TABLES

Table 1. List of initial simulation parameters and relevant non-dimensional numbers.

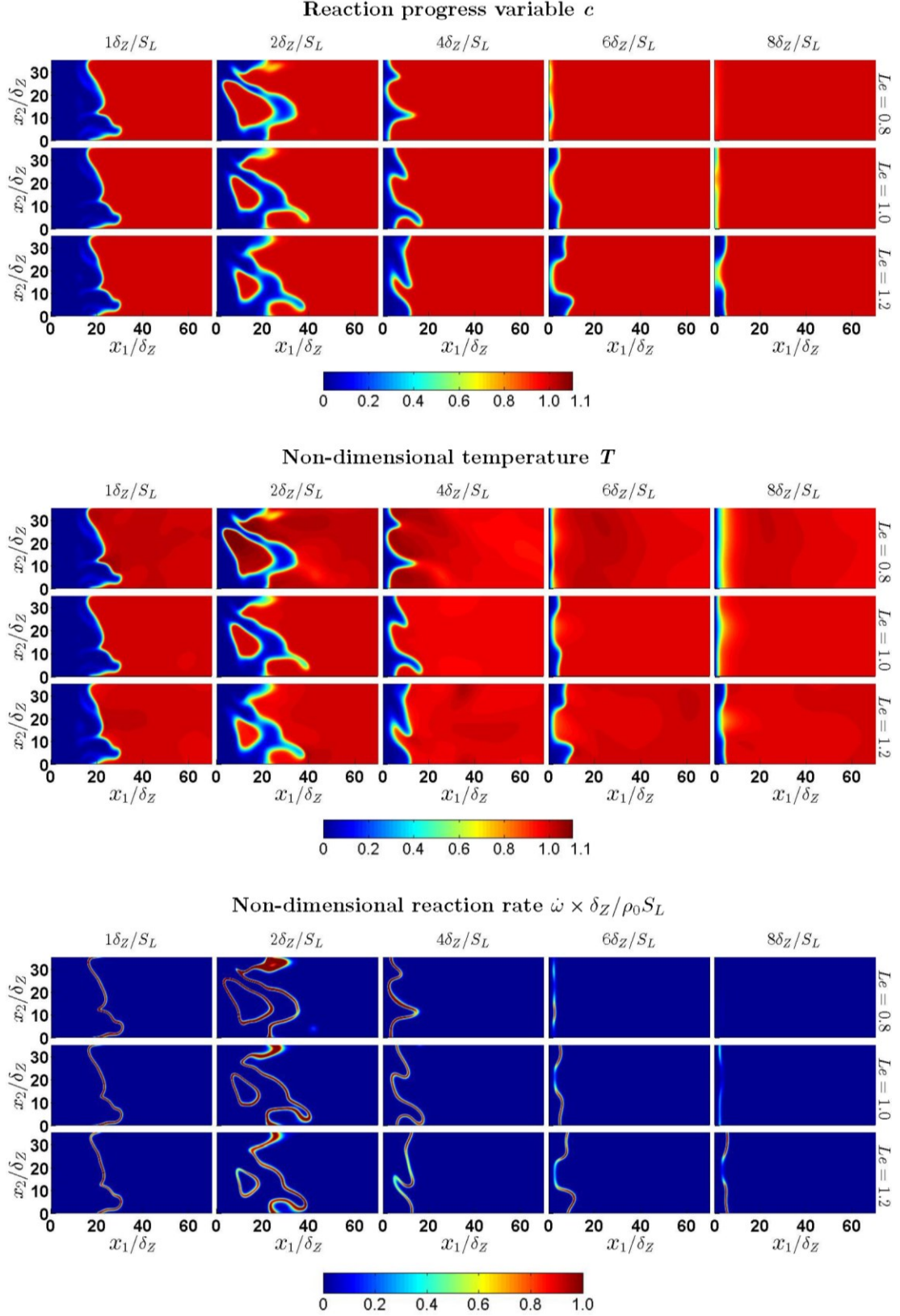| Case	A	B	C	D	E
u'/S_L	5.0	6.25	7.5	9.0	11.25
l/δ_{th}	1.67	1.44	2.5	4.31	3.75
Re_t	22.0	23.5	49.0	100	110
Da	0.33	0.23	0.33	0.48	0.33
Ka	8.65	13.0	13.0	13.0	19.5

FIGURE CAPTIONS

Figure 1: Distributions of reaction progress variable c, non-dimensional temperature T and non-dimensional reaction rate $\dot{\omega} \times \delta_Z/\rho_0 S_L$ for turbulent case D with $Le = 0.8, 1.0$ and 1.2 at $t = \delta_Z/S_L,\ 2\,\delta_Z/S_L,\ 4\,\delta_Z/S_L,\ 6\,\delta_Z/S_L,\ 8\,\delta_Z/S_L$ on central $x_1 - x_3$ plane.

