

Interactive comment on “Measurement experiences with FluxSet digital D/I station” by László Hegymegi et al.

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Reading the angles of a non magnetic theodolite digitally could be a great improvement for the DI-Flux absolute measurement. It is a great development and I recommend to publish the paper if the following minor comments are considered.

The main question, how much the digital reading influences the measurement quality, should be pointed out more clearly. The only quality check is a set of absolute measurements at one (magnetically quiet) day, which tells us, that the DS-1 works. The error bars (even if three are presented, St-Dev, Variance and Max-Min) can not be related to specific sources. ΔF is based on external data only and not relevant for the quality of the DS-1 system. Thus a more dedicated check of the potential risk of introducing the digital reading shall be added.

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In detail: (1) Please add a more specific test checking the precision of the angular readings. One option could be that you measure the field component for arbitrary angular settings (within the fluxgate range of +/-3000nT) and compare it with the nominal field component calculated for the angles. The field vector should be known in an observatory at any time, and the setup parameter (orientation vs. azimuth mark, fluxgate offset, fluxgate orientation) are known from at least one absolute measurement with the DS-1 system.

(2) Reducing the influence of the nearby electronics (including battery and RF unit) to a level below 1nT is a remarkable achievement. For more confidence, results of a magnetic characterization of the electronics should be added which should includes remanent and induced (electronics might contain soft magnetic material) contributions as well as the effect of perm and deperm.

(3) Using the single component fluxgate sensor for absolute measurements by the residual method with larger deviations from zero crossing (as indicated in Figure 2) the author should mention how he eliminates non linearity errors and scale values uncertainties because only offset and alignment errors are vanished by the DI-Flux measurement procedure.

Last but not least I want to point out again the importance of this development because absolute measurements could become more robust and observer skills less important. With the DS-1 only leveling of the theodolite and focusing of the azimuth mark still need human skills. The opportunity of reading angles digitally could improve the method using a three axes fluxgate on top of the telescope of the non magnetic theodolite significantly. With a synchronous reading of the fluxgate data, external variometer and scalar data, the dependency on field activity should be reduced / vanished.

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