OBSERVATIONS OF $N_2O_5$ AND $NO_3$ IN AMBIENT AIR VIA CONTINUOUS-WAVE CAVITY RING-DOWN SPECTROSCOPY

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The nitrate radical, $NO_3$, and its related reservoir compound, dinitrogen pentoxide, $N_2O_5$ are important intermediates in atmospheric chemistry. The nitrate radical reacts reversibly with nitrogen dioxide to form dinitrogen pentoxide, and these three compounds are thought to be equilibrated in the ambient atmosphere. These molecules act as intermediates between $NO_x$ (NO and $NO_2$) and nitric acid. The nitrate radical, due to its strong visible absorption bands in the red, has been measured in the ambient atmosphere via long-path spectroscopy. Recently, cavity ring-down spectroscopy has been used to measure $NO_3$ in-situ, also affording detection of $N_2O_5$ via thermal dissociation to $NO_3$ at 80°C. We have applied continuous-wave CRDS to detect these compounds in ambient air. This technique will be discussed. We report observations of $N_2O_5$ in Fairbanks, AK during wintertime. Atmospheric implications of the observations are also discussed.