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Application of a mesoscale atmospheric coupled fire model BRAMS-SFIRE to Alentejo wildland fire and comparison of performance with the fire model WRF-SFIRE

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Models of fuel with the identification of vegetation patterns of Montado ecosystem in Portugal was incorporated in the mesoscale Brazilian Atmospheric Modeling System (BRAMS) and coupled with a spread wildland fire model. The BRAMS-FIRE is a new system developed by the Centro de Previsão de Tempo e Estudos Climáticos (CPTEC/INPE, Brazil) and the Instituto de Ciências Agrárias e Ambientais Mediterrâneas (ICAAM, Portugal). The fire model used in this effort was originally, developed by Mandel et al. (2013) and further incorporated in the Weather Research and Forecast model (WRF). Two grids of high spatial resolution were configured with surface input data and fuel models integrated for simulations using both models BRAMS-SFIRE and WRF-SFIRE. One grid was placed in the plain land and the other one in the hills to evaluate different types of fire propagation and calibrate BRAMS-SFIRE.
The objective is simulating the effects of atmospheric circulation in local scale, namely the movements of the heat front and energy release associated to it, obtained by this two models in an episode of wildland fire which took place in Alentejo area in the last decade, for application to planning and evaluations of agro wildland fire risks.
We aim to model the behavior of forest fires through a set of equations whose solutions provide quantitative values of one or more variables related to the propagation of fire, described by semi-empirical expressions that are complemented by experimental data allow to obtain the main variables related advancing the perimeter of the fire, as the propagation speed, the intensity of the fire front and fuel consumption and its interaction with atmospheric dynamic system

References

Mandel, J., J. D. Beezley, G. Kelman, A. K. Kochanski, V. Y. Kondratenko, B. H. Lynn, and M. Vejmelka, 2013. New features in WRF-SFIRE and the wildfire forecasting and danger system in Israel. Natural Hazards and Earth System Sciences, submitted, Numerical Wildfires, Cargèse, France, May 13–18, 2013.