

Review of “Technical note: A microcontroller-based automatic rain sampler for stable isotope studies” by Michelsen et. al.

Review by Rolf Hut

I’ve read the paper “Technical note: A microcontroller-based automatic rain sampler for stable isotope studies” with great interest. I think it is highly relevant for the readership of HESS and recommend publishing it. I only have a minor suggestion that could (hopefully) make the article even more useful to the hydrological community.

On reproducibility

I applaud that the authors make their design completely open so the community can reproduce it for their own work. However, I have two issues with the way the material is presented. Firstly, providing a Bill of Materials, technical drawings, software and even an operation manual might not be enough for hydrologist to be able to re-produce the work of the authors. I would strongly recommend to add a “build guide” document to the (impressive) list of documents that the authors already provide. This build guide would detail, step by step, how to construct the sampler. For example, currently it is unclear what fabrication techniques to use in construction of the sampler. I recommend using a site like [instructables.com](https://www.instructables.com) for their comprehensive format and exporting the resulting instructable as a pdf.

On archiving

Given the target of the authors “to enable reproduction” and the general nature of institute website designs (and corresponding URLs) to change every season, I would not advice to use an institute website as the main repository for the results of this work. I strongly urge the authors to make all material currently available on

<https://www.ufz.de/index.php?en=44048> (and the requested build guide, see above) available

- as supplementary material to this publication
- or publish it on Github and create a DOI through Zenodo

on code, power consumption and re-usability

I understand the choice for C as a language to program the microcontroller, given the need for low power consumption. I’ve briefly scanned the code and it is well documented. I particularly like that the section on event based sampling instead of time based sampling is already present, but commented out for now. The C language however has a steep learning curve. Many hydrologist that work in making sensor systems use the Arduino ecosystem for that reason. Since controlling a stepper-motor is the main action on the sampler, I believe

that this could be achieved in the Arduino eco-system, at the cost of greater power consumption. Since there is ample room for a solar panel on top of the sampler, low power might not always be the main concern. I would like to ask the authors to add a sentence or two that the functionality of the sampler could be achieved with parts from the Arduino eco-system as well, although at the cost of greater power consumption.

Concluding, I really like the work presented, recommend it for publication in HESS with only a few minor changes suggested.

On co-publication

Finally, a general remark aimed at the editors of HESS, or the leadership of the EGU publishing committee. As I mentioned in my review of Hartmann 2018 (<https://www.hydrology-earth-syst-sci.net/22/4281/2018/hess-22-4281-2018-discussion.html>) I would argue that this work is of interest to both the readership of HESS, as well as of Geoscientific Instrumentation (GI). Shouldn't it be possible to have an article be accepted in both journals? Why not have a single peer review system, followed by a list of papers authors can select from where to publish?