

We would like to thank the two anonymous referees, together with the handling editor, for taking time to review our work and in turn providing constructive feedback in helping to improve the manuscript. Please note that referee comments in the two author response files are indicated in black and author responses in red.

In accordance with our own re-assessment of the manuscript, we provide below details of a few minor additional revisions we have implemented in the track-change version of the revised manuscript that are not directly associated with the referee comments. All line (L) numbers refer to those indicated in the revised manuscript file:

- We consider the finding for an enhancement in near-surface ozone of stratospheric origin over the Arctic to be better quoted as a range as opposed to a central lag date. See L19-20:

“An enhancement in STE leads to a significant 5–10% increase in near-surface ozone of stratospheric origin over the Arctic, with a typical time-lag between 20 and 80 days.”

- We additionally cite the Hong and Reichler (2021) study mentioned by referee #2 on L59.

- We now abbreviate ‘stratosphere-to-troposphere’ (STT) at the first mention in the manuscript on L73:

“..., due to enhanced downward stratosphere-to-troposphere (STT) transport”.

- L94: The CAMS reanalysis is continuously being made available up until the present-day. Thus, ‘(2003-2018)’ → ‘(2003-2022)’ at the time of writing.
- The typical temporal frequency of ozonesonde profiles was previously understated as approximately weekly. It is rather *“...typically a sub-weekly to weekly basis,...”* (L130).
- In Sect. 2.7, we first add the chemical formula of ozone and water vapour in parentheses in the first instance. Subsequently, we now only refer to each species using the chemical formula (L181-196).
- L213: We composited ozone profiles over a seven as opposed to a ‘six’ month period as initially stated. However, since we reduce our period of focus from November-May to December-April, it is now a ‘five’ month period.
- L241: ‘Of particular note...’ → ‘Of note...’

- L309: Overbar missing from w^* term which is now added.
- L321: 'during' → 'following'
- L346: Paragraph break added here in Sect. 4.2.
- L356: Addition at end of sentence: '..., but primarily the PJO-type events'.
- L430: 'Stratosphere-to-troposphere (STT)' previously defined already so now referred only as 'STT'.
- L476: Word 'transport' missing after use of STT acronym which is now added.
- L493: 'conventional' → 'NWP'.
- L496: Additional citation added 'Shepherd et al., 2018'. Reference below:

Shepherd, T. G., Polichtchouk, I., Hogan, R. J., and Simmons, A. J.: Report on stratosphere task force. European Centre for Medium-Range Weather Forecasts. ECMWF Technical Memorandum, 824, <https://doi.org/10.21957/0vkp0t1xx>, 2018.
- L625: 'transport' added after mention of STT.
- L649: 'Shepherd et al., 2018' reference cited again.