

Supplementary Material

A Long Short-term Memory Neural Network for the Low-cost Prediction of Soot Concentration in a Time-dependent Flame

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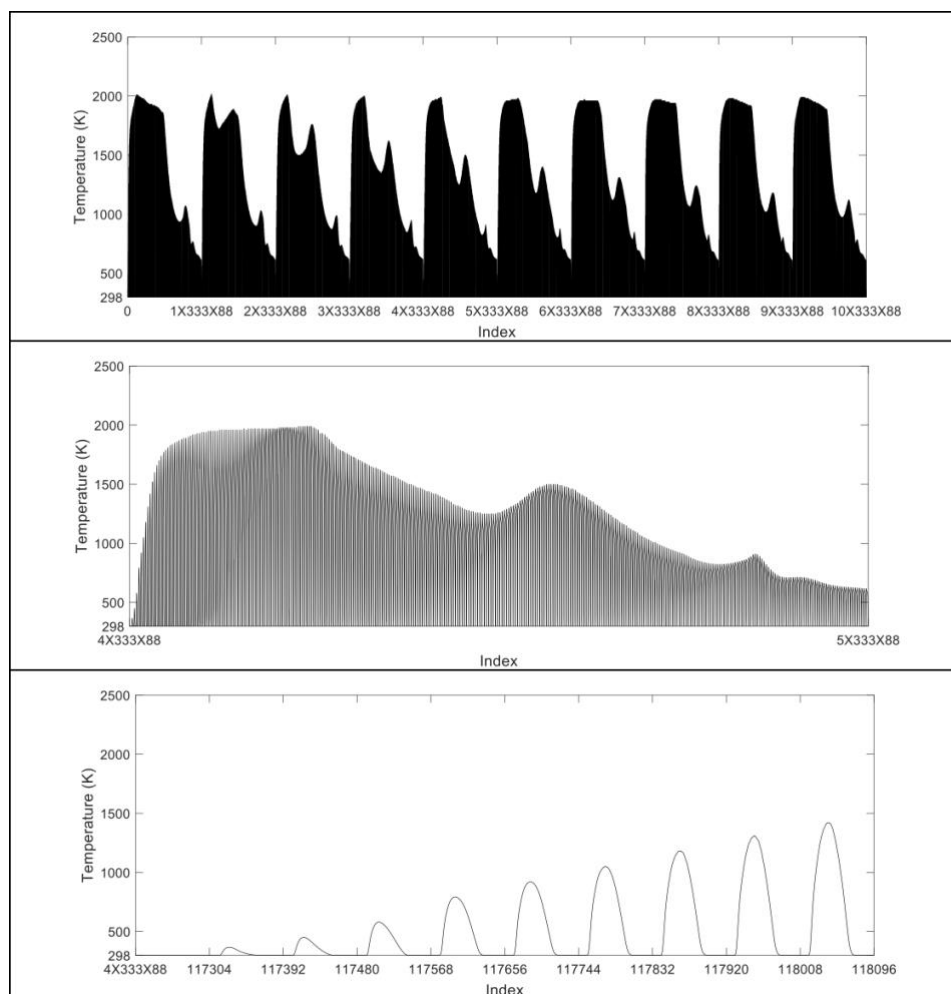


Figure S1: The contents of the spatiotemporal array for temperature. From top to bottom, the figure is zoomed in.

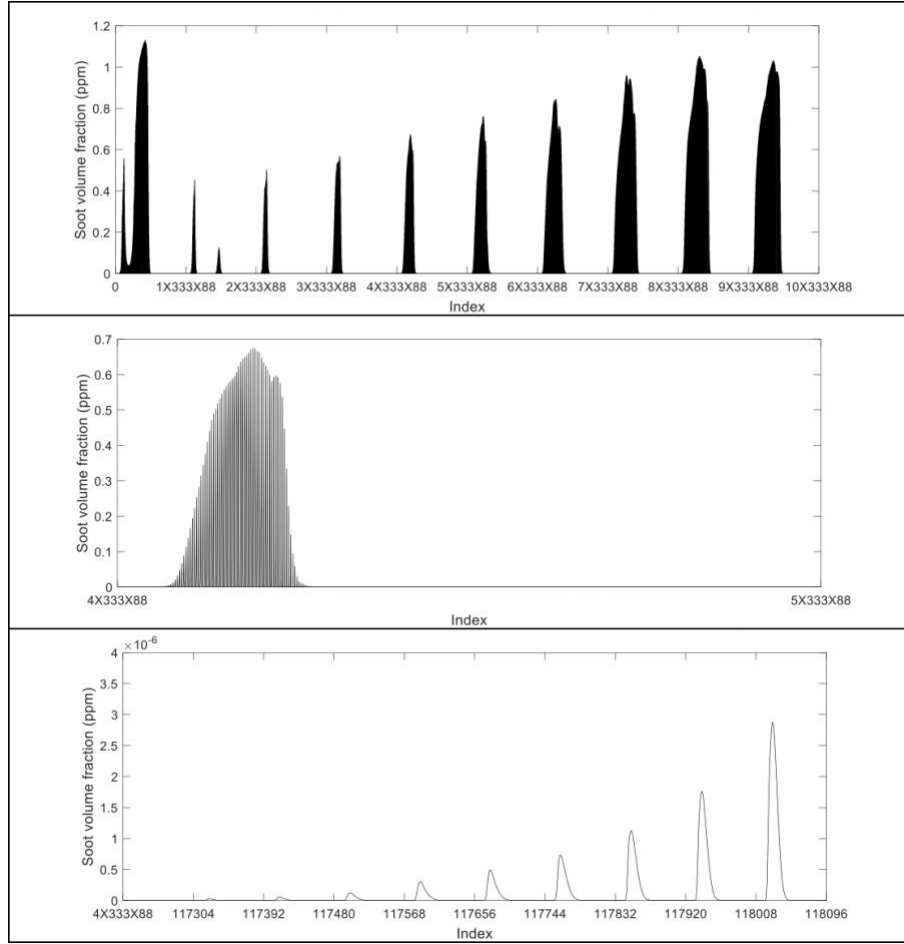


Figure S2: The contents of the spatiotemporal array for soot volume fraction. From top to bottom, the figure is zoomed in.

Table S1: The peak f_v , volume integral, $RMSE$, and relative errors for LSTM and CFD at each time step.

	LSTM		CFD		RMSE	Relative Error, $f_{v,max}$	Relative Error, Vol. Int.
	$f_{v,max}$ (ppm)	Volume integral	$f_{v,max}$ (ppm)	Volume integral			
t_1	1.258	0.1848	1.126	0.1862	0.0515	11.72%	0.75%
t_2	0.75	0.0129	0.453	0.0193	0.0116	65.56%	33.16%
t_3	0.817	0.0225	0.504	0.0282	0.0188	62.10%	20.21%
t_4	0.843	0.0421	0.57	0.0518	0.028	47.89%	18.73%
t_5	0.86	0.0711	0.674	0.0881	0.0352	27.60%	19.30%
t_6	0.914	0.1112	0.761	0.1383	0.0408	20.11%	19.60%
t_7	0.984	0.168	0.845	0.204	0.049	16.45%	17.65%
t_8	1.066	0.254	0.96	0.2891	0.0586	11.04%	12.14%
t_9	1.143	0.3937	1.046	0.4004	0.0603	9.27%	1.67%
t_{10} (test)	1.027	0.5083	1.3164	0.5254	0.055	21.98%	3.25%