

ESMAPBD BDFE2
Data Report WINDCUBEv2 S/N WLS7-598
at the site Feni,
Chittagong District, Bangladesh
for the period from
2017-09-01 to 2017-09-30

2018-05-24


Summary report: SG17010KB13

ESMAPBD BDFE2

Data Report WINDCUBEv2 S/N WLS7-598

at the site Feni, Chittagong District, Bangladesh

Summary report: SG17010KB13

Location or measuring site:	E 91.358190, N 22.800290, Feni, Chittagong District / Bangladesh		
Client:	Suntrace GmbH	Große Elbstraße 145c D-22767 Hamburg	
	On behalf of Worldbank Group	1818 H Street, NW Washington, DC 20433	
Contractor:	windtest grevenbroich gmbh Frimmersdorfer Str. 73a D-41517 Grevenbroich		
Date of order:	2017-09-12	Contract number:	17 0091 09
Auditor:	Editor:		

Dipl.-Ing. Frank Albers
Division manager energy assessment

Dipl.-Ing. Florian Schmidt
Project manager site assessment

Grevenbroich, 2018-05-24

This summary may only be copied in extracts with the written consent of windtest grevenbroich gmbh.
It comprises 10 pages in total, incl. appendices.



CONTENTS

1	Introduction.....	4
2	Measurement statistics	4
3	Time series.....	5
4	Daily profile.....	6
5	Wind direction distribution	7
6	Natural turbulence	7
7	Wind profile.....	8
8	Station Log.....	9
9	Appendix	10
9.1	Processing	10



1 Introduction

windtest grevenbroich gmbh (wtg) was instructed by Suntrace GmbH to evaluate the data of the LiDAR wind measurement system at the location Feni. This report only contains the data measured by the LiDAR device ranging from 2017-09-01 until 2017-09-30 at the present site. In parallel an environmental measurement including a small meteorological mast (10 m) is being performed by the customer. The results of these measurements can be taken from a separate report provided by the customer.

2 Measurement statistics

Table 1: Mean measurement values during the evaluation period

Mean Values	Wind speed [m/s]	Wind speed max [m/s]	Wind speed min [m/s]	Wind direction [°]	Weibull A [m/s]	Weibull k []	Availability [%]
40 m	3.87	15.20	0.20	186.0	4.26	1.744	99.9
60 m	4.41	17.27	0.25	188.2	4.89	1.790	99.8
80 m	4.70	18.32	0.13	190.0	5.24	1.849	99.6
100 m	4.89	18.61	0.18	191.7	5.47	1.905	99.0
110 m	4.98	18.76	0.21	192.5	5.57	1.921	98.6
120 m	5.06	18.84	0.28	193.6	5.65	1.930	97.8
130 m	5.12	19.01	0.29	194.5	5.73	1.940	97.3
140 m	5.18	19.07	0.25	195.6	5.81	1.968	96.4
150 m	5.22	19.10	0.17	196.8	5.86	1.979	95.7
160 m	5.25	19.08	0.17	197.9	5.94	2.013	94.6
180 m	5.37	19.22	0.11	199.4	6.06	1.995	93.0
200 m	5.44	19.20	0.27	201.0	6.15	2.019	91.7

Table 2: Availability during the evaluation period

Availability per day [%]	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	28	29	30	31	
40 m	100	100	100	100	100	100	100	100	99	100	100	100	100	99	100	100	100	99	100	100	99	100	100	100	100	100	100	100	99	100	-	
60 m	100	100	100	100	100	100	100	100	99	100	99	100	100	98	100	100	100	100	100	99	100	100	100	100	100	100	100	99	100	99	99	-
80 m	100	100	100	100	100	100	100	100	99	100	99	100	100	100	100	100	100	100	100	100	99	100	100	100	99	99	99	100	95	98	-	
100 m	100	100	100	99	100	100	100	100	99	100	97	100	100	100	99	100	100	100	100	100	99	100	100	100	99	99	97	100	87	93	-	
110 m	100	100	100	99	100	100	100	100	99	100	94	100	100	100	98	100	100	100	100	100	99	100	100	100	97	99	96	100	84	91	-	
120 m	97.5	100	100	97	100	100	100	100	99	100	88	99	100	100	97	100	100	99	100	100	99	100	100	100	94	99	95	99	83	90	-	
130 m	96.8	100	99	97	100	100	100	100	99	100	88	99	100	100	97	100	99	97	100	100	99	100	100	100	94	98	95	99	76	86	-	
140 m	96.8	100	98	97	100	100	100	100	99	100	83	98	100	99	98	100	97	94	99	100	99	100	100	100	90	97	92	99	71	85	-	
150 m	94.1	100	96	97	100	100	100	99	99	100	83	97	100	99	98	100	97	89	99	100	99	100	100	100	90	92	91	97	69	85	-	
160 m	93.4	100	97	97	100	100	100	95	99	99	81	99	99	94	97	100	94	84	96	100	99	100	100	100	87	93	90	97	63	85	-	
180 m	89.9	99	94	97	99	100	100	94	99	99	75	96	99	91	97	100	83	81	95	100	99	100	99	100	85	88	89	96	60	85	-	
200 m	87.1	99	94	97	99	100	100	94	98	97	74	95	98	87	95	100	80	74	93	100	99	100	98	100	85	88	85	90	60	85	-	



