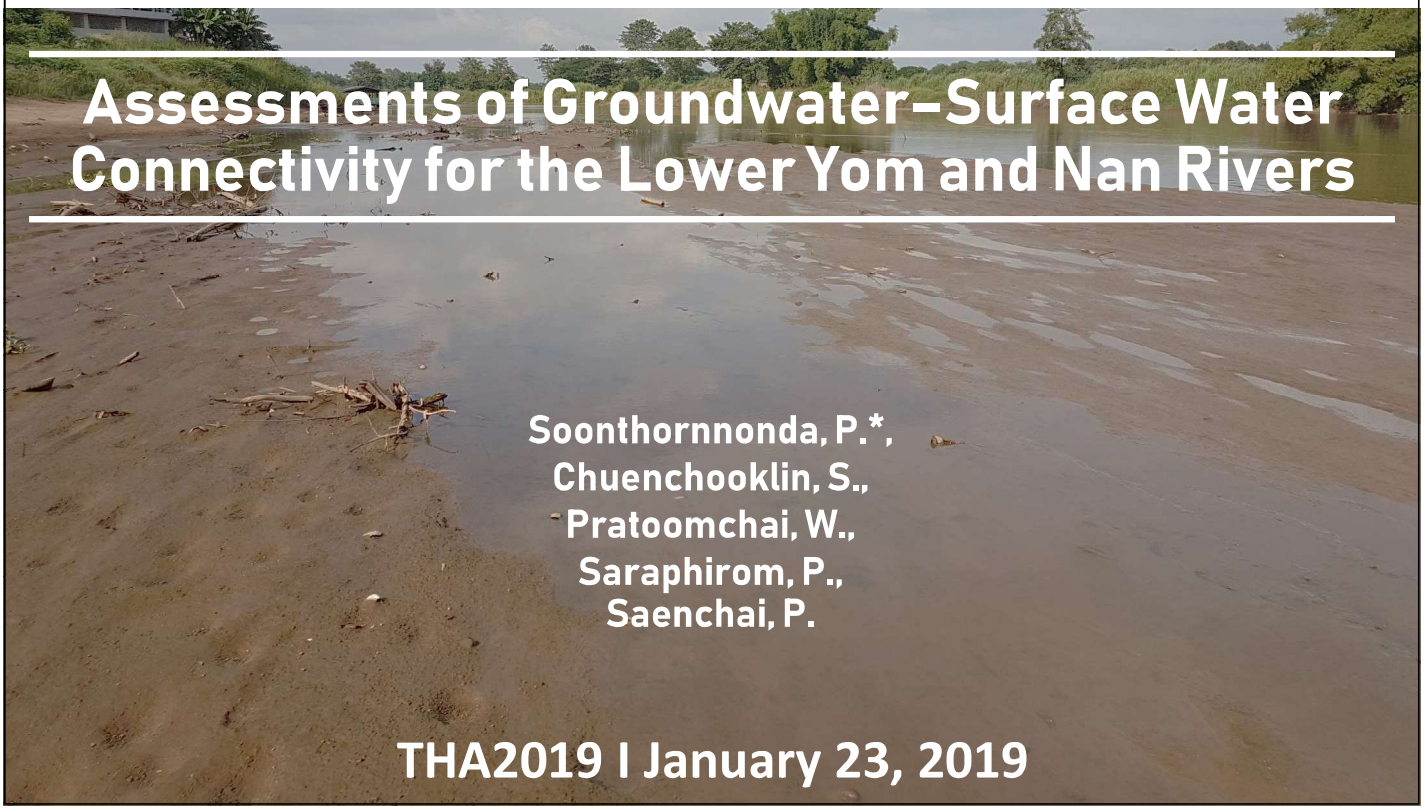

Assessments of Groundwater–Surface Water Connectivity for the Lower Yom and Nan Rivers

