

Pyrocumulonimbus activity during the Fort McMurray wildfire in Western Canada

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Fire activity is influenced by three factors: fuels, ignition sources, and weather conditions. In early May 2016, these factors combined in northeastern Alberta to create Canada's costliest natural disaster and Alberta's third largest wildfire event in its recorded history. The Fort McMurray wildfire started on May 1, 2016 about seven kilometers southwest of Fort McMurray. The wildfire underwent explosive growth and spread rapidly. Before being declared under control in early July, the wildfire burned an area of nearly 590,000 ha, displaced close to 90,000 residents of Fort McMurray and surrounding regions, and destroyed about 2600 residential homes and other buildings. Total insurable losses are estimated at about US\$3 billion with several billion more in other losses.

Pyrocumulonimbus (pyroCB) activity associated with this wildfire was detected on May 3-4 and again on May 16-18. Data from several sources, including weather station observations, weather radar, satellite imagery, the Canadian Lightning Detection Network (CLDN) and numerical weather prediction data are used to analyze/investigate these occurrences. The pyroCb on May 4 was an exceptional event. Several episodes of cloud-to-ground lightning associated with this pyroCB were detected by the CLDN. Provincial fire officials subsequently identified four new fire ignitions in the vicinity of this lightning activity. PyroCbs can sometimes produce lightning (referred to as pyrogenic lightning), but fire ignition by pyrogenic lightning has rarely been reported.