

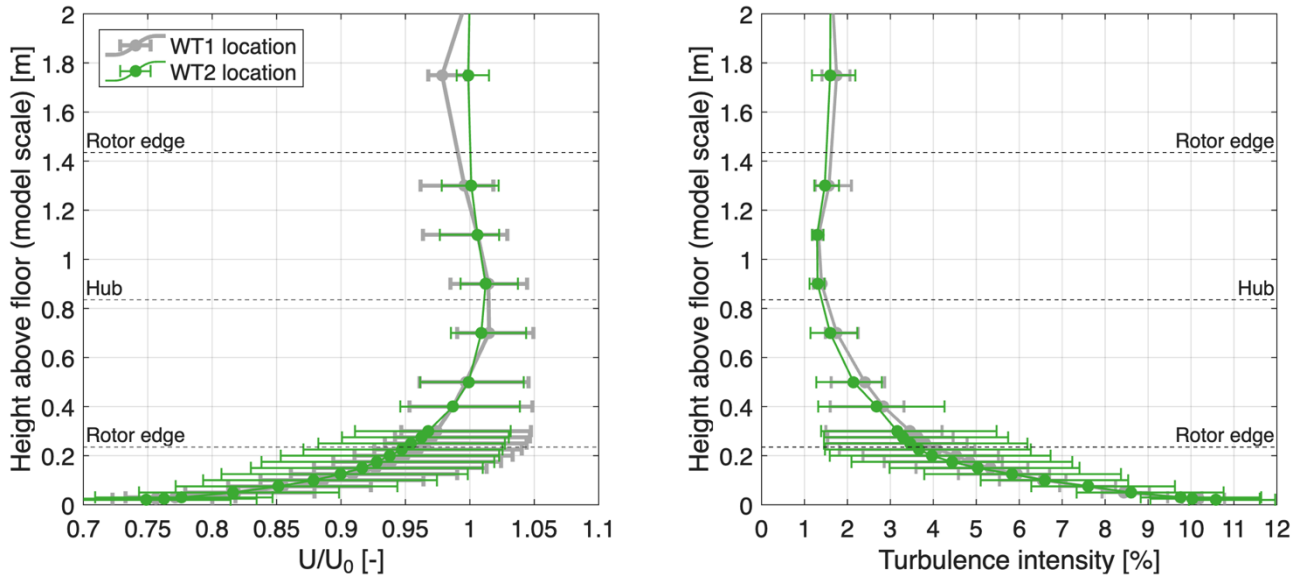


Figure A1. Vertical profiles of mean streamwise velocity and turbulence intensity in the wind-tunnel test section at the wind turbine locations. The error bars show the minimum and maximum values over four measurement points at lateral distances of $y_i = [-0.25, 0, 0.5, 0.75]$ m.

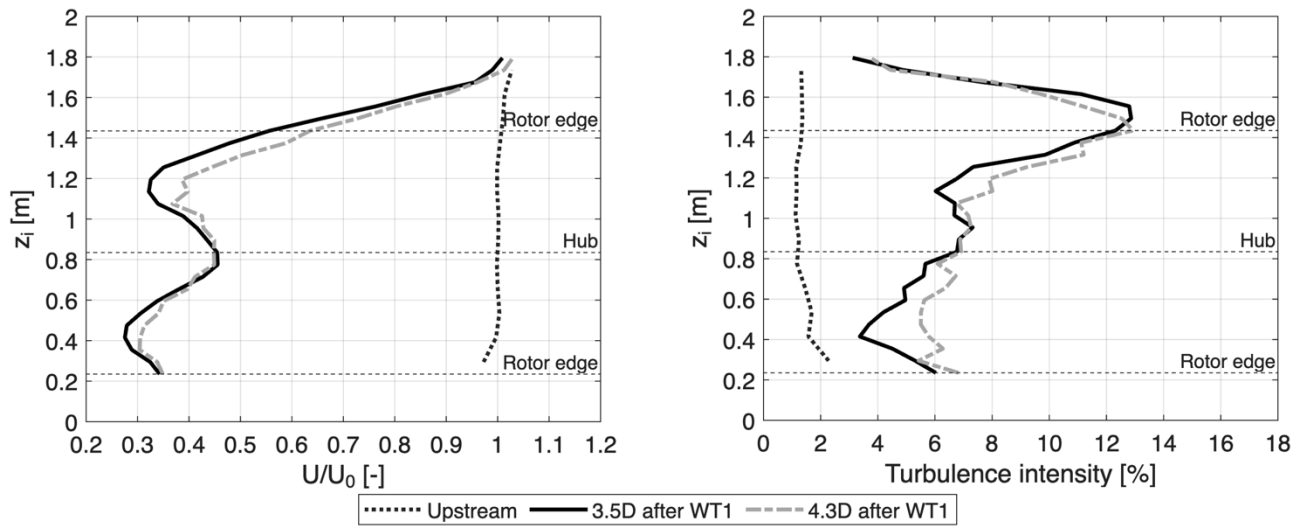


Figure A2. Vertical profiles of mean streamwise velocity and turbulence intensity at $y_i = 0.15D$ and different x_i positions.

