

How Dry Must the Great Salt Lake Playa be to Emit Dust?

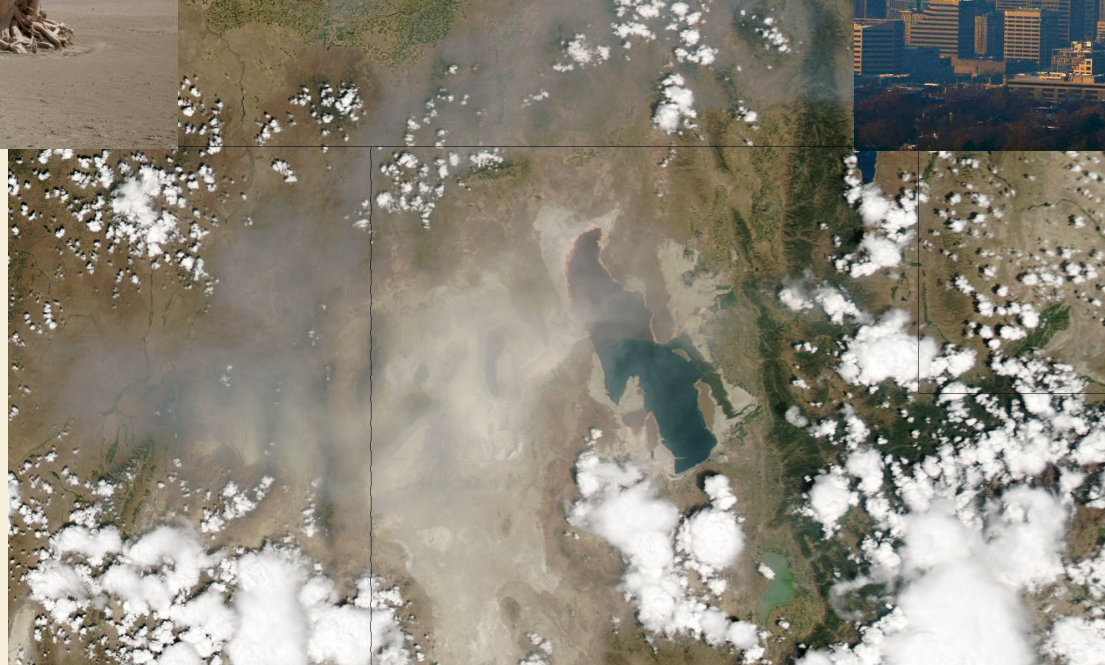
Thorn K. Merrill

Advised by Dr. Kevin D. Perry

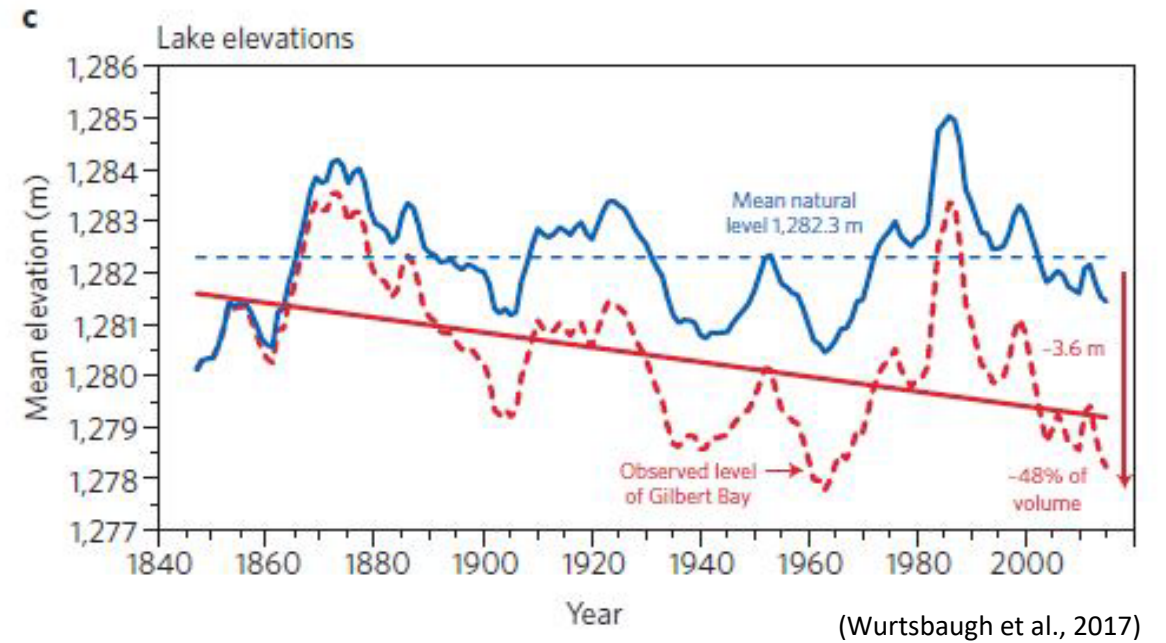
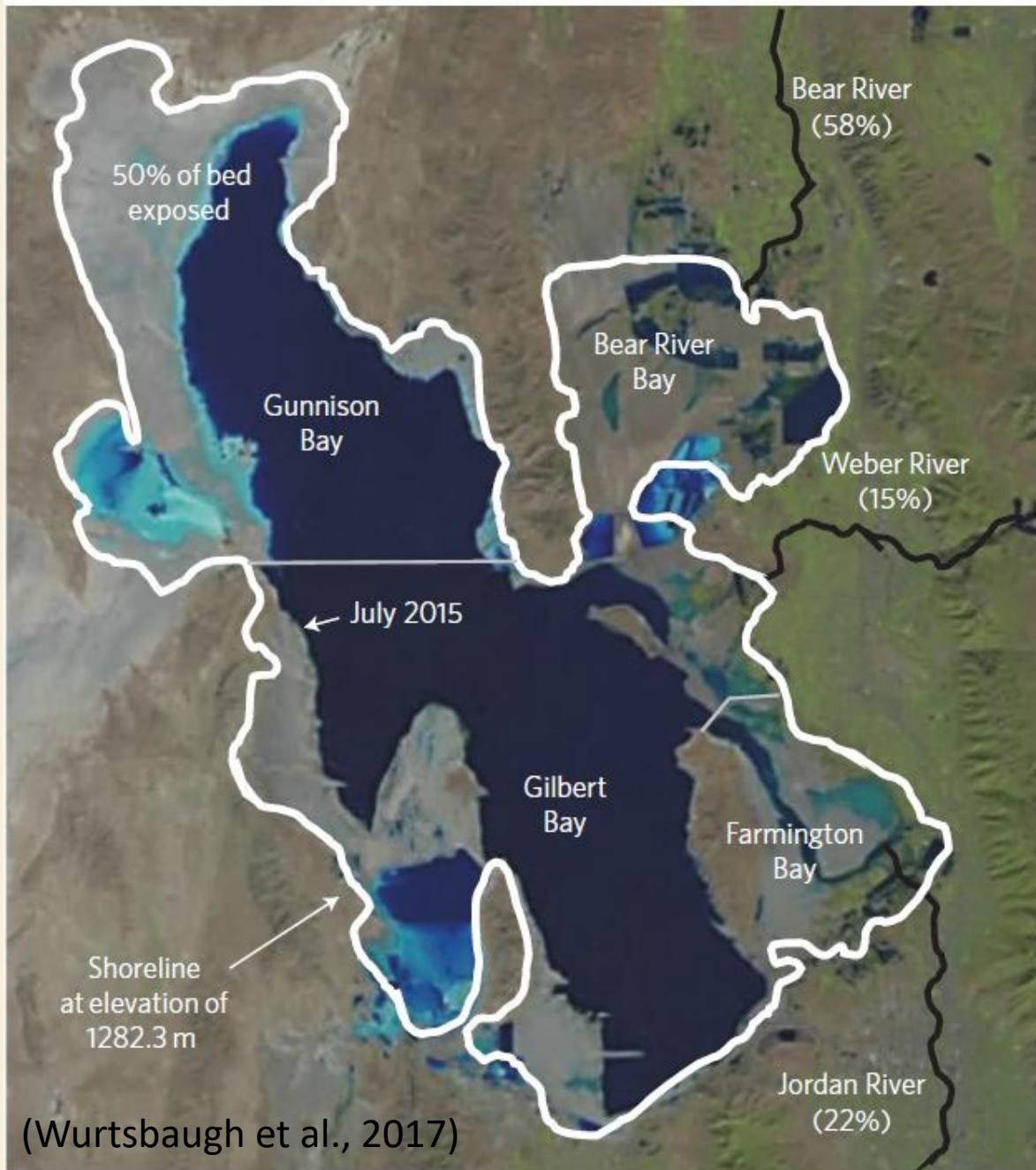


