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LIDAR wind speed measurements at a Taiwan onshore wind park

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Measurements of wind speed and wind direction were carried out using a Leosphere Windcube LIDAR system at a Taiwan onshore wind park. The Lidar shot a total of five laser beams to the atmosphere to collect the light-of-sight (LOS) velocity. Four beams were sent successively in four cardinal directions along a 28° scanning cone angle, followed by a fifth, vertical beam. An unchangeable sampling rate of approximately 1.2 Hz was set in the LIDAR system to collect the LOS velocity. The supervisory control and data acquisition (SCADA) data from two GE 1.5 MW wind turbines near the LIDAR deployment site were acquired for the whole measuring period from February 4 to February 16 of 2015. The SCADA data include the blade angular velocity, the wind velocity measured at hub height from an anemometer mounted on the nacelle, the wind turbine yaw angle, and power production; each parameter was recorded as averages over 1-min periods. The data analysis involving the LIDAR measurements and the SCADA data were performed to obtain the turbulent flow statistics. The results show that the turbine power production has significant dependence to the wind speed, wind direction, turbulence intensity and wind shear.