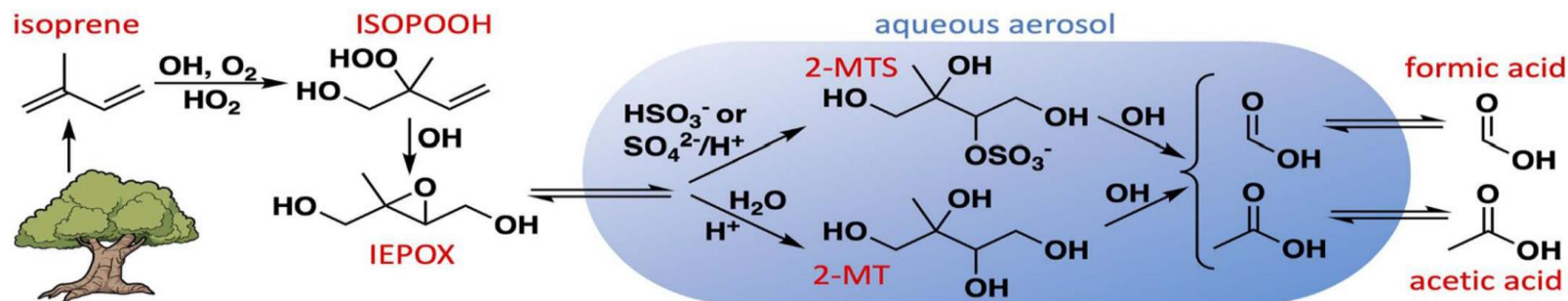


# Understanding formation of small acids from multiphase processing of isoprene epoxydiols

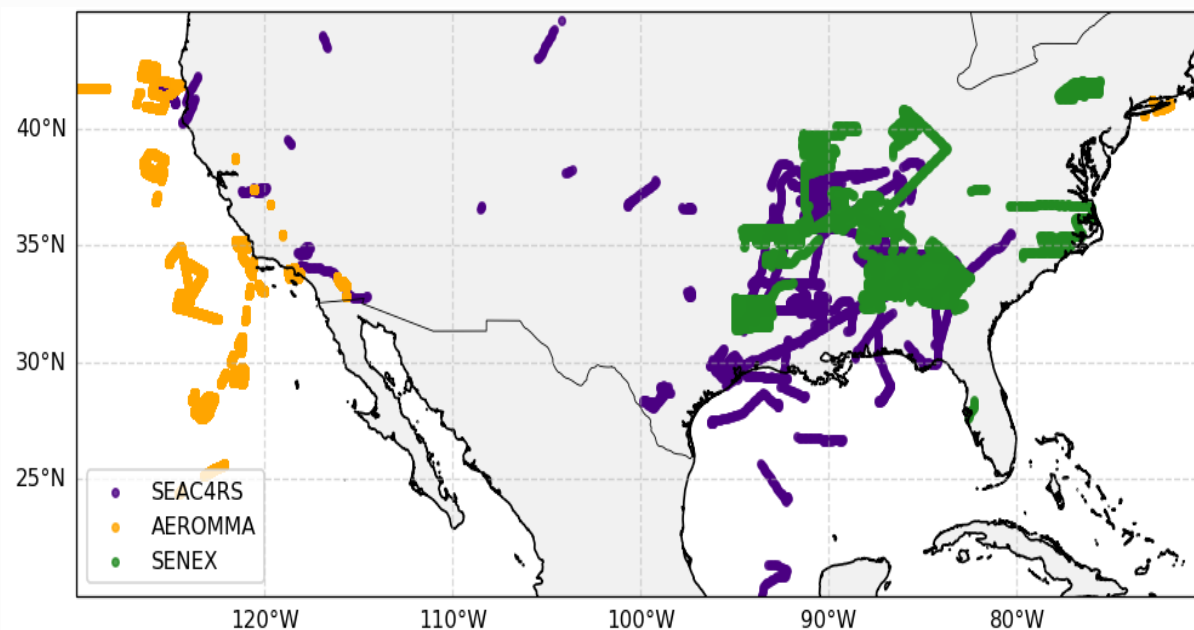


Huilin Zhan, Department of Geography, University College London, UK

## Heterogeneous processing of IEPOX forms small acids



[Bates et al., 2023]

