

Interactive comment on “A low-cost device for measuring local magnetic anomalies in volcanic terrain” by Bertwin M. de Groot and Lennart V. de Groot

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The article describes a hand held device to measure magnetic field directions and intensities close to the ground. For that the authors combine standard components (magnetic field sensor, inclinometer, gps, scope and bubble leveler) in a smart and easy way to obtain magnetic readings in a fixed earth reference frame. The article is well written and provides sufficient information about the construction and the data processing.

The weak point is the evaluation of the accuracy of the instrument. The author's claim "certainly $<0.5^\circ$ in paleomagnetic direction" is not backed up by statistical sound ref-

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erence values. There are some factors that should be tested to show that the device accuracy is really valid under common field conditions.

1) Temperature coefficients of all components. This should be tested.

2) GPS accuracy. The authors assume $<1\text{m}$ horizontally. The manufacturer's hand-book states "Demonstrated under following conditions: 24 hours, stationary, first 600 seconds of data discarded". However waiting for 10 minutes at each measurement point is not very convenient in the field. Additionally the limited visibility of satellites due to topography can further affect the GPS accuracy. This can of course be overcome by using greater distances but should be tested and discussed in the paper.

3) The authors compare their measurements to the IGRF value which represents a global field model and can deviate locally. Hence it would be much better to compare the obtained field directions to in situ reference measurements with a proven instrument. Non-magnetic theodolites with attached single axis flux gate sensors are commonly used in geomagnetic observatories and can easily provide such measurements. Additionally the authors could use known field directions generated by helmholtz coil systems to demonstrate the accuracy of their system for different field conditions without the need to travel to many different locations.

I recommend this article for publication once the authors provide a statistically solid demonstration of the accuracy of their instrument.

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