邱永嘉 教授 水文地質研究室

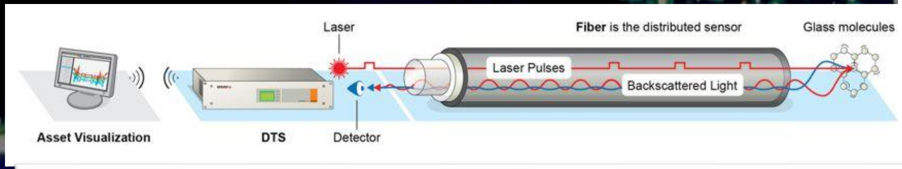
學　　歷：美國加州大學洛杉磯分校 土木與環境工程學系 博士

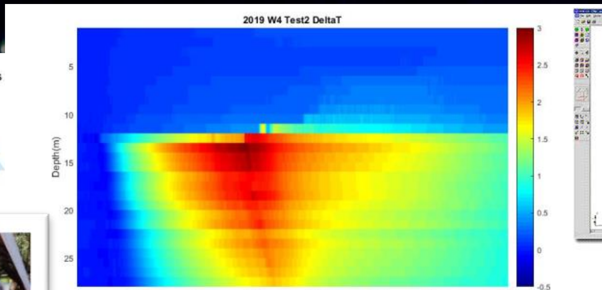
經　　歷：國立臺灣海洋大學 地球科學研究所 所長
國立臺灣海洋大學 地球科學研究所 教授
國立台灣海洋大學 地球科學研究所 副教授
國立台灣海洋大學 應用地球科學研究所 助理教授

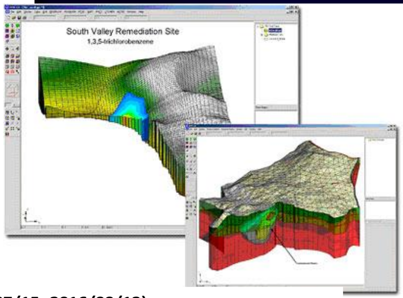
研究領域：水文地質、地表水與地下水交互作用、裂隙岩體地下水流、地下水資源規劃與管理

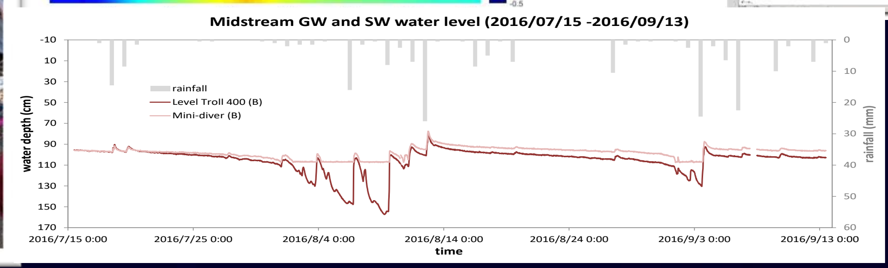
研究內容：

- 以熱能為水流示蹤劑，利用創新的分散式光纖溫度感測器（fiber-optic distributed temperature sensor, FO-DTS）的量測優勢，提供時空的高解度資料，將其應用在各種水文地質環境之中，包括：地表水與地下水交互作用、裂隙岩體地下水流及地熱能源與溫泉。
- 地表水與地下水間之交互作用不僅在水文生態系統中扮演著極為重要的角色，對於整水文循環，甚至水資源的規劃與管理亦是不可或缺的一環。地下水（或伏流水）的出滲，不僅影響河川的基流量，亦影響河川的生態環境，透過現地試驗與數值模擬，解析交互作用之路徑及控制機制，提供未來地下水資源管理之參考依據。









Yung-Chia Chiu, Professor

Hydrogeology Laboratory

Education :

- Department of Civil and Environmental Engineering, UCLA (Ph.D.)

