FIRE MONITORING AND SMOKE EMISSIONS BY REMOTE SENSING

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ABSTRACT

Emissions of atmospheric pollutants from vegetation fires can greatly affect local and regional air quality. The near real-time information on the magnitude of fires, the amount of pollutants emitted, and their impact on air quality is critical to fire managers' decisions to conduct prescribed fires, so that EPA ambient air quality standards are complied with. We will describe an integrated system (1) to monitor vegetation conditions, location of fires and the burned area, and (2) to quantify the emissions of air pollutants every 12 hours with a spatial resolution of 1 km x 1 km. The real-time data from the NOAA Advanced Very High Resolution Radiometer (AVHRR) satellite and the NASA Earth Observing System (EOS) satellites will be used to monitor the greenness and moisture status of vegetation and the location and size of active fires and burned areas. The algorithms used for deriving the vegetation status from the AVHRR and EOS satellite data are being verified from a historical database of fire occurrence. The algorithms used to monitor active fires and burned areas are being verified by comparing the ground survey data with the AVHRR and EOS satellite data in Alaska and the western U.S. Two large-scale field experiments are being planned to verify the satellite measurements in the western U.S. in 1999 and in southern Africa in 2000. To quantify emissions of pollutants in near real–time, we are developing a model to predict the emission factors of different pollutants as a function of combustion efficiency and weather and vegetation conditions, which will be determined from satellite measurements. In addition, the concentrations of carbon monoxide and particulate matter over fire regime will be monitored from the Measurements of Pollution in the Troposphere (MOPITT) instrument onboard the EOS AM satellite. We anticipate the prototype of the integrated system to be developed in four years and the integrated system to be operational in six years.