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THA2019 I January 23, 2019

Presentation OUTLINE

- Objectives
- Materials & Methods
- Results & Discussion
- Conclusions

Objectives

1

2

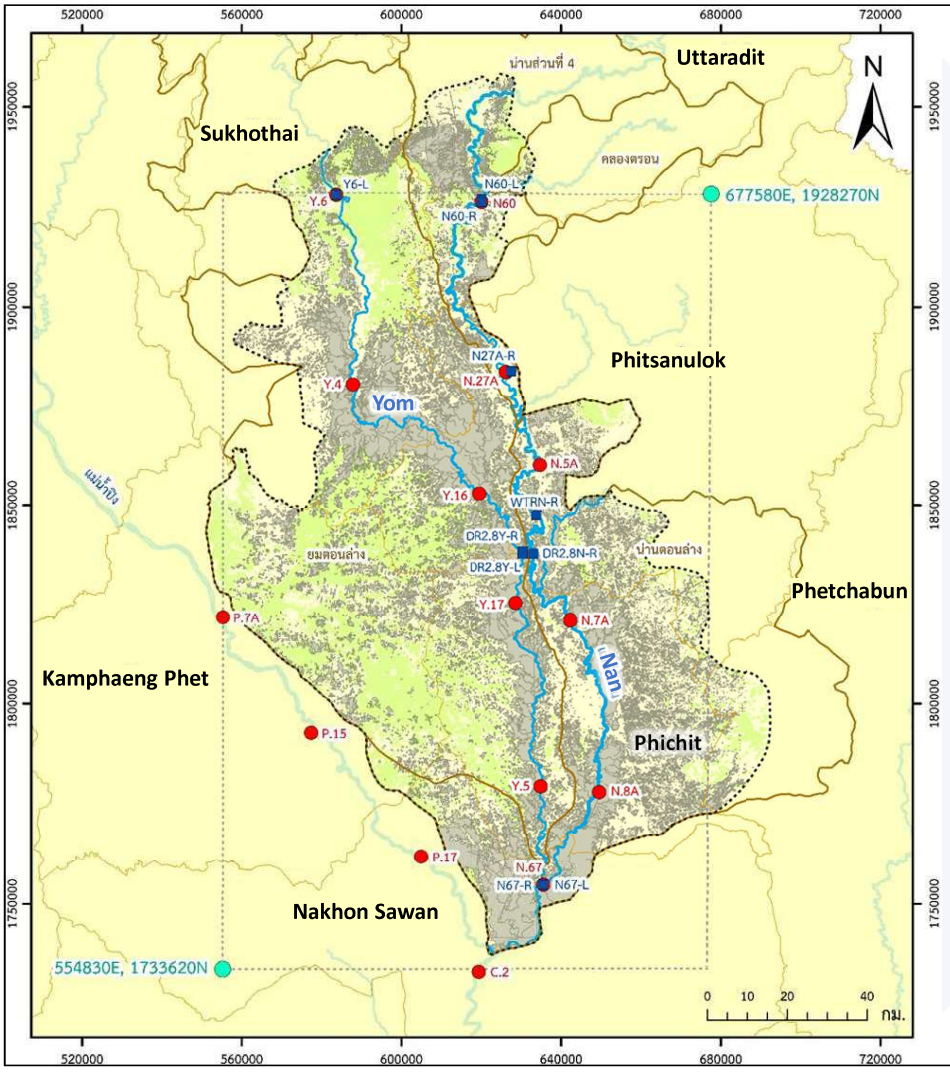
3

To assess the GW-SW connectivity for the Lower Yom and Nan Rivers.

