

Reviewer comments in black text

Author responses in orange italic text

Additions to the manuscript in blue italic text

Anonymous Referee #2 Received and published: 4 August 2020

This paper presents a very interesting comparison of HCHO between two different ground-based measurement techniques: MAX-DOAS and FTIR as well as their comparison with satellite-based (TROPOMI and OMI) data. The research presented in this paper is relevant to the scientific community since in several occasions questions have been raised regarding the differences between both MAX-DOAS and FTIR measurement techniques as well as their comparison with satellite-based measurements. Moreover, this research presents novel results in the Australasian region. For these reasons I recommend the publication of this paper in AMT. A few specific and minor/technical comments are suggested below.

Specific comments/suggestions:

a) Page 8, line 173 and Page 9, lines 182-183: When explaining the criteria to filter satellite-based datasets it is mentioned that cloud-free data was used (cloudy scenes were avoided or excluded from the analysis), was there a threshold value used? – *Cloudy scenes were determined by filtering for the recommended quality control parameter < 0.5 , which incorporates cloud radiance fraction (at 340 nm) < 0.5 . The relevant text on page 8 has been updated:*

“The recommended quality control (QC) filtering was applied, excluding retrieved values where the QC flag was less than 0.5 (on a scale of 0-1), which ensures scenes with cloud radiance fraction (at 340 nm) < 0.5 are excluded from the comparisons.”

b) Page 21, Figure A4: When comparing ground-based measurements with OMI, which data field was used?, the “ColumnAmount” or the “ReferenceSectorCorrectedVerticalColumn”? – *The “ColumnAmount” field was used. This has now been noted in the figure caption of A4.*

c) Page 18, line 376: Would it be possible to please clarify the phrase “This would begin to address the current Northern-Hemispheric bias in satellite validation studies.”, Is this in reference to the representativeness or the amount of monitoring stations used for satellite validations in both hemispheres? – *Yes, a sampling bias of SH vs NH validations studies – see response to the same question from Reviewer 1.*

Minor/technical comments:

Page 2, line 37: please review the phrase “Photolysis and reaction with OH and photolysis” – *amended to “Photolysis and reaction with OH limit...”*

Page 6, Figure 3a: a parenthesis is missing on the “y” axis of Figure 3a. – *fixed*

Page 7, line 144: a parenthesis is missing after 2018) – *fixed*

Page 9, line 187: cycle of formaldehyde? – *fixed*

Page 10, line 216: the forested west coast – *fixed*

Page 11, Figure 5: panels (b) and (c) have as insets a different panel letter (a) and (b) – *fixed*

Page 14, line 298: methods use different... – *fixed*

Page 15, line 312: well with the... – *fixed*

Page 17, line 327: please review the phrase “points lie are within” – *fixed*, “*points lie within*”

Page 18, line 371: please review the phrase “will be critical tool” – *fixed*, “*will be a critical tool*”