

**ESMAPBD BDFE2**  
**Data Report WINDCUBEv2 S/N WLS7-598**  
**at the site Feni,**  
**Chittagong District, Bangladesh**  
**for the period from**  
**2017-10-01 to 2017-10-31**

**2018-05-24**


**Summary report: SG17010KB14**

# ESMAPBD BDFE2

## Data Report WINDCUBEv2 S/N WLS7-598

### at the site Feni, Chittagong District, Bangladesh

Summary report: SG17010KB14

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

Dipl.-Ing. Frank Albers  
Division manager energy assessment

Dipl.-Ing. Florian Schmidt  
Project manager site assessment

Grevenbroich, 2018-05-24

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It comprises 10 pages in total, incl. appendices.



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## 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 2017-10-01 until 2017-10-31 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	3.57	18.76	0.21	113.8	3.87	1.457	99.5
60 m	4.13	21.61	0.41	138.8	4.52	1.486	99.4
80 m	4.46	22.77	0.39	156.7	4.90	1.510	99.4
100 m	4.68	23.33	0.44	170.0	5.12	1.498	99.3
110 m	4.78	23.71	0.49	177.5	5.21	1.492	99.0
120 m	4.86	24.15	0.46	184.6	5.30	1.492	98.7
130 m	4.93	24.68	0.39	190.5	5.39	1.495	98.3
140 m	4.97	24.94	0.36	196.9	5.46	1.504	97.8
150 m	5.01	25.29	0.46	202.1	5.46	1.482	97.4
160 m	5.05	25.53	0.41	207.2	5.48	1.461	96.7
180 m	5.11	25.77	0.42	215.1	5.51	1.438	94.3
200 m	5.16	26.00	0.46	220.1	5.58	1.428	91.8

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	98	100	100	93	99	100	100	100	100	100	100	100	100	100	97	100	100	99	100	100	99	100	100	100	100	99	100	100
60 m	100	100	100	97	100	100	94	99	100	100	100	100	100	100	100	100	99	97	100	100	99	100	100	99	100	100	100	100	98	100	100
80 m	100	100	100	96	100	100	96	99	100	100	100	100	100	100	100	100	100	96	100	100	98	100	100	99	100	100	100	100	98	100	100
100 m	100	100	100	95	100	100	96	99	100	100	100	100	100	100	100	100	100	94	100	100	98	100	100	99	100	100	100	100	96	100	100
110 m	100	100	100	94	100	100	96	99	99	100	100	100	100	100	100	100	99	92	100	100	98	100	100	99	100	100	100	100	94	99	100
120 m	100	100	100	93	99	100	95	99	97	100	100	100	100	100	100	100	99	88	100	100	97	100	100	99	100	100	100	100	94	99	100
130 m	100	99	100	91	97	99	94	99	95	100	100	100	100	100	100	100	98	88	100	100	97	100	100	99	100	100	100	100	94	97	100
140 m	100	99	99	90	94	97	94	99	94	100	100	100	99	100	100	100	98	86	100	99	94	100	100	99	100	100	100	100	92	97	100
150 m	100	99	99	90	94	97	93	99	93	100	99	100	99	100	100	100	97	84	99	98	94	100	100	99	100	100	100	100	90	95	100
160 m	99.6	99	99	90	94	96	93	99	92	100	99	100	97	100	100	100	95	85	99	95	92	100	100	99	100	100	100	100	86	90	99
180 m	98.9	98	97	85	94	94	92	99	92	100	99	100	86	92	100	100	90	73	99	88	91	100	100	99	100	100	100	100	76	86	97
200 m	97.5	98	94	85	92	94	92	97	92	99	99	100	62	73	100	100	88	68	99	85	89	100	100	99	100	100	100	100	66	85	94