Professional experience :

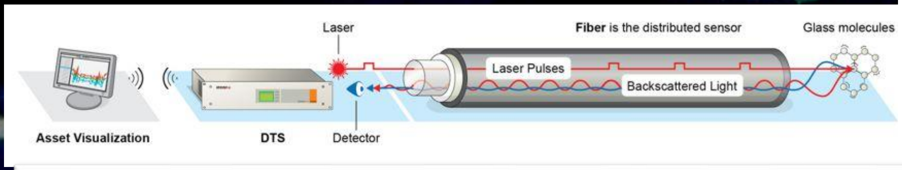
- Director, Institute of Earth Science, NTOU
- Professor, Institute of Earth Science, NTOU
- Associate Professor, Institute of Earth Science, NTOU
- Assistant Professor, Institute of Applied geosciences, NTOU

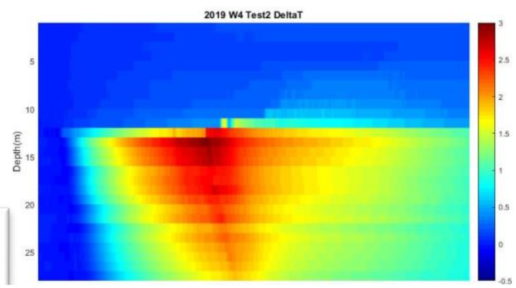
Expertise :

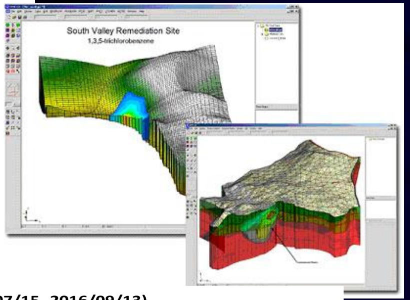
Hydrogeology, Surface water and groundwater interaction, Groundwater flow in fractured rocks, Groundwater resources management

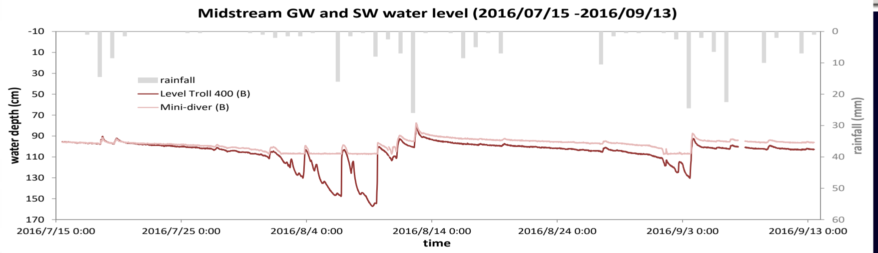
Research interest :

- Based on the theory of heat transfer, utilizing the fiber-optic distributed temperature sensor (FO-DTS) can provide high-resolution of temperature data in terms of space and time and trace the groundwater flow. The novel approaches are applied to different hydrogeological environments, such as surface water and groundwater interactions, groundwater flow in fractured rocks, and geothermal energy and hot springs.
- Surface water and groundwater plays an important role hydro-ecological system. It links the hydrological cycle and provides crucial water resources. The contribution of groundwater (hyporheic flow) discharges to stream not only affect the stream baseflow but also influence the riparian ecosystem. Through field experiments and numerical simulation, we try to delineate the flow directions of interactions and understand the controlled mechanisms behind the processes. The study can provide as a reference tool for the groundwater resources management.









Journal of Hydrology **2020**, *584*; doi:10.1016/j.jhydrol.2020.124665

Contents lists available at ScienceDirect

Journal of Hydrology

journal homepage: www.elsevier.com/locate/jhydrol

Research papers

The effect of hydrological conditions and bioactivities on the spatial and temporal variations of streambed hydraulic characteristics at the subtropical alpine catchment

Yung-Chia Chiu[a], Tsung-Yu Lee[b,*], Shao-Yu Hsu[c], Lin-Yan Liao[d]

[a] Institute of Earth Sciences, National Taiwan Ocean University, Keelung, Taiwan
[b] Department of Geography, National Taiwan Normal University, Taipei, Taiwan
[c] Department of Bioenvironmental System Engineering, National Taiwan University, Taipei, Taiwan
[d] Shei-Pa National Park Headquarters, Ministry of Interior, Miaoli, Taiwan

水文環境與生物活動對於亞熱帶高山集水區河床水力特性時空變異之影響

邱永嘉[1]、李宗祐[2*]、許少瑜[3]、 廖林彥[4]

