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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Characterising terrestrial influences on Antarctic air masses using radon-222 measurements at King George Island" *by* S. D. Chambers et al.

**Anonymous Referee #2**

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General comments: The paper presents an interesting contribution to the use of radon-222 as a tracer and represents a substantial contribution to scientific progress within the scope of Atmospheric Chemistry and Physics. However, in opinion of the referee the paper can be improved with some more precise information regarding meteorological parameters and effects of local source.

Specific comments: The station is an international known meteorological station, however there is any specific meteorological data presented. The information of temporal variations of monthly and daily temperature, wind speed, wind direction, solar radiation humidity, rain(snow) can be useful. The author can have a look on other publications

that this information is available and useful, such in Yu xia et al. 2010 Atmos. Meas. Tech. 3, 723- 731, Grossi et al.2012 rad meas. 47, 149-162 and others. Could these meteorological values be presented and analyzed together with the radon concentrations? Therefore, at least, in section 3.2 the sector analysis could be interested to be presented with meteorological parameters

Free snow-ice coverage could be an important radon local source, since the other mentioned continents (South America and specially Australia) are quite far away. Therefore, to have a more robust conclusion regarding the influence of local source, an estimation of the local radon exhalation map according to the snow cover in the region could be interesting to see. For instance, the readers do not know if there is a volcanic area relatively close to the station that can significantly influence the radon concentrations. This local radon map estimation, together with the meteorological analysis, could lead to see some direction that enhanced the radon concentration. Could the authors introduce some information regarding the possible radon map in the region? Is there any possible significant local radon source?

I would like to point out that if thoron can sometimes be significant at Antarctic stations, this can probably lead that a very radon close source has a significant effect on the radon. Can the authors comment this idea?

Regarding the comparison with Mawson station. At both stations there are high summer concentration and low winter but not similar. Could be partially explained by local effects due to different variable local radon exhalation map? (for instance different snow cover map)

In order to identify local or SouthAmerica/Australia source it would be interesting to see the measured data for anthropogenic gases. Would be possible to introduce this information in the text?

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 11541, 2014.