3 Time series

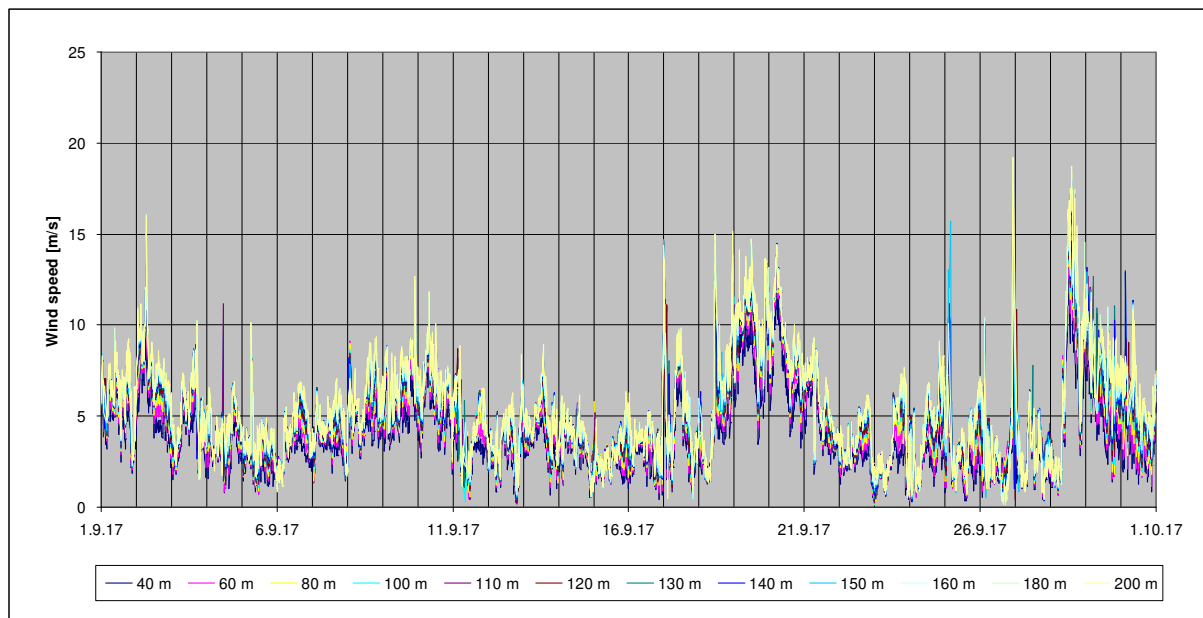


Figure 1: Time series of wind speed during the evaluation period

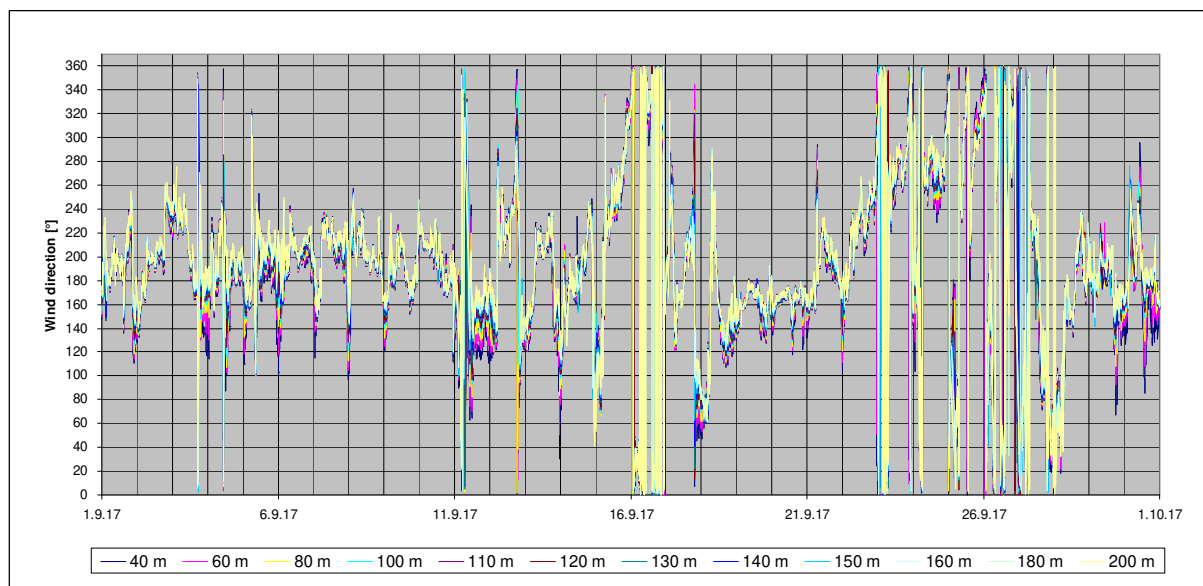


Figure 2: Time series of wind direction during the evaluation period



4 Daily profile

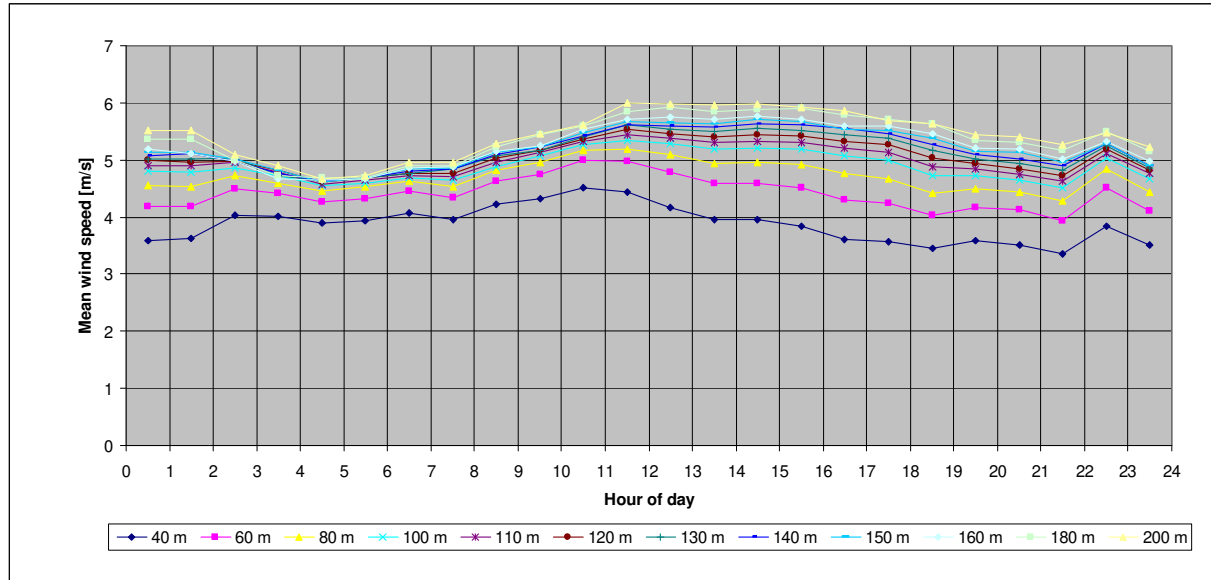


Figure 3: Daily profile of wind speed during the evaluation period

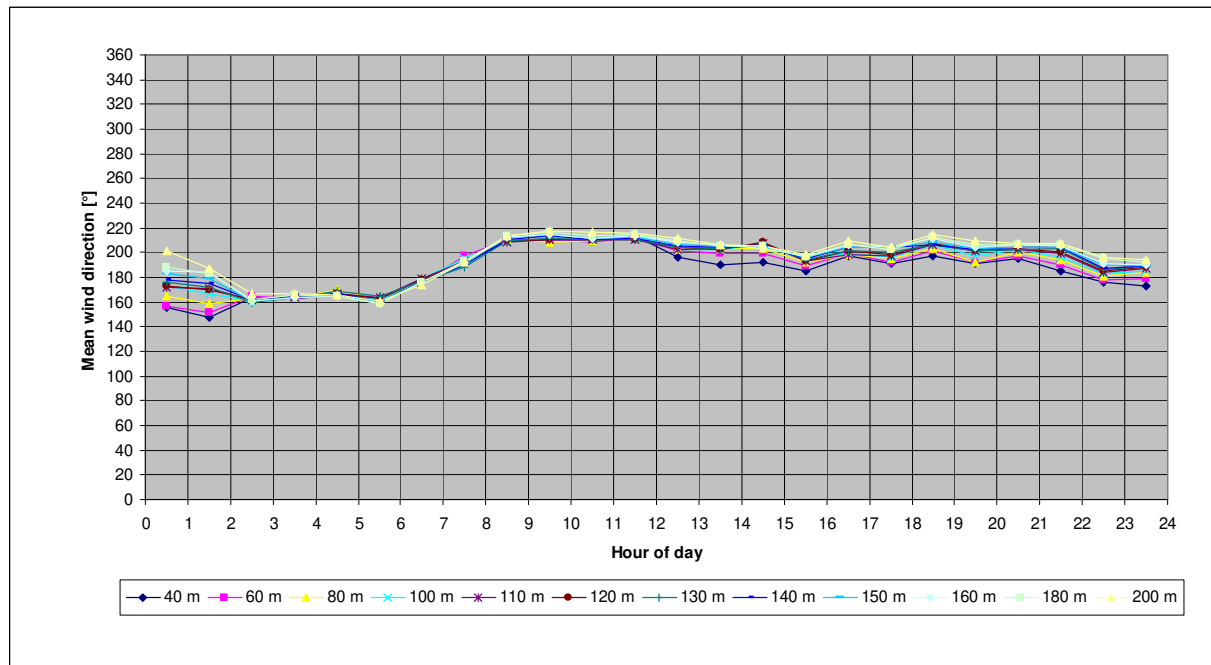


Figure 4: Daily profile of wind direction during the evaluation period



5 Wind direction distribution

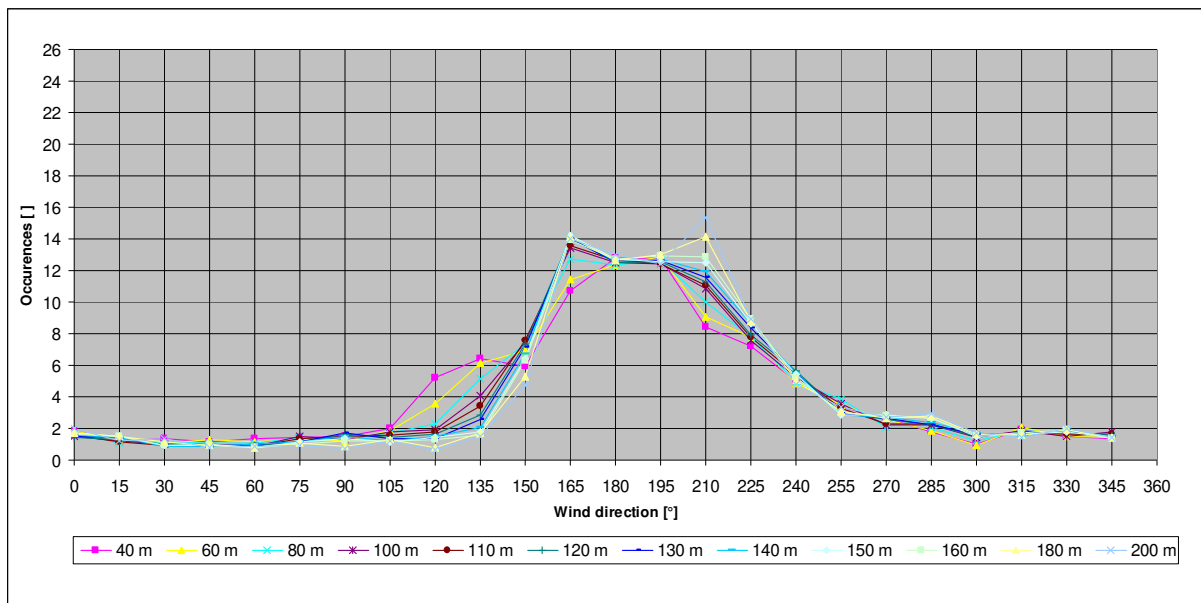


Figure 5: Frequency distribution of wind direction during the evaluation period

6 Natural turbulence

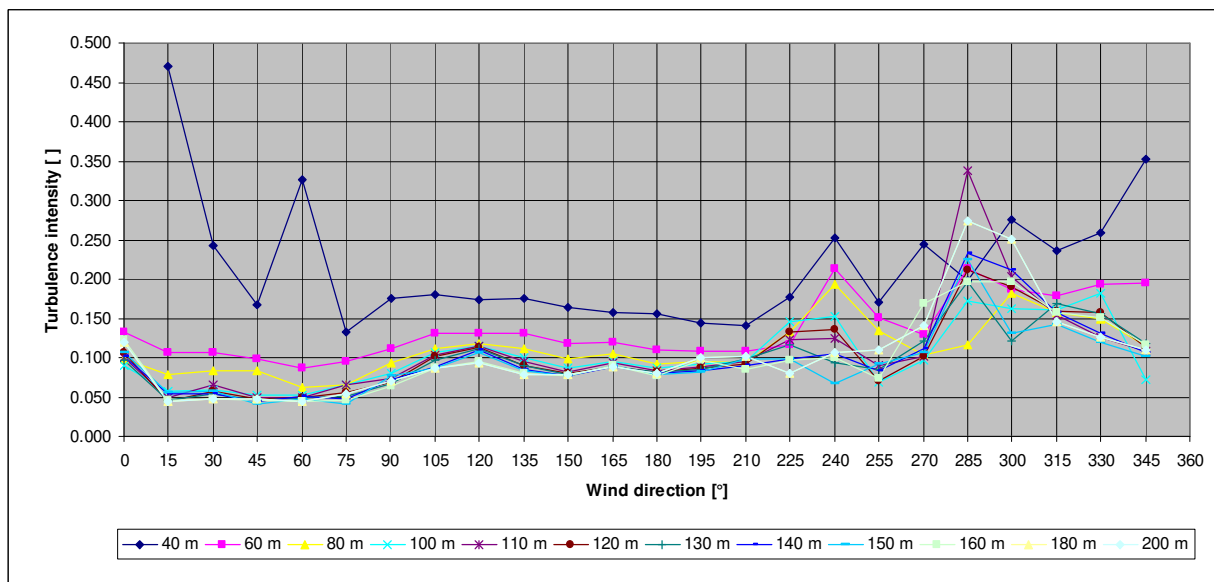


