



# Building a useful (and persistently-identified) digital crust

Daven P. Quinn, UW–Madison Department of Geoscience

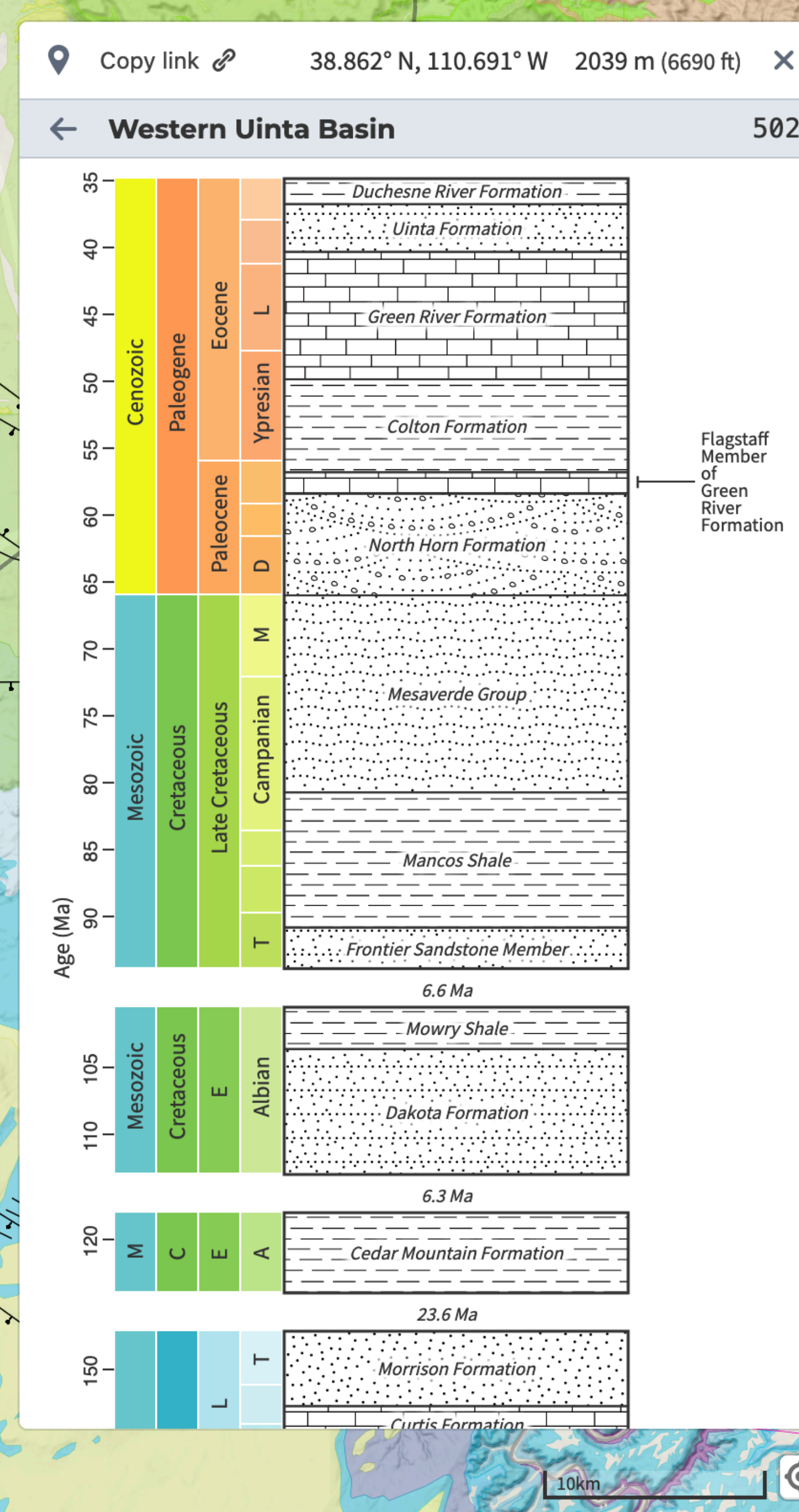
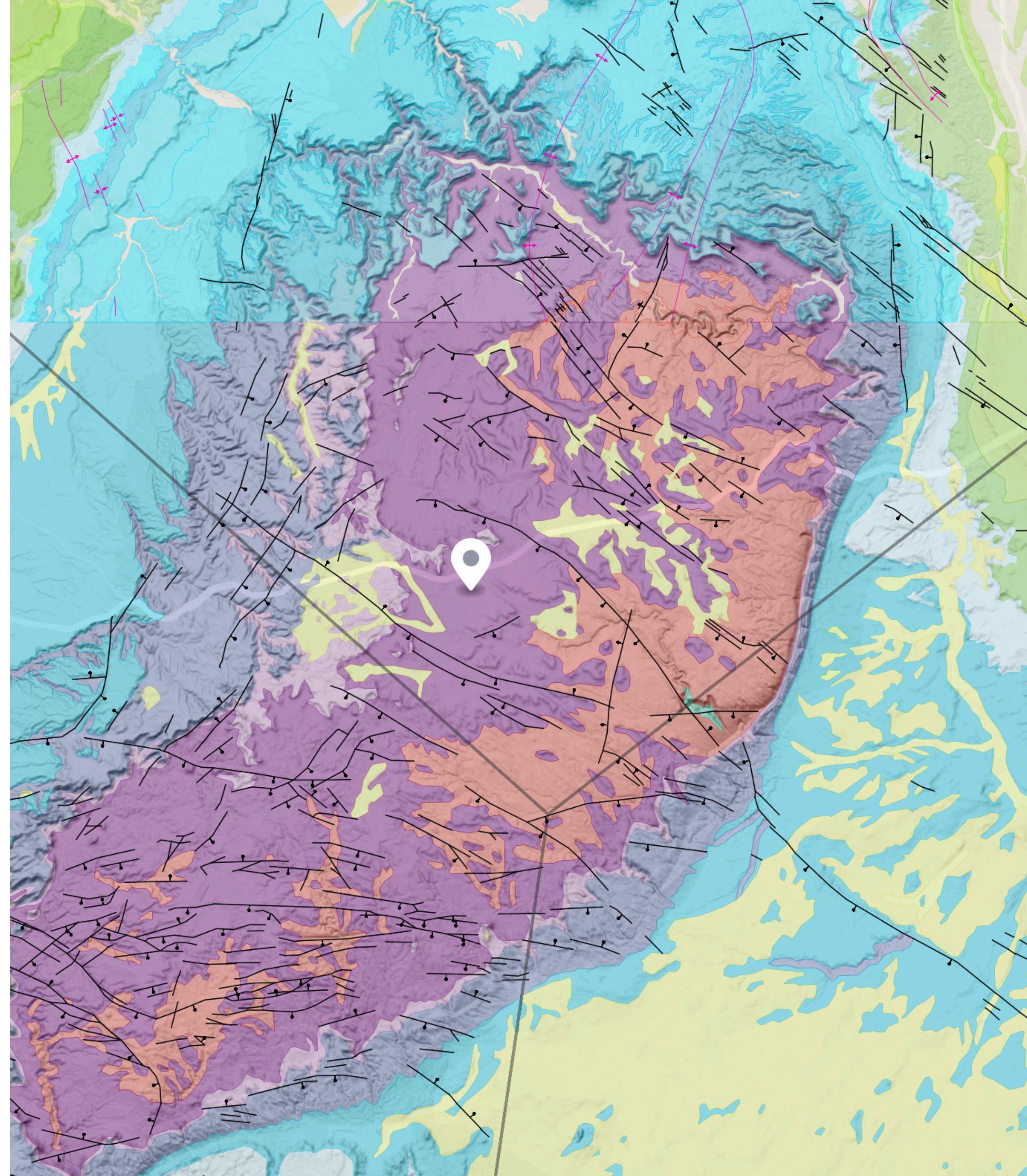
<https://macrostrat.org/map>

