Referees Report

In general the paper is scientifically sound in approach and methodology and addresses subject matter of general interest in light of the new or planned satellite missions targeting atmospheric composition and air quality.

Note that the information provided about Sentinel-4 is still not at all clear or accurate in some aspects – it is referred to a satellite at one point when it is in-fact an instrument that will fly on the MTG-S platform. These issues need correction. Some recommendations are made below in the detailed comments.

Detailed Comments

1) Page 2 Line 28: The nominal spatial resolution of GOME-2 is 40 (ALT) x 80 (ACT) km
2) Page 3 Line 5: information of -> information on
3) Page 3 Line 11: analyses -> analysis
4) Page 3 Line 18: Replace "will be followed up by the Sentinel-5 (S5) mission planned for launch in 2021." -> will be followed by the Sentinel-5 (S5) mission to be flown on the EUMETSAT EPS-SG A satellite, planned for launch in 2022 (https://www.eumetsat.int/website/home/Satellites/FutureSatellites/EUMETSATPolarSystemSecondGeneration/index.html)
5) Page 3 Line 21: insight on -> insight into
6) Page 3 Line 22 & 23: "The satellite flies in an early afternoon sun-synchronous orbit with an equator crossing mean local solar time of 13:30 with a wide swath enabling" – the satellite does not have a wide swath, the instrument does. Please rephrase.
7) Page 3 Lines 26-19: "The Ultra-violet/Visible/Near-Infrared (UVN) sounder as part of the Sentinel-4 (S4) mission on board the geostationary (GEO) Meteosat Third Generation Sounder (MTG-S) satellite (ESA, 2018a), with a planned launch in 2021, will also provide similar resolution to TROPOMI, but with higher temporal resolution (hourly)." Should be replaced with "The Sentinel-4 mission (ESA, 2018a) is implemented as the Ultra-violet/Visible/Near-Infrared (UVN) sounder to be flown on the Meteosat Third Generation Sounder (MTG-S) satellite (https://www.eumetsat.int/website/home/Satellites/FutureSatellites/MeteosatThirdGeneration/index.html) with a planned launch in 2023. It will provide similar resolution to TROPOMI, but with higher hourly temporal resolution."
8) Page 3 Line 14: overoptimistic -> overly optimistic
9) Page 4 Line 27: influencing parameters for the observations -> parameters which influence the observations
10) Page 5 Line 3: overoptimistic -> overly optimistic
11) Page 5 Line 8: set-up -> set up
12) Page 5 Line 19: in accordance to -> in accordance with
13) Page 6 Line 6: Sentinel-4 is not a satellite (see comment above). Please correct to be on-board the MTG-S satellite.
14) Page 6 Line 8: wavelengths ranges -> wavelength ranges
15) Page 6 Line 15: S4 orbit -> MTG-S orbit
16) Page 6 Line 25: Sentinel-4 is not a satellite (see comment above). Please correct to be on-board the MTG-S satellite.
17) Page 6 Line 27: S4 orbit -> MTG-S orbit
18) Page 6 Lines 29 & 30: Based on the location of the edges, we compute the coordinates of the individual observations assuming a spatial resolution of 7x7 km2 at nadir for both

instruments. This statement applies to S5P but not S4. There is no nadir for Sentinel-4. It is embarked on a geostationary platform (located in the equatorial plane) and the FOV is off nadir. The nominal resolution is 8 x 8 km at a nominal location within Europe. Please correct.

19) Page 7 Line 1: “Note that normally the size of the footprints away from nadir increases roughly like 1/viewing angle.” This should be clarified for Sentinel-4.
20) Page 8 Line 12: Please replace the Sentinel-4 and Sentinel-5 Mission Requirements document with https://sentinel.esa.int/documents/247904/2506504/Copernicus-Sentinels-4-and-5-Mission-Requirements-Traceability-Document.pdf