**TABLES**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Case | A | B | C | D | E |
|  | 5.0 | 6.25 | 7.5 | 9.0 | 11.25 |
|  | 1.67 | 1.44 | 2.5 | 4.31 | 3.75 |
|  | 22.0 | 23.5 | 49.0 | 100 | 110 |
|  | 0.33 | 0.23 | 0.33 | 0.48 | 0.33 |
|  | 8.65 | 13.0 | 13.0 | 13.0 | 19.5 |

**FIGURE CAPTIONS**

Figure 1: Distributions of reaction progress variable , non-dimensional temperature and non-dimensional reaction rate for turbulent case D with , 1.0 and 1.2 at , , , , on central plane.

Figure 2: Variations of   (solid line) and (dash line) with at different time instants for cases A-E (1st-5th columns) and and.

Figure 3: Variations of , ——; , ——; , ——; , ——; , —— with at *t* = , , , for turbulent cases A-E with , 1.0 and 1.2.

Figure 4: Variations of  extracted from DNS data (solid line) along with the predictions of Eqs. 9 (dotted line) and 10 (broken line) with at *t* =, , , for turbulent cases A-E with , 1.0 and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

Figure 5: Variations of  extracted from DNS data (solid line) along with the predictions of Eqs. 14 (dotted circle line) and 15 (broken triangle line) with at *t* = , , , for turbulent cases A-E with , 1.0 and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

Figure 6: Variations of  extracted from DNS data (solid line) along with the predictions of Eqs. 18 (dotted circle line) and 20 (broken triangle line) with at *t* = , , , for turbulent cases A-E with , 1.0 and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

Figure 7: Variations of    with along with the predictions of Eq. 19a at *t* = , , , for turbulent cases A-E with , 1.0 and 1.2.

Figure 8: Variations of   obtained from DNS data and the predictions of Eqs. 21 and 24 with at *t* = , , , for turbulent cases A-E with , 1.0 and 1.2. Please refer to the table in Fig. 2 for the colour scheme.

