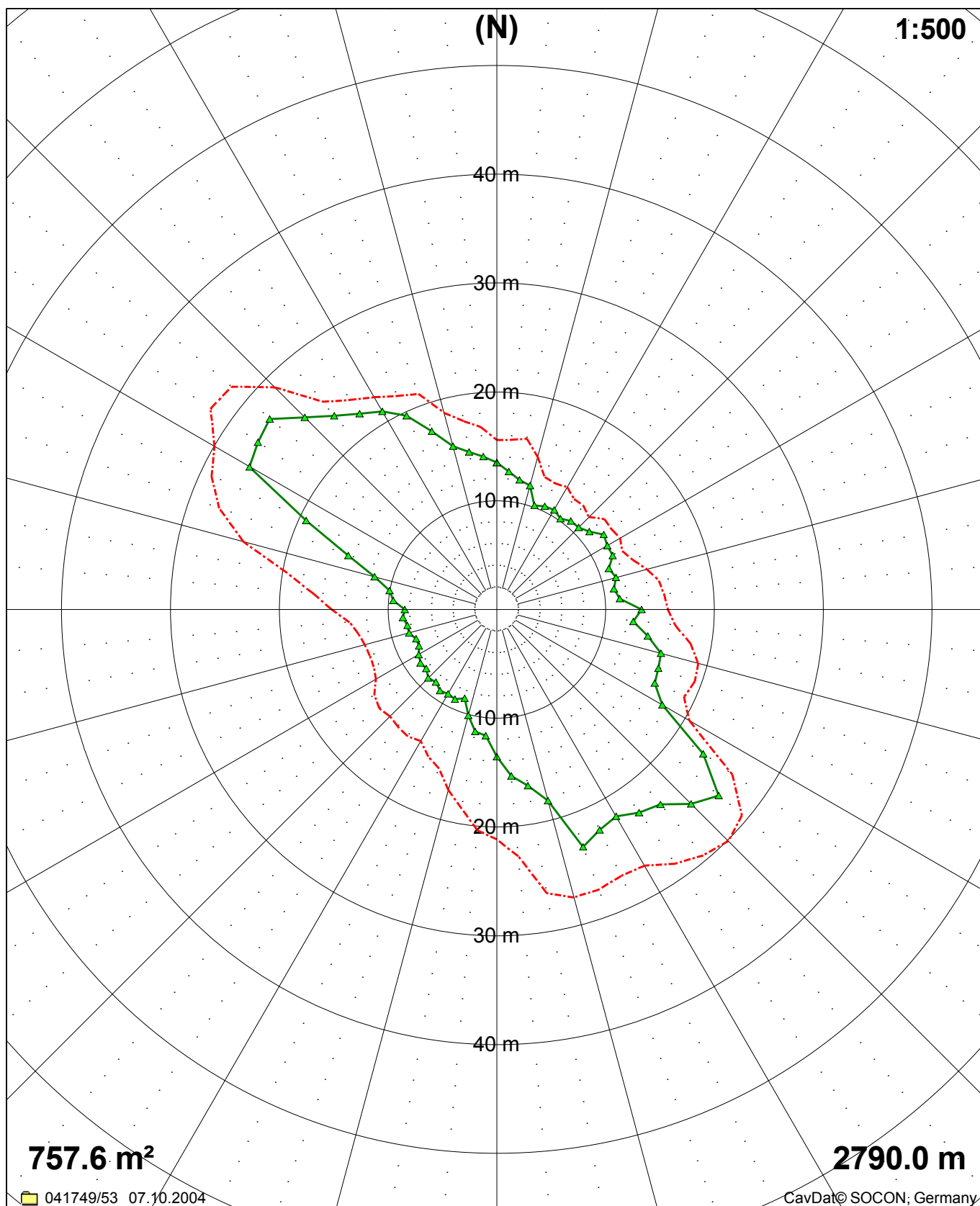
- - - (16.10.2003)

d_{max}: 54.6 m 130° <--> 310° r_{min}: 8.7 m -> 250° r~: 16.4 m r_{max}: 27.5 m -> 310°



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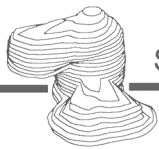
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—▲— (07.10.2004)

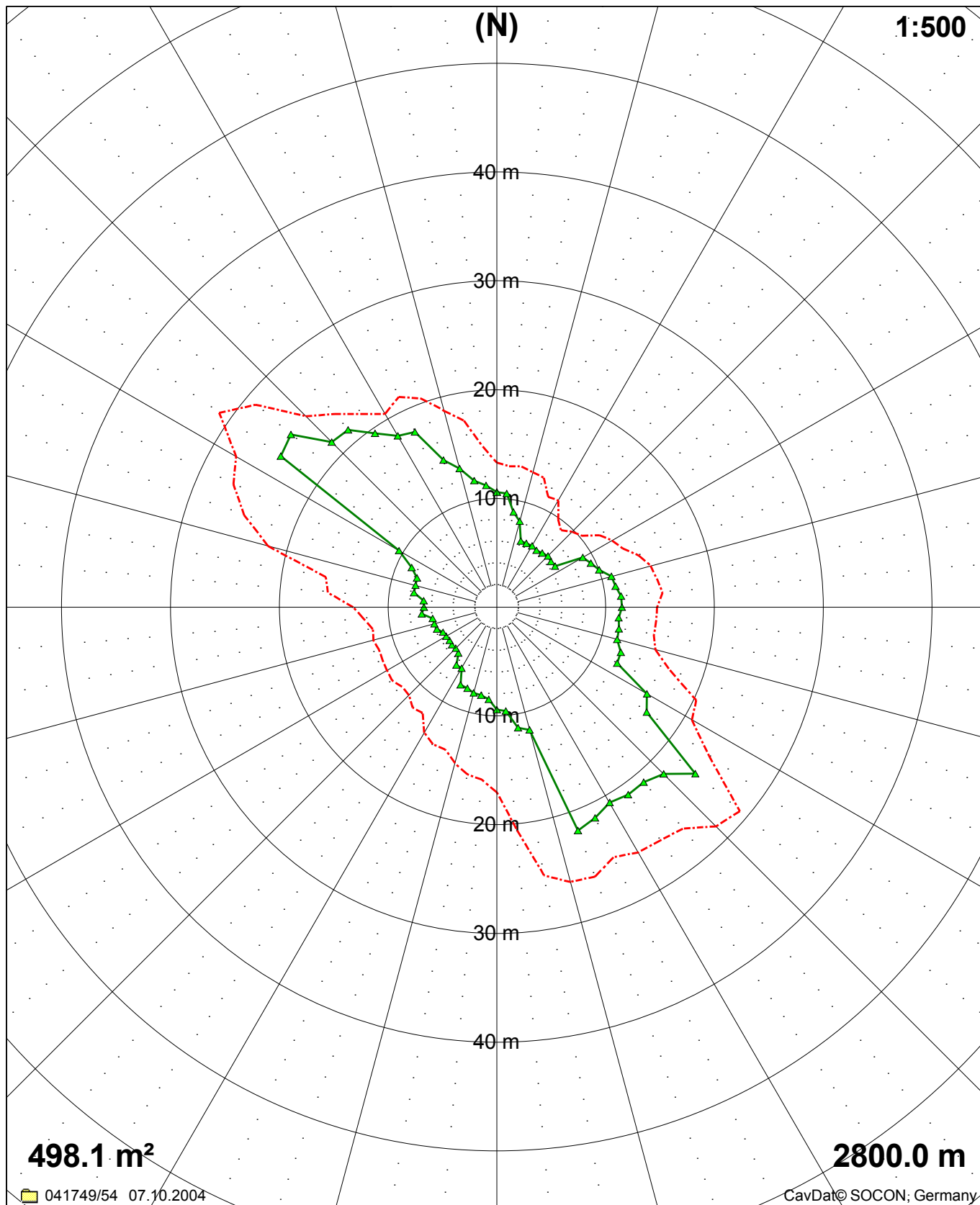
- - - (16.10.2003)

$d_{\max}$: 53.9 m 310° <--> 130° $r_{\min}$: 7.9 m -> 249° $r_{\sim}$: 15.5 m $r_{\max}$: 27.2 m -> 310°



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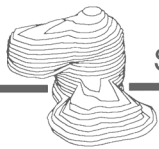
07.10.2004



—▲— (07.10.2004)

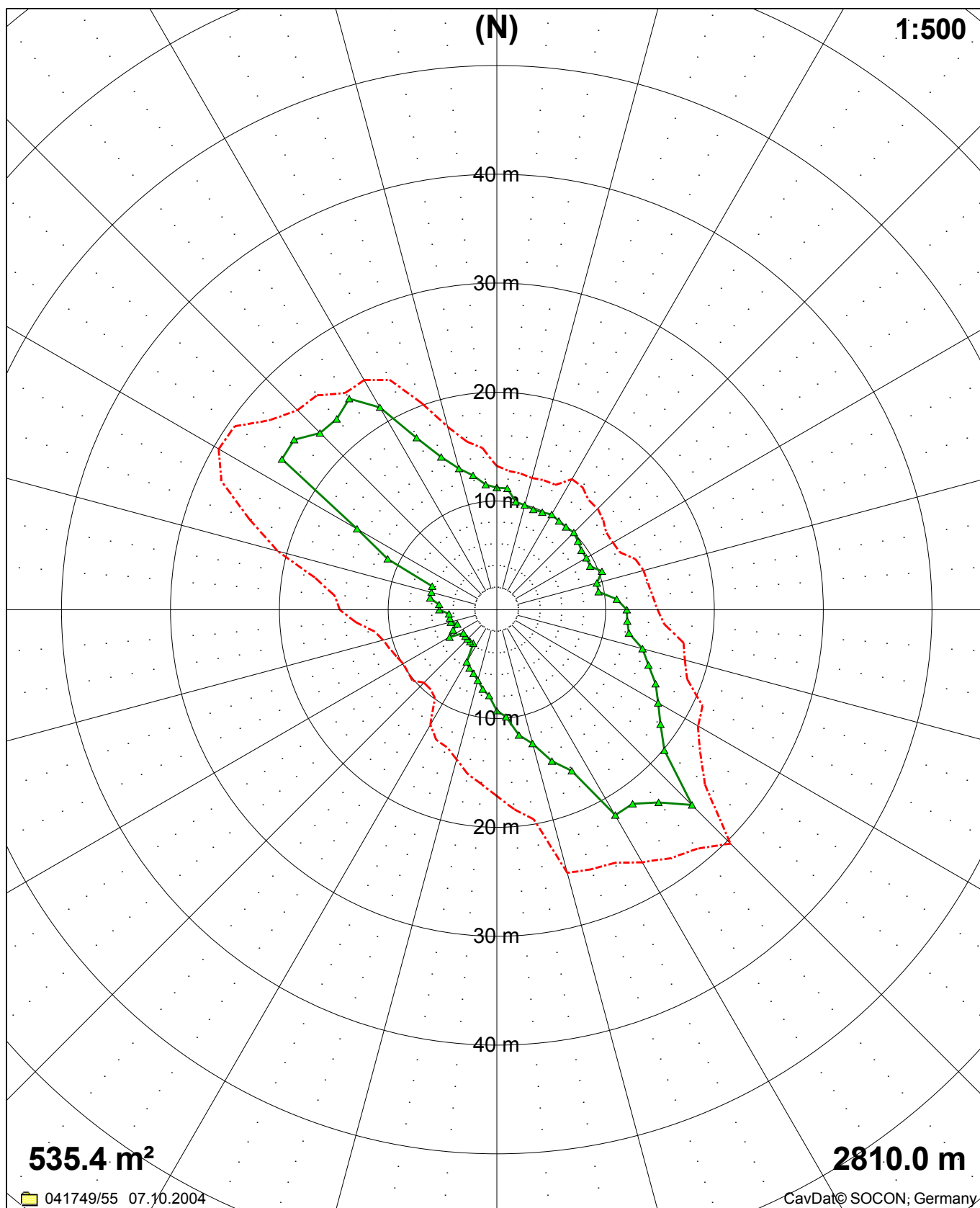
- - - (16.10.2003)

d_{max}: 48.5 m 130° <--> 310° r_{min}: 5.3 m -> 235° r~: 12.6 m r_{max}: 24.7 m -> 310°



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535.4 m²

2810.0 m

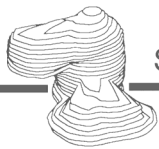
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—▲— (07.10.2004)

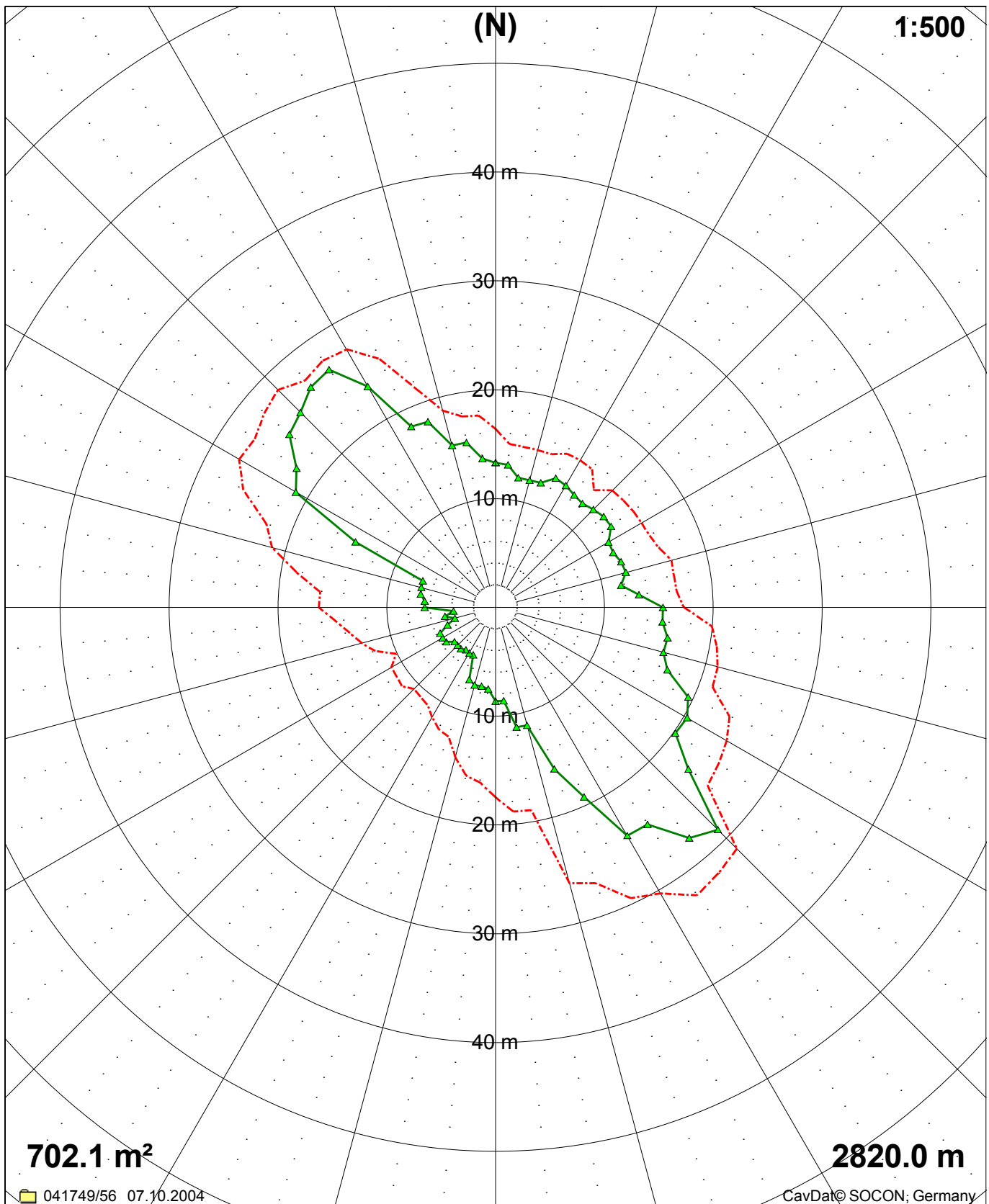
- - - (16.10.2003)

d_{max}: 48.3 m 315° <--> 135° r_{min}: 3.7 m -> 215° r~: 13.1 m r_{max}: 25.4 m -> 135°



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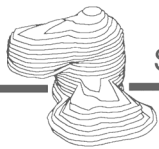
07.10.2004



(07.10.2004)

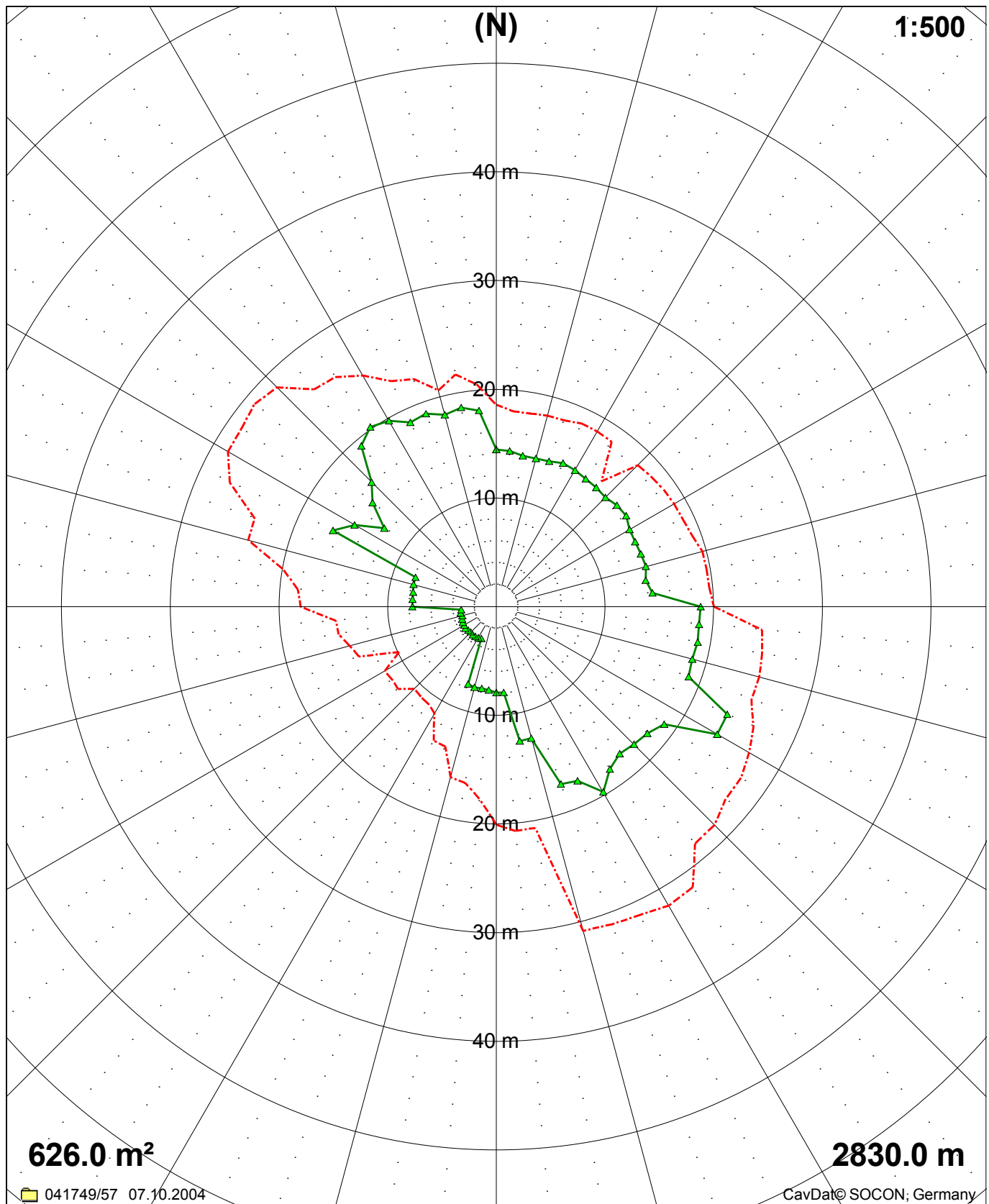
(16.10.2003)

$d_{\max}$: 54.2 m 135° <--> 315° $r_{\min}$: 3.9 m -> 255° $r_{\sim}$: 14.9 m $r_{\max}$: 28.9 m -> 135°



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626.0 m²

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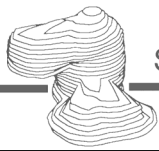
2830.0 m

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—▲— (07.10.2004)

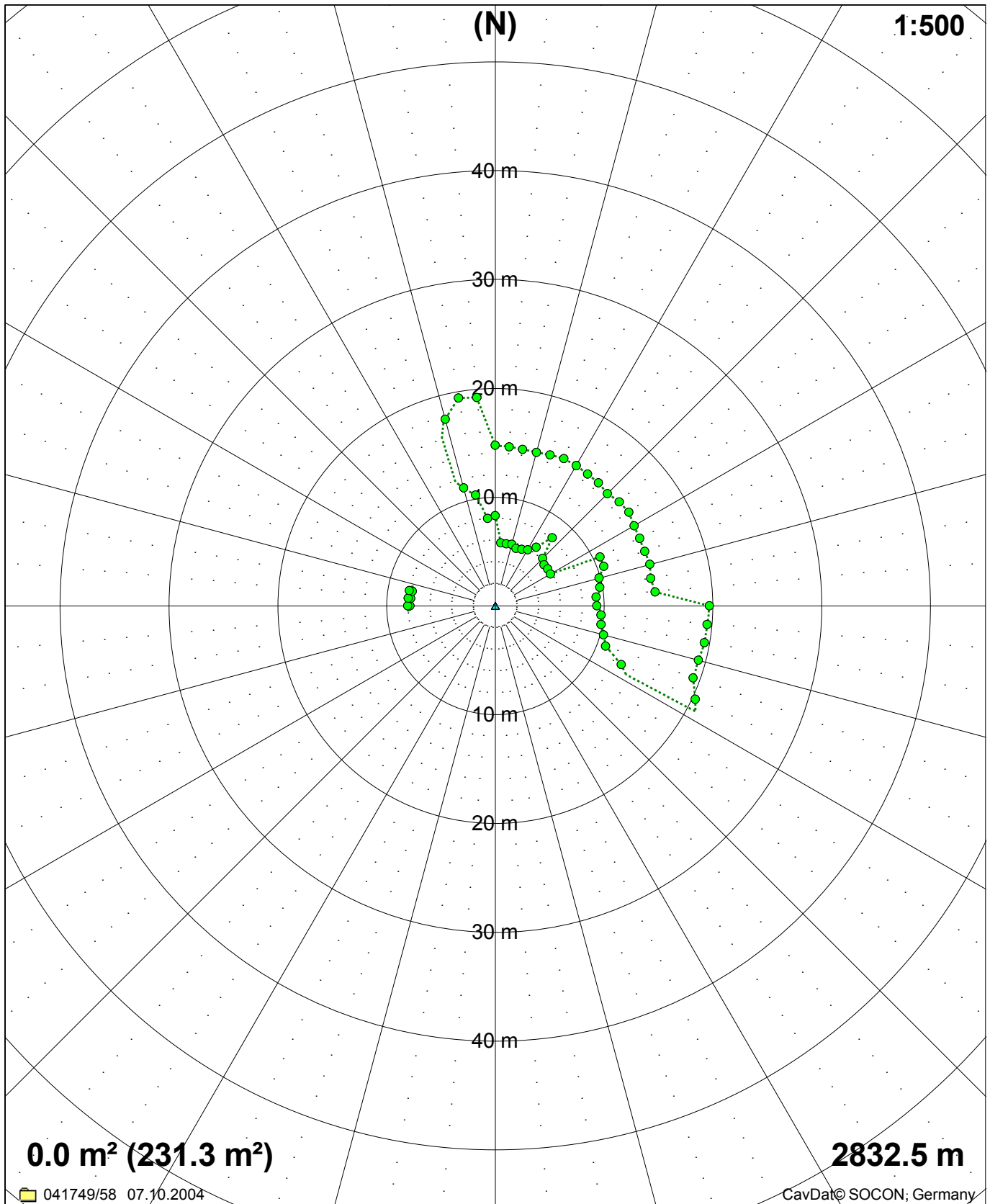
- - - (16.10.2003)

d_{max}: 40.0 m 115° <--> 295° r_{min}: 3.2 m -> 255° r~: 14.1 m r_{max}: 23.5 m -> 120°



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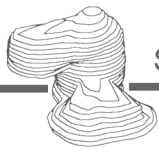
07.10.2004



