



Seasonal Variations of Low Molecular Weight Dicarboxylic Acids in Atmospheric Aerosols at Okinawa Islands, Japan

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Low molecular weight dicarboxylic acids are major fraction of water soluble organic compounds in the atmospheric aerosols. Recently, economy of East Asia grows up remarkably, and atmospheric aerosols discharged from this area have been transported to Japan. In this study, we collected aerosol at Cape Hedo (CH) and University of the Ryukyus(UR), and studied the distribution and origin of low molecule dicarboxylic acid. Aerosols were collected on a quartz filter with a high volume air sampler. Low molecular weight dicarboxylic acids extracted by pure water were derivatized to dibutyl esters by reactions with BF3/butanol and were measured by GC-FID. In many samples, oxalic acid showed the highest concentration. Concentration of oxalic acid, malonic acid, succinic acid and malic acid were strongly correlated between the two sampling sites. Oxalic acid occupied on the average 83% and 76% of all the dicarboxylic acid measured for CH samples and UR samples. It is suggested that the aerosols in Okinawa were affected by secondary photochemical reactions, not by the primary emissions from local sources. The seasonal variation of the dicarboxylic acids concentrations in CH and UR showed higher in spring and fall, and a lower in summer. From the back trajectory analysis, dicarboxylic acids concentrations showed higher when an air mass came from East Asia area, and showed lower when it came from Pacific Ocean.