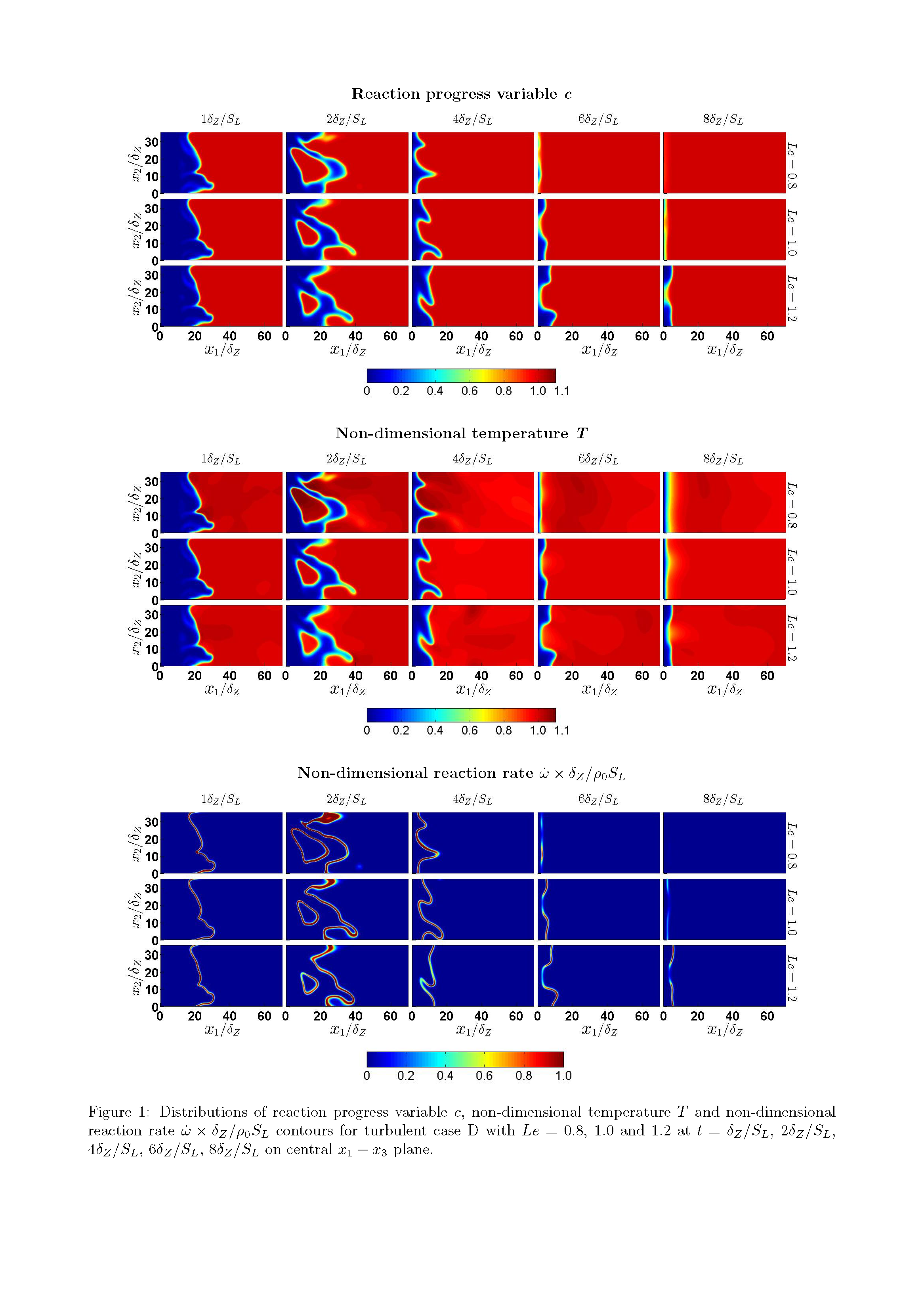


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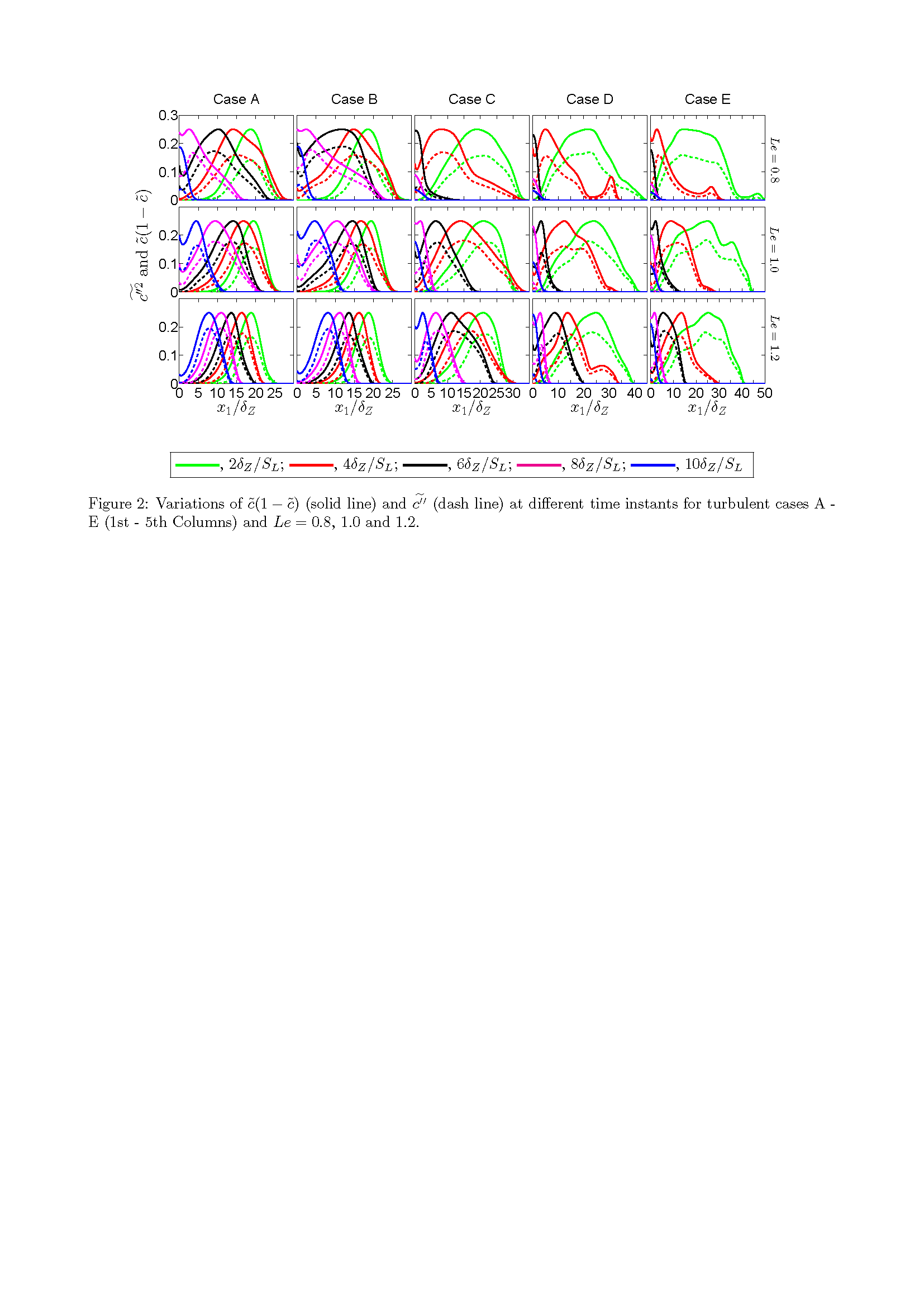