—●— (07.10.2004)

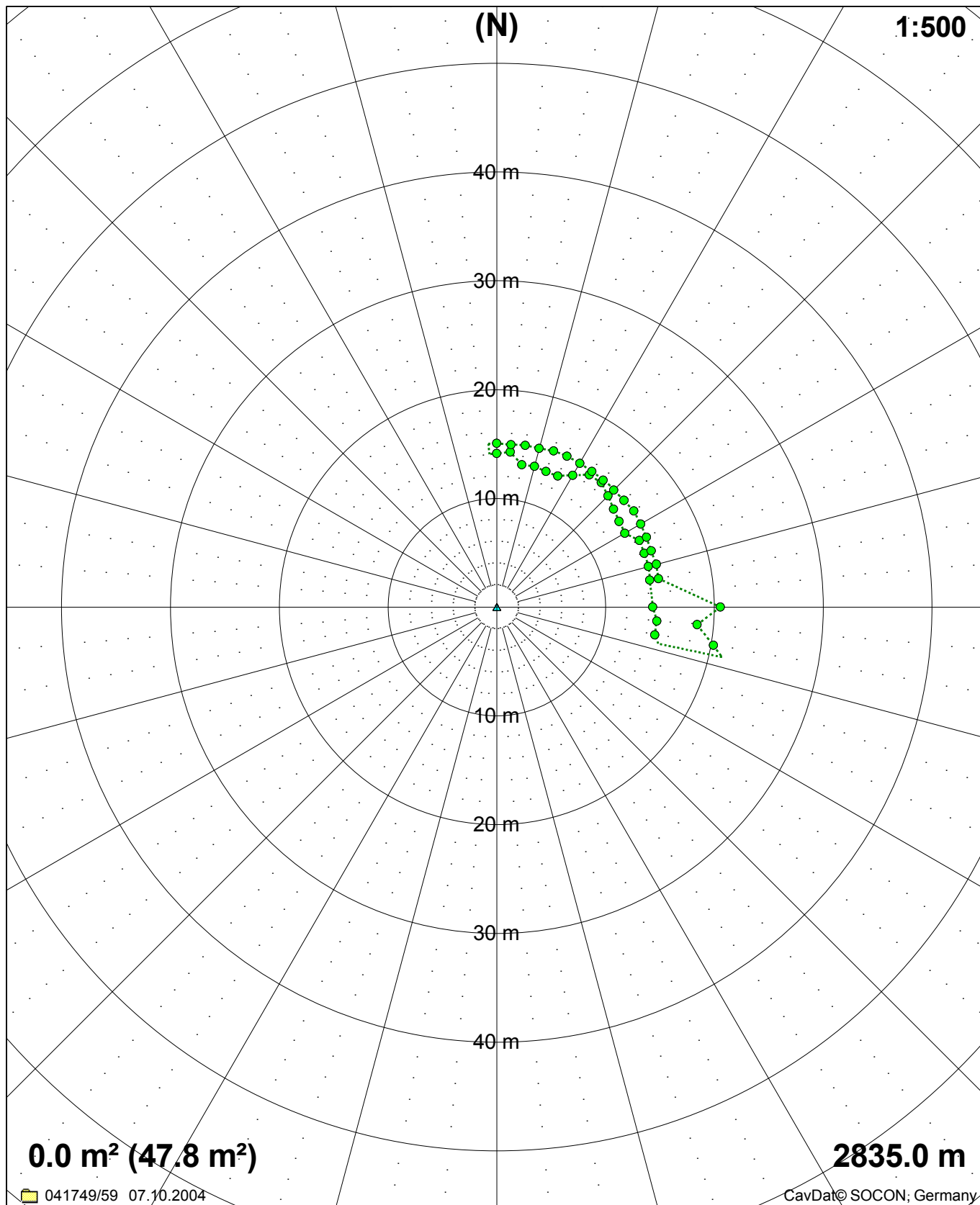
—●— Hintersolung (07.10.2004)

d_{max}: 27.7 m 270° <--> 90° r_{min}: 0.0 m -> 1° r~: 8.6 m r_{max}: 20.3 m -> 115°



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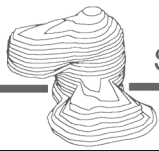
07.10.2004



—●— (07.10.2004)

—●— Hintersolung (07.10.2004)

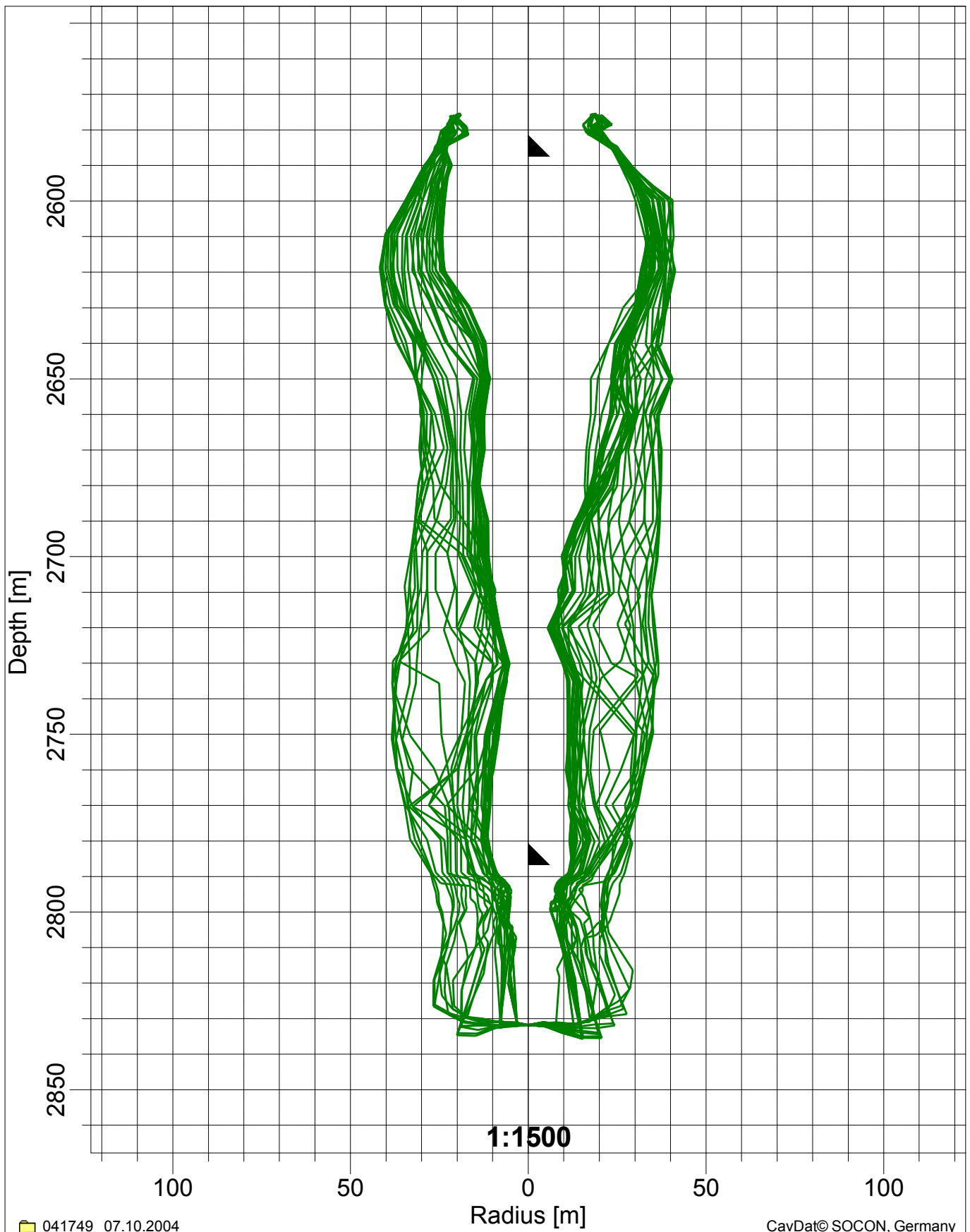
d_{max}: 20.5 m 90° <--> 270° r_{min}: 0.0 m -> 1° r~: 3.9 m r_{max}: 20.5 m -> 90°



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MAXPLOT

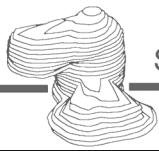
07.10.2004



133/8" : 2543.4 m

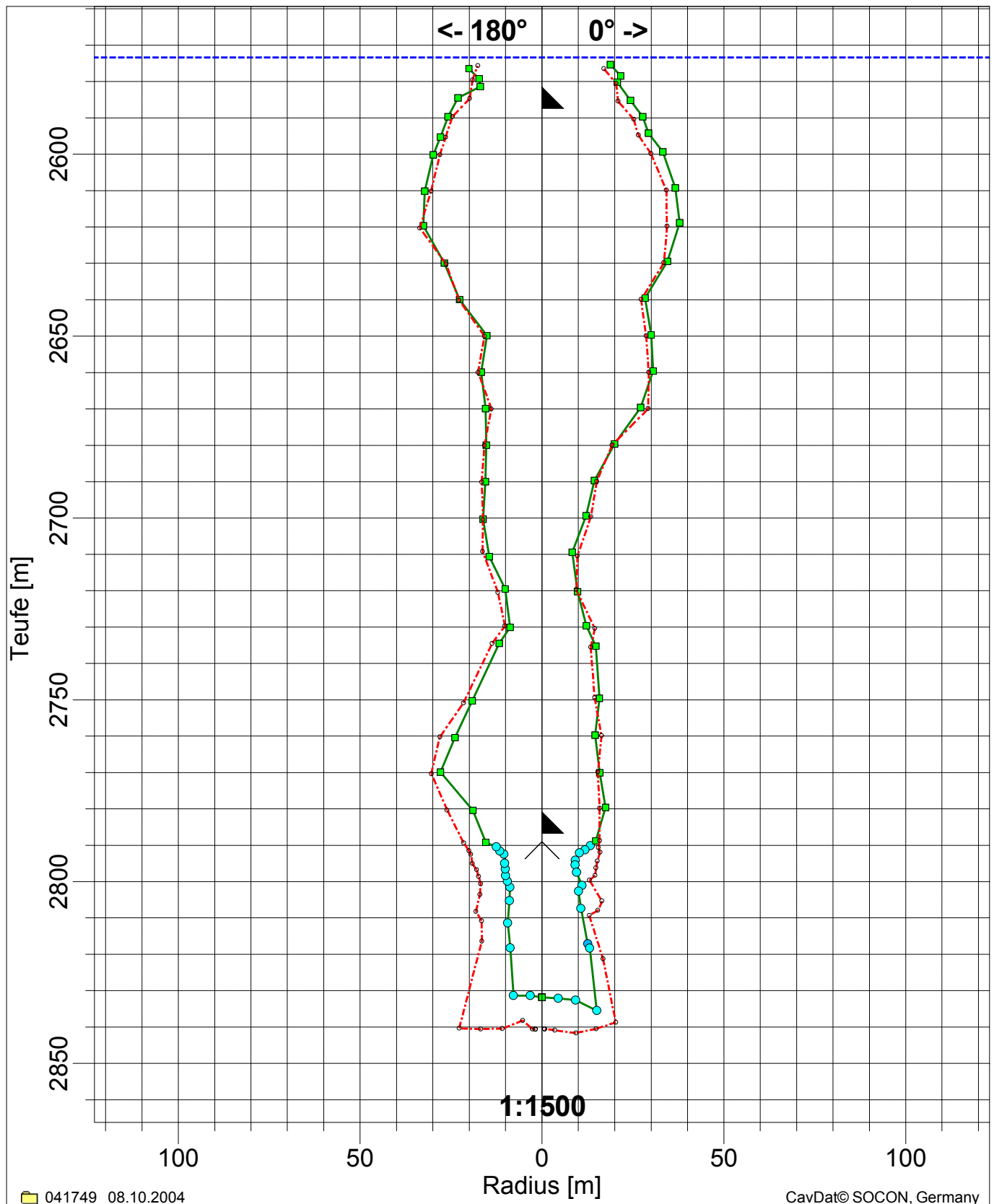
103/4" : 2587.4 m

7" : 2786.7 m



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

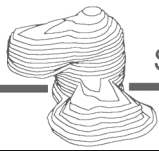
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

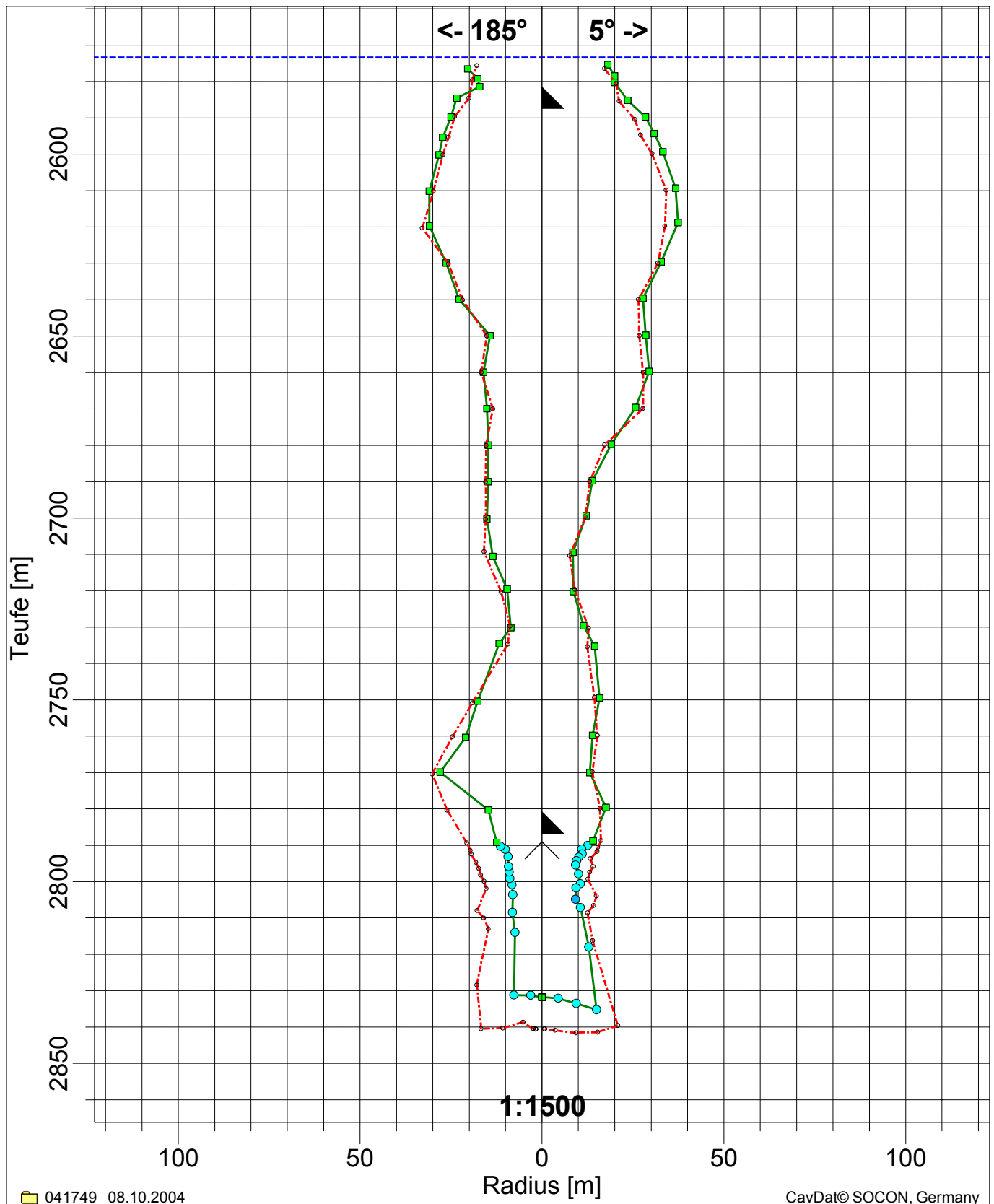
- - - (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

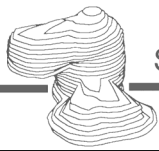
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

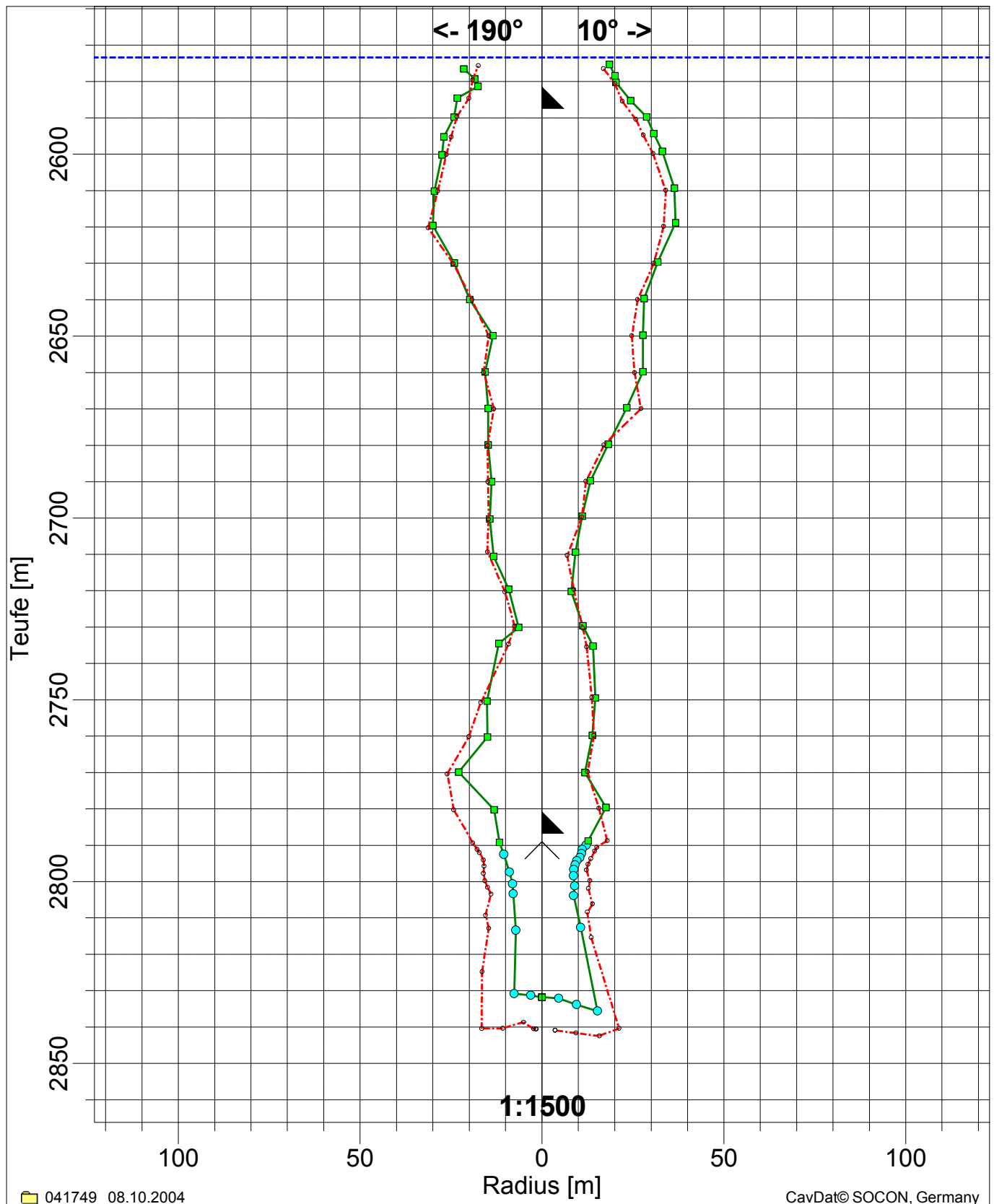
- - - (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

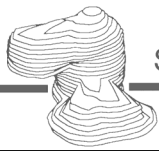
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

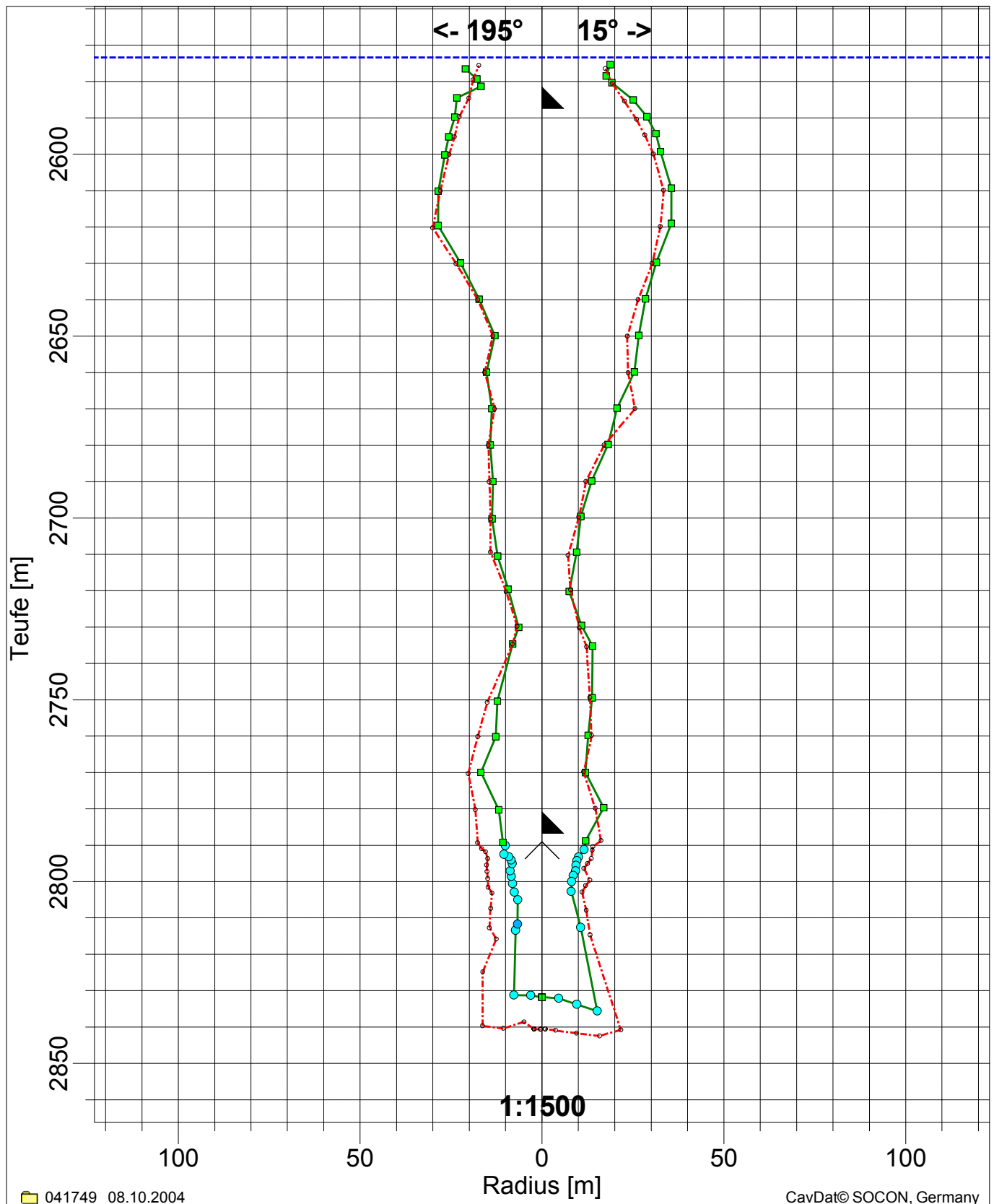
- - - (16.10.2003)

∨ ^ Kipp-Position



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133/8" : 2543.4 m

103/4" : 2587.4 m

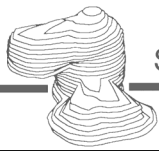
7" : 2786.7 m

--- Spiegel 2573.4 m

-■- (08.10.2004)

