Interactive comment on "Robust Isochron Calculation" *by* Roger Powell et al.

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Received and published: 14 April 2020

As noted by the reviewer, the regression attempted is not simple linear regression, as is explicit in the development of YORK. This is a given in the standard isochron calculations that the current manuscript intends to augment or supercede.

Suggestion (a) of the reviewer is certainly relevant and is now considered in the Discussion of the manuscript. High leverage data particularly in small datasets is an unresolved problem. As covered in Maronna et al. (2019), ch. 5, there are several difficulties in general, the first being what to use as ρ in the estimator, as in Appendix 1 of the manuscript. Whereas a HAMPEL (a re-descending ρ) is advocated in Maronna, this is inadvisable in small datasets, not wishing to "lose" information. A second, bigger problem is what to use as the initial estimate of the linear trend—prior to using this ρ— given that the $L1$ estimate used in our algorithm is not robust in the presence of such

data. Although Maronna et al. (2019) make detailed suggestions, it is not clear how they could be married with using the analytical uncertainties in the algorithm. A way forward is simply to follow Huber and Rochetti (2009), e.g. their p. 150 and p.161, who note that trying to automate safeguarding against high leverage data is overrated, and that it is better to rely on diagnostics (e.g. `hat` to identify high leverage) and human judgement in data assessment.

Relating to suggestion (b), (A1) is simply the uncertainties for datapoint k in covariance matrix form, derived from the analytical measurements. It is not clear what is being referred to by the reviewer here? The newer Maronna is now cited, an edition we were unaware of (thank you).

Interactive comment on Geochronology Discuss., https://doi.org/10.5194/gchron-2020-4, 2020.