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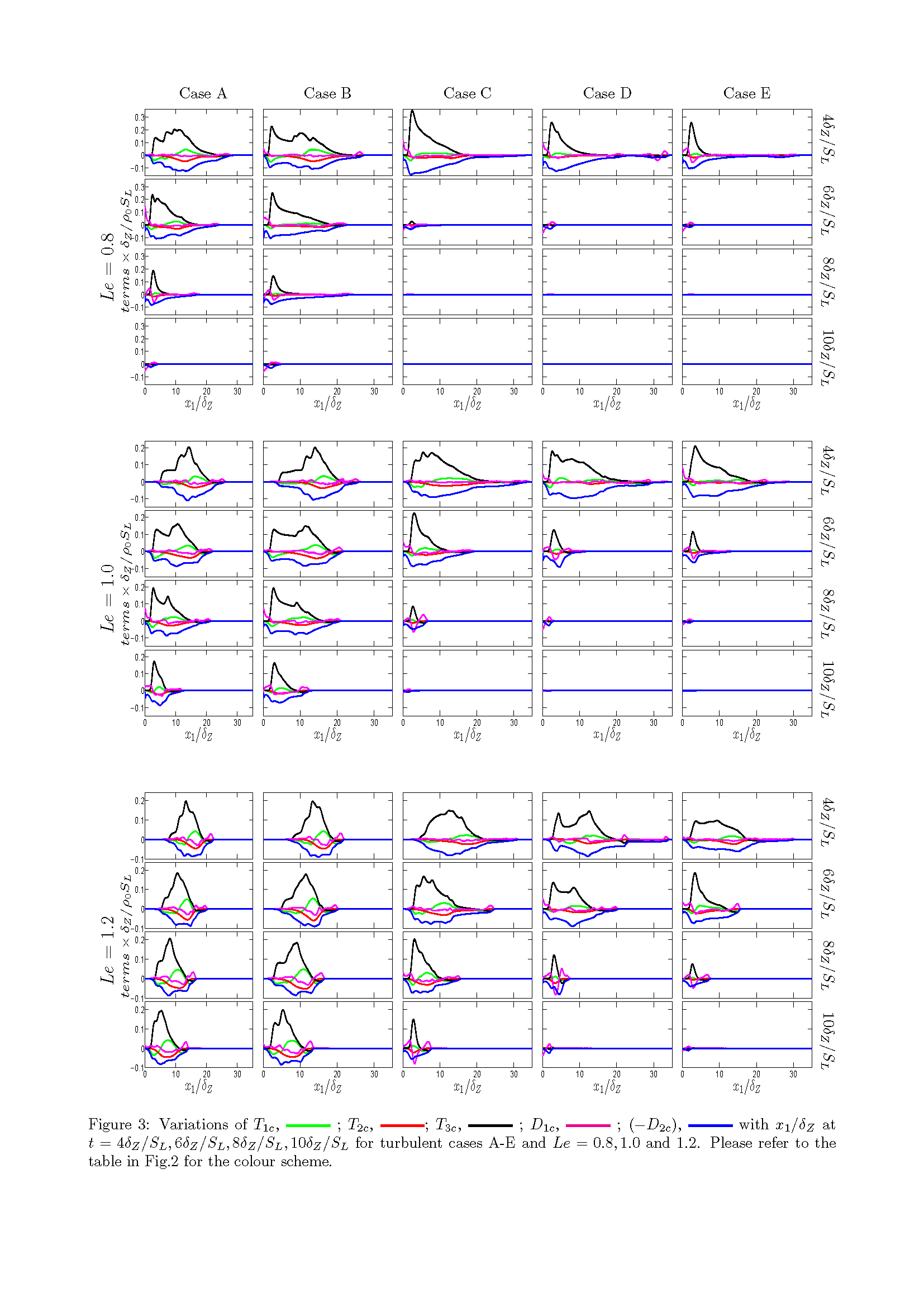