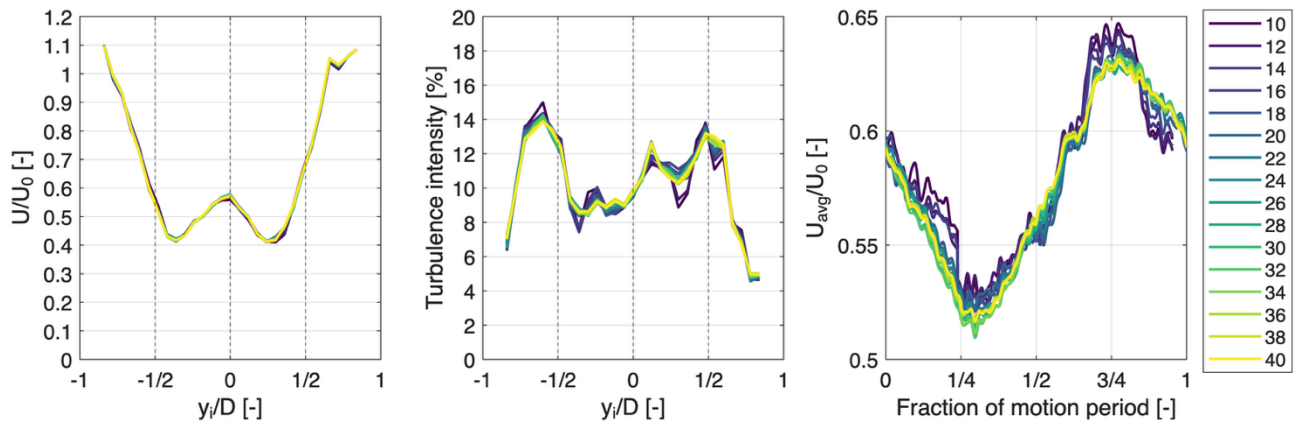


Figure A3. Variation of the mean streamwise velocity (left), turbulence intensity (center), and instantaneous spatially averaged streamwise velocity over the rotor region (right), computed using a number of motion cycles between 10 and 40 for the case with surge motion at a frequency of 2 Hz, at a distance of 3.5D downstream of turbine 1.

$$A_{F_x} = \frac{\rho R \pi U^2}{2} \frac{1}{2} (C_t(\lambda_{\min})(1 + \Delta U^*)^2 - C_t(\lambda_{\max})(1 - \Delta U^*)^2) \quad \text{Eq. A1}$$

$$\lambda_{\min} = \frac{R \omega_r}{U(1 + \Delta U^*)} \quad \text{Eq. A2}$$

$$\lambda_{\max} = \frac{R \omega_r}{U(1 - \Delta U^*)} \quad \text{Eq. A3}$$

Table A1. Values of the main variables of Eq. A1–A3 for WT1 in “WT1” case and for WT2 in “WT1 fix.” Case.

	WT1 in “WT1” case	WT2 in “WT1 fix.” case
Ct “fixed”	0.82	0.70
U	4.9	3.1
ΔU	0.25 m/s	0.25 m/s
ΔU^*	0.05	0.08
ω_r	570	360
$\lambda_{\min}$	6.96	6.95
$\lambda_{\max}$	7.69	7.68
$C_t(\lambda_{\min})$	0.78 (-0.04 w.r.t. Ct fixed)	Assume the same variation w.r.t Ct fixed of WT1: 0.66
$C_t(\lambda_{\max})$	0.86 (+0.04 w.r.t. Ct fixed)	Assume the same variation w.r.t Ct fixed of WT1: 0.74
$\frac{1}{2} (C_t(\lambda_{\min})(1 + \Delta U^*)^2 - C_t(\lambda_{\max})(1 - \Delta U^*)^2)$	0.042	0.072
$\frac{\rho R \pi U^2}{2}$	15.89	6.36
A_{F_x}	0.67	0.46
A_{F_x} measured (Fig. 6)	0.63	0.43 (0.5 Hz), 0.50 (2 Hz)