FAIROS PIDs workshop, UC–Boulder, September 2023



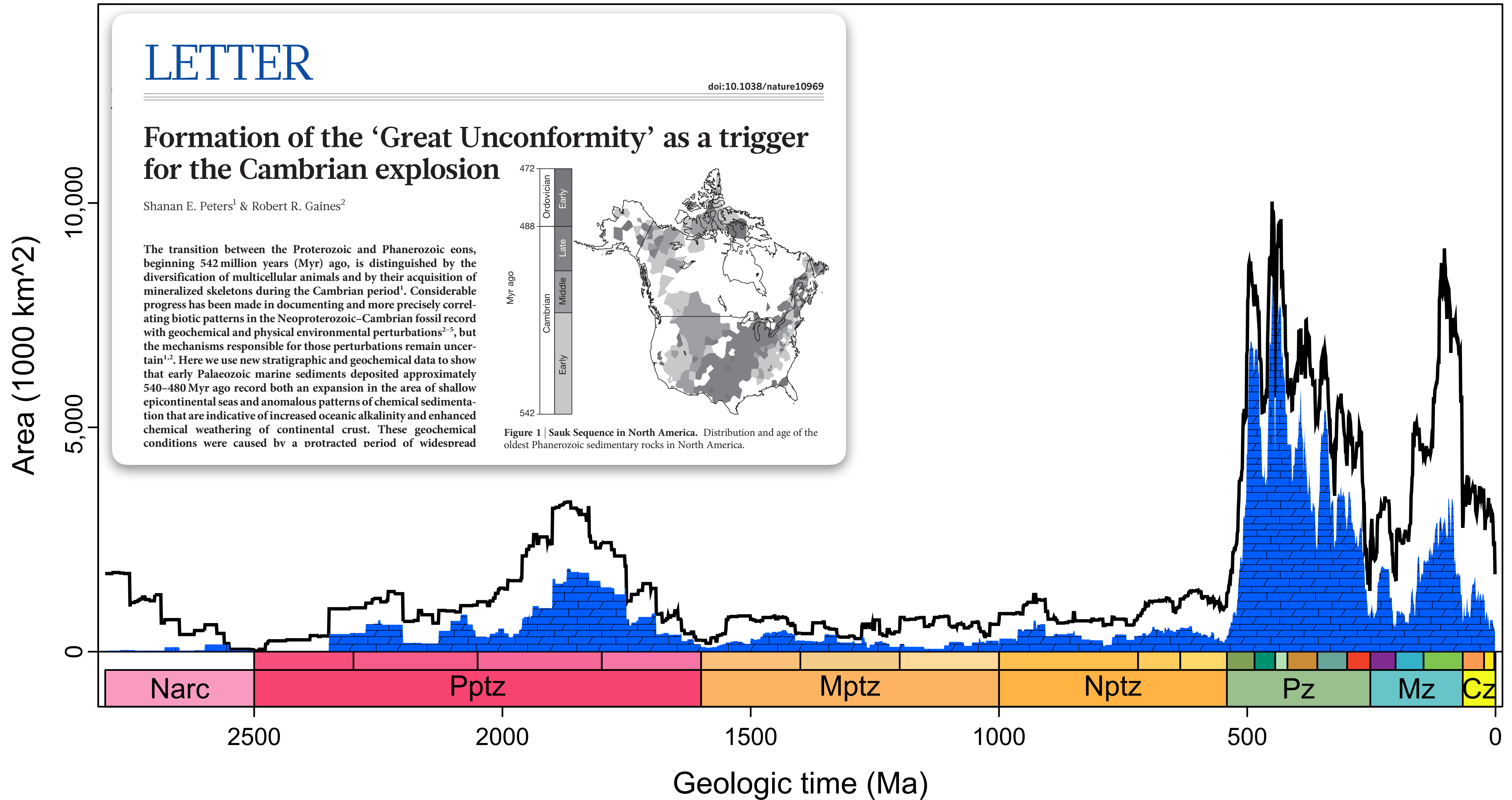
# MACROSTRAT

A quantitative, descriptive data system for geological information



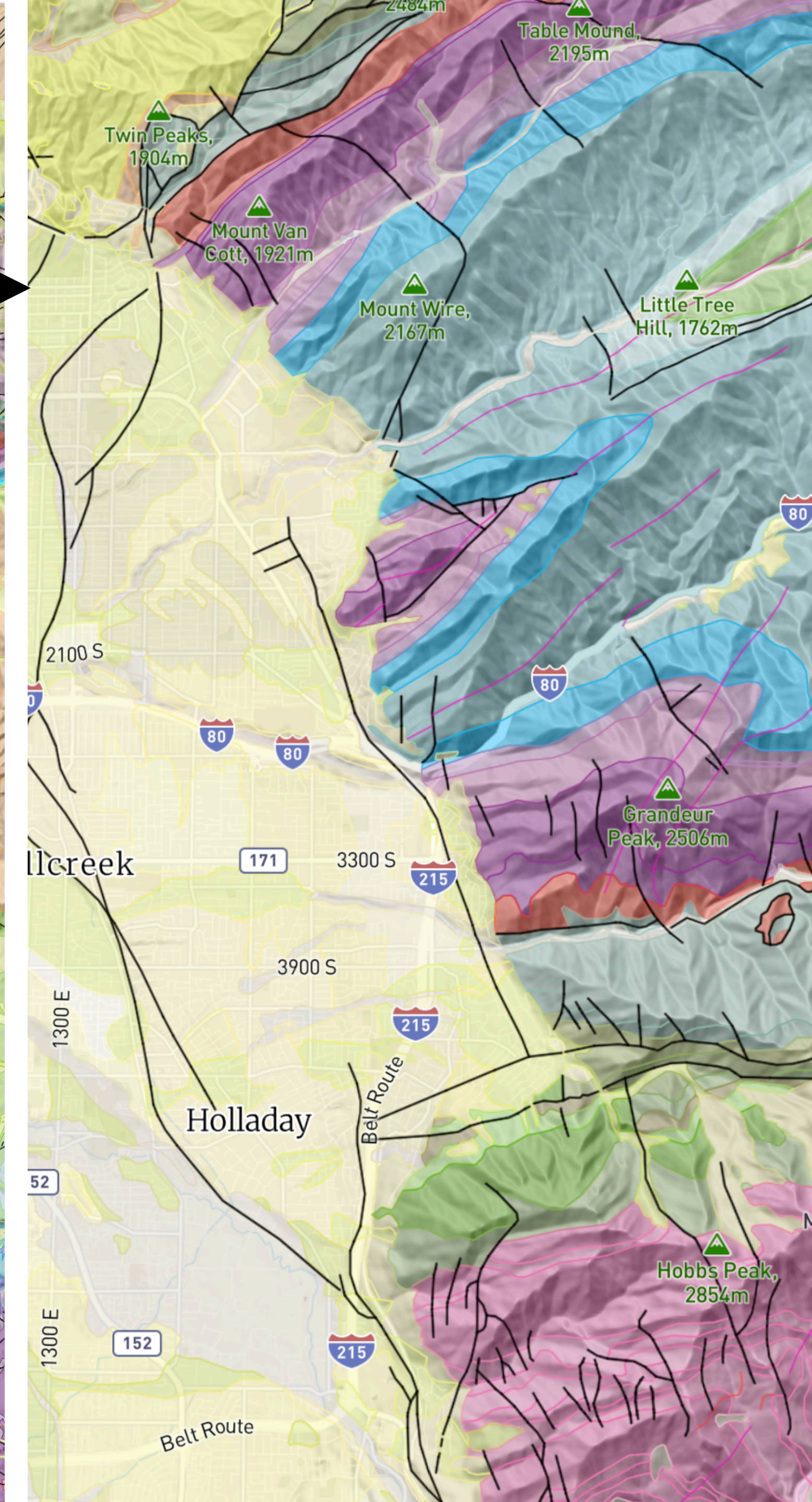
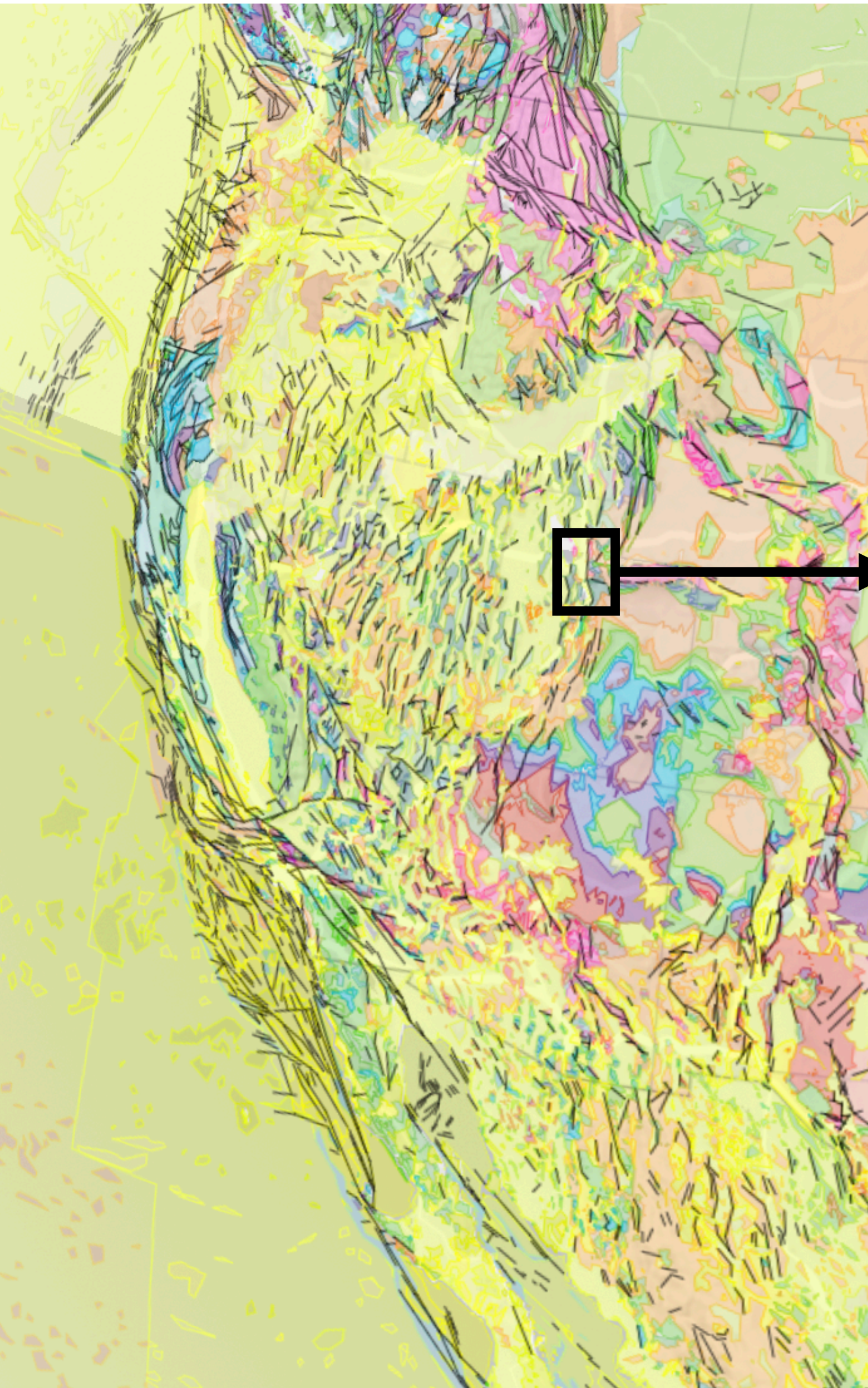


