
Supplementary information

Thermal-optical coupling and germicidal assessment of in-duct UV-C systems

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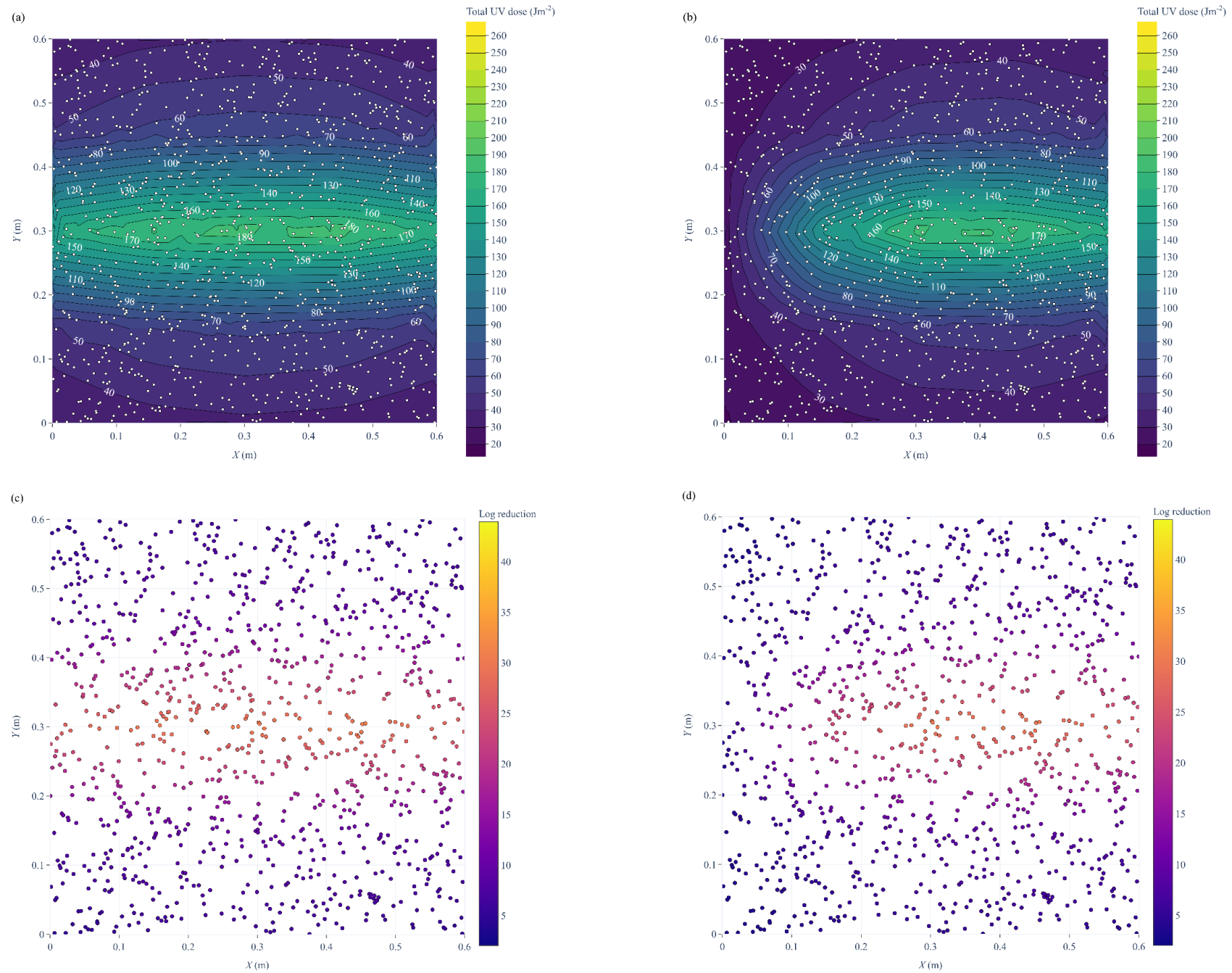


Figure S1. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 2-1 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

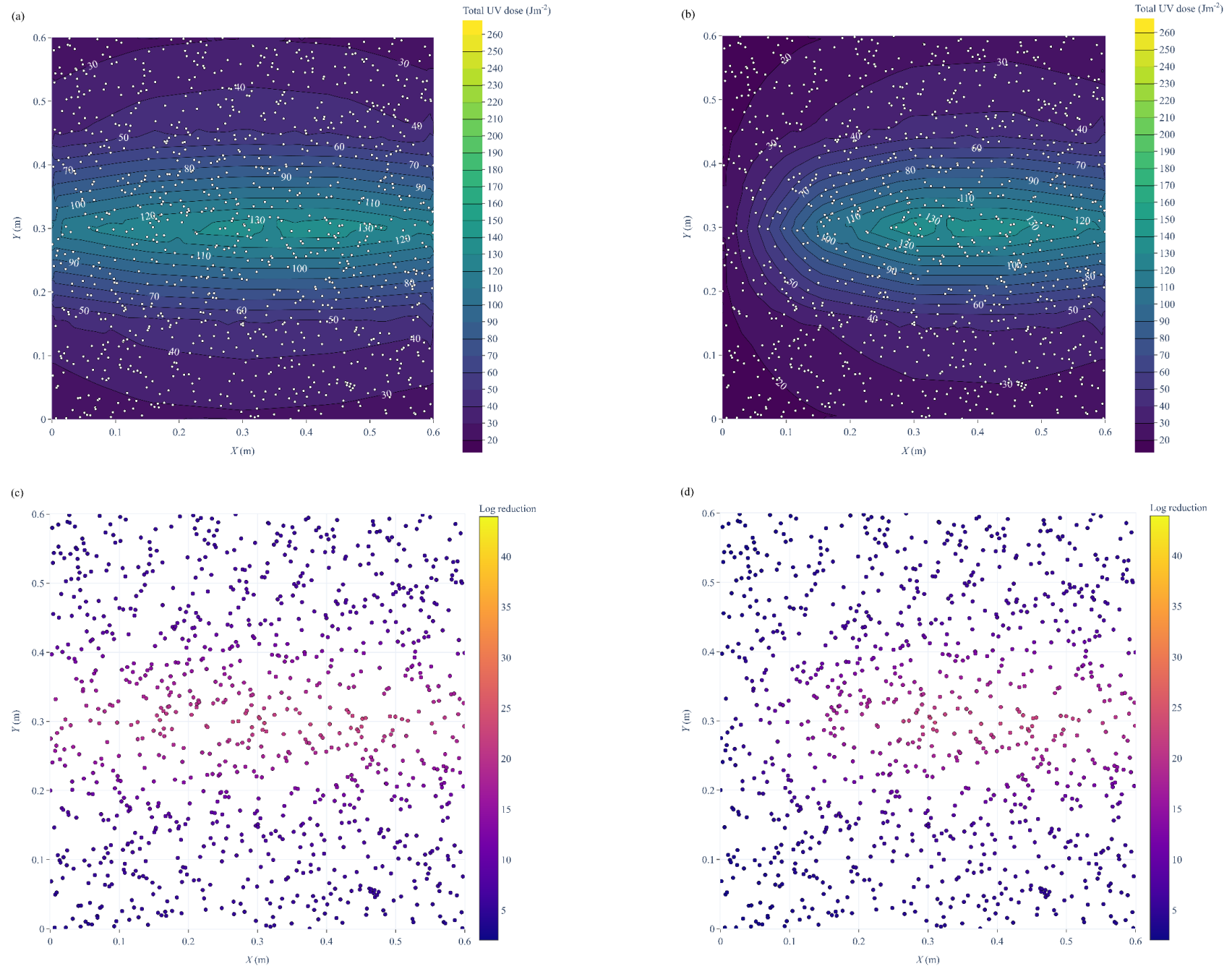


Figure S2. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 2-1 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

