

# International Journal of Wildland Fire

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Contents	Volume 19	Issue 8	2010
Wildfires in boreal ecosystems: past, present and some emerging trends <b>Martin P. Girardin, Adam A. Ali and Christelle Hély</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 991–995			Increasing awareness of climate change and concept of emulating natural disturbances through forest management have heightened interest in fire-related studies in boreal forests. This paper summarises new insights and some future research needs arising from the 12 papers presented in this special issue.
Peak detection in sediment–charcoal records: impacts of alternative data analysis methods on fire-history interpretations <b>Philip E. Higuera, Daniel G. Gavin, Patrick J. Bartlein and Douglas J. Hallett</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 996–1014			Charcoal peaks in lake sediments provide valuable records of fire history in stand-replacing fire regimes. Despite increasing use of this proxy, data analysis methods vary and have not been systematically compared. We demonstrate important biases between methods and make recommendations based on analyses of simulated and empirical datasets.
Effects of vegetation zones and climatic changes on fire-induced atmospheric carbon emissions: a model based on paleodata <b>Laurent Bremond, Christopher Carcaillet, Charly Favier, Adam A. Ali, Cédric Paitre, Yves Bégin, Yves Bergeron and Pierre J. H. Richard</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 1015–1025			The past carbon release resulting from paleo-fires during the Holocene is examined using a simple model between measured carbon emissions from modern fires and sedimentary charcoal records of biomass burning within boreal and cold temperate forests in eastern Canada (Quebec, Ontario). Direct carbon emissions are estimated for each ecozone.
Resilience of the boreal forest in response to Holocene fire-frequency changes assessed by pollen diversity and population dynamics <b>Christopher Carcaillet, Pierre J. H. Richard, Yves Bergeron, Bianca Fréchette and Adam A. Ali</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 1026–1039			We analysed the influence of past fire frequencies, inferred from sedimentary charcoal, on the vegetation dynamics and diversity, inferred from pollen. The main feature is a strong stability of the diversity, despite changes in tree abundances suggesting a resilience of the vegetation structure facing the natural range of fire frequency.
The role of fire in southern Scandinavian forests during the late Holocene <b>Richard H. W. Bradshaw, Matts Lindbladh and Gina E. Hannon</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 1040–1049			Fire is a climate-moderated, natural disturbance of southern Scandinavian boreal forests but is strongly linked with human activities in adjoining temperate forest. Fire is only a minor determinant of vegetation composition at a regional scale in southern Scandinavia. Fires occur irregularly and factors such as grazing, mowing and establishment of arable fields are more important as drivers of vegetation change.
A 400-year history of fires on lake islands in south-east Sweden <b>Mats Niklasson, Igor Drobyshev and Tomasz Zielonka</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 1050–1058			By using dendrochronological methods we investigated past fire regime on the mainland and on islands in a large lake in south-east Sweden. We observed large variation in historical fire activity on islands and on the mainland, which we related to patterns of past forest use.
An evaluation of spatial and temporal patterns of lightning- and human-caused forest fires in Alberta, Canada, 1980–2007 <b>Yonghe Wang and Kerry R. Anderson</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 1059–1072			The spatial and temporal patterns of forest fire ignitions in Alberta were evaluated using the <i>K</i> -function and kernel estimation methods. Human- and lightning-caused fires had different characteristics in their spatial distributions. The spatial knowledge could help for developing fire-response and fire-suppression strategies in the province.
Variation in local weather explains differences in fire regimes within a Québec south-eastern boreal forest landscape <b>Igor Drobyshev, Mike D. Flannigan, Yves Bergeron, Martin P. Girardin and Byambagere Suran</b> <i>International Journal of Wildland Fire</i> <b>19</b> , 1073–1082			We examine the differences in fire regime and evaluate possible sources of its variation in a boreal mainland–islands system, north-western Quebec, Canada. The study suggests that more fire-prone local weather and higher frequency of lightning strikes increase frequency of low-intensity fires on the islands, compared with the mainland.

The effects of surficial deposit–drainage combinations on spatial variations of fire cycles in the boreal forest of eastern Canada

**Nicolas Mansuy, Sylvie Gauthier, André Robitaille and Yves Bergeron**

*International Journal of Wildland Fire* **19**, 1083–1098

Landscape composition influences local pattern of fire size in the eastern Canadian boreal forest: role of weather and landscape mosaic on fire size distribution in mixedwood boreal forest using the Prescribed Fire Analysis System

**Christelle Hély, C. Marie-Josée Fortin, Kerry R. Anderson and Yves Bergeron**

*International Journal of Wildland Fire* **19**, 1099–1109

Spatial pattern analyses of post-fire residual stands in the black spruce boreal forest of western Quebec

**Amar Madoui, Alain Leduc, Sylvie Gauthier and Yves Bergeron**

*International Journal of Wildland Fire* **19**, 1110–1126

Will climate change drive 21st century burn rates in Canadian boreal forest outside of its natural variability: collating global climate model experiments with sedimentary charcoal data

**Yves Bergeron, Dominic Cyr, Martin P. Girardin and Christopher Carcaillet**

*International Journal of Wildland Fire* **19**, 1127–1139

Potentially limited detectability of short-term changes in boreal fire regimes: a simulation study

**Juha M. Metsaranta**

*International Journal of Wildland Fire* **19**, 1140–1146

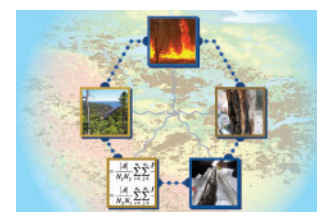
The driest surficial deposit–drainage seem to induce shorter fire cycles at a large scale; however, they alone cannot explain fire cycle variations at a regional scale. Our results suggest that a possible combination of top-down (precipitation, temperature, aridity index) and bottom-up factors (surficial deposits and their drainage) could explain fire cycle variations at the regional scale.

Using a fire-growth model with three weather fire risks and 14 boreal forest scenarios, we showed that both weather and landscape composition factors significantly influenced simulated fire sizes. Fire size increased with shade-tolerant species dominance related to fire-cycle length. Simulations were compared with archived fire information with a sustainable forest management perspective.

This paper provides information on influence of local and regional physiographic conditions on creation of residuals habitats in large fires in the western of Quebec. Fires in the west zone generate less residual habitats compared with fires in the east. Under certain conditions, residual habitats are associated with water bodies, a situation rarely reported in other studies.

We compare past variability in fire frequency inferred from sedimentary charcoal with expected changes predicted using global climate models. This addresses an issue that arises from the application of the Emulation of Natural Disturbances paradigm within which natural history is used as a reference to manage forest resources in a changing environment.

In boreal forests, climate change is expected to increase area burned over the coming decades. However, because area burned is highly variable, detecting this change is uncertain. Alternatively, return periods for annual area burned can estimate the frequency and magnitude of large fire years that have not yet been observed.



Images: Société de protection des forêts contre le feu, Québec (top), S. Gauthier (right), S. Alleaume (bottom right), Y. Wang (bottom left), N. Mansuy (left), and M. P. Girardin (background).