

***Interactive comment on* “SILLi 1.0: A 1D Numerical Tool Quantifying the Thermal Effects of Sill Intrusions” by Karthik Iyer et al.**

Anonymous Referee #2

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The manuscript SILLi 1.0: A 1D Numerical Tool Quantifying the Thermal Effects of Sill Intrusions by Iyer, et al is a welcome addition to the field that helps to provide a step forward in predictive modelling of intrusion effects on host rocks. The authors present a good method through the modeling with many sensible and clear outcomes of the 1D approach. I am pleased to recommend its publication in Geoscientific Model Development providing some minor revisions are addressed: 1. A little background and context to the modelling around intrusions would help the reader to see more clearly the novel aspects of this model (for example, perhaps some broader discussion early on as to the wider affects of intrusions on organic rich sedimentary successions, particularly with respect to hydrocarbon prospectivity (although not the primary focus of this paper will certainly be of significant interest to the field and indeed requires some finer back-

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ground detail in line with the time spent on thermogenic gas, PETM etc). Suggested Refs to broaden background: Archer et al (2005); Rodríguez'guez et al (2005, 2006) – especially for comparison with the 2D models within, alongside some comparison of other modelling methods in refs already noted. Perhaps also Schofield et al 2015 or Muirhead et al 2017 for a broader view on organic matter alteration adjacent to intrusions). Specifically, why is this modelling method more applicable than/or add to the other modelling? 2. The correlation of modelled and actual TOC and VR is compelling, however the manuscript would benefit from some more detail about how the data is refined e.g. lines 384-386 and how this ties back to the methods above. Although TOC and VR have been typically used as a measurement around sills for decades – how does this correlate to other maturity parameters such as mineralogical markers, biomarkers? 3. The extent of the thermal aureoles of sills can be measured using TOC and VR (as discussed, among many other parameters). In the Model Input section these are displayed as 'optional'. Organic matter will frequently thermally alter in very different manners to mineralogical material and surely one or other parameter must be used to help gauge the full thermal impact of the sill? Clarity over the use of VR and/or TOC would help the reader. I look forward to seeing the modified manuscript and to any future work that develops this interesting, topical and essential model further.

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