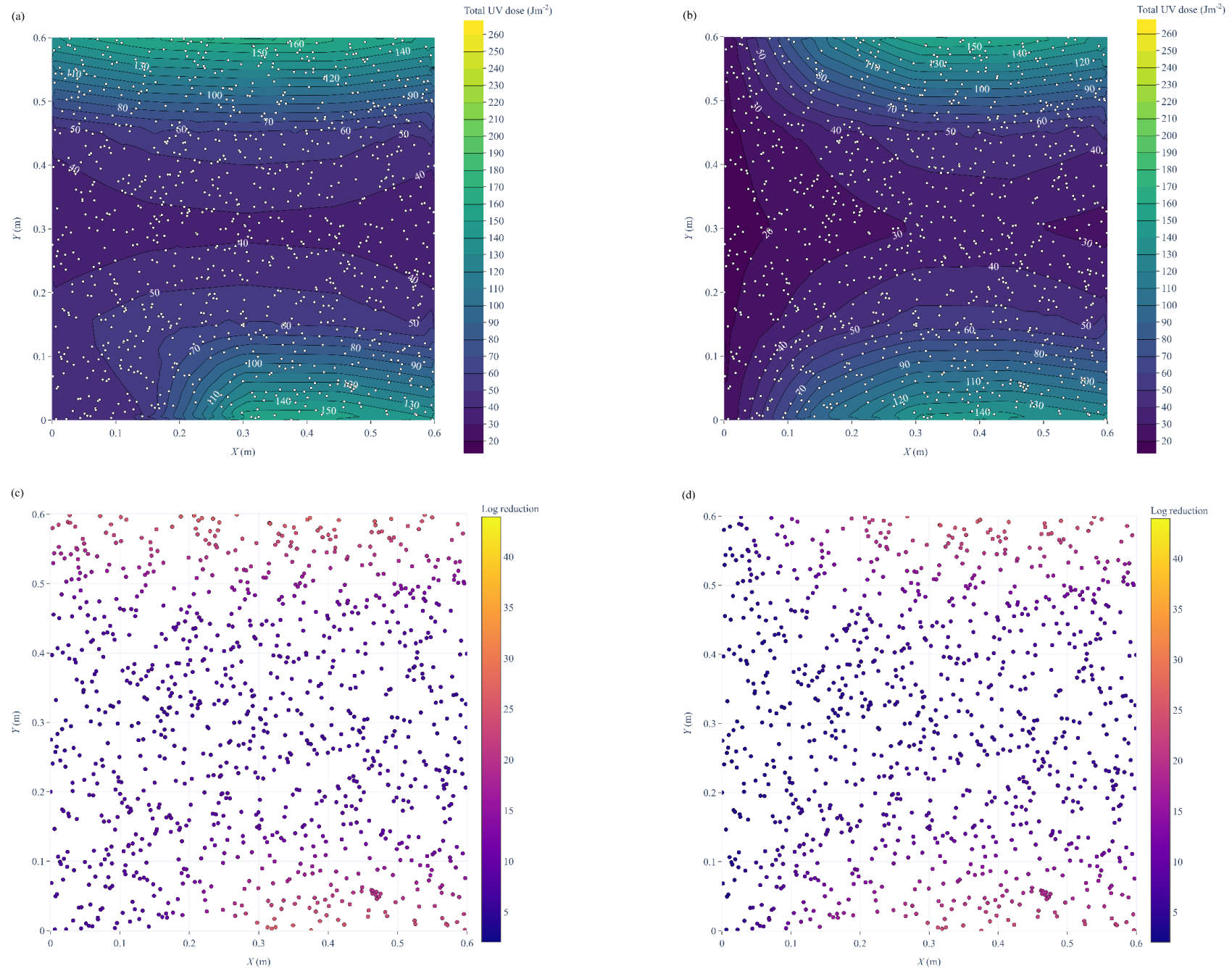


Figure S3. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 2-2 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

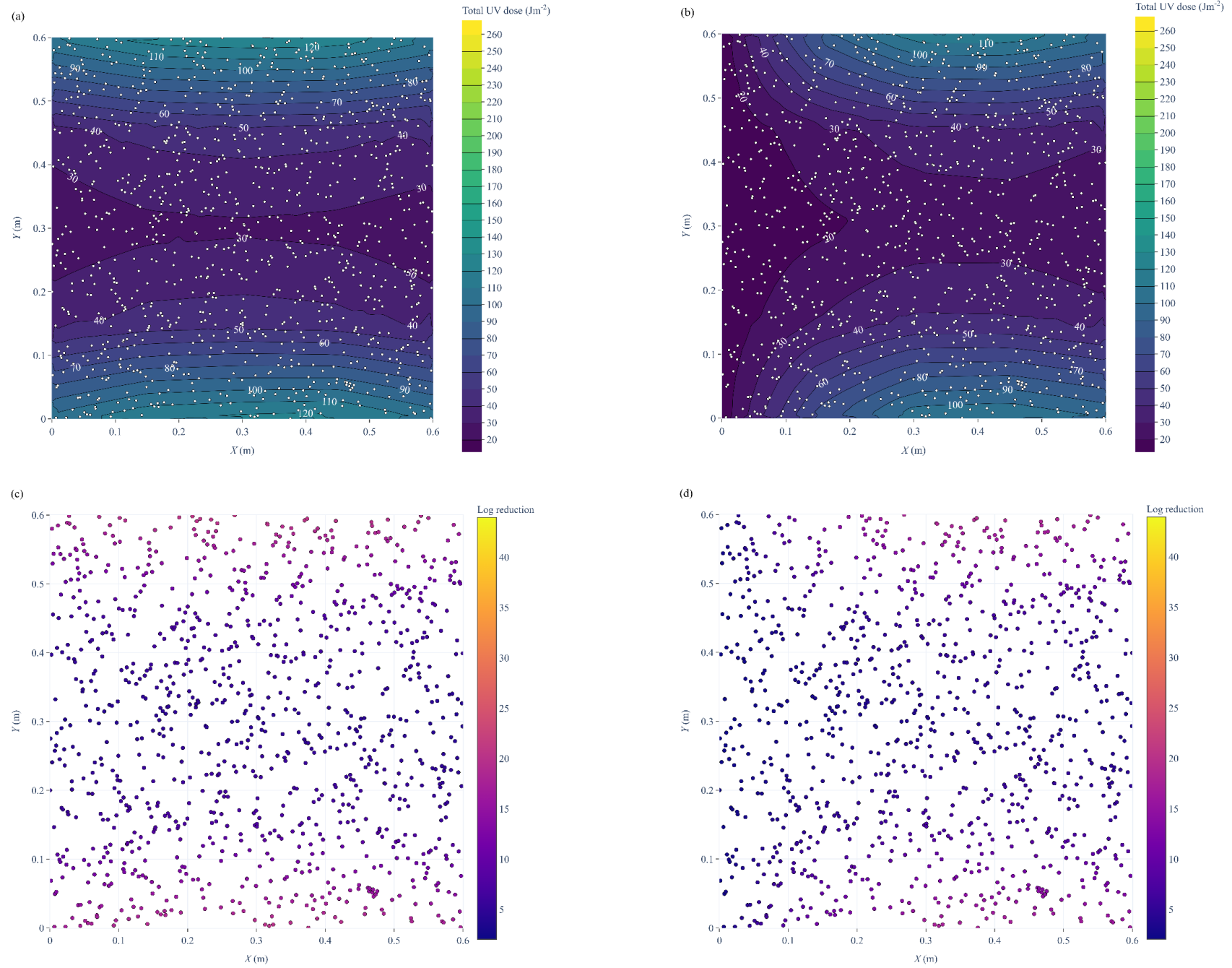


Figure S4. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 2-2 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

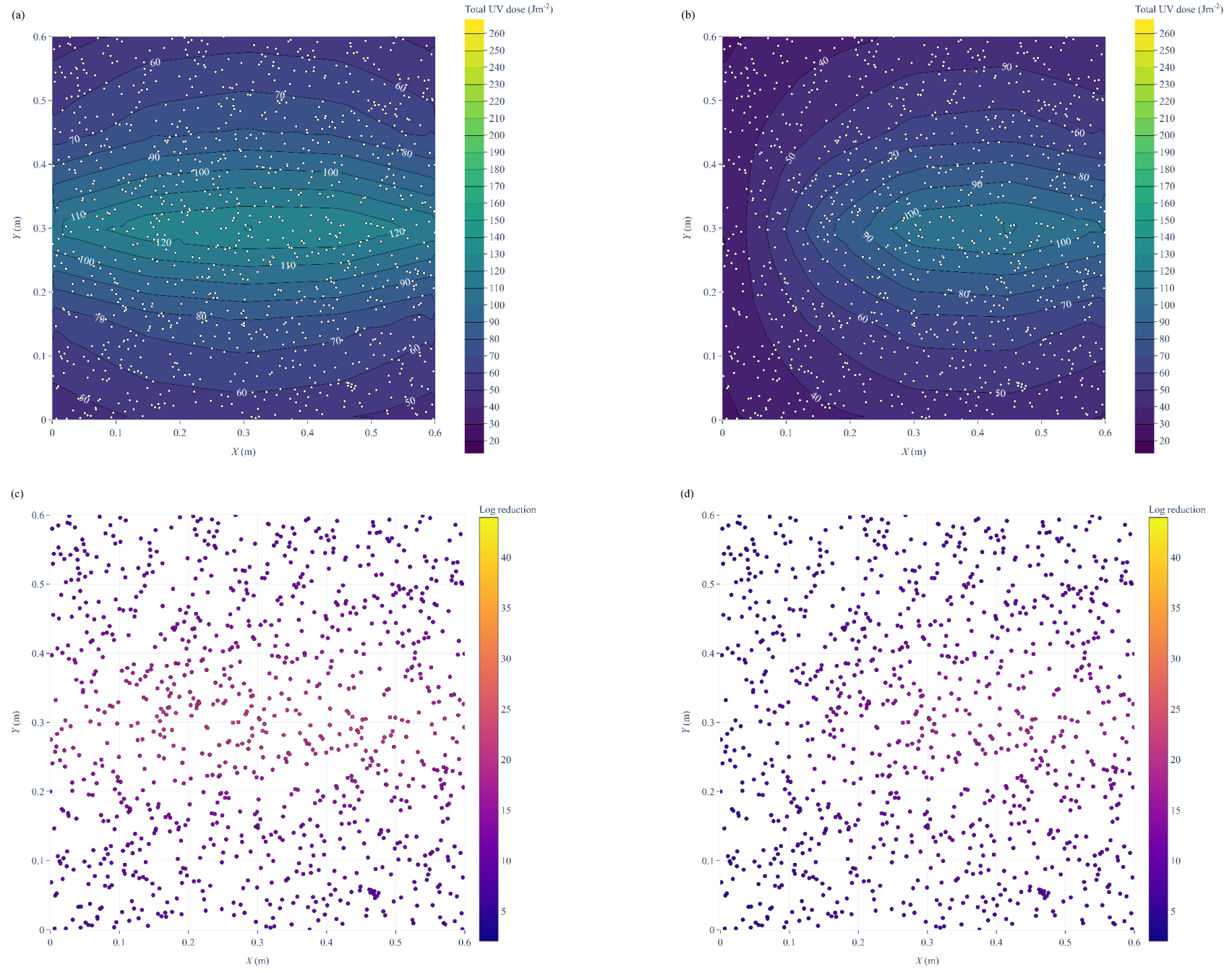


Figure S5. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 3-1 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

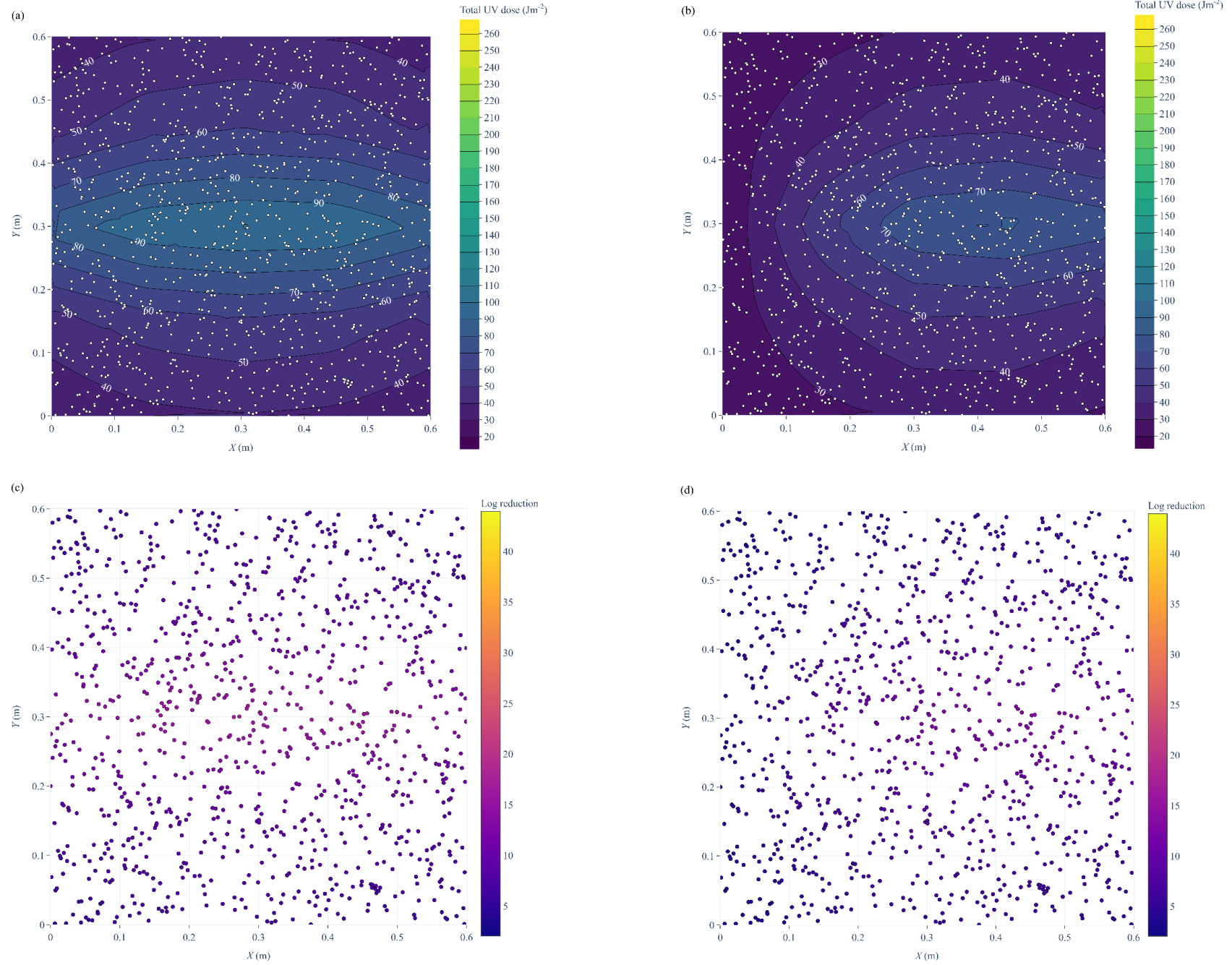


Figure S6. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 3-1 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

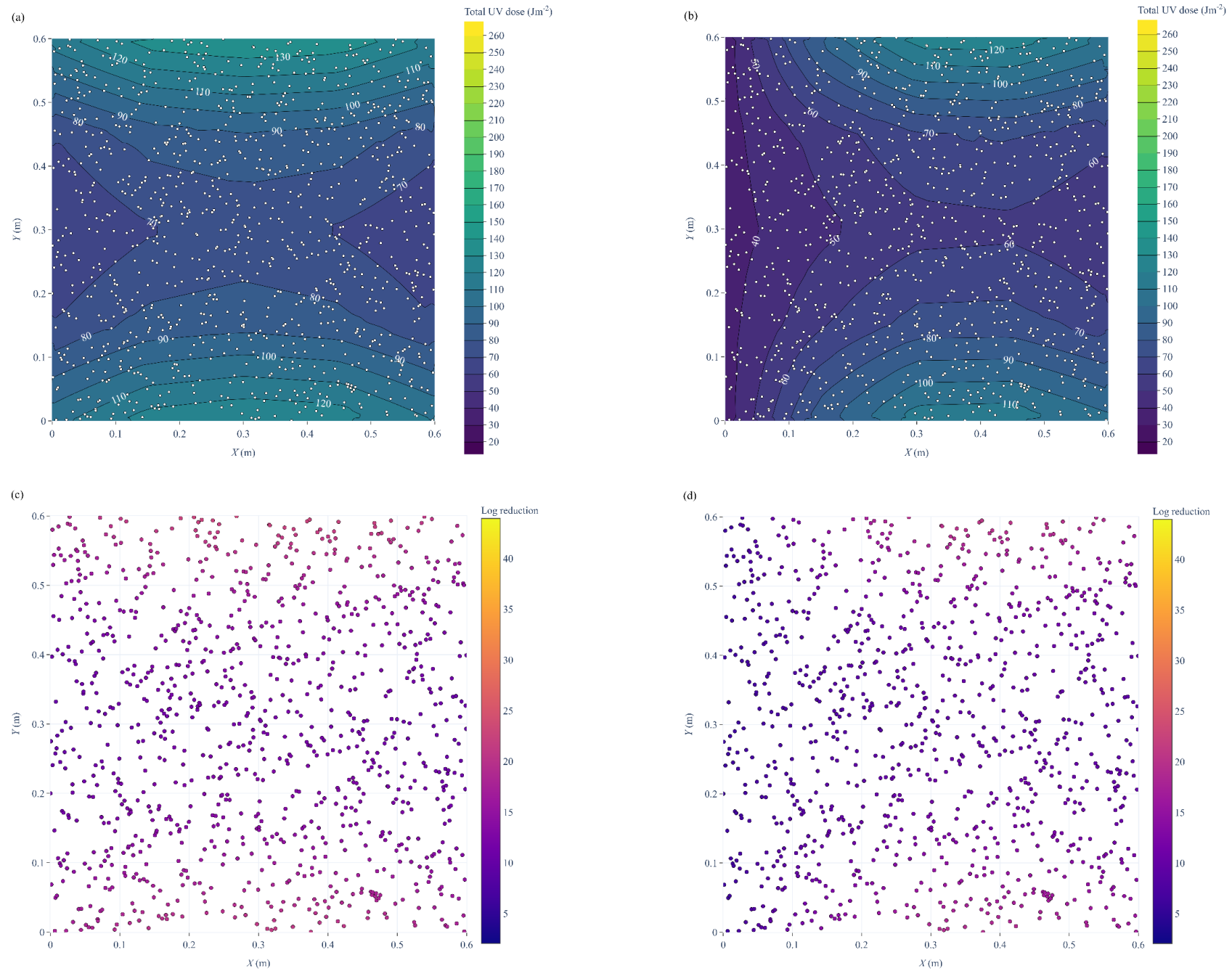


Figure S7. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 4-1 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

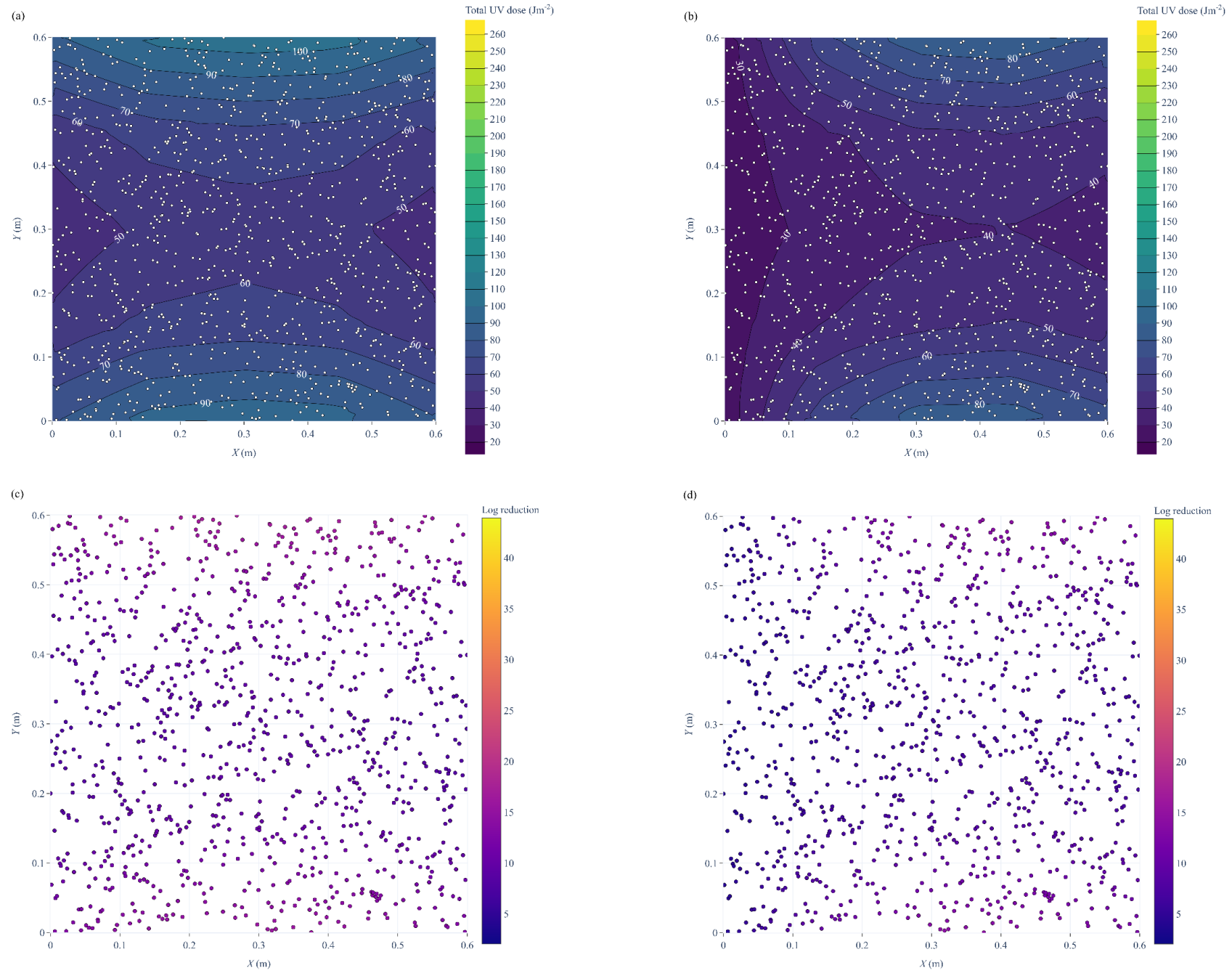


Figure S8. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 4-1 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

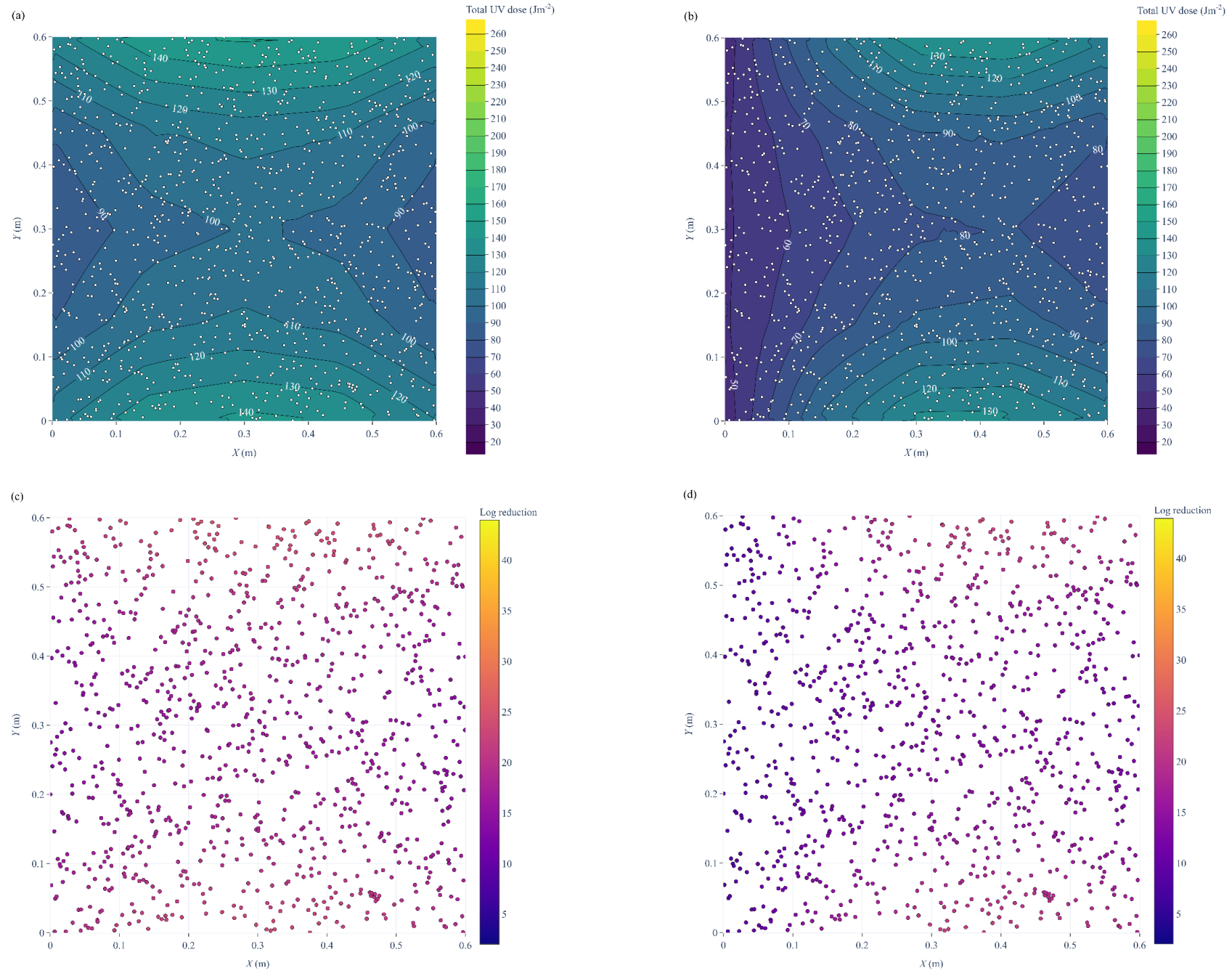


Figure S9. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 5-1 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

