2.170 ROx (OH, HO2 and RO2) uptake coefficients by ambient aerosols in Kyoto, Japan.

Early Career Scientist

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Abstract:

Atmospheric aerosols have multifaceted effects on climate and human health. The ROx radicals (=OH+HO_2+RO_2) play the key roles in the oxidation of trace gases and the aerosol phase reactions in the atmosphere. Nevertheless, the discrepancies between the field measurements and the calculations from box modeling of ROx radical have largely hindered our understanding of the overall ROx recycling. The investigation of the ROx produce and sink processes is thus important to reproduce its distributions in the atmosphere. To date, the ROx heterogeneous uptake by the ambient aerosols, which is important for the assessment of its impact on tropospheric chemistry and the chemical evolution of particle composition through the heterogeneous reactions, and may also in part account for the ROx sink processes, is sparsely investigated. In this study, a laser-flash photolysis and laser-induced fluorescence (LFP-LIF) detection technique is employed to measure the ROx uptake coefficients by ambient aerosols in Kyoto (Japan) in real time. A versatile aerosol concentration enrichment system (VACES) is built to enrich the ambient particles to compensate the relative high limit of the detection (LOD) of the LFP-LIF instrument for ambient aerosol. Coupled with the additional measurement results from an aerosol mass spectrometer (AMS), a portable aerosol mass spectrometer (PAMS) and an Aethalometer, the main physical and chemical properties of the aerosol that determine the ROx uptake coefficients will be presented.