1. 國立臺灣海洋大學地球科學研究所
2. 國立臺灣師範大學地理學系
3. 國立台灣大學生物環境系統工程學系
4. 雪霸國家公園管理處

重要研究成果

- 本研究中選定雪霸國家公園內之七家灣溪上游支流有勝溪為試驗場址，以熱能為水流示蹤劑，針對水溫及水位進行長期監測，探討高山一級河川之地表水與地下水交互作用。
- 研究結果顯示，在發生斷流的區段，具有較高的垂直方向水力傳導係數。在強降雨事件過後，無斷流發生的河道區段，垂直方向上的水力傳導係數增加**1**倍；然而，在斷流發生的河道，水力傳導係數則大幅度降低**50 – 75%**。
- 水力傳導係數的增加主要與降雨所導致的河川流量增加，並將河床孔隙中的細顆粒物質帶走有關；而水力傳導係數的降低則與阻塞層（**clogging layer**）的形成有關。

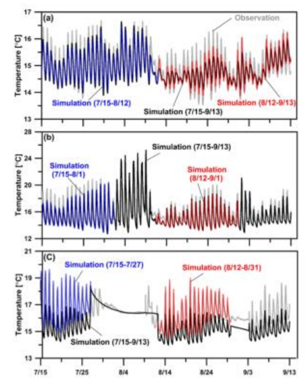


Fig. 8. Temperature simulations of VS2DH for the 2-in. wells at (a) Well A (at 360 cm), (b) Well B (at 310 cm), (c) Well C (at 360 cm). Three simulations are shown in each panel, including (1) one set of parameters, i.e. VK, K_T, C_S, D_L, are consistent through the entire period (black curve), (2) individual simulation was conducted before an intensive rainfall event on 8/12 (blue curve) and (3) after the event (red curve). The observed temperatures are shown in grey curves. Please refer to the text for more details. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

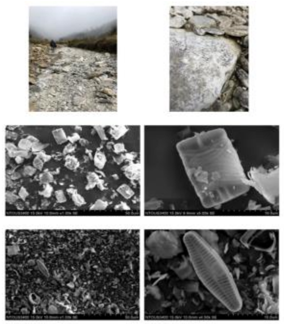


Fig. 9. Photos of (a) the fragmented reach taken on 8/9, (b) close look on the remains of dead diatom on the boulder, and (c–f) the remains of dead diatom under the scanning electron microscope (SEM) at different scale. The white skeletons are made of silica, a unique feature of diatom anatomy.

River Research and Applications **2020**, *36: 1430 - 1441*; doi:10.1002/rra.3668

Received: 7 November 2019 | Revised: 29 May 2020 | Accepted: 2 June 2020

DOI: 10.1002/rra.3668

RESEARCH ARTICLE

WILEY

Coupling high-resolution monitoring and modelling to verify restoration-based temperature improvements

Austin Hall[1] | Yung-Chia Chiu[2] | John S. Selker[1]

[1]Department of Biological and Ecological Engineering, Oregon State University, Corvallis, Oregon

[2]Institute of Earth Sciences, National Taiwan Ocean University, Keelung City, Taiwan

Correspondence
Austin Hall, California Department of Water Resources, 901 P Street, Room 411-A, Sacramento, CA 94236.
Email: austin.hall@water.ca.gov

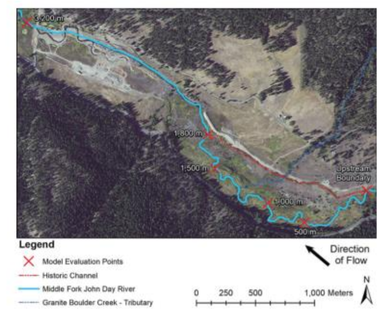
耦合高解析度監測與數值模擬驗證河道復育對於溫度之改進

Austin Hall[1*]、邱永嘉[2]、John S. Selker[1]

1. 美國奧勒剛州立大學生物與生態工程學系
2. 國立臺灣海洋大學地球科學研究所

重要研究成果

- 於美國**Oregon**的**Middle Fork of the John Day River**進行**FO-DTS**的河道溫度量測，並以一維河道能量傳輸模式**Heat Source**進行模擬，評估河道復育（**river restoration**）對於**Middle Fork of the John Day River**水溫之影響。
- 研究結果顯示，經過復育之後的河道，因流速增加、河道變深與變窄及地下水的出滲，可有效降低白天河水溫度達**0.7ºC**，並提升夜晚河水溫度達**0.9ºC**。此研究所提出之理論與方法，未來將可廣泛的應用於河道復育策略評估，有效的降低河道復育之成本，並提高復育之成效。



