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Haze Layers Over Central Amazonia: Sources and Chemical Characteristics

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Haze layers were observed during several flights in July/August 1985 over the Amazon Basin between Tefe and Belem. They occurred at altitudes between 1000 and 4000 m and were usually only some 100-300 m thick, but they extended horizontally over several 100 km. These layers strongly influenced the chemical and optical characteristics of the atmosphere over most of the Amazon Basin.

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The atmospheric aerosol in the haze layers contained both very large (20-30 μm) and fine (0.2-1 μm) particles at roughly equal mass concentrations. The aerosol was composed predominantly of organic material, NH_4^+ , K^+ , NO_3^- , SO_4^{2-} , and anionic organic species.

CO , CO_2 , O_3 , NO , and gaseous formic and acetic acid concentrations were significantly elevated relative to the regional background. The chemical characteristics of the haze layers, together with aircraft observations and satellite remote sensing of extensive biomass burning in the Amazon Basin, suggest that fire emissions are the primary source of the haze layer components. Both local burning in Central Amazonia and large-scale fires at the southern perimeter of the rainforest region contribute to the formation of haze layers. Long-range transport appeared to produce the layers at the highest altitudes and of largest geographical extent. The chemical similarity of the haze layer aerosols and the regional boundary layer aerosols suggests a significant contribution of biomass burning to the boundary layer aerosol over Central Amazonia during the burning season.