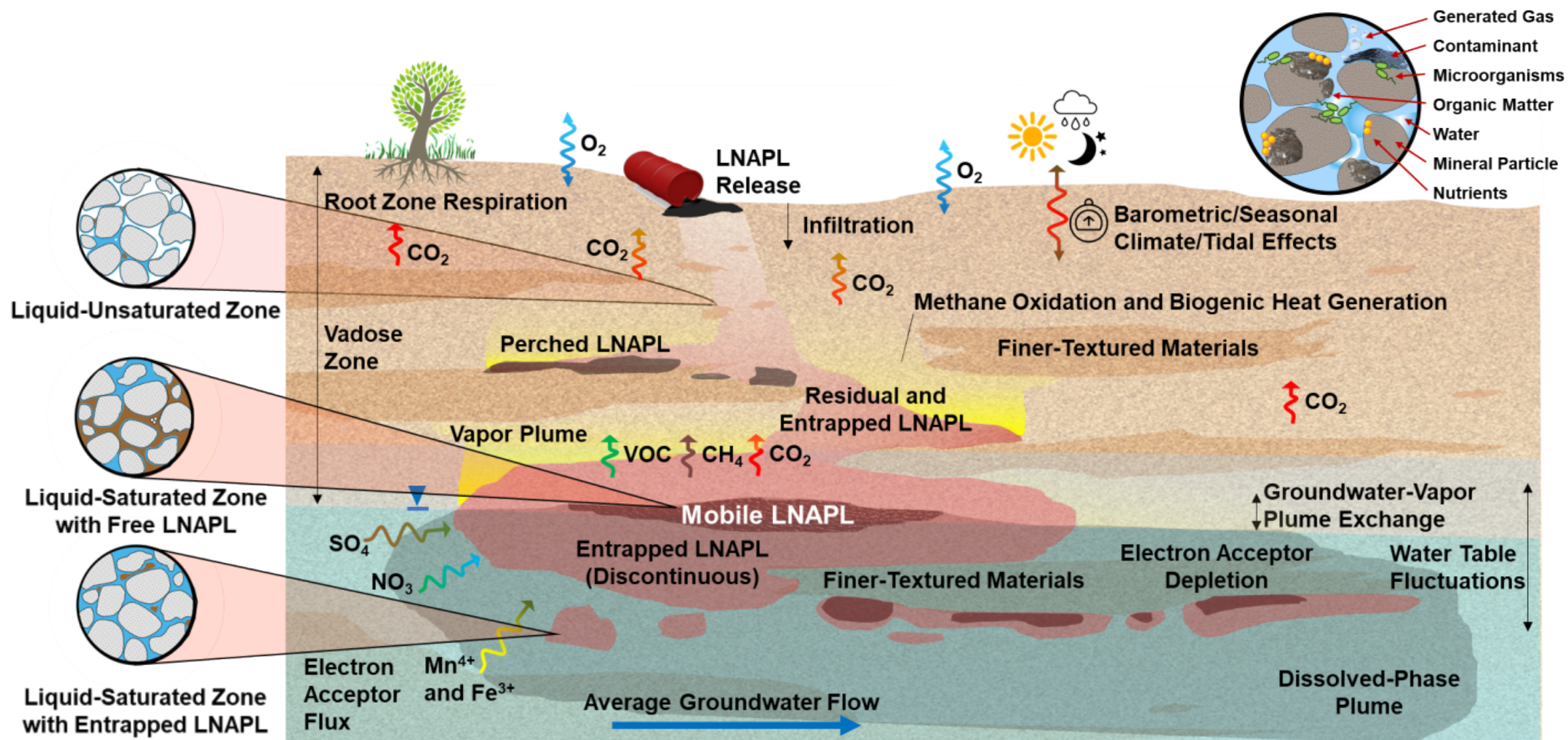




Identification of Mobile, Residual and Entrapped LNAPL Using Laser-Induced Fluorescence as a Line of Evidence

Jonás García-Rincón, Ph.D.

Mobile, Residual and Entrapped LNAPL



(after Alden et al. 2023)

Liquid-Unsaturated Zone

**Liquid-Saturated Zone
with Free LNAPL**

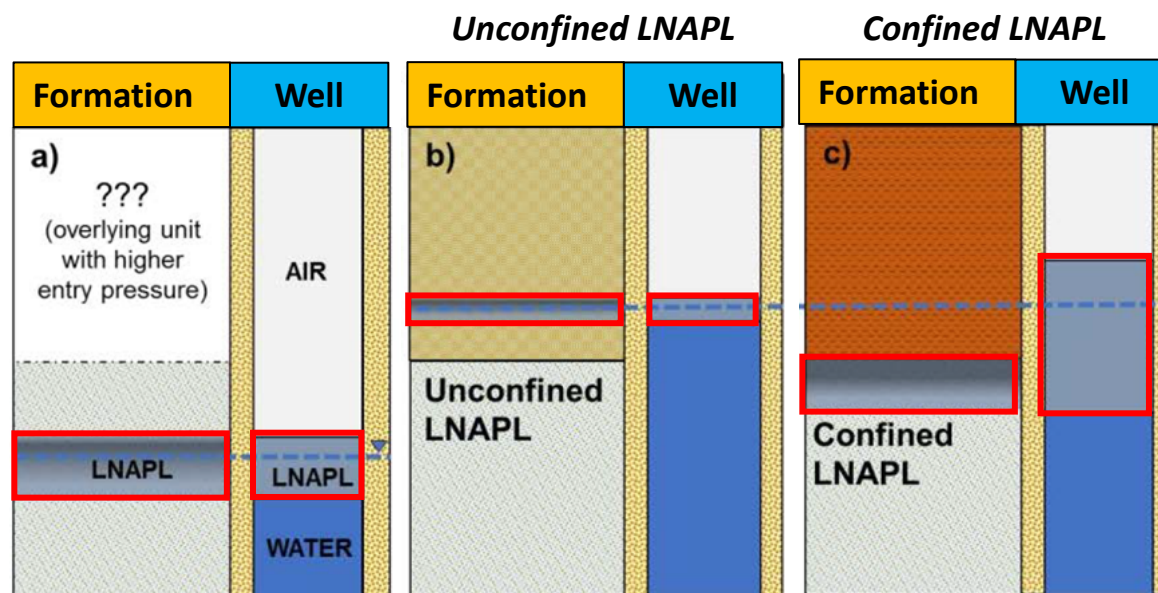
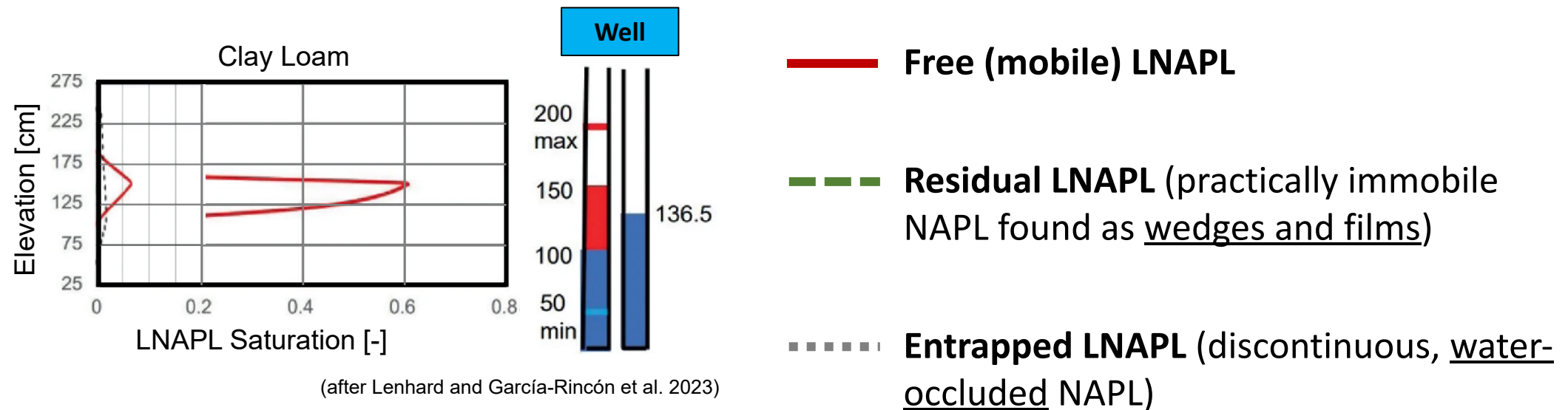
**Liquid-Saturated Zone
with Entrapped LNAPL**