# Shallow-marine sedimentary rock area through geologic time





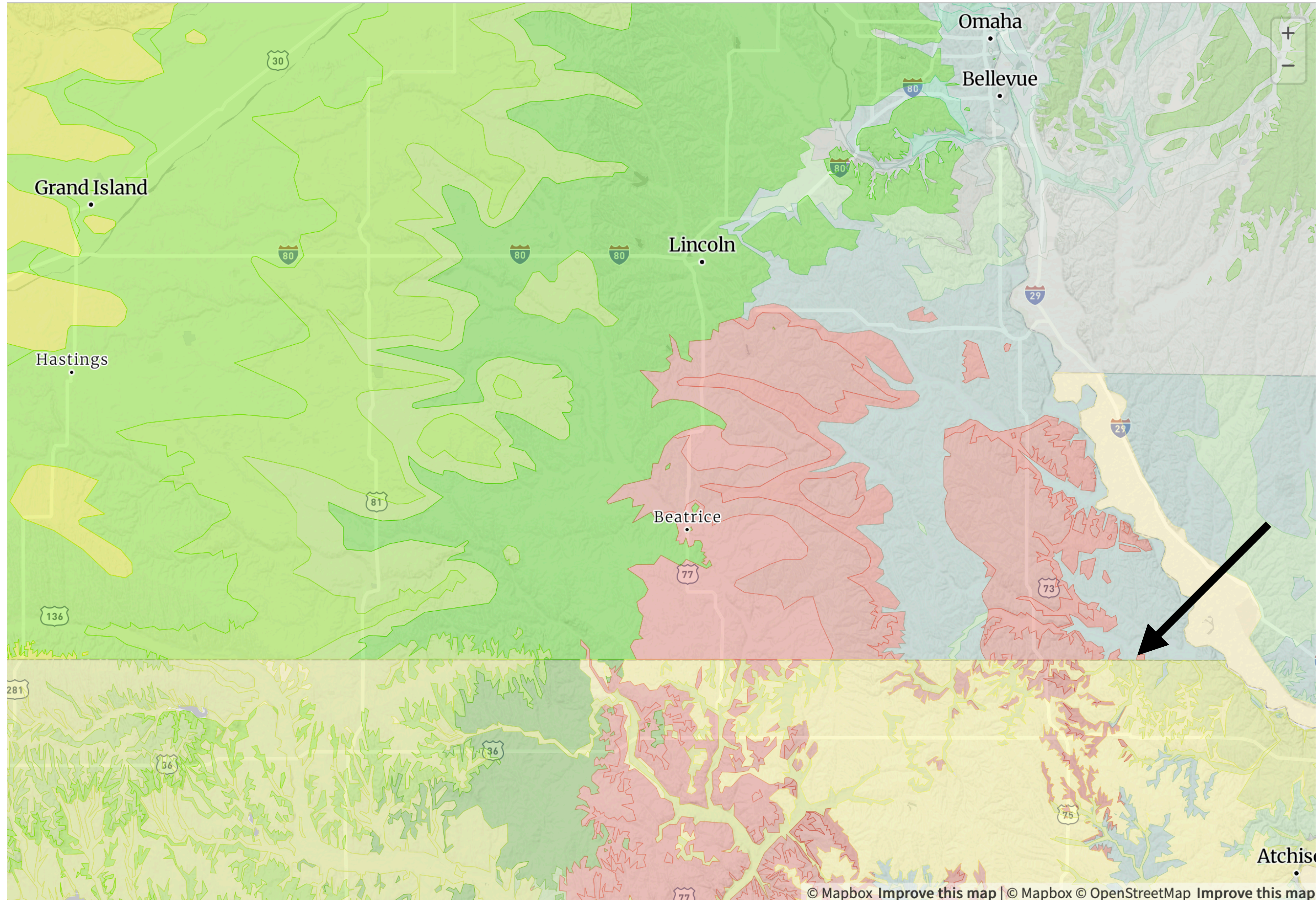
# MACROSTRAT'S GEOLOGIC MAP



<https://macrostrat.org/map>



# Macrostrat's geologic map punts on hard problems!



- **NOT seamless map units**
- Source boundaries are often quite apparent

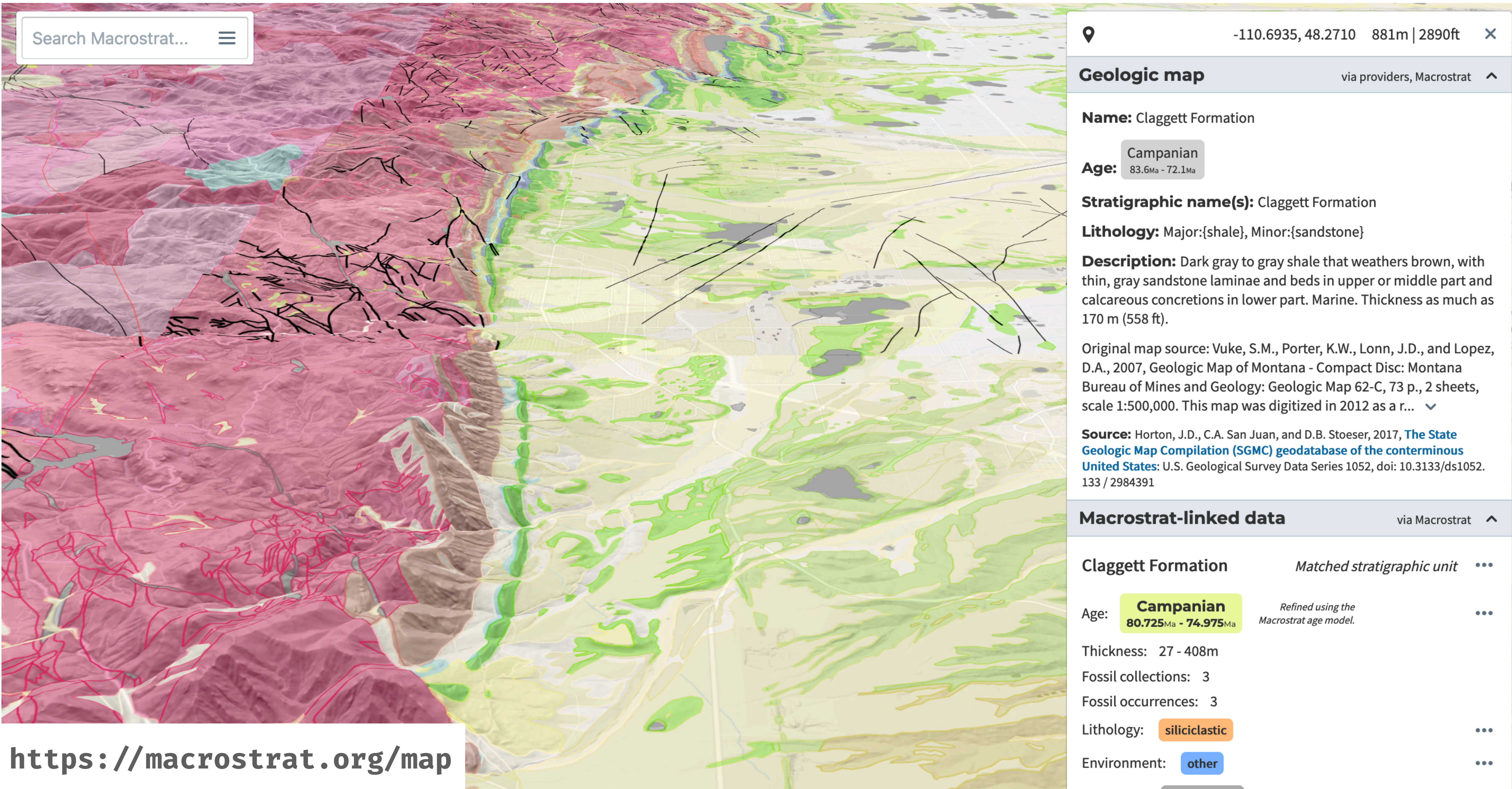
Not a single map...a best-effort harmonization across many maps with a variety of core assumptions

This is controversial among data curators!



# Macrostrat – A platform for geological exploration

Web interface



Search Macrostrat... ☰

📍 -110.6935, 48.2710 881m | 2890ft ✕

### Geologic map

via providers, Macrostrat ^

**Name:** Claggett Formation

**Age:** Campanian  
83.6Ma - 72.1Ma

**Stratigraphic name(s):** Claggett Formation

**Lithology:** Major:{shale}, Minor:{sandstone}

**Description:** Dark gray to gray shale that weathers brown, with thin, gray sandstone laminae and beds in upper or middle part and calcareous concretions in lower part. Marine. Thickness as much as 170 m (558 ft).

Original map source: Vuke, S.M., Porter, K.W., Lonn, J.D., and Lopez, D.A., 2007, Geologic Map of Montana - Compact Disc: Montana Bureau of Mines and Geology: Geologic Map 62-C, 73 p., 2 sheets, scale 1:500,000. This map was digitized in 2012 as a r... ▾

**Source:** Horton, J.D., C.A. San Juan, and D.B. Stoesser, 2017, [The State Geologic Map Compilation \(SGMC\) geodatabase of the conterminous United States](#): U.S. Geological Survey Data Series 1052, doi: 10.3133/ds1052.133 / 2984391

### Macrostrat-linked data

via Macrostrat ^

**Claggett Formation** *Matched stratigraphic unit* ⋮

Age: **Campanian**  
80.725Ma - 74.975Ma *Refined using the Macrostrat age model.* ⋮