Figure 2: Variations of $\tilde{c}(1 - \tilde{c})$ (solid line) and $\widetilde{c''^2}$ (dash line) with x_1/δ_Z at different time instants for cases A-E (1st-5th columns) and $Le = 0.8, 1.0$ and 1.2.

Figure 3: Variations of T_{1c}, ———; T_{2c}, ———; T_{3c}, ———; D_{1c}, ———; $(-D_{2c})$, ——— with x_1/δ_Z at $t = 4\delta_Z/S_L$, $6\delta_Z/S_L$, $8\delta_Z/S_L$, $10\delta_Z/S_L$ for turbulent cases A-E with $Le = 0.8, 1.0$ and 1.2.

Figure 4: Variations of $\overline{\rho u_1'' c''^2}$ extracted from DNS data (solid line) along with the predictions of Eqs. 9 (dotted line) and 10 (broken line) with x_1/δ_Z at $t = 4\delta_Z/S_L$, $6\delta_Z/S_L$, $8\delta_Z/S_L$, $10\delta_Z/S_L$ for turbulent cases A-E with $Le = 0.8, 1.0$ and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

Figure 5: Variations of $\overline{\rho u_1'' c''}$ extracted from DNS data (solid line) along with the predictions of Eqs. 14 (dotted circle line) and 15 (broken triangle line) with x_1/δ_Z at $t = 4\delta_Z/S_L$, $6\delta_Z/S_L$, $8\delta_Z/S_L$, $10\delta_Z/S_L$ for turbulent cases A-E with $Le = 0.8, 1.0$ and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

Figure 6: Variations of T_{3c} extracted from DNS data (solid line) along with the predictions of Eqs. 18 (dotted circle line) and 20 (broken triangle line) with x_1/δ_Z at

$t = 4\delta_Z/S_L$, $6\delta_Z/S_L$, $8\delta_Z/S_L$, $10\delta_Z/S_L$ for turbulent cases A-E with $Le = 0.8$, 1.0 and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

Figure 7: Variations of $\bar{\omega}^+ = \bar{\omega} \times \delta_Z/\rho_0 S_L$ with x_1/δ_Z along with the predictions of Eq. 19a at $t = 4\delta_Z/S_L$, $6\delta_Z/S_L$, $8\delta_Z/S_L$, $10\delta_Z/S_L$ for turbulent cases A-E with $Le = 0.8$, 1.0 and 1.2.

Figure 8: Variations of $\tilde{\varepsilon}_c^+ = \tilde{\varepsilon}_c \times \delta_Z/S_L$ obtained from DNS data and the predictions of Eqs. 21 and 24 with x_1/δ_Z at $t = 4\delta_Z/S_L$, $6\delta_Z/S_L$, $8\delta_Z/S_L$, $10\delta_Z/S_L$ for turbulent cases A-E with $Le = 0.8$, 1.0 and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