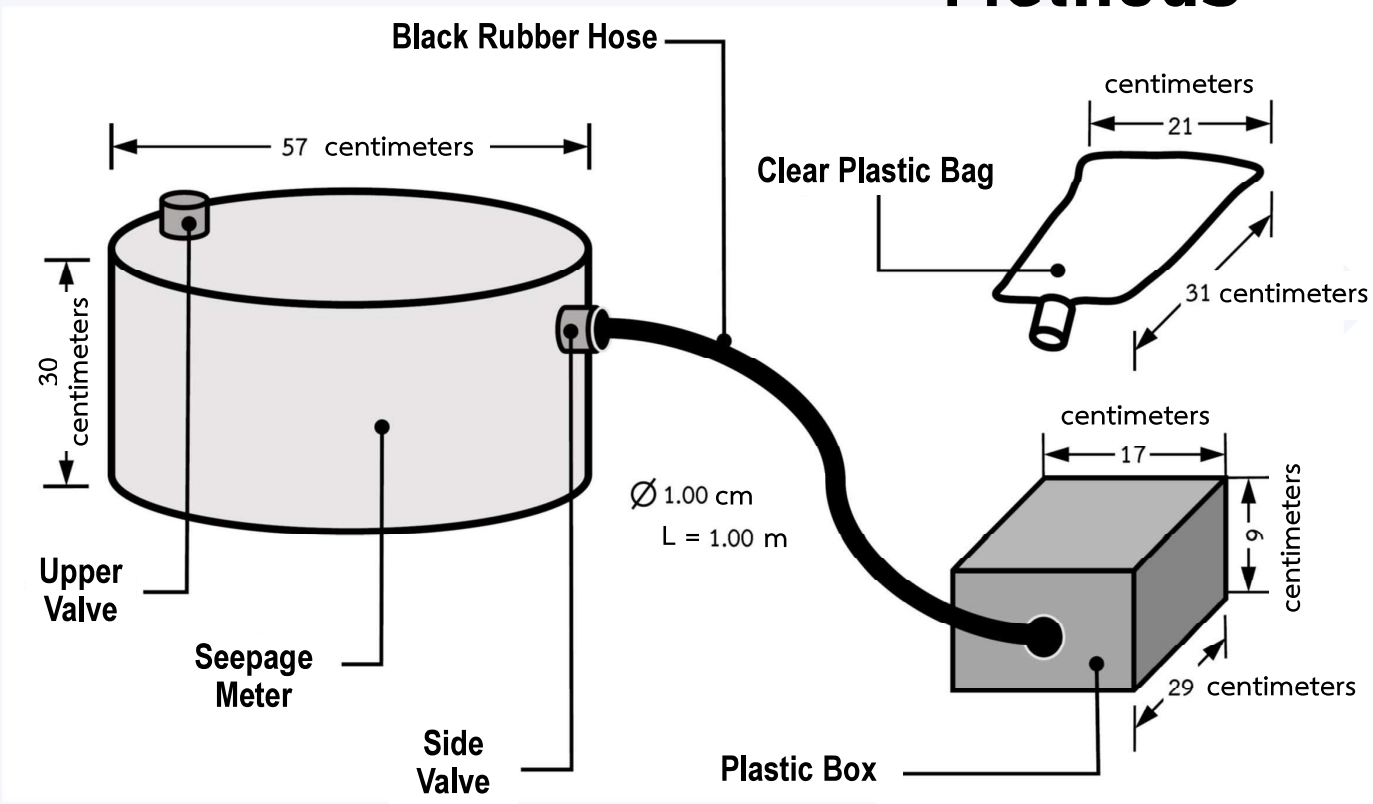
To conduct streambed thermal measurements.

To perform directly measurements of exchange fluxes using the seepage meter.