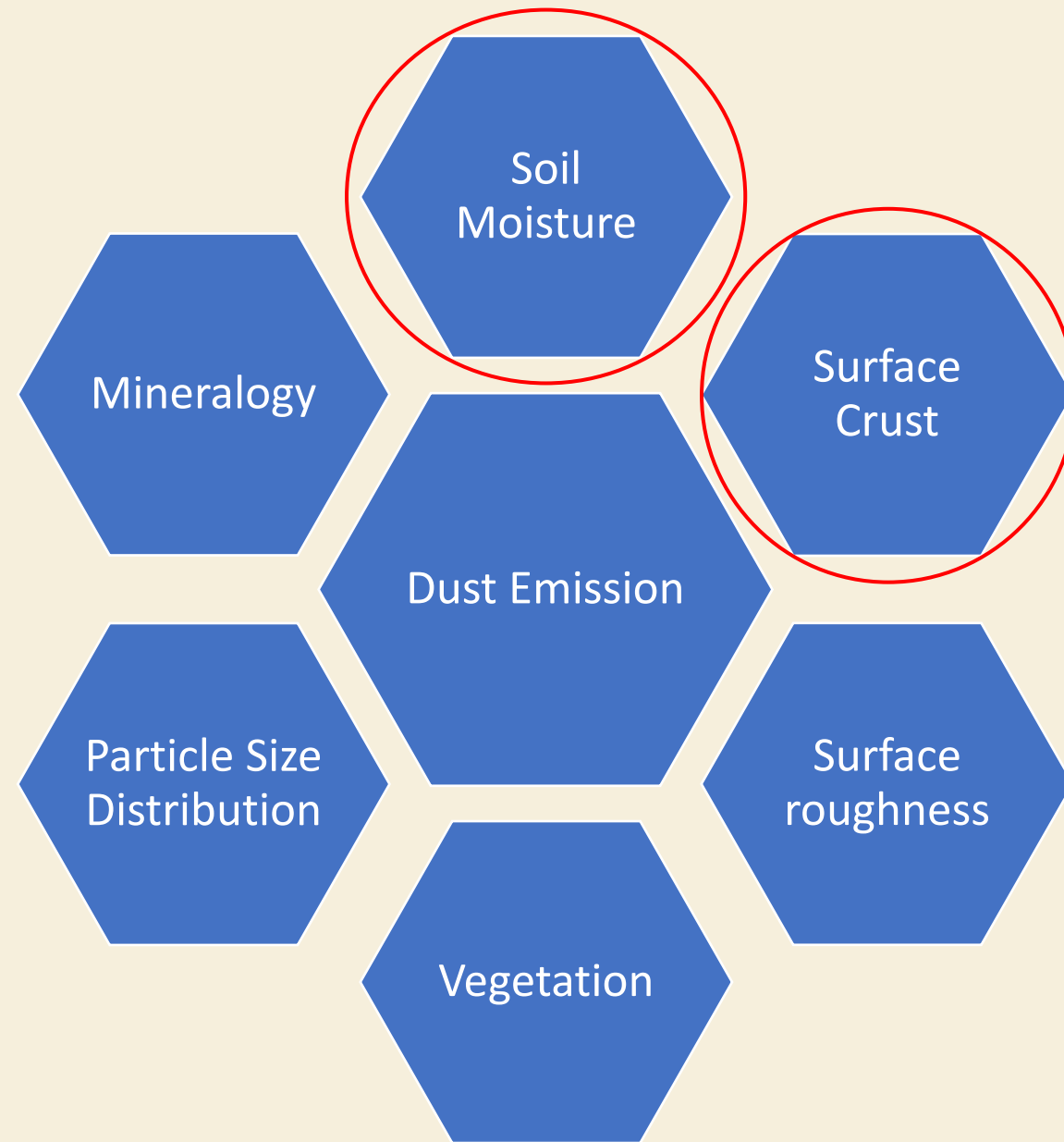
Photo: Zach Coury

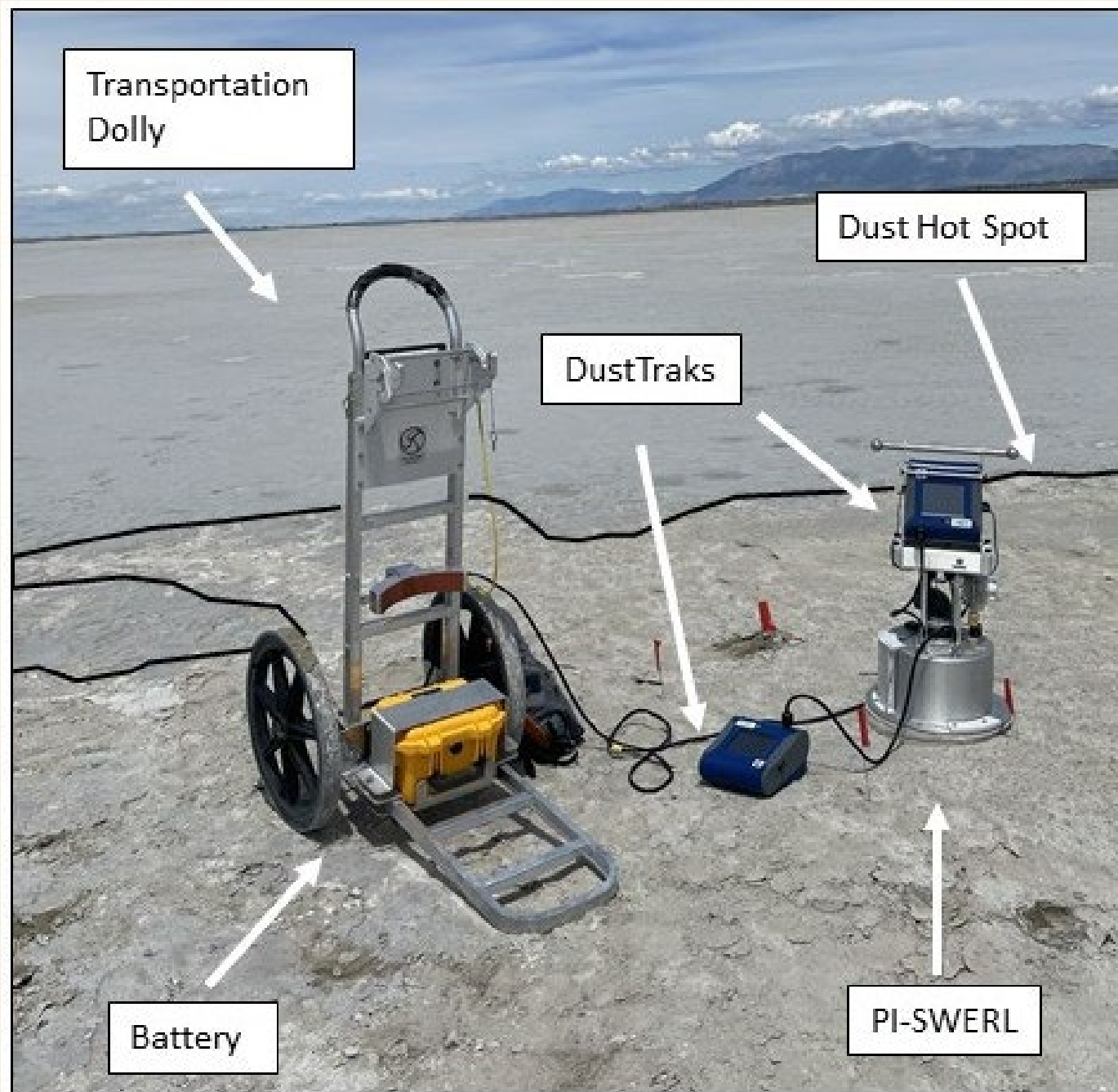
Motivation:



Lake Level Decline







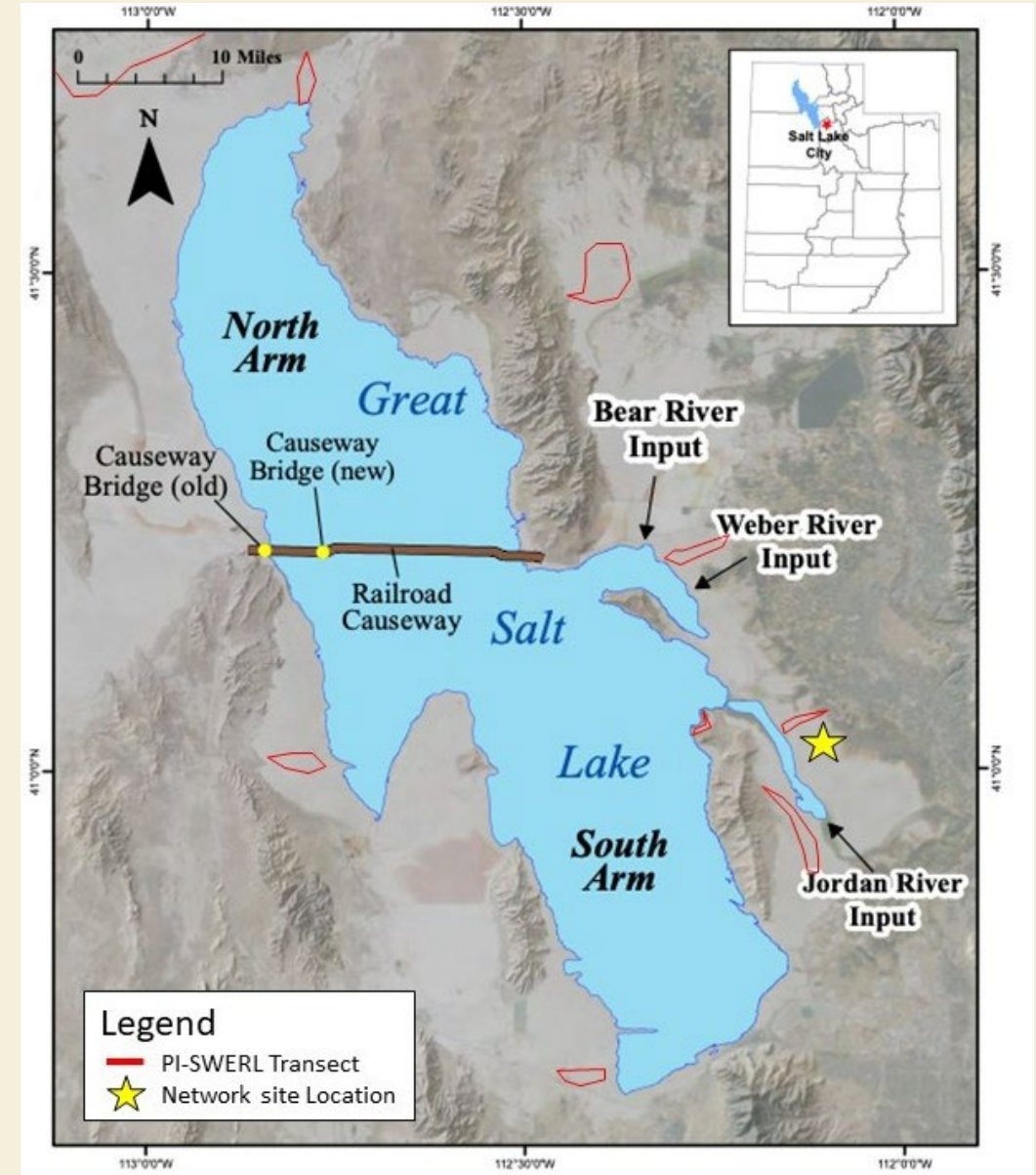
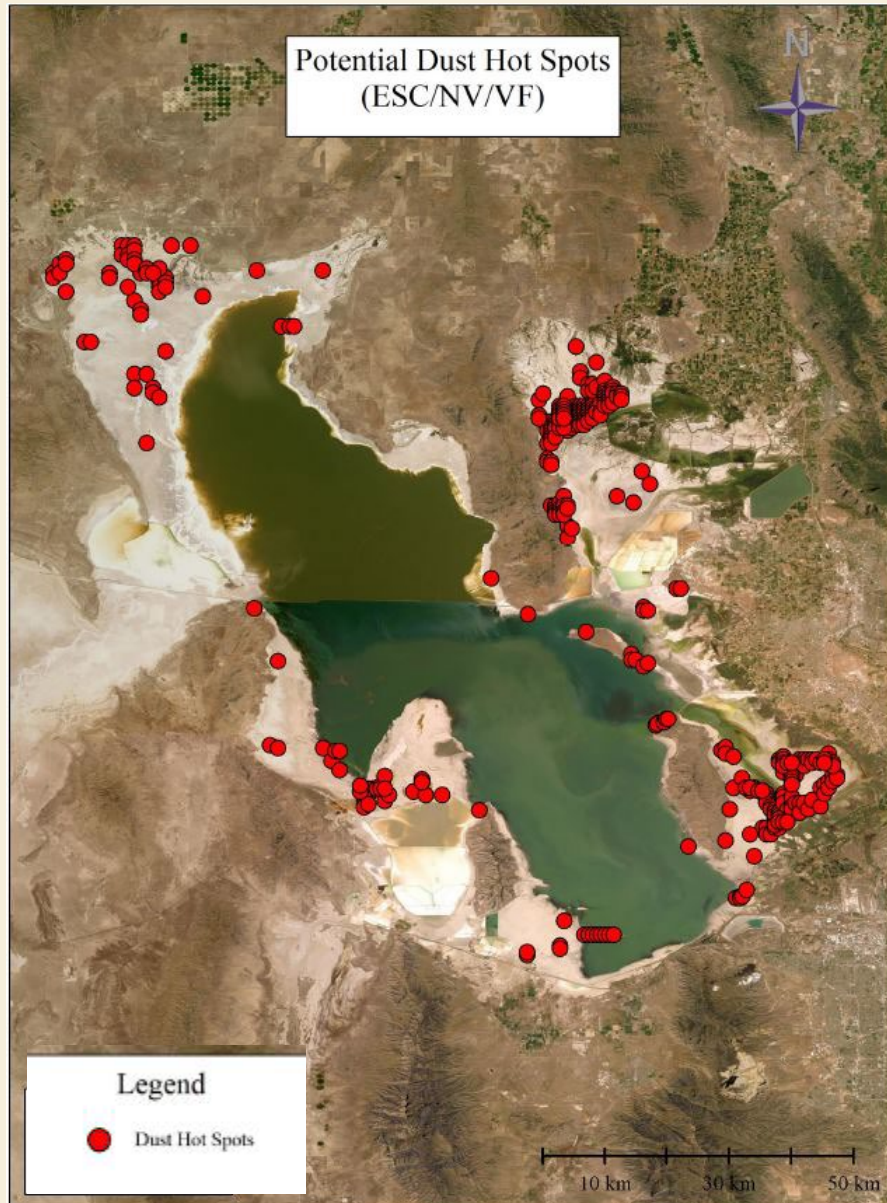
Threshold Friction Velocity and Flux:

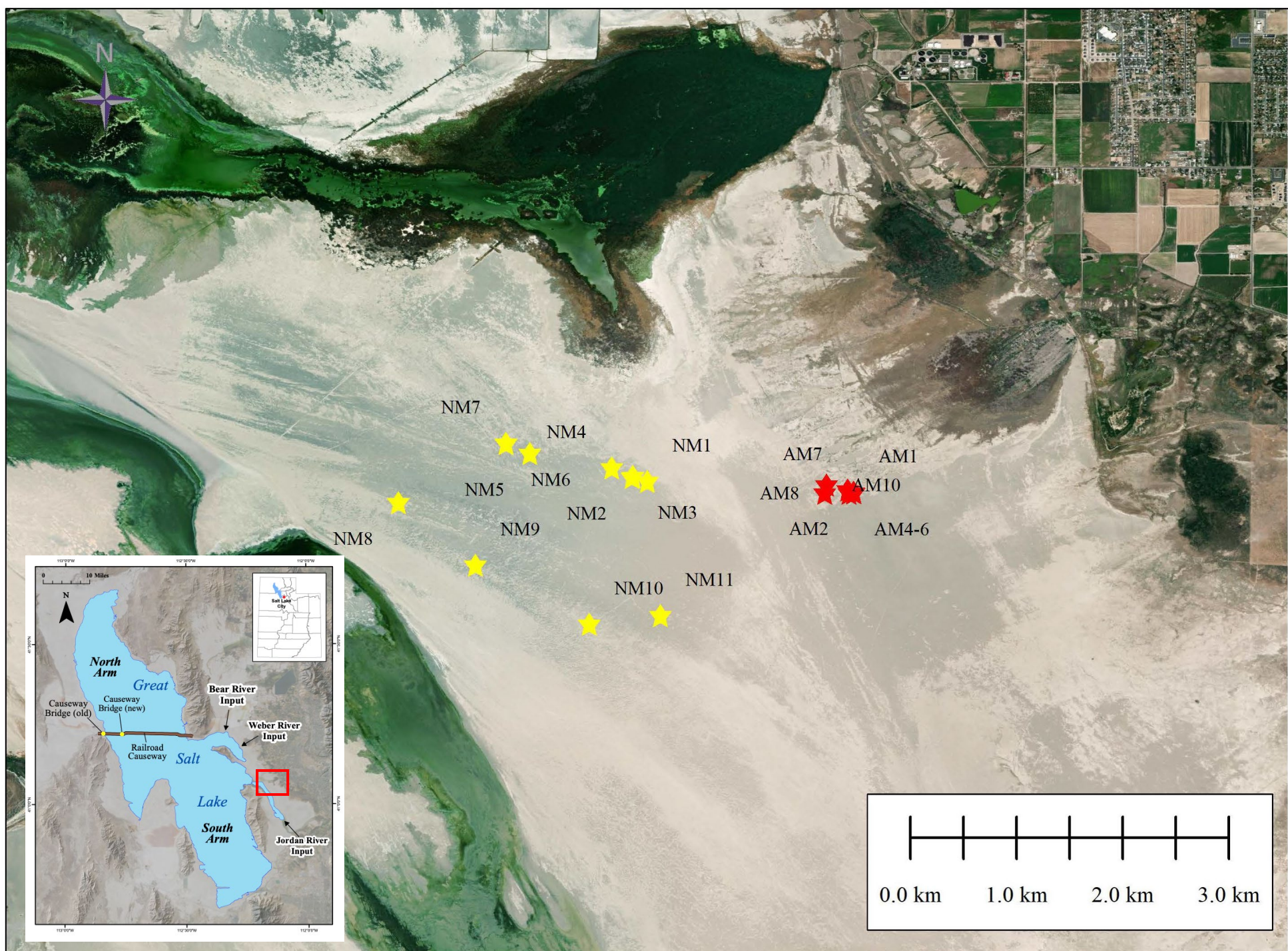
- Dust emission is initiated at the threshold friction velocity (u_t^*)
- PM_{10} Flux ($\text{mg m}^{-2} \text{s}^{-1}$)



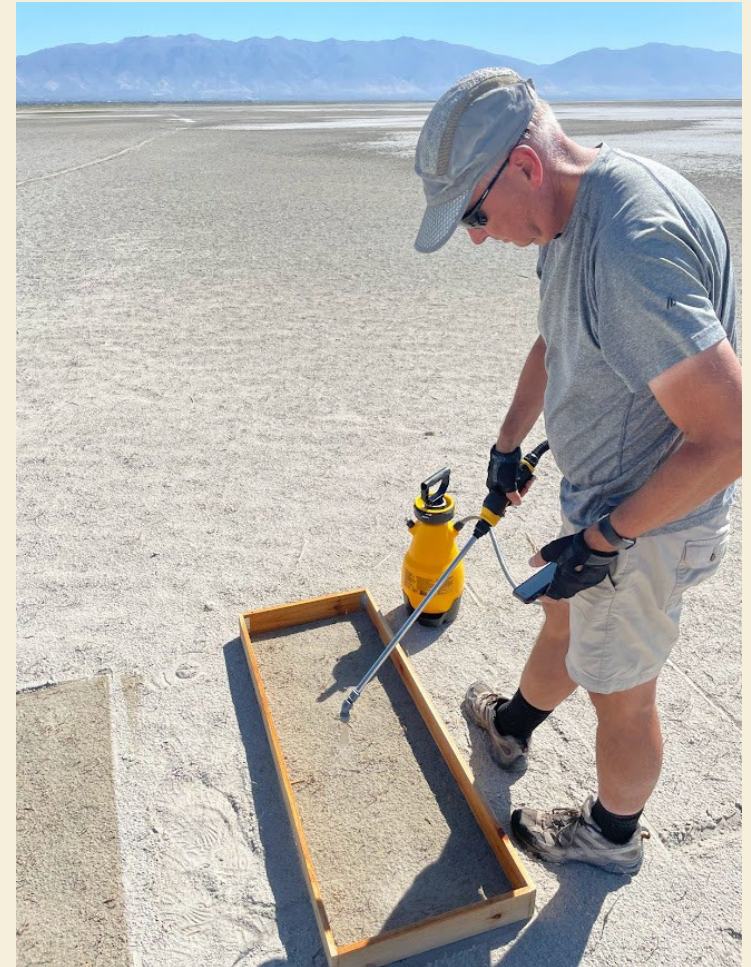
Photo: Kevin Perry

Where are the highly emissive areas on the GSL playa?