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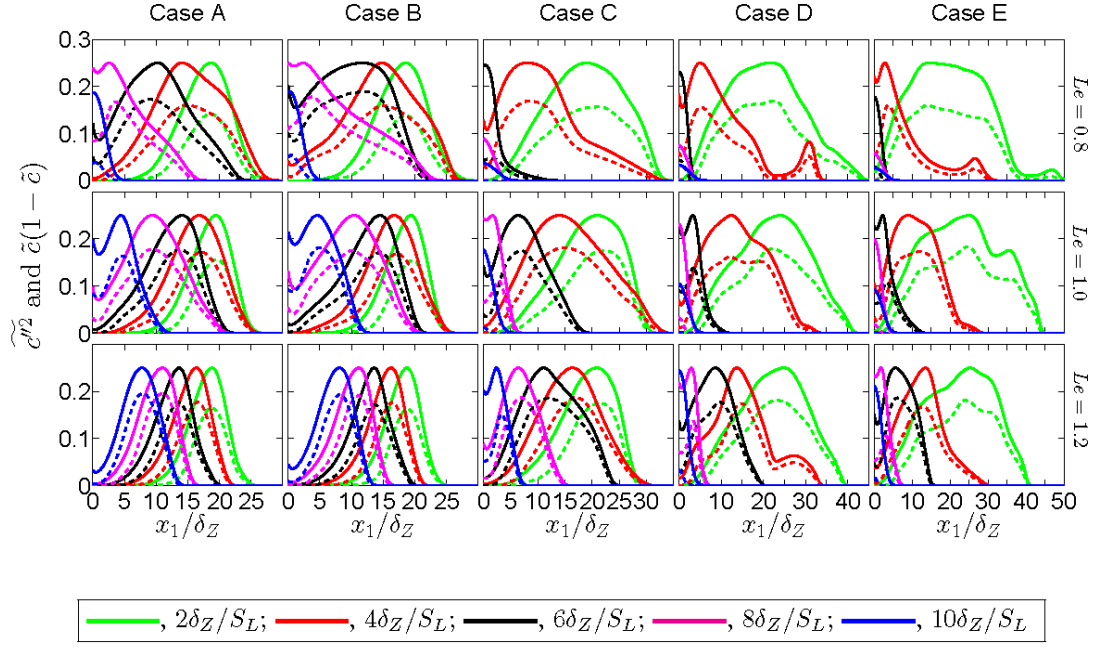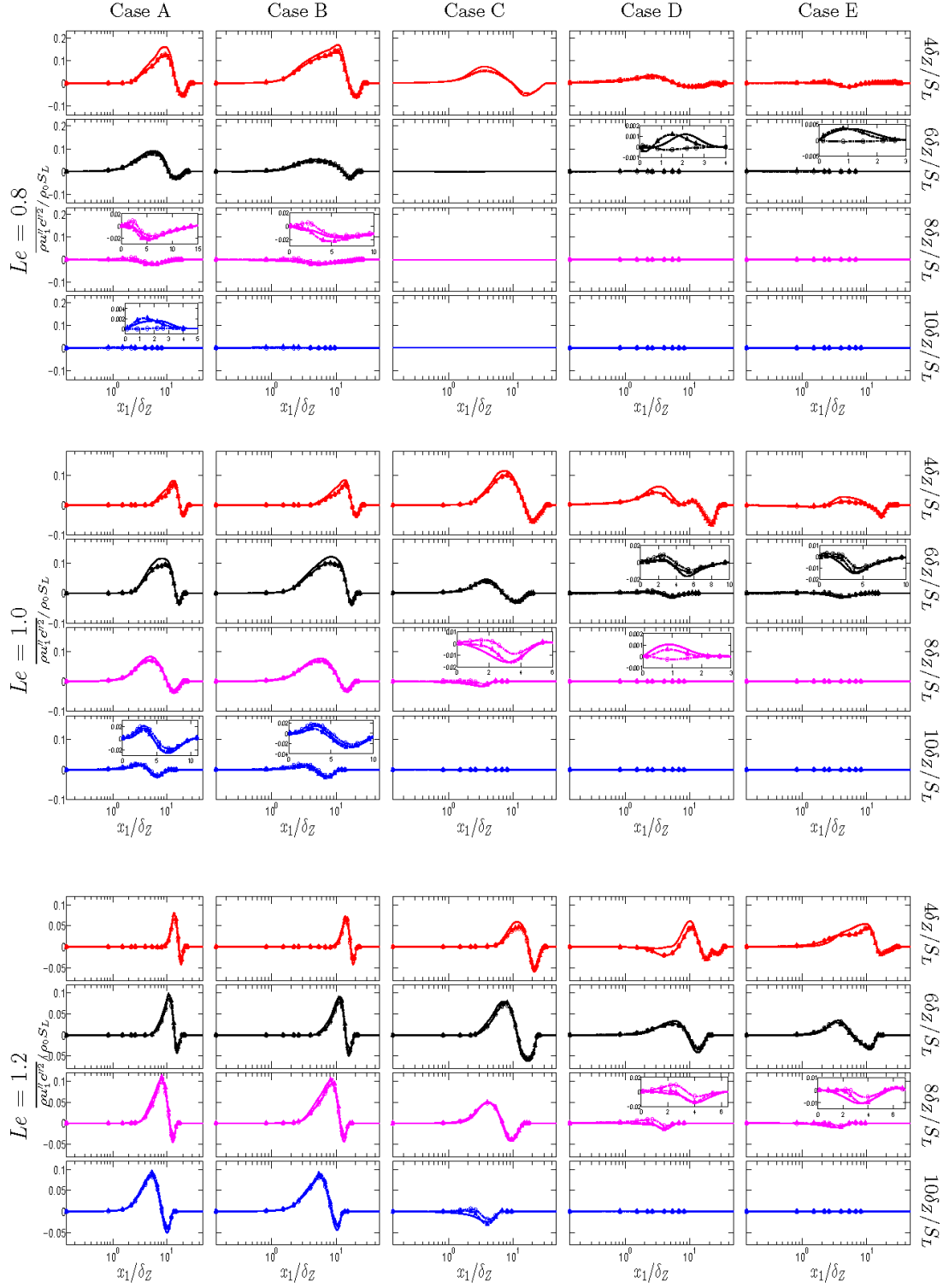