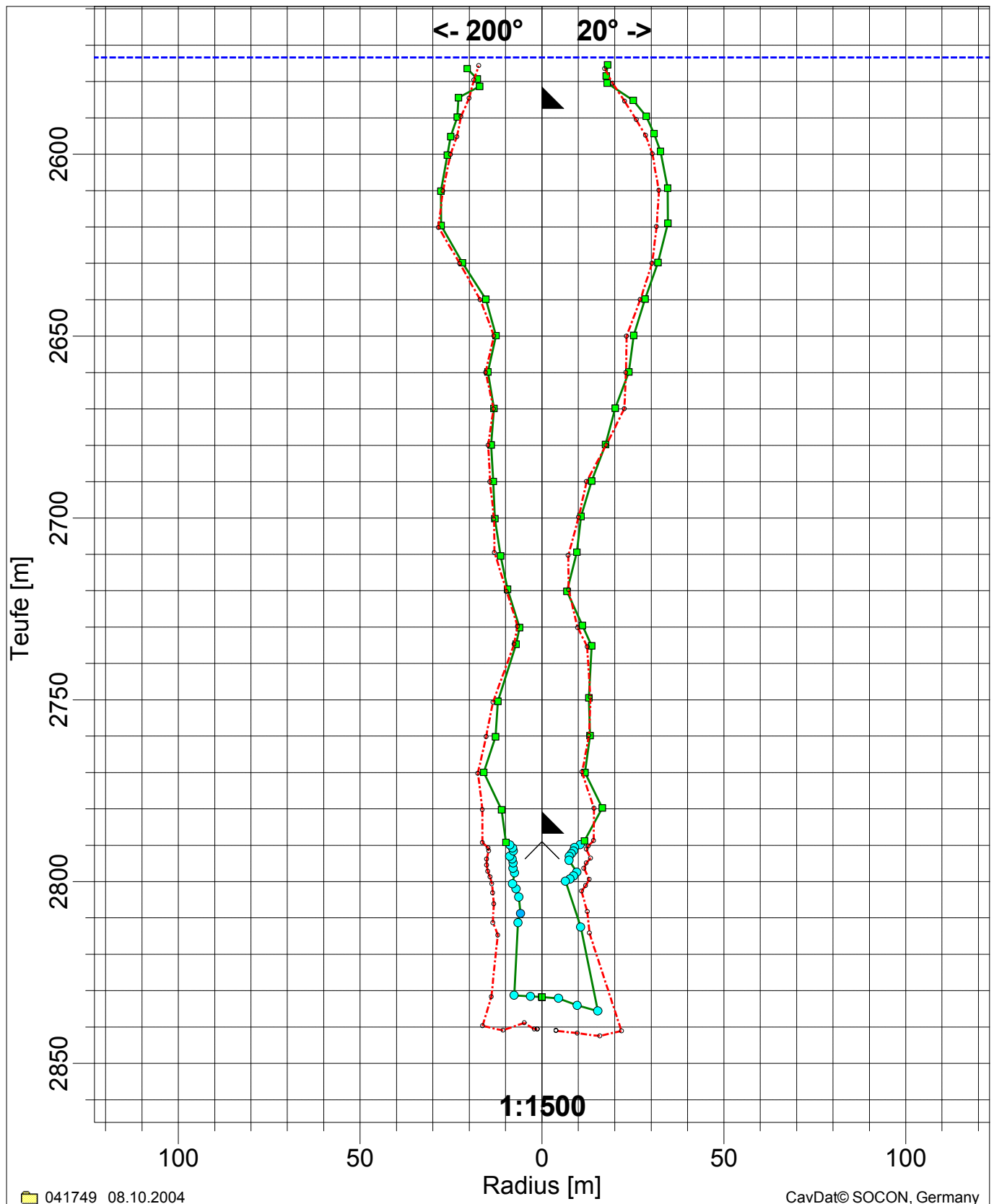
-○- (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

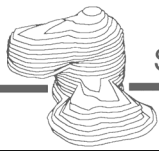
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

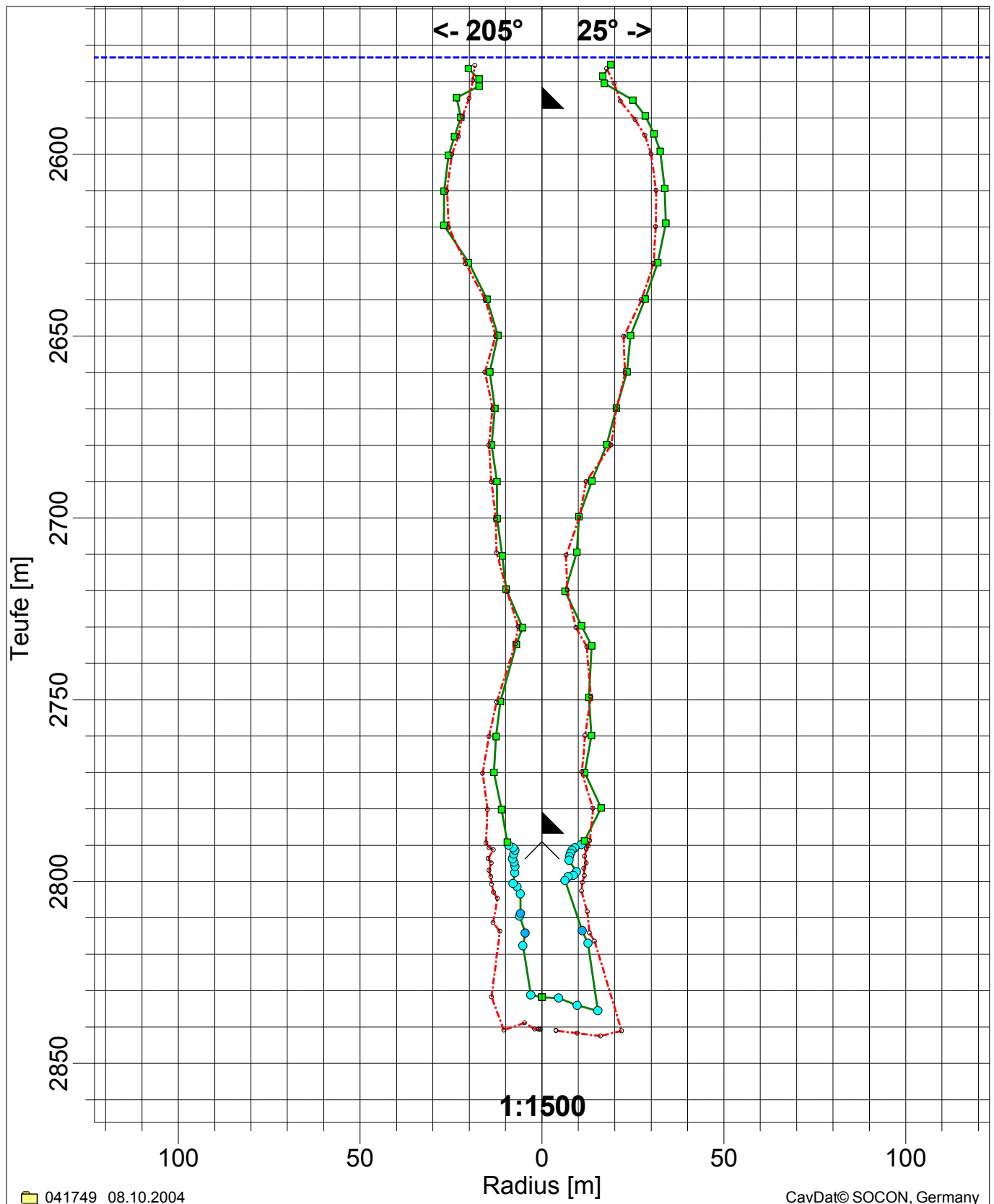
- - - (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

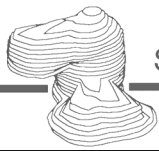
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

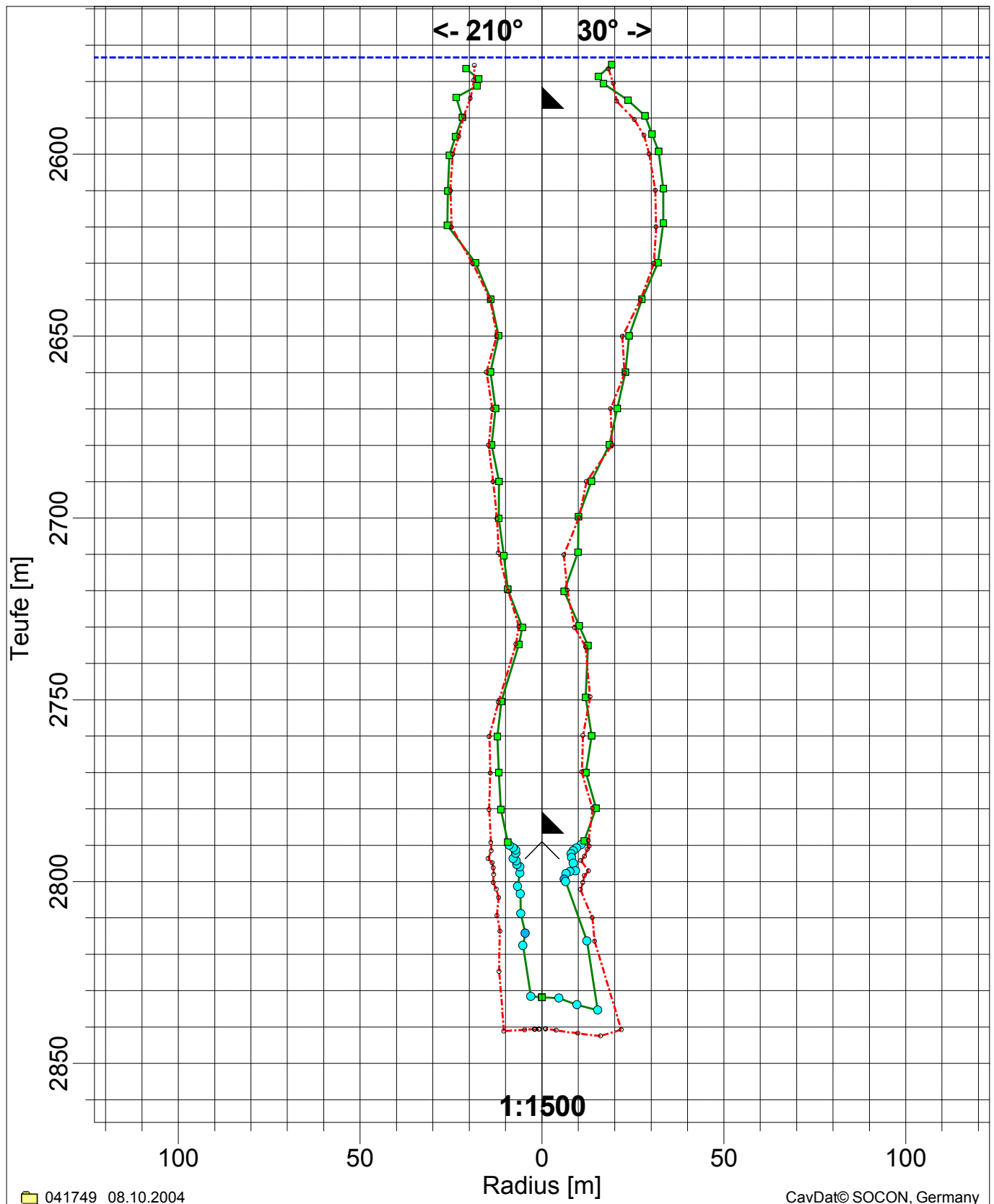
- - - (16.10.2003)

∨ ^ Kipp-Position



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133/8" : 2543.4 m

103/4" : 2587.4 m

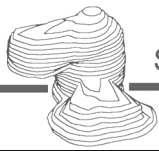
7" : 2786.7 m

--- Spiegel 2573.4 m

- - - (08.10.2004)

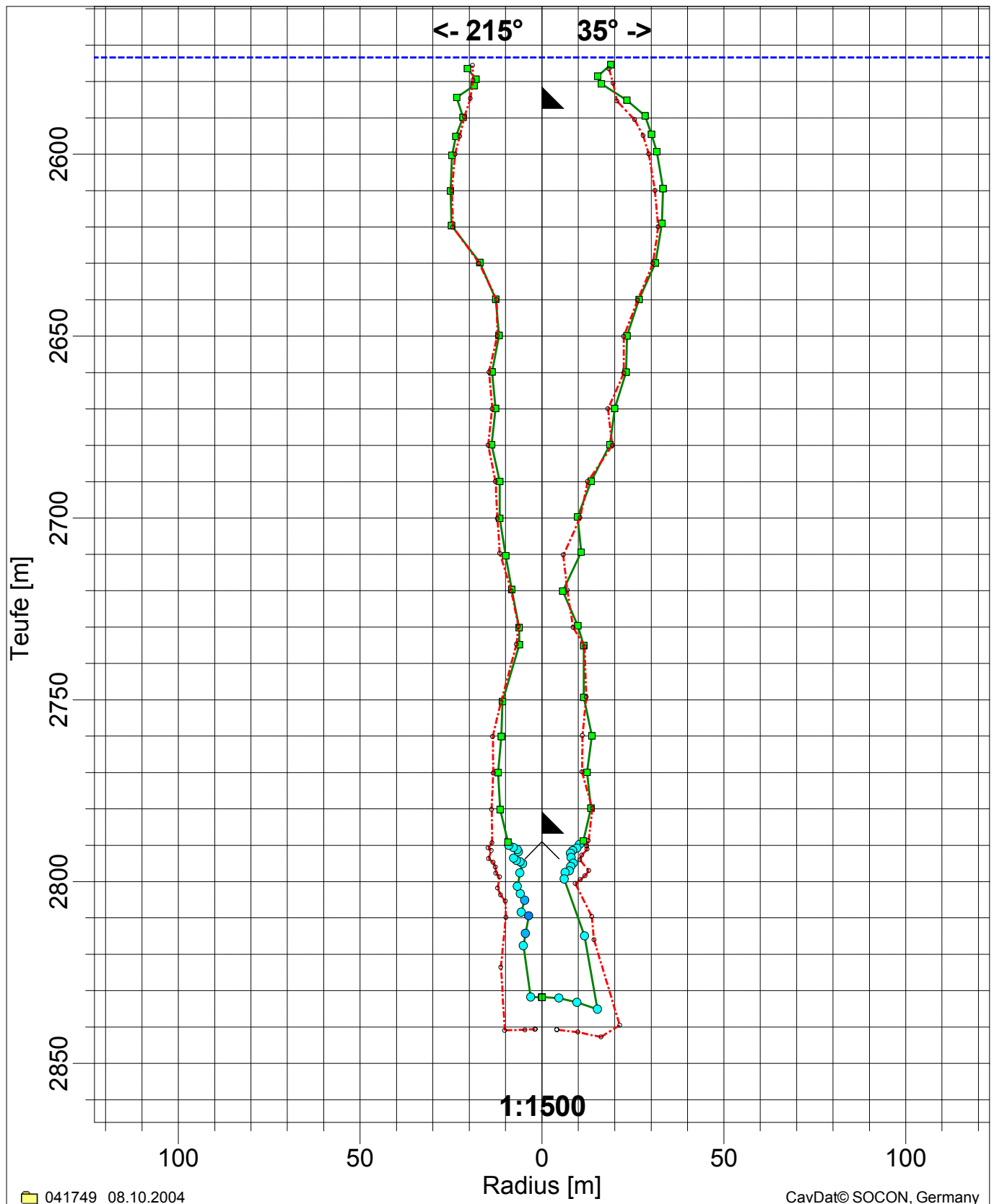
- - - (16.10.2003)

v ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

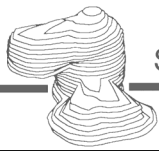
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

-■- (08.10.2004)

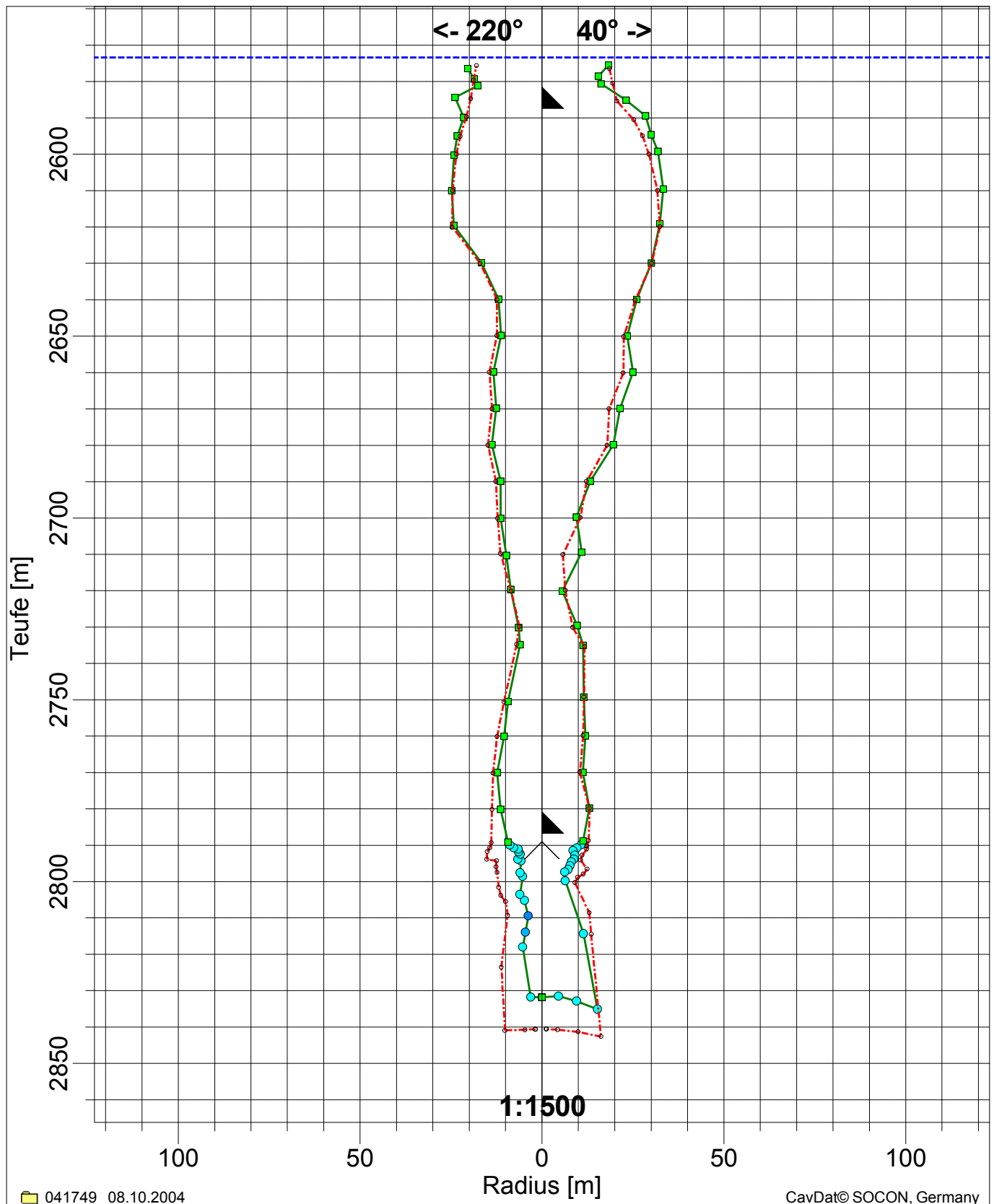
-.-.- (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

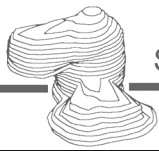
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

-■- (08.10.2004)

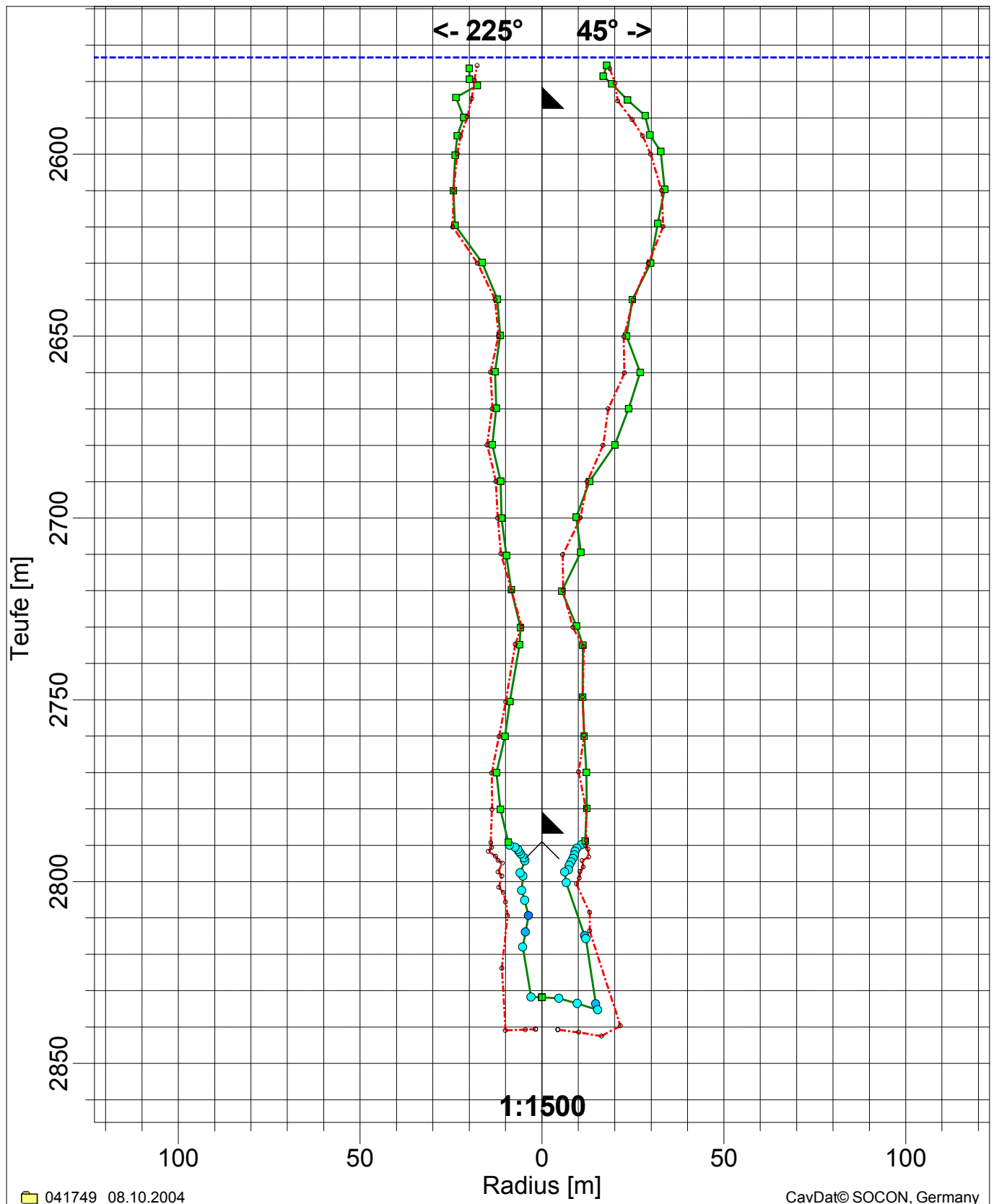
-.-.- (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

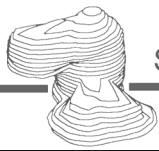
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