RE 2 Aerial imagery of the Middle Fork of the John Day River on the Oxbow Conservation site. The labelled locations correspond to of comparison between the model and monitored data and other points of analysis. Restoration led to the closure of the river channel ed with red dashes, and extended the tributary (dark blue) into the south channel [Colour figure can be viewed at wileyonlinelibrary.com]

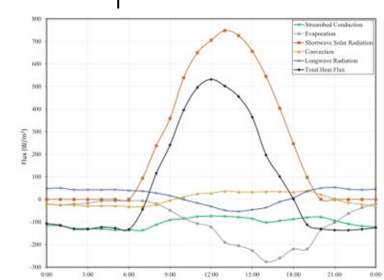


FIGURE 6 Modeled energy fluxes for an unshaded section of the MFJDR encompassed by the Phase 2 project for August 6. Shortwave solar radiation controls the energy budget and is the primary driver for stream heating [Colour figure can be viewed at wileyonlinelibrary.com]

Soil Research **2021**, 59, 406 – 418; doi: 10.1071/SR20190

重要研究成果

CSIRO PUBLISHING
Soil Research
https://doi.org/10.1071/SR20190

Simplified power law relationship in the estimation of hydraulic conductivity of unsaturated sands using electrical conductivity

Ching-Yi Liu[A], *Yun-Da Hsieh*[A], *and Yung-Chia Chiu*[A,B]

[A]Institute of Earth Sciences, National Taiwan Ocean University, No. 2, Beining Road., Jhongjheng District, Keelung City 202, Taiwan (R.O.C.).
[B]Corresponding author. Email: ycchiu@mail.ntou.edu.tw

以未飽和砂之導電度推估水力傳導係數之冪次關係式

劉慶怡[1]、謝昀達[1]、邱永嘉[1]*

1. 國立臺灣海洋大學地球科學研究所

- 未飽和層中之水力傳導係數為一項重要但不易直接獲得的參數。本研究以實驗室砂箱的實驗數據進行探討，針對石英砂以及渥太華砂二種不同性質之材料，探討在排水及注水條件下保水曲線之變化，透過導電度與含水量變化，推估未飽和層中砂的水力傳導係數之關係式。並與前人提出之公式加以印證，探討造成推估水力傳導係數差異之原因。

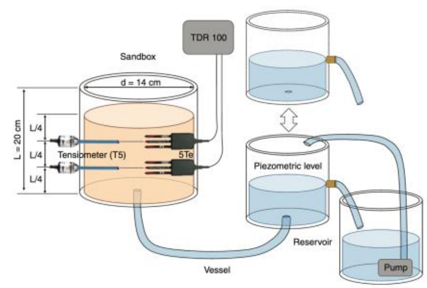


Fig. 1. Design of the sandbox experiment. The TDR probes (CS640) and tensiometers (T5) were placed at the locations 15 and 10 cm from the top of the sandbox. The water injection and draining tube was at the bottom of the sandbox and connected to a reservoir. A vessel was used to collect the water released from the reservoir.

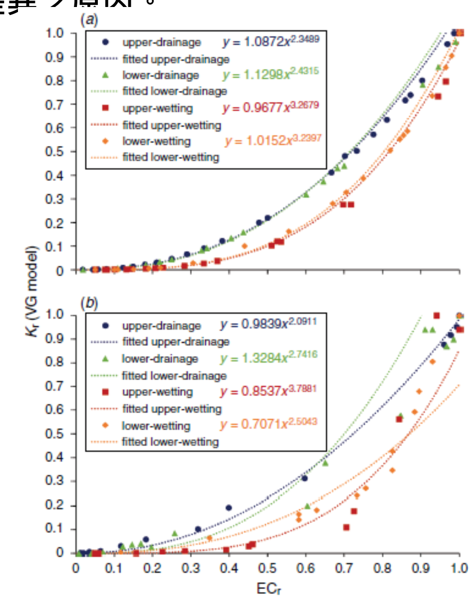


Fig. 5. The power law relationships between EC_r and K_r of (*a*) Quartz sand and (*b*) Ottawa sand based on VG model.