### 3 Time series

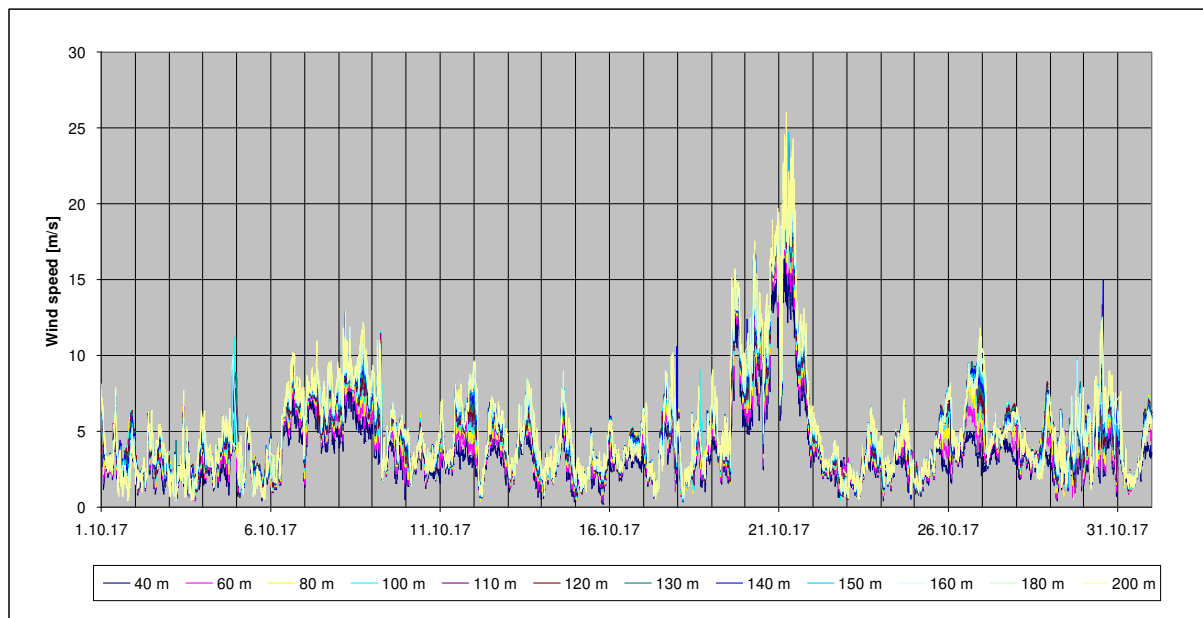


Figure 1: Time series of wind speed during the evaluation period

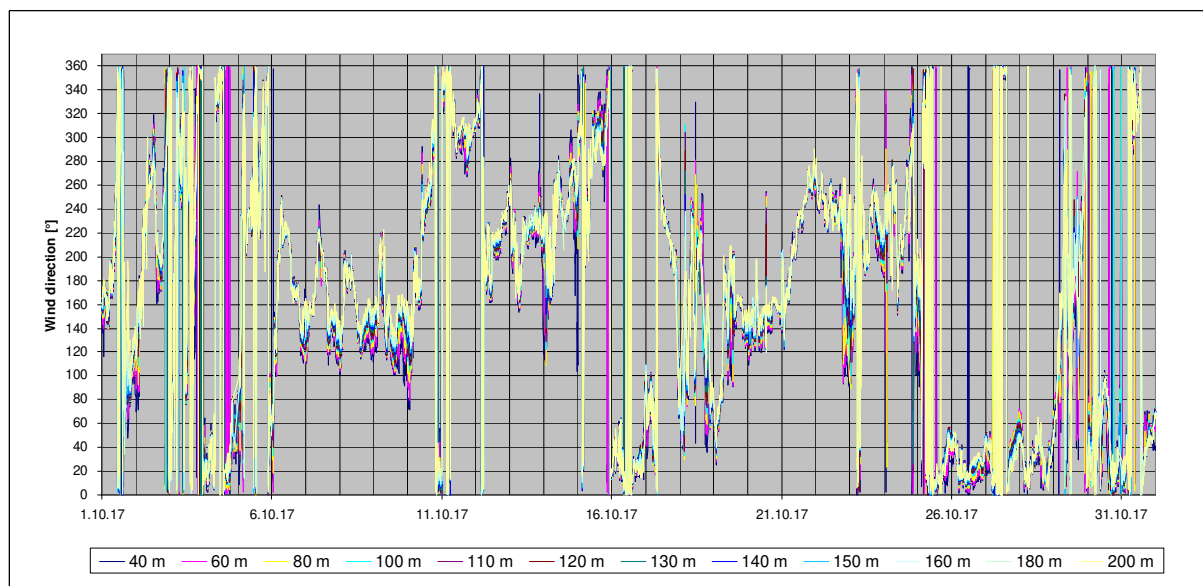


Figure 2: Time series of wind direction during the evaluation period



## 4 Daily profile

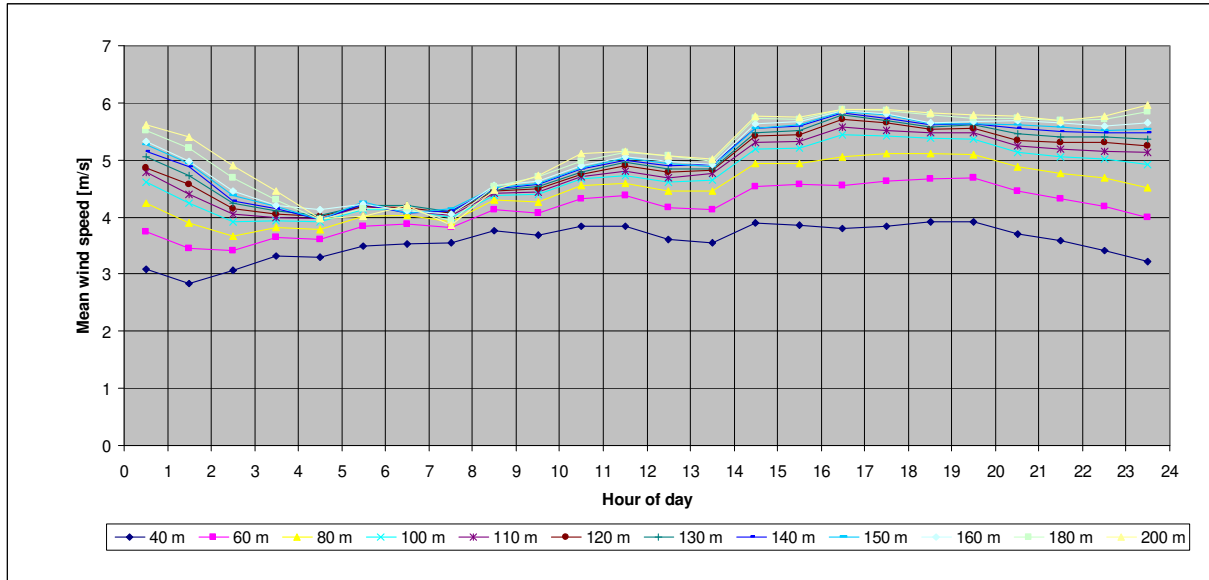


