# Seven Anion Comparison

for the Center and West Hill Slope Systems in the Landscape Evolution Observatory (LEO) Project



Sarah C. Corrigan, Edward A. Hunt, Katerina M. Dontsova



# OVERVIEW L.E.O.

• The Landscape Evolution Observatory consists of three identical, sloping, 333 m<sup>2</sup> convergent landscapes inside a 5,000 m<sup>2</sup> environmentally controlled facility.

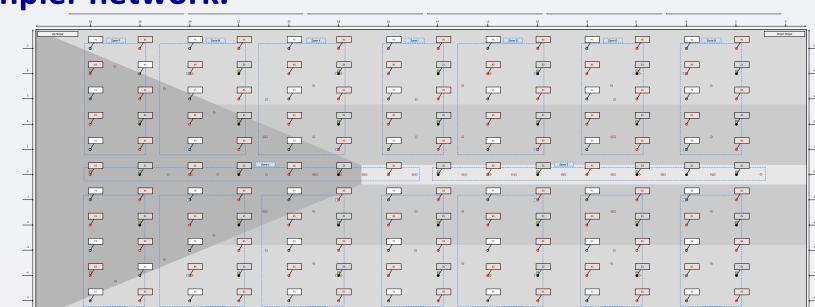
Images taken from: https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=s&ved=OCACQJRxqFQoTCNel34WMilccCFRZblaodflED8w&url=http%3a%2F%2Fwww.nkr.project&ei=bKjDVde\_N5a2cQT8go8YDw&bvm=bv.9980a247,d.cGURpsig=AFQ(CNHi7dh)wvTn-XRNE12io8zXkxy&wsis=1d38972389710696

Average slope = 10% Soil thickness = 1 m Total weight = 10% kg

Total weight = 10% kg

Figure 1.1

- These engineered landscapes contain 1 meter depth of 'soil' that will undergo physical, chemical, and mineralogical changes over many years.
- Currently the landscapes are being studied as 'bare soil.'
- During this time investigations will focus on
- hydrological processe
- > surface modification by rainsplash and overland flo
- hillslope-scale fluid transit times
- evolution of moisture state distribution
- > rates and patterns of geochemical weathering
- emergent non-vascular and microbial ecology
- > the development of carbon and energy cycles within the shallow subsurface.
- Each landscape contains a spatially dense sensor and sampler network.



These sensors were used to collect data for the concentrations of seven different anions, to be able to compare the West and Center slopes.

Information on the LEO project taken from the brochure at: https://criticalzone.org/images/national/associated-files/Jemez-Catalina/events/LEO\_brochure\_Rev1\_111912.p

## METHODS

Collected rainfall samples from designated collection points beneath the hill slope

Analyzed concentration of 7 anions present in water samples using Ion Chromatography

Used anion concentrations from West and Center slopes to compare and contrast comparable collection points

### RESULTS

Following are anion results collected for the west (RED) and center (BLUE) hill slopes. The x axis values are integers, which correspond to samples where sufficient anion comparisons could be made between slopes.

