

Interactive comment on “Building a Raspberry Pi School Magnetometer Network in the UK” by Ciarán D. Beggan and Steve R. Marple

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Author's Response: Chris: Thank you for the positive comments on the work. We have taken your suggestions and provide a detailed response below.

1. Perhaps it may be useful to state the approx precision of the system and price (1.5 nT and 150 GBP?) of the system already in the abstract. This information is likely of great interest to many readers. **Response: This was also commented by Reviewer 1. The manuscript has been updated to provide this information.**

2. Section 2: Similar to a bicycle dynamo: please add a note that unlike a bicycle dynamo there is no permanent magnet in the core involved in generating the Earth's magnetic field, since the temperatures there are too high. **Response: We have updated**

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the text to clarify this point. Added in a reference to Lowrie (2007).

3. Section 2: 'the speed and density of the solar wind ... increases and energy is passed' -> 'the speed and density of the solar wind ... increases, and the interplanetary magnetic field is perturbed, resulting in energy being passed' **Response: Text has been modified as requested.**

4. Section 2: 'generating large magnetic fields' -> generating relatively large magnetic fields (amplitudes up to 100-1000 nT) **Response: Text has been modified.**

5. Section 2.1 'The current is directly proportional to' -> 'the current needed to produce saturation is directly proportional to' **Response: Text has been modified "The current difference is directly" as this was also noted by Reviewer 1.**

6. Section 3: The magnetometer system consists of -> The Raspberry Pi school magnetometer system consists of **Response: Text has been changed**

7. Section 3. 'true accuracy' Do you mean precision? Is this not a variometer without absolute measurement accuracy? **Response: Text has been changed to say precision. The relative accuracy over a few hours is good, but it is not a full field absolute instrument so, yes, the accuracy at any given time would be poor.**

8. Section 3.1/ Fig 2. There is an offset in H between Rpi and GDAS1 early on 12th Sept of > 50 nT, any idea of the reason for this? **Response: I'm not entirely sure. Most likely it is some manmade background that disappeared by the middle of the day (like on the 17th Sep) as the system was in an office in Murchison House. It may in part also be due to longer term temperature drift – there is a mean value subtracted from the Rpi data rather than a linear fit over the five days.**

9. Section 3.1 'remove much of the error by backing-out the measured temperature through calibration. Has this been done? If so it might be nice to show the corrected version in Fig 3? **Response: Yes, I have played around with the temperature correction and made code and example data available in Python for the schools themselves to**

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have a go. I used a least squares fit to a second-order polynomial so get an offset (near zero), linear and second-order terms. The coefficients are quite dependent on the time-series selected though as the instrument response is non-linear with temperature. Hence, the best strategy in reality is to keep the temperature stable. For the data used in Figure 6, the temperature changes were 'backed out' as best as possible (though not fully in BGS03 for example at the end of the time-series), and the data from the BGS variometers were aligned to true north, again as best as possible (given the lack of orientation information).

10. Section 4 'cover the UK in both latitude and longitude'. Perhaps a school in N. Ireland might also be of interest? **Response:** Although I didn't try too hard, I didn't meet anyone from a school in NI at any of the IOP fairs or come across one through other contacts.

11. Section 5 'the aurora moves as far south as LER' Do you mean the magnetic signature of the aurora or the aurora as seen in visual observations? **Response:** The aurora were visible across the UK (and photographed by the BGS Aurora Camera in ESK though it was raining in LER) but I've amended the sentence to be clearer.

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