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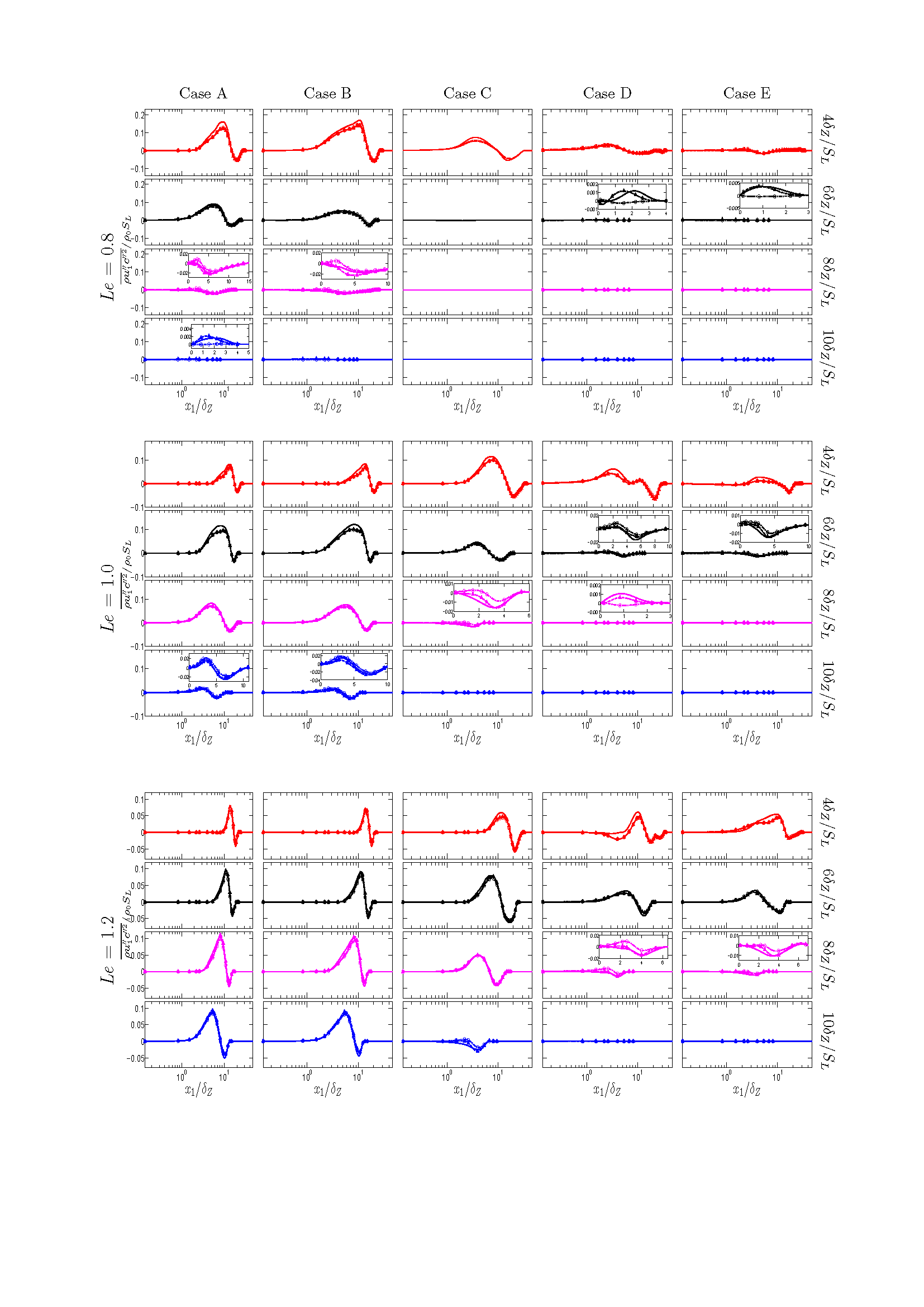


