

# ***Interactive comment on “Three Decades of Tropospheric Ozone Lidar Development at Garmisch-Partenkirchen” by Thomas Trickl et al.***

## **Anonymous Referee #1**

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This is an overview paper that mainly summarises the lessons learned from a dedicated team that built several ozone dial systems and have operated them over no less than three decades. The paper includes many details that are excellent learning material for scientists and technicians in this field.

The paper is well structured.

There are a number of minor corrections needed: pp 1

29 Due to a considerable technical progress meanwhile rather small changes of the mixing ratio of the order of just 30 a few parts per billion (ppb) may be resolved, which is necessary for distinguishing also the influence of minor

change 'meanwhile' to 'it has been shown that nowadays'

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Discussion paper



pp 2

32 In the mid-1990s also a mobile ozone DIAL was built in co-operation with OHB System (Bremen, Germany;

change 'also a mobile ozone DIAL was built' to 'a mobile ozone DIAL was also built '

pp 5

8 The conversion efficiency was determined for a laser repetition rate of 10 Hz. During the lidar measurements it 9 turned out that the second-Stokes output may significantly increase when selecting a repetition rate of 100 Hz, 10 sometimes even leading to range signal overflow in the transient digitizer. This effect was unexpected and must 11 be taken into account when setting the detector supply voltages. We did not analyse this behaviour in detail.

It is rather surprising that this behaviour was not studied in deatail or that the conversion efficiency experiments were not performed at a laser repetition rate of 100 Hz at which the measurements are actually performed. Some additional explanatory text is needed here to describe the choices of the authors. Im partucular, the conversion efficiency impacts the signal strength (as is described) so this is an important parameter in setting the optimal detector gain and integration time for the ozone measurements.

pp 5

22 remote control option. The manufactured had promised external control of warm up and rotation of the

change 'manufactured' to 'manufacturer'

pp 6

6 We derive a guess of the unknown pump wavelength of our Powerlite laser model

The authors give a value for the laser wavelength that is derived from experiments

with other lasers so it seems and state 'the individual values varying strongly'. Please indicate the range in which the value of the laser wavelength can vary.

pp 7 12 All lenses with focal lengths below 0.2 m are anti-reflection coated in order to avoid angle-dependent transmittances.

Why are not all lenses coated?

pp 8 33 An aperture with four adjustable blades (custom-made by OWIS) was placed at the entrance of each

This could be supported by a figure/diagram.

pp 24 The paper describes a major achievement of long term observations. A series of valuable technical recommendations is given. However, a clear statement about the prospects of continuation of the time series in Garmisch-Partenkirchen could be added.

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