Mobile, Residual and Entrapped LNAPL



(Zimbron 2022)

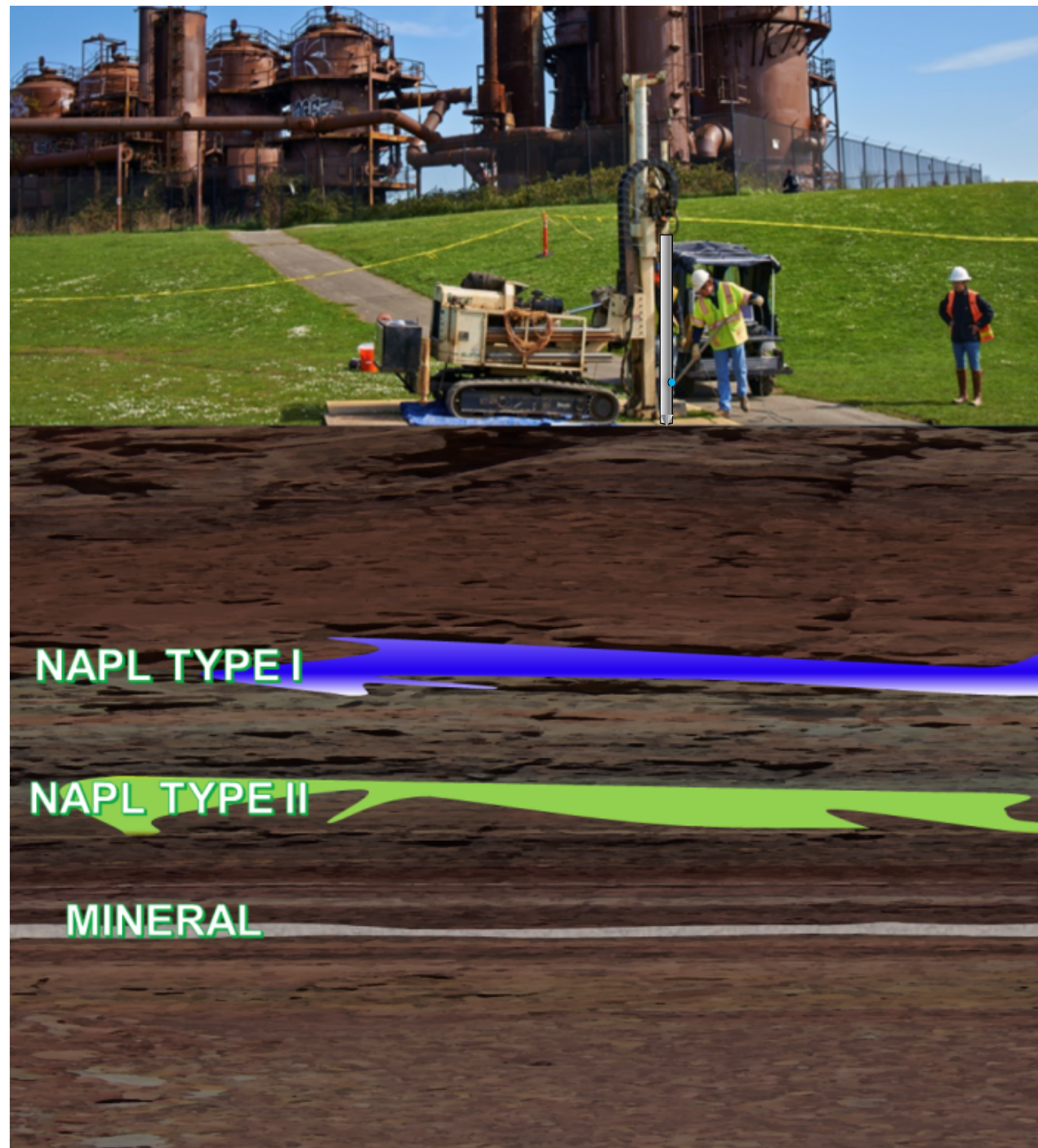
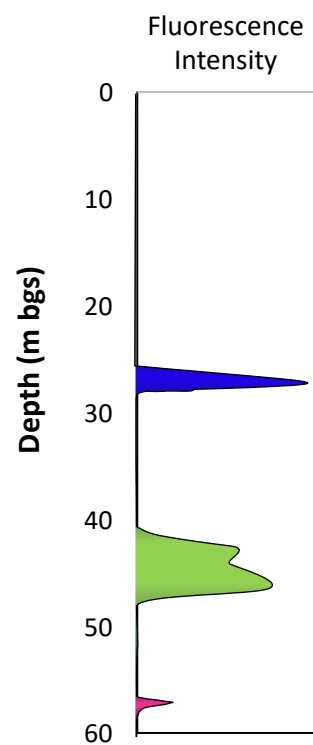
Monitoring Wells vs Reality



(after García-Rincón 2020)