Thickness: 27 - 408m

Fossil collections: 3

Fossil occurrences: 3

Lithology: **siliciclastic** ⋮

Environment: **other** ⋮

<https://macrostrat.org/map>





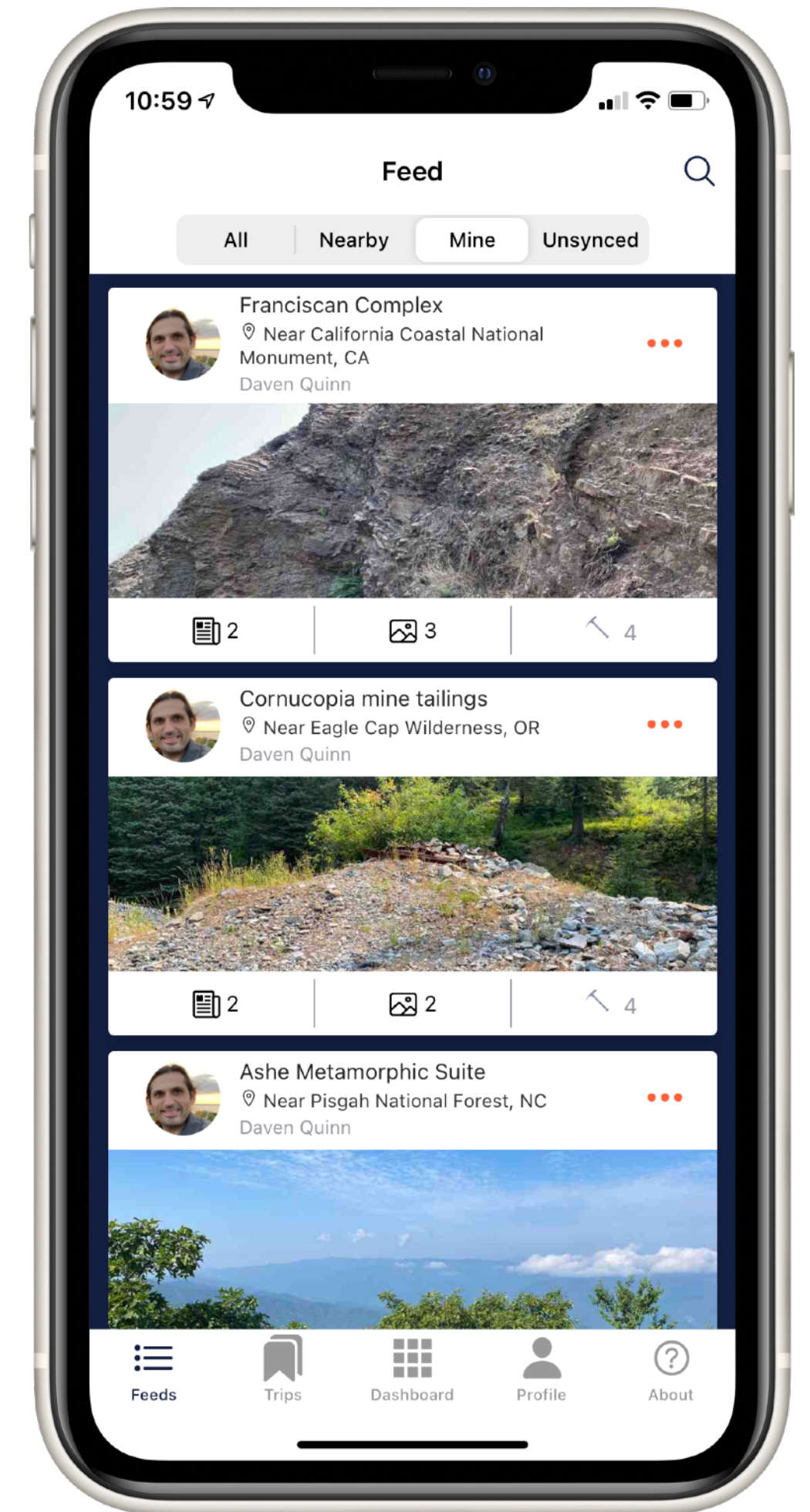
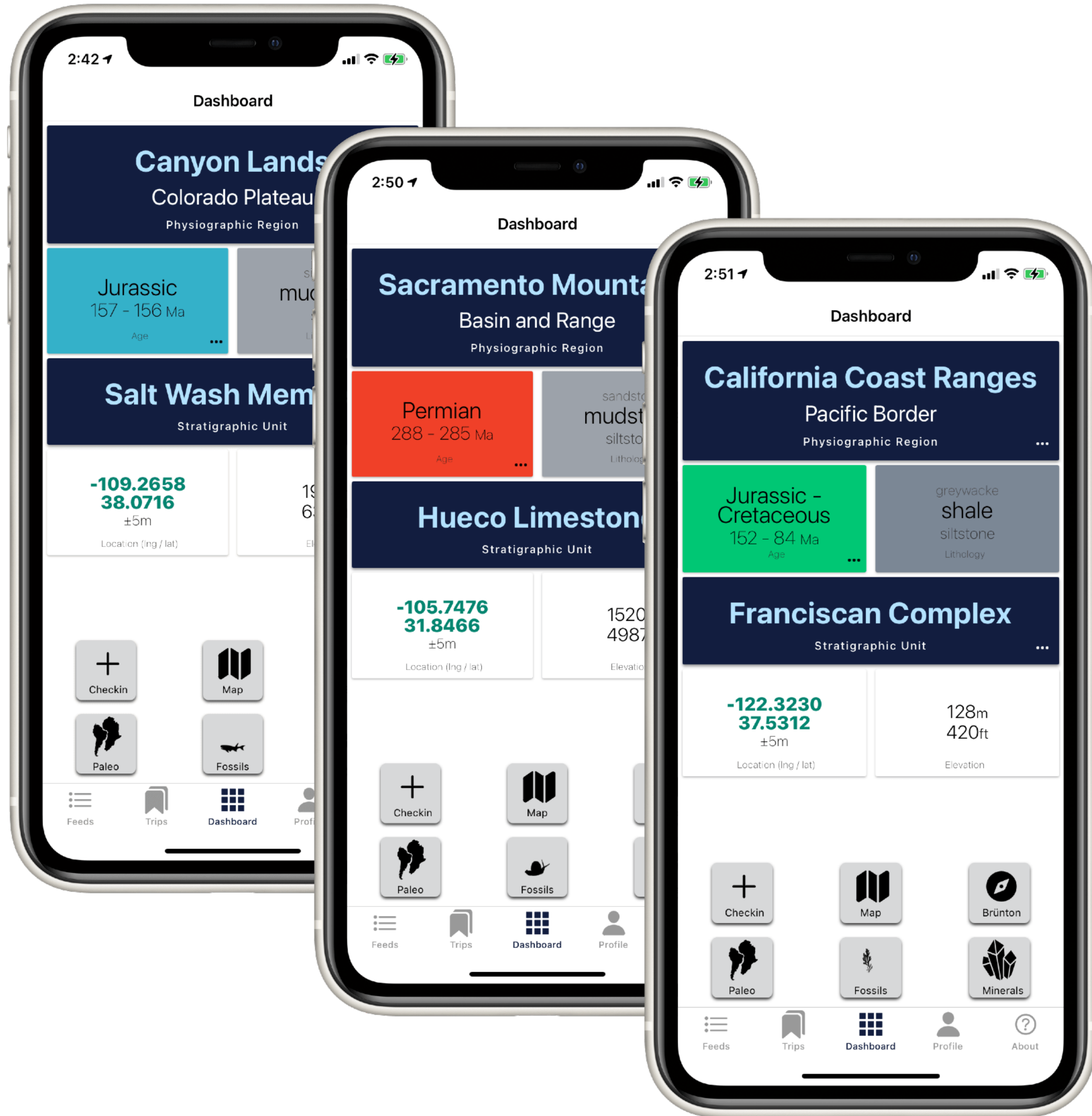
# Rockd

<https://rockd.org>

*Understand your geological surroundings*

*Explore Macrostrat's map*

*View and contribute local observations*







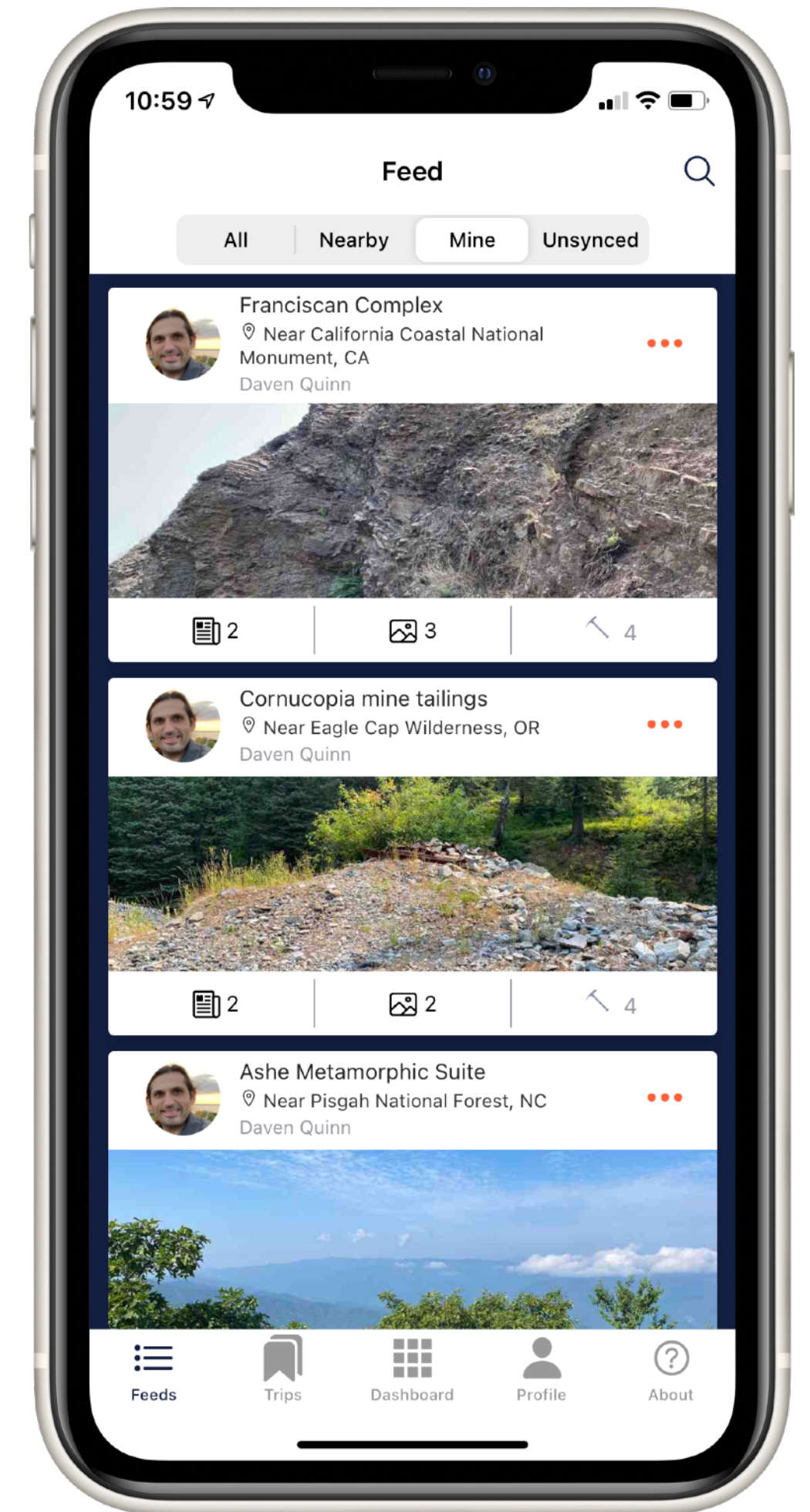
# Rockd

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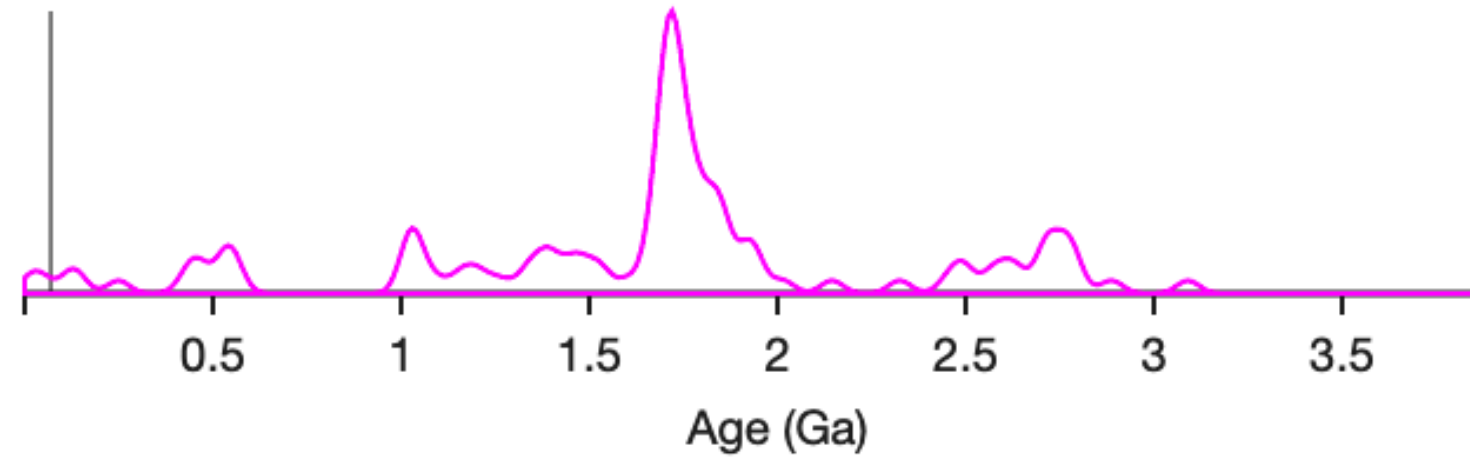




