



## **Interpretation of streambed heat transfer using fiber optic derived temperatures**

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Advances in Raman spectra fiber optic temperature sensing (DTS) now can produce mapping of stream and stream bottom temperatures at very high (<1 m) spatial resolution. Such high spatial (and temporal) quality datasets can provide precise monitoring of groundwater inflows into small streams, provide a more synoptic view of stream/groundwater exchanges and also open up the possibility for real time energy balance monitoring of streams and small rivers. However, thermal anomalies and trends measured by DTS whether spatial or temporal can be driven by multiple processes, many of which are challenging to interpret and de-convolve. DTS data collected from a short (500 m) reach of the Truckee River in the western US are used to demonstrate various streambed exchanges of thermal energy that can now be deduced from DTS technology, ranging from diffuse groundwater discharges, hyporheic exchanges through a pool/riffle complex, solar heating of bed sediments and thermal inputs derived solely by bed thermal conduction. It will be shown that bed conduction into the water column, even on shallow clear water streams, can be a significant component of heat transfer in streams.