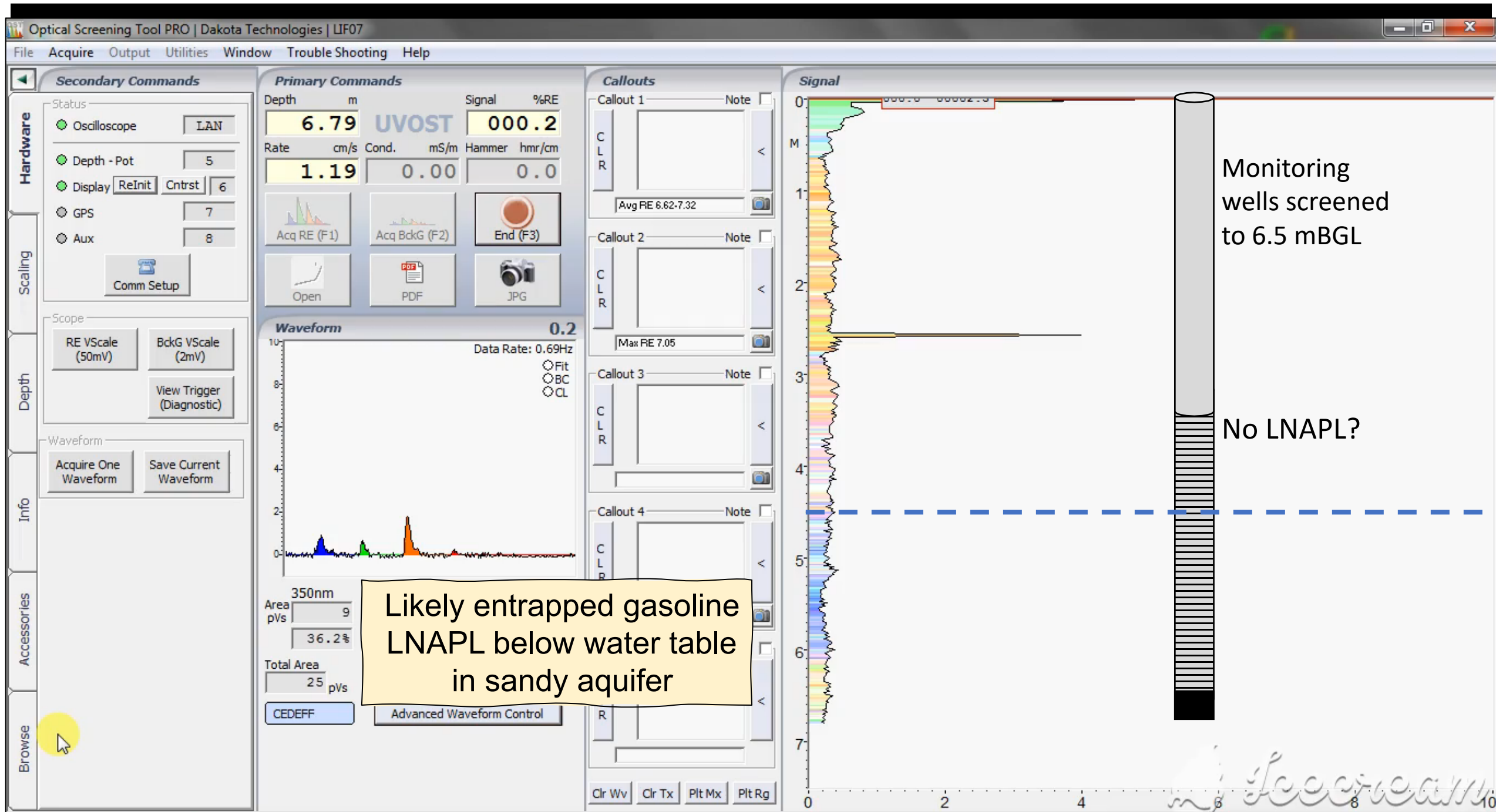
Laser-Induced Fluorescence vs Reality

- Advanced with direct-push technology
- Fluorescence measurements influenced by LNAPL saturation, sediment type, LNAPL type, etc.

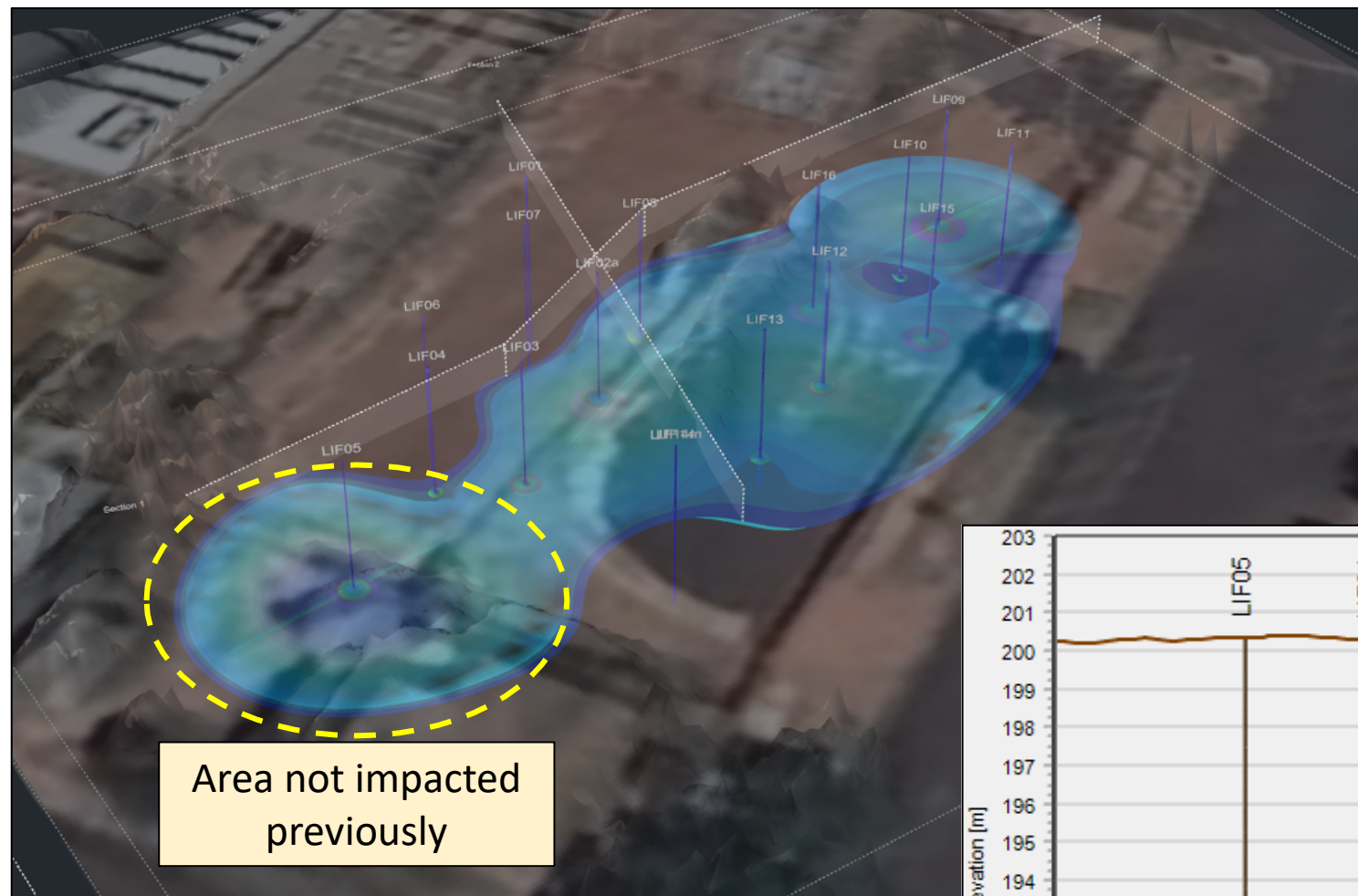


(after Dakota Technologies)

