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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The spatial scale of ozone depletion events derived from an autonomous surface ozone network in coastal Antarctica" *by* A. E. Jones et al.

Anonymous Referee #2

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The manuscript "The spatial scale of ozone depletion events derived from an autonomous surface ozone network in coastal Antarctica" introduces new method for taking measurements in an autonomous way and its first results that allow evaluating the spatial extend, vertical scale and inland penetration of spring time surface ozone depletion events in Antarctica. The information is presented in a clear, adequate and logical manner.

Tables and figures are clear, well suited and prepared to illustrate and support the observations and conclusions.

While succinct and up to date review of the current research is presented, two of the citations: Richter et all., 1998 line 73 and Read et all., 2008 line 352 are not included into the list of the references.

Including an explanation on asl (line 26) and UAVs (line 81) will help in better presenting the content.

Consistency in measuring time interval will eliminate confusion (1 min averages (line 126) or 60 s averages (line 133))

The work will benefit if line 172 and line 173 are clarified.

The reader is referred to a previous technical paper for the technical details on the method and instrumentation characteristics. However, the instrumentation specifications detailed by manufacturer and described in the technical paper do not explain how potential effect of snow and ice accumulation over the intake was monitored. Was the snow and ice accumulation monitored and evaluated during the data collection and by what means? It is known that humidity introduces a bias in ozone data obtained from an instrument based on UV absorption by a few percent. Near by presence of water, snow penetration and crystal growth on the instrument lines at low pressure and low temperatures and their subsequent melt could lead to an increase in the humidity in the absorption cell. Was the potential of increased humidity and its impact evaluated in the data set?

Including information on how authors assessed and corrected for the development of an instrument drift in particular on the measurements taken by autonomous monitors at different low temperatures is essential for this work. The drift due to temperature change or contamination in the absorption cell is well known problem for those instruments (2B Technologies Inc. 202 ozone instrument operational manual). An accurate offset correction could be measured by using an external ozone scrubber and preprogrammed hardware component for routine zero measurements at different operating conditions. Were such zero ozone measurements a part of the data collection process?

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The reported stabilization period of 3-10 minutes (line 126 and line 129) is surprisingly short for instruments that have been powered off and remained at low temperatures. Model 202 instrument has well estimated stabilization period of up to 20 minutes for laboratory based measurements. This time period is required for the lamp, photodiode, and internal temperature of the absorption cell to stabilize. One would expect this stabilization period to increase at the harsh environmental conditions the autonomous instruments have been operating at. Were any modifications made on the instruments in order to reduce the warm up and stabilization period with confirmed outcome to support the filtering applied to the data sets?

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 27555, 2012.