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Laboratory studies of iodine oxide chemistry by laser induced fluorescence.

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The iodine oxides, IO and OIO, are known trace components of the marine boundary layer (MBL), and have been implicated in catalytic loss of ozone, O_3, and new-particle formation respectively. Molecular iodine and organic iodine containing compounds are released into the coastal MBL and rapidly photolysed to yield free I-atoms, which in turn react with O_3 to produce IO. OIO is known to be formed as IO is oxidised by itself or by BrO, however its atmospheric sources and sinks are yet to be fully characterised.

The experimental technique of laser flash photolysis coupled to laser induced fluorescence detection of IO was used to measure rate coefficicients, k, and product yields, α, for reactions of atmospheric interest. Important results included for the reaction:

IO + DMS $\rightarrow$ I + DMSO (R1)

$k_1(256 < T/\,\mathrm{K} < 341) = (3.2 \pm 1.4)\times10^{-13}\exp\{(-925 \pm 136) / T)$,

$\alpha(\mathrm{I}) = 0.98^{+0.06}_{-0.09}$

implying that (R1) has little influence upon the chemistry of the MBL. Also studied were alternative source reactions for IO and OIO, *eg.* $CH_2I + O_2 \rightarrow IO + HCHO$ (R2), and $IO + O_3 \rightarrow OIO + O_2$ (R3). The atmospheric implications of these results are discussed.