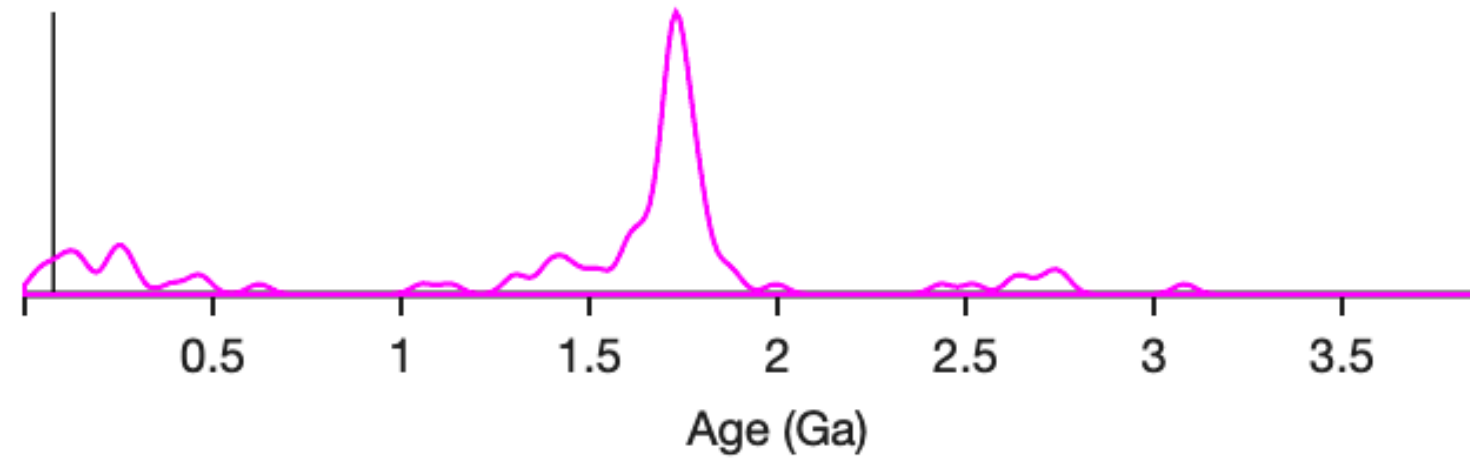
# GETTING MORE GEOLOGICAL INFORMATION INTO THIS FRAMEWORK

## Detrital-zircon geochronology

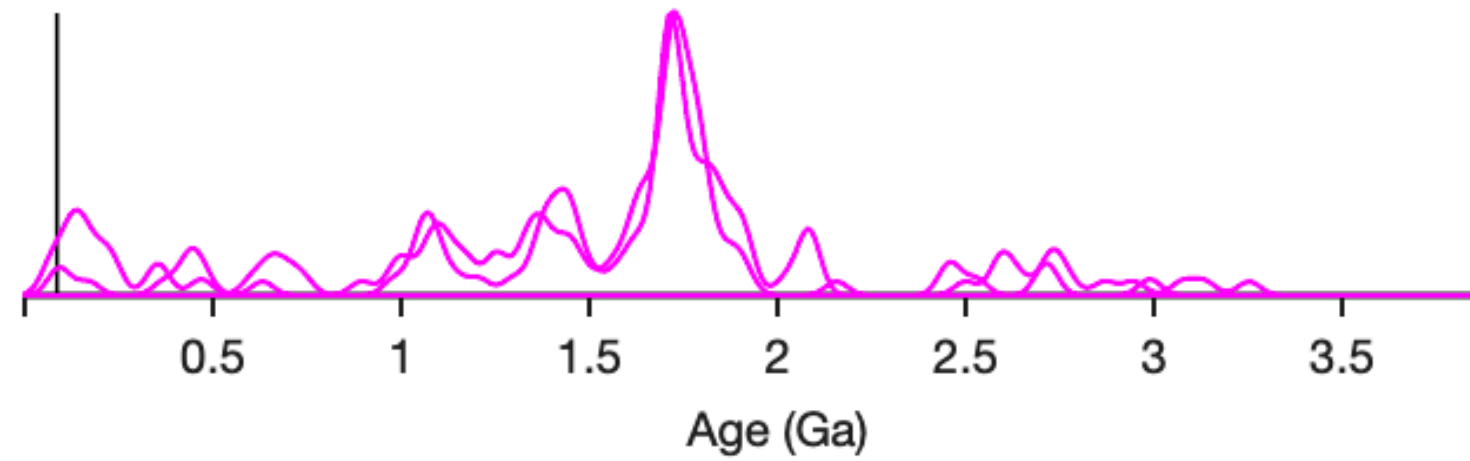
### Lance Formation



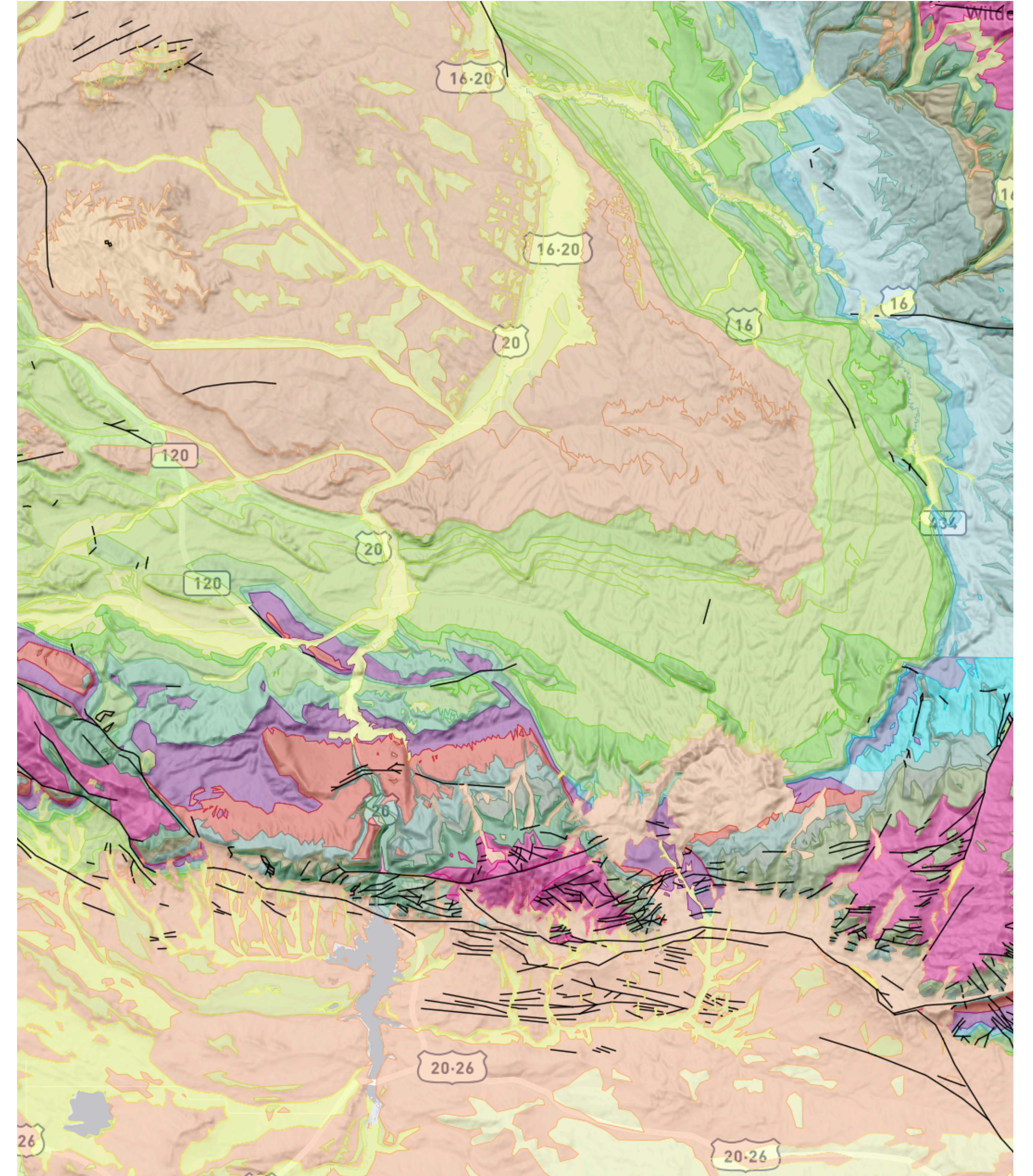
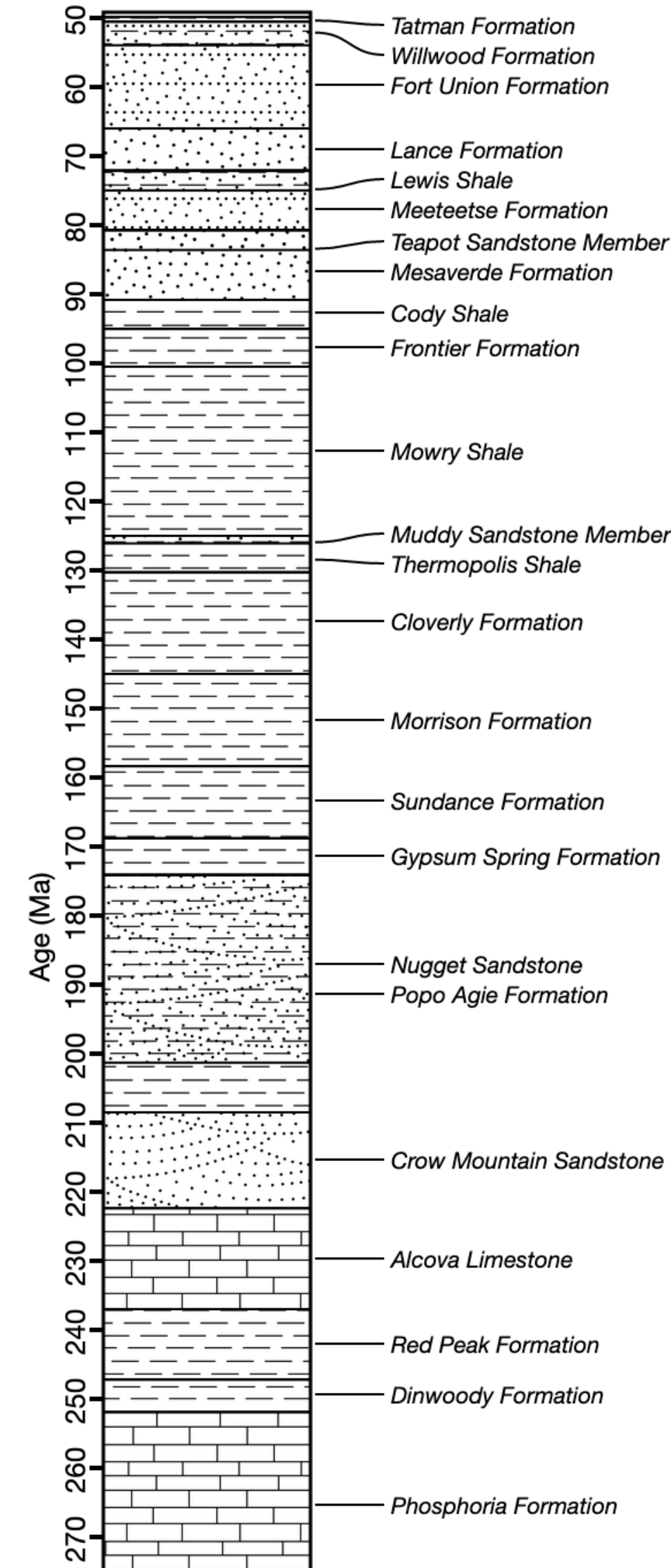
### Meeteetse Formation