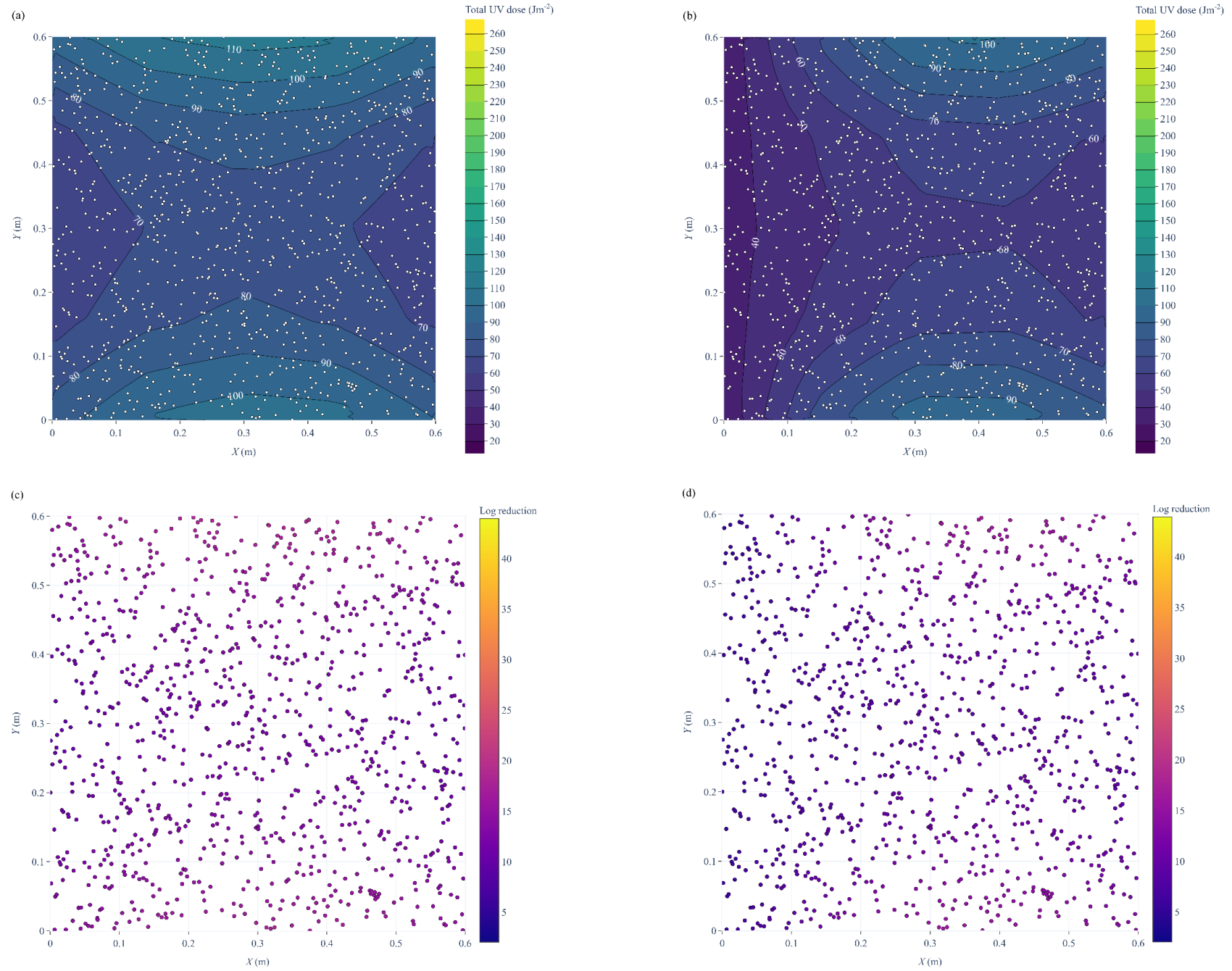


Figure S10. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 5-1 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

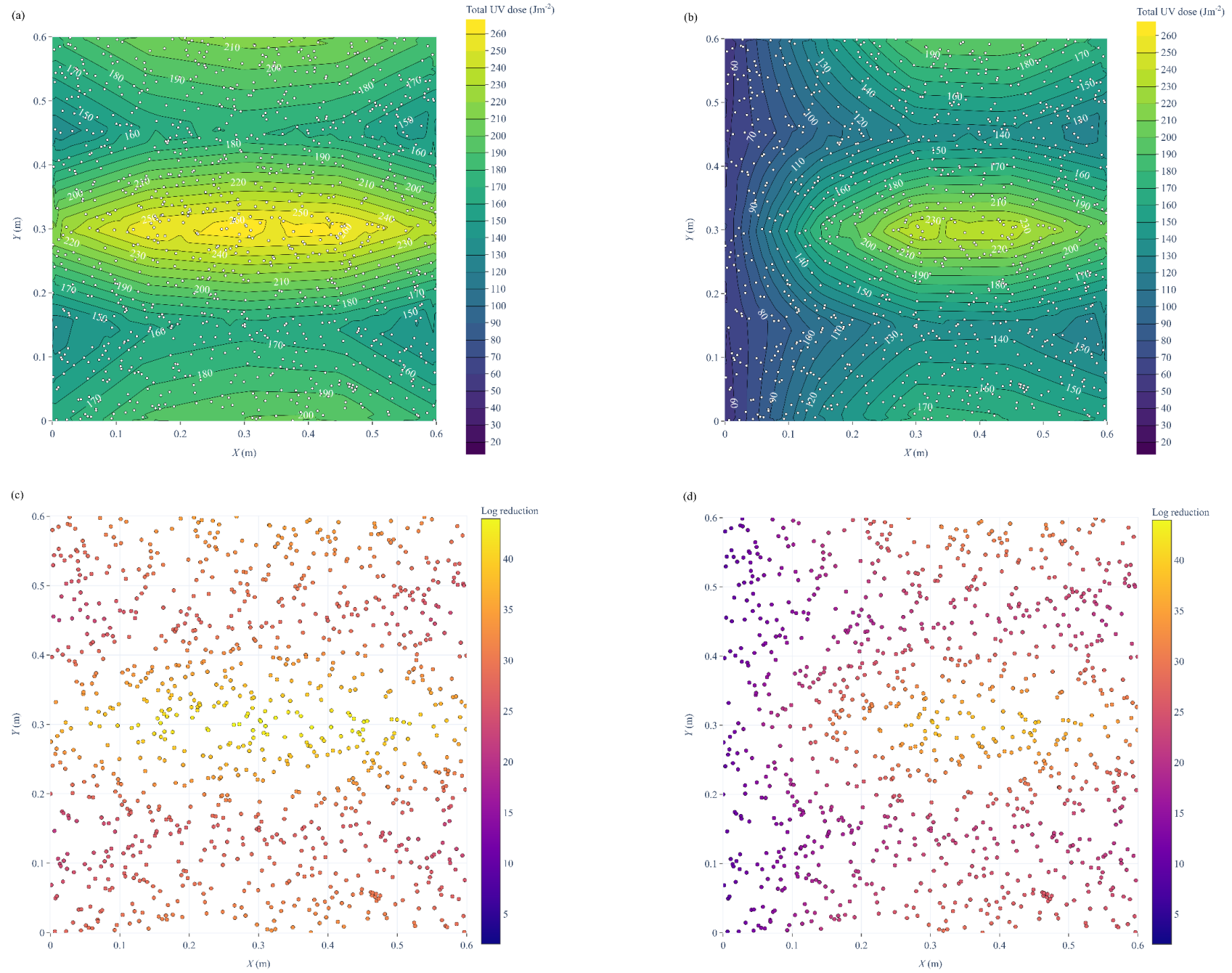


Figure S11. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 6-1 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

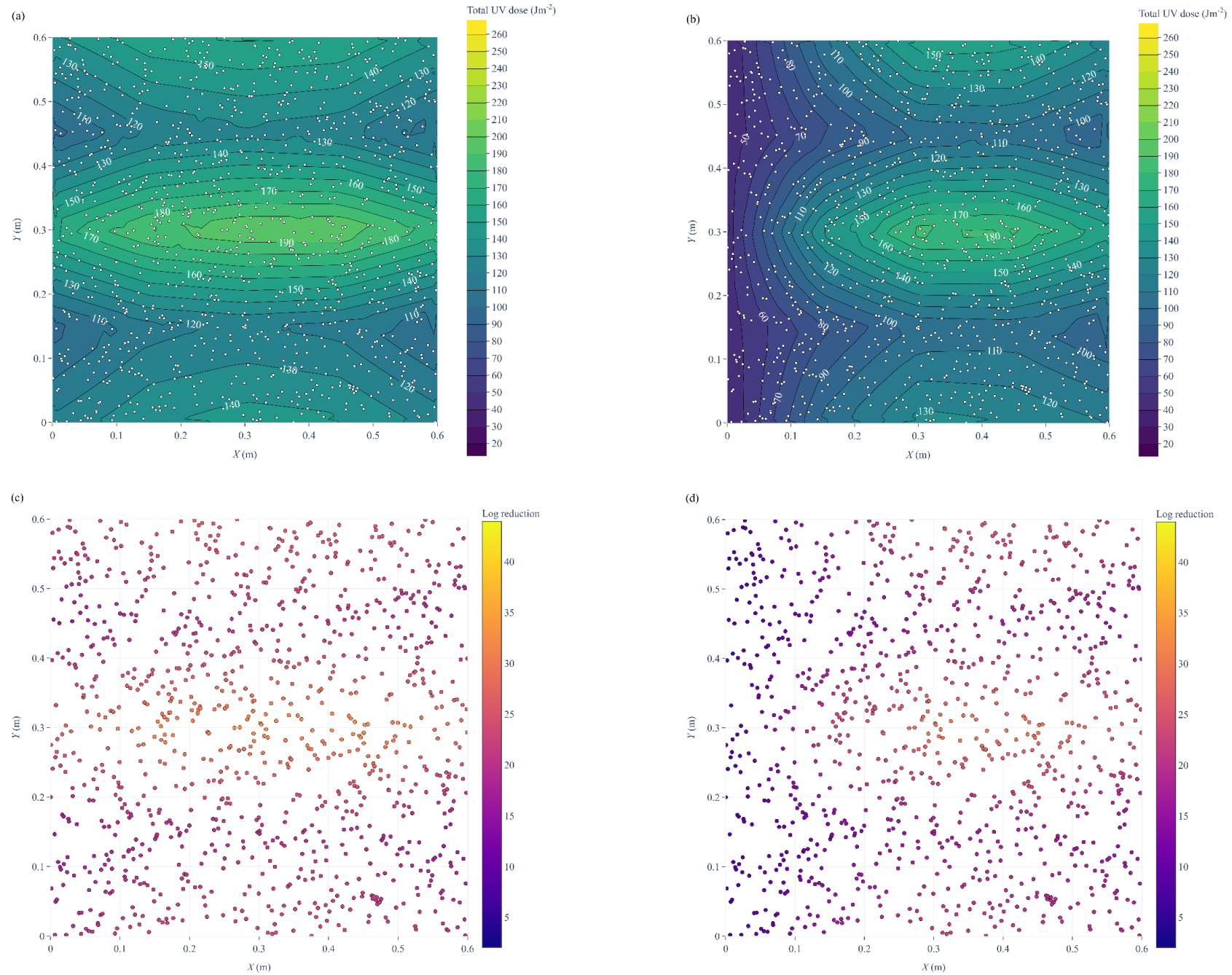


Figure S12. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 6-1 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

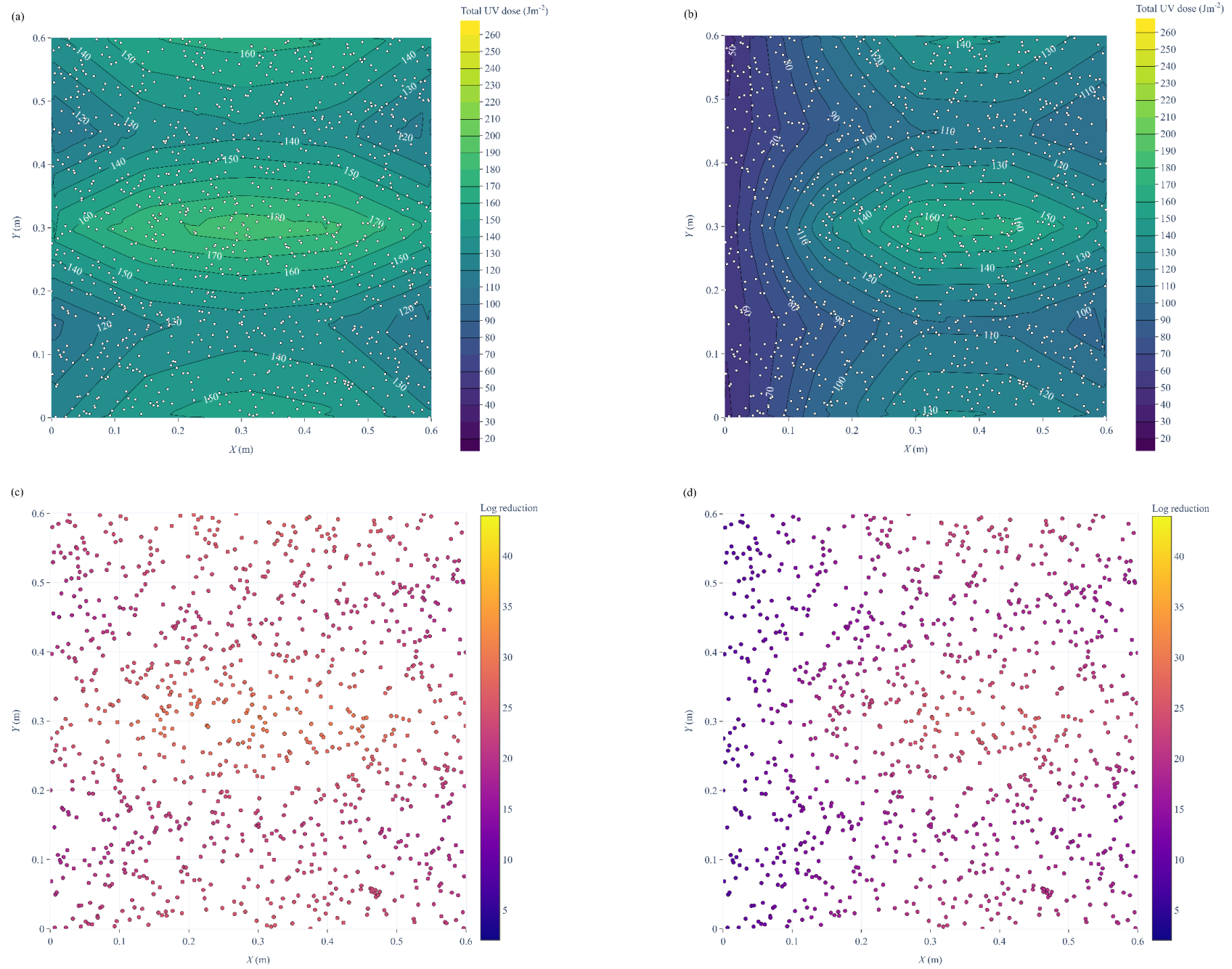


Figure S13. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 6-2 at a nominal airflow velocity of $U = 1.1 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.

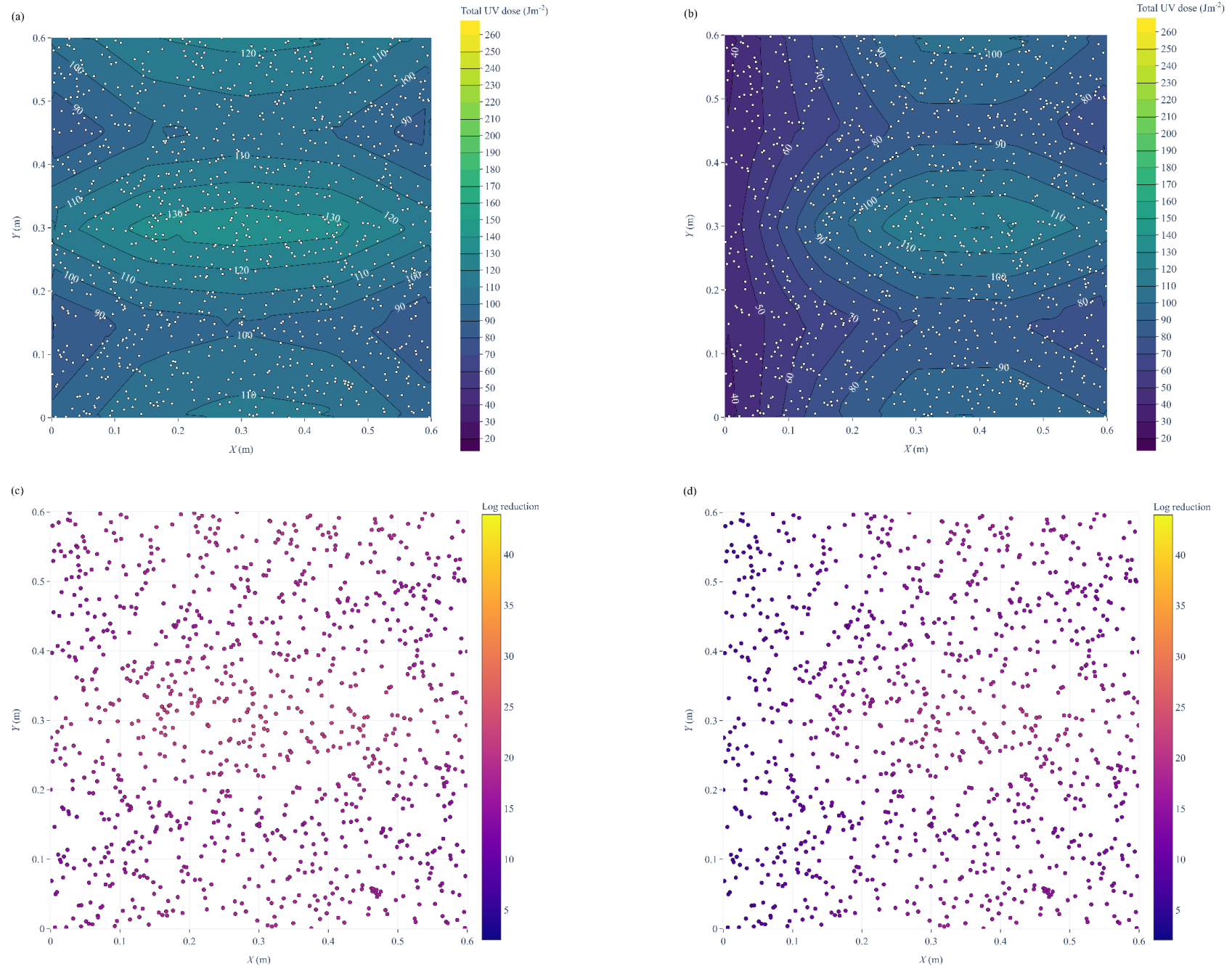


Figure S14. Cumulative Lagrangian UV dose and corresponding calculated SARS-CoV-2 log reduction at the duct exit for arrangement 6-2 at a nominal airflow velocity of $U = 1.5 \text{ m s}^{-1}$: (a) total UV dose, 95 W; (b) total UV dose, 60 W; (c) calculated log reduction, 95 W; and (d) calculated log reduction, 60 W. The duct exit was located approximately 1.3 m downstream of the final lamp array. Markers indicate the cross-sectional positions of the tracked particles at the duct exit.