

## ***Interactive comment on “Active heat pulse sensing of 3D-flow fields in streambeds” by Eddie W. Banks et al.***

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This manuscript represents a very nice scientific piece of work, describing an innovative heat-tracing tool to track 3-D shallow groundwater flow that's especially useful in streams, but also useful such hydrologic settings as hillslopes with measurable shallow interflow (which the authors might consider mentioning in there final draft). Itemize comments are below: 1. This review assumes Eq. [6] thru [18] are correct, since this is not this reviewers field of professional interest. 2. A summary of the extensive use of down-hole thermal pulse techniques in groundwater flow studies should be included, focusing on these equipment, methods and results. 3. Discussion in this manuscript jumps from 1-D o 3-D streambed flow patterns, without any mention of several good 2-D studies using heat as a tracer, such as, Constantz et al. (WRR, 2013) and Con-

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stantz et al. (WRR, 2016). 4. Finally, all the figures are very nice; however, in Figure 3, visually its unclear why there is upward flux in the specific drawing to represent this direction of flow, which requires a significant hydraulic head to create this flow pattern. Is it possible to show this in the figure itself, in addition to explaining in the text?

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