

Response to comments by R. Hobday

We thank Richard Hobday for his encouragement and for providing valuable practical and historical context for our opinion piece on the Open Air Factor. We will add text in our revised manuscript referring readers to this practical and historical context from the medical perspective in ref [7], the biological weaponry in ref [8], and the threat of increasing antimicrobial resistance in ref [9].

However, it is noticeable that practical and historical comments give no further clues to the initial question we posed, i.e. What is the chemical nature of OAF?

At first in the 19th century it was thought that the newly discovered gas, ozone (Schoenbein, 1848) was a germicidal purifier in clean air, and coastal towns made competitive claims that elevated ozone amounts measured there gave health benefits to visitors. By the mid 20th century the views on health benefits of ground level ozone had reversed. As a result of intensive research which firmly established the nature and causes of photochemical oxidant smog, first recognized in Los Angeles, California, and the significance of long-range transport of tropospheric ozone for removal by oxidative processes of atmospheric gases which would otherwise accumulate in the air.

By contrast, the nature of OAF and the chemical detail of its action as a germicidal agent destroying disease-causing infections has been largely overlooked since its discovery, also in the mid-20th century. However, the germicidal efficiency of OAF appears to be orders of magnitude more powerful than O₃. At that time, it was not widely appreciated that emissions of natural volatile organic compounds from natural vegetation (terrestrial, agricultural, and marine sources) and their atmospheric oxidation products, formed by reactions with ozone and photochemical degradation made such a large contribution to trace gas chemistry in the lower atmosphere world-wide. We hope that this paper will stimulate research leading to a more comprehensive understanding of the mechanisms at work in these processes.

References

Schoenbein, C. F.: Das Ozon als Mittel zur Unterscheidung der Arsen- von den Antimonflecken, 151, 361-366, <https://doi.org/10.1002/andp.18481511105>, 1848.

Schoenbein, C. F.: Ueber die Erzeugung des Ozons durch Phosphor in reinem Sauerstoffgas, 151, 367-377, <https://doi.org/10.1002/andp.18481511107>, 1848.

Schönbein, C. F.: Hat der Phosphor einen Geruch? Ann. Phys. Chem. 75, 377-386, 1848.