### Mesaverde Formation



## Bighorn Basin

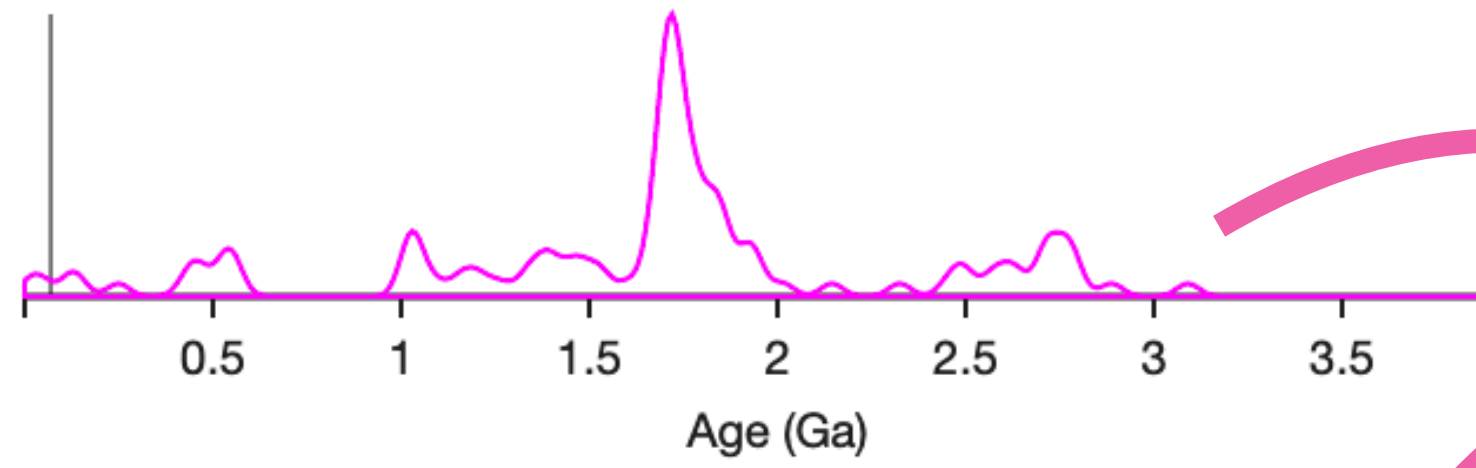




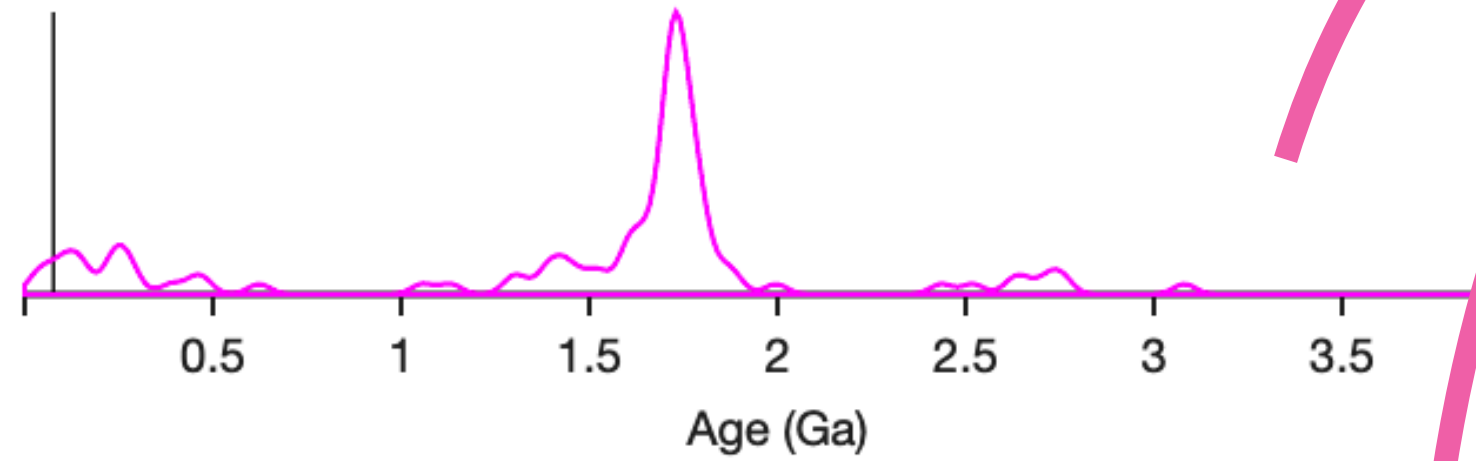
# GETTING MORE GEOLOGICAL INFORMATION INTO THIS FRAMEWORK

## Detrital-zircon geochronology

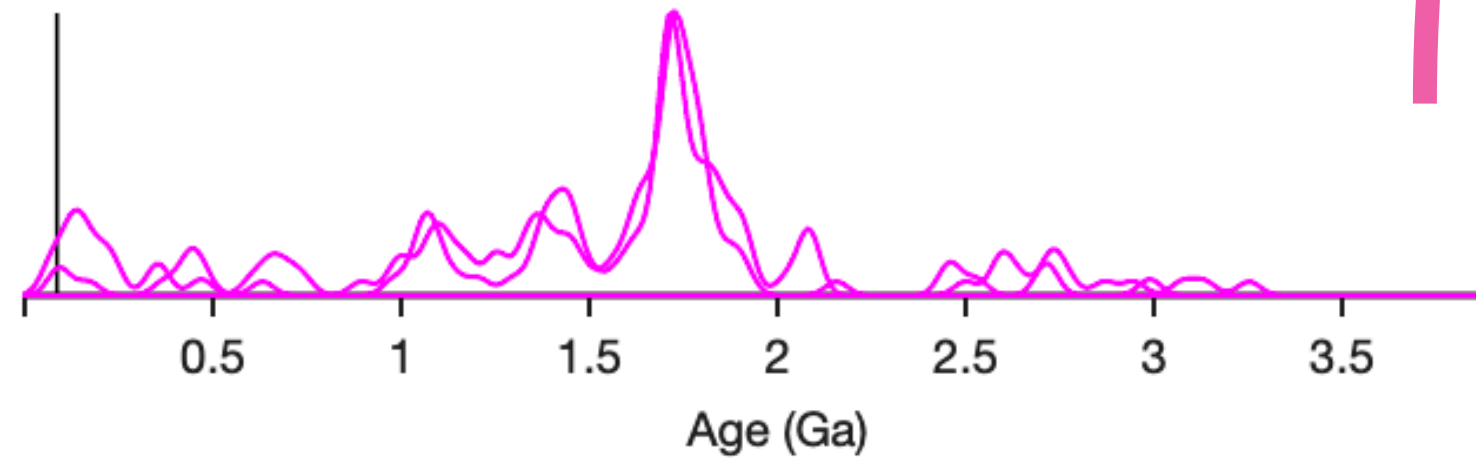
### Lance Formation



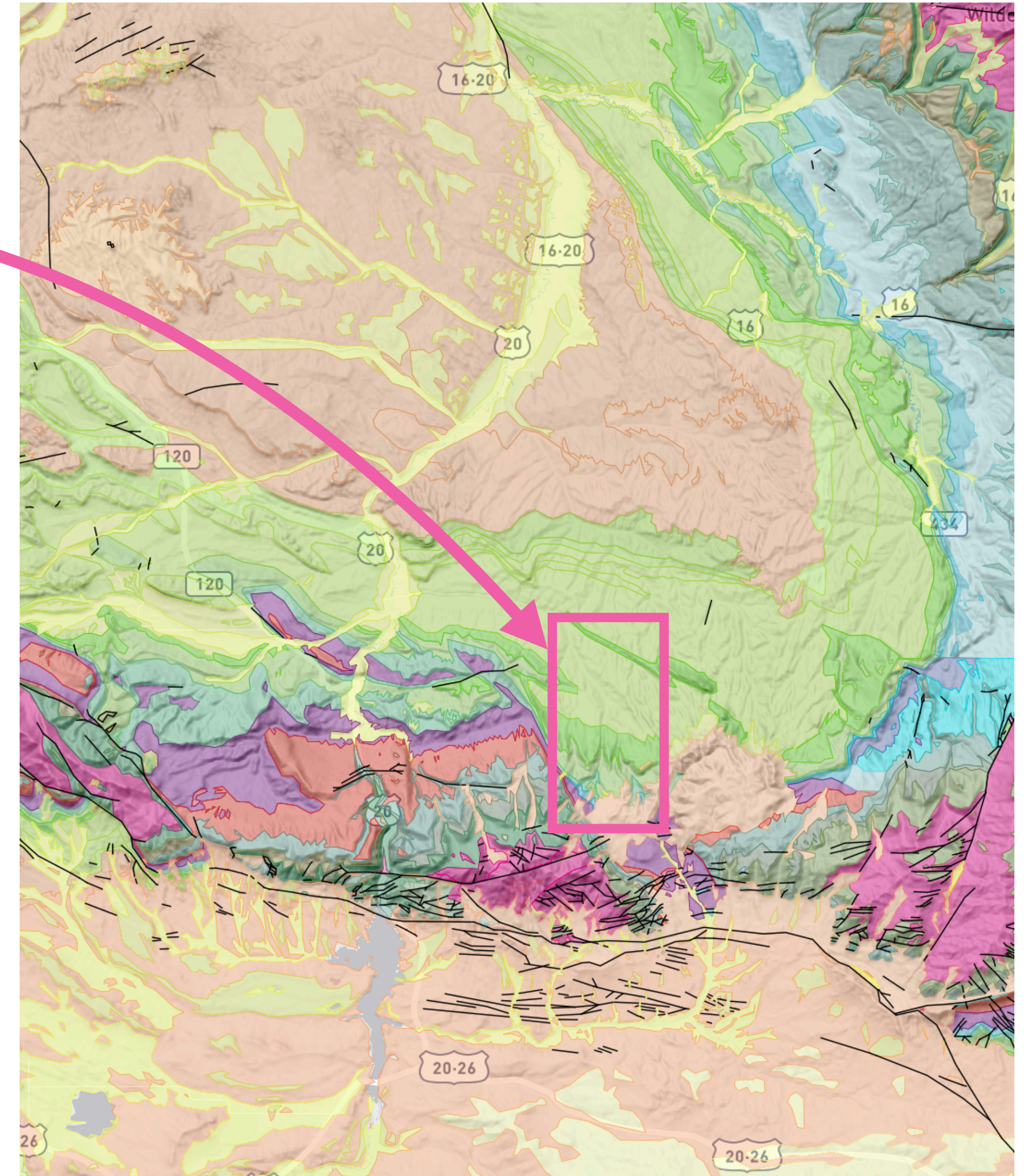
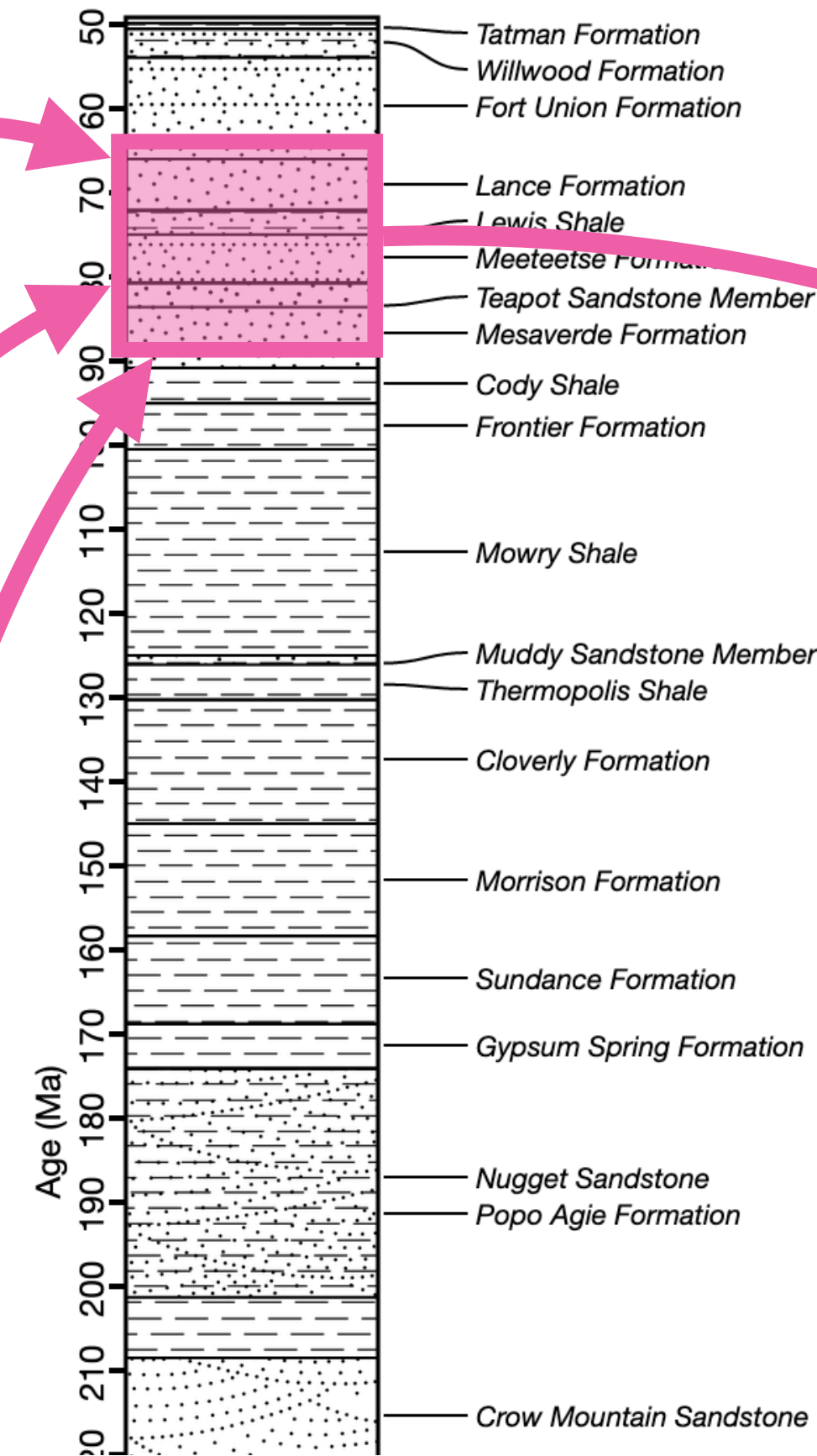
### Meeteetse Formation



### Mesaverde Formation



## Bighorn Basin



- Geologic unit name forms a “primary key” that defines the relationship!
- Of course, labs often don’t track this data 😞



# SOLUTION: METADATA TRACKING!

Need for good metadata is recognized in geoscience

USGS has a metadata mandate, supported by workflows, data curation staff, and tools



## DATA MANAGEMENT

# Describe (Metadata/Documentation)

By [Data Management](#)

Throughout the data lifecycle process, documentation must be updated to reflect actions taken upon the data. This includes acquisition, processing, and analysis, but may touch upon any stage of the lifecycle. Updated and complete metadata are critical to maintaining data quality.

*Exhortative explainer for agency staff*

Description	Minimum	Maximum	Units
Chemical analyses of stream sediment samples		40.98	degree
Longitude coordinates of sample site reported in decimal degrees	-106.64	-104.07	degree
Concentration of aluminum in a stream sediment sample	0.00	9.3	mass percent dry weight
Concentration of calcium in a stream sediment sample	0.01	10	mass percent dry weight
Concentration of iron in a stream sediment sample	0.02	50	mass percent dry weight
Concentration of potassium in a stream sediment sample	0.01	4.3	mass percent dry weight
Concentration of magnesium in a stream sediment sample	0.01	4.6	mass percent dry weight
Concentration of sodium in a stream sediment sample	0.01	3.6	mass percent dry weight
Concentration of phosphorus in a stream sediment sample	-0.01	0.61	mass percent dry weight
Concentration of titanium in a stream sediment sample	0	5.2	mass percent dry weight
Concentration of silver in a stream sediment sample	-2	75	part per million
Concentration of arsenic in a stream sediment sample	-30	324	part per million
Concentration of barium in a stream sediment sample	18	12000	part per million
Concentration of beryllium in a stream sediment sample	-1	18	part per million