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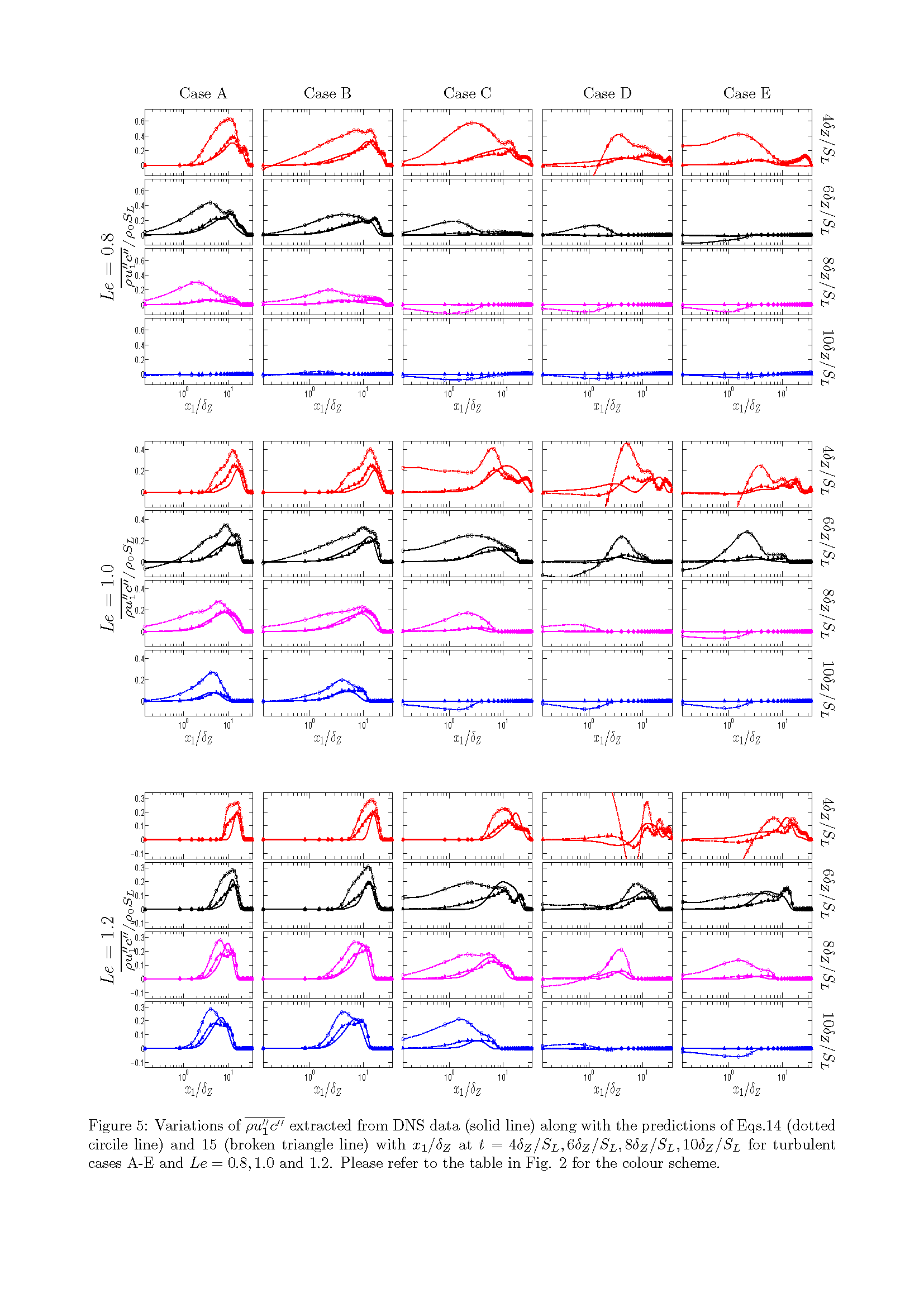


