

Interactive comment on “Halogen activation and radical cycling initiated by imidazole-2-carboxaldehyde photochemistry” by Pablo Corral Arroyo et al.

Anonymous Referee #2

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This is a nice contribution aiming at understanding how triplet states chemistry may induce both halogen activation and HO₂ release. Imidazole-2-carboxaldehyde (IC) was used a proxy for chromophoric dissolved organic matter (CDOM) or brown carbon (BrC) in coated wall flow tube experiments. Its chemistry was simulated by a simple “box” model, which was adjusted to the measured yields. The experiments and calculations are performed according to the current best standards.

While the manuscript itself is well written, it could nevertheless benefit from some reediting as some sentences are repeating between the experimental and result sections.

This manuscript is definitively suitable for publication in Atmospheric Chemistry and

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Physics, and I would raise only a very few minor comments.

While the films were prepared from aqueous solutions, it unclear from the experimental section if those stay liquid during the experiments or if they were drying out. The authors should make clear in which phase the experiments were performed. There is only a few superficial mention about the relative humidity set during the experiments, which may affect both the phase and temperature of the films.

In order to adjust to the measurements, the authors decided to keep the inter-halogen conversion reactions (reactions 8-11) at their literature values and tune the HO₂ scavenging reactions 12 – 16 (or 11-15 as stated elsewhere in the text). To obtain reasonable model results, they were reduced. Here as I wondering if the authors have thoughts on the possible influence of the CA. radicals produced in reaction R4? Very recently, Roveretto et al (ACS Earth Space Chem., 2019, 3 (3), pp 329–334) reported, in similar experiments, between those organic and inorganic radicals. While this is not affecting the conclusions made here, it might explain the need of adjusting part of the rate constants in Table 1.

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