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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An investigation of ozone and planetary boundary layer dynamics over the complex topography of Grenoble combining measurements and modeling" *by* O. Couach et al.

Anonymous Referee #2

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GENERAL COMMENTS

The paper describes measurements and modelling of ozone and planetary boundary layer height during a three-day period in July 1999.

Three-dimensional fields of ozone were obtained from 2 ground level stations (one equipped with a vertical sounder) and from 4 flights with an aeroplane. The temporal evolution of the mixed layer height was deduced from the signals of a LIDAR. The measurements of ozone, planetary boundary layer height and various meteorological parameters are compared with the output of a numerical model.

The paper includes a fair amount of detailed descriptions on certain parameters while

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many important aspects are only discussed superficially.

SPECIFIC COMMENTS

To me the comparison between model output and measurements does not look very convincing. The temperature data depicted in Fig. 4, for example, show an offset of 5-10 Kelvin which makes any later statements of calculated planetary boundary layer height very uncertain. I also find the reported windspeeds of only 1-2 m/s between 1800 and 2900 meters hard to believe (but that's just a feeling and I may be in error here).

Although there exist a connection between the aerosol backscatter signal obtained from the LIDAR and the planetary boundary layer height in the real world I think the discussion and stated numbers (in meters) of the planetary boundary layer height is a gross overinterpretation of this sparse amount of data available. The temperature profiles depicted in Fig. 8 does not give much guidance and it's very difficult to estimate planetary boundary layer height from these profiles.

From Fig. 9 it is clear that atmospheric ozone is destroyed near the ground during night. It is a very interesting approach to break down the process into the mechanisms shown in Fig 10. The method to end up with the presented results is, however, very rough and many other possibilities exist. To resolve this interesting question much more data and a combination of laboratory work and atmospheric modelling is needed.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 797, 2003.