Materials & Methods



Materials & Methods



Materials & Methods

Materials & Methods

$$Q_s = \frac{V_{t_2} - V_{t_1}}{t_2 - t_1}$$

$$q = \frac{Q}{A}$$

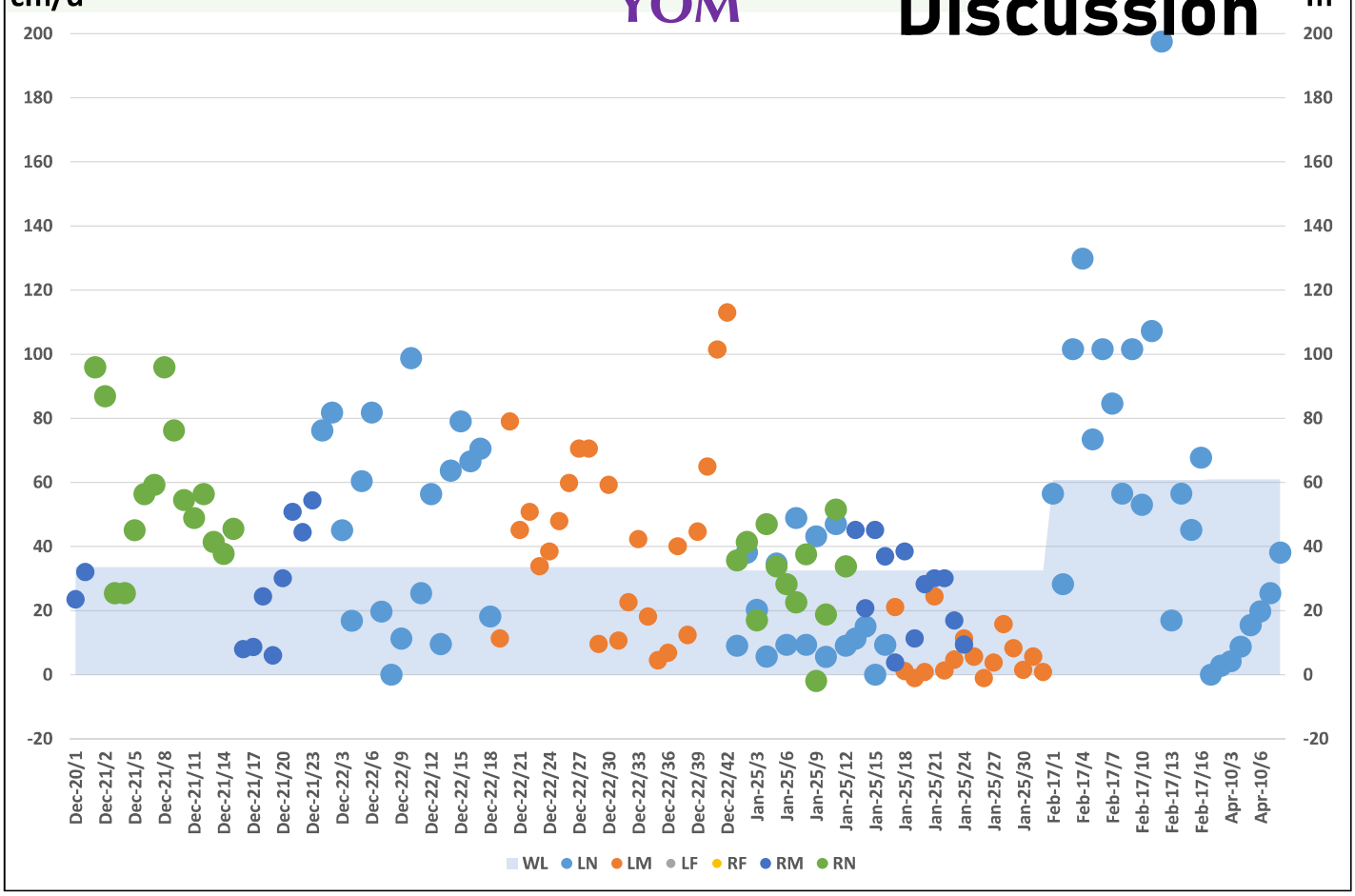
V_{t_1} = the volume contained in the bag at the start of the measurement period (cm^3)
V_{t_2} = the volume in the bag at the end of the measurement period
t_1 and t_2 = the times at the start and end of the measurement period (day)
A = the area of seepage cylinder ($0.25 \times \pi \times 57^2 = 2{,}553\ cm^2$)
q = the seepage flux in length per time (cm/day)

