

## ***Interactive comment on “Polar tropospheric ozone depletion events observed in IGY” by H. K. Roscoe and J. Roscoe***

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This manuscript addresses surface ozone measurements made at Halley Bay, Antarctica. The measurements are quite unique because they were performed fifty years ago and because the dataset covers a complete cycle of the year including the dark winter season. Therefore, the report on the historic dataset is not only a very worthwhile contribution to the discussion of ozone chemistry but also on climate change in general. The paper addresses also the question of a possible dark reaction of ozone and sea water.

In my opinion these two topics, the presentation of the dataset and its interpretation with the dark reaction, should not be combined in a single paper. Therefore, I suggest to split the paper in two parts. Part one dealing with the measurements and part two about the dark reaction. Part one should be published in ACP after some minor

changes and part two after substantial modification.

- I feel that the title is too general. A title like “Surface ozone at Halley Bay, Antarctica, observed in 1957-1958” would be more specific.
- Pg 3639 “However, we must remain suspicious that there was a problem with the apparatus because no such low-ozone episodes are observed in midwinter at Neumayer”. This is not true if considering the complete Neumayer ozone dataset. For example, ozone depletion events were clearly observed in June 1982. See <http://gaw.kishou.go.jp/wdcgg/PlotData.php?file=o3/hourly/y1982/nmy770s0.dat>. Some more examples of ozone depletion events observed at stations in the dark are compiled by Tarasick and Bottenheim (ACP,2, 197-205,2002). In order to estimate the influence of a possible dark reaction it would be interesting to study these more recent datasets in the satellite era with trajectory calculations.
- In the 1950s the sea ice extent was probably 20% larger as compared to recent values (Curran et al, Science, 2003). Therefore, it was more likely that ozone-poor airmasses were coming from the sea ice north of the dark polar circle.

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