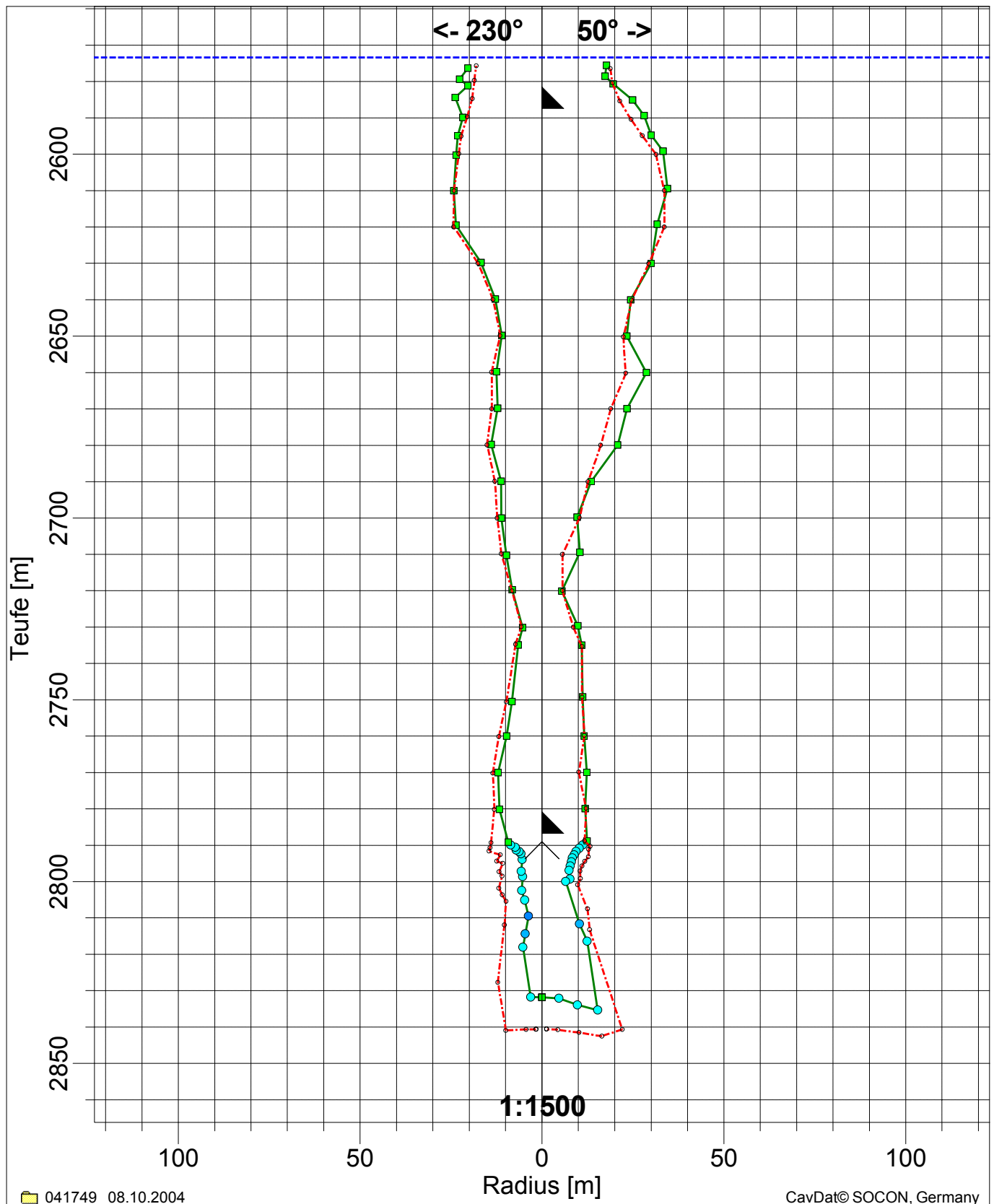
- - - (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

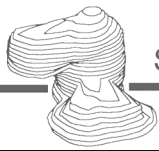
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

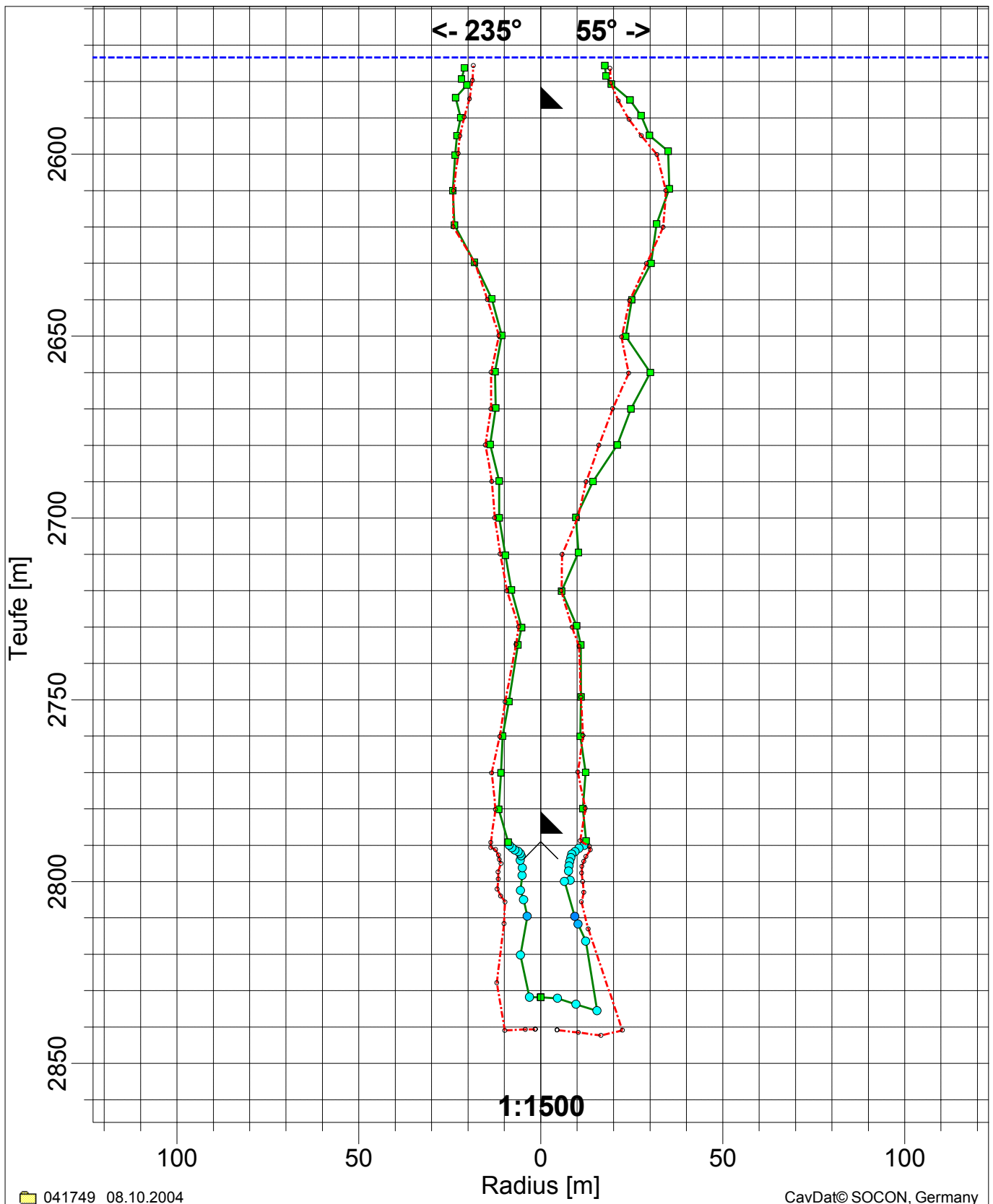
- - - (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

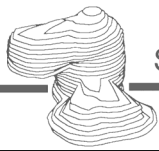
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

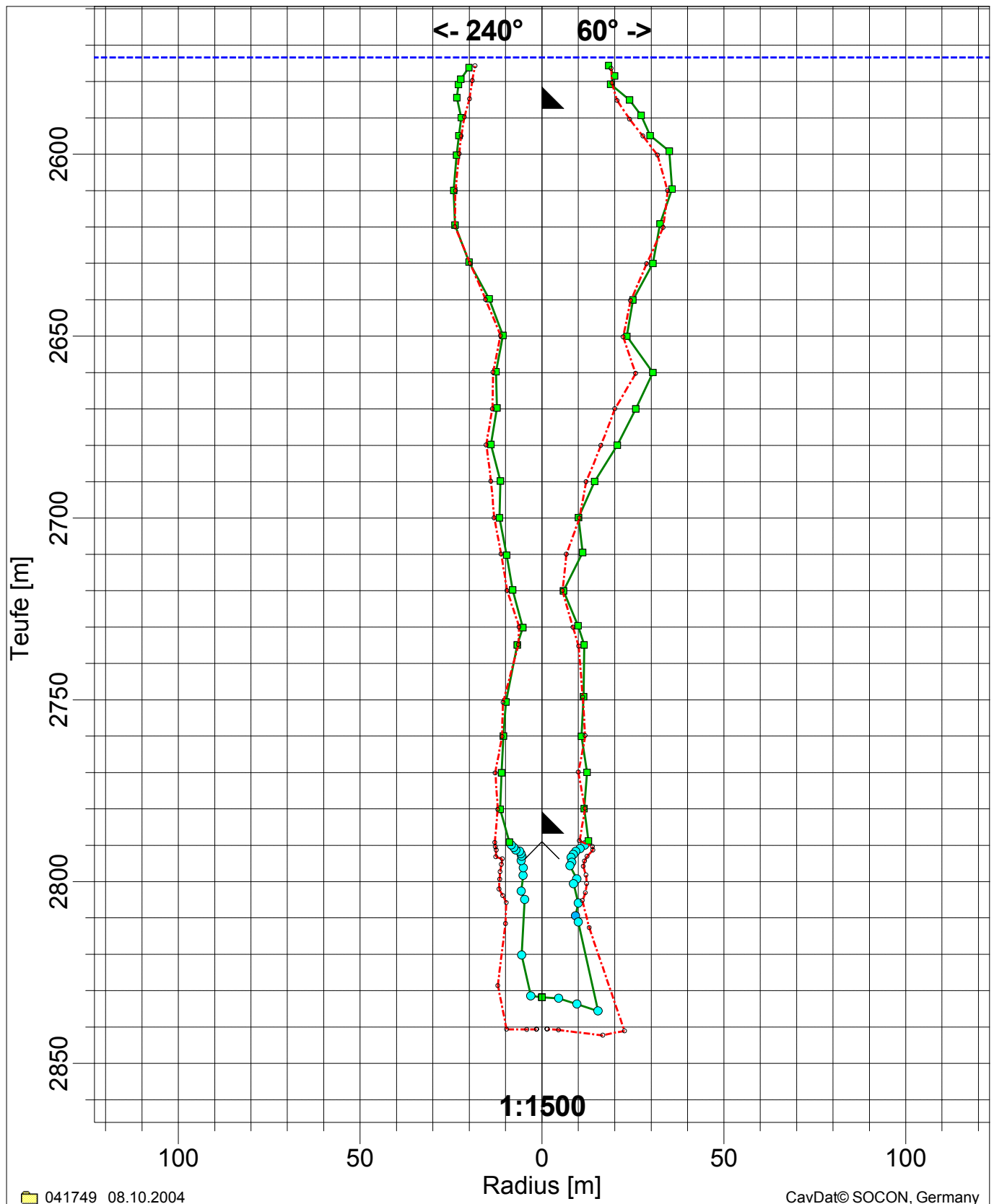
- - - (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

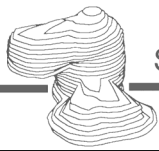
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

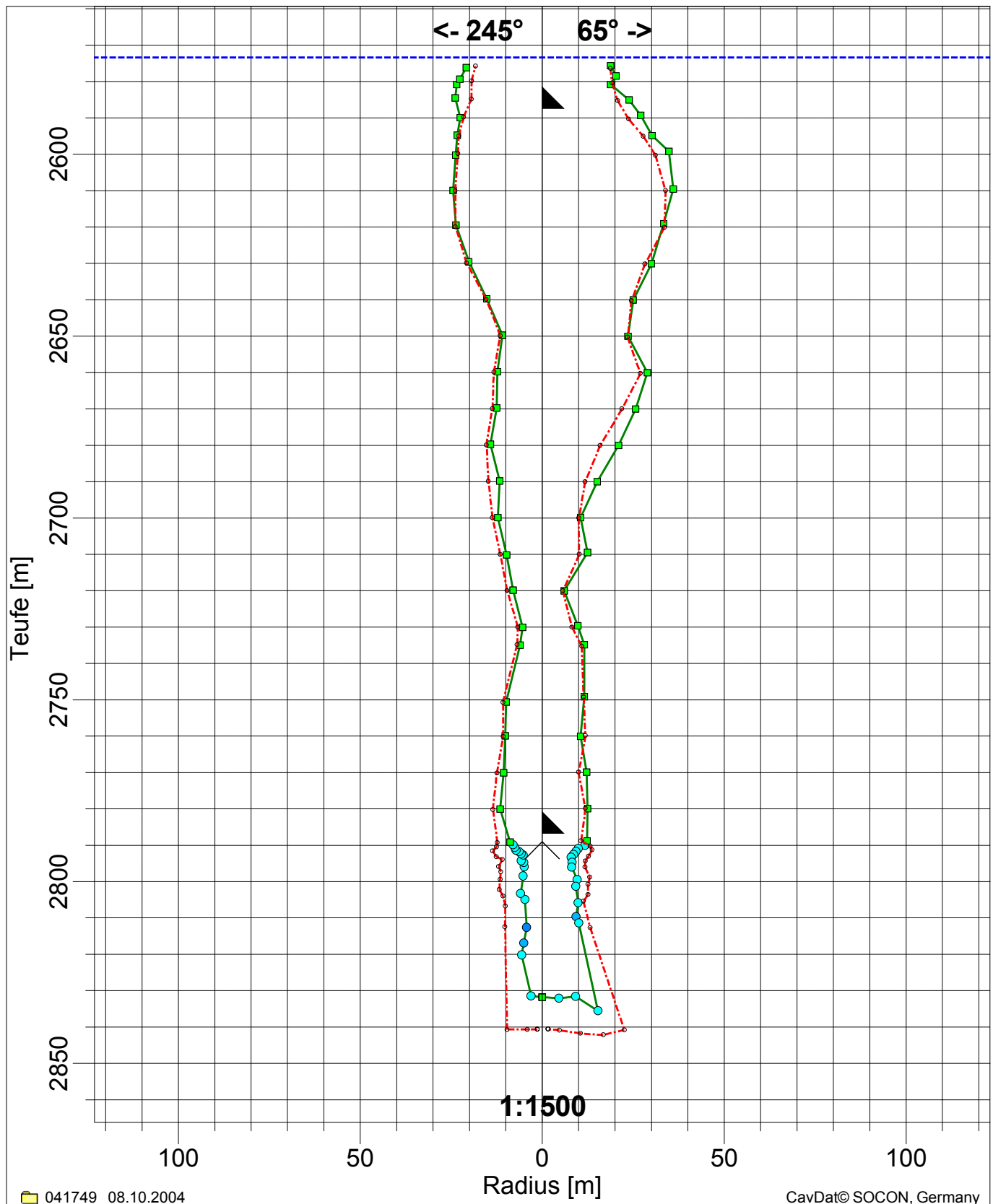
- - - (16.10.2003)

∨ ^ Kipp-Position



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133/8" : 2543.4 m

103/4" : 2587.4 m

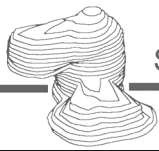
7" : 2786.7 m

--- Spiegel 2573.4 m

-■- (08.10.2004)

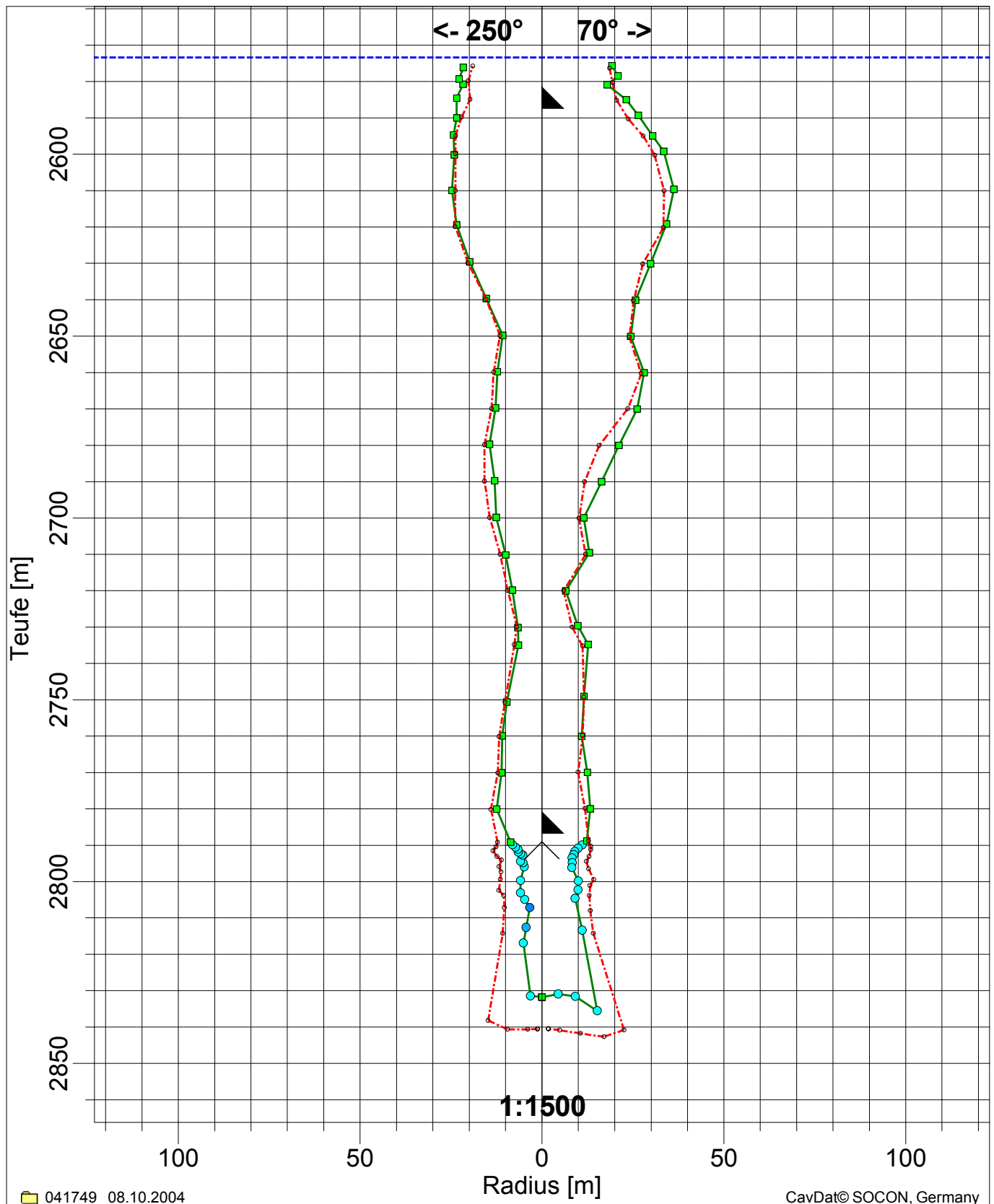
-○- (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

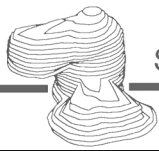
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

-■- (08.10.2004)

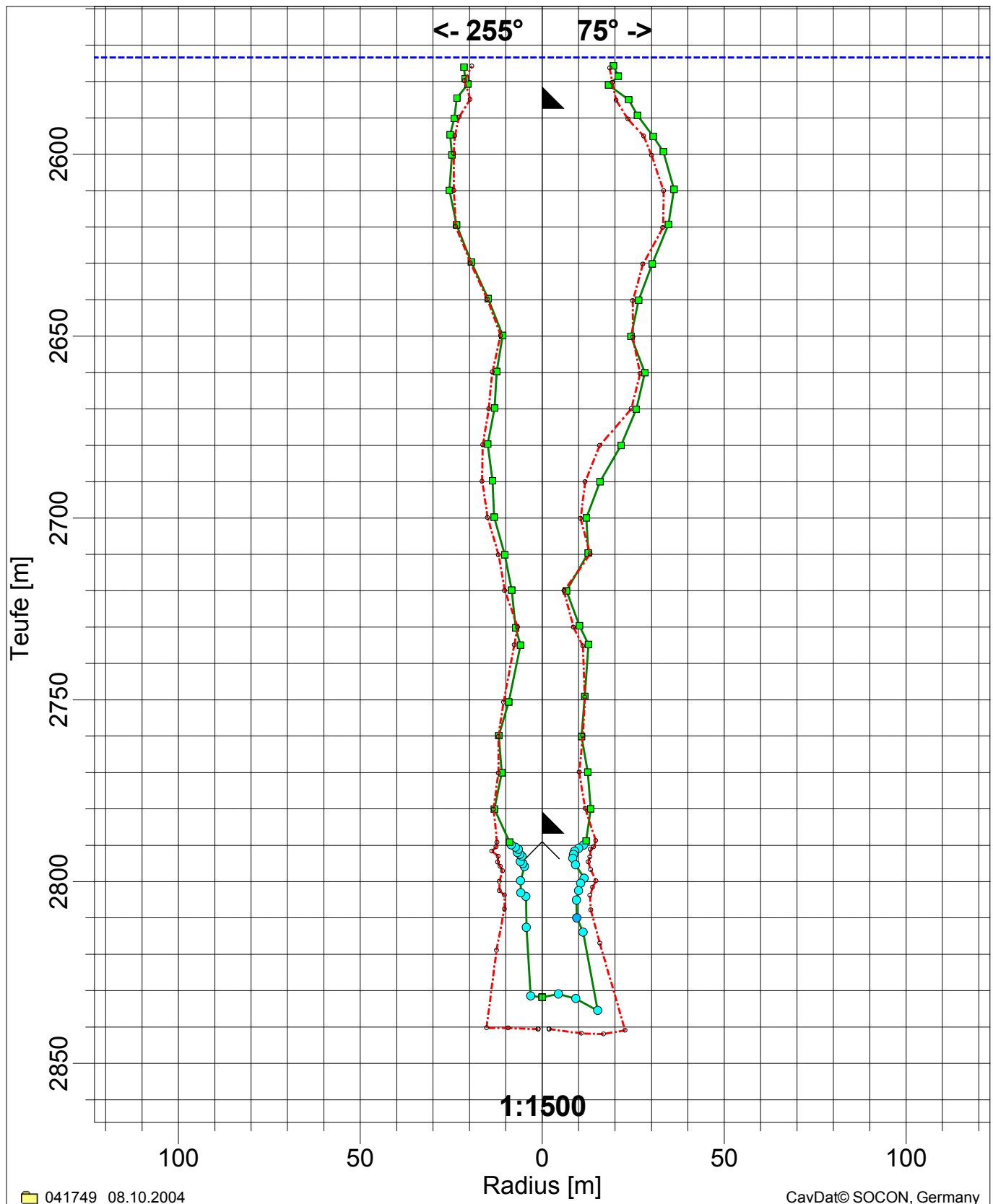
-.-.- (16.10.2003)

∨ ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

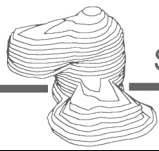
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

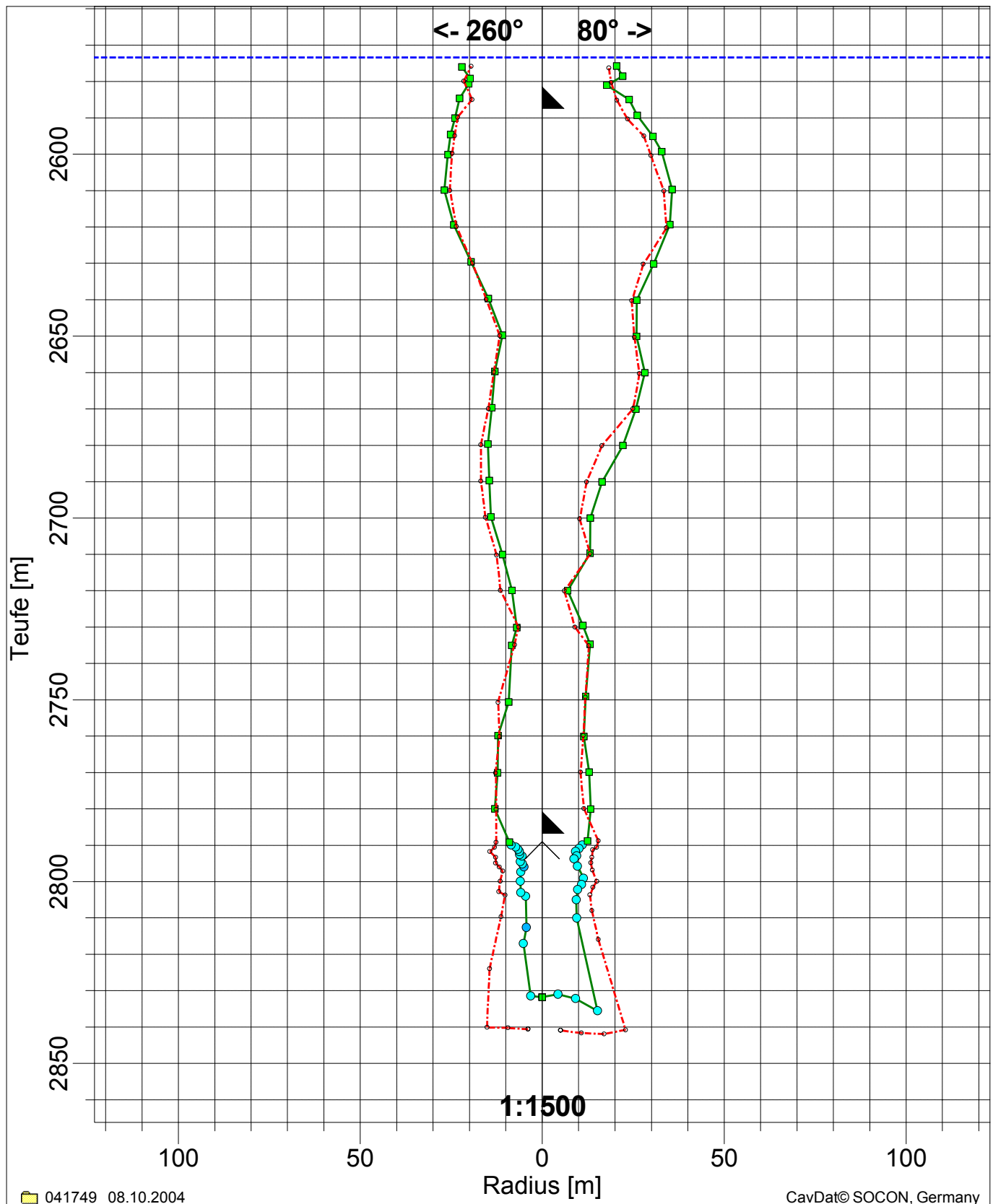
- - - (16.10.2003)

