RC1: Anonymous Referee #1, 20 Dec 2024

The paper is well-written and the dataset will potentially be of interest to at least three groups of readers: climate research, ozone research, and science historiography.

For climate research, the dataset presents the interesting aspect of adding several decades of station data that predate what is taken as the acceptable observational record for surface ozone. The authors review the previously-published datasets and present appropriately the originality of the new dataset. The authors warn that exploitation will not be straightforward, for reasons cited in the paper, chiefly a strong dependence of the semi-quantitative ozone obtained by ozonoscope on humidity and other factors. The papers having reviewed the data quality from these instruments are also duly cited. However, to assit data exploitation, it seems humidity data are also available along with the observations. Furthermore, as data from other neighboring observatories and stations are rescued -in a similar way as done here- the accuracy of reconstruction of the humidity information is due to improve with techniques such as climate reanalysis (e.g., Slivinski et al., 2019, https://doi.org/10.1002/qj.3598).

One point to clarify would be if all observed elements reported in the original sheets got transcribed? or if some observed elements were not digitized, which ones were left out?

The reviewer makes a good point here. We understand that the reviewer is asking if in the logbooks from observatories there was more information on other variables measured. The answer for this is yes. This is shown in our Fig.2, which on top of the ozone and humidity data, it includes pressure, temperature, winds, etc. Winds were digitized for Lisbon, but for different purposes to the goals of this paper and irrelevant at the moment for the purpose of this research. Therefore, they are not included in the published database. and other variables were not digitized. We clarify this now in the text, modifying the sentence at the beginning of Section 2.2, which now reads "*usually consisting of reports of atmospheric pressure, rain, evaporation, temperature, vapor pressure, humidity, cloud coverage, wind direction and speed. Also, they included O_3, published for the first time in 1863, beginning the series of "Annaes do Observatorio do Infante D. Luiz" (hereinafter AOIDL) reports (see Figure 2 for an example) (Brito Capello, 1863). Only O_3 and humidity data were digitized in the context of the work presented here.*".

For ozone research, the dataset presents, besides monthly data, also daily nightly and diurnal observations (when available). This availability within the data series may present an opportunity to apply to earlier times our understanding of ozone chemistry and surface ozone variability, which is still developing (e.g., Monks et al., 2021, https://doi.org/10.5194/acp-21-12909-2021).

Many thanks for bringing this on the table. It is an obvious opportunity that these datasets enable, and we had not thought about suggesting it. We have adapted the comment of the reviewer to include it in the Conclusions section of our manuscript, and now we cite the paper by Monks et al.

Finally, for science historiography, this paper presents the interesting point of illustrating how scientists today recognize, as a community, when observation techniques do evolve, and thus for some applications it may be preferable to leave aside some of the earlier records (e.g., Tarasick et al., 2019), but even then, how efforts continue to try and extract value from past observations (this paper).

We fully agree with this reflection by the reviewer, and we are happy that this view is shared by others in the research community. We hope that this is a useful paper and contributes to this idea and the discussion on it.

Table 3: the image would need to be rotated (years are shown upside-down).

We are aware of it. However, this is a problem of the format of the manuscript to submit to the journal. Both Table 2 and Table 3 should be in landscape, instead of vertical, as they appear right now. When the tables are in landscape, the numbers in the vertical are not flipped and read well. We will work with the typewriters to get it right before publication of the final manuscript.