**Unit 2.2 Biogeochemistry**

Goal: Use elemental chemistry data from a soil profile to explore major biogeochemical processes that dominate in critical zone.

Data will be provided to calculate and graph the mass transfer coefficients as a function of depth. Based on these plots, make generalized statements about how different elements behave in this soil profile and what processes dominate, e.g., depletion by rock-water interaction, addition by dust inputs or elemental loading by human activities etc. The data for this example are from Jin et al., 2010.

Jin, Lixin, et al. "Mineral weathering and elemental transport during hillslope evolution at the Susquehanna/Shale Hills Critical Zone Observatory." Geochimica et Cosmochimica Acta 74.13 (2010): 3669-3691.

1. Calculate tau values for all elements using the data provided.
2. Plot tau vs. depth profiles for each element.
3. Based on these plots, make generalized statements about how different elements behave in the soil profile and what processes dominate for different elements. For example, profiles could provide evidence of depletion by rock-water interaction, addition by dust inputs, elemental loading by human activities, etc.

In your 5 - 10 minute group presentation, include the following elements:

* What is the main idea?
* How does this method work?
* What kind of results were obtained using this method?
* How is the data analyzed? Where should it be used? Over what timescales is it useful?
* What are its advantages and disadvantages?
* What are the limitations to this method of analysis?
* How is this relevant to the Critical Zone?