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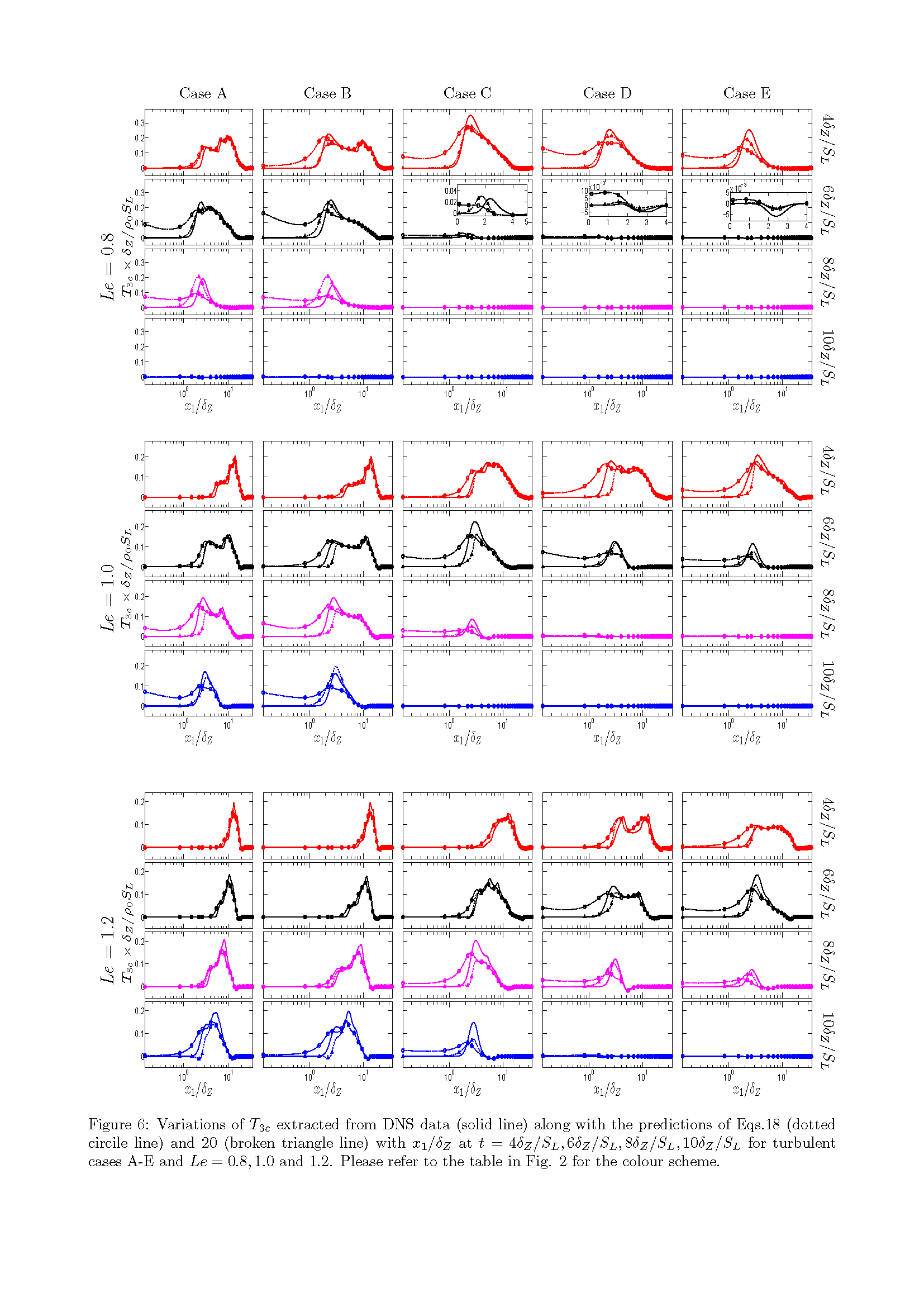