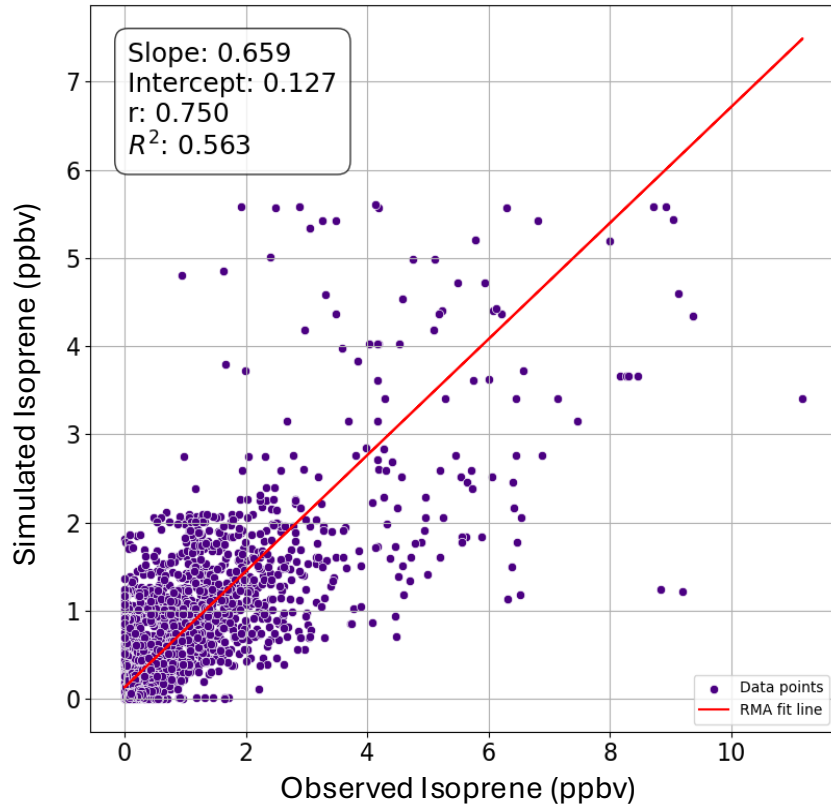


### Method:

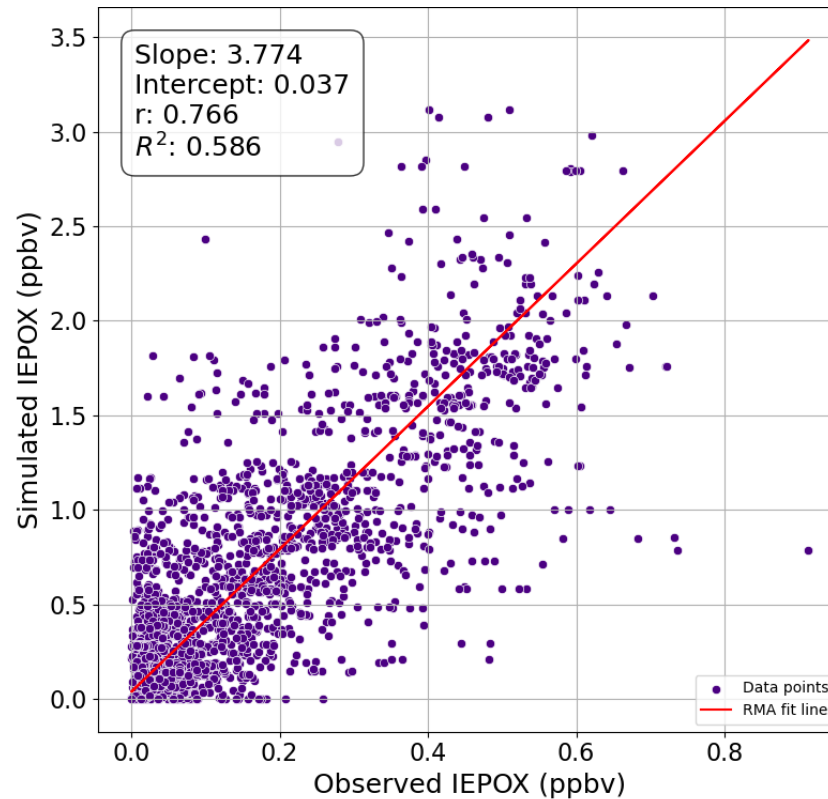
- GEOS-Chem Model v14.5.0
- NASA aircraft observations (flight paths of SEAC<sup>4</sup>RS, AEROMMA, and SENEX campaigns are showed on the left)

