Measure-Correlate-Predict Long-Term Wind Speed

Long-term mean wind speed at a site from a short measurement correlated with a long-term reference station, by linear regression and by the ratio method.

Method: Measure-correlate-predict by linear regression

Input parameters

Unit system: SI

Parameter	Value	Unit
Regression slope (site on reference)	1.0500	
Regression intercept	0.60000	m/s
Long-term mean at the reference station	5.6000	m/s
Reference mean during the concurrent period	6.0000	m/s
Site mean during the concurrent period	6.9000	m/s

Calculated results

Parameter	Value	Unit
Long-term site mean (regression)	6.4800	m/s
Long-term site mean (ratio method)	6.4400	m/s
Adjustment to the measured mean (regression)	-6.0870	%
Approximate change in energy	-17.172	%

Notes for this case

• MCP: fit site = a × reference + b over the concurrent period, then apply it to the reference station's long-term mean. Needs at least a year of concurrent data, a good correlation (r² above about 0.8) and a consistent reference record. The cube gives only a rough energy change.

Formula and method

$$\bar{y}_{LT} = a\bar{x}_{LT} + b, \quad \bar{y}_{LT,ratio} = \bar{y}_c \frac{\bar{x}_{LT}}{\bar{x}_c}$$

Variables

a	Regression slope (site on reference)	-
b	Regression intercept	m/s
$\bar{x}_{LT}$	Long-term mean at the reference station	m/s
$\bar{x}_c$	Reference mean during the concurrent period	m/s
$\bar{y}_c$	Site mean during the concurrent period	m/s
$\bar{y}_{LT}$	Long-term site mean (regression)	m/s
$\bar{y}_{LT}/\bar{y}_c - 1$	Adjustment to the measured mean (regression)	-
$(\bar{y}_{LT}/\bar{y}_c)^3 - 1$	Approximate change in energy	-

Method and standards

Measure-correlate-predict.

Assumptions and limits

- Linear relation stable over time.

References

Measure-correlate-predict by linear regression

Report details

Report reference	FCC-6B6P-V8WC (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/environmental/wind-power/mcp-long-term-wind-speed

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.