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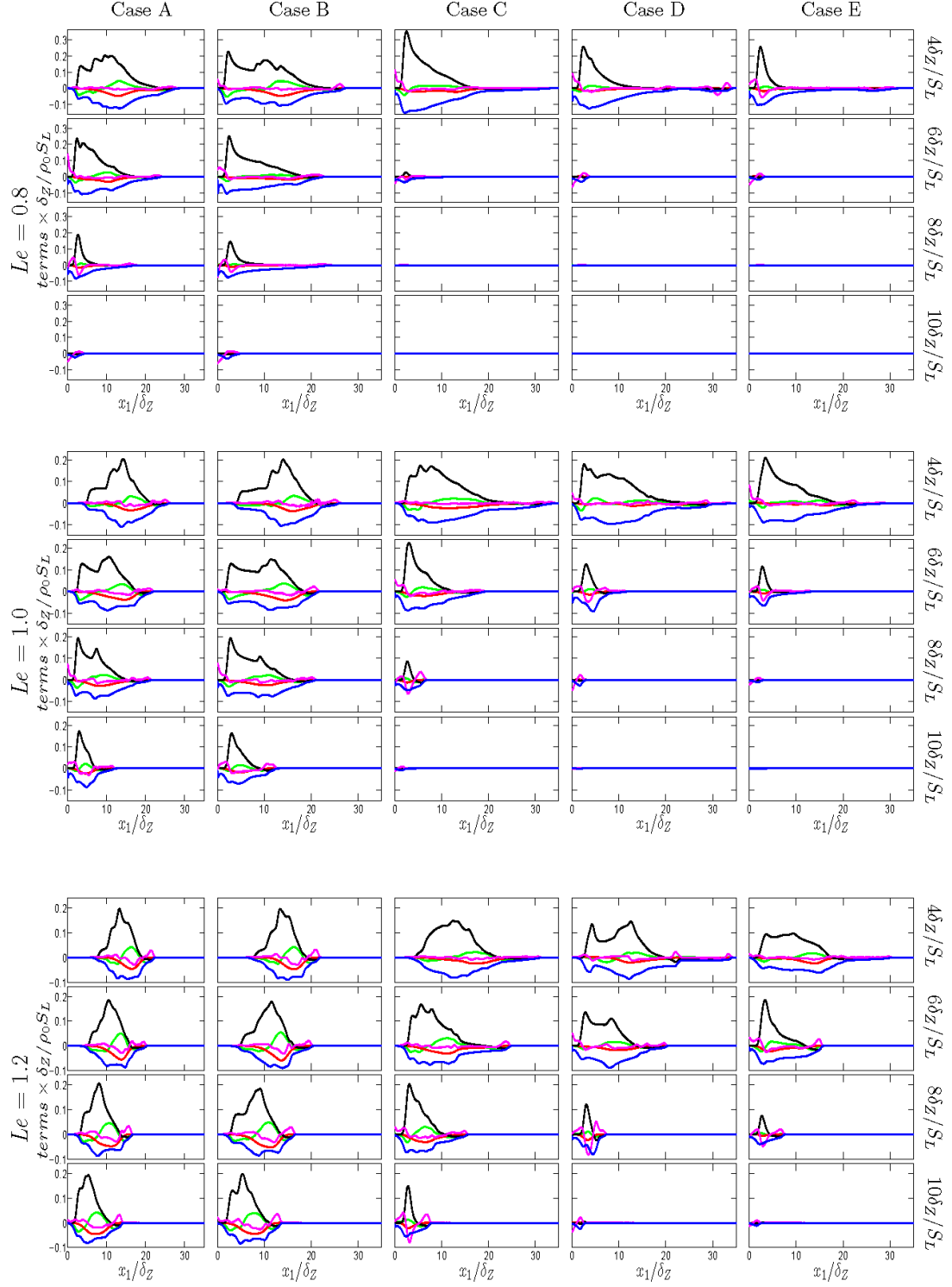