∨ ^ Kipp-Position



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133/8" : 2543.4 m

103/4" : 2587.4 m

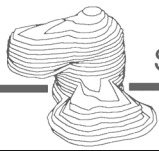
7" : 2786.7 m

--- Spiegel 2573.4 m

- - - (08.10.2004)

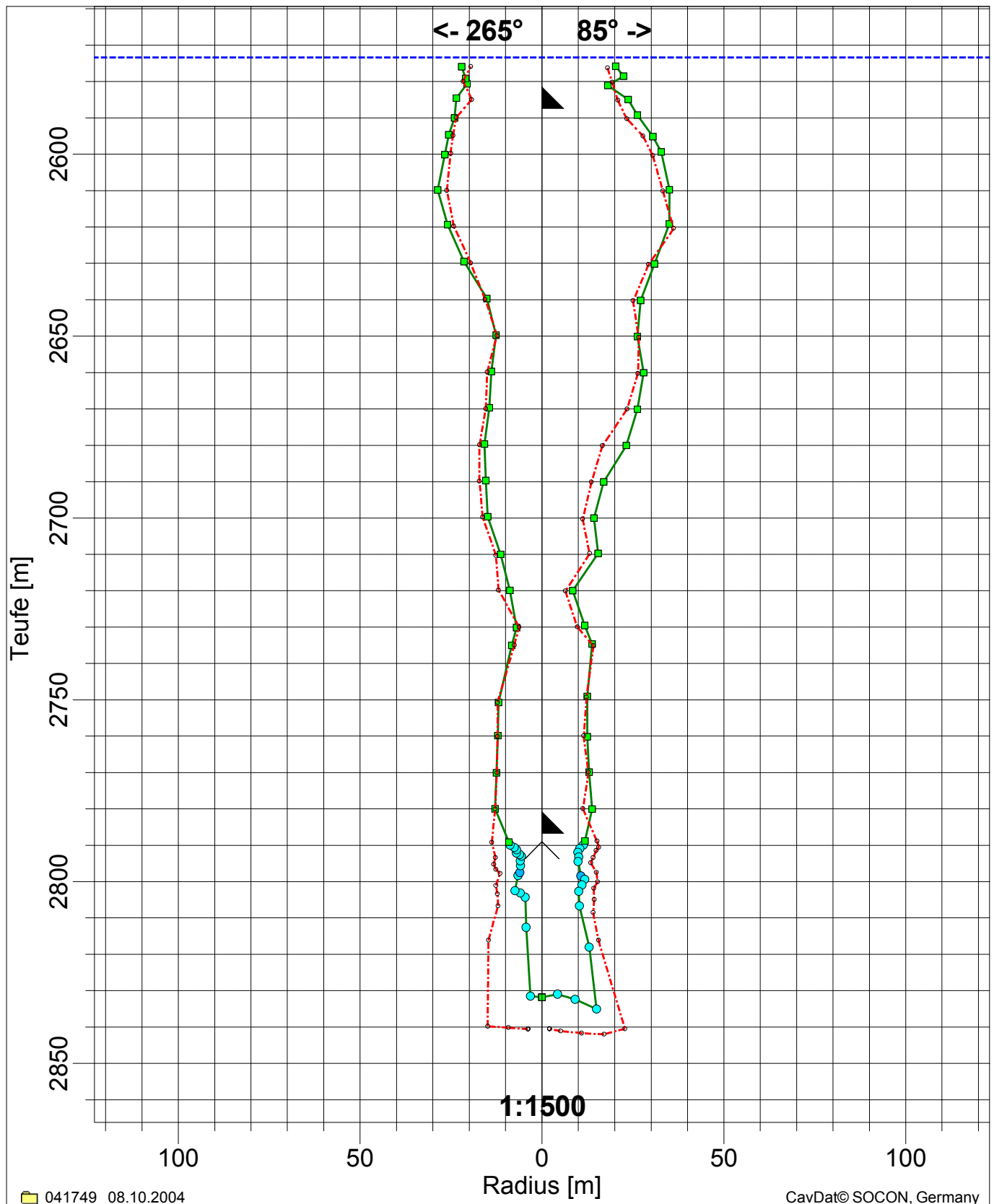
- - - (16.10.2003)

v ^ Kipp-Position



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▲ 133/8" : 2543.4 m

▲ 103/4" : 2587.4 m

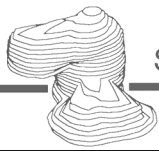
▲ 7" : 2786.7 m

--- Spiegel 2573.4 m

—■— (08.10.2004)

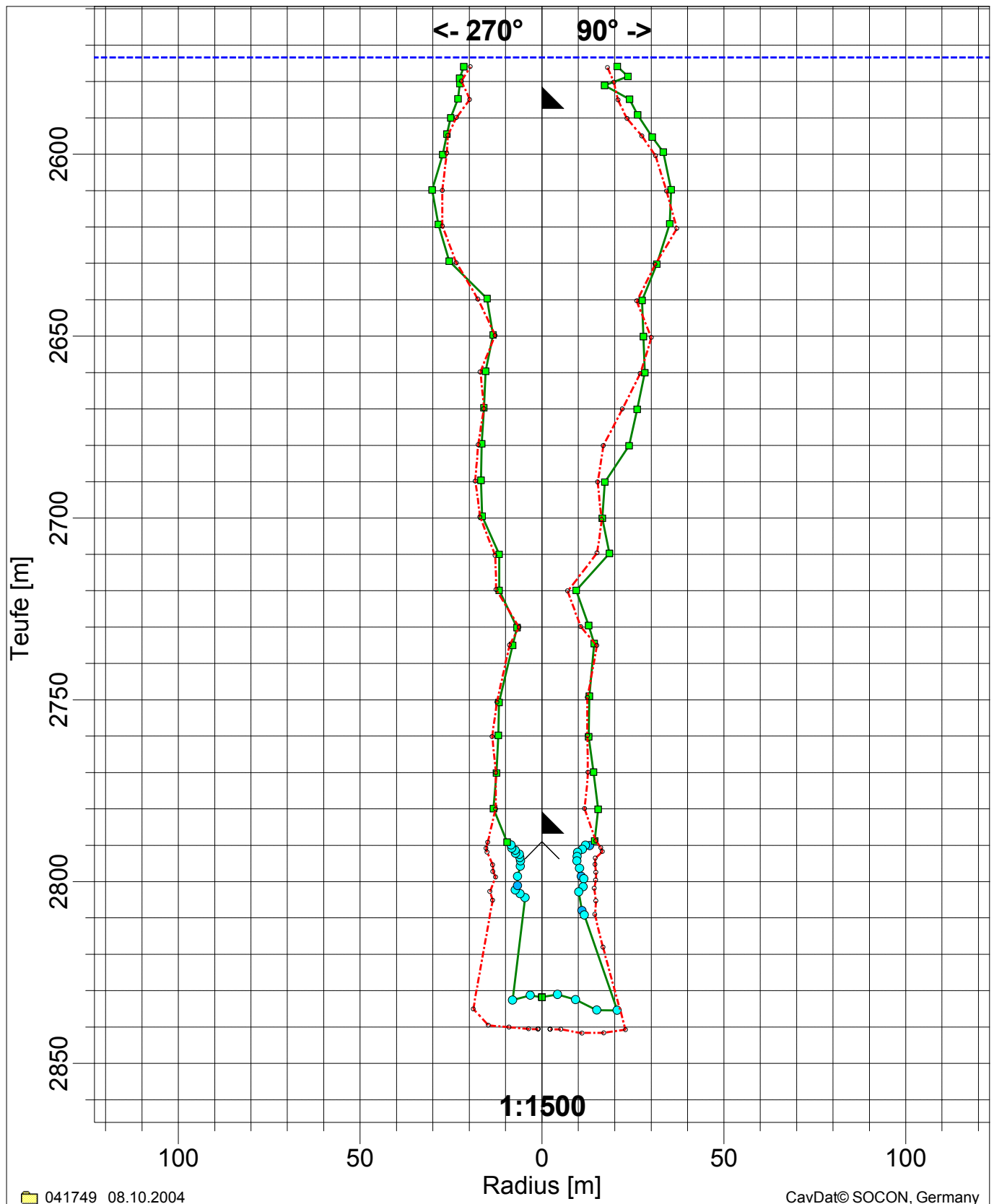
- - - (16.10.2003)

∨ ^ Kipp-Position



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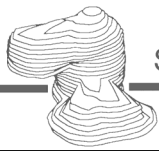
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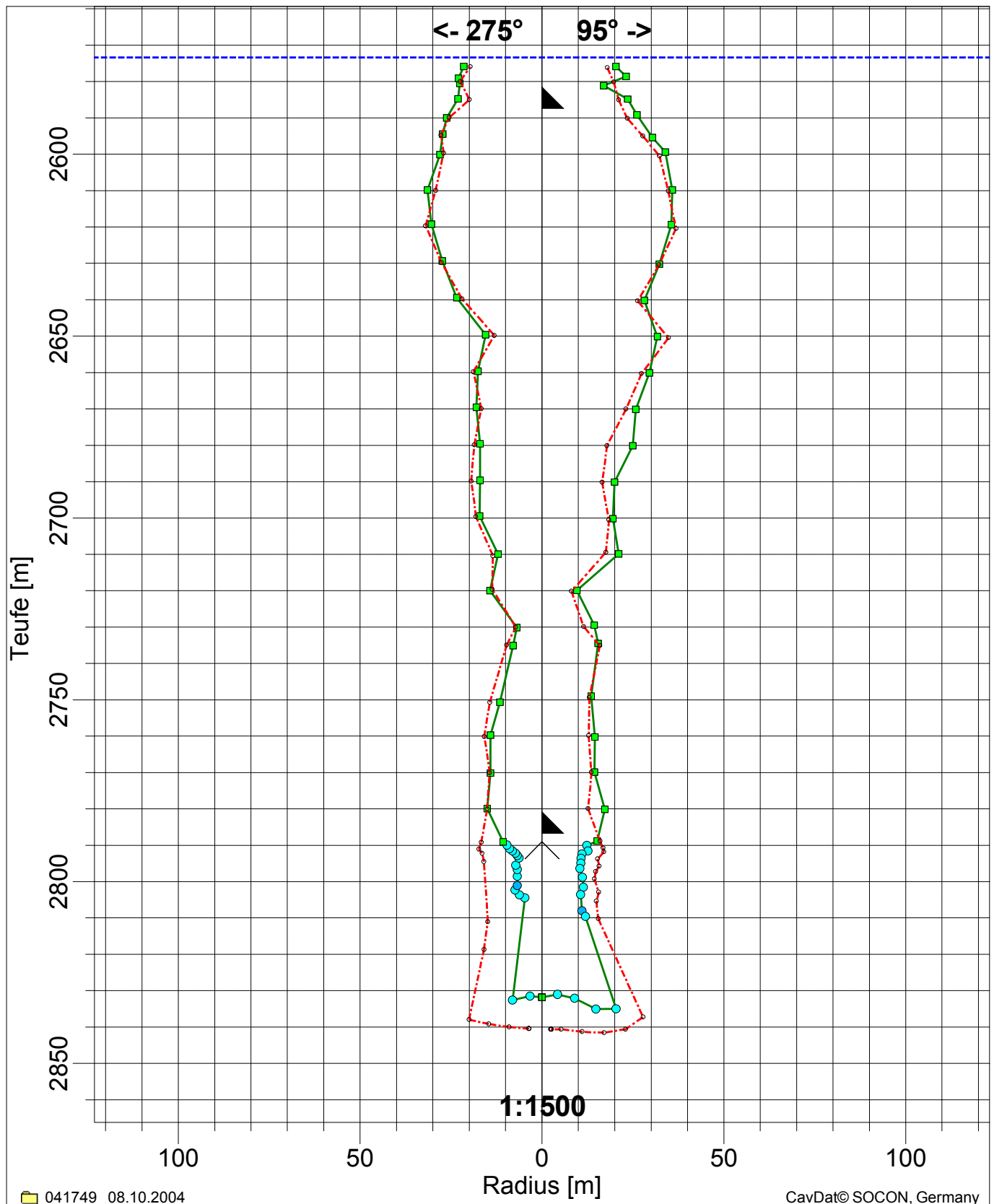
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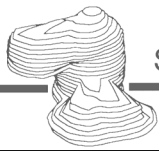
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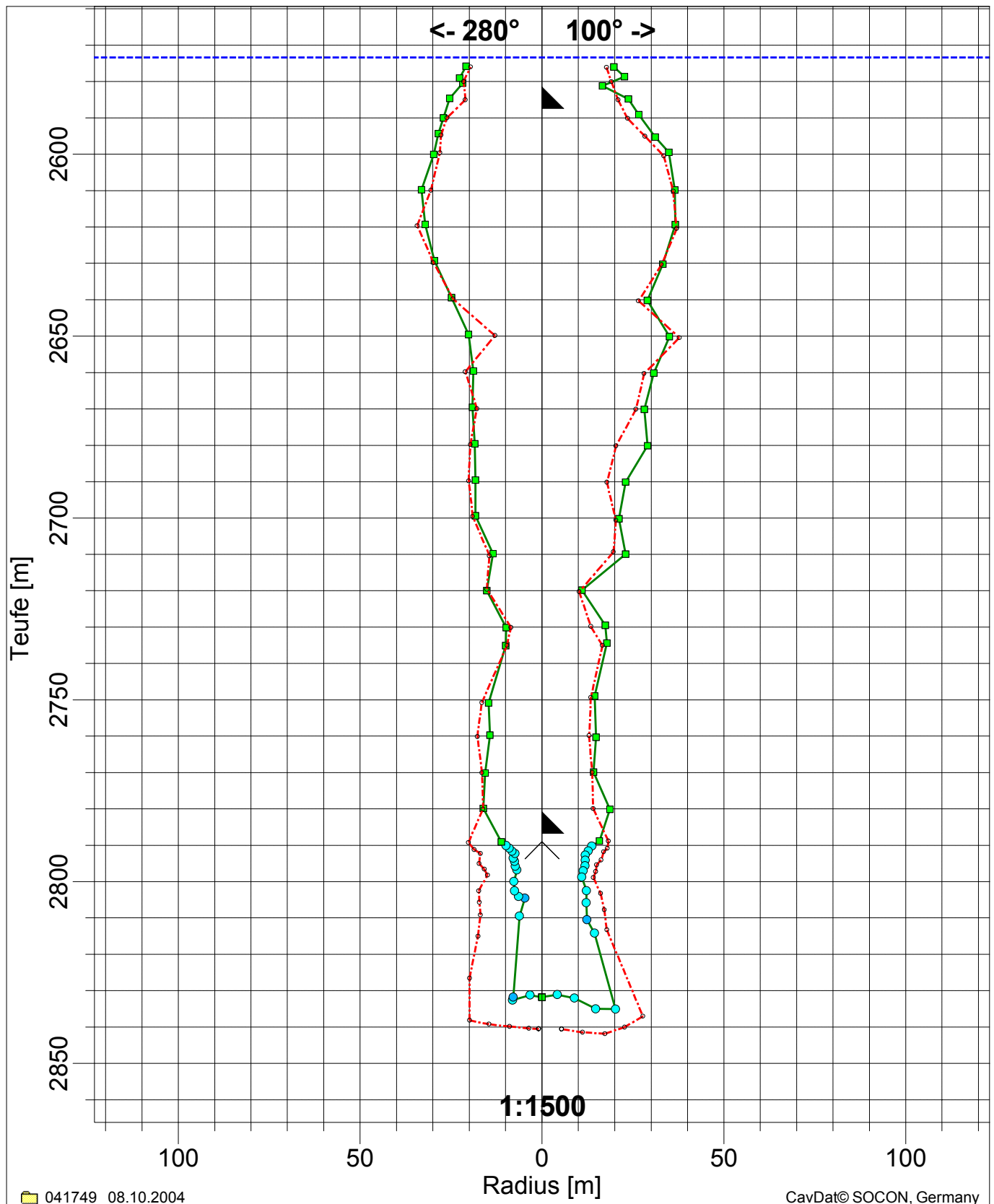
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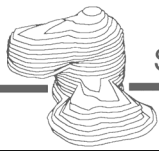
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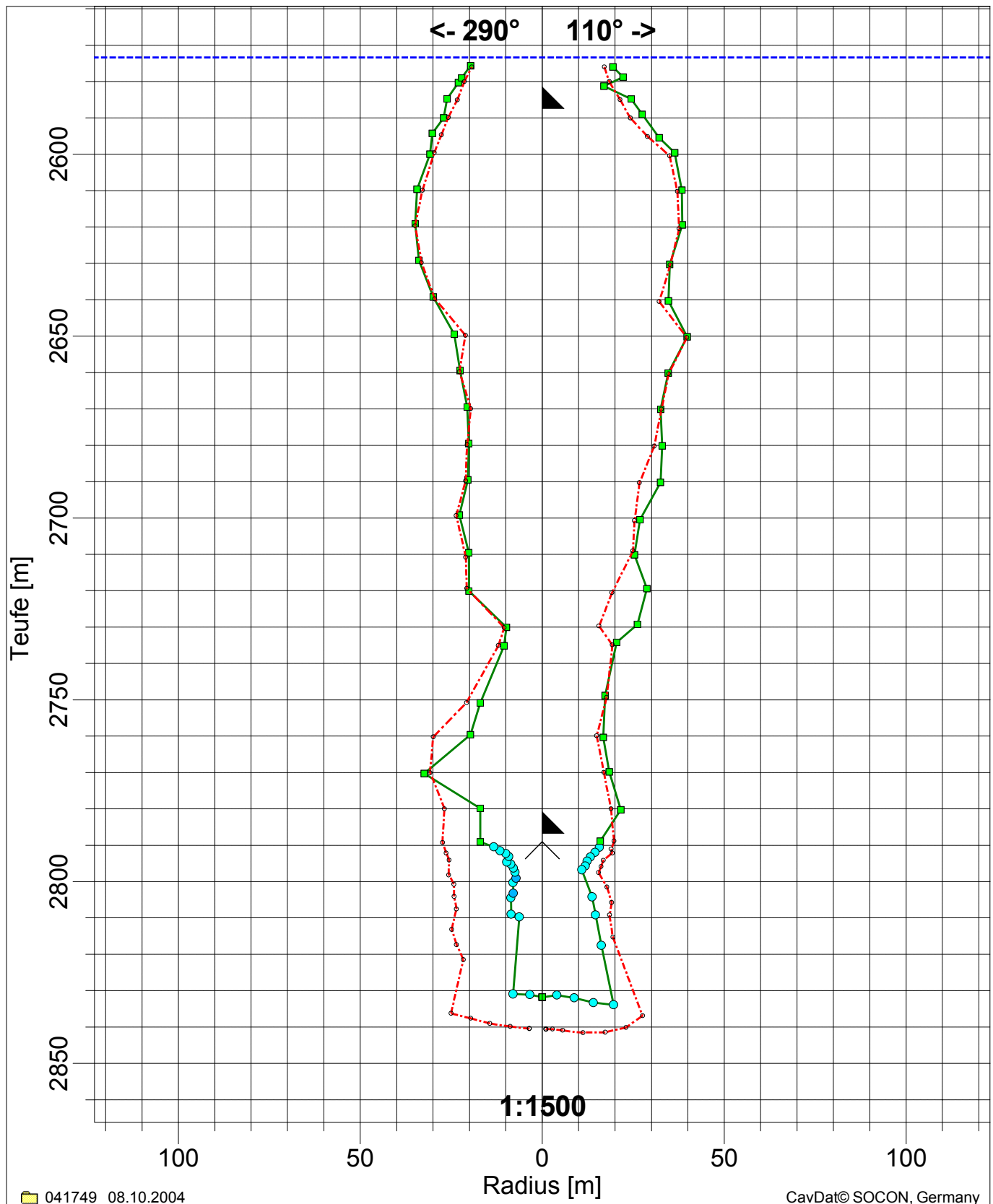
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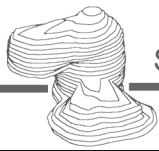
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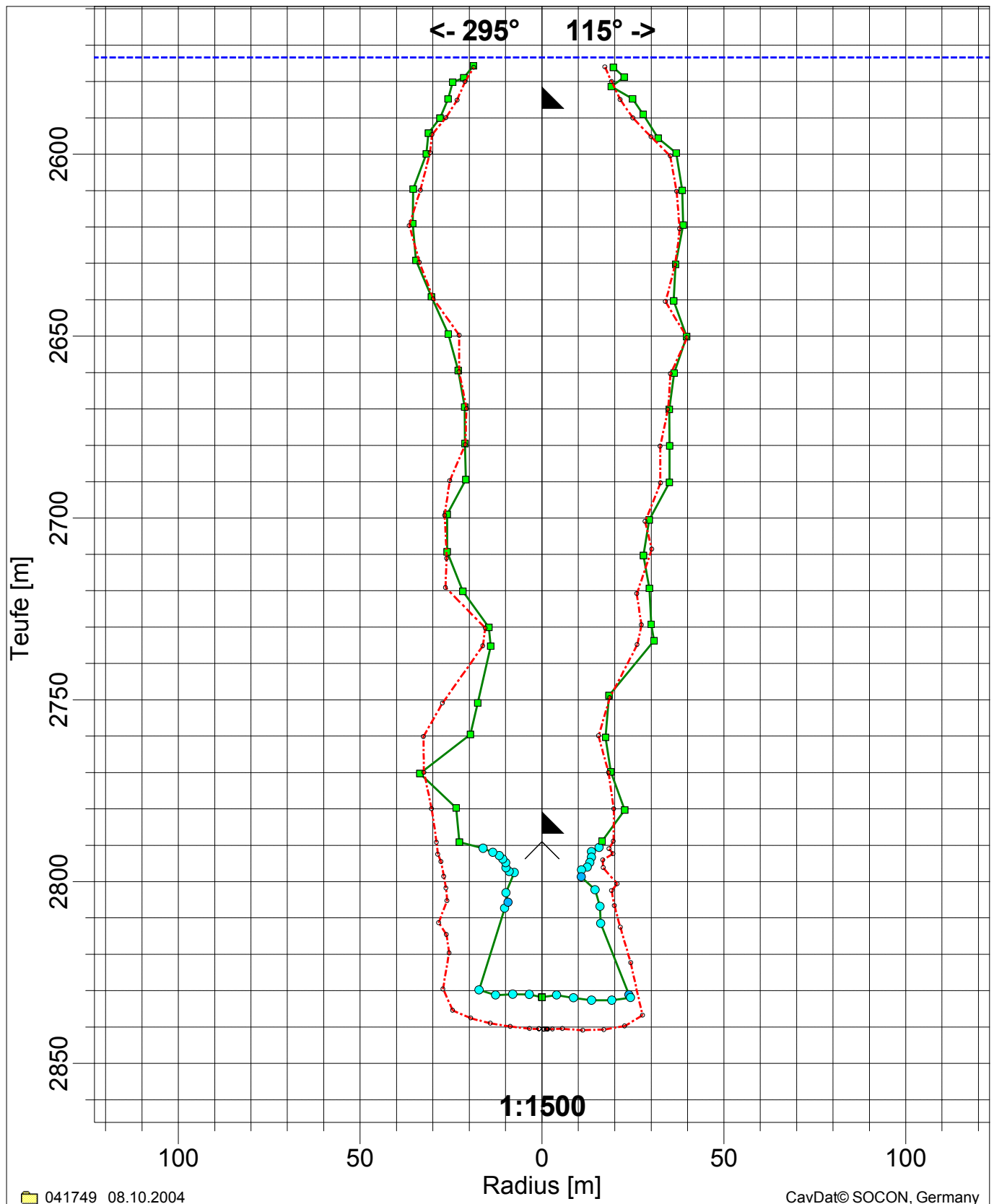
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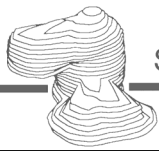
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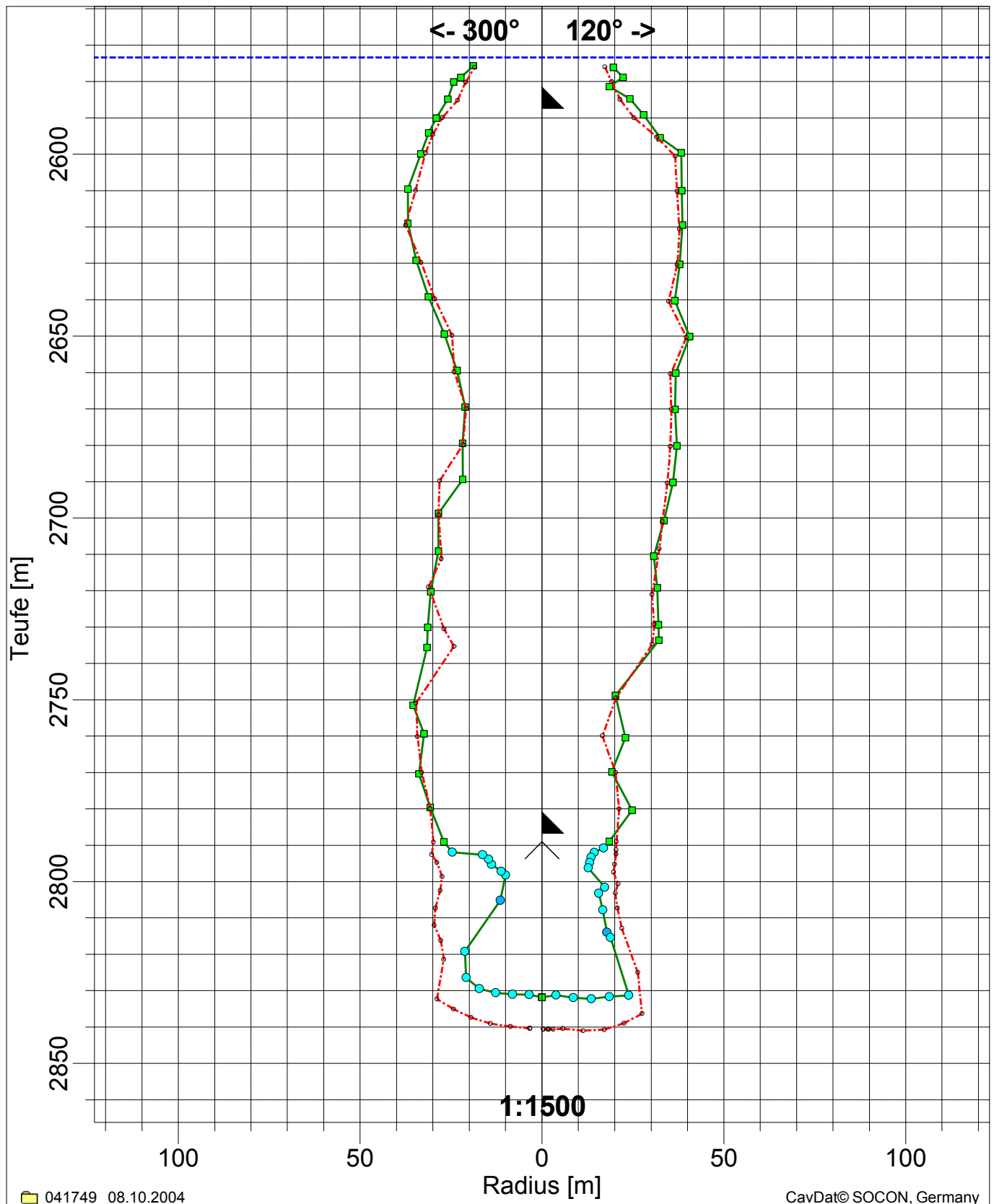
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v ^ Kipp-Position