DR2.8Y-L

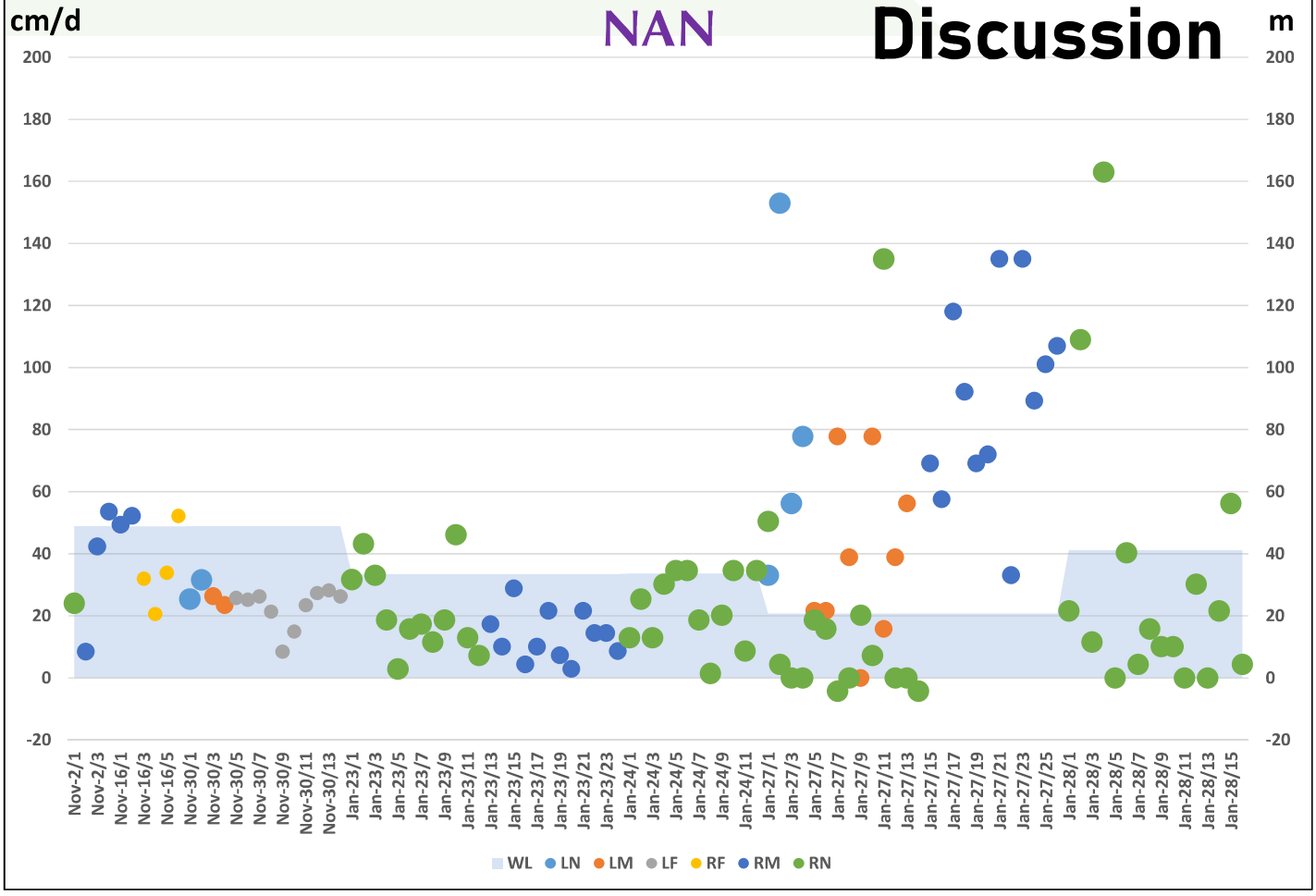
DR2.8N-R

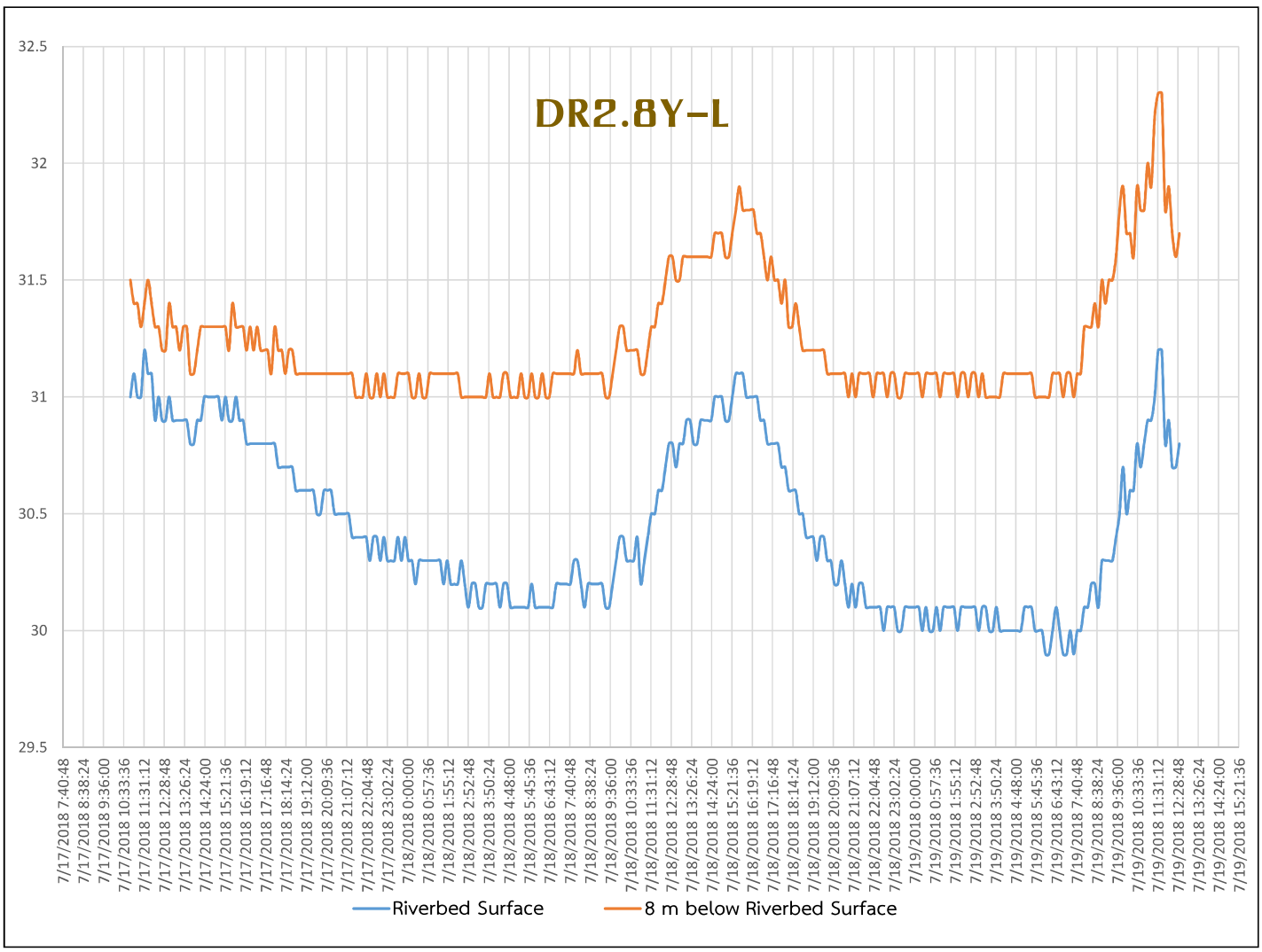
Monitoring Site	River Name	Seepage (n)	Temperature (Well Depth, m)	Location
Y6-L	Yom	24		Nong O, Si Satchanalai District, Sukhothai
DR2.8Y-L DR2.8Y-R	Yom Yom	74 49	8	DR2.8 I Ban Rai, Bang Krathum District, Phitsanulok
N60-L N60-R	Nan Nan	14 10		Hat Song Khwae, Tron District, Uttaradit
N27A-R	Nan	16		Phrom Phiram Pattana Bridge I Phrom Phiram District, Phitsanulok
DR2.8N-R	Nan	24	8	DR2.8 I Ban Rai, Bang Krathum District, Phitsanulok
WTRN-R	Nan	12		Wat Tarong Tawantok, Watphrik, Amphur Mueang, Phitsanulok
N67-L N67-R	Nan Nan	13 26		Koei Chai, Chumsaeng District, Nakhon Sawan

