

Supplementary material for

Wake Characteristics of Tall Buildings in a Realistic Urban Canopy Boundary-Layer Meteorology

Denise Hertwig* · Hannah L. Gough · Sue Grimmond · Janet F. Barlow · Christoph W. Kent · William E. Lin · Alan G. Robins · Paul Hayden

*Department of Meteorology, University of Reading, P.O. Box 243, Reading, RG6 6BB, UK
E-mail: d.hertwig@reading.ac.uk

Table ESM_1 Fit parameters for curves in Fig. 6. Fit is obtained for $f(x) = a + bx^{-p}$, describing the change of velocity differences (ΔU) with longitudinal distance d_x/H .

Case	z/H_{81}	a	b	p
Tall _N (Fig. 6a)	0.33	-0.020	-0.292	1.499
	0.37	-0.036	-0.308	1.715
	0.45	0.030	-0.417	1.191
	0.57	0.015	-0.389	1.456
	0.68	0.010	-0.326	1.578
	0.74	0.029	-0.310	1.369
	0.80	0.010	-0.249	1.719
Core _N (Fig. 6b)	0.33	-0.041	-0.056	2.853
	0.37	-0.057	-0.060	2.206
	0.45	-0.032	-0.164	1.197
	0.57	-0.046	-0.226	1.387
	0.68	-0.074	-0.259	1.68
	0.74	-0.007	-0.383	1.156
	0.80	-0.035	-0.369	1.509
Case	z/H_{134}	a	b	p
Tall _{SE} (Fig. 6c)	0.20	0.276	-1.765	1.253
	0.27	0.152	-2.148	1.750
	0.41	0.069	-2.861	2.291
	0.45	0.101	-2.862	2.238
	0.60	0.096	-2.177	2.100
	0.75	0.131	-1.730	1.805
	0.94	0.048	-1.710	2.662
Core _{SE} (Fig. 6d)	0.20	-0.173	-4.238	5.032
	0.27	0.097	-0.988	0.998
	0.41	-0.088	-2.000	2.172
	0.45	0.243	-1.539	0.950
	0.60	0.342	-1.548	0.804
	0.75	-0.047	-2.193	2.337
	0.94	0.002	-1.225	2.131
Increased _{SE} (Fig. 6e)	0.20	-0.044	-1.620	2.330
	0.27	0.073	-1.413	1.504
	0.41	0.024	-2.046	1.936
	0.45	0.349	-1.685	0.951
	0.60	0.134	-1.566	1.357
	0.75	0.053	-1.732	1.935
	0.94	0.119	-0.746	1.201