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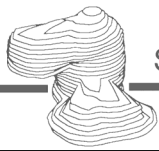
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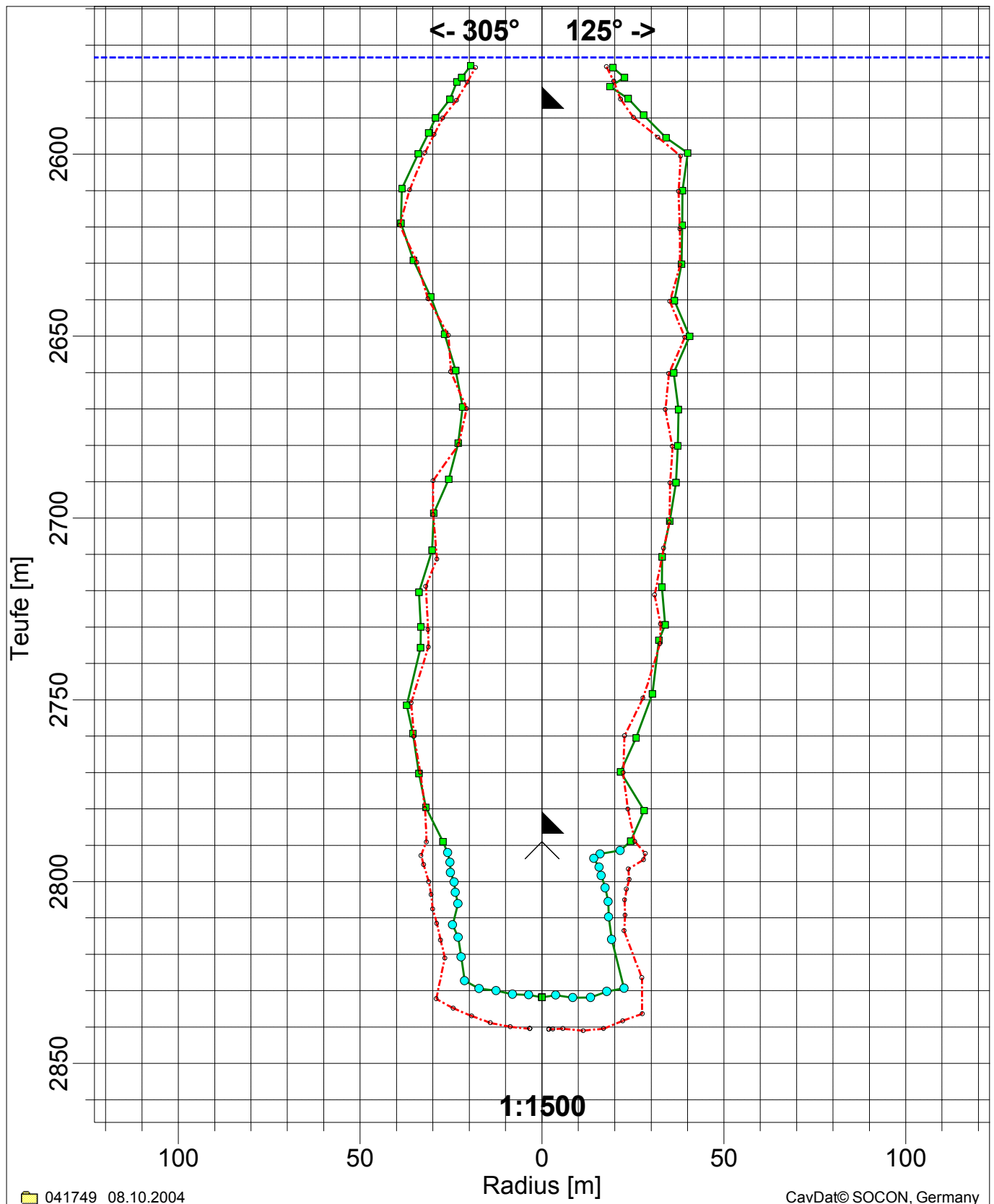
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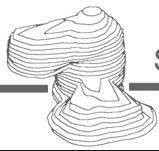
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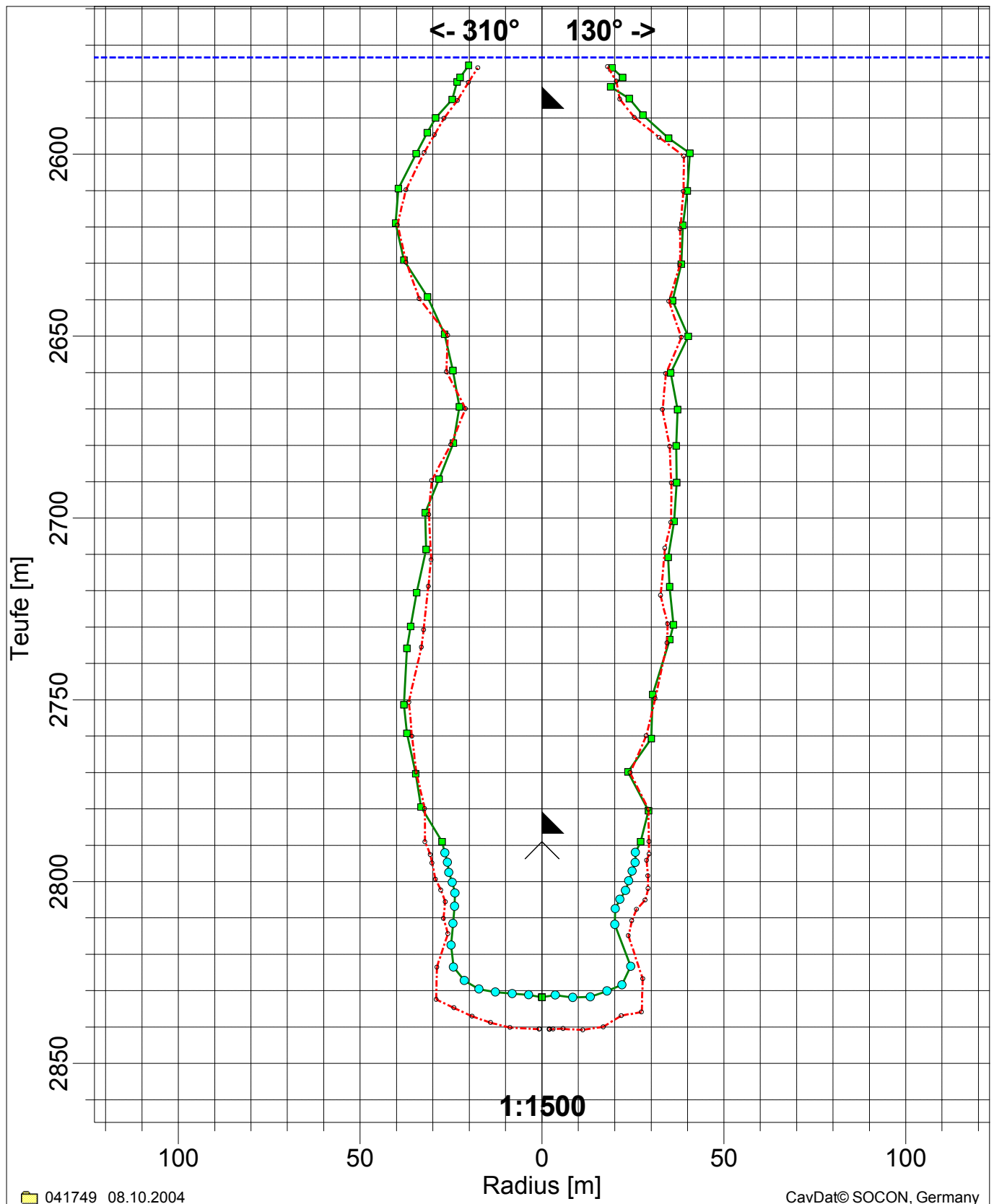
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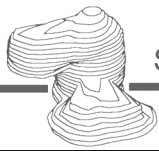
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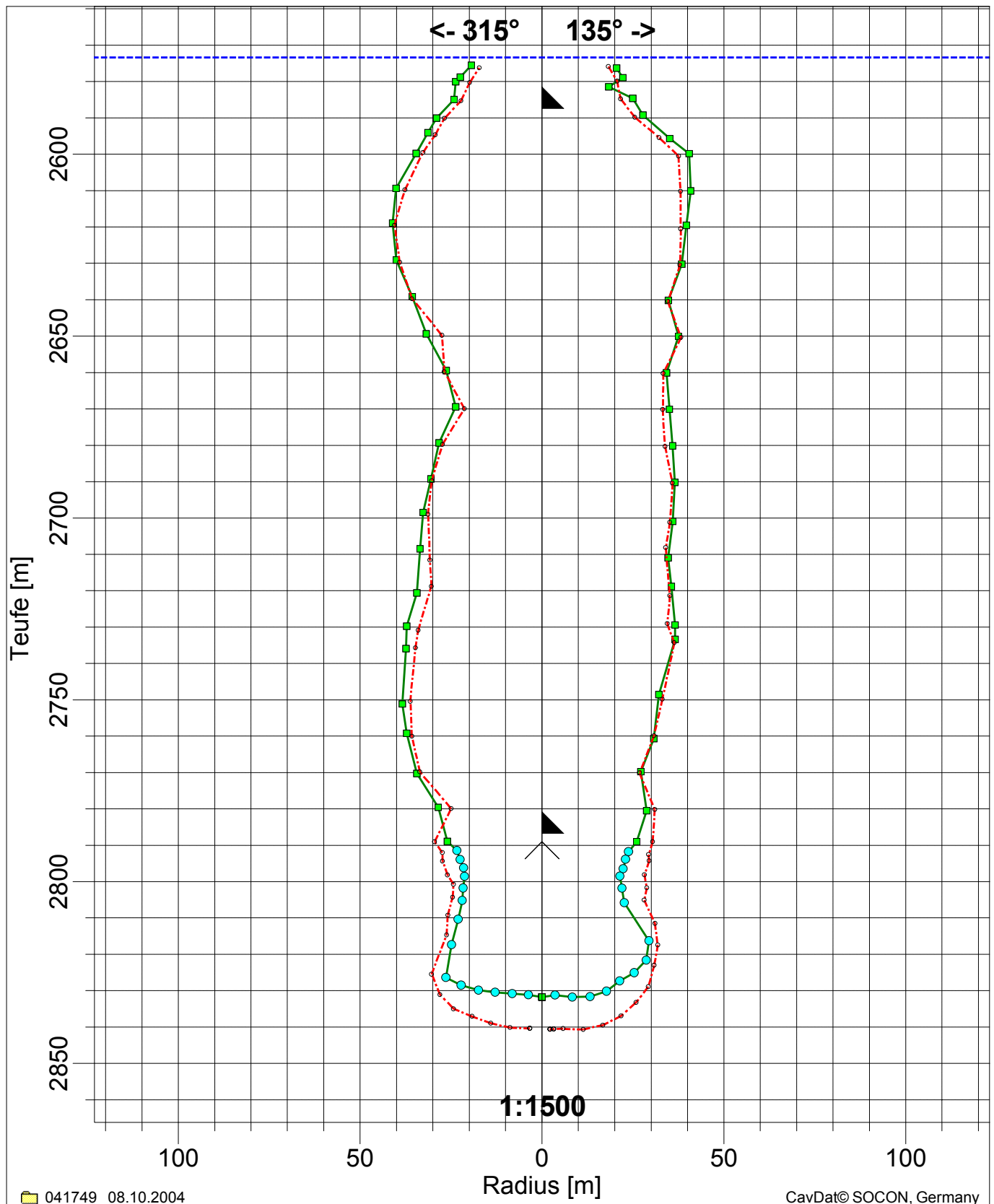
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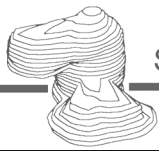
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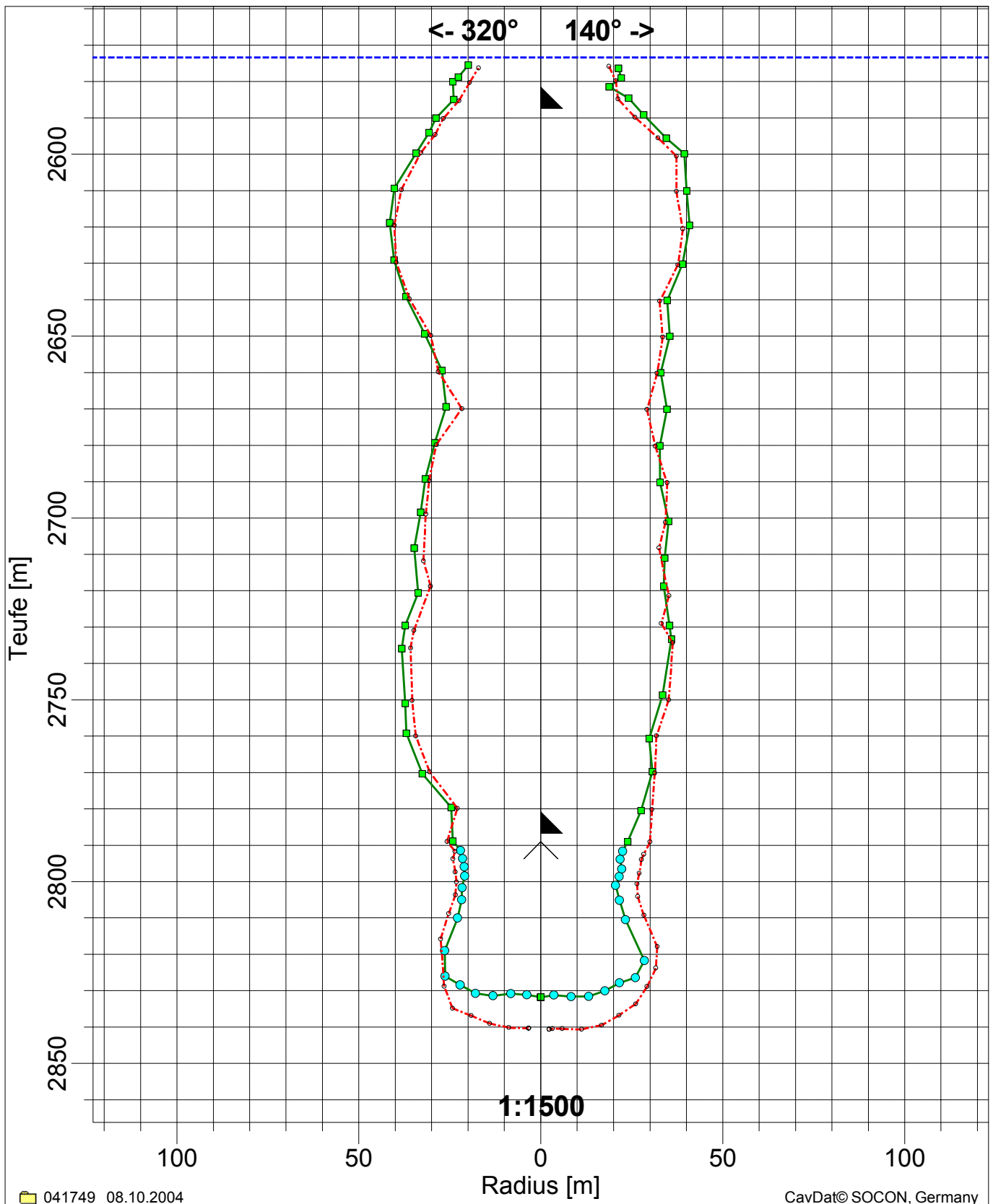
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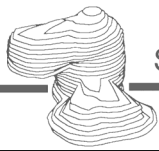
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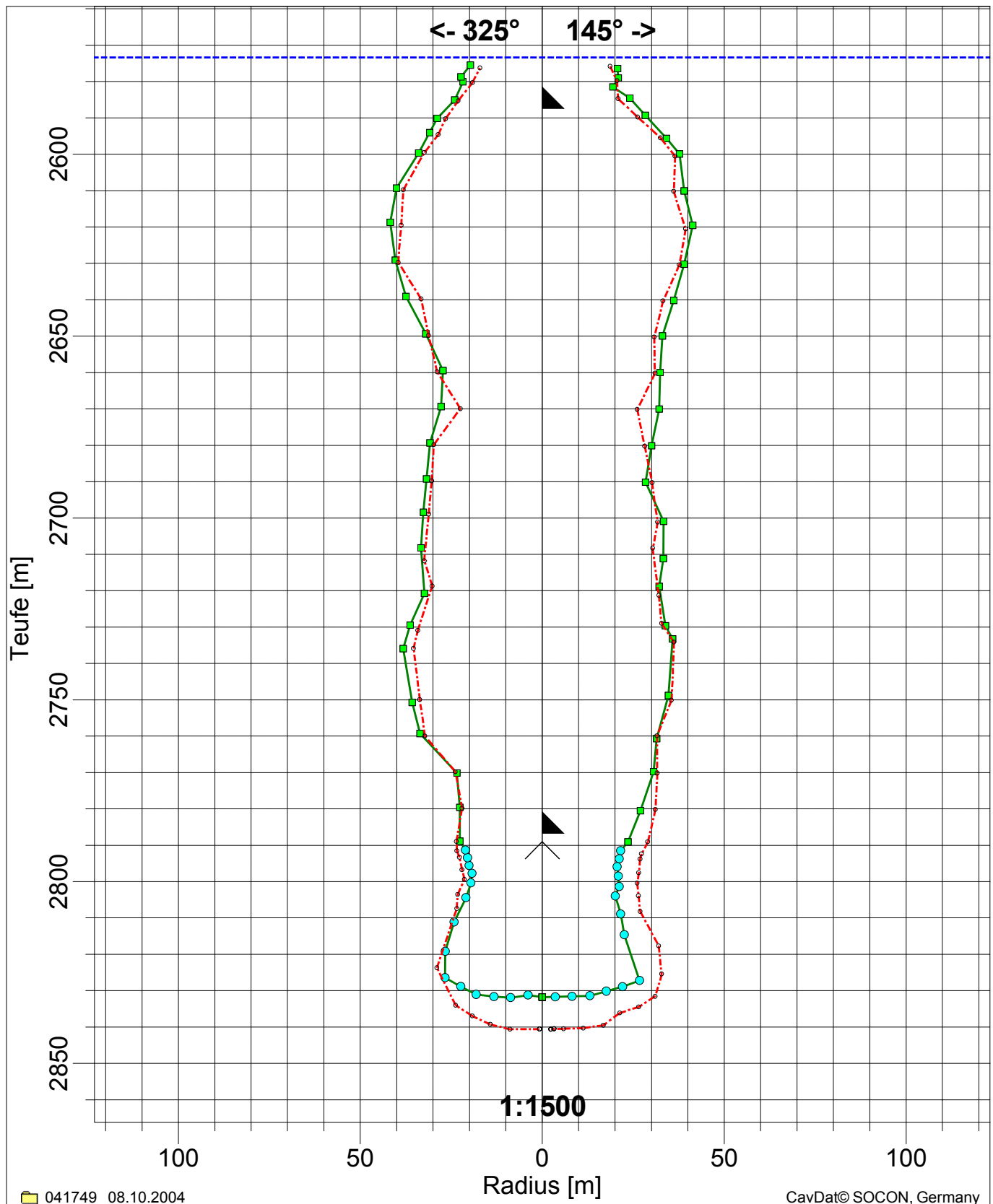
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v ^ Kipp-Position



