

# The Effects of Vegetation and Depth on the Soil Geochemistry Above Titan Cave in Wyoming

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## Supporting Information

The leachate solution was created from approximately 3.3 grams of each soil sample. Forty milliliters of ammonium acetate solution was added and allowed to sit at room temperature overnight. The samples were then shaken vigorously for 15 minutes, centrifuged for 10 minutes at 3,000 rpm, and decanted. Each decanted sample underwent the following process three times: addition of 30mL of ammonium acetate, 1m vigorous shaking, centrifugation, and decanting, resulting in 130mL of leachate solution. Samples were dried and redissolved in 20 mL of 3% nitric acid solution. Finally, a small sample from each tube was diluted at a ratio of 1:50 with 3% nitric acid to obtain a concentration that a mass spectrometer could analyze.



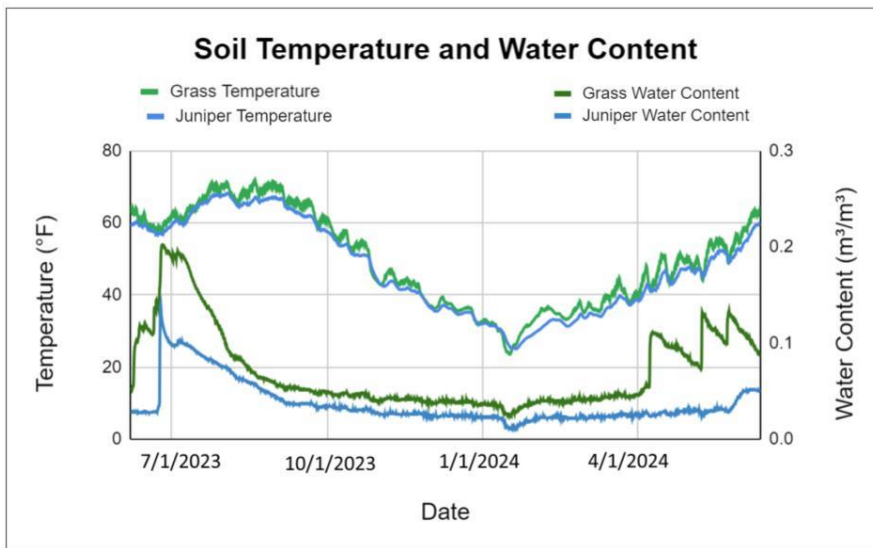
**Figure S1.** Depicts a Google Earth map of the approximate locations for grass and juniper sites as well as the entrance to the cave in June, 2024. The red box shows the approximate area of a controlled burn carried out in November, 2024.



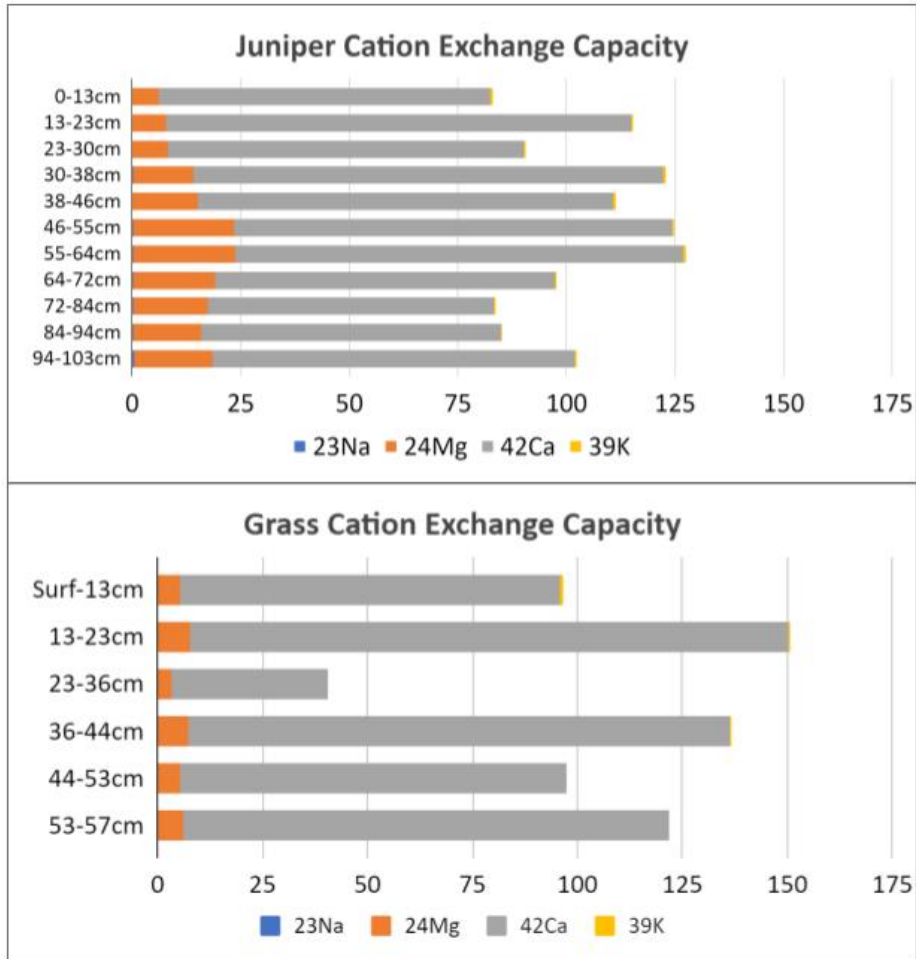
**Figure S2.** Collection of soil core samples at the juniper site using a bucket auger.



**Figure S3.** Temperature and moisture logger at the juniper site.



**Figure S4.** Temperature (top two lines) and water content (bottom two lines) for grass (green) and juniper (blue) collection sites.



**Figure S5.** Cation exchange capacity (CEC) at both juniper (a) and grass (b) collection sites. These graphs indicate the relative amounts of various cations at various depths.

Date	Sample	$\delta^{13}\text{C}$ in ‰ VPDB (mean +/- std. dev.)	$^{14}\text{C}$ Age (mean +/- std. dev.)	$\text{CO}_2$ Conc. (ppmv)
June 2024	Juniper Shallow	-16.86 +/- 0.21	-123 +/- 14	3116
	Juniper Deep	-17.81 +/- 0.10	-208 +/- 14	3896
	Grass Shallow	-17.98 +/- 0.12	32 +/- 14	2660
	Grass Deep	-18.31 +/- 0.12	97 +/- 15	3298
October 2023	Juniper Shallow	-18.24 +/- 0.14		
	Juniper Deep	-17.94 +/- 0.12		
	Grass Shallow	-16.92 +/- 0.24		
	Grass Deep	-16.23 +/- 0.36		

**Table S6.** Carbon concentration chart of soil samples at juniper (blue) and grass (green) sites each with shallow and deep samples.  $\delta^{13}\text{C}$  in ‰ VPDB presents the present ratio of carbon isotopes relative to the VPDB standard for samples from June of 2024 and October of 2023.  $^{14}\text{C}$  Age shows the results of radiocarbon analysis in years after 1950 for samples from June of 2024. Finally,  $\text{CO}_2$  Conc. is the concentration of carbon in parts per million by volume for samples from June of 2024.