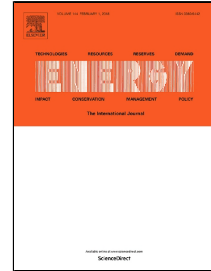


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# Analysis of wind power intermittency based on historical wind power data

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## Abstract

As wind power provides an increasingly larger share of electricity supply, the challenges caused by wind power intermittency have become more and more prominent. A better understanding of wind power intermittency would contribute to mitigate it effectively. In the present study, the definition of wind power intermittency is given firstly. Based on the definition, wind power intermittency is quantified by duty ratio of wind power ramp (DRWPR). This index provides system operators quantitative insights into wind power intermittency. Furthermore, some characteristics of wind power intermittency can be extracted by the index, such as the differences between wind speed intermittency and wind power intermittency, the differences of wind power intermittency between different scales and so on. The wind power intermittency of a Chinese wind farm is studied in detail based on the proposed index and historical data.

**Keywords:** wind power; intermittency; duty ratio; ramp event; characteristics; forecasting

## Abbreviations

AGC	Automatic generation control
ACPS1D	Average control performance stands 1 drop
ACF	Autocorrelation function
DRWPR	Duty ratio of wind power ramp
ELCWP	Electricity loss of curtailed wind power
ERCOT	Electric Reliability Council of Texas
MFD	Maximum frequency deviation
MACE	Maximum area control error
MCPS1D	Maximum control performance stands 1 drop
PCWP	Proportion of curtailed wind power
PDF	Probability density function
PACF	Partial autocorrelation function
SVR	Support vector regression
WPD	Wind power density

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