HARLINGEN BAS #1

08.10.2004



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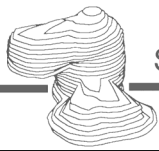
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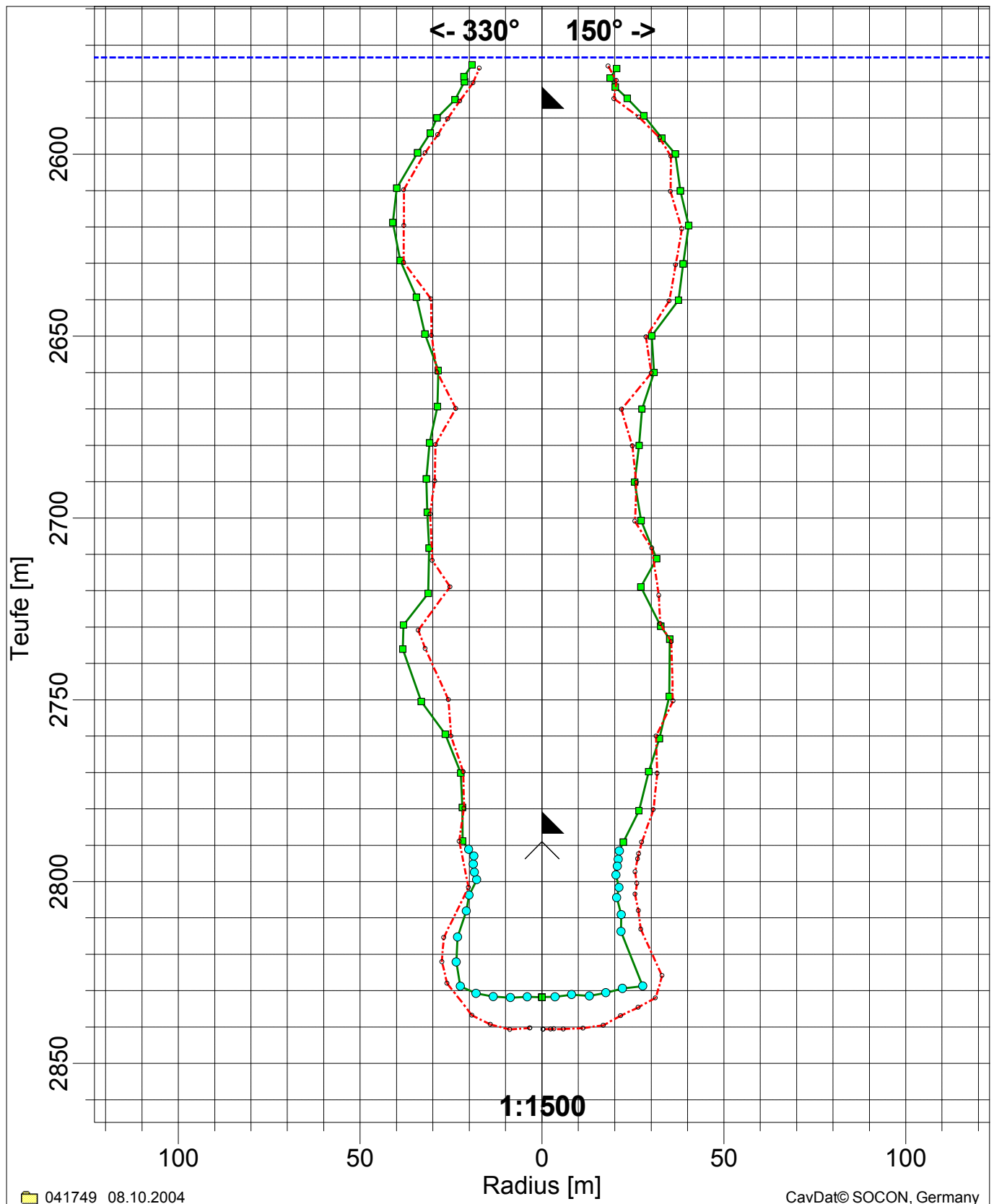
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v ^ Kipp-Position



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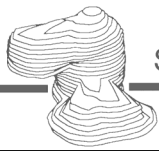
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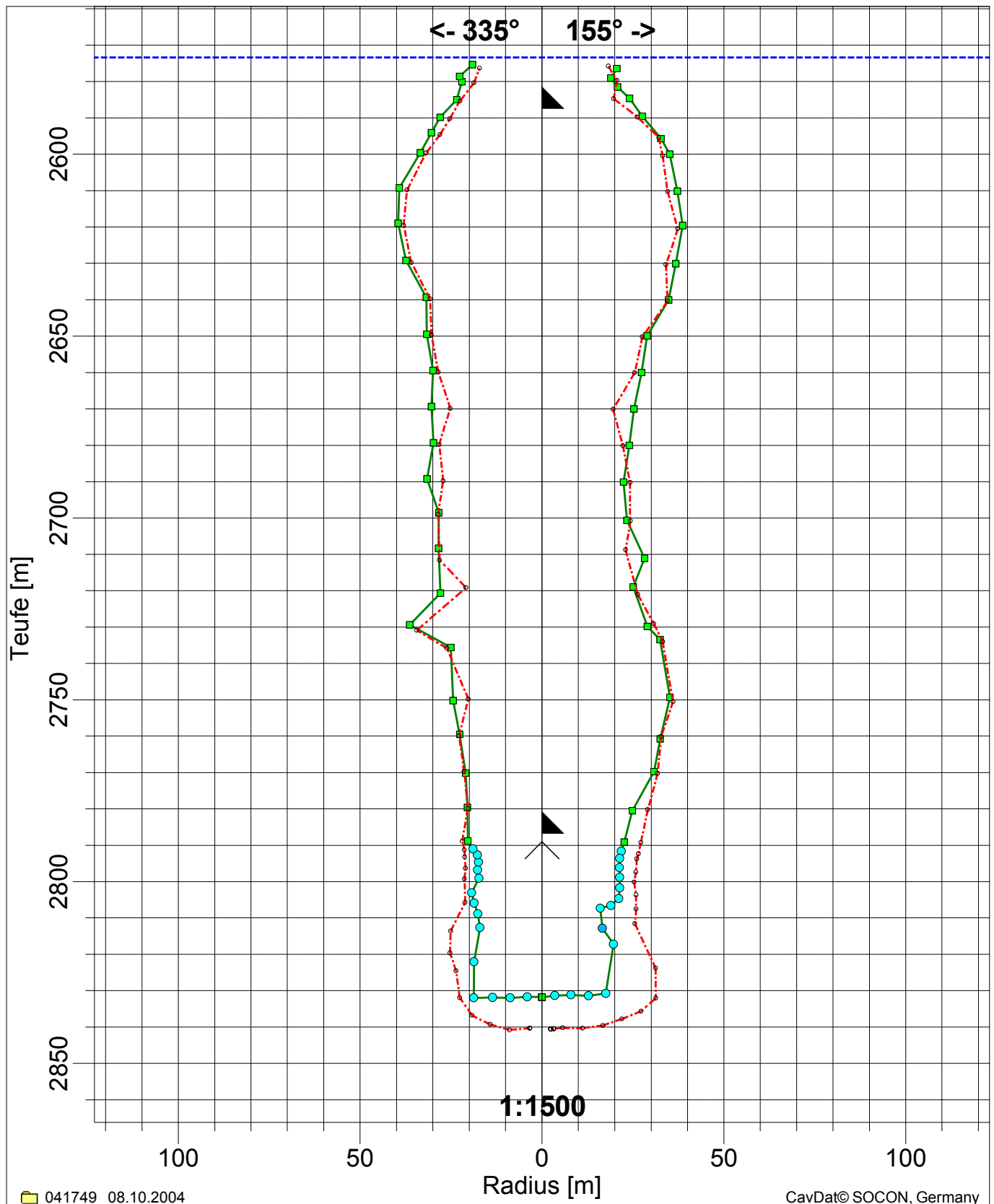
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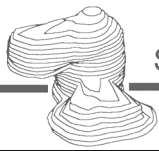
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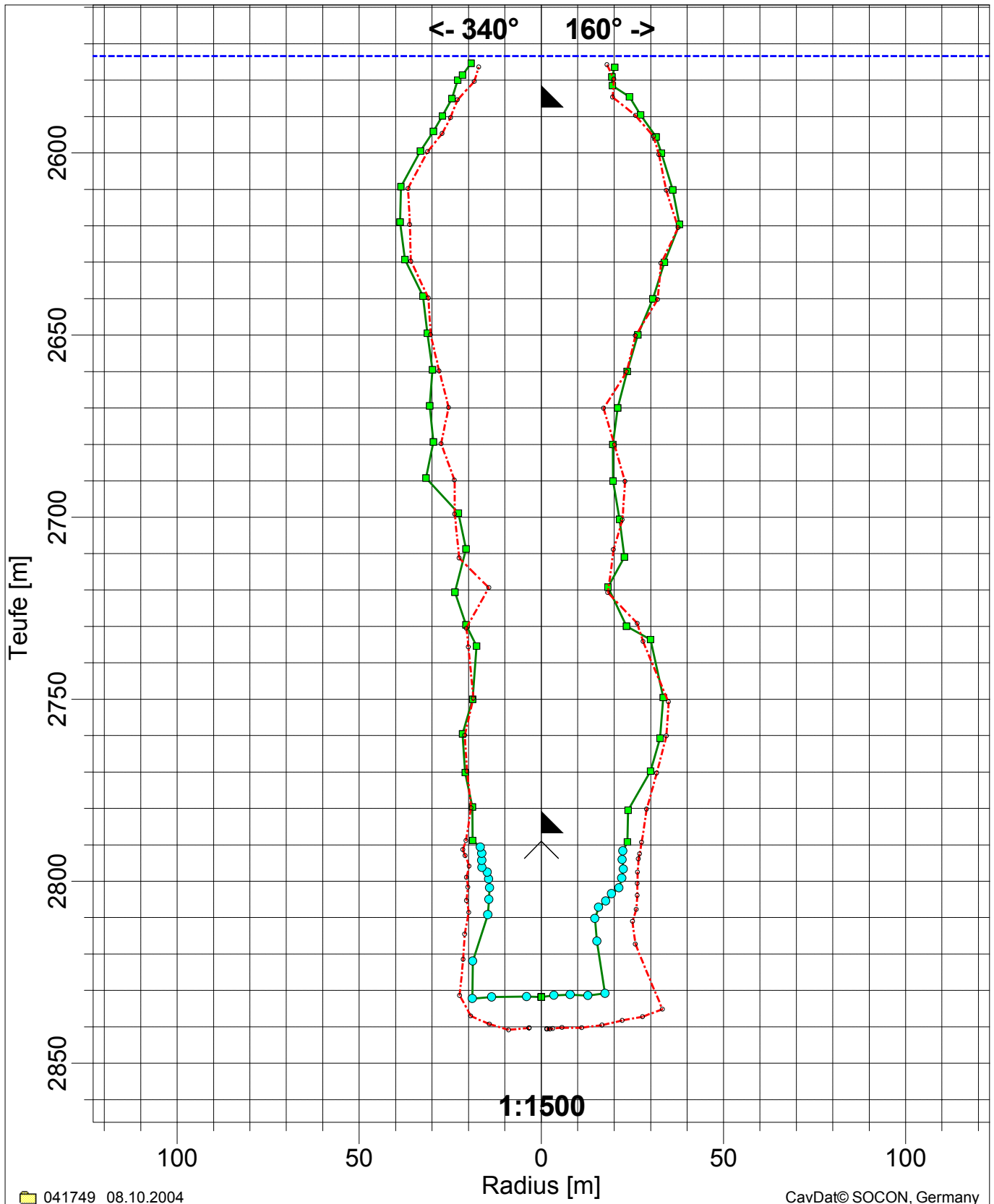
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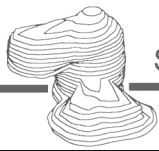
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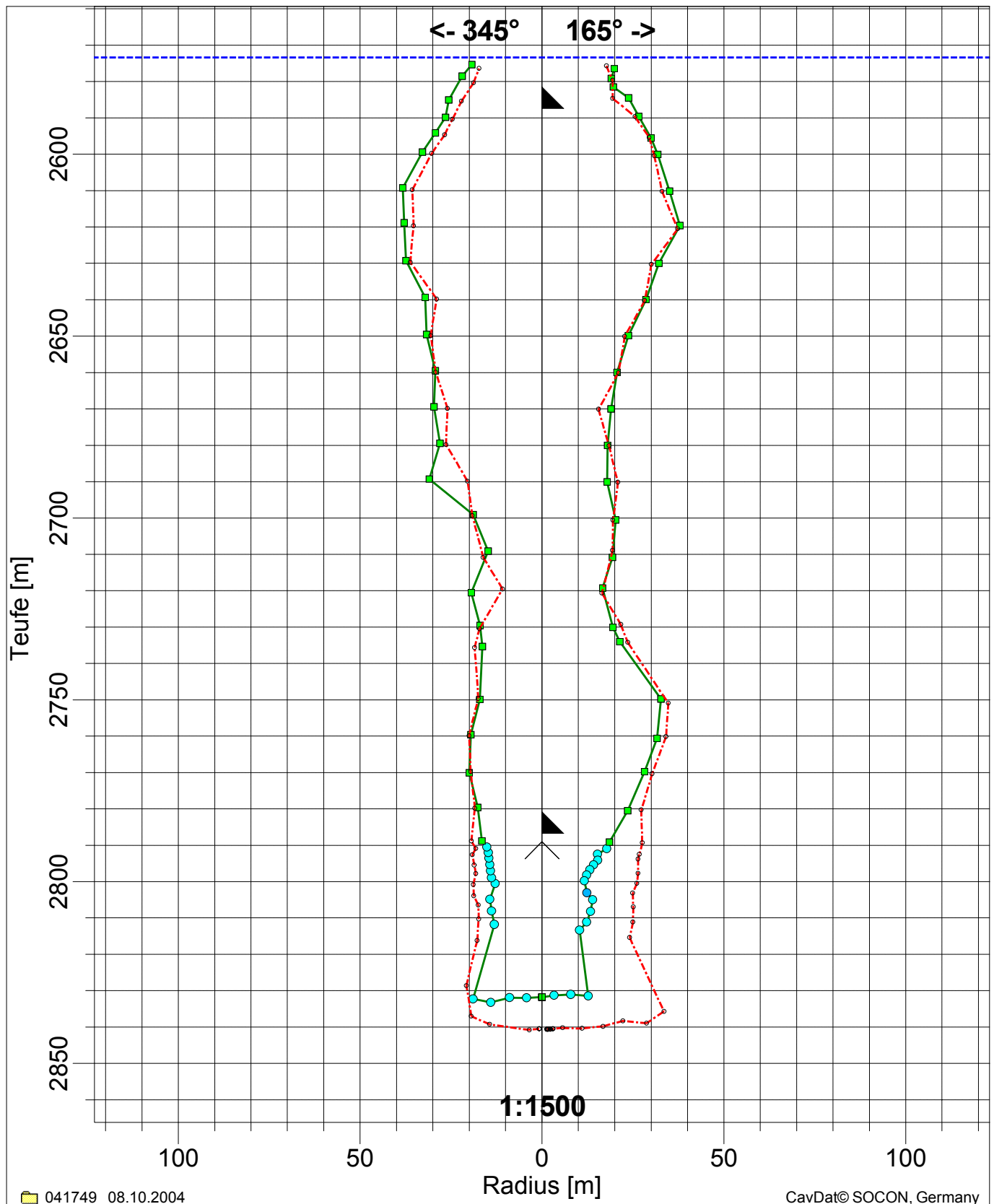
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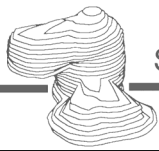
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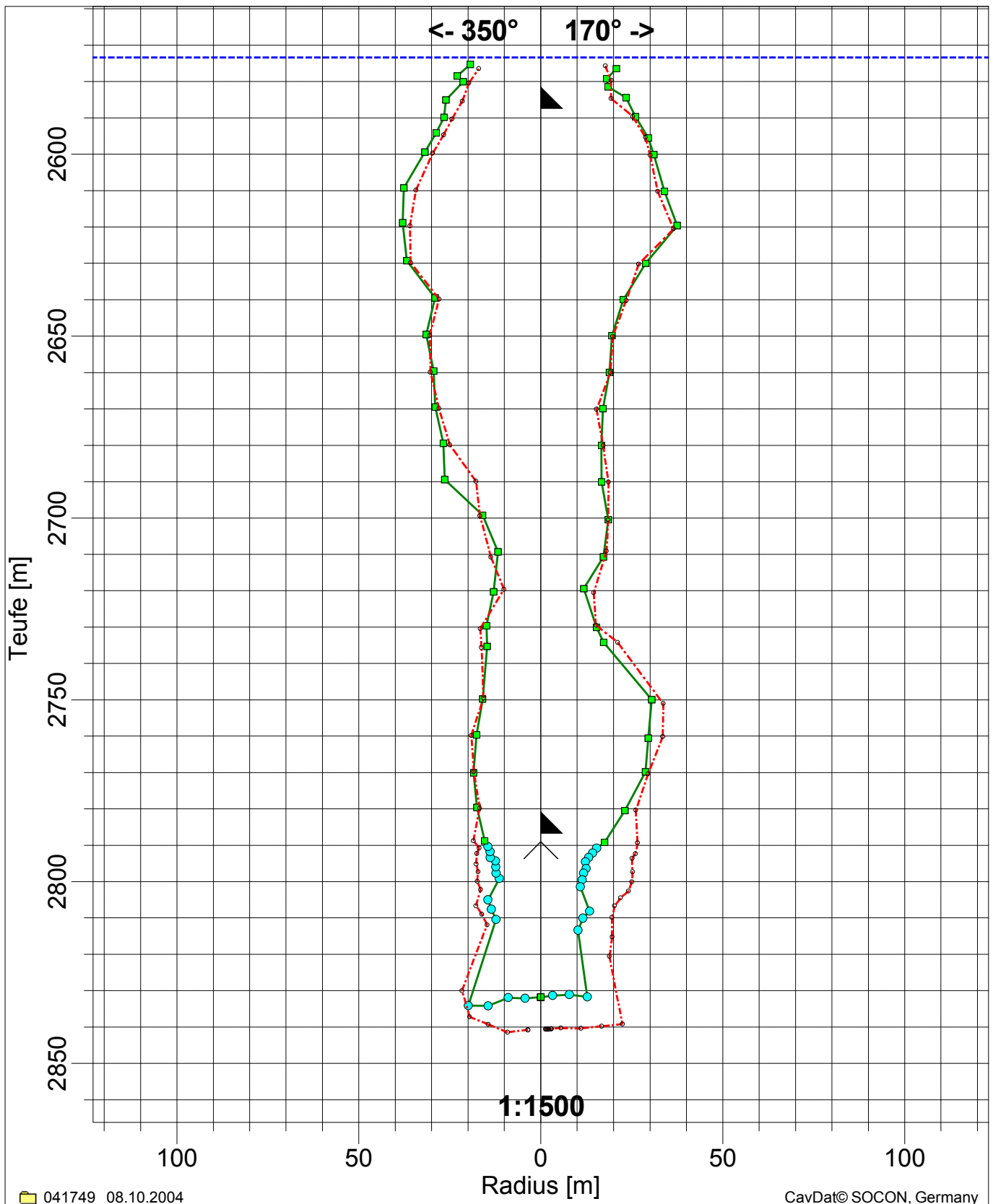
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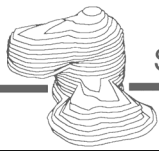
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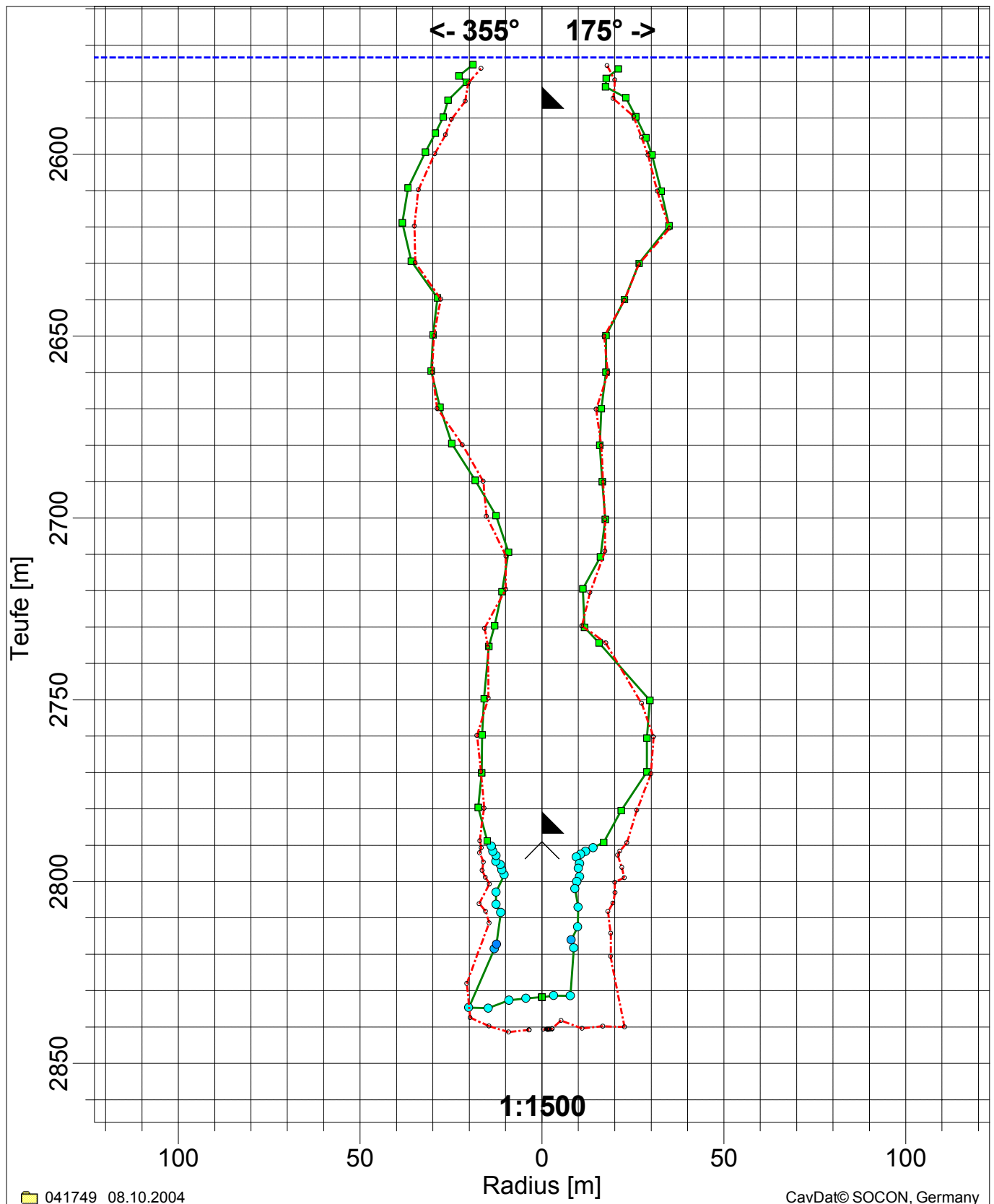
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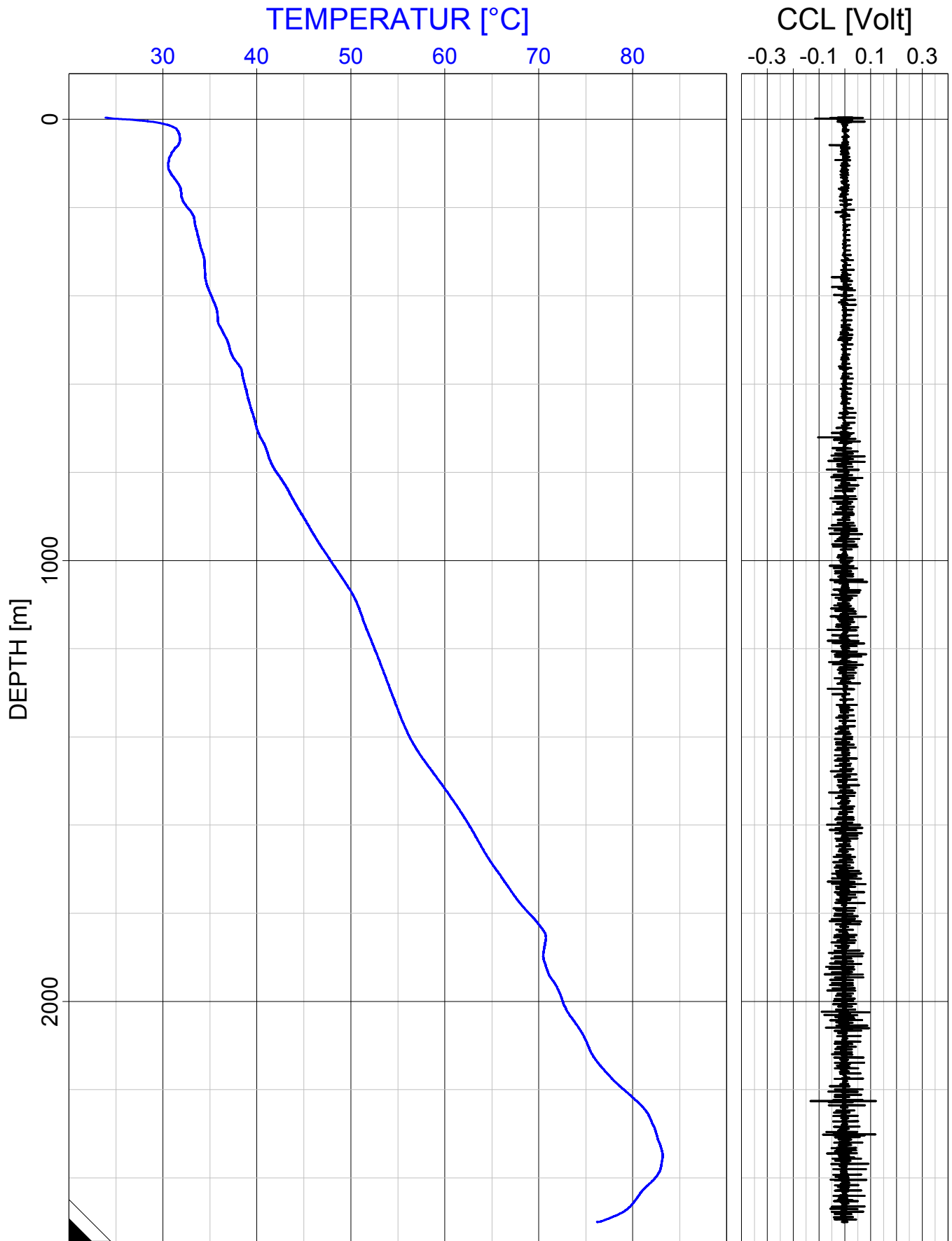


