Recent Boreal Forest Fires under Climate Change

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This paper describes recent trends of forest fires and weather in Alaska, North America and Sakha, Far East Siberia. Both regions have reported have large forest fires in recent years. Potential causes are discussed from a climate and vegetation perspective. Mean air temperature increased about 3^{o}C since 1830 in Yakutsk, Sakha. In Sakha and in interior Alaska, the rate of warming increased notably in the 1970's. At the same time, there was a gradual decreasing trend in precipitation. Forest fire histories from the mid-1950's in Alaska and Sakha show that mean annual area burned increased notably in the 1990's. A warmer, drier climate greatly increases boreal forest flammability. Under such climate conditions, large forest fires occurred near Yakustk, Sakha, in 2002. In 2004, wildfires burned 26,700km^2 in Alaska. Nine individual fires exceeded 1,000km^2 in size during a summer characterized by record high temperatures and extreme drought. A substantial portion of fire growth was realized on just a few days when strong pressure gradient winds occurred. Total burn area in 2004 was the largest since record-keeping began in Alaska in 1956. Combined with an additional 19,000km^2 burned in 2005, the area burned equals 10% of Alaska's boreal forest area in just two years. The correlation between fire activity and climate trends suggests that global warming may bring more frequent large-scale fire events to the boreal forest.