# Preliminary results about comparison between observation and simulation in SEAC<sup>4</sup>RS campaign

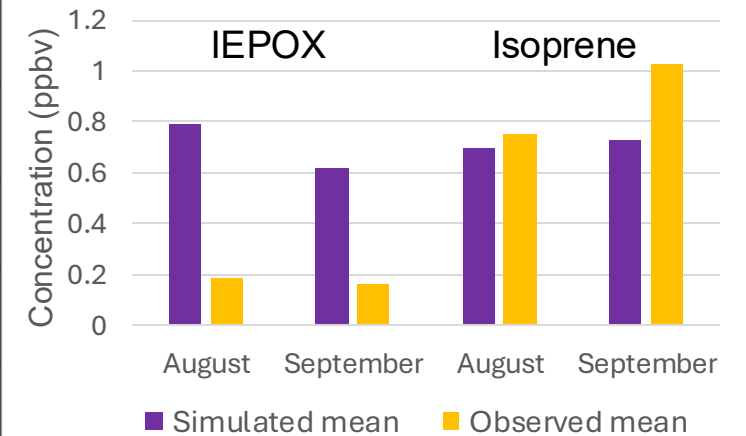
Regression Plot of Isoprene



Regression Plot of IEPOX



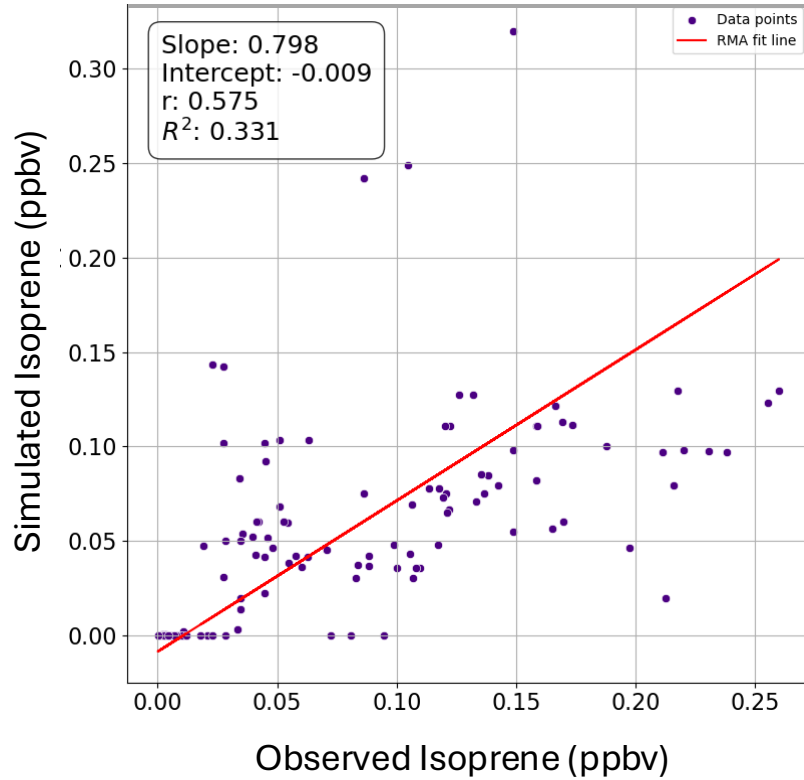
Comparison of Simulated and Observed Mean Concentrations of IEPOX and isoprene