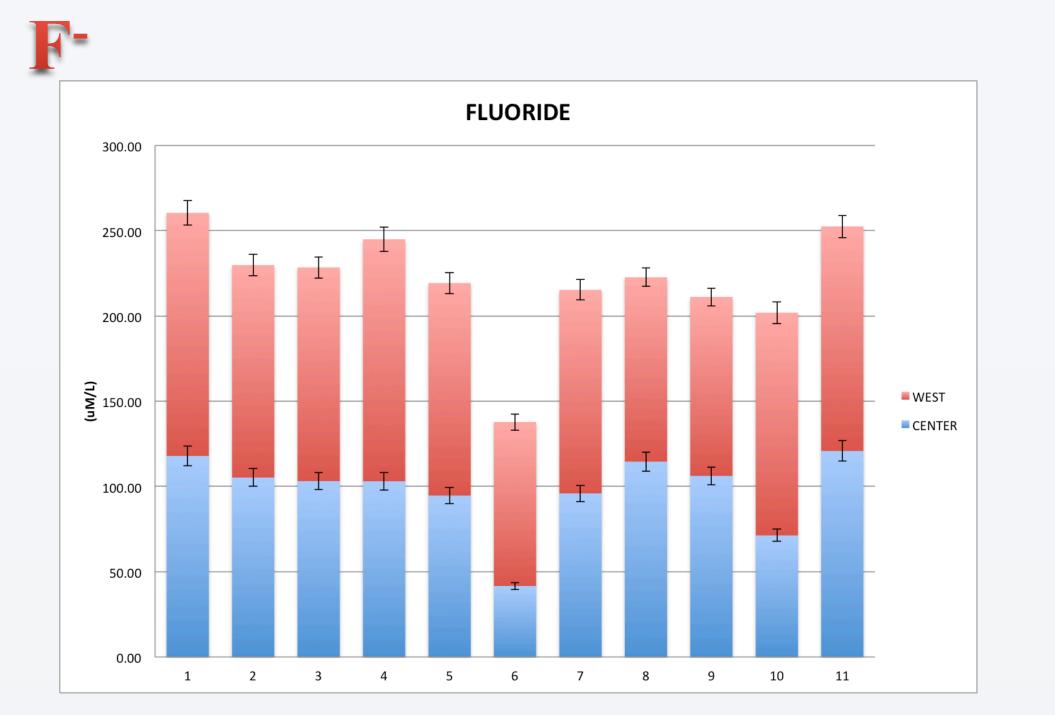
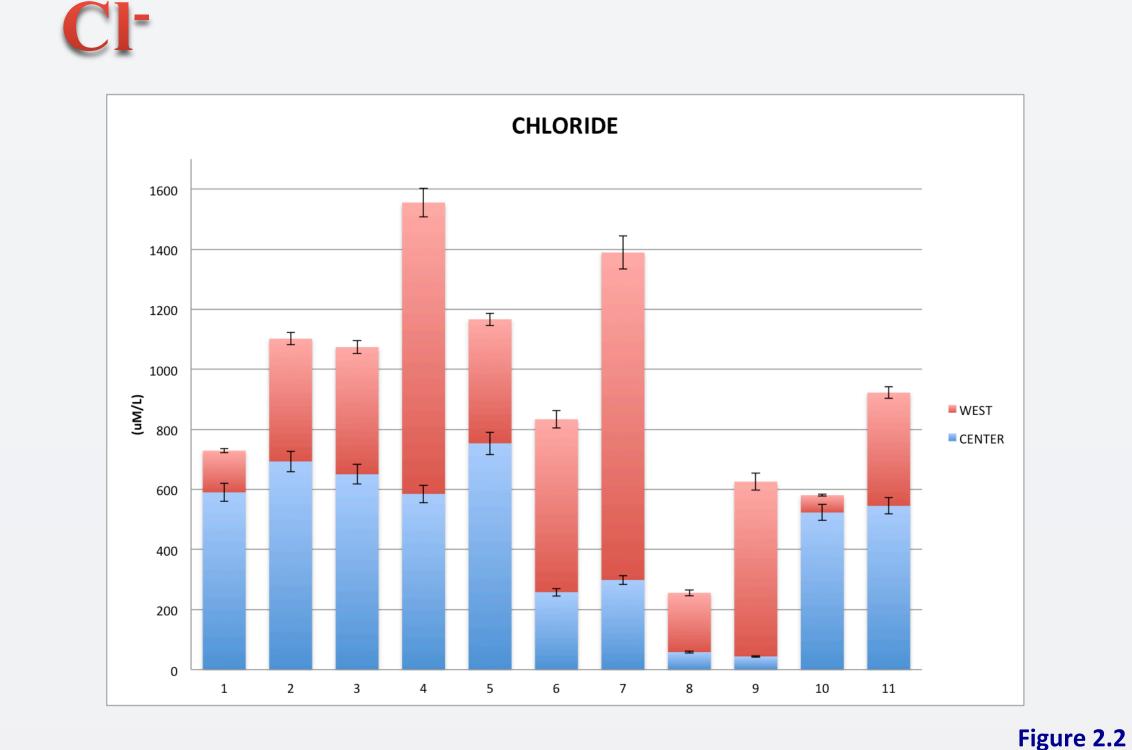


Figure 2.1



NO<sub>2</sub>
There was not enough Nitrite present in collected water samples for effective comparison of these anion concentrations.

There was not enough Bromide present in collected water samples for effective comparison of these anion concentrations.