Figure 3: Daily profile of wind speed during the evaluation period

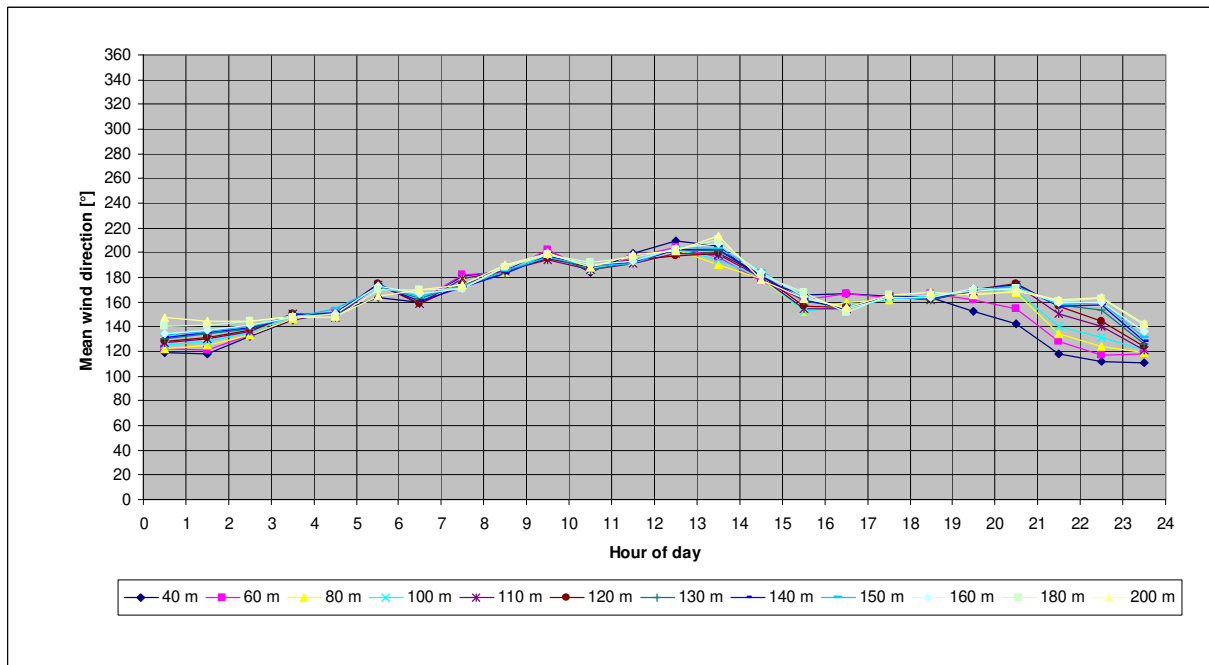


Figure 4: Daily profile of wind direction during the evaluation period



## 5 Wind direction distribution

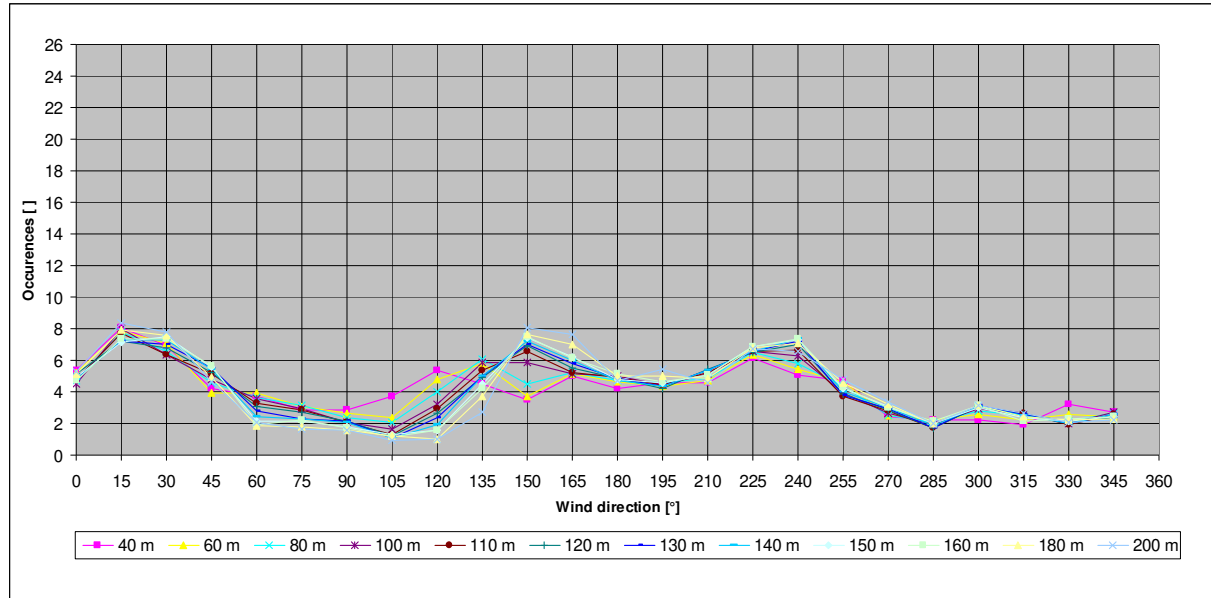


Figure 5: Frequency distribution of wind direction during the evaluation period

## 6 Natural turbulence

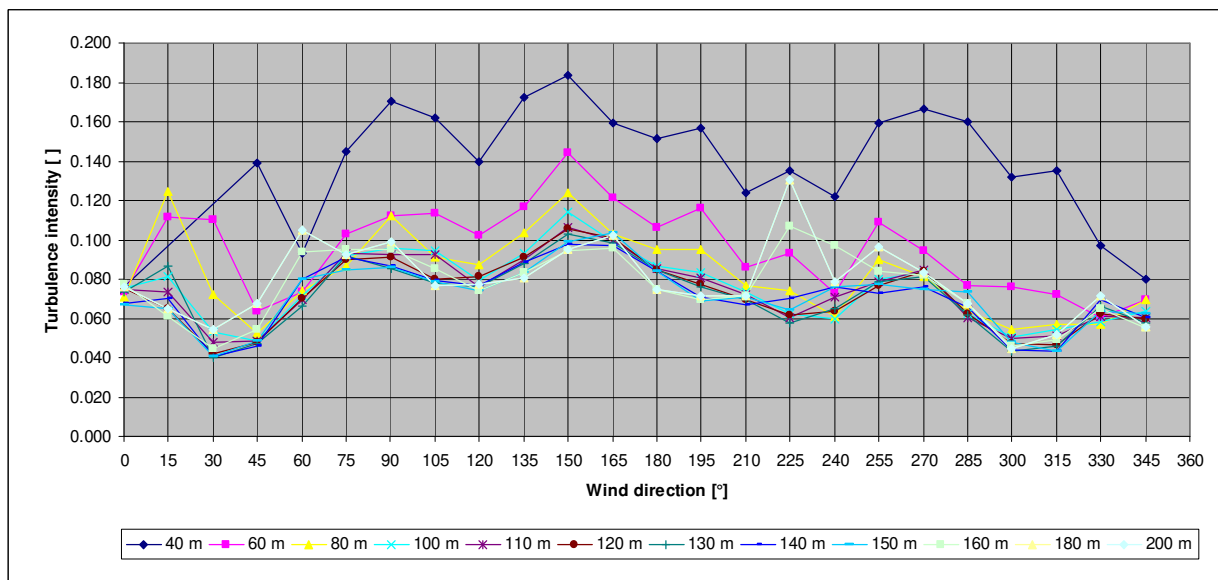


Figure 6: Directional mean turbulence during the evaluation period



## 7 Wind profile

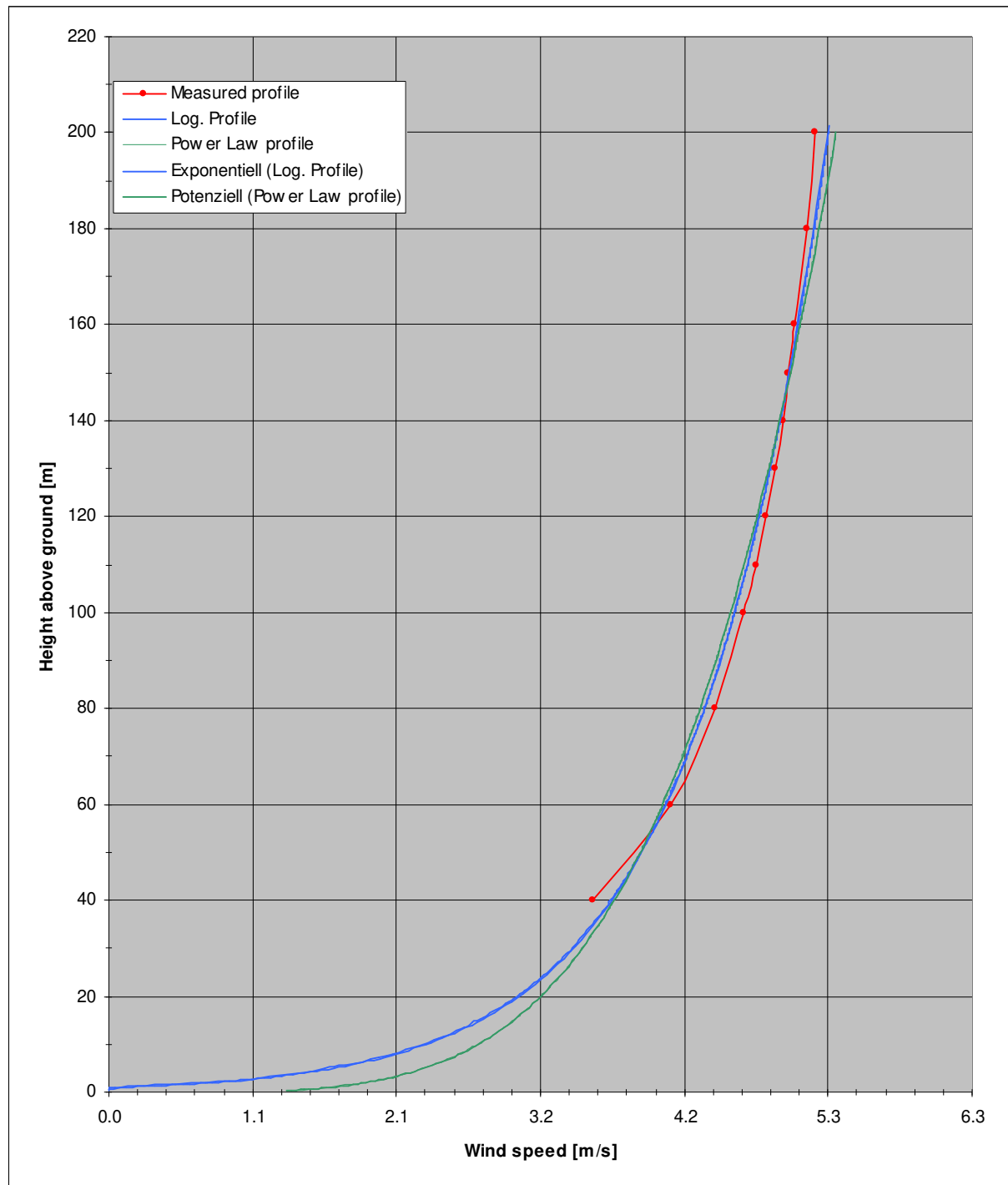


Figure 7: Wind profile during the evaluation period





## 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

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Dipl.-Ing. Florian Schmidt  
Project Manager



## 9 Appendix

### 9.1 Processing

<b>Version</b>	<b>Date</b>	<b>Content</b>
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
SG17010KB14	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-10-01 to 2017-10-31

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