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AN EXPERIMENT TO ESTIMATE CO CONCENTRATIONS FROM BIOMASS BURNING AND COMPARISON WITH AIRCRAFT MEASUREMENTS

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ABSTRACT

Fire pixels detected by satellite are a useful tool to study biomass burning. We have used this information to feed a simple model, which calculates the regional carbon monoxide (CO) mixing ratio resulting from a given distribution of fire pixels. The model assumes that the observed concentration is the result of a background concentration, a regional component, and a transport term. A field experiment was designed to check the model. Several flights were made aboard an instrumented Bandeirante aircraft in the biomass-burning region of central Brazil to measure atmospheric CO in several specific situations. The fixed Maxaranguape, RN, observation station near Natal is used to obtain background concentrations of trace gases, including CO. In regions where the transport term is small, the model calculates CO concentrations that compare well with the measurements. One exception occurs in regions of strong horizontal transport, when the transport term reaches values of the order of the regional component. In the atmospheric well mixed source region, CO concentrations are of the order of 300-400 parts per billion by volume, ppbv, whereas the background values are of the order of 80 ppbv.