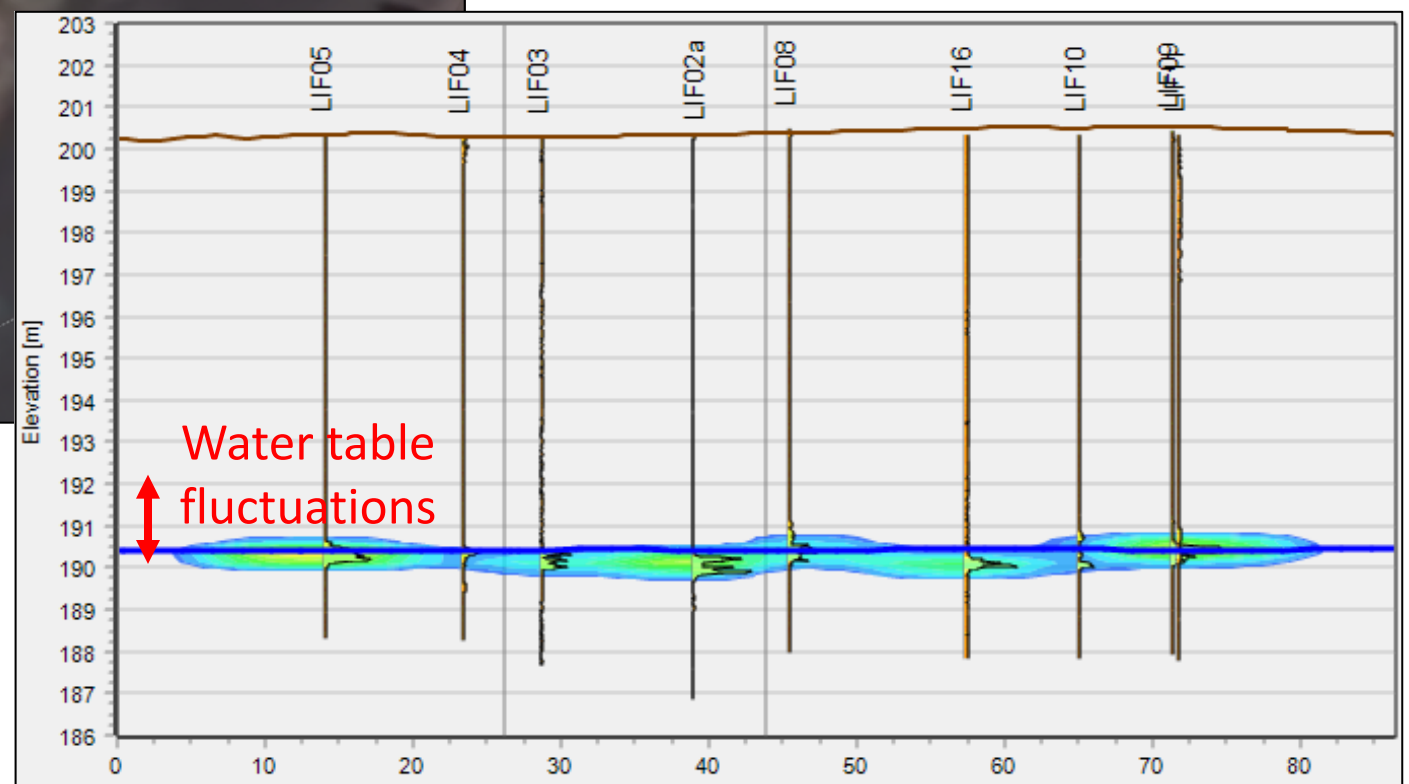
Example 1 in Sandy Aquifer



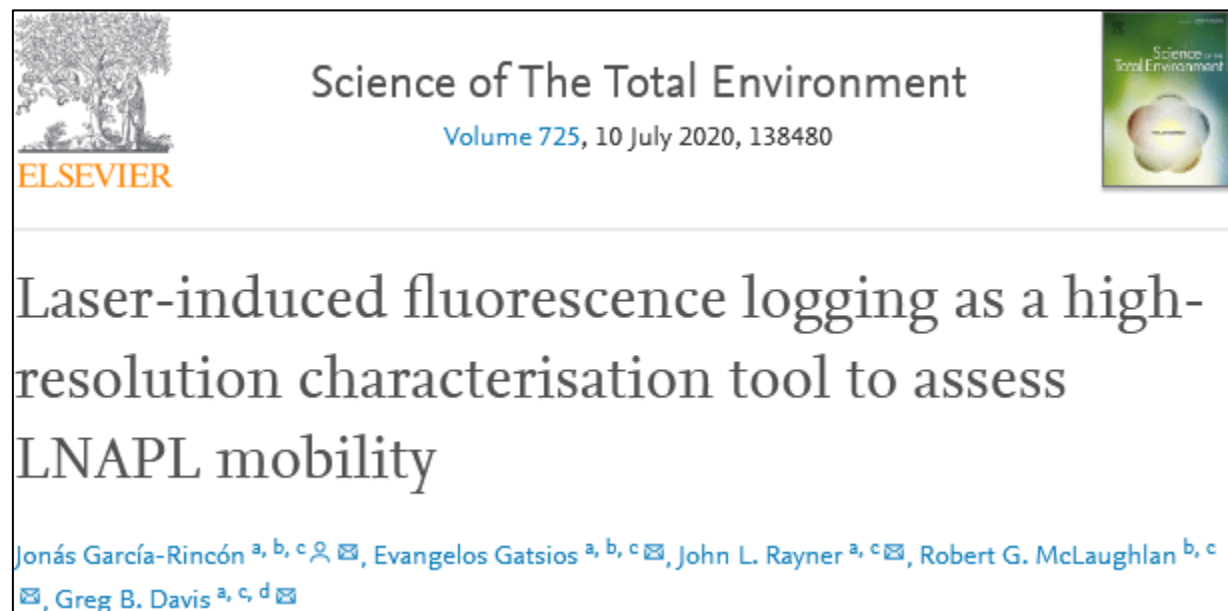
Example 2 in Sandy Aquifer



Confined or mobile LNAPL?



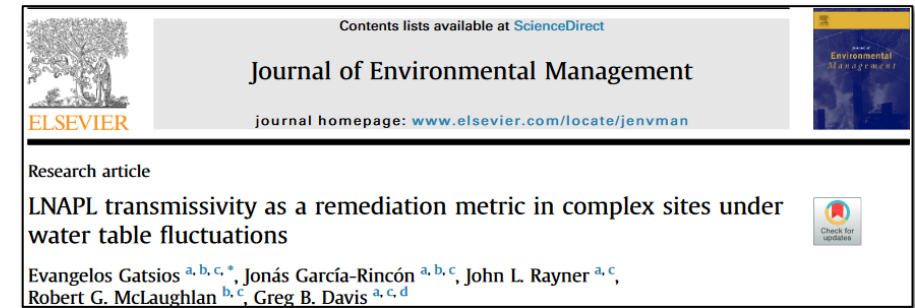
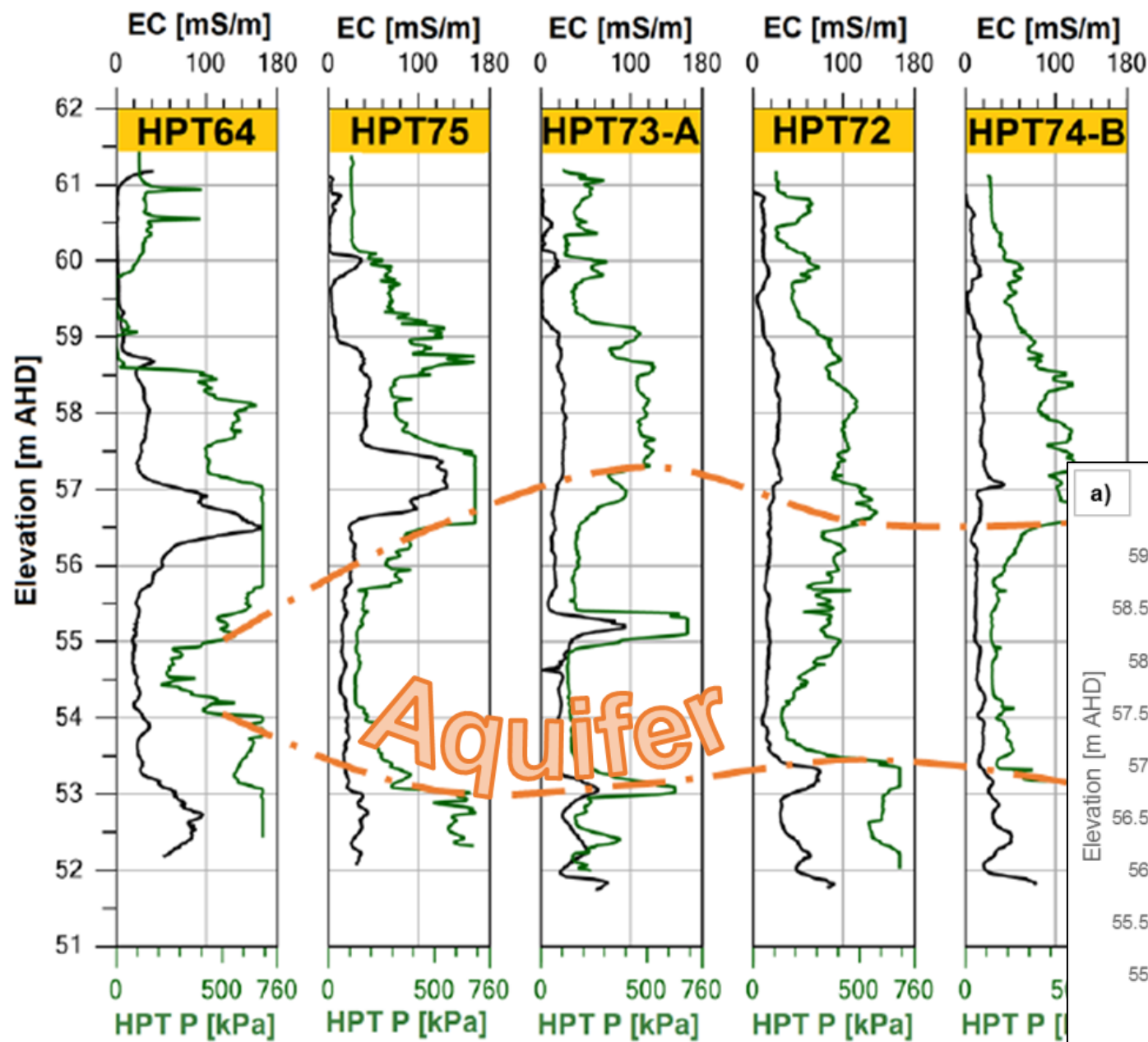
Example in Heterogeneous System