Concentration of cadmium in a stream sediment sample	-2	106	part per million
Concentration of cerium in a stream sediment sample	-4	450	part per million
Concentration of cobalt in a stream sediment sample	-2	120	part per million
Concentration of chromium in a stream sediment sample	-2	320	part per million
Concentration of copper in a stream sediment sample	-2	7270	part per million
Concentration of europium in a stream sediment sample	-2	19.6	part per million
Concentration of gallium in a stream sediment sample	-999	42	part per million
Concentration of lanthanum in a stream sediment sample	-2	2140	part per million
Concentration of lithium in a stream sediment sample	-2	69	part per million
Concentration of manganese in a stream sediment sample	6	36200	part per million
Concentration of molybdenum in a stream sediment sample	-2	144	part per million

```
1 Metadata:
2 Entity_and_Attribute_Information:
3   Detailed_Description:
4     Entity_Type:
5       Entity_Type_Label: Sed_Stats
6       Entity_Type_Definition: Chemical analyses of stream sediment samples
7     Attribute:
8       Attribute_Label: Latitude
9       Attribute_Definition: Latitude coordinates of sample site reported
10      Attribute_Domain_Values:
11        Range_Domain:
12          Range_Domain_Minimum: 37.73471
13          Range_Domain_Maximum: 40.97751
14        Attribute_Units_of_Measure: degree
15      Attribute:
16        Attribute_Label: Longitude
17        Attribute_Definition: Longitude coordinates of sample site reported
18        Attribute_Domain_Values:
19          Range_Domain:
20            Range_Domain_Minimum: -106.63615
21            Range_Domain_Maximum: -104.06801
22          Attribute_Units_of_Measure: degree
```

*Vocabulary management interface*

The screenshot shows the 'Metadata Wizard' interface with tabs for Identification, Data Quality, Spatial, Entity and Attribute, Distribution, and Metadata Reference. The 'Identification' tab is active, showing fields for Dataset Title, Dataset Author/Originator, and Originator. A dialog box titled 'FGDC Validation Errors' is open, listing numerous errors such as 'The value for 'origin' cannot be empty', 'Element 'pubdate' is not a valid value of the union type 'pubdateType'', and 'The value for 'abstract' cannot be empty'.

