Comments from the IAGOS PIs in charge of the IAGOS Ozone data set, its measurement on board passenger aircraft and its long-term quality.

It is not our intention to substitute ourselves to the work of the nominated reviewers regarding the overall scientific quality of the study. However, one major flaw is the comparison of the ozonesondes within 4 degrees of the IAGOS airports. It is difficult to make any conclusions from this due to the ozonesondes and IAGOS aircraft sampling completely different air masses. Because the authors did not respect the IAGOS data policy (https://iagos.aeris-data.fr/data-policy/), we did not have the opportunity to discuss this manuscript before submission. It was mandatory to inform the IAGOS Ozone PIs (from CNRS).

Therefore, the main purpose of this comment is to warn co-authors, reviewers, as well as the editors, and potential readers that this manuscript does not address potential defaults of the IAGOS ozone data sets. (i) none of the co-authors are committed to delivering the high quality of the IAGOS ozone data sets, and (ii) lines 314-315 are wrong. An intercomparison campaign in Julich in June 2023 demonstrated that there is no influence of the pumps on the Ozone IAGOS measurements between 1000 and 200 hPa. This is mentioned in Line 326, as a future activity. However, this activity was completed last year and the co-authors know this. The results, under preparation for publication, show that the IAGOS-CORE ozone measurements (Package 1 with pressurization pumps) and IAGOS-CARIBIC ozone measurements differ by less than 2% and the WCCOS reference UV photometer measurements are usually higher by maximum 5% compared to both IAGOS instruments.

Response: We appreciate the constructive comments by Dr. Valérie Thouret. In our manuscript, we have provided the following acknowledgments section in accordance with IAGOS requirements: "**Acknowledgments.** We thank many whose dedication makes datasets used in this study possible. The global ozone sounding data were acquired from the World Ozone and Ultraviolet Radiation Data Center (http://www.woudc.org) operated by Environment Canada, Toronto, Canada, under the auspices of the World Meteorological Organization. Flight-based atmospheric chemical measurements are from IAGOS. IAGOS is funded by the European Union projects IAGOS-DS and IAGOS-ERI. MOZAIC/CARIBIC/IAGOS data were created with support from the European Commission, national agencies in Germany (BMBF), France (MESR), and the UK (NERC), and the IAGOS member institutions (http://www.iagos.org/partners). The participating airlines (Lufthansa, Air France, Austrian, China Airlines, Hawaiian Airlines, Air Canada, Iberia, Eurowings Discover, Cathay Pacific, Air Namibia, Sabena) supported IAGOS by carrying the measurement equipment free of charge since 1994. The data are available at http://www.iagos.fr thanks to additional support from AERIS. We are also thankful to the Digital Research Alliance of Canada at the University of Toronto for facilitating data analysis."

We are very sorry that we failed to consult the IAGOS PIs before submitting the manuscript. Therefore, we contacted the IAGOS PIs immediately after the reviewer pointed out this problem. Once again, we sincerely apologize to the IAGOS PIs for our negligence and hope the reviewer can forgive our unintentional mistake.

The reason for comparing the ozonesondes within 4 degrees of the IAGOS airports is to make a more systematic comparison between the two datasets. However, we only screened out ten sites with a distance < 1°, which we believe is insufficient to reflect the two datasets' global observations. Therefore, we expanded the distance range of the site selection to 23 sites, enhancing our comparison results' credibility. In addition, it is worth noting that our comparison found: "For the ECC ozonesonde, the overall bias with respect to IAGOS measurements varies from 5.7 to 9.8 ppb, when the station pairs are grouped by station-airport distances of <1° (latitude and longitude), 1-2°, and 2-4°. Correlations for these groups are R = 0.8, 0.9 and 0.7." This indicates that differences in the distance of the observation sites does not have a large impact on the comparison results, which is encouraging, as it is what we would expect for a constant instrument-related bias.

Lines 314-315 are wrong. It is important to note that the "and/or loss of ozone on the inlet pump that could cause IAGOS monitors to read low at pressures below 800 hPa" mentioned in our article refers to a problem that only existed in early aircraft observations, which is clearly stated in our article. "Possible reasons for the difference include: side reactions that cause sondes to produce excess iodine (Saltzman and Gilbert, 1959), and/or loss of ozone on the inlet pump that could cause IAGOS monitors to read low at pressures below 800 hPa. The latter was **an issue in earlier aircraft ozone sampling programs** (Schnadt Poberaj et al., 2007; Dias-Lalcaca et al., 1998; Brunner et al., 2001), **but Thouret et al. (1998) found it negligible for MOZAIC/IAGOS."**

In Lines 367-385, we added, " A recent intercomparison campaign at the World Calibration Centre for Ozone Sondes (WCCOS) in Julich in June 2023 indicates that the pumps do not greatly influence the ozone IAGOS measurements between 1000 and 200 hPa. The IAGOS-CORE ozone measurements (Package 1 with pressurization pumps) and IAGOS-CARIBIC ozone measurements differ by less than 2%, and the WCCOS reference UV photometer measurements are usually higher by 1-2% (to a maximum of 5%) compared to both IAGOS instruments (Blot et al., 2021; Nédélec et al., 2015; Thouret et al., 2022). IAGOS-CARIBIC does not have pressurization system, so that's why the good comparison between both IAGOS systems means a lot.

However, as noted by Saltzman and Gilbert (1959), the differences in stoichiometry found at different pH values imply that the chemistry of reaction of ozone with KI is complex, involving reactions that cause loss of iodine, as well as reactions other than the principal one that produce additional iodine. Several authors have noted the existence of slow side reactions involving the phosphate buffer, with a time constant of about 20 minutes, that may also increase the stoichiometry from 1.0 (Tarasick et al., 2021, Smit et al., 2024). Furthermore, evaporation causes the concentration of the sensing solution to increase, which can further enhance the stoichiometry, by concentrating the phosphate buffer, and to a lesser degree, by increasing the concentration of the KI itself (Johnson et al., 2002). These factors could contribute to the observed average relative bias between sondes and IAGOS found in this study. "

Added references:

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