Atmospheric
Measurement
Techniques

Discussions

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Interactive comment on "Characterization of a chemical modulation reactor (CMR) for the measurement of atmospheric concentrations of hydroxyl radicals with a laser-induced fluorescence instrument" *by* Changmin Cho et al.

Anonymous Referee #1

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This manuscript describes the application and characterization of a chemical modulation reactor for interference-free measurements of OH using the FZJ-LIF instrument. I find it interesting that while applying a method to remove interferences, additional interferences could be introduced. This makes the tests performed and reported in this manuscript very important for consideration in future ambient OH measurements. This manuscript is thorough and well written. With only minor changes, I fully recommend publication in AMTD.

Specific comments

P7, line 2: How far do the injectors protrude into the CMR?

P9, Eq. 17: Clarify what $\alpha 2$ is in the text.

P9, line 4: Although the measurements suggest no internal OH scrubbing, the model calculated reactivity (550 sˆ-1) is greater than that calculated for complete mixing (283 sˆ-1×1.8=510 sˆ-1). Do the authors have any comment on this?

P10, line 35: Although the three experiments shown in Figure 5 agree to within 15%, do the authors have any comment on why the interference is lower with the CMR?

P14, lines 21-4: This was confusing to read. Is line 22 supposed to read 'if the ratio Pd/(Phν+Pd) is "smaller" than 0.7'?

P40, Figure 13: It appears that the measurements show curvature while the parameterization does not. Do the authors have any comment on this?

Technical corrections

Abstract. P1, line 20: add the word 'for' to be read as 'allowed for performing'

Abstract. P1, line 26: add an 's' to be read as 'ambient air conditions'

Abstract. P1, line 27: change to 'in the summer season had a median'

Abstract. P1, line 32: change to 'for an unexplained'

P2, line 15: change to 'helped with investigation'

P2, line 18: remove 'the' to be read as 'where OH reactivity'

P2, line 19: remove comma after 'was found'

P2, line 20: change 'The discrepancy' to 'This discrepancy'

P2, line 21: replace 'in' to be read as 'missing from the chemical mechanisms'

P4, line 26: add 'an' to be read as 'used as an OH'

P4, line 27: remove comma after scavenger

P4, line 31: remove second 'is' to be read as 'It is controlled'

P5, line 18: change 'an 1σ' to 'a 1σ'

P5, line 20: remove 's' from 'measurements'

P5, line 20: add a comma after '(HOx cell)'

P5, line 22: reword to be read as 'During the JULIAC experiments, NO ($2.5\times10\hat{}13$ cmˆ-3) was used for minimizing a possible'

P6, line 1: add a space after '270'

P6, line 2: change 'higher' to 'greater'

P6, line 5: remove comma after '%)'

P6, line 9: remove comma after 'SAPHIR'

P6, line 10: add 'a' to read as 'by a mixed'

P6, line 21: remove 'Here,'

P7, line 1: add space after 'Reynolds'

P7, line 4: remove comma after 'found'

P7, line 23: remove comma after 'OH'

P7, line 24: remove comma after 'expected'

P7, line 27: remove comma before 'if'

P8, line 16: reword to be read as 'injectors produce a larger flow resistance within the CMR'

P11, line 15: add 'the' to be read as 'for the FZJ-LIF'

P12, line 20: add an 's' to 'Equation' for both instances

P13, line 18: add an 's' to 'kind'

P13, line 34: add 'the' to be read as 'in the case'

P14, line 8: add 'a' to be read as 'is a similar'

P14, line 21: change 'relative' to 'relatively'

P14, line 22: remove comma after 'error'

P15, line 7: add comma after 'seasons'

P15, line 12: replace 'depending' with 'dependent'

P15, line 15: remove comma after '%'

P16, line 3: remove 'from organic compounds'

P16, line 24: replace 'in' with 'on'

P16, line 28: add a space to read '10 000'

P17, line 9: add a comma after 'environment'

P17, line 15: add 'a' to be read as 'provides a maximum'

P17, line 21: replace 'reasonable' with 'reasonably'

P18, line 26: add 'the' to be read as 'in the summer'

P18, line 28: correct spelling to 'occurred'

P18, line 38: add a comma after 'study'

P18, line 41: replace 'in' to 'on' to be read as 'times on the order'

P26, line 1: replace 'gases' with 'gas'

P28, line 3: replace 'an' with 'a'

P40, line 3: add 'to' to be read as 'compared to a'

P40, line 4: add '.' after 'experiments'

P40, line 5: add 'by' to be read as 'averaged by more'

Table S1 caption: add 'the' to be read as 'for the JULIAC'

Table S2 caption: replace 'gases' with 'gas'

Figure S2 caption: remove 'and DOAS'