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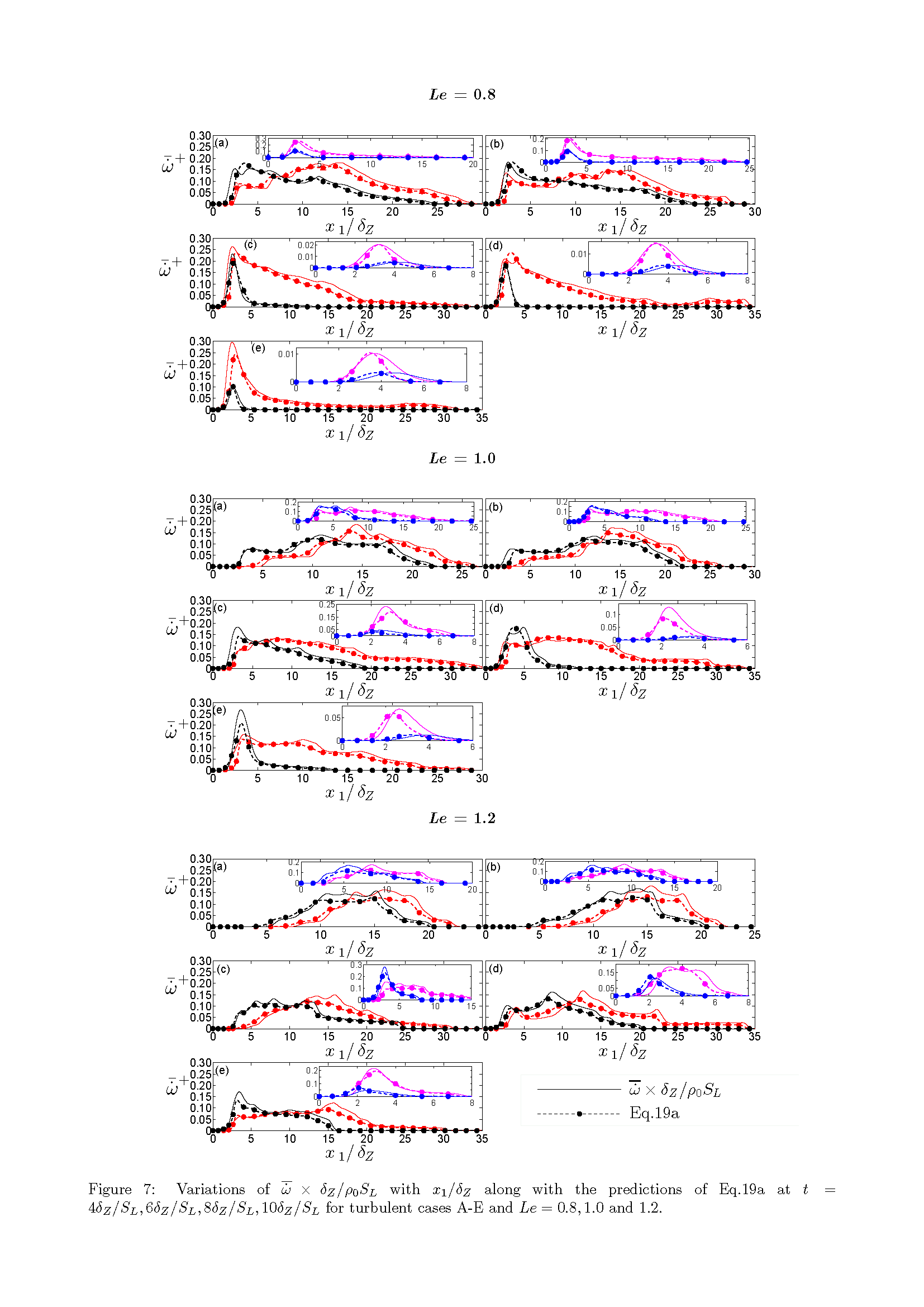