Figure 6: Directional mean turbulence during the evaluation period



7 Wind profile

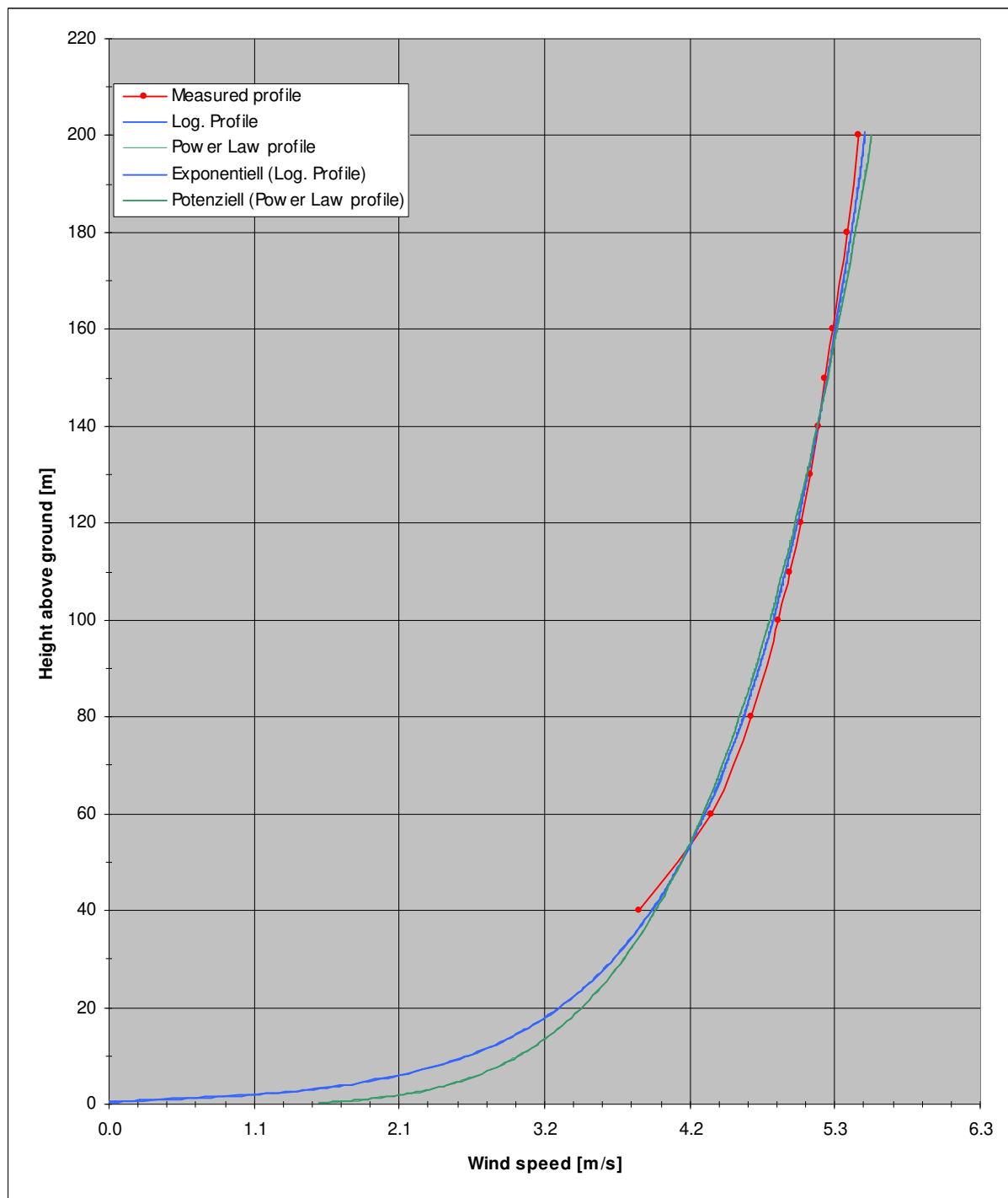


Figure 7: Wind profile during the evaluation period



8 Station Log

Date	Note	Issues
2017-06-04	Installation of LiDAR (Florian Schmidt, wtg) Connection to utility grid due to charger problems with 24 V	frequent restarts
2017-06-15	Manufacturer recommends to turn off LiDAR due to frequent restarts	frequent restarts
2017-06-16	LiDAR disconnected from Grid (Najmul Hossain, EQMS)	LiDAR disconnected
2017-07-27	Installation of DC-AC converter to supply LiDAR (Najmul Hossain, EQMS) LiDAR connected to power supply Performance check via remote connection (Florian Schmidt, wtg)	-
2017-07-28	Performance check via remote connection (Florian Schmidt, wtg)	-
