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Project Abstract

Wildfire, Ecosystems, and Climate: Examining the Relationships Between Weather, Extreme Fire Events and Fire-Induced Land-Cover Change in the Changing Climate of Siberia.

This proposed research seeks to utilize 20 years of existing NASA-derived satellite and meteorological datasets and Siberian ground-based extreme fire events datasets to statistically analyze the coincidence in severe fires and the meteorological and synoptic-scale weather characteristics that generate the conditions necessary to sustain extreme fire events. After establishing these relationships, we intend to expand the scope of existing bioclimatic models to predict fire regimes under climate change scenarios for 2030, 2060 and 2090 and to simulate phytomass change and change in the extent and distribution of the dominant vegetation. Our focus is on Northern Eurasia because this is a region that is currently experiencing rapid warming and is expected to be strongly influenced by future climate change. Siberia is particularly unique because: (1) this region has the potential to interact with and feed back to both the regional and global climate systems due to its continental extent; and (2) the dominant force of Land Cover Change in Siberia is fire disturbance. This project delivers on near- and long-term Climate Change Science Program Land-Use / Land-Cover Change milestones by analyzing existing data to define historic and contemporary rates and the extent of regional Land Cover Change brought about by a major driving force of that change, fire disturbance. Also, the primary weather and climate variables that drive and sustain large fire events will be statistically quantified. Then, fire danger mapping and bioclimatic models will be used to project the largest driving force of change and the resulting change in future Land Cover. Overall, the goal is to explore the degree to which current and future climate variability affects wildfire-induced Land Cover Change and to highlight the significance of the interaction between the biosphere and the climate system in support of the inclusion of biospheric models in future Atmosphere Ocean General Circulation Models.