Computer Models
For
Fire and Smoke

Model Name:	Weather Research and Forecasting (WRF®) Model including the physics package WRF-Fire
Version:	Version 3.5
Date:	April 2013
Model Actively Supported?:	Yes. See wrf-model.org for description of tutorials, support.
Classification:	coupled numerical weather prediction – wildland fire behavior model
Very Short Description:	The Weather Research and Forecasting (WRF) Model is a next-generation mesoscale numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs. It features two dynamical cores, a data assimilation system, and a software architecture allowing for parallel computation and system extensibility. The model serves a wide range of meteorological applications across scales ranging from meters to thousands of kilometers. It includes the WRF-Fire physics package which represents the growth of a wildland fire and interaction with the atmosphere through exchange of sensible and latent heat fluxes release by the fire, which alter the atmospheric state including winds, which feed back on the fire. The fire module copies most of the physics components of the CAWFE coupled weather fire model (described in another entry).
Modeler(s), Organization(s):	WRF was developed at the National Center for Atmospheric Research (NCAR), which is operated by the University Corporation for Atmospheric Research (UCAR). WRF was a collaborative partnership principally among the National Center for Atmospheric Research (NCAR), the National Oceanic and Atmospheric Administration (represented by the National Centers for Environmental Prediction (NCEP) and the (then) Forecast Systems Laboratory (FSL)), the Air Force Weather Agency (AFWA), the Naval Research Laboratory, the University of Oklahoma, and the Federal Aviation

Administration (FAA). Janice Coen (NCAR) and Ned Patton (NCAR) adapted WRF-Fire from CAWFE, with contributions from numerous individuals at the U.S.D.A. Forest Service, the Australian Bureau of Meteorology, and the University of Colorado at Denver.

User's Guide:

http://www.mmm.ucar.edu/wrf/users/docs/user_guide_V3/contents.html

Technical References:

Skamarock, W. C., J. B. Klemp, J. Dudhia, D. O. Gill, D. M. Barker, M. G. Duda, X. Huang, W. Wang, J. G. Powers, 2008: A description of the Advanced Research WRF Version 3. NCAR Technical Note NCAR/TN-475+STR, DOI: 10.5065/D68S4MVH.

Coen, J. L., M. Cameron, J. Michalakes, E. G. Patton, P. J. Riggan, and K. M. Yedinak, 2013: WRF-Fire: Coupled Weather-Wildland Fire Modeling with the Weather Research and Forecasting Model. J. Appl. Meteor. Climatol., 52:16-38. (doi:10.1175/JAMC-D-12-023.1) http://journals.ametsoc.org/doi/pdf/10.1175/JAMC-D-12-023.1

Validation References:

various for WRF in applications to numerous atmospheric phenomena.

Availability:

Price:	No cost.
Necessary Hardware:	
Computer Language:	Fortran
Size:	
Contact Information:	For help, contact wrfhelp@ucar.edu . For questions regarding the WRF-Fire physics package, contact Janice Coen at janicec@ucar.edu
Detailed Description:	http://www.mmm.ucar.edu/wrf/users/fire/wrf-fire.html