THE INTERNATIONAL CROWN FIRE MODELLING EXPERIMENT: BACKGROUND, GENESIS, OVERVIEW, AND SUMMARY

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ABSTRACT

The 22nd Tall Timbers Fire Ecology Conference featured a special session on selected aspects of the wildland fire research carried out during the International Crown Fire Modelling Experiment (ICFME), co-chaired by M.E. Alexander of the Canadian Forest Service (CFS) and R.A. Lanoville of the Northwest Territories' Department of Resources, Wildlife and Economic Development (RWED). The present contribution summarizes the first two of the nine oral presentations made during the main conference session dealing with 1) the background information and origins of ICFME and its relevance to other wildland fire research activities, and 2) an introductory overview and an up-to-date summary on ICFME. Nine posters presented at the conference also dealt with studies carried out under ICFME.

ICFME was a major project of CFS fire research carried out in collaboration with RWED's Forest Management Division near the community of Fort Providence in Canada's Northwest Territories from 1995 to 2001. ICFME evolved as a result of many factors such as the fire–global change issues that began to emerge in the late 1980s; the growing desire by both CFS and U.S. Forest Service fire researchers to develop a model for predicting crown fire rate of spread and intensity that had a physical basis as opposed to the empiricism of the past; the trend towards international, multi-disciplinary, collaborative research and field experiments (e.g., STARE/SAFARI-92 fire–atmospheric chemistry experiment in southern Africa); and the growing realization that individual countries or agencies do not have the capacity in terms of staff, logistical support, and funding to conduct outdoor experimental fire behavior research studies in isolation.

ICFME constituted a major field activity of two international organizations that became established in the early 1990s: the International Geosphere-Biosphere Programme's project on global atmospheric chemistry associated with biomass burning and the International Boreal Forest Research Association's Fire Working Group. The other two major field campaigns of these international organizations in the boreal forest have been the 1994 "Bor Forest Island Fire Experiment" in central Siberia that proceeded ICFME and the 1999 FROSTFIRE project (http://www.fs.fed.us/pnw/fera/frostfire/), a landscape-scale prescribed fire experiment involving permafrost terrain in interior Alaska, which eventually followed ICFME. The initial focus of ICFME was on the testing and calibration of a physically-based model for predicting crown fire behavior. However, the project quickly expanded to accommodate a multitude of other research objectives.

The ICFME site was selected in 1994, and most of the plot set-up and preburn fuel sampling was completed in 1995–1996. Eighteen experimental crown fires were successfully carried out during a roughly 3-week period during June–July of each year in what eventually amounted to four separate phases: 1997—3 fires; 1998—2 fires; 1999—6 fires; and 2000—7 fires. An attempt was made to burn one remaining plot in June 2001 in what amounted to the fifth and final phase of ICFME.

ICFME provided a unique opportunity to bring together a diverse group of fire research scientists and managers from around the world to study crown fire behavior and impacts in a highly integrated, interdisciplinary field setting. More than 100 people participated in ICFME for varying lengths of time over 7 summers from more than 30 organizations involving 14 countries.

The ICFME fires represent the most complex, heavily instrumented and documented experimental crown fires undertaken anywhere in the world to date. New instrumentation used during the ICFME fires has provided valuable new data sets and insights into the nature and characteristics of crown fires (e.g., "in-fire" video footage) needed by both researchers and managers for use in the physical modeling of crown fires and in devising strategies to protect communities from wildfire and ensuring the safety of wildland firefighters. The results from ICFME will contribute to a greater understanding of the physical mechanisms and ecological consequences associated with crown fires, translating into improved forest fire management practices in the future.

For more information on ICFME, including updates on the latest publications and other products resulting from this research endeavor, consult the project's website (http://fire.cfs.nrcan.gc.ca/research/environment/icfme/icfme_e.htm). For a current synthesis of ICFME, a well-illustrated, popular-style article is available upon request from the authors (Alexander, M.E., B.J. Stocks, B.M. Wotton, and R.A. Lanoville. 2001. Tracking the spread and intensity of crown fires. Initial Attack 2001 [Fall]:8–11.).

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