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*Supplement of*

## **Limitations of fibre optic distributed temperature sensing for quantifying surface water groundwater interactions**

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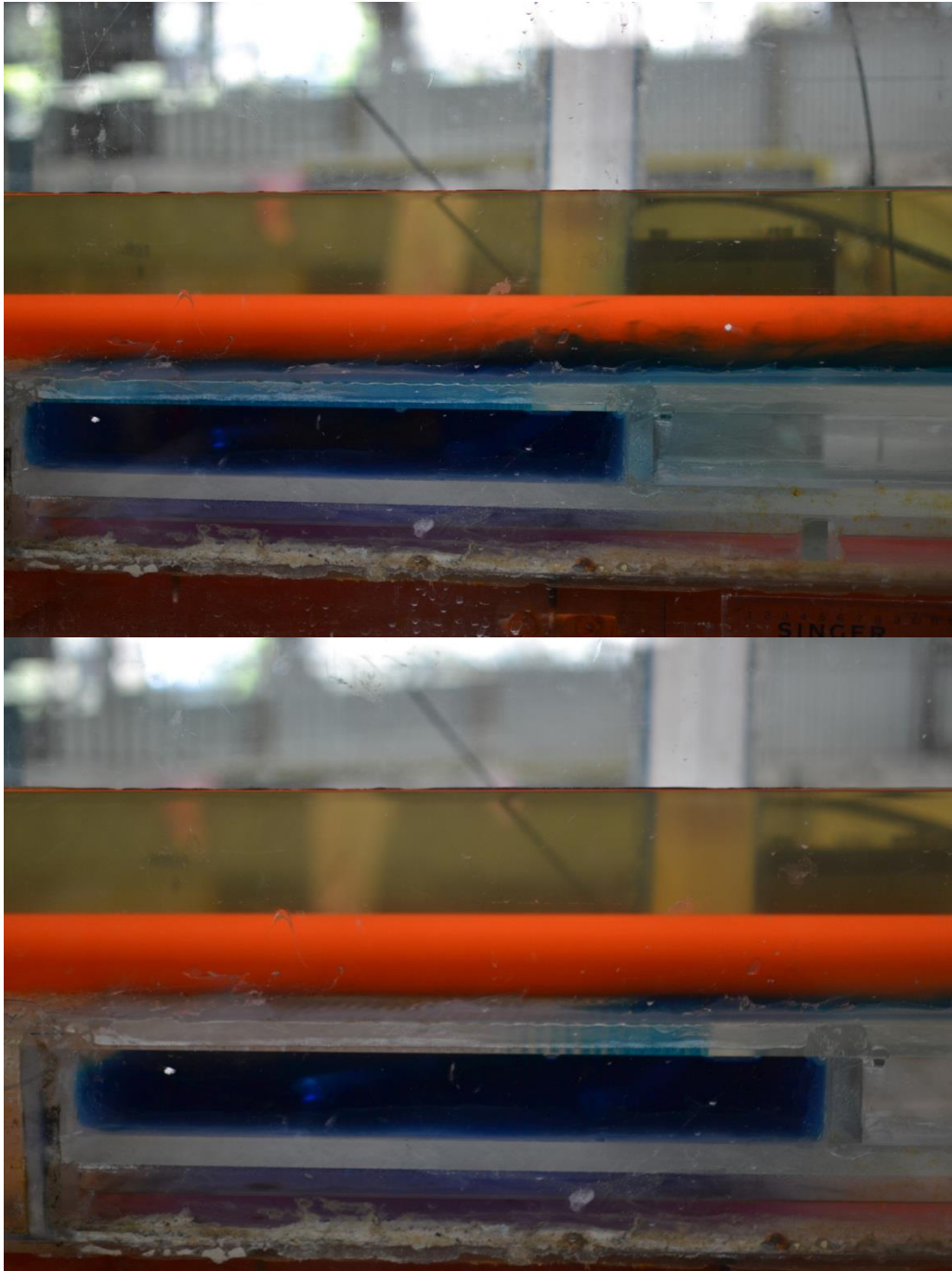
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**Supporting information:****Table S1.** Variable surface water and groundwater velocities (and flow rates) for 10 °C colder groundwater.