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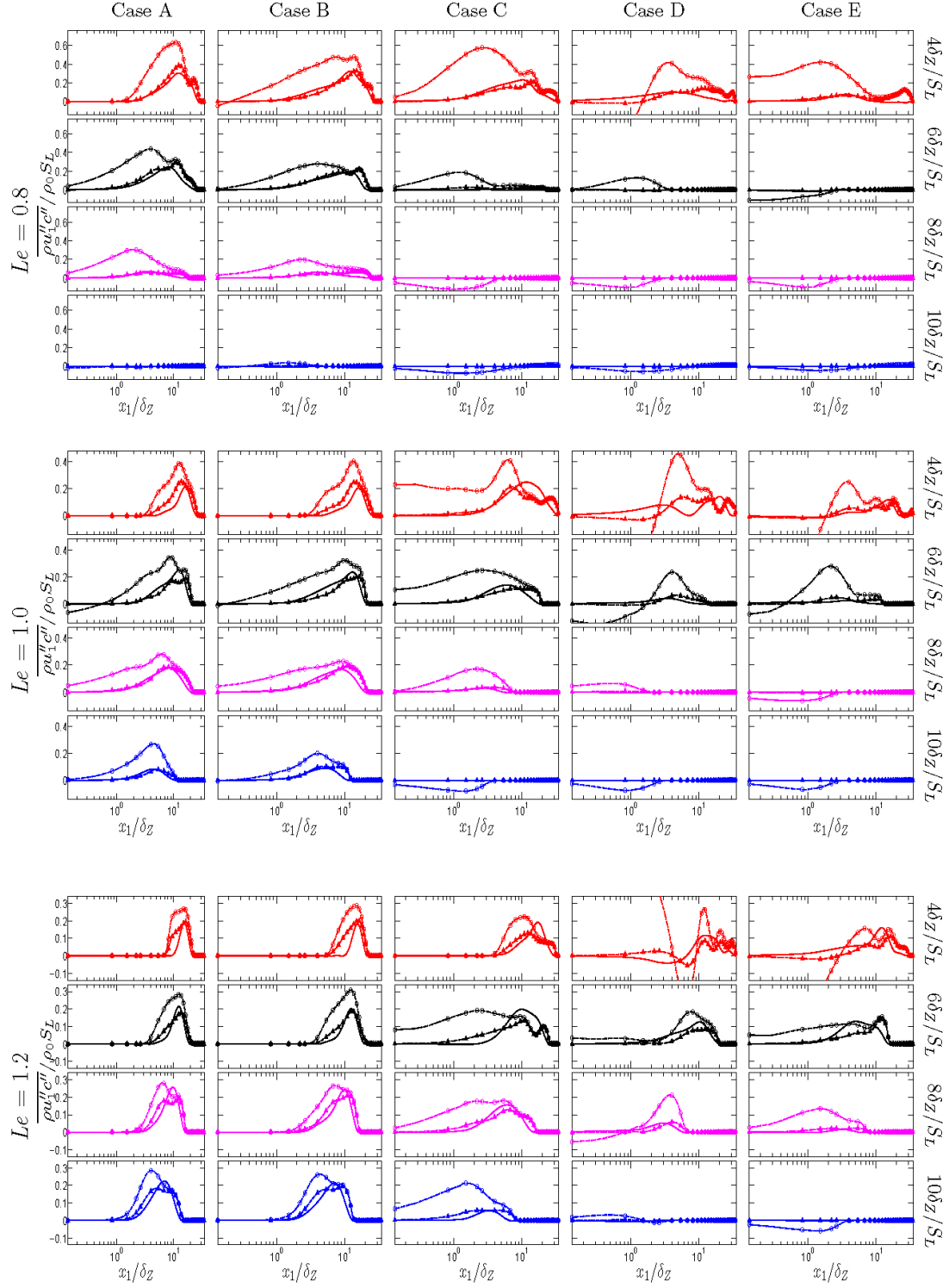
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