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07.10.2004

Einfahrtslog, Teufe nach Kabellänge



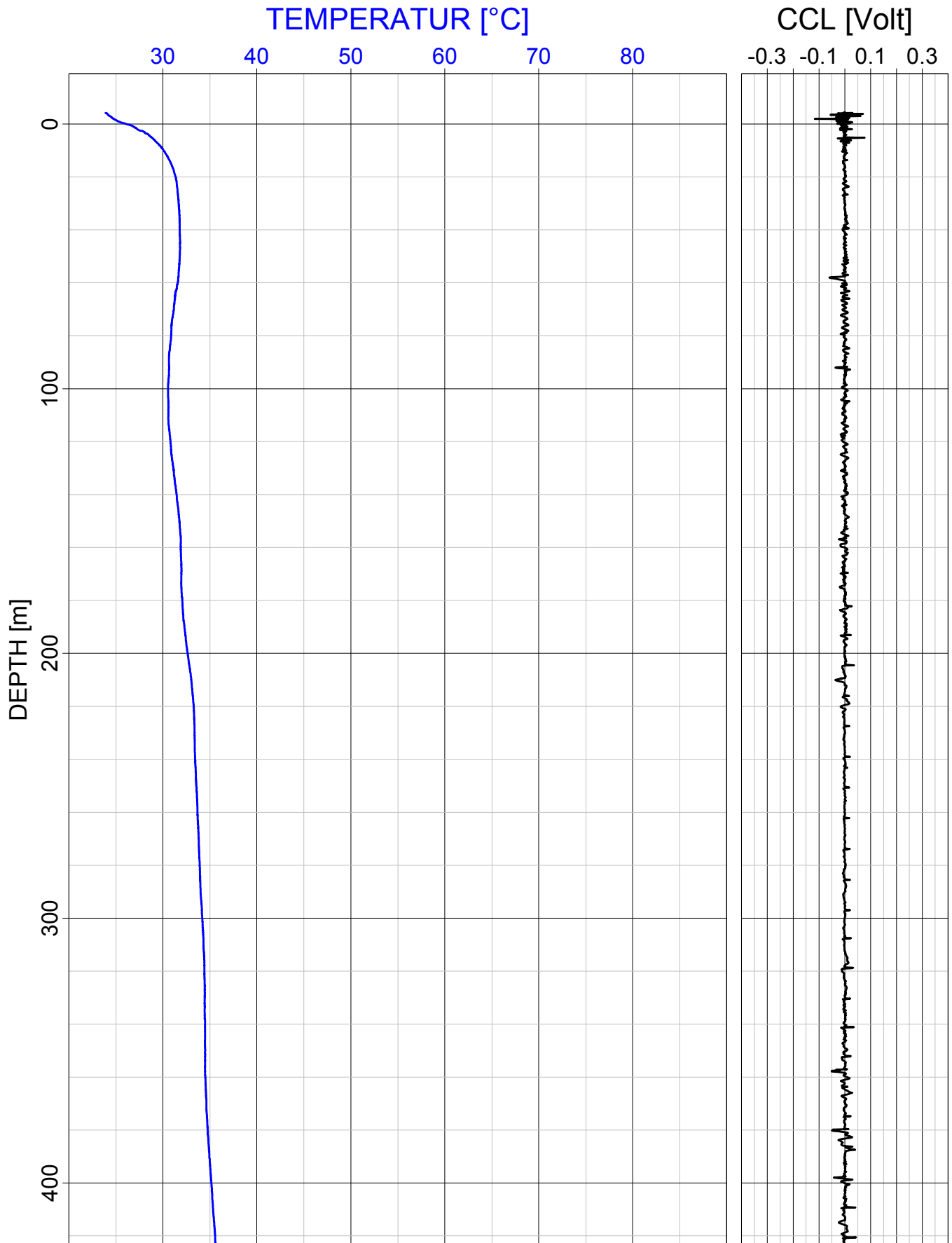


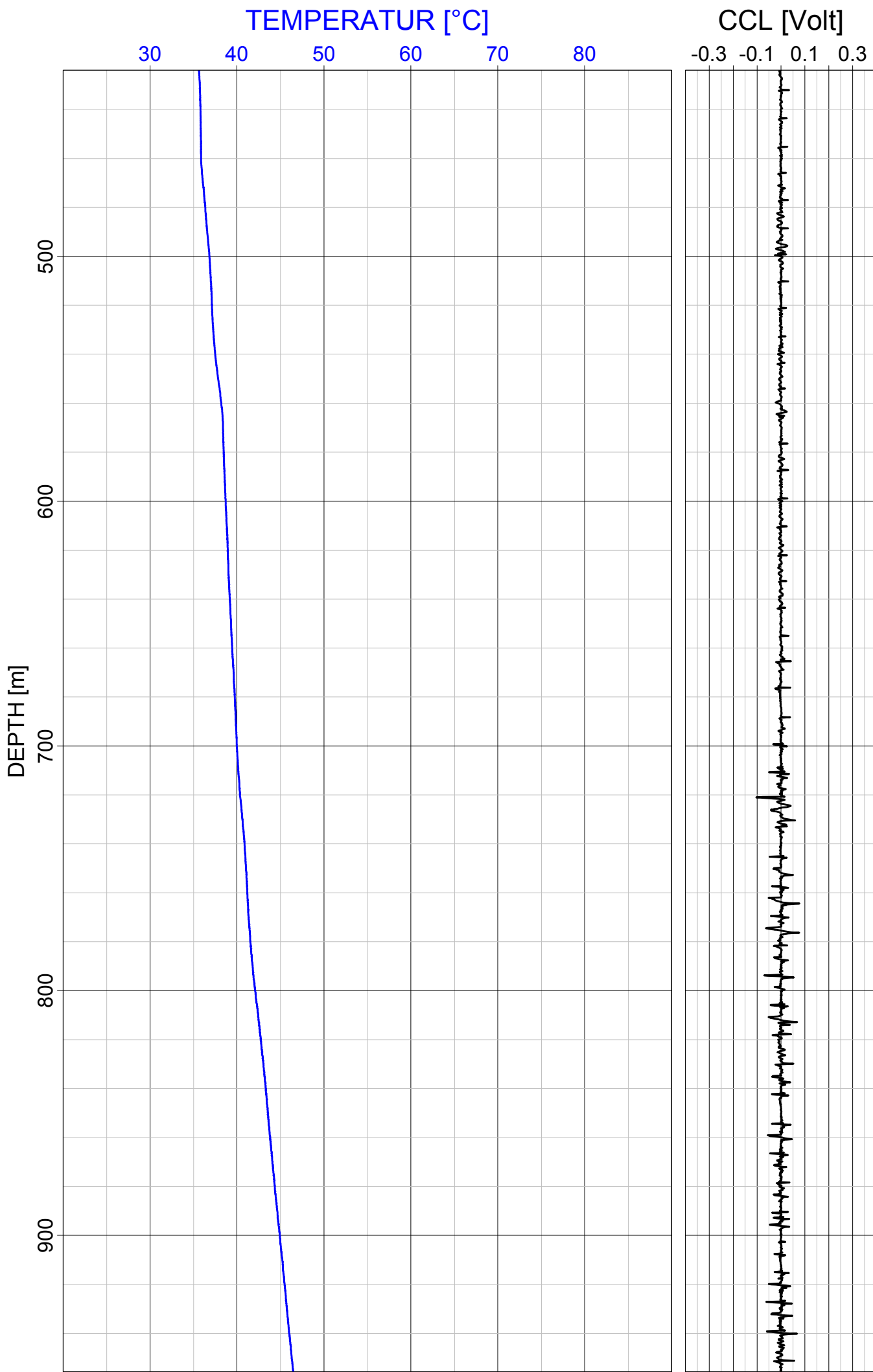
HARLINGEN BAS #1

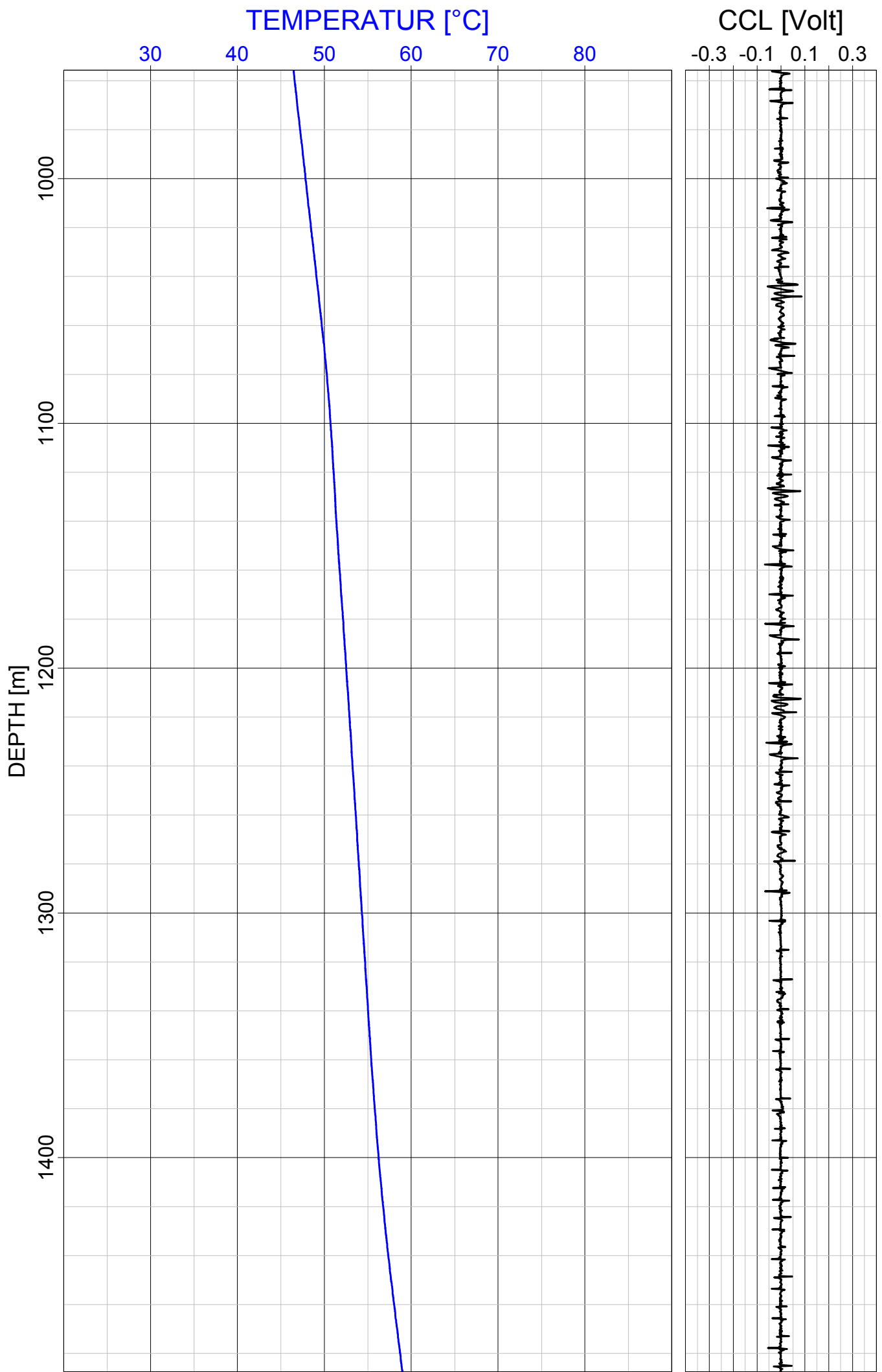
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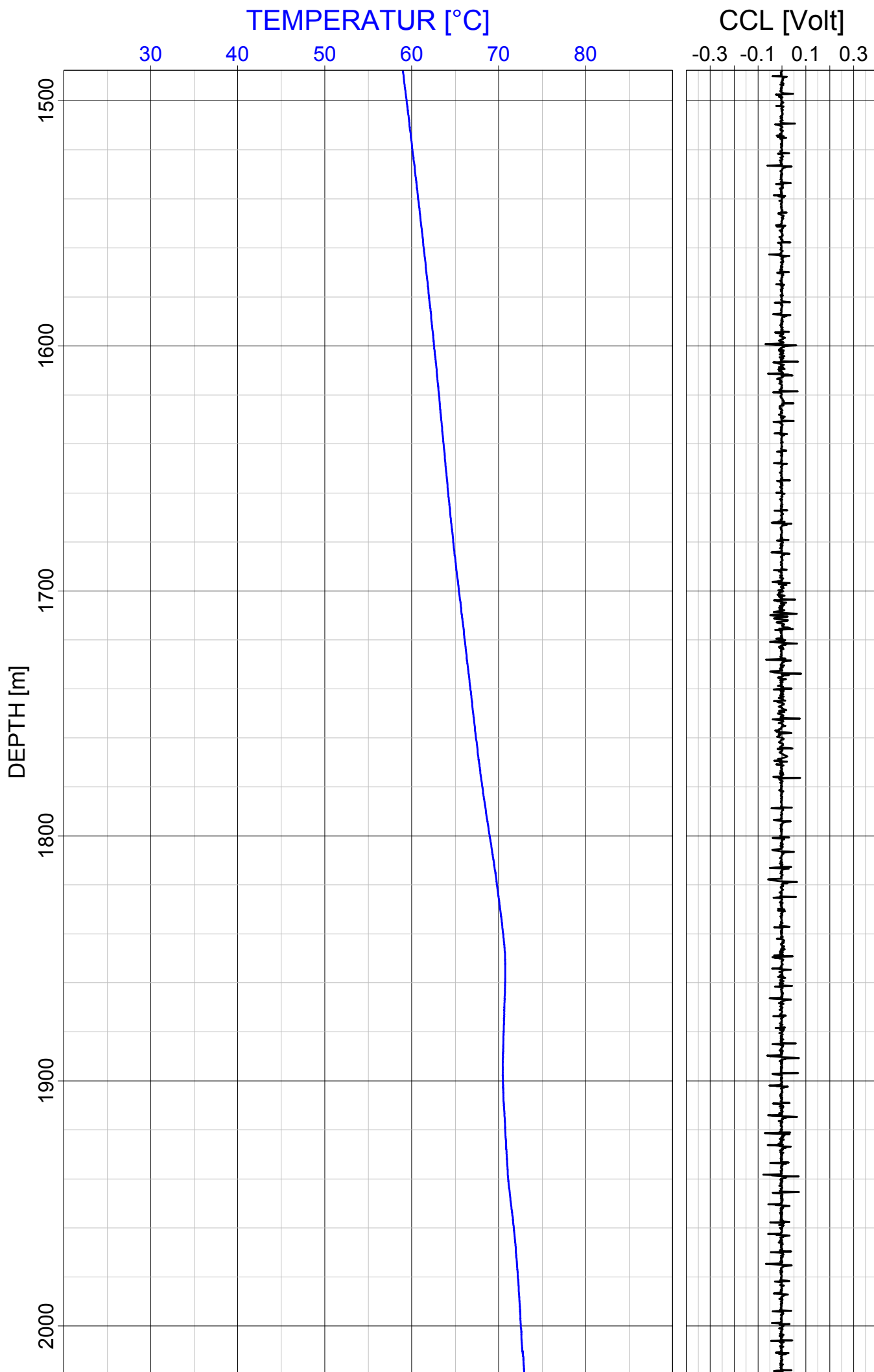
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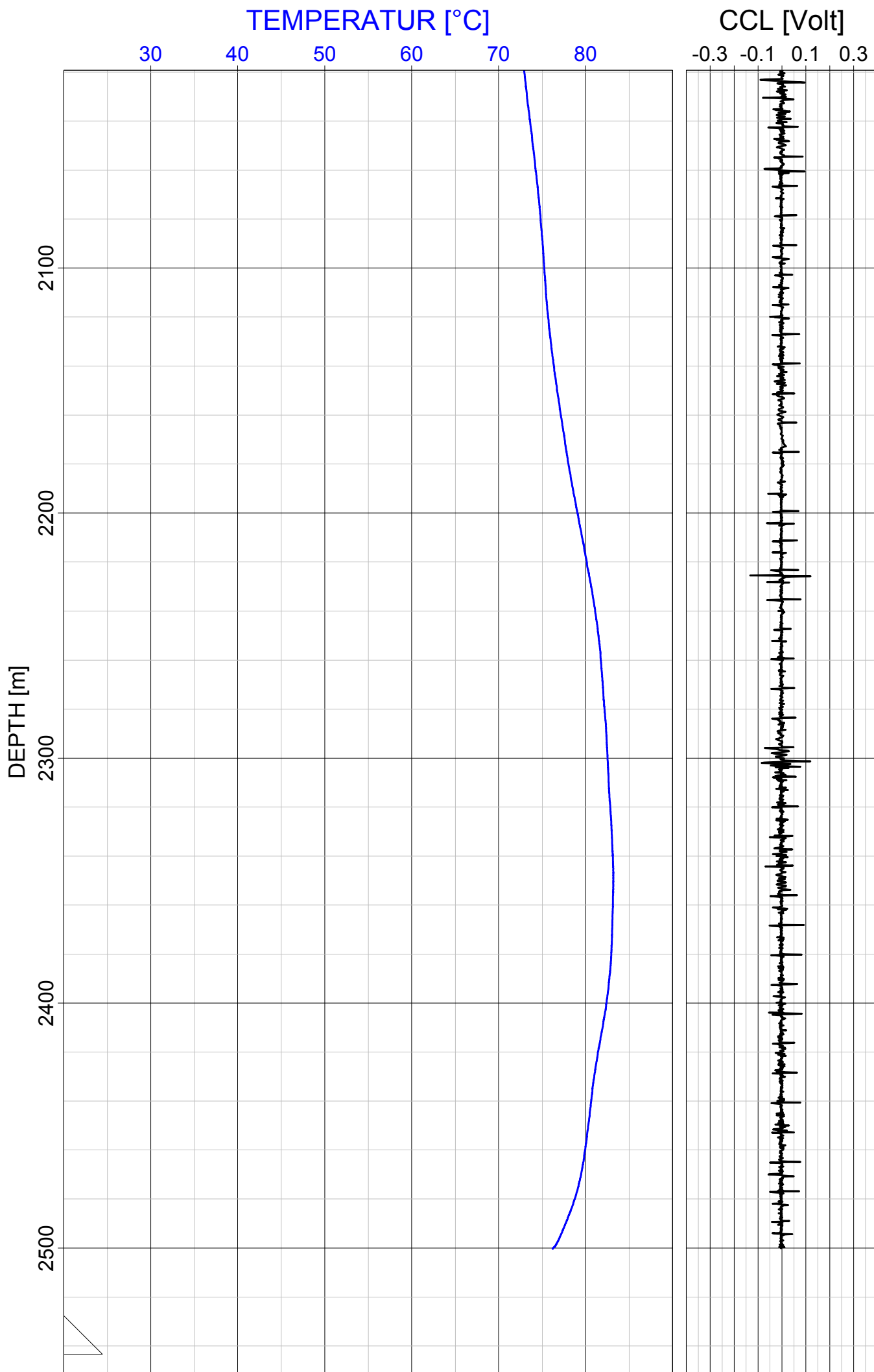
Einfahrtslog, Teufe nach Kabellänge









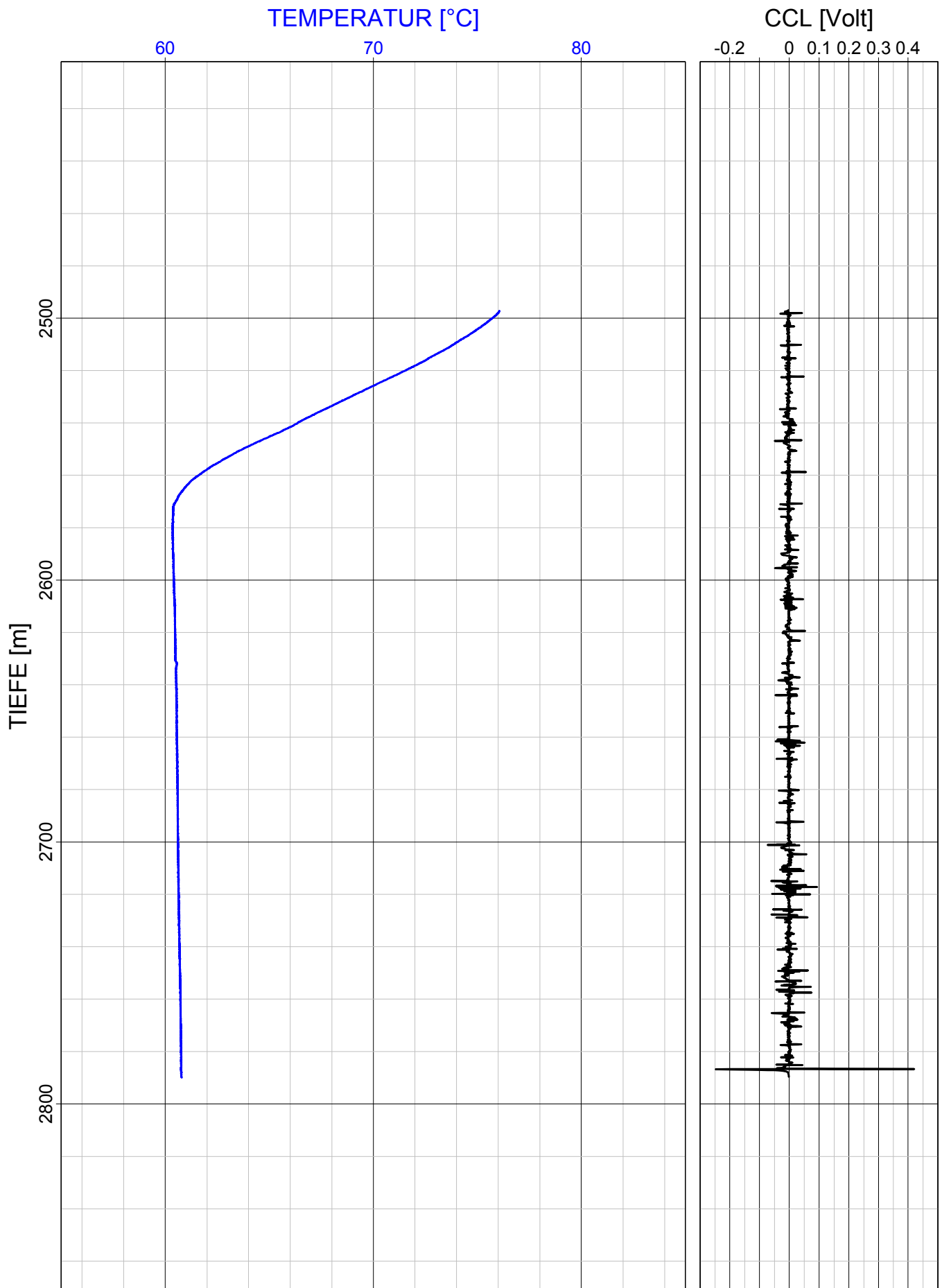




HARLINGEN BAS #1

1:2000

07.10.2004





HARLINGEN BAS #1

1:500

07.10.2004