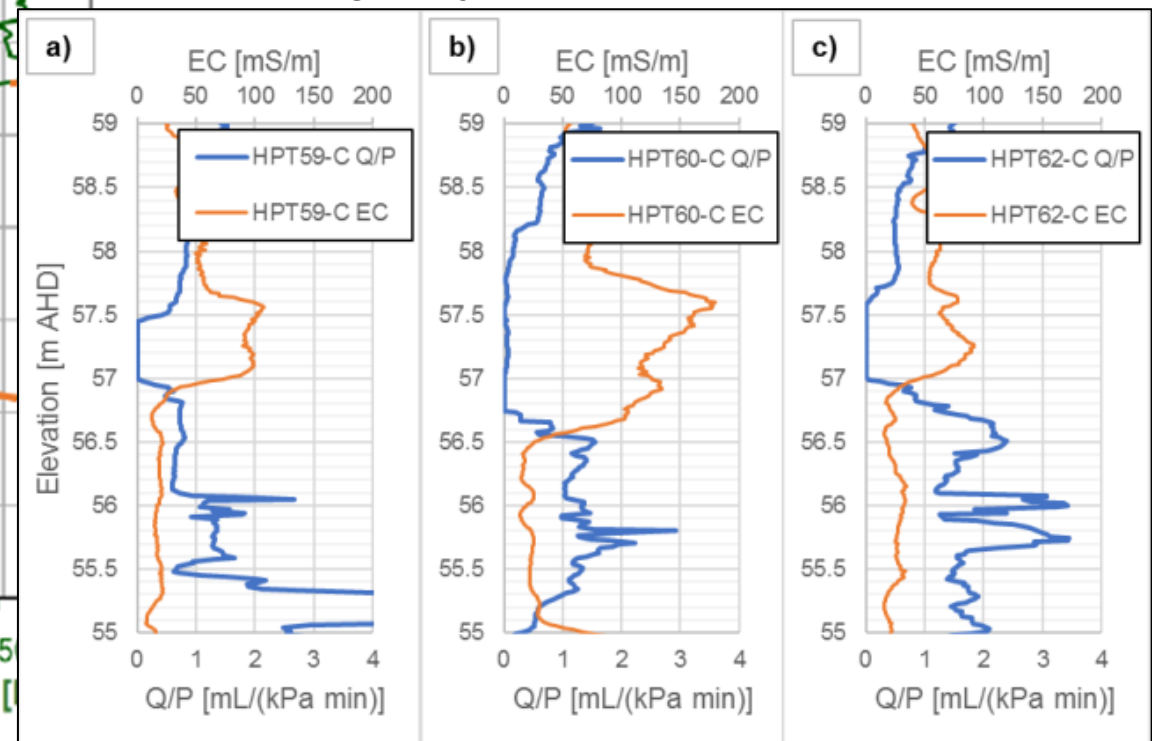
BACKGROUND:

- Recent petrol release in Western Australia
- Fluvial depositional environment
- Multi-year in-well fluid level monitoring
Coring, modelling...
UVOST, HPT
Baildown tests, LNAPL mass recovery trials...

Confining Conditions

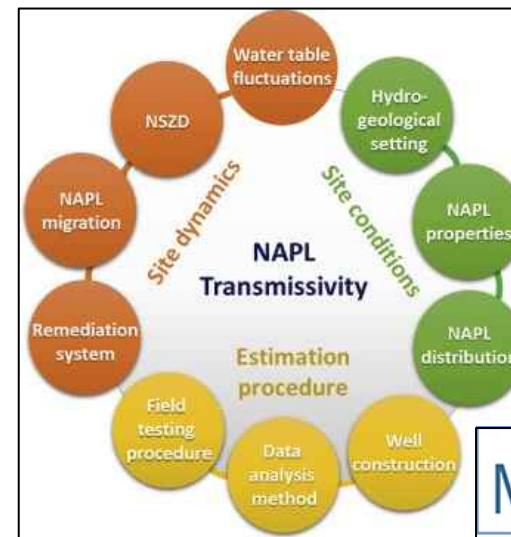
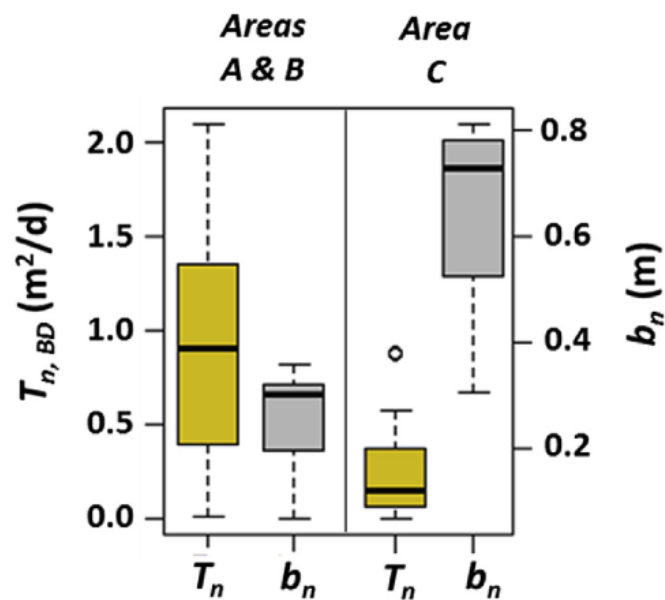
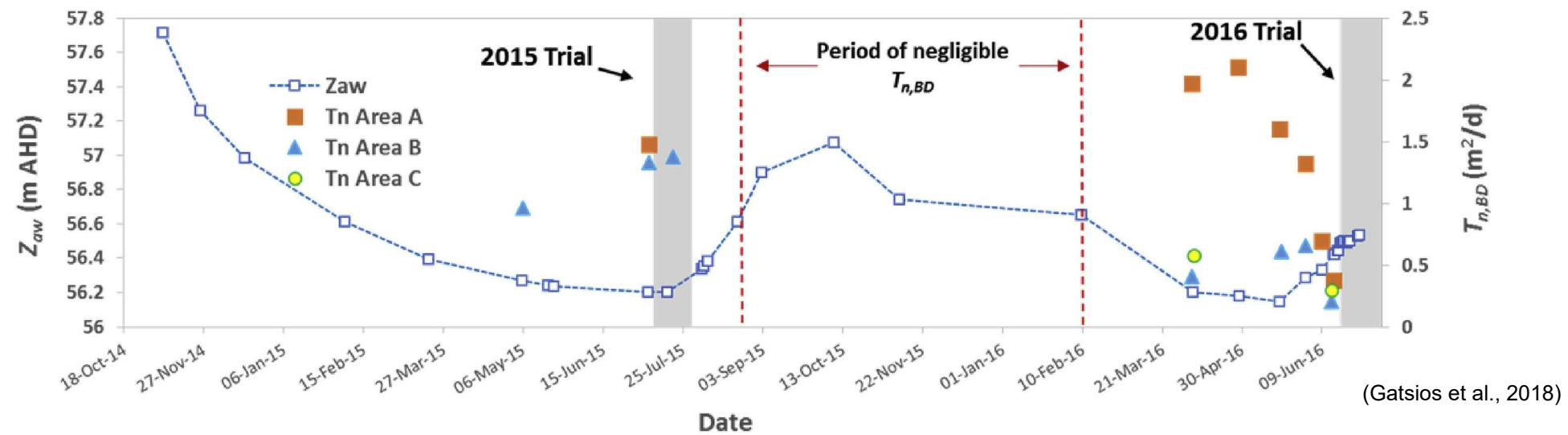


HPT logs adjacent to the same well



(García-Rincón, 2020)