NO3

NITRATE

SOO

400

100

NITRATE

WEST
CENTER

1 2 3 4 5 6 7 8

 $SO_4^{2-}$ 

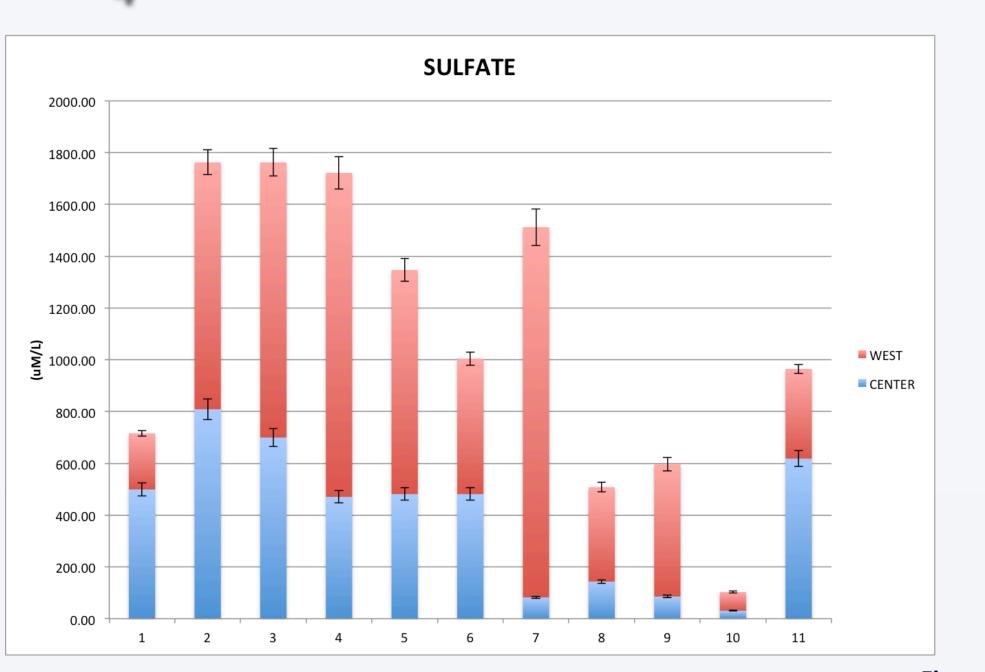


Figure 2.4



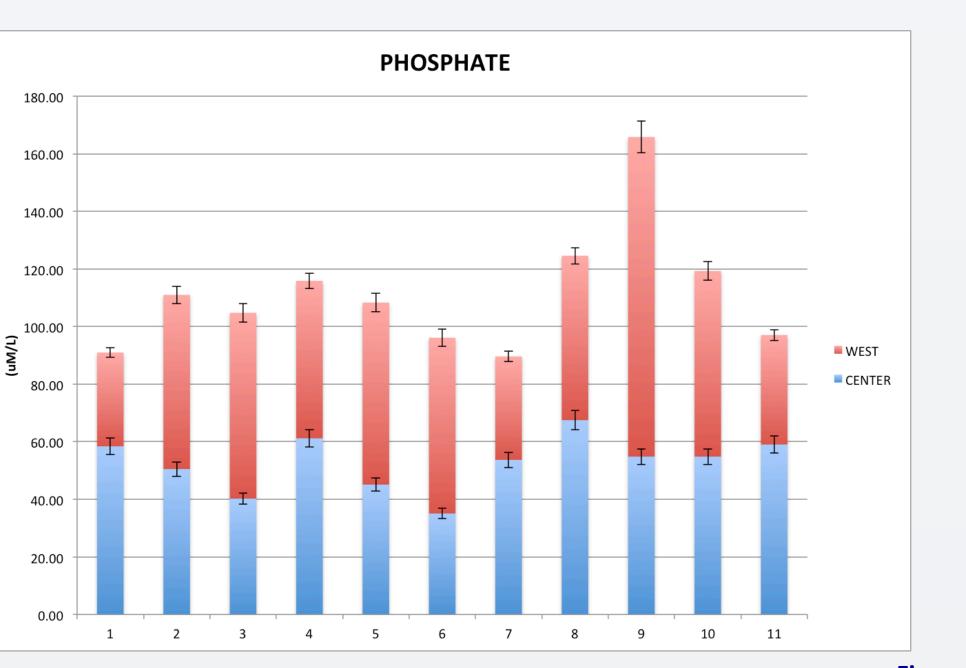


Figure 2.5

### CONCLUSIONS

- The concentrations of all compared anions are significantly different between the two slopes.
- The West slope consistently has higher anion concentrations, suggesting a more nutrient rich soil, as compared to the Center slope.
- This proves that though theoretically identical, all three hill slopes require complex chemical backgrounds first for further experimentation to be valid.
- These anion changes can continue to be tracked to assist in drawing conclusions in many other aspects of the LEO project.

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CAL POLY
SAN LUIS OBISPO