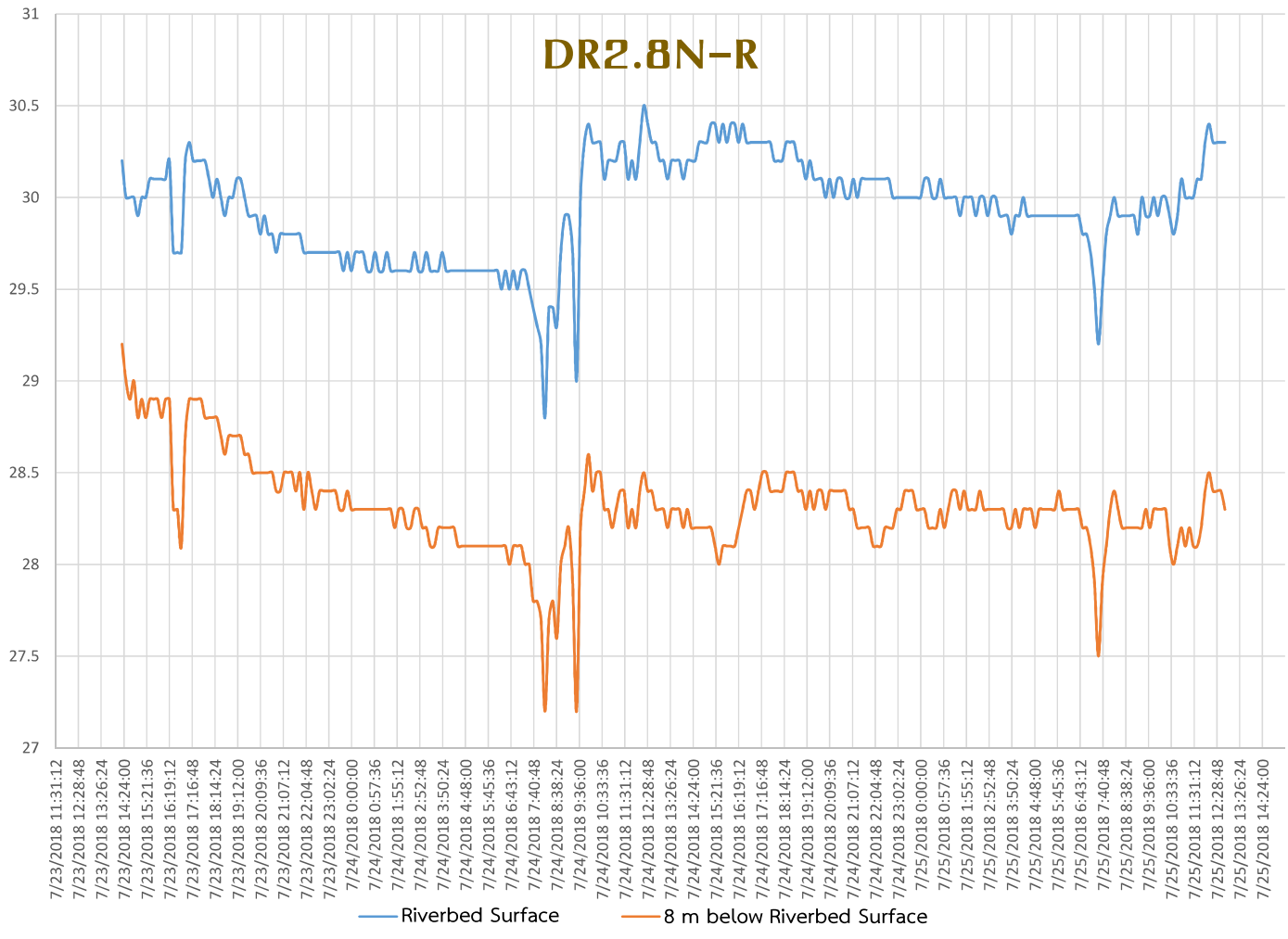
Results & Discussion



Results & Discussion







Conclusions

- The cylindrical seepage meter is well applied for direct measurement of exchange flux. This is demonstrated for the Lower Yom and Nan Rivers during October 2017 to April 2018.
- Exchange fluxes of -4.32 to 163 cm/day for the Lower Nan and -1.90 to 198 cm/day for the Lower Yom exhibit similar decreasing tendencies towards the drier season.
- The groundwater has discharged into the Lower Yom River ~1.5 times higher than the Lower Nan River.

Conclusions

- **The rapid thermal responses in the streambed are due to high rates of infiltration (High Groundwater Recharge in the Morning). The exchange direction could then vary throughout the day (Groundwater Discharge in the Late Afternoon and Evening).**

- **The conjunctive water management approach may be taken into consideration in the use of new and/or existing facilities (e.g., dug wells and irrigated canals) for recharging the groundwater due to imbalance of groundwater use and natural replenishment.**

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Phu Soi Dao National Park (1,633 m)
THANK YOU !!