

Computer Models For Fire and Smoke

Model Name: The Coupled Atmosphere-Wildland Fire Environment Model (CAWFE)

Version:

Date: January 2014

Model Actively Supported?: No

Classification: coupled numerical weather prediction – wildland fire behavior model

Very Short Description: CAWFE is a numerical weather prediction system designed for simulating weather in very complex terrain at horizontal resolutions of 10s to 1000s of m and includes a fire behavior module that captures the growth of a wildland fire and its feedbacks with the atmosphere. The simulated weather directs the growth of one or several fires, which consume wildland fuels and release sensible and latent fluxes that alter the atmospheric state, creating fire-induced winds that in turn alter fire growth. Smoke is produced as a function of fuel consumed and transported in the simulated plume. Newer additions include the assimilation of active fire detection data as initialization of the wildland fire in progress.

Modeler(s), Organization(s): Janice Coen, National Center for Atmospheric Research.

User's Guide:

Technical References: Coen, J. L., 2013: Modeling Wildland Fires: A Description of the Coupled Atmosphere-Wildland Fire Environment Model (CAWFE). NCAR Technical Note NCAR/TN-500+STR. 38 pp.

Clark, T.L., W.D. Hall, and J.L. Coen, 1996: Source Code Documentation for the Clark-Hall Cloud-scale Model Code Version G3CH01. NCAR Technical Note NCAR/TN-426+STR, DOI: 10.5065/D67W694V.

Validation References: Coen, J. L. and P. J. Riggan, 2012: Simulation and thermal imaging of the 2006 Esperanza wildfire in southern California: Application of a coupled weather-wildland fire model. International Journal of Wildland Fire. Accepted.

Coen, J. L. and W. Schroeder, 2013: Use of spatially refined remote sensing fire detection data to initialize and evaluate coupled weather-wildfire growth model simulations. Geophys. Res. Lett. 40:1-6. (doi:10.1002/2013GL057868)

Availability: publicly available

Price: no cost

Necessary Hardware:

Computer Language: Fortran

Size:

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Detailed Description:

Application to fire behavior basics:
http://www.mmm.ucar.edu/people/coen/files/newpage_f.html.

Case studies:
http://www.mmm.ucar.edu/people/coen/files/newpage_m.html

Assimilation of active fire detection data:
http://www.mmm.ucar.edu/people/coen/files/newpage_da.html