LNAPL Transmissivity



Groundwater
Monitoring & Remediation

NGWA

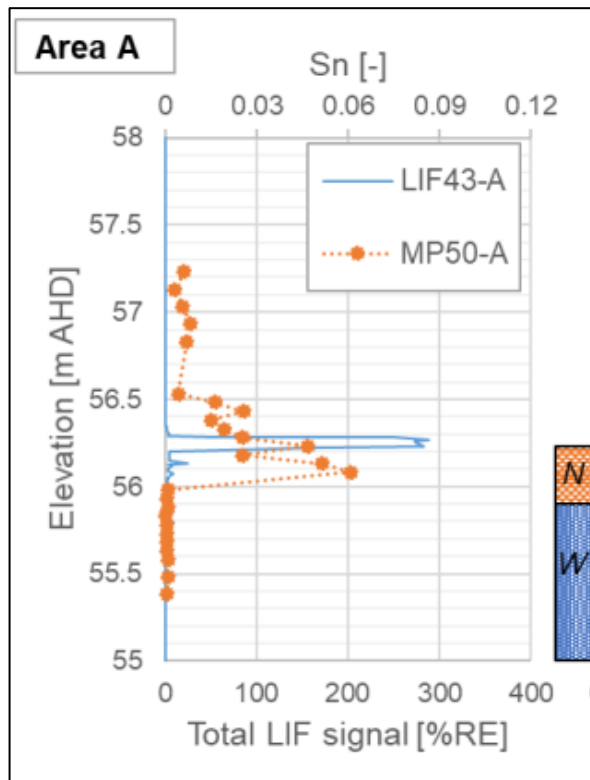
Guest Editorial | [Free Access](#)

LNAPL Transmissivity: A Twisted Parameter

by G.D. Beckett, David Huntley

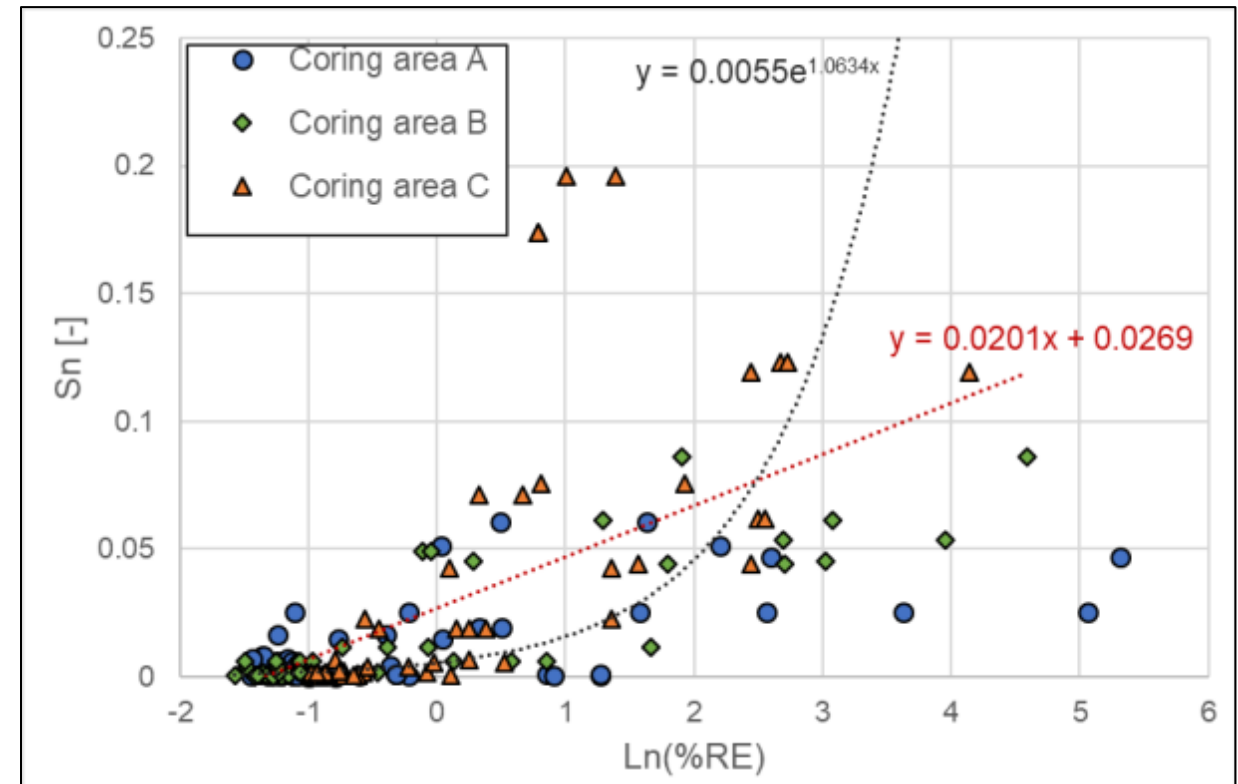
First published: 28 July 2015 | <https://doi.org/10.1111/gwrm.12116> | Citations: 8

LIF vs Coring

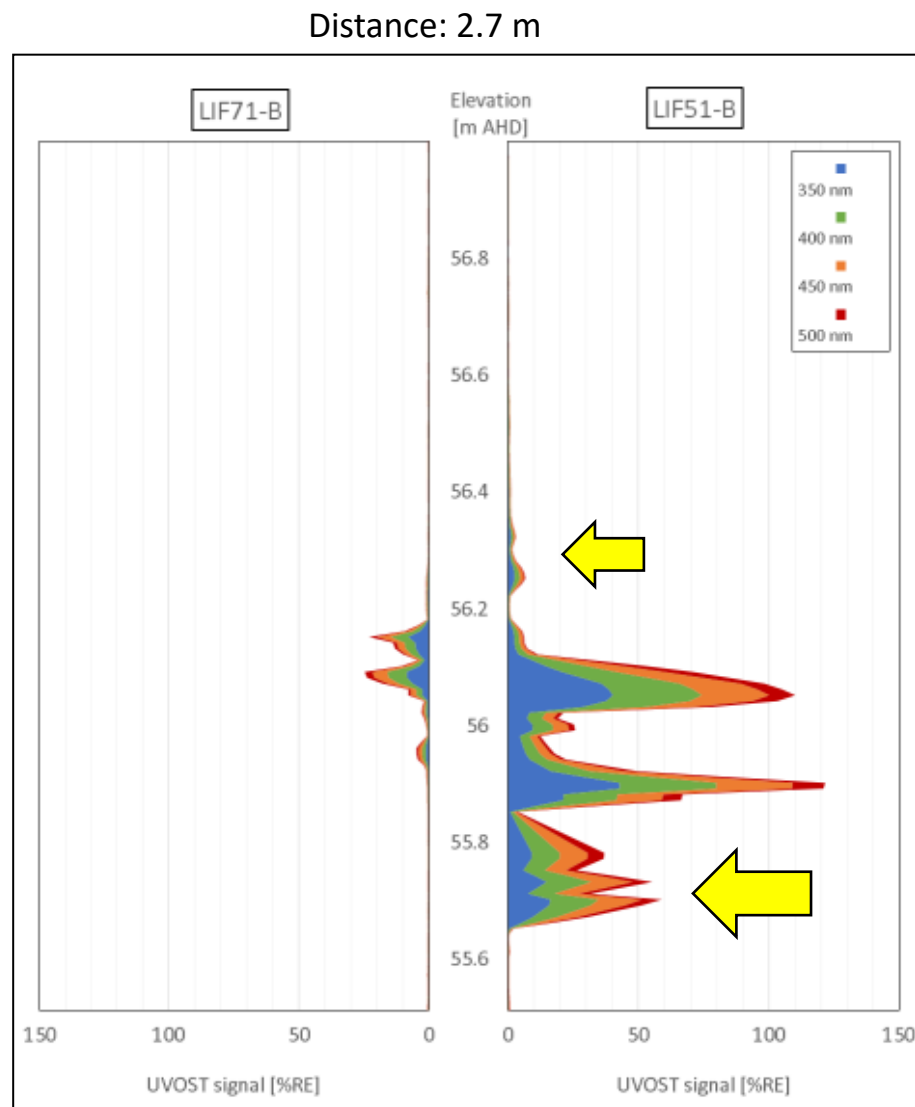


(García-Rincón et al. 2020)