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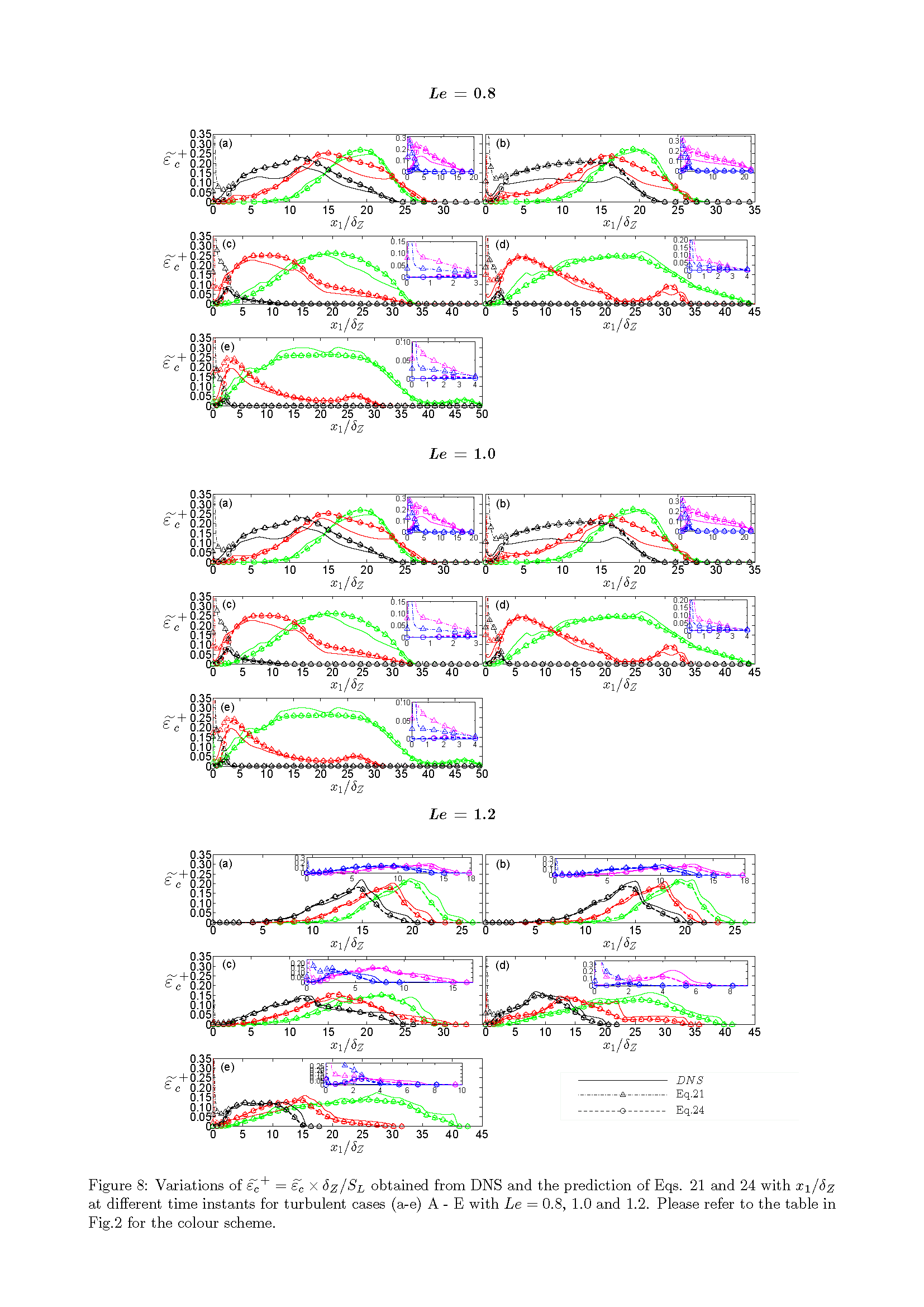


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