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Reply on RC2

R. Giles Harrison and John C. Riddick

Author comment on "Atmospheric electricity observations at Lerwick Geophysical Observatory" by R. Giles Harrison and John C. Riddick, Hist. Geo Space. Sci. Discuss., https://doi.org/10.5194/hgss-2022-6-AC3, 2022

Thank you for the careful consideration given to the manuscript and the very helpful points made. We will modify the title to be more specific as suggested. Providing a map across several scales is a good suggestion too, which will improve the value of the existing site plan.

We agree an illustration of the original form of the data will be worthwhile. This manuscript, however, and the choice of journal, is only intended to provide an historical overview of the measurements undertaken. Further, an extensive analysis of the data is not possible without it having been fully digitised, which has yet to occur. Consequently, it will be only possible to show samples of data, but we can include more. (The Carnegie-like variation during the later period when fair weather criteria have been given elsewhere, e.g. fig 9a of Harrison and Nicoll 2008).

We appreciate the reviewer's support for our parallel about diagnosing the atmospheric effects from nuclear tests and the ozone hole. As mentioned above, it is not possible to extensively discuss this. Some examples have already been given in the literature cited (e.g. fig 2a of Harrison 2020, or fig 4 of Harrison 2003), but given the importance – and limited appreciation - of this aspect we recognise that something more can probably helpfully be added to this manuscript which we will address. We can include the additional references mentioned, and the subsequent results which are associated with radioactive deposition from Chernobyl and Fukushima.

On the technical points, firstly, the largest deviations from the electrograph's measurement range will almost certainly be associated with strongly electrified clouds overhead, and/or charged rain reaching the surface. Secondly, during the period of radioactive contamination, the importance of investigating the Loch and freezing conditions was that it revealed the origin of the radioactivity effects. In the case of frozen land, which might be thought to prevent radioactive material leaving the soil, the PG was increased. Also, over water, where there would have been no deposition retained at the surface, the PG was increased. Together, these observations indicate that the conductivity was only being reduced over land. This will be clarified.

Publication of international atmospheric electricity data by the USSR's Hydrometeorological Service was arranged through the World Meteorological Organisation, and began in January 1964: this opportunity was taken up after publication ceased of the Observatories Year Book in 1967.