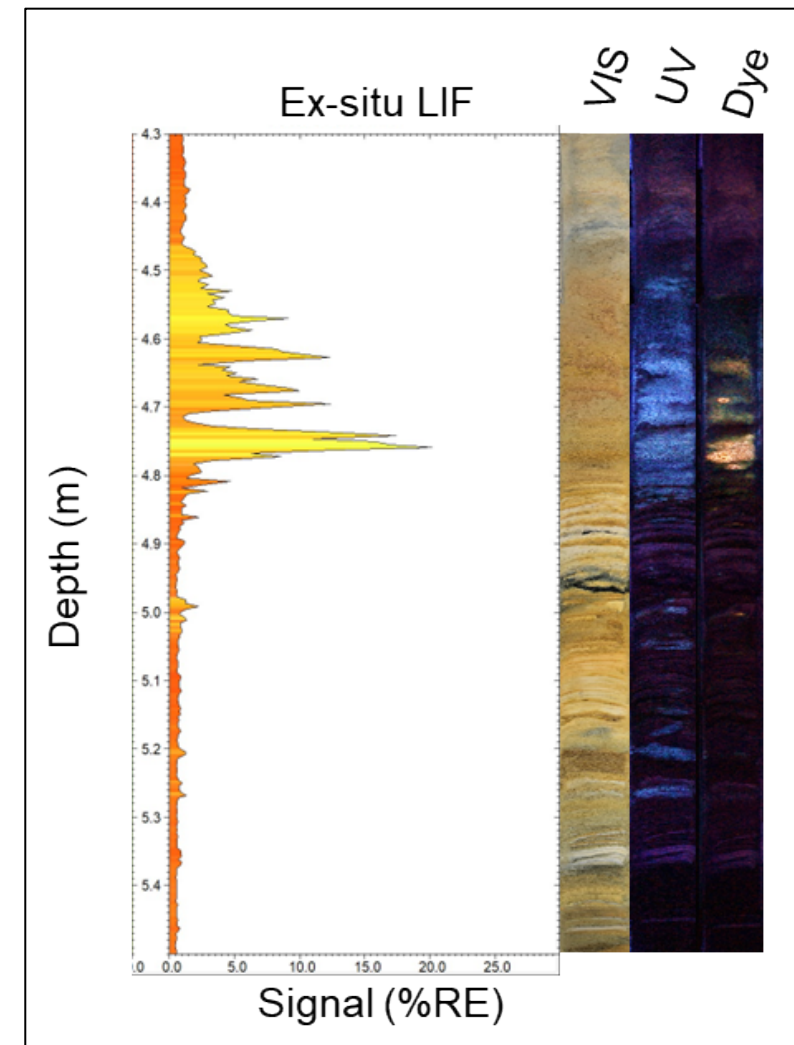
Poor correlation with S_n measurements through coring



LIF vs Coring

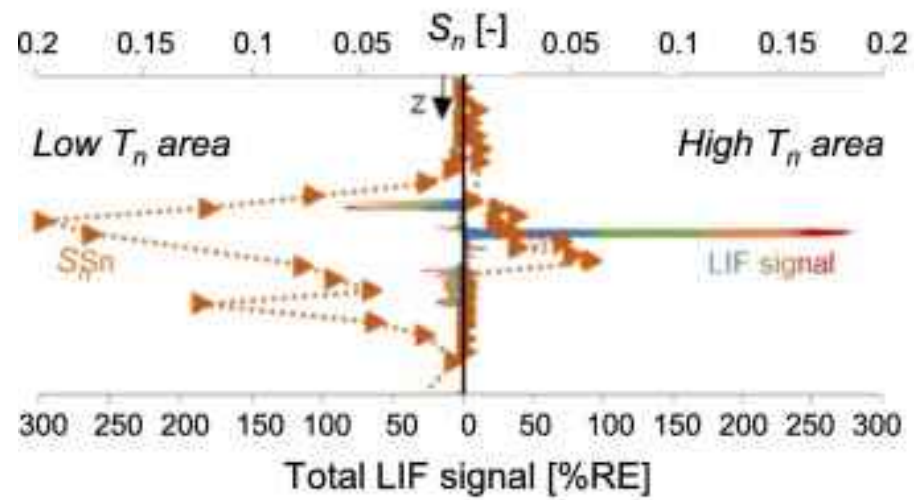


(García-Rincón et al. 2020)



(after St. Germain 2023)

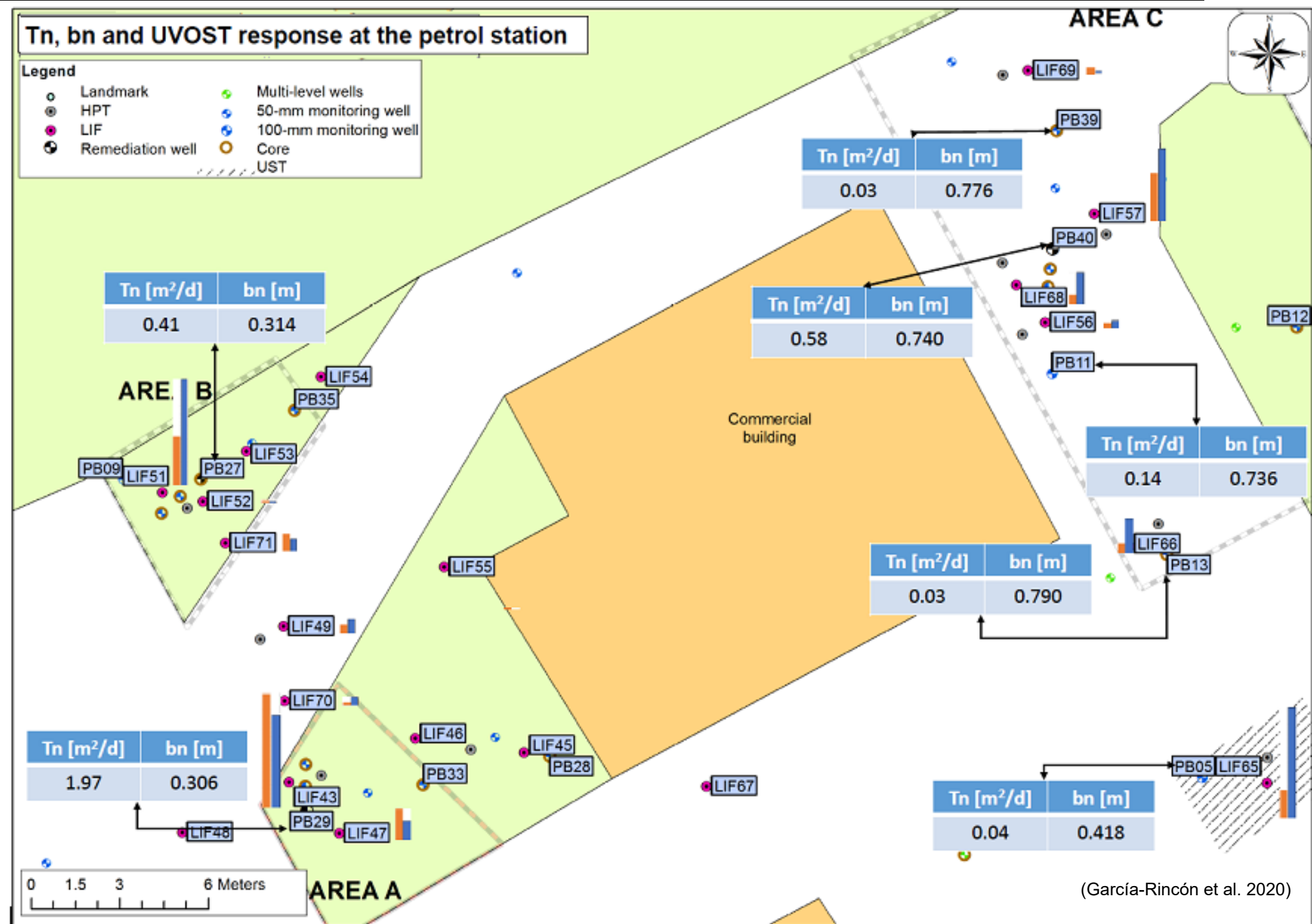
LIF vs Coring vs Tn



(Garcia-Rincon et al., 2020)

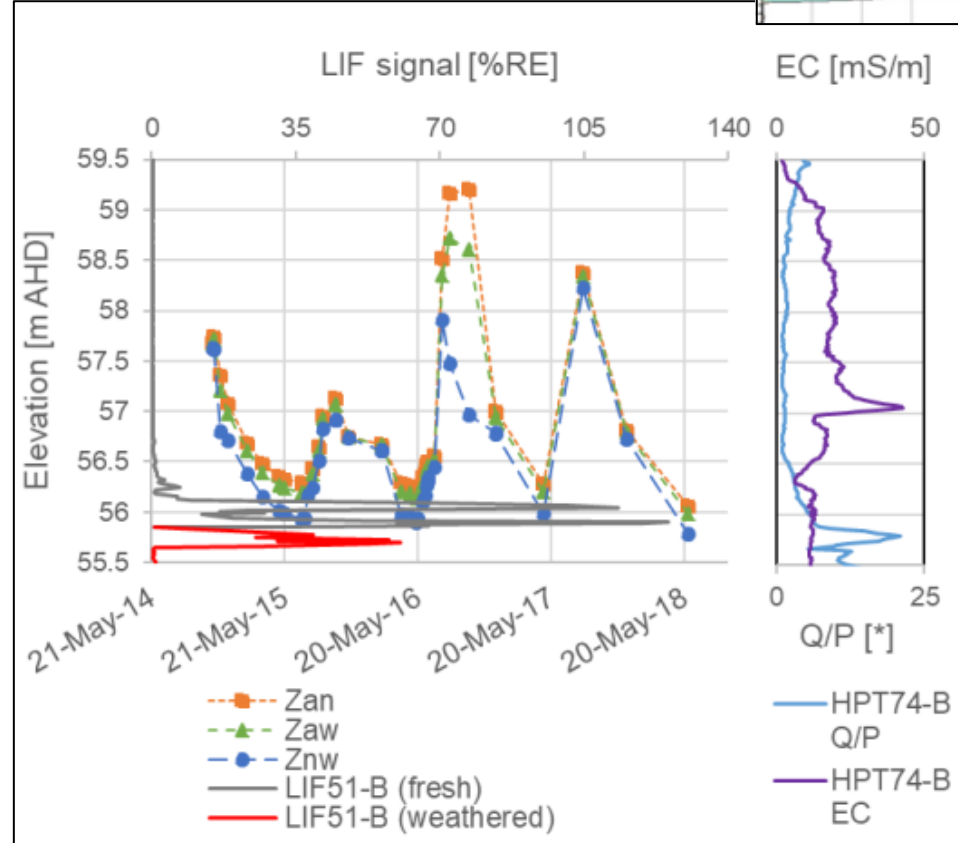
LIF vs Tn

Spearman's rank correlation coefficient of 0.84 between maximum LIF signal and LNAPL transmissivity (T_n)

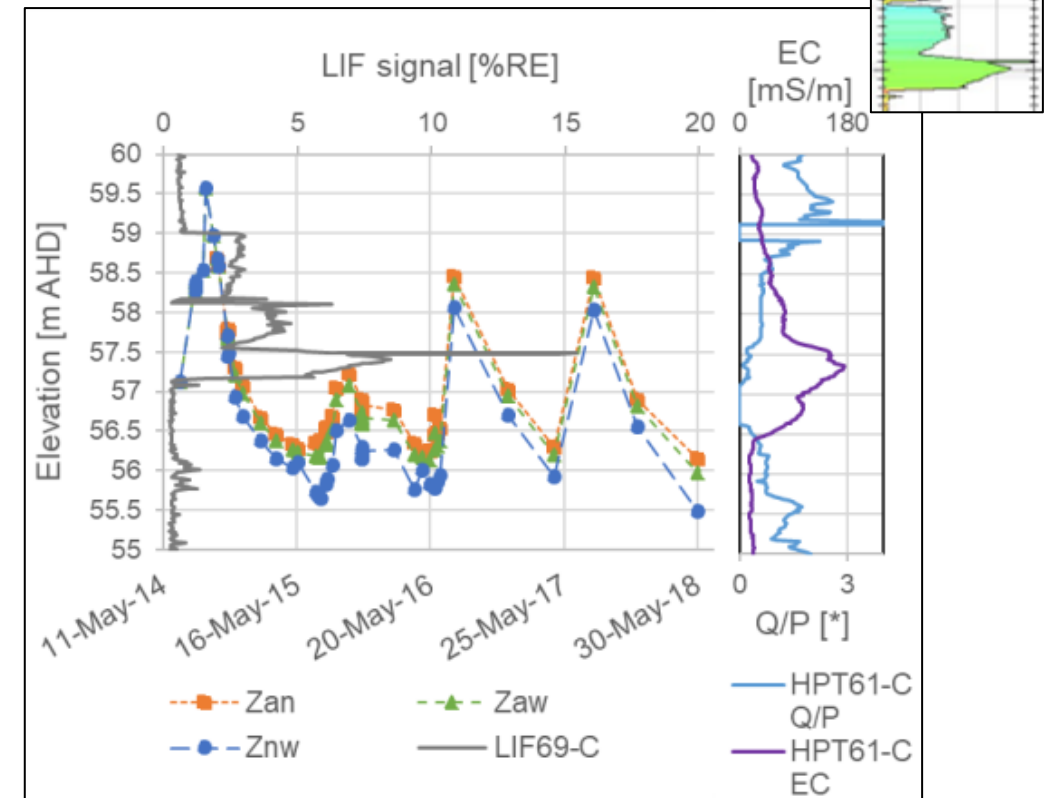


Delineating Immobile LNAPL

Entrapped LNAPL (or confined?)



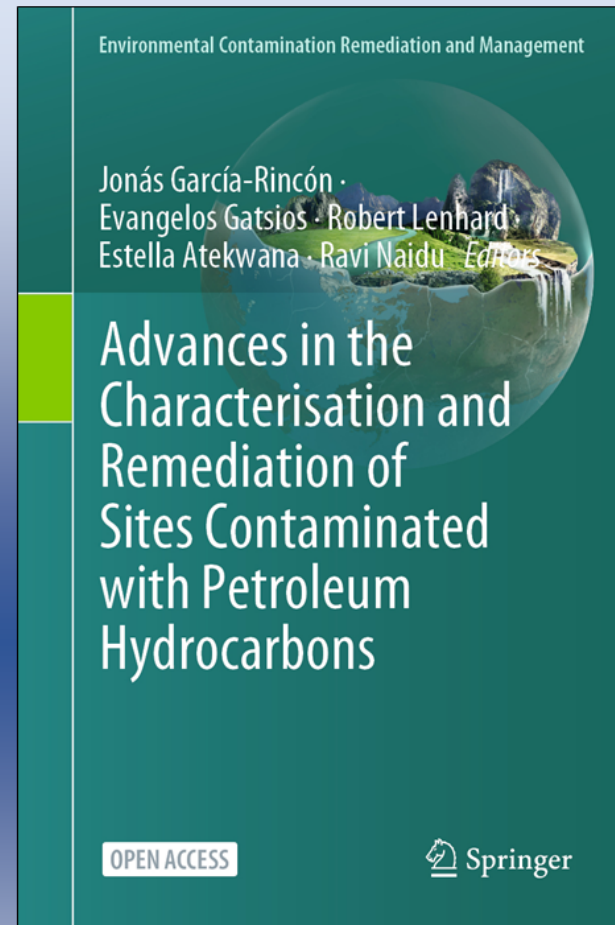
Residual LNAPL (or perched?)



(García-Rincón et al. 2020)

HRSC may help to rapidly identify immobile NAPL that cannot be seen in wells

Further Information



Springer



amazon

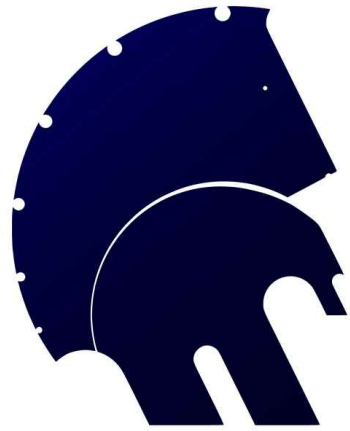


INTERGEO

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Thank you!



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