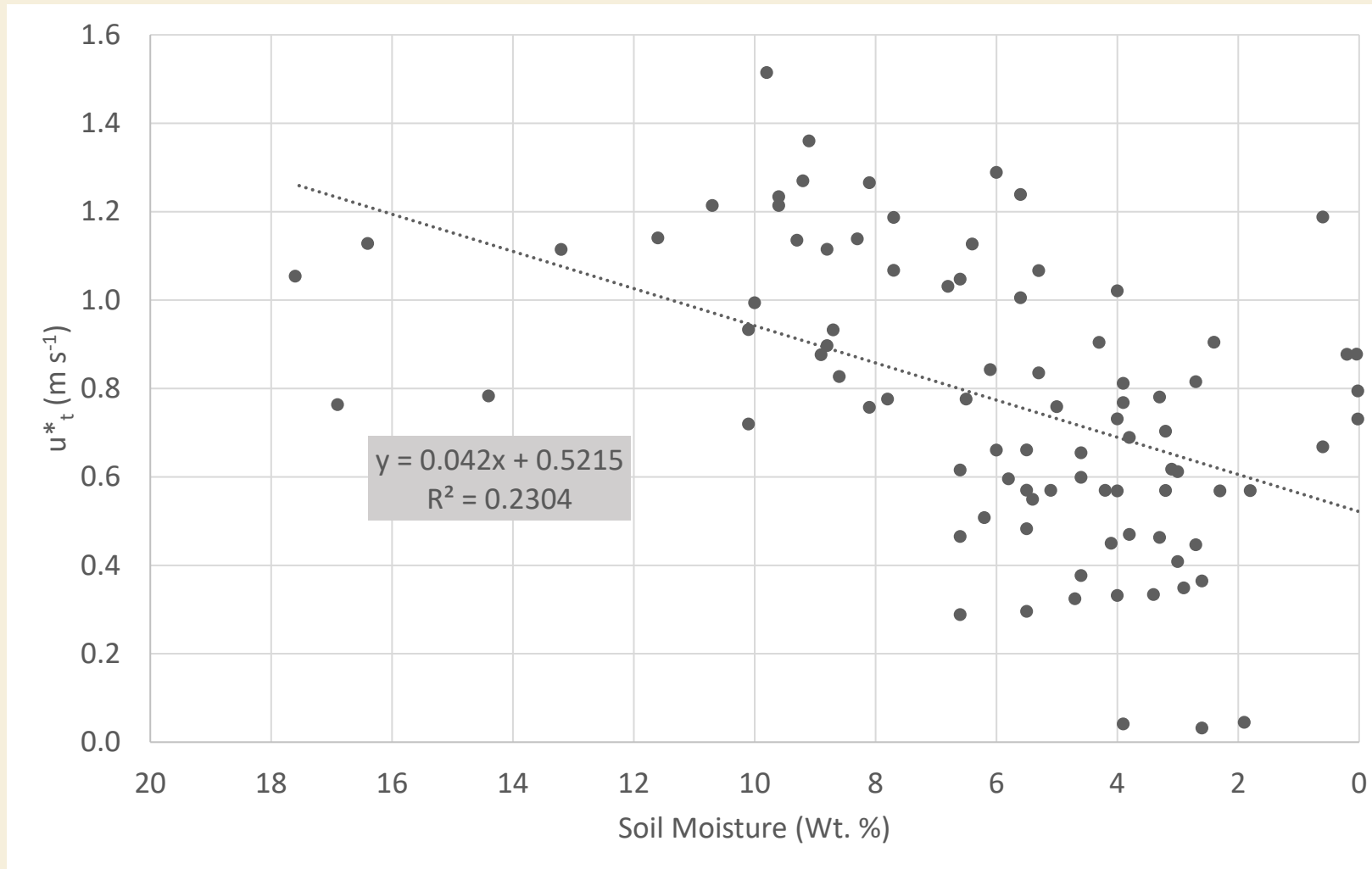




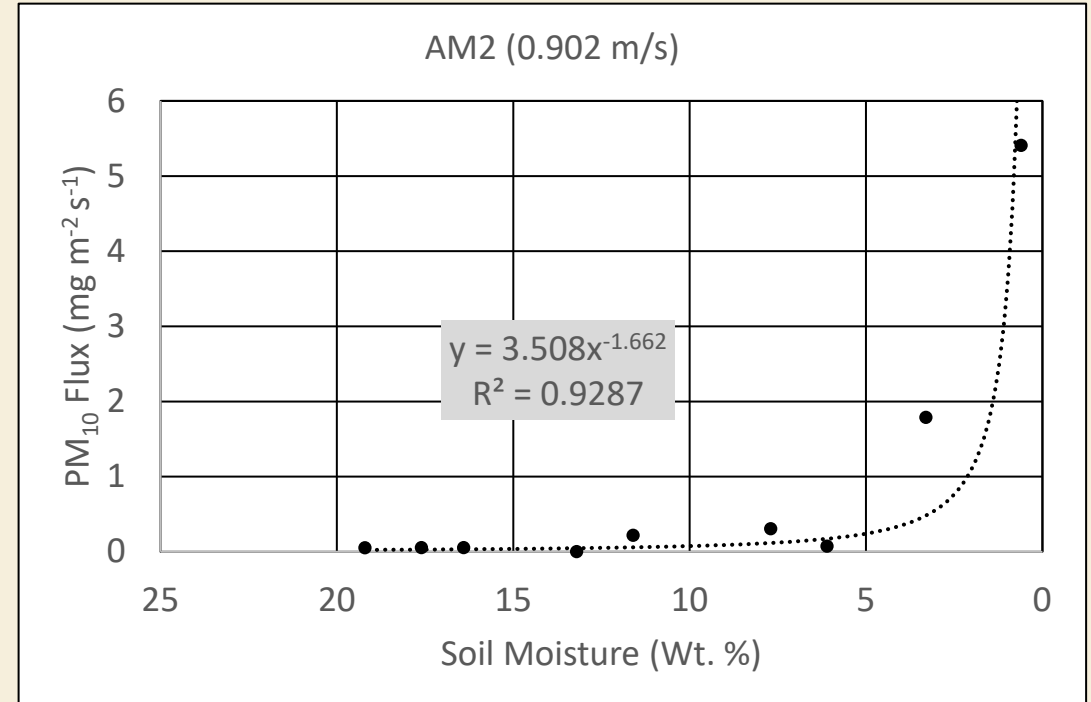
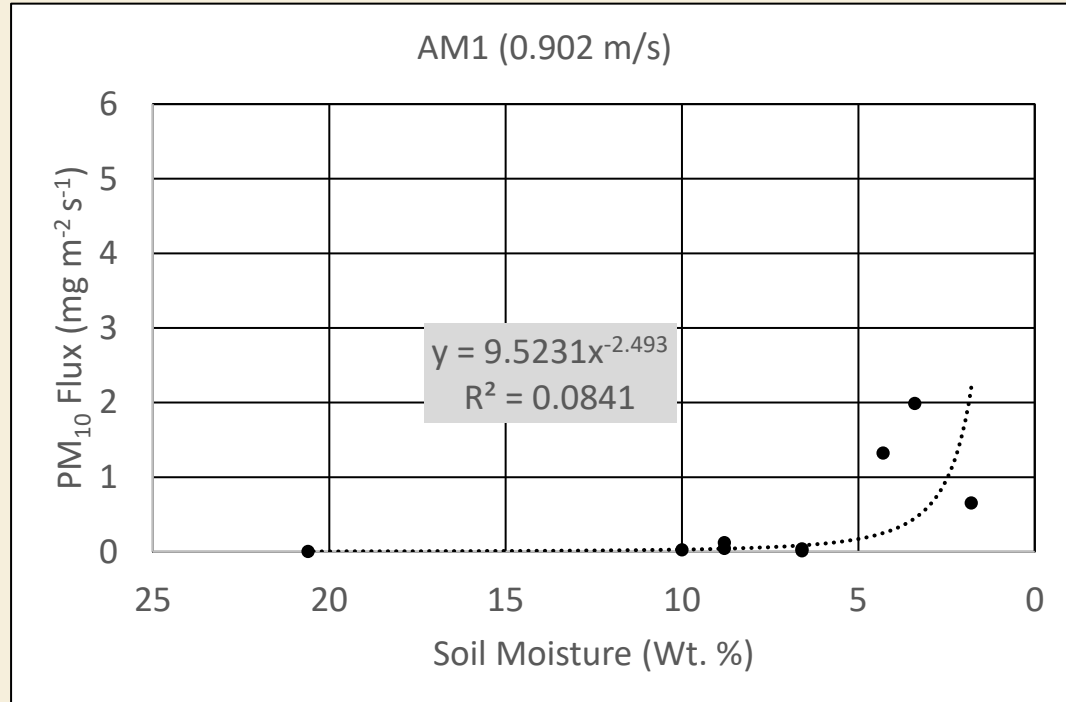
Natural vs. Artificial Moisture sampling:



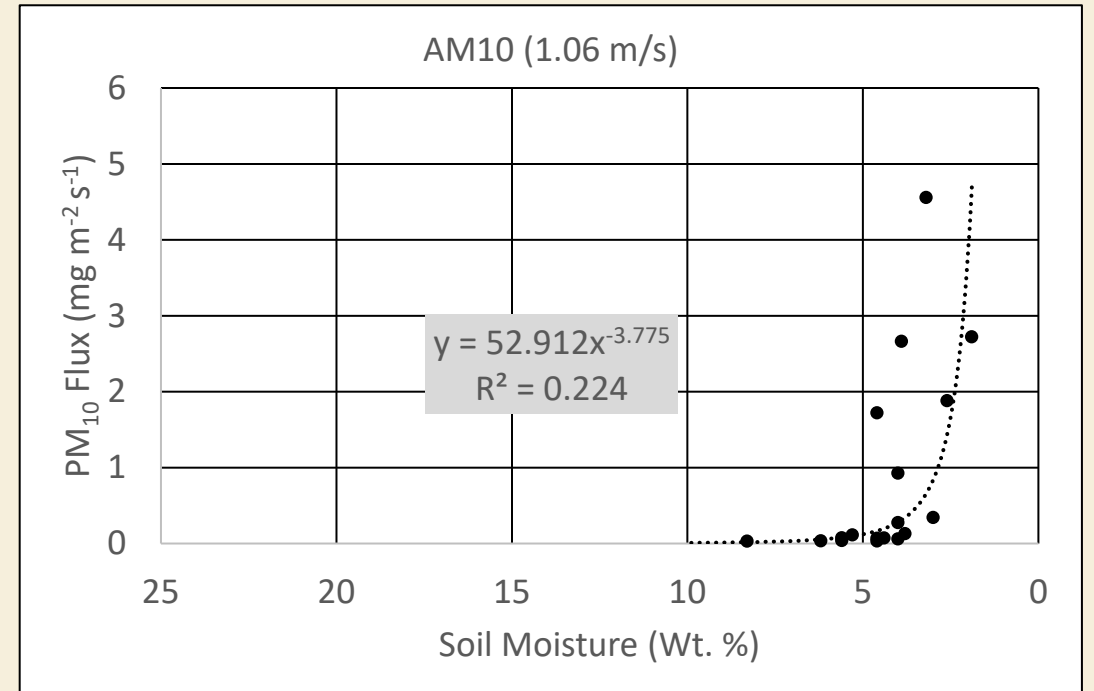
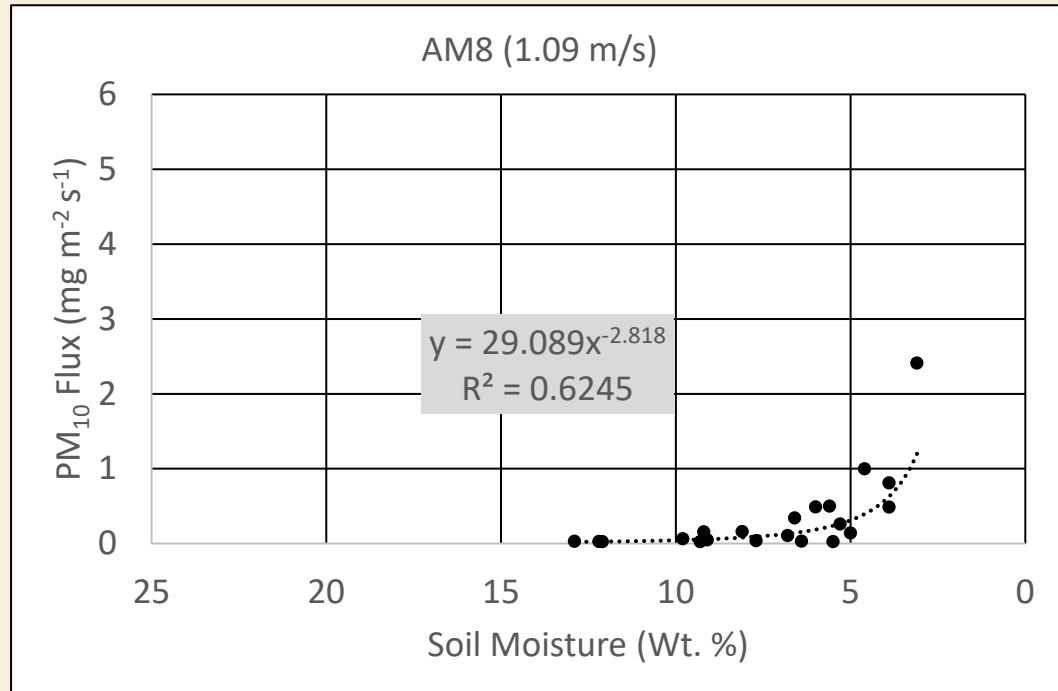
AM Thresholds:



AM Dust Emission Flux:

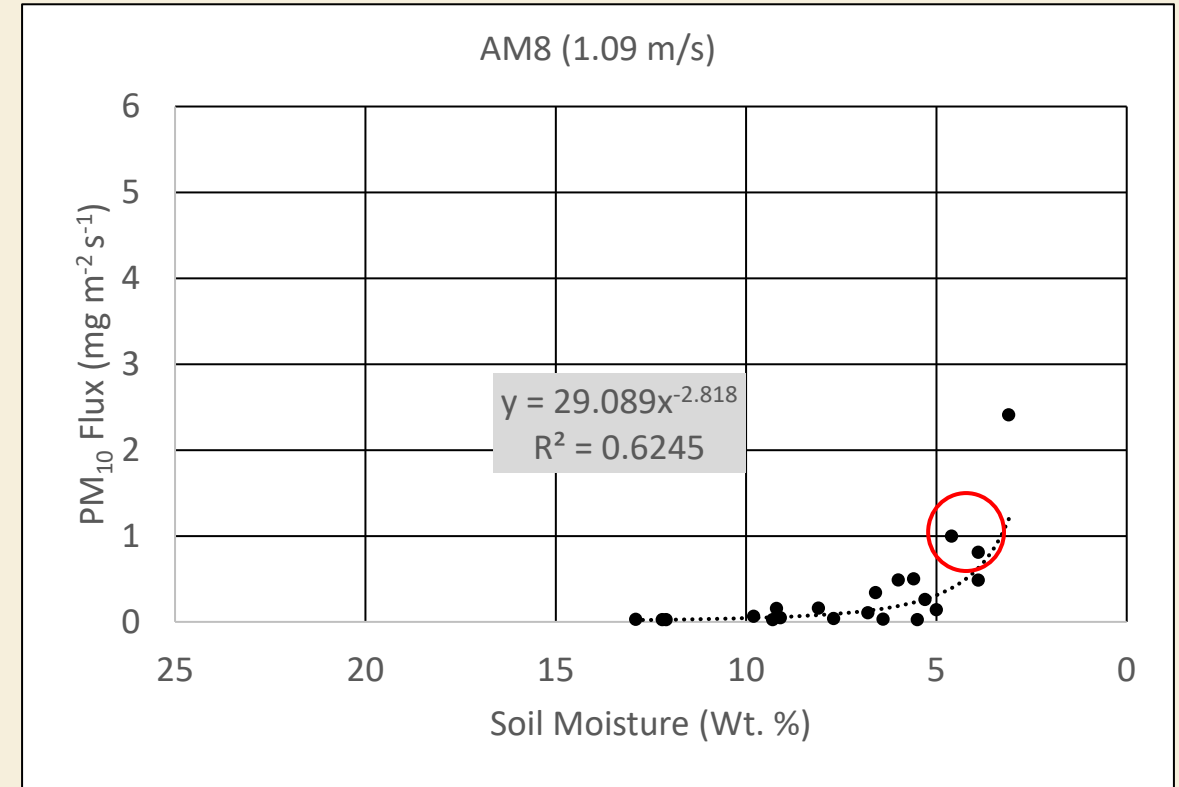


AM Dust Emission Flux:

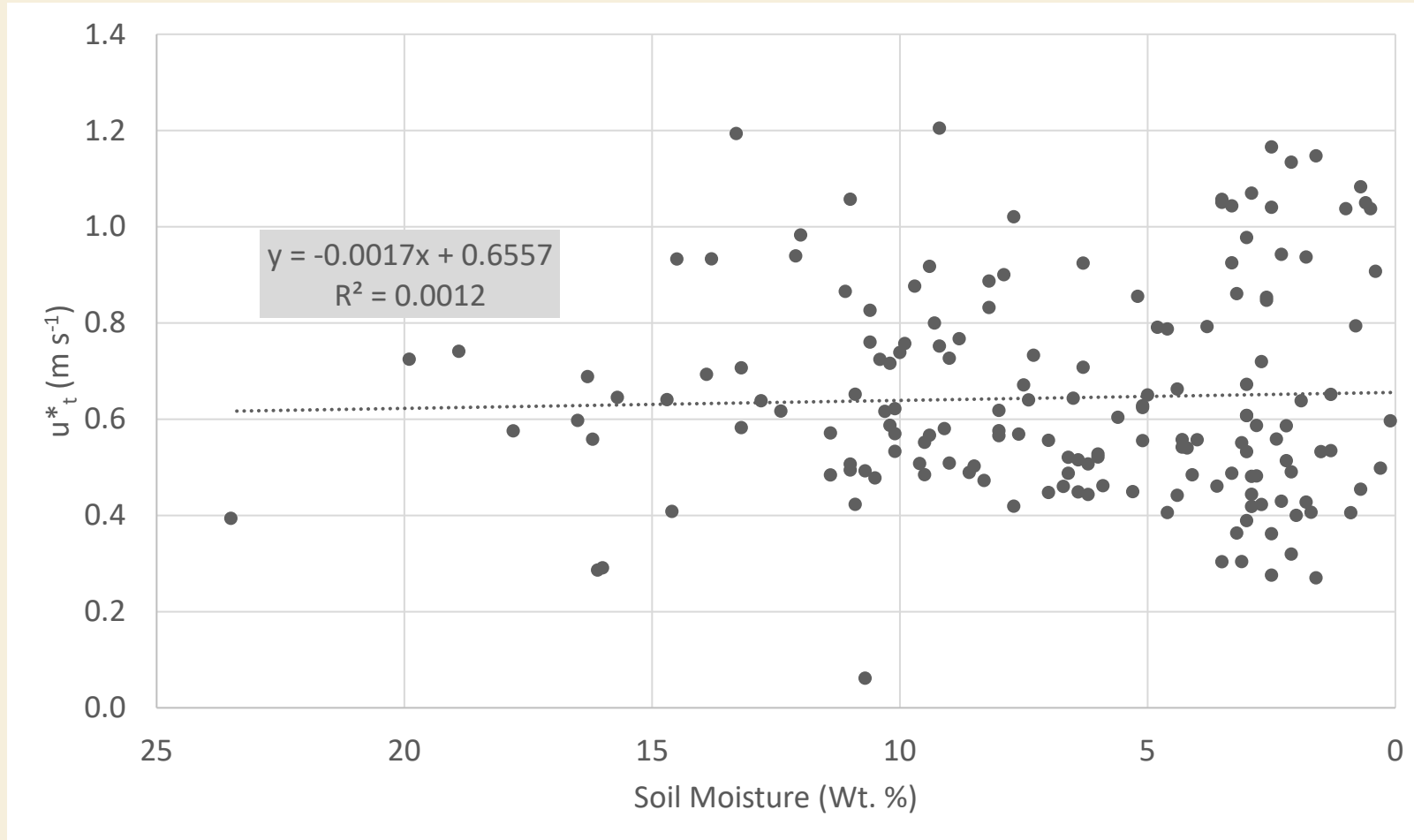


How to suppress dust emission?

