10.1071/WF24102
International Journal of Wildland Fire

Supplementary Material

Integrating an urban fire model into an operational wildland fire model to simulate one dimensional wildland–urban interface fires: a parametric study

Dwi M. J. Purnomo[A], *Yiren Qin*[B], *Maria Theodori*[A], *Maryam Zamanialaei*[A], *Chris Lautenberger*[C], *Arnaud Trouvé*[B] and *Michael J. Gollner*[A,*]

[A]Department of Mechanical Engineering, University of California, Berkeley, USA

[B]Department of Fire Protection Engineering, University of Maryland, College Park, MD 20742, USA

[C]CloudFire Inc., 985 Lincoln Way, Suite 207, Auburn, CA 95603, USA

*Correspondence to: Email: mgollner@berkeley.edu

Table S1. List of heat release rate of burning structures. This table was adapted from Jiang *et al.* (2021).

Structure area (m^2)	HRR per unit area (kW/m^2)	Occupancy type	Data source
30.7	500	Shop	CIBSE TM19
30.7	250	Hotel	CIBSE TM19
21.6	278	Office	GB 51251-2017
8.64	197 - 255	Residence	Actual measurement
174	230 - 575	Residence	FDS simulation
109	366 - 687	Residence	FDS simulation
14.4	520 - 1014	Residence	FDS simulation
17.28	267	Office	FDS simulation
1200	233 - 292	Industrial	FDS simulation

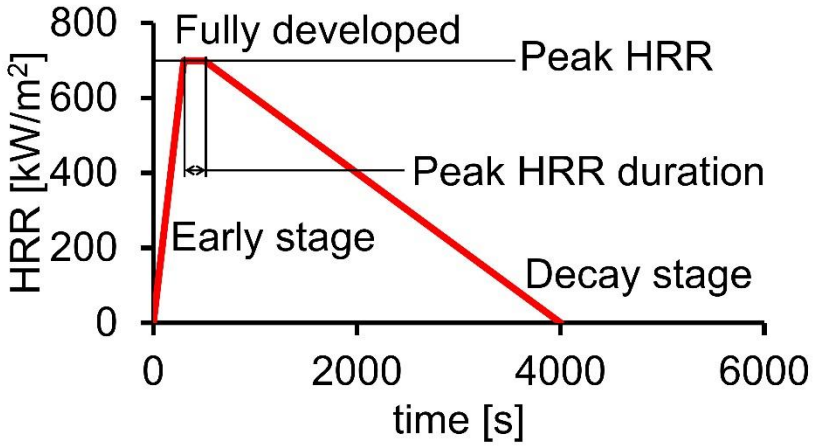

Figure S1. Illustration of transient HRR.

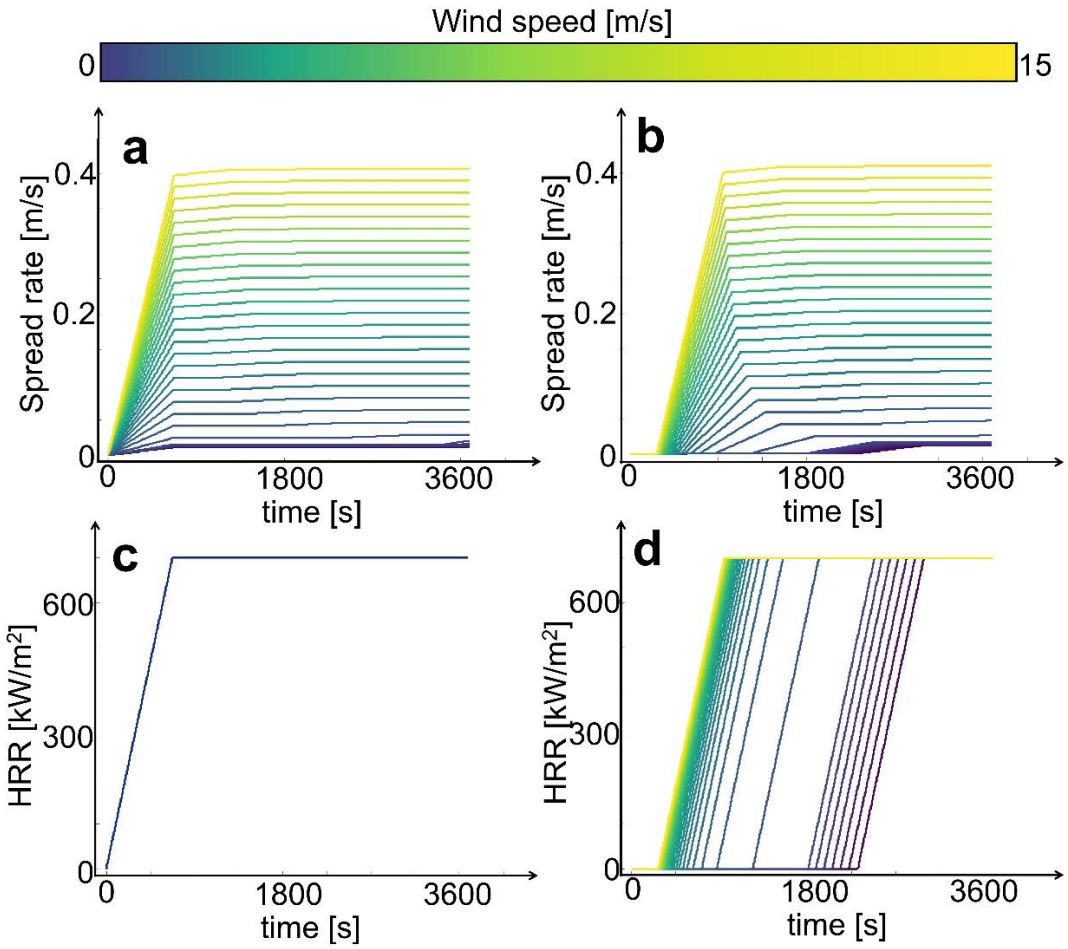

Figure S2. Spread rate ($U(t)$) vs. time for the first cell (a) and second cell (b) from the ignition point and (c and d respectively) its corresponding HRR profiles that influence them.

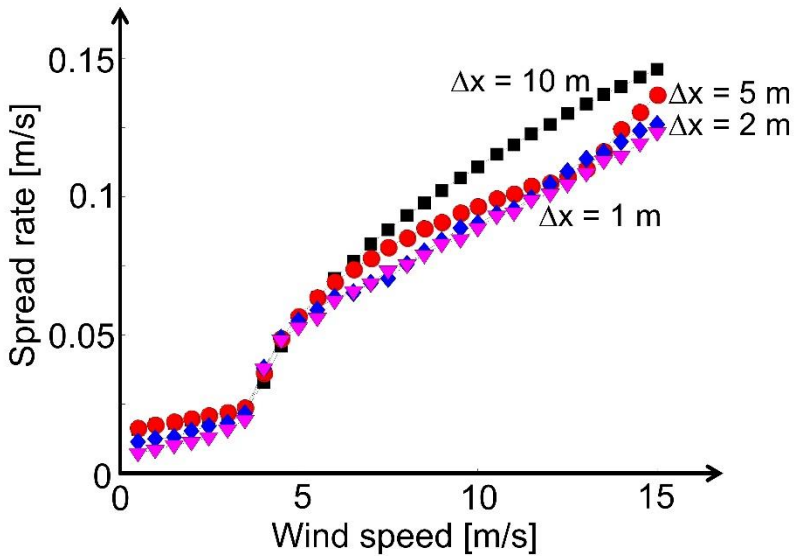

Figure S3. Effects of using different cell size for the same cases on spread rate.

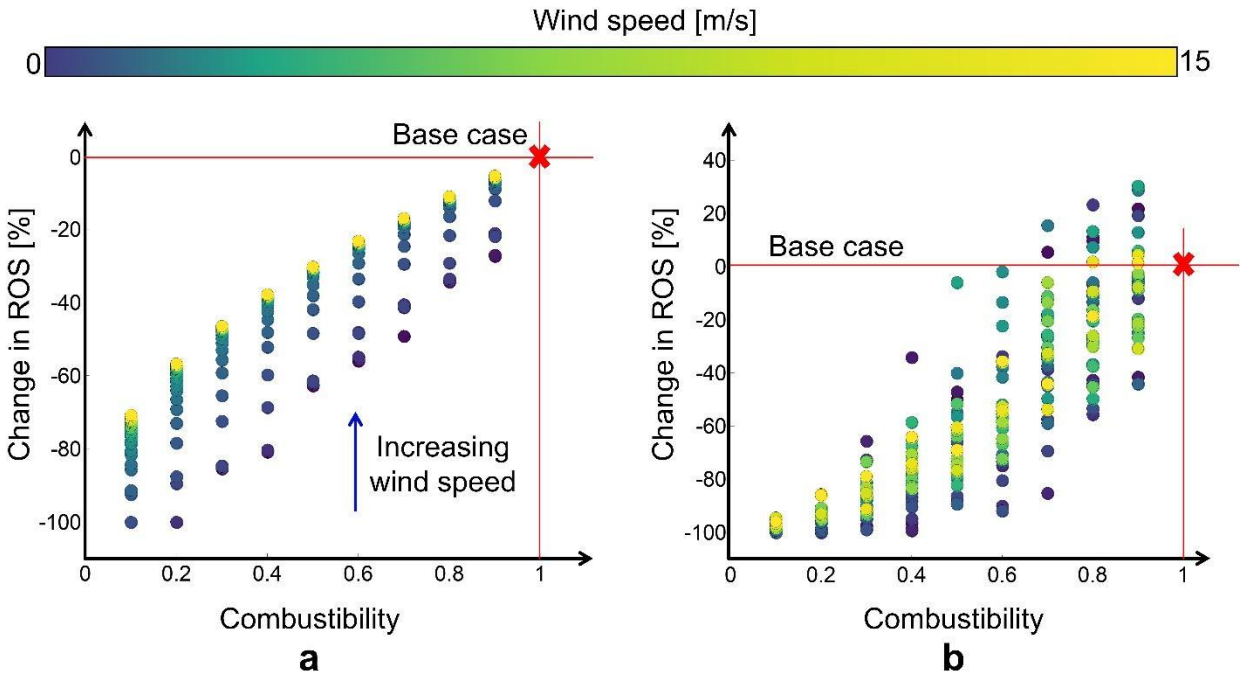

Figure S4. Effects of different combustibility on rate of spread (ROS) compared to the baseline scenario (red cross) under different wind conditions: (a) without ember considerations and (b) with ember considerations.

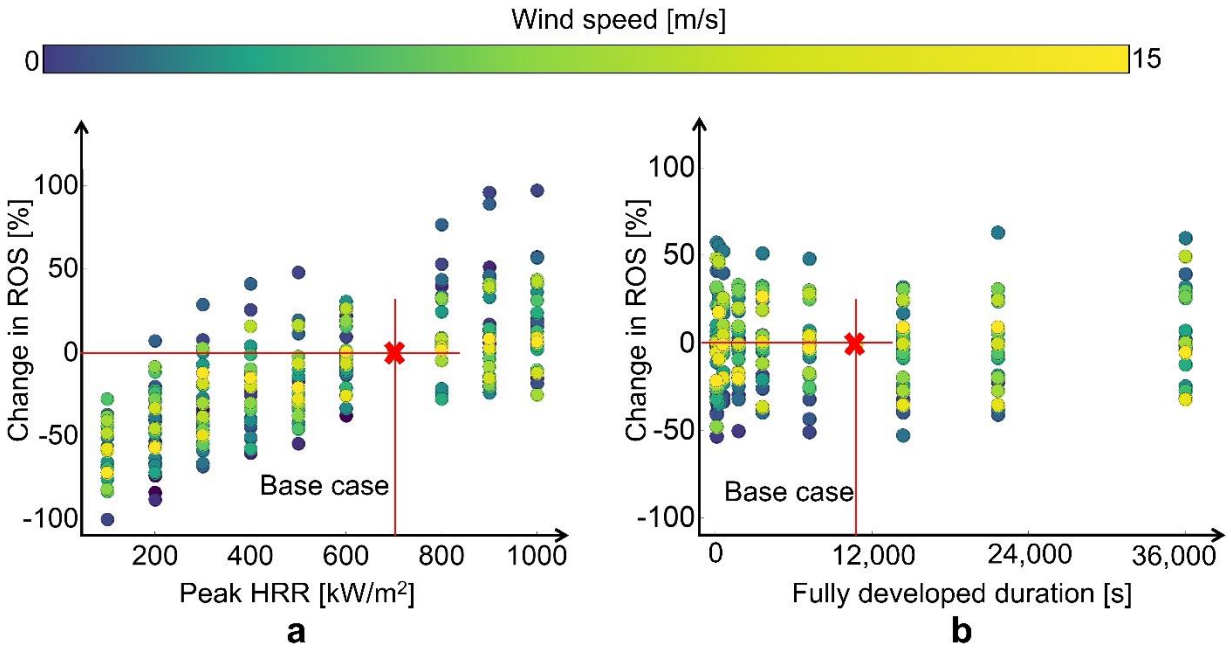

Figure S5. Effects of different peak HRR (a) and fully developed duration (b) on rate of spread (ROS) compared to the baseline scenario (red cross) under different wind conditions with ember considerations.

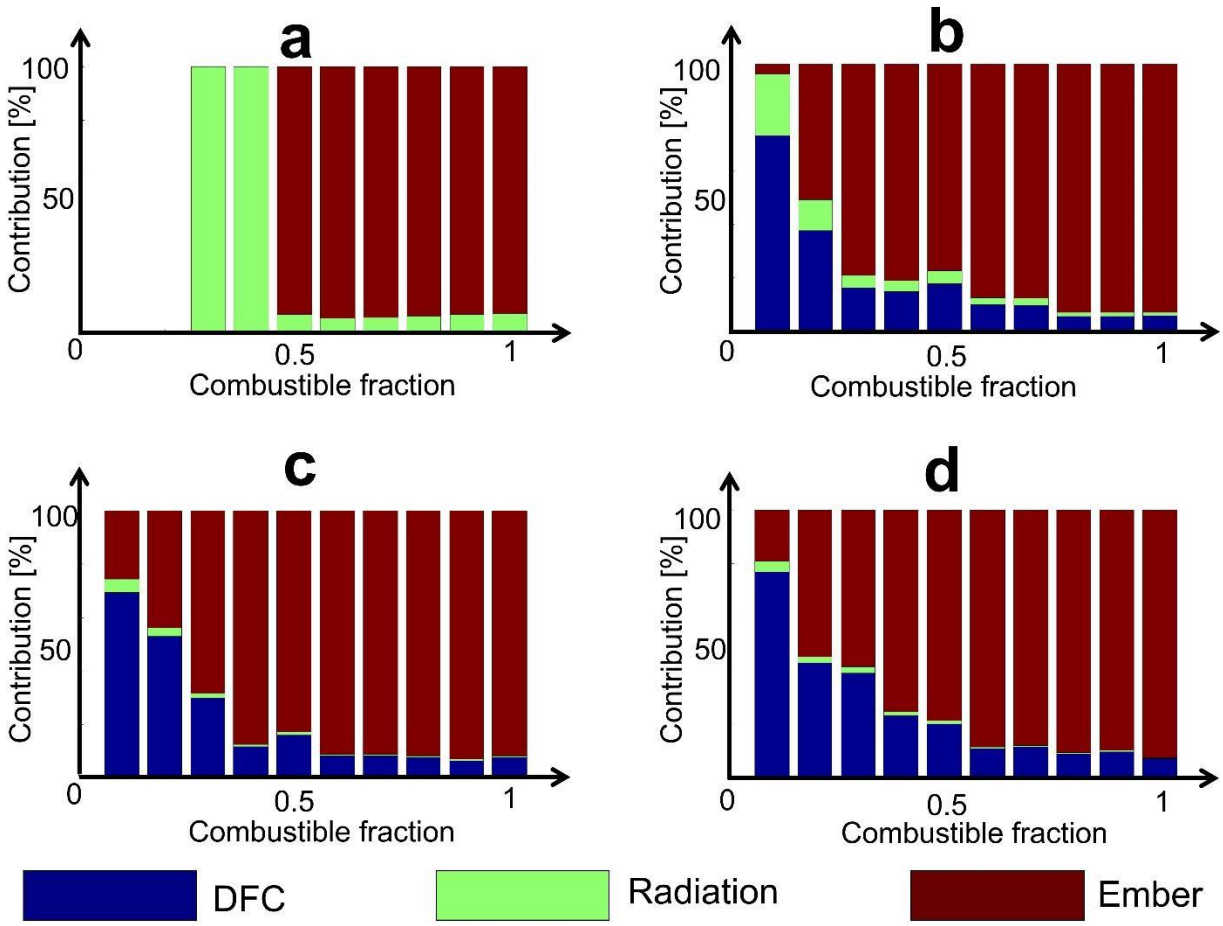

Figure S6. Contributions of direct flame contact (DFC), radiation, and embers on fire propagation for different combustible fraction under different wind speed conditions: (a) 0.5 m/s, (b) 5 m/s, (c) 10 m/s, and (d) 15 m/s.

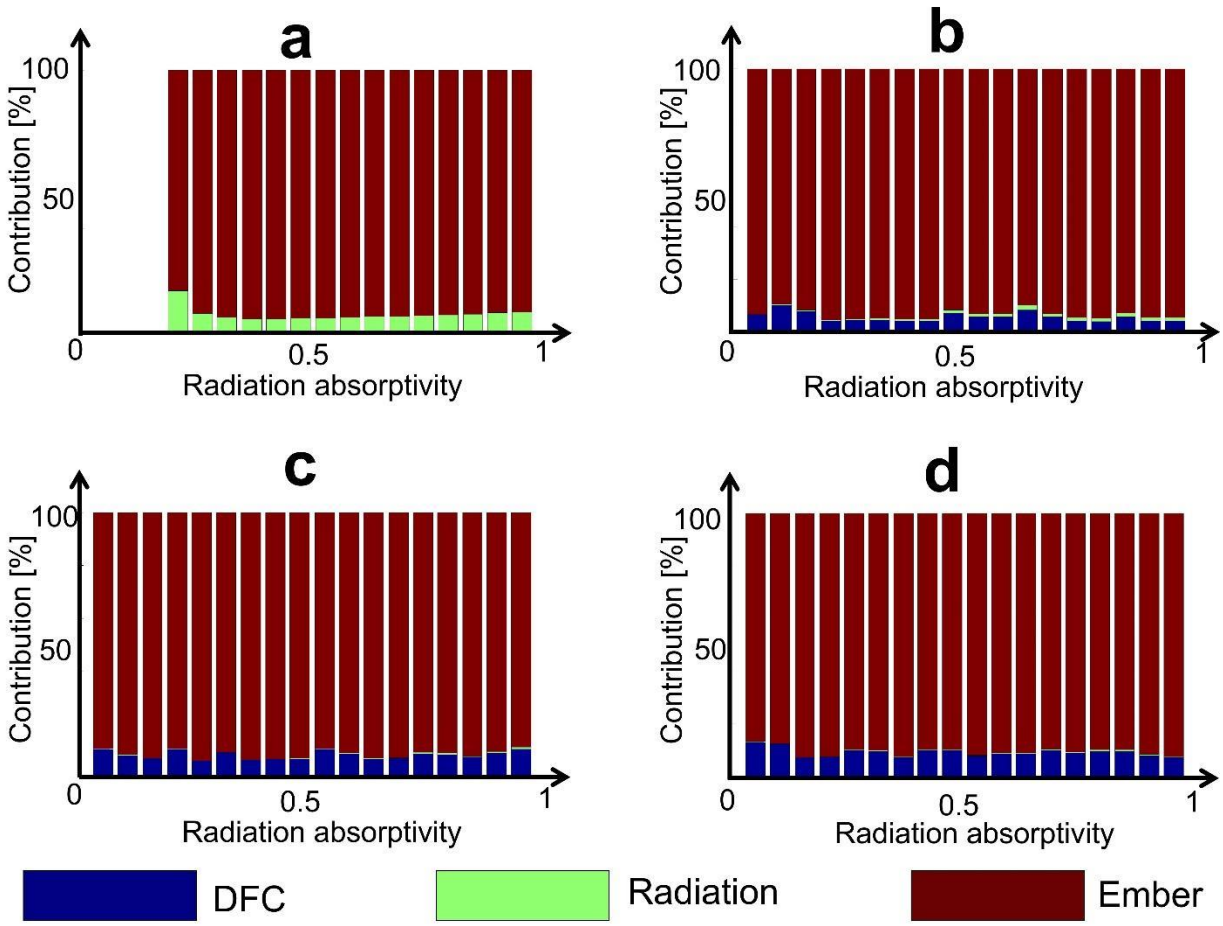

Figure S7. Contributions of direct flame contact (DFC), radiation, and embers on fire propagation for different radiation absorptivity under different wind speed conditions: (a) 0.5 m/s, (b) 5 m/s, (c) 10 m/s, and (d) 15 m/s.

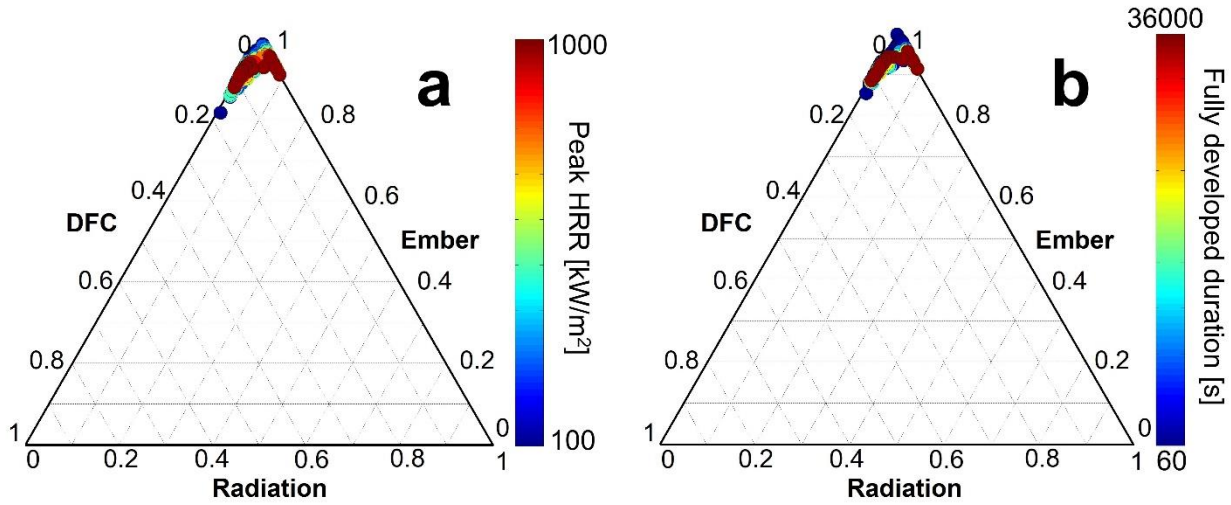

Figure S8. Relative contributions of spread from DFC, radiation, and ember for different peak HRR (a) and fully developed duration (b).