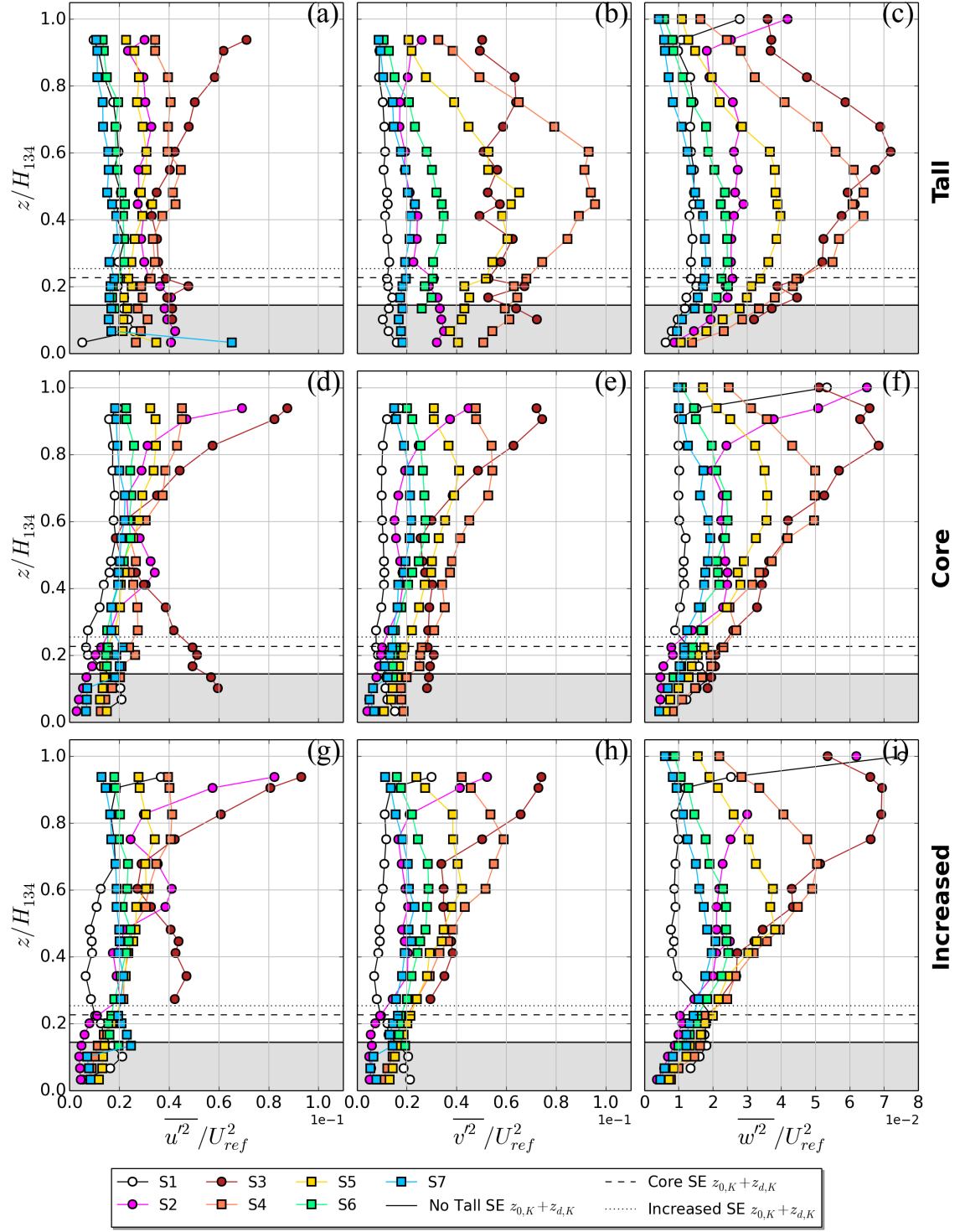


Fig. ESM_2 Vertical profiles of (a,d,g) $\overline{u'^2}$, (b,e,h) $\overline{v'^2}$, and (c,f,i) $\overline{w'^2}$ for (a-c) Tall_{SE} and (d-f) Core_{SE} and (g-i) Increased_{SE}. Symbols as in Fig. 5.