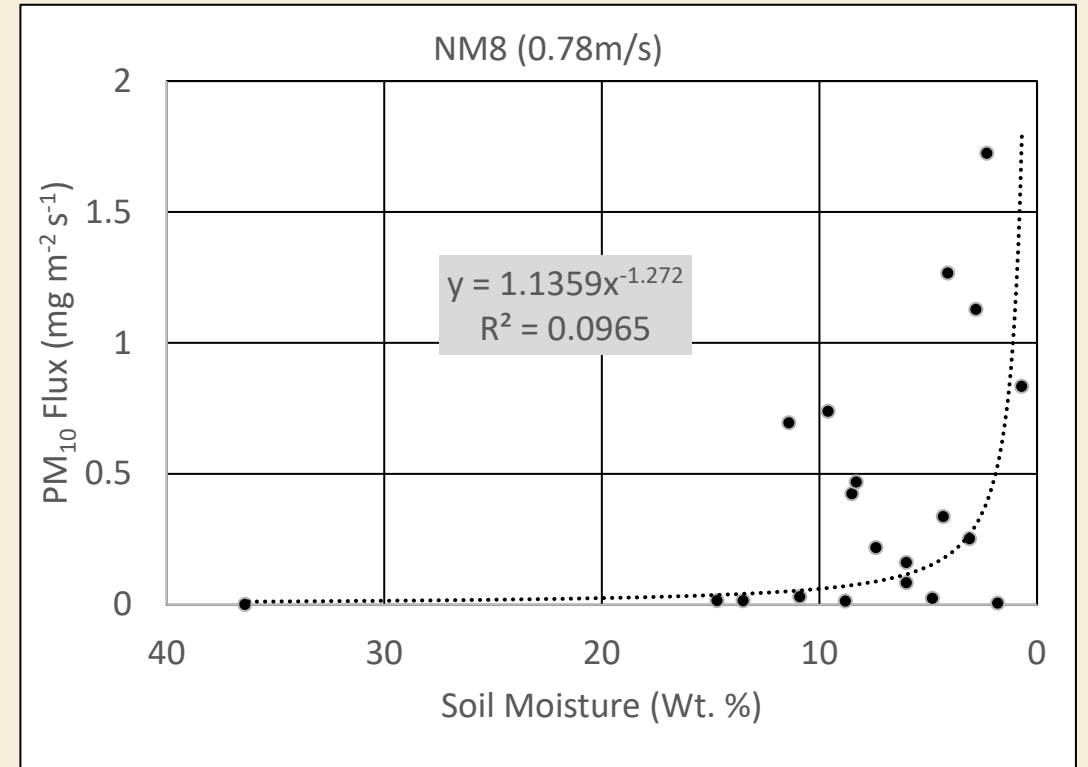
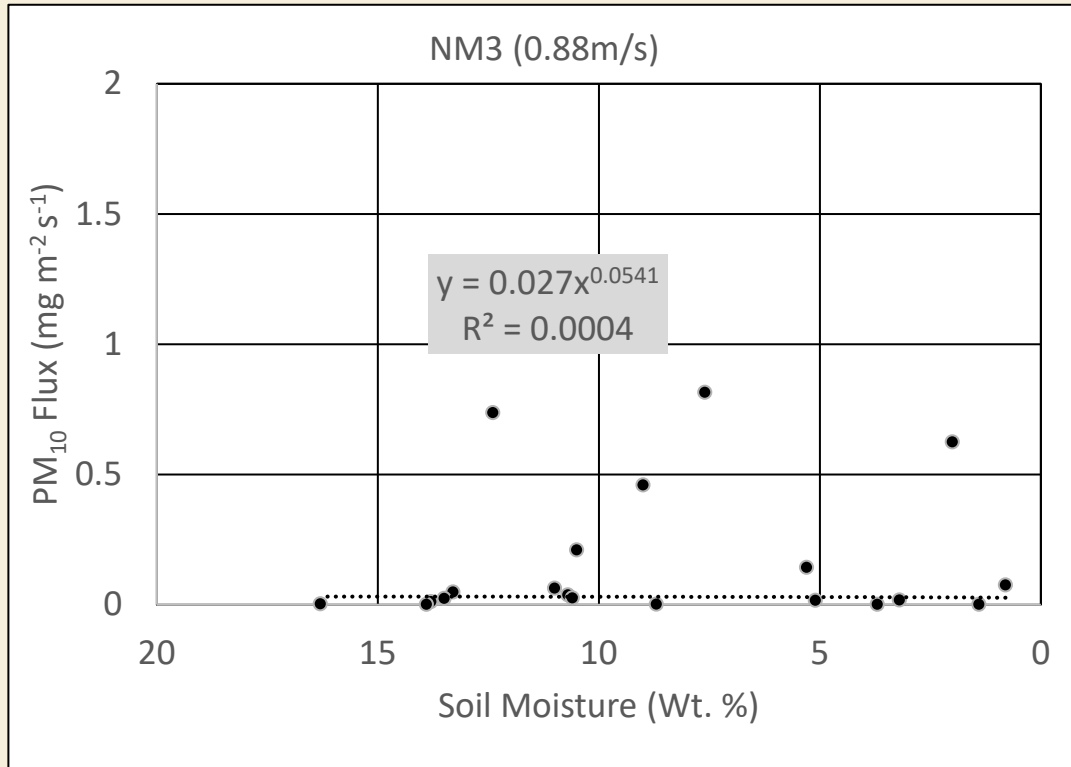
- Based on AM sampling 4% soil moisture suppresses emission at $u^* = 0.84\text{-}1.1$ m/s
- Consistent with 10-30 m/s winds associated with dust storms (Hahnenberger and Nicoll 2012)



NM Thresholds:



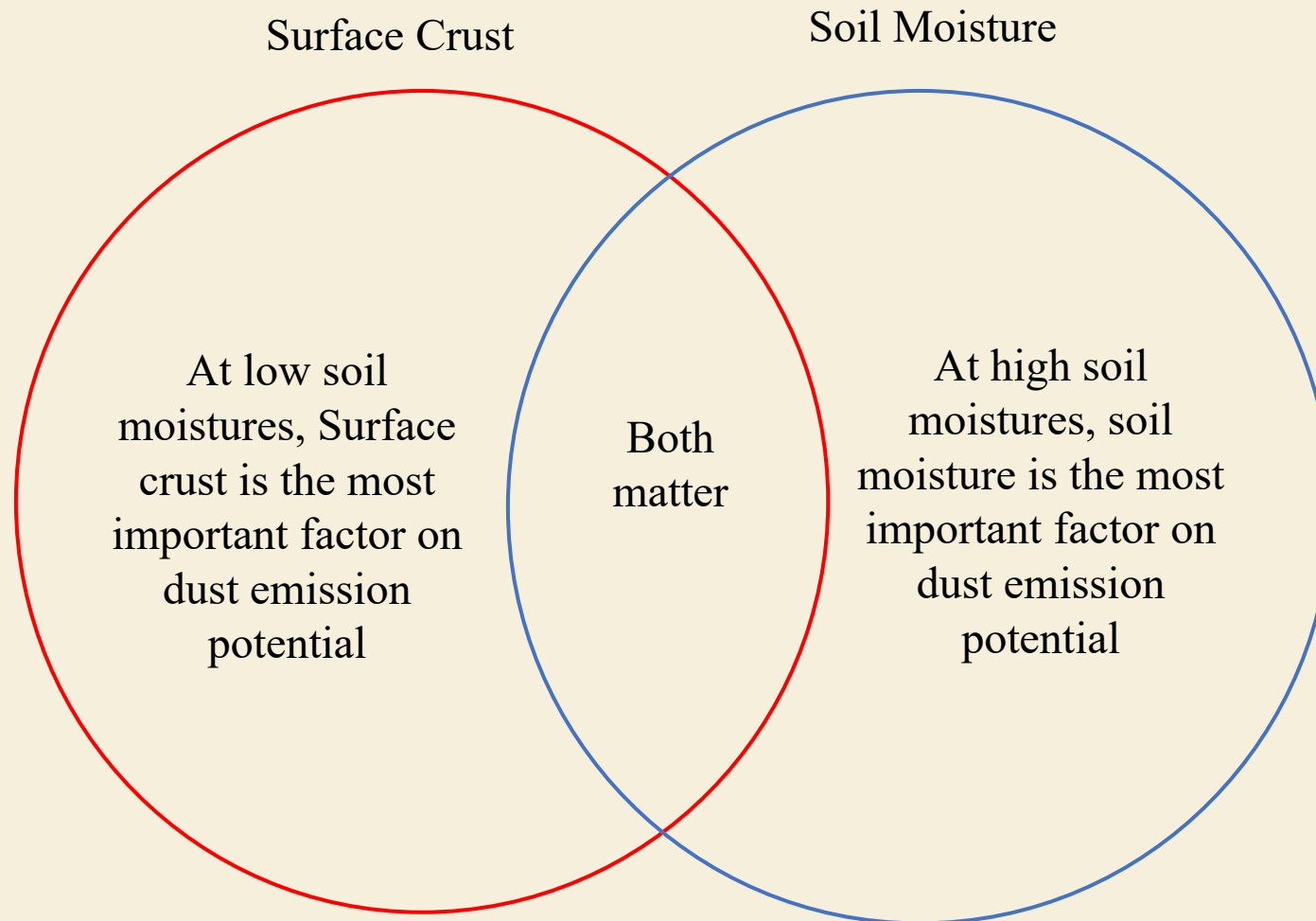
NM Dust Emission Flux:



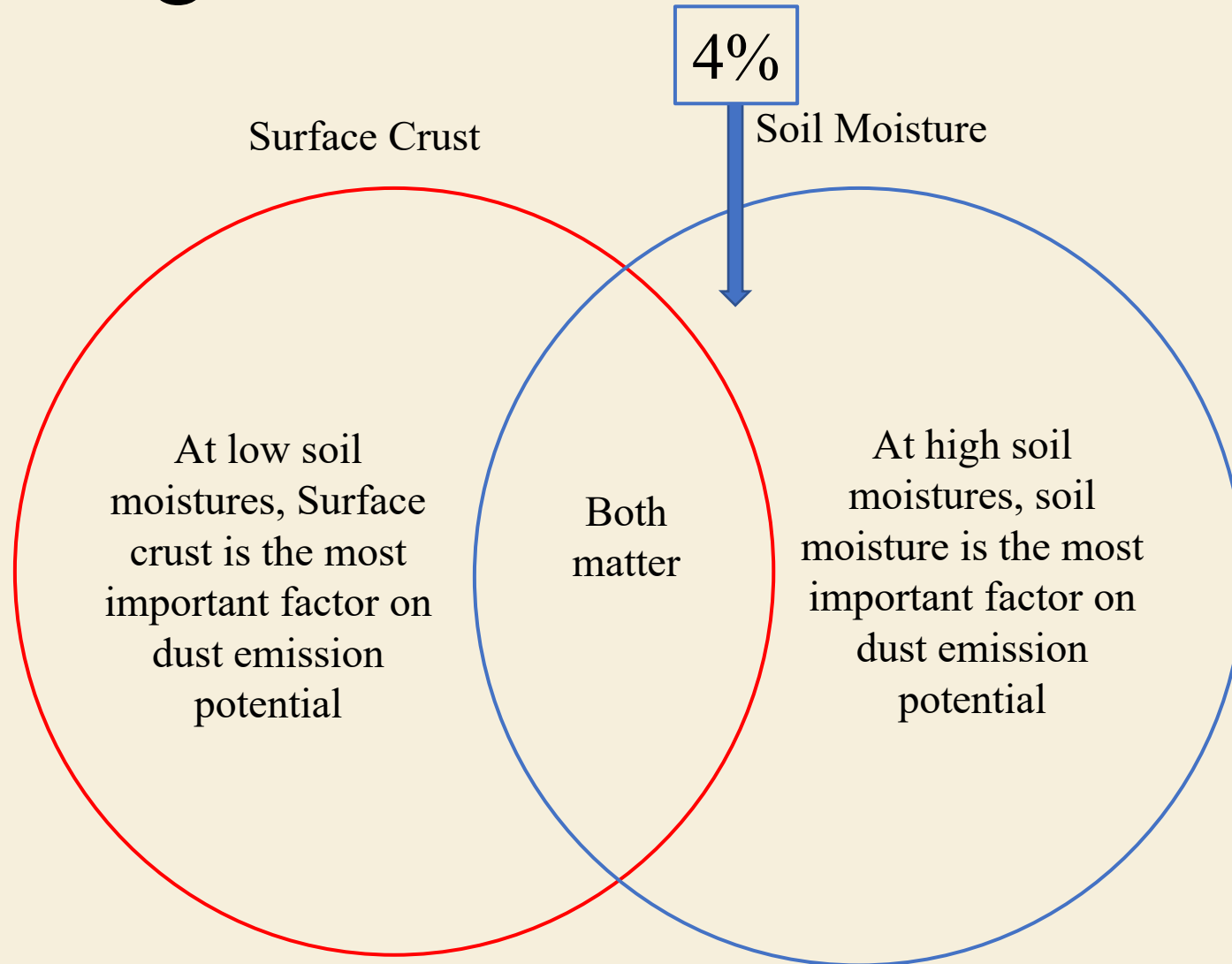
Rain days and Seiche



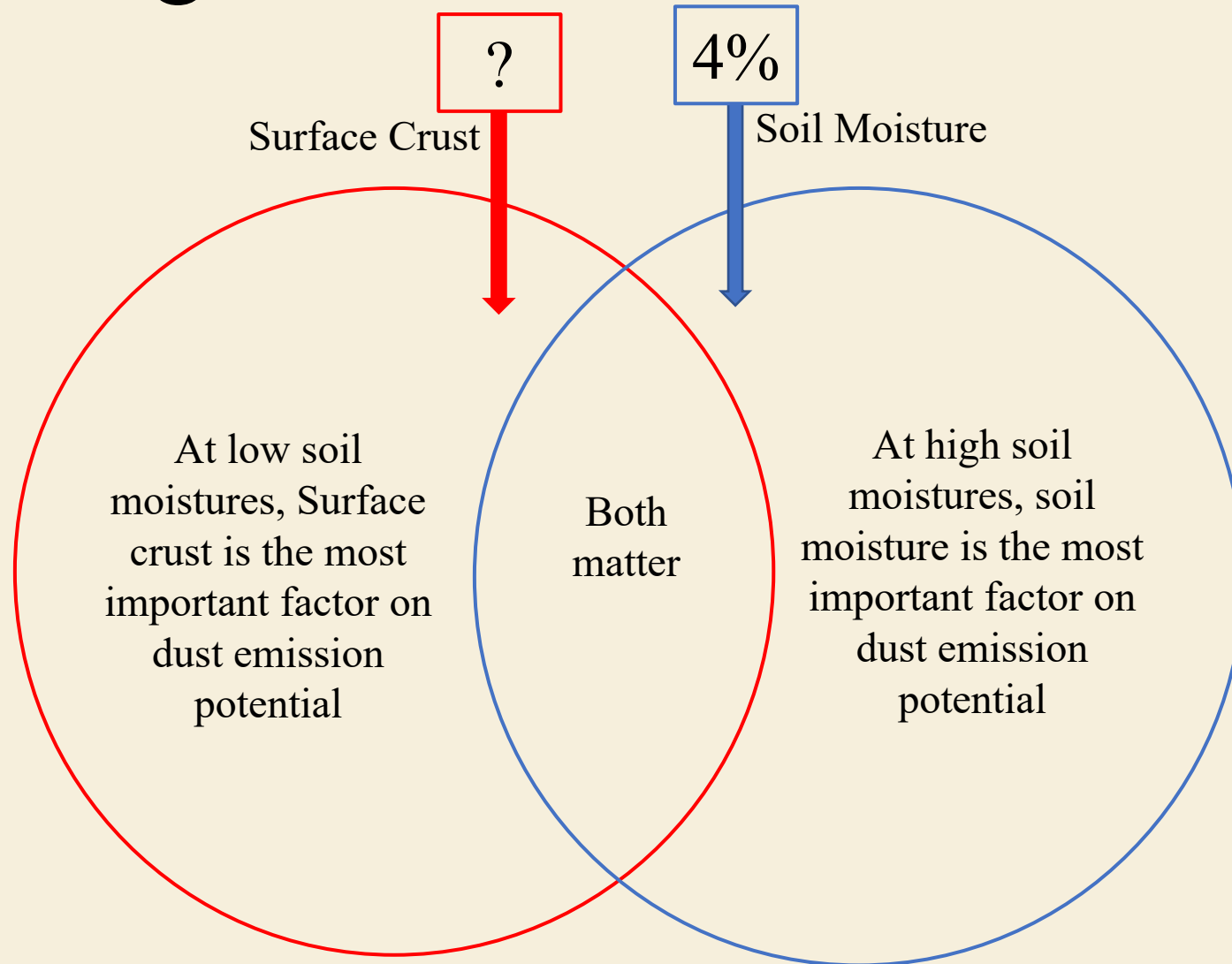
Key Findings: NM vs. AM



Key Findings: NM vs. AM



Key Findings: NM vs. AM



Acknowledgments:

Dr. Kevin Perry

Dr. Mark Sweeney

Dr. Sebastian Hoch

Dr. Derek Mallia



Questions?



Ramp test vs. Step Test:

