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

Anonymous Referee #1

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The authors present a good method for modeling the thermal effects of sill-like intrusions on host rocks. I recommend its publication in Geosci. Model Dev. Discussion after some minor revisions: 1) Please further highlight the novelty of SiLLi by comparing it with some other similar simulators such as MagmaHeatNS1D. MagmaHeatNS1D was developed based on almost the same models and written using an object-oriented language. In comparison, the Silli indeed considers some additional geological processes. Iver et al. needs to introduce the significance of these processes. Wang D., MagmaHeatNS1D: One-dimensional visualization numerical simulator for computing thermal evolution in a contact metamorphic aureole, Computers & Geosciences, 2013, 54(4): 21-27. 2) Line 153: modeling results are highly sensitive to boundary conditions. What kind of boundary condition is assumed for the upper and lower boundaries

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Discussion paper

by SiLLi? Besides, how to prove that “5 times the thickness of the bottommost sill” is reasonable? Such assumption needs to be made based on either special sensitivity analysis or the results of some similar researches. 3) Section 3.6: Iyer et al. consider some potential heat sink/source but ignored water boiling and vaporization. Why? For the one-dimensional thermal models, Jeager (1959), Barker et al. (1998, international journal of coal geology) Wang et al. (2007, GRL) and Wang (2011, international journal of coal geology) pointed out its effects on thermal evolution of host rocks. This may be explained in this section. 4) Section 3.6: although most organic-rich rocks are less permeable, Jaeger (1959), Galushkin (1997), Wang and Manga (2015) indeed showed the possible heat convection mechanism in shallowly buried shale host rocks. These work need to cited in this section.

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