DETECTION OF IODINE MONOXIDE RADICALS IN THE MARINE BOUNDARY LAYER USING AN OPEN-PATH CAVITY RING-DOWN SPECTROMETER

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An open-path cavity ring down spectroscopy (CRDS) instrument for measurement of atmospheric iodine monoxide (IO) radicals has been tested in the laboratory and subsequently deployed in Roscoff as part of the Reactive Halogens in the Marine Boundary Layer (RHaMBLe) project in September 2006. In situ measurements are reported of local IO mixing ratios in the marine boundary layer.[a] The absorption cross section at the bandhead of the IO $A^2\Pi_{3/2}$ - $X^2\Pi_{3/2}$ (3,0) vibronic band was used to obtain the mixing ratios of atmospheric IO. The mixing ratios of IO were obtained on two days, peaked close to low tide, and were 5 - 10 times higher than values calculated from column densities previously reported by long-path, differential optical absorption spectroscopy (DOAS) in coastal regions. The typical detection limit of the instrument was estimated to be 10 pptv of IO with the total accumulation time of 30 s. The observations of relatively high concentration, compared to the values previously reported by DOAS, are consistent with the concurrent observations using a LIF (Laser induced Fluorescence) instrument.[b] The observed IO mixing ratios fluctuated, in part, because the open-path configurations had disadvantages that included perturbation of ring-down measurements by air currents and light scattering caused by aerosols. However these problems were more than amply compensated for by elimination of unknown sampling losses. The contribution of aerosol particles to the obtained IO mixing ratios will be discussed at the meeting.

[a] R. Wada, J. M. Beames and A. J. Orr-Ewing *J. Atoms. Chem.* **58**, 69, 2007.

[b] L. K. Whalley, K. L. Furneaux, T. Gravestock, H. M. Atkinson, C. S. E. Bale, T. Ingham, W. J. Bloss and D. E. Heard *J. Atoms. Chem.* **58**, 19, 2007.