*Scary (and required) metadata wizard*



# Academic labs live in a world of Excel

try	Mineral	Np	Dim Mass (µg)	rs (µm)	4He (nmol/g)	±	U (ppm)	±	Th (ppm)	±	Sm (ppm)	±	eU	4He (ncc)	±	Re (%)	U (ng)	±	Th (ng)	±	Sm (ng)	±	Th/U	Raw Date (Ma)
z	1	0.93	31.87	40.559	0.194	155.64	1.87	54.28	1.19	0.00	#DIV/0!	168.4	0.849	0.004	100.0	0.1454	0.002	0.0507	0.001	0.0000	0.000	0.349	44.52	
z	2	2.56	42.38	138.777	0.411	281.86	5.16	102.73	1.47	0.00	#DIV/0!	306.0	7.967	0.024	100.0	0.7219	0.013	0.2631	0.004	0.0000	0.000	0.364	83.53	
z	2	4.80	55.11	205.913	0.599	452.70	7.12	195.01	2.25	0.00	#DIV/0!	498.5	22.152	0.064	100.0	2.1728	0.034	0.9360	0.011	0.0000	0.000	0.431	76.12	
z	2	4.12	49.31	899.300	2.531	5223.55	84.02	846.04	10.48	0.00	#DIV/0!	5422.4	82.973	0.234	100.0	21.5022	0.346	3.4827	0.043	0.0000	0.000	0.162	30.70	
z	2	3.97	50.28	103.972	0.305	305.57	6.53	157.54	3.88	0.00	#DIV/0!	342.6	9.262	0.027	100.0	1.2145	0.026	0.6261	0.015	0.0000	0.000	0.516	56.02	
z	2	2.80	44.99	219.658	0.627	491.14	8.68	441.54	8.65	0.00	#DIV/0!	594.9	13.796	0.039	100.0	1.3762	0.024	1.2373	0.024	0.0000	0.000	0.899	68.06	
z	2	4.47	44.66	136.464	0.401	384.74	6.23	202.19	5.45	0.00	#DIV/0!	432.3	13.676	0.040	100.0	1.7203	0.028	0.9040	0.024	0.0000	0.000	0.526	58.27	
z	2	2.24	33.49	75.761	0.233	190.59	2.96	204.57	5.51	0.00	#DIV/0!	238.7	3.807	0.012	100.0	0.4273	0.007	0.4587	0.012	0.0000	0.000	1.073	58.55	
z	2	2.69	39.47	109.186	0.350	334.90	5.97	122.65	1.25	0.00	#DIV/0!	363.7	6.573	0.021	100.0	0.8995	0.016	0.3294	0.003	0.0000	0.000	0.366	55.43	
z	2	5.38	64.13	85.671	0.250	215.25	4.45	109.17	1.52	0.00	#DIV/0!	240.9	10.339	0.030	100.0	1.1589	0.024	0.5878	0.008	0.0000	0.000	0.507	65.59	
z	2	5.26	52.62	33.436	0.125	73.13	1.30	36.78	0.62	0.00	#DIV/0!	81.8	3.940	0.015	100.0	0.3844	0.007	0.1934	0.003	0.0000	0.000	0.503	75.36	
z	0	50.44	134.99	6.811	0.028	12.69	0.24	8.27	0.15	0.00	#DIV/0!	14.6	7.700	0.032	100.0	0.6403	0.012	0.4172	0.008	0.0000	0.000	0.652	85.66	
z	0	45.01	124.68	16.438	0.058	27.34	0.50	40.64	0.65	0.00	#DIV/0!	36.9	16.584	0.058	99.6	1.2307	0.023	1.8292	0.029	0.0000	0.000	1.486	82.00	
z	0	83.41	152.20	12.787	0.031	25.71	0.56	11.21	0.15	0.00	#DIV/0!	28.3	23.907	0.058	100.0	2.1445	0.046	0.9354	0.013	0.0000	0.000	0.436	83.09	
z	0	3.13	50.94	43.511	0.271	101.75	3.08	31.21	0.70	0.00	#DIV/0!	109.1	3.051	0.019	100.0	0.3184	0.010	0.0977	0.002	0.0000	0.000	0.307	73.54	
z	1	2.50	47.43	0.020	0.010	0.00	#DIV/0!	1.31	0.03	0.00	#DIV/0!	0.3	0.001	0.001	75.3	0.0000	0.000	0.0033	0.000	0.0000	0.000	#DIV/0!	12.23	
z	1	1.35	37.94	0.046	0.017	0.00	#DIV/0!	5.01	0.21	0.00	#DIV/0!	1.2	0.001	0.001	27.5	0.0000	0.000	0.0068	0.000	0.0000	0.000	#DIV/0!	7.18	
z	0	3.34	47.32	24.439	0.093	71.81	2.00	18.59	0.25	0.00	#DIV/0!	76.2	1.829	0.007	100.0	0.2398	0.007	0.0621	0.001	0.0000	0.000	0.259	59.23	
z	0	5.81	62.85	0.009	0.003	0.00	#DIV/0!	0.91	0.03	0.00	#DIV/0!	0.2	0.001	0.000	74.6	0.0000	0.000	0.0053	0.000	0.0000	0.000	#DIV/0!	7.39	
z	0	2.34	48.52	46.766	0.235	130.03	1.74	102.50	2.69	0.00	#DIV/0!	154.1	2.457	0.012	100.0	0.3048	0.004	0.2403	0.006	0.0000	0.000	0.788	56.00	
z	0	14.86	87.73	18.156	0.075	28.79	0.77	23.87	0.57	0.00	#DIV/0!	34.4	6.047	0.025	100.0	0.4278	0.011	0.3547	0.008	0.0000	0.000	0.829	97.06	
z	2	14.38	74.24	216.536	1.055	337.90	3.79	187.07	2.57	0.00	#DIV/0!	381.9	69.788	0.340	100.0	4.8588	0.055	2.6900	0.037	0.0000	0.000	0.554	104.24	
z	2	14.09	70.48	143.113	0.679	200.18	2.00	114.60	1.02	0.00	#DIV/0!	227.1	45.206	0.215	100.0	2.8211	0.028	1.6150	0.014	0.0000	0.000	0.572	115.72	
z	2	9.65	64.80	178.421	0.728	274.80	4.78	152.76	2.11	0.00	#DIV/0!	310.7	38.579	0.157	99.8	2.6509	0.046	1.4736	0.020	0.0000	0.000	0.556	105.55	
z	2	9.07	64.27	238.133	0.783	444.08	5.44	178.36	2.49	0.00	#DIV/0!	486.0	48.424	0.159	100.0	4.0289	0.049	1.6182	0.023	0.0000	0.000	0.402	90.19	
z	2	13.67	73.23	219.312	0.578	381.45	5.50	160.74	2.05	0.00	#DIV/0!	419.2	67.186	0.177	100.0	5.2136	0.075	2.1970	0.028	0.0000	0.000	0.421	96.24	
z	2	3.66	47.11	0.054	0.003	1.08	0.14	0.00	#DIV/0!	0.00	#DIV/0!	1.1	0.004	0.000	53.2	0.0040	0.000	0.0000	0.000	0.0000	0.000	0.000	9.27	
z	2	4.17	49.82	844.329	4.532	1638.61	44.87	580.49	12.17	0.00	#DIV/0!	1775.0	78.983	0.424	99.7	6.8389	0.187	2.4228	0.051	0.0000	0.000	0.354	87.58	
z	2	400.95	212.48	2.629	0.003	0.0416	0.0030	0.5512	0.0115	0.0000	#DIV/0!	0.1711	23.627	0.026	21.0	0.0167	0.001	0.2210	0.005	0.0000	0.000	13.260	2542.80	
z	2	261.86	222.52	2.749	0.000	0.1212	0.0052	0.0448	0.0018	0.0000	#DIV/0!	0.1317	16.134	0.002	2.9	0.0317	0.001	0.0117	0.000	0.0000	0.000	0.370	2952.29	
z	0	59.70	143.44	5.279	0.020	13.52	0.20	4.55	0.15	0.00	#DIV/0!	14.6	7.064	0.027	100.0	0.8072	0.012	0.2714	0.009	0.0000	0.000	0.336	66.75	
z	1	1.21	37.32	0.030	0.022	0.00	#DIV/0!	0.00	#DIV/0!	0.00	#DIV/0!	0.0	0.001	0.001	88.9	0.0000	0.000	0.0000	0.000	0.0000	0.000	#DIV/0!	#DIV/0!	
z	2	8.58	66.01	96.771	0.515	665.51	7.52	371.85	10.09	0.00	#DIV/0!	752.9	18.619	0.099	99.9	5.7127	0.065	3.1919	0.087	0.0000	0.000	0.559	23.79	
z	2	4.80	50.88	66.388	0.259	449.99	9.75	281.34	3.24	0.00	#DIV/0!	516.1	7.138	0.028	100.0	2.1586	0.047	1.3496	0.016	0.0000	0.000	0.625	23.81	
z	2	14.03	75.23	36.573	0.184	249.26	3.95	146.62	1.94	0.00	#DIV/0!	283.7	11.504	0.058	100.0	3.4980	0.055	2.0576	0.027	0.0000	0.000	0.588	23.86	
z	2	9.88	67.18	41.483	0.125	291.23	4.16	168.63	3.29	0.00	#DIV/0!	330.9	9.187	0.028	100.0	2.8777	0.041	1.6663	0.033	0.0000	0.000	0.579	23.21	
z	2	11.67	71.88	17.455	0.058	125.12	2.01	78.10	0.97	0.00	#DIV/0!	143.5	4.566	0.015	100.0	1.4604	0.023	0.9115	0.011	0.0000	0.000	0.624	22.52	
z	2	4.57	51.13	58.987	0.176	439.28	8.90	237.58	4.94	0.00	#DIV/0!	495.1	6.042	0.018	100.0	2.0076	0.041	1.0858	0.023	0.0000	0.000	0.541	22.06	

1000s of files spanning 10+ years of operation

Each lab has different file formats, data standards, etc.



# Academic labs live in a world of Excel

1000s of files  
spanning 10+  
years of  
operation

The screenshot shows an Excel spreadsheet titled "Data\_Reduction\_Sheet\_repaired". The spreadsheet contains a table with columns labeled: try, Mineral, Np, Dim Mass (µg), rs (µm), 4He (nmol/g), U (ppm), Th (ppm), Sm (ppm), eU, 4He (ncc), Re (%), U (ng), Th (ng), Sm (ng), Th/U, and Raw Date (Ma). The data rows