2017-07-31	Data and performance check (Florian Schmidt, wtg) No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2017-08-08	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2017-09-05	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2017-09-09	Data connection restored Data and performance check (Florian Schmidt, wtg)	-

Note: Weekly and other frequently performed checks as well as data backup will not be listed in the station log.

We hereby affirm that the evaluation was performed in accordance with the latest state of the art, impartially and to the best of our knowledge and belief.

Grevenbroich. 2018-05-24

Dipl.-Ing. Florian Schmidt
Project Manager



9 Appendix

9.1 Processing

Version	Date	Content
SG17010B1	2017-04-25	Verification of the remote sensing device type Leosphere WINDCUBE v2 S/N WLS7-598 performed at the verification station Grevenbroich
SG17010B2	2017-06-22	Installation of the Remote Sensing Device Type Leosphere WINDCUBE v2 S/N WLS7-598 at the site Feni
SG17010KB1	2017-08-31	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB2	2017-09-11	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB3	2017-10-06	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB4	2017-11-08	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB5	2017-12-18	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-11-01 to 2017-11-30
SG17010KB6	2018-01-17	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-12-01 to 2017-12-31
SG17010KB7	2018-03-02	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-01-01 to 2018-01-31
SG17010KB8	2018-03-02	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-02-01 to 2018-02-28
SG17010KB9	2018-04-13	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-06-04 to 2017-06-30
SG17010KB10	2018-04-13	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-07-01 to 2017-07-31
SG17010KB11	2018-04-13	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-03-01 to 2018-03-31
SG17010KB12	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-08-01 to 2017-08-31
SG17010KB13	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-09-01 to 2017-09-30

Copy to	Copy no.
Customer	1
Project folder	2

Copy no.: