

1st Quarter Wind Resource Interim Report Arkansas Anemometer Loan Program

Site: Mansfield, AR
Period: 02.19.2010-
06.19.2010

Details

Site	Mansfield, Arkansas
Participant	Jack Turner
Project no.	004
Latitude	35°06'21.09" N
Longitude	94° 10'22.09" W
Elevation	270 m
Soil Type	Rocky soil + Superficial Bedrock (Rock anchors installed)
Mast height	34 m
Report Quarter	1st quarter data (02.19.2010-06.19.2010)

Basic Data Information

Frequency of data checks	Daily/weekly
Data Acquisition	Per day
Start date	02/19/2010 00:00
End date	06/19/2010 23:50
Duration	120 days
Length of time step	10 minutes
Total Number of Data	17,424

Monthly Wind Velocity Averages at 33 m

Year	Month	Possible Records	Recovery Rate (%)	Mean (m/s)	Min (m/s)	Max (m/s)	Std. Dev. (m/s)	Weibull k	Weibull c (m/s)
2010	Feb	1440	100	4.47	0.4	9.10	1.617	3.01	4.98
2010	Mar	4464	100	5.06	0.4	16.00	2.133	2.50	5.69
2010	Apr	4320	100	4.91	0.4	15.08	2.537	1.99	5.52
2010	May	4464	100	4.06	0.4	13.60	1.939	2.20	4.58
2010	Jun	2736	100	3.99	0.4	9.30	1.591	2.71	4.48
All data		17424	100	4.55	0.4	16.00	2.132	2.22	5.12
Mean of monthly means				4.55					

1. Status of Relevant Sensors

The state of all relevant sensors is periodically checked by visual inspection of data. Additionally, all signals are regularly checked by automatic failure detection to provide a general overview on the course of the operated measurement campaign. No correction of mast has been applied either.

Status of Relevant Sensors

Remark: The automatic failure detection algorithm is based on predefined measures of failure or plausibility. The table above lists the results as percentage of the total available data. "Availability" gives the portion of remainders after removing faulty values. The following columns represent the portion of faulty values according to each failure definition. Four kinds of failure were checked: plausible "range¹", "icing²" (only anemometers and wind vanes), "constant value³", "related⁴" (mutual consistence test if reference sensor available) and "vMax"⁵.

Sensor/Signal	Availability	Failure Checks				
		Range	Icing	Constant Value	Related	VMax
V33 Due West	96.98%	0%	0%	0%	0%	3.02%
V33 Due East	97.49%	0%	0%	0%	0%	2.51%
V20 Due West	97.56%	0%	0%	0%	0%	2.44%
WVane 34	100%	0%	0%	0%	0%	0%
Temp	100%	0%	0%	0%	0%	0%

¹ Wind speed: 0 – 50 m/s, temperature: -20 – +50 °C

² Consecutive constant values during combined conditions of temperature (<2°C) and humidity (>80%rH)

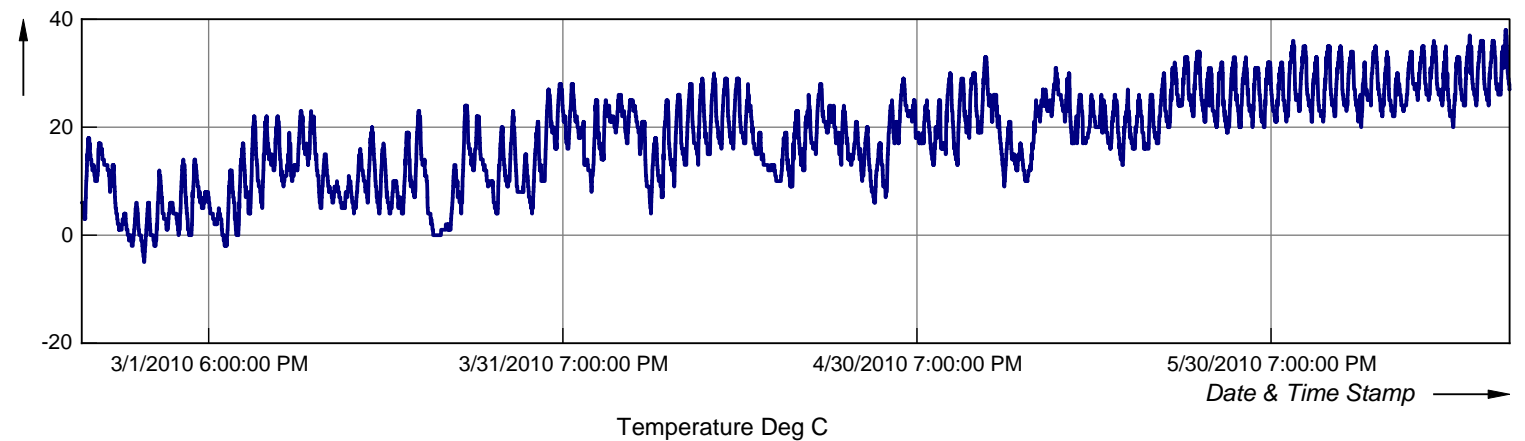
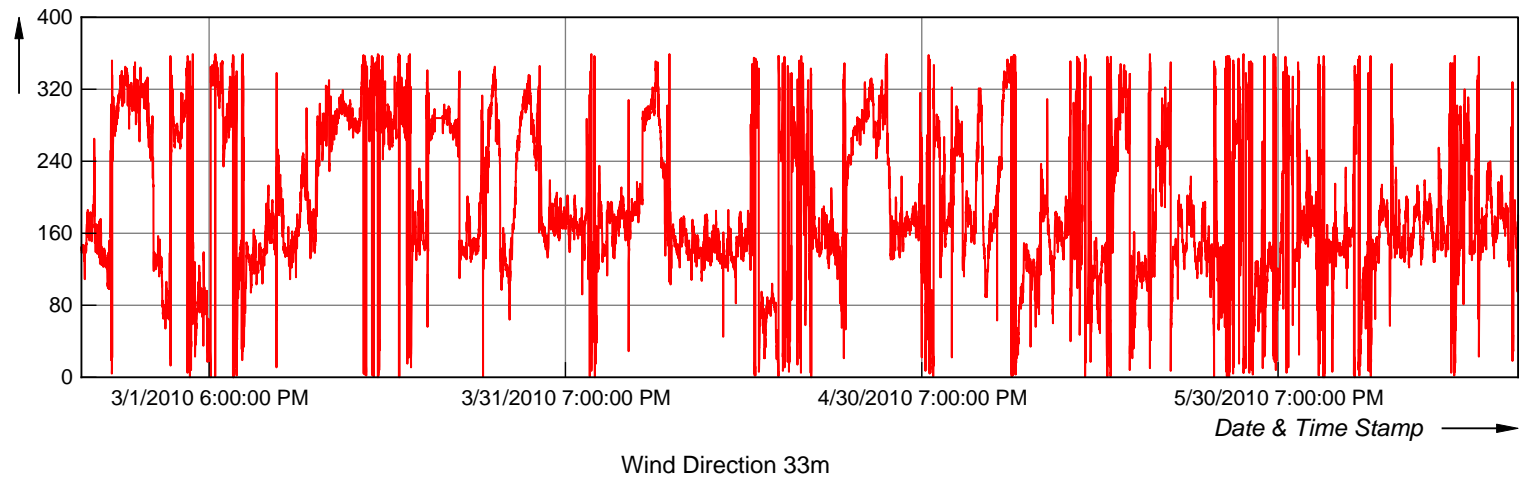
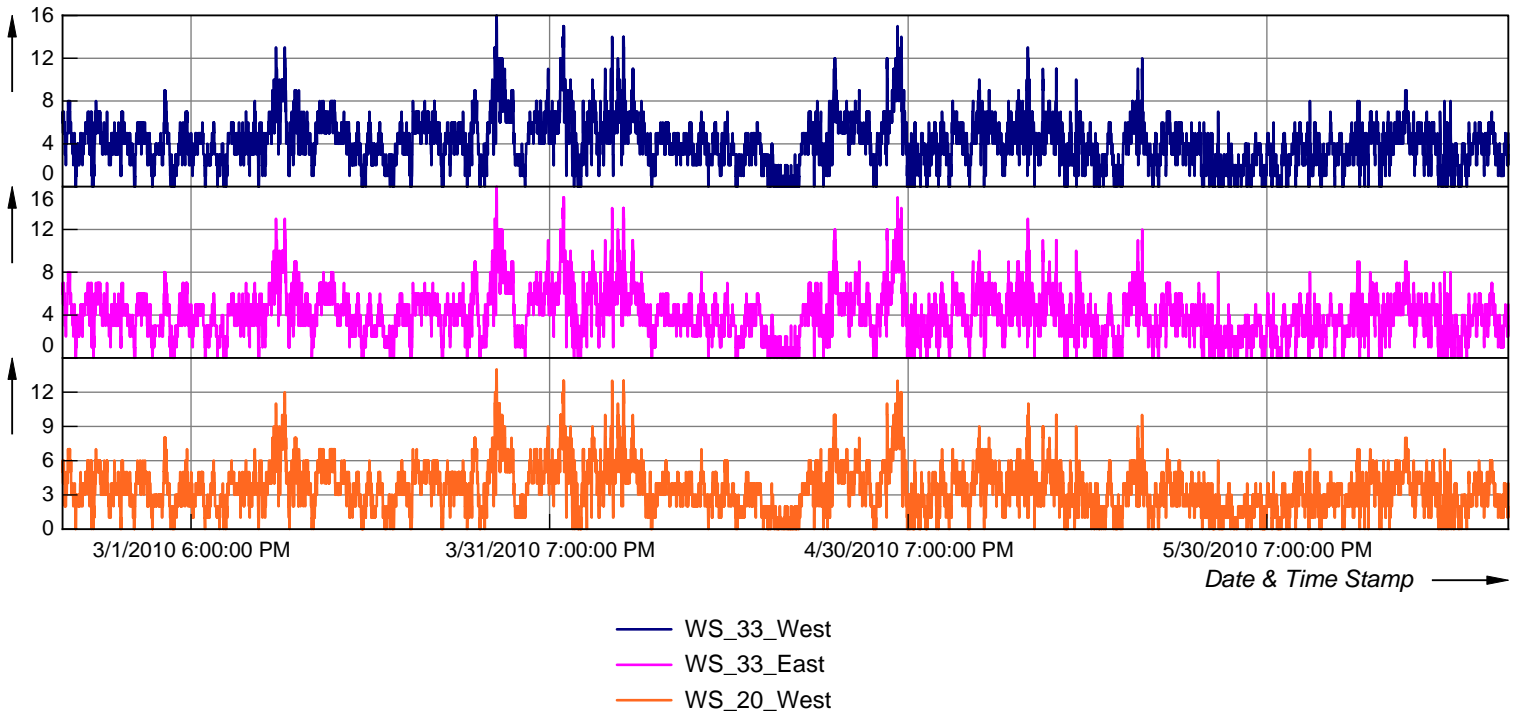
³ Constant values for minimum 3 consecutive 10-min intervals (only average)

⁴ Ratio of tested signal and reference signal: 1/3 – 3 [dimensionless]

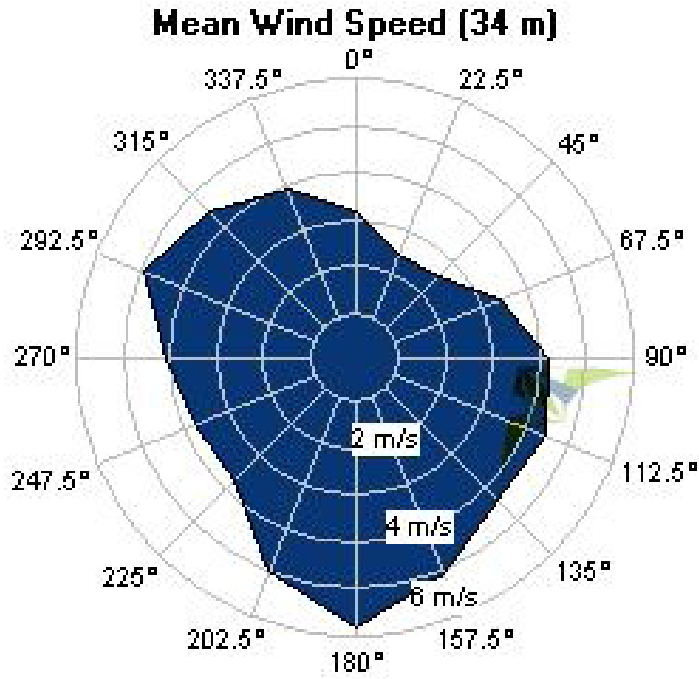
⁵ $v_{max} > 2.5 * v_{avg}$ (10-min-interval)

2 Intermediate Evaluation (Preliminary)

2.1 Average Timeseries Plots, all relevant sensors



2.2. Wind Rose: Graphical Presentation of joined wind speed and direction (Top Anemometer 33W) (North = 0 Deg ; South = 180 Deg ; West = 270 Deg ; East = 90 Deg)



2.3 Graphical Presentation of wind speed frequency distribution (Top Anemometer _34 W)