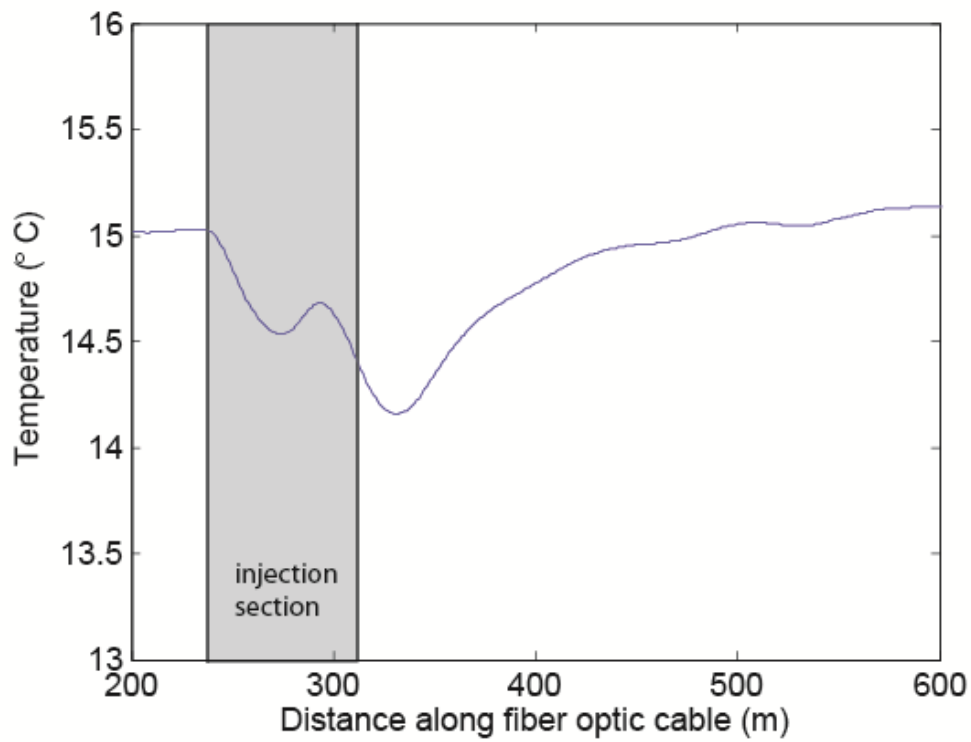
	Surface water velocity (m/s)	Groundwater velocity (m/s)
1	0.00457 (9.1 L/min)	$2.52 \times 10^{-4}$ (0.175L/min)
2	0.0212 (42.2 L/min)	$9.78 \times 10^{-4}$ (0.68 L/min)
3	0.0601 (120.3L/min)	$1.366 \times 10^{-3}$ (0.95 L/min)
4	0.0977 (195.5L/min)	$2.013 \times 10^{-3}$ (1.4 L/min)
5	0.11965 (239.4L/min)	$2.818 \times 10^{-3}$ (1.96 L/min)

**Table S2.** Velocities used in hot water/cold water injection test.

Case	a	b	c	d
Surface water velocity (m/s)	0.11965	0.11965	0.00457	0.00457
Groundwater velocity (m/s)	$2.818 \times 10^{-3}$	$2.52 \times 10^{-4}$	$2.52 \times 10^{-4}$	$2.818 \times 10^{-3}$
Velocity ratio of groundwater to surface water	0.024	0.002	0.055	0.617



**Fig. S1.** Dye test where a) the groundwater velocity is slow (water only exits at the end of the injection section and mixing occurs partially inside the injection section) and b) the groundwater velocity is fast (water exits from entire injection area).



**Fig. S2.** The apparent temperature response along the cable showing that the maximum temperature difference can appear not at the injection location but skewed to locations farther downstream depending on groundwater and surface water velocities. This is a result of the mixing conditions of the two flows around the fibre optic coil.