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Low Molecular Weight Carboxylic Acids and Carbonyls in an Urban Atmosphere: Winter Measurements in Sao Paulo City, Brazil

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Carboxylic acids and aldehydes are important constituents of the atmosphere. They contribute to a large fraction of the non-methane hydrocarbon mixture and can be emitted by direct emissions and formed by photochemical processes. The lower carbonyls and carboxylic acids play important role in photochemical processes acting as source of OH radicals. However, ozone and OH radical can react with saturated hydrocarbons generating these compounds.

To evaluate the chemical atmospheric profile from a megacity with serious air pollution problems, these compounds are being studied in the important South American City of Sao Paulo, Brazil. With a intense vehicular traffic, 62% \ of which is fueled with gasohol (gasoline + 22% \ hydrated alcohol), 8% \ with diesel and 30% \ with hydrated ethanol, few studies about these chemical compounds in this polluted urban area have been reported.

Winter measurements (August 1999) of carboxylic acids and carbonyls compounds were carried out in two (urban and forested) different sites in Sao Paulo. The concentration of formic, acetic, glycolic and pyruvic acids ranged respectively from 0.1 to 10.6; 0.6 to 19.0; 2.3 to 27.0 and 5.1 to 8.3 ppbv for forested site samples and 0.4 to 6.7; 1.4 to 18.4; 0.68 to 1.0 and 3.64 to 14.7 ppbv for urban site samples. The concentrations of formaldehyde and acetaldehyde ranged from 1.0 to 46.7; 1.4 to 50.9 ppbv for forested site samples and 2.5 to 45.6; 1.2 to 56.6 ppbv for urban site samples, respectively.

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This experiment was a part of a study about meteorology and pollution in Sao Paulo to evaluate the photochemical products and the pollutants transport in Sao Paulo atmosphere. Emission sources and mass transport from these species are suggested.

200 Fall Meeting

Dec. 15-19, 2000

San Francisco, Calif

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Wong S. Fung -
Dec 2000