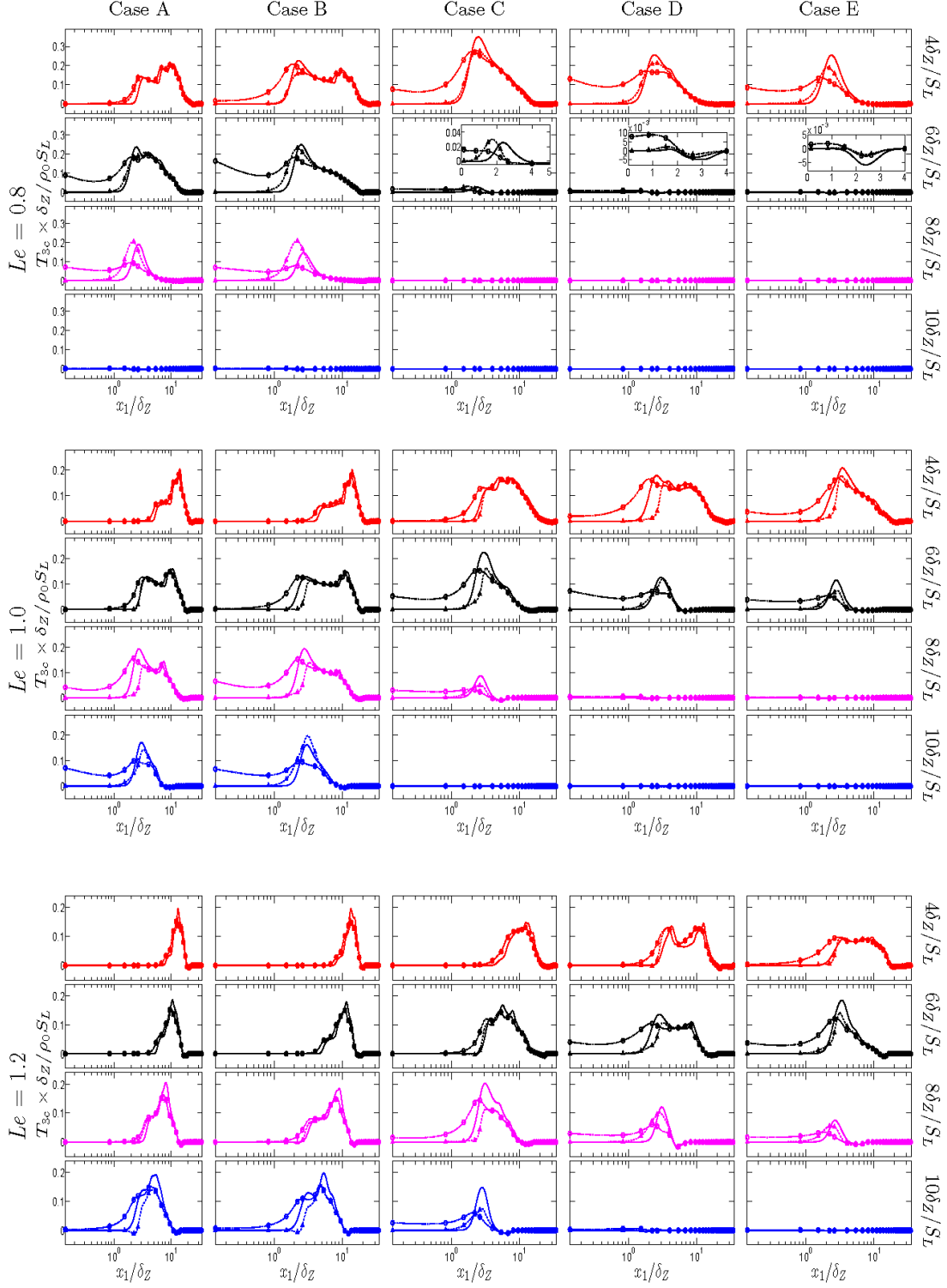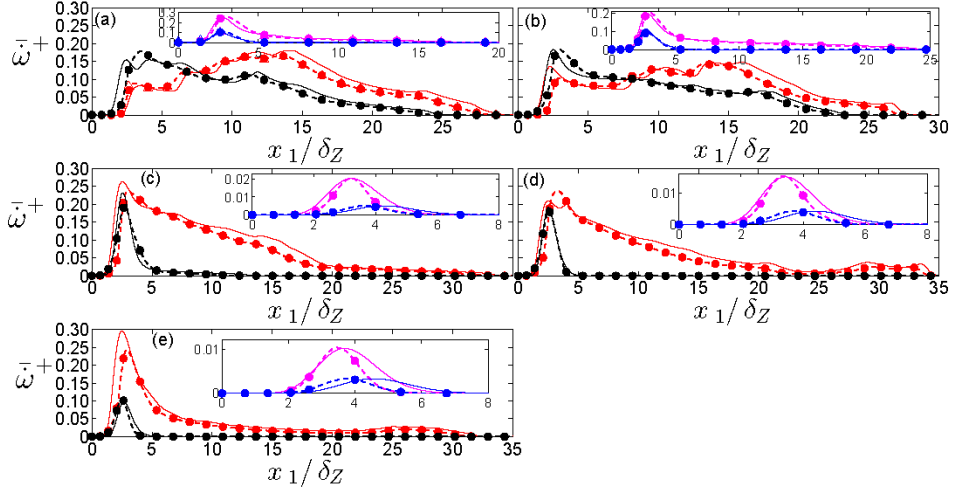
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