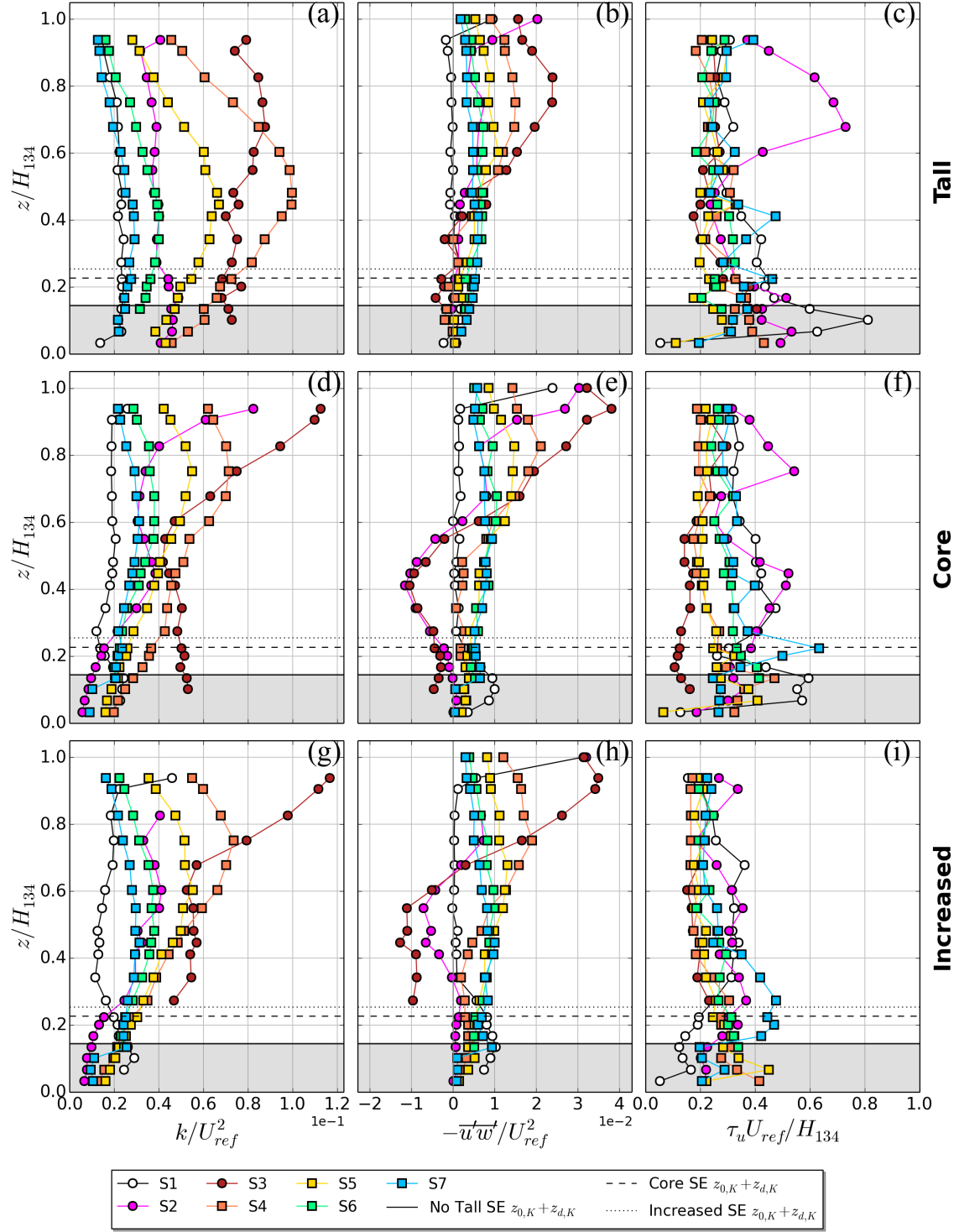


Fig. ESM.3 Vertical profiles of (a,d,g) turbulence kinetic energy, (b,e,h) vertical turbulent momentum flux and (c,f,i) turbulence integral time scale of the streamwise velocity for (a–c) Tall_{SE} and (d–f) Core_{SE} and (g–i) Increased_{SE}. Symbols as in Fig. 5.