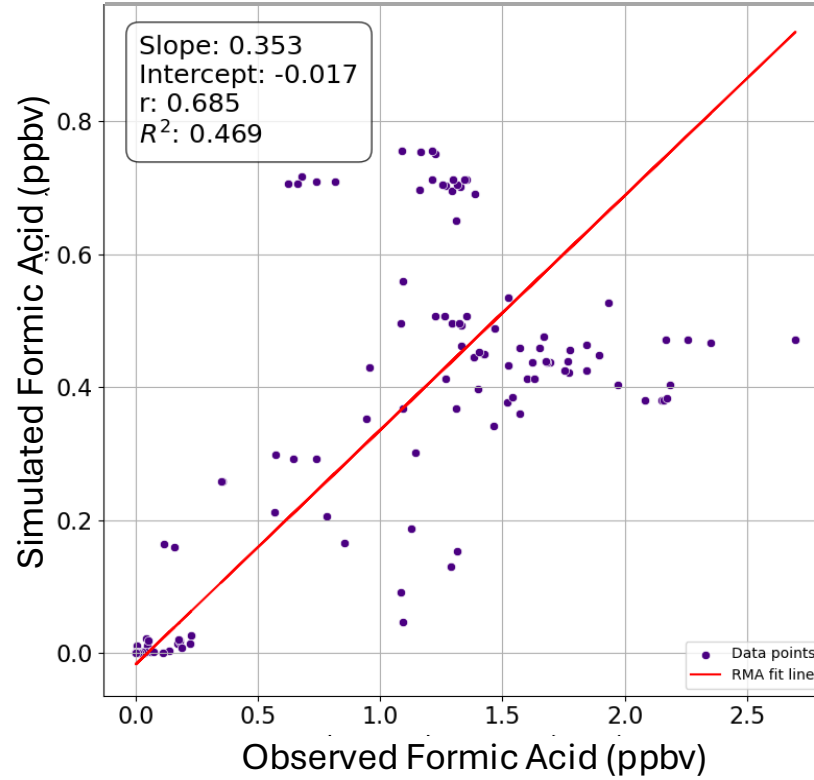
- For a single month, the model overestimates IEPOX, which is consistent with the study of Vasilako in 2021.
- Based on the mean value of two months of IEPOX, the model overestimates 3.88 to 4.33 times.
- For isoprene, the model shows 10% difference in August, 29% underestimation in September.

# Evaluation of isoprene and formic acid in June 2023 AEROMMA campaign

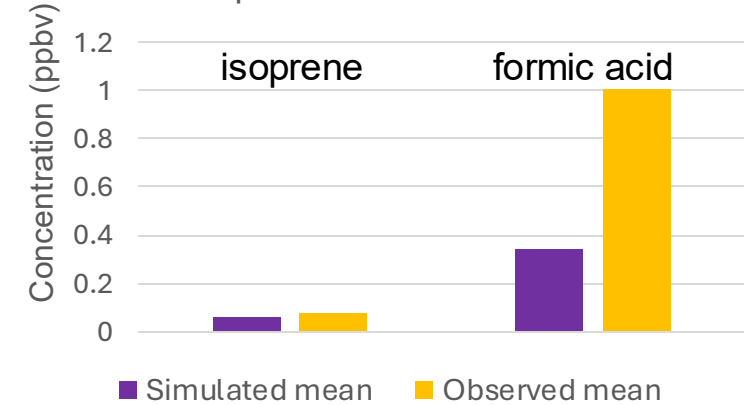
Regression Plot of Isoprene



Regression Plot of Formic Acid



Comparison of Simulated and Observed Mean Concentrations of isoprene and formic acid



	Simulated mean	Observed mean	Underestimation
isoprene (ppbv)	0.0549	0.0795	↓ 31%
formic acid (ppbv)	0.3393	1.0104	↓ 66%

- Isoprene is slightly underestimated in the model compared to a large underestimate in formic acid and large overestimate in IEPOX.
- The initial comparison of the default model supports the need for a multiphase mechanism that would consume more IEPOX and produce more formic and acetic acid than the current model does.