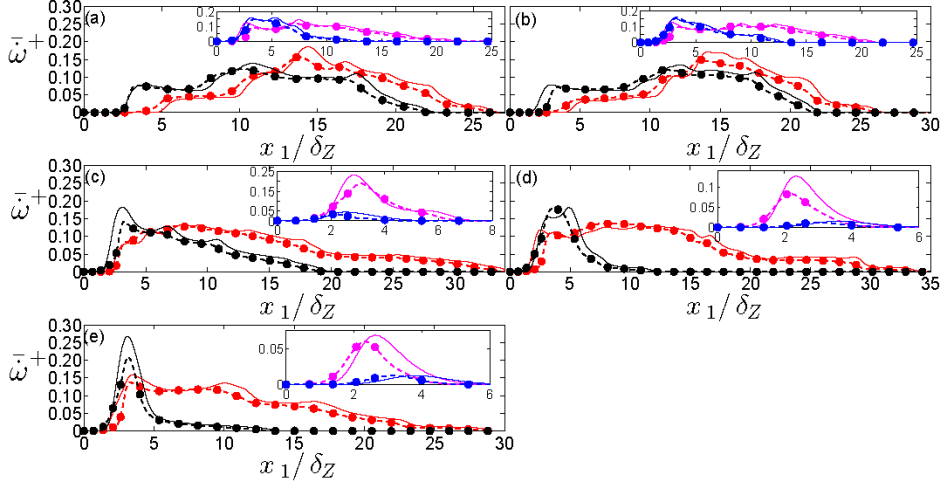
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$Le = 0.8$

$Le = 1.0$

$Le = 1.2$
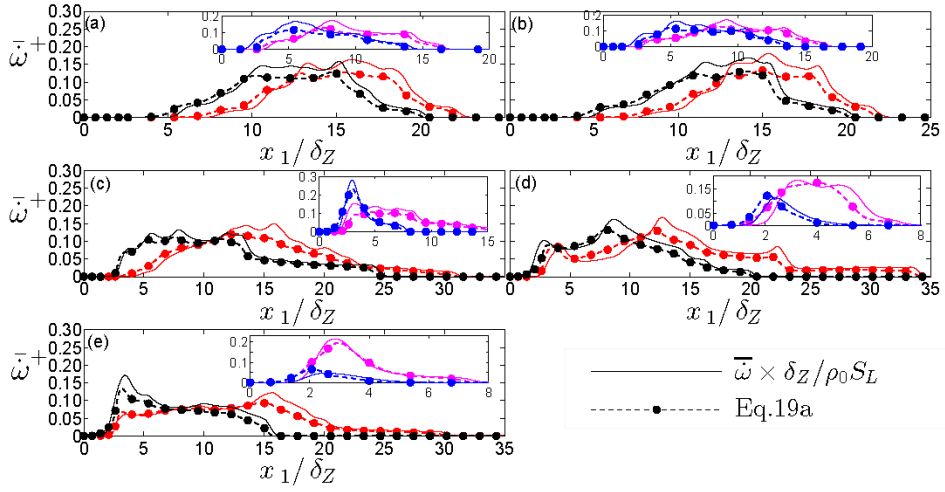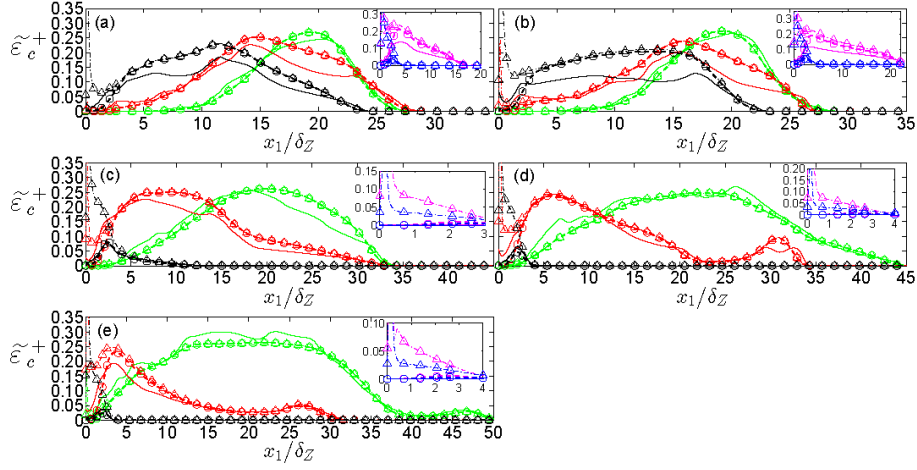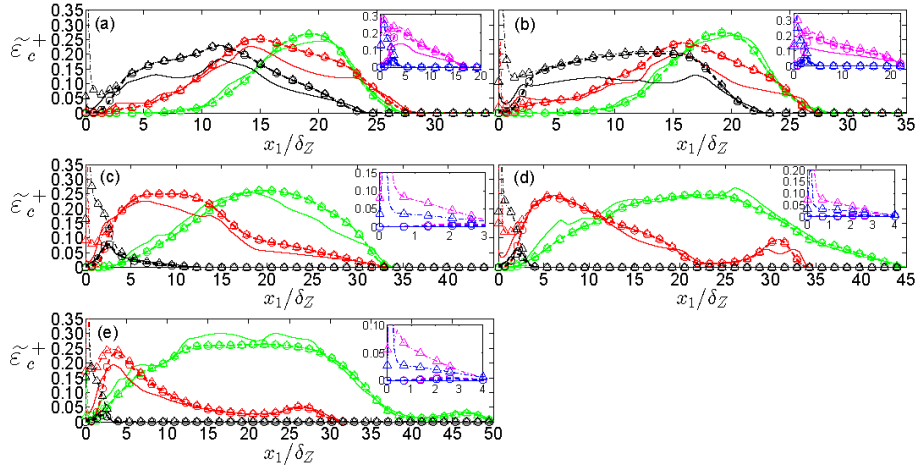

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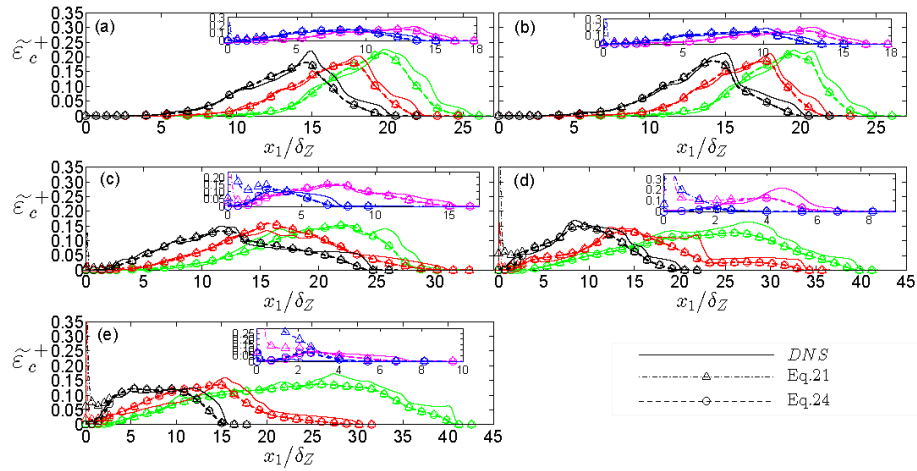
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