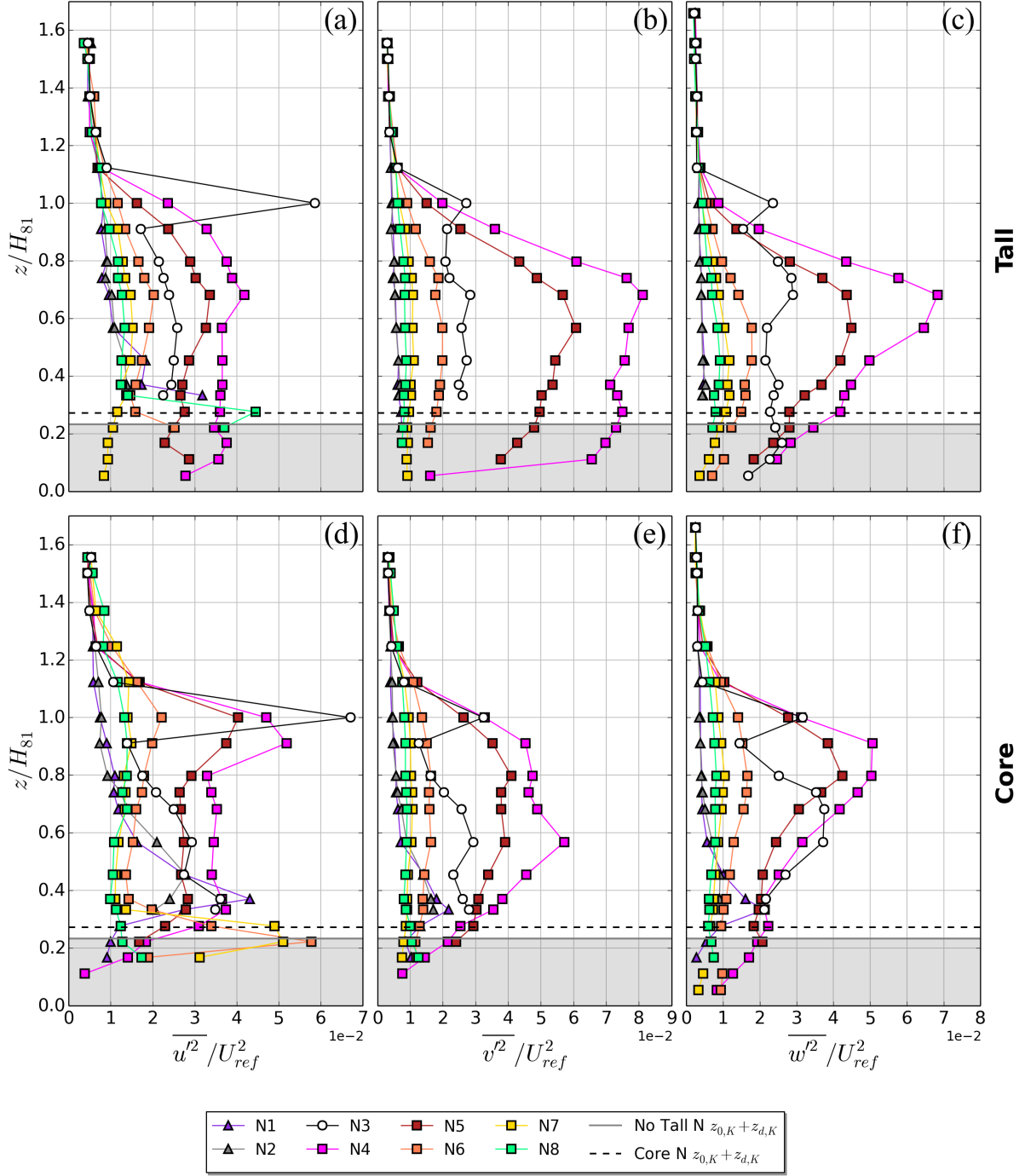


Fig. ESM_4 Vertical profiles of (a,d) $\overline{u'^2}$, (b,e) $\overline{v'^2}$, and (c,f) $\overline{w'^2}$ for (a-c) Tall_N and (d-f) Core_N. Symbols as in Fig. 4.

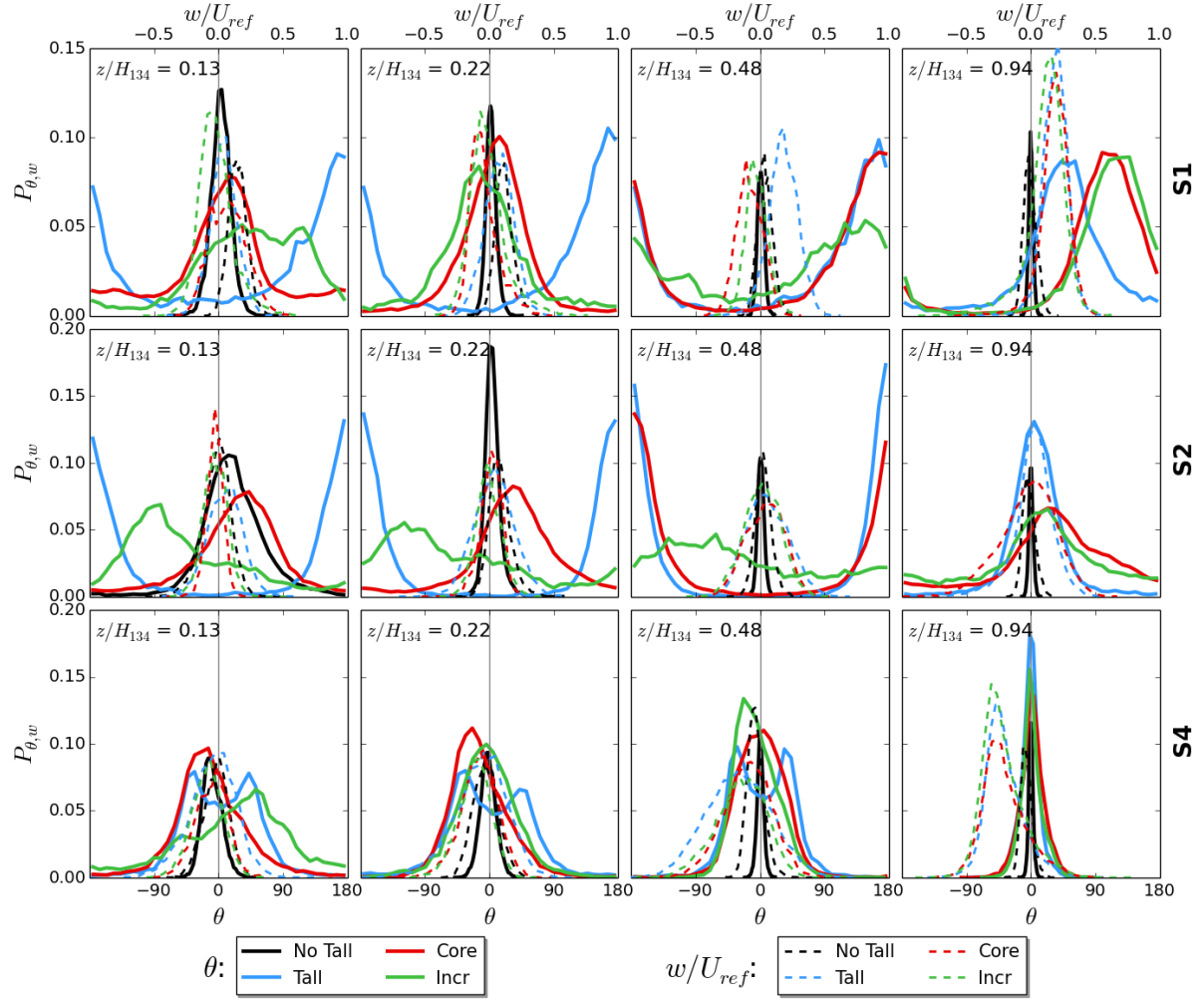


Fig. ESM.5 Frequency distributions of instantaneous values of horizontal wind direction θ (solid lines) and vertical velocity w (dashed lines) downwind of building T₁₃₄ (south-east orientation) at four heights in the No Tall_{SE}, Tall_{SE}, Core_{SE} and Increased_{SE} configurations (sites S1/S2: near-wake; S4: main-wake).

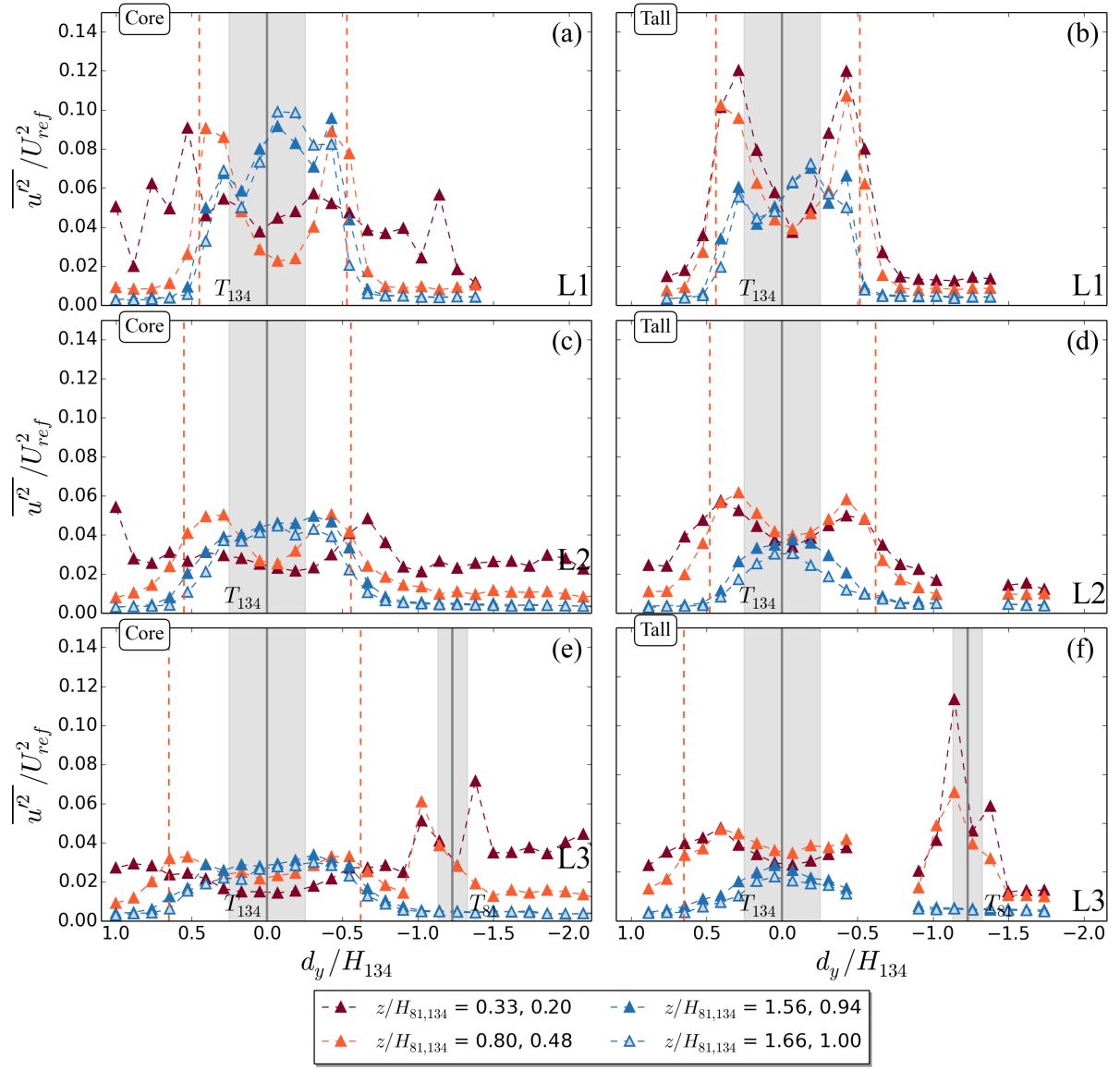


Fig. ESM.6 Lateral profiles in the wake of building T₁₃₄ of $\overline{u'^2}$ for (a,c,e) Core_{SE} and (b,d,f) Tall_{SE}. Symbols and notation as in Fig. 10.

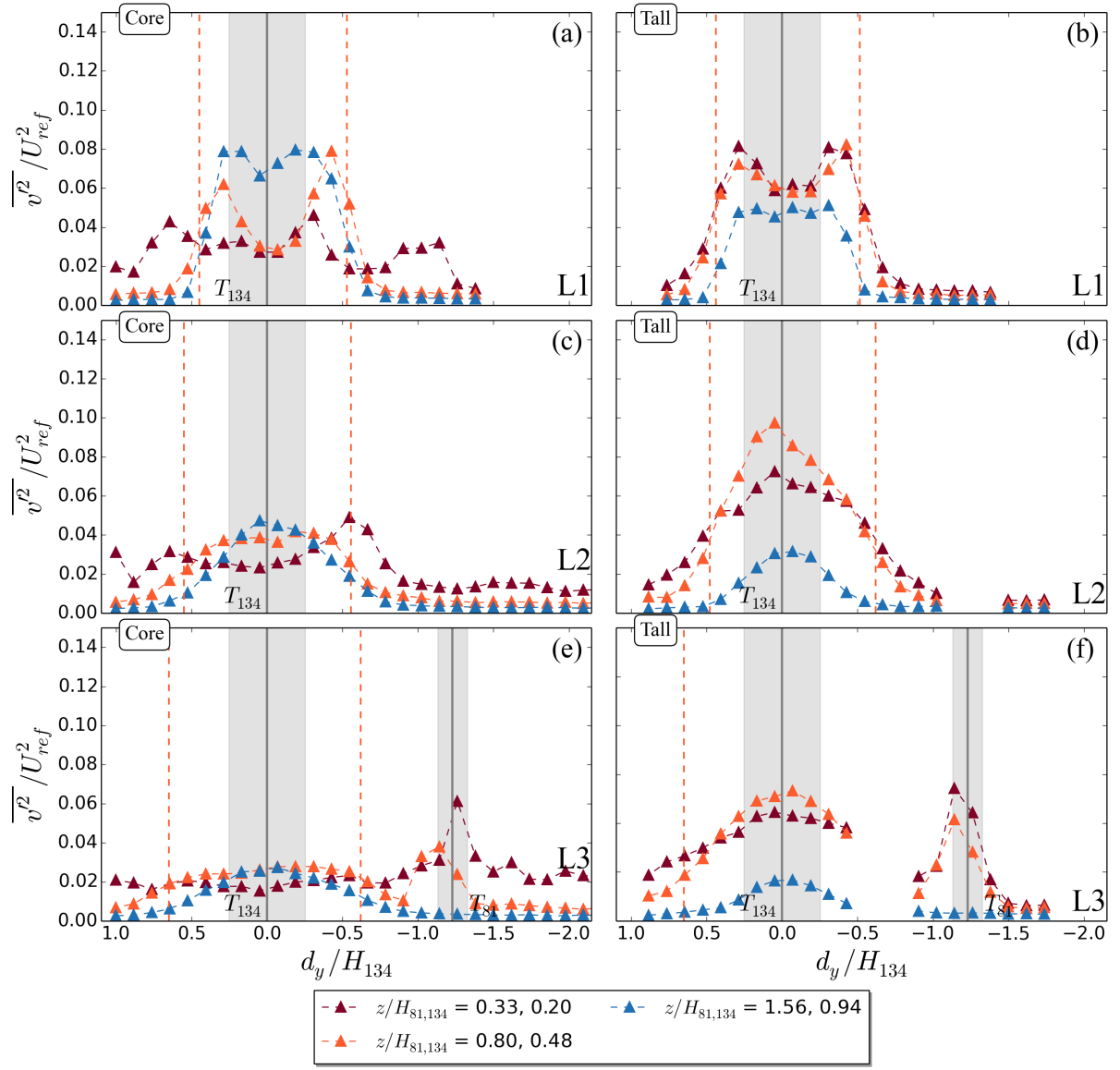


Fig. ESM_7 Lateral profiles in the wake of building T₁₃₄ of $\overline{v'^2}$ for (a,c,e) Core_{SE} and (b,d,f) Tall_{SE}. Symbols and notation as in Fig. 10.

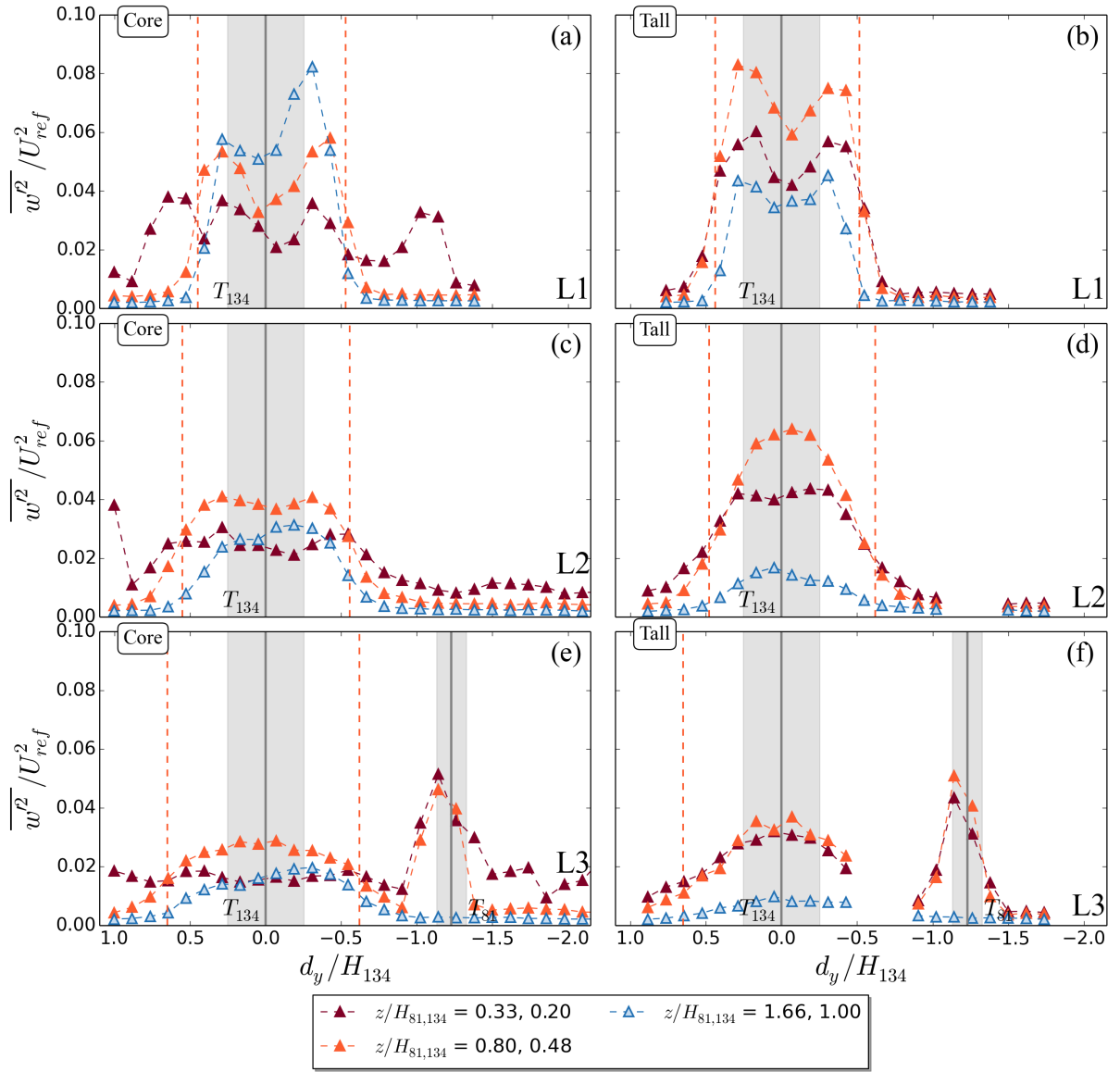


Fig. ESM_8 Lateral profiles in the wake of building T₁₃₄ of $\overline{w'^2}$ for (a,c,e) Core_{SE} and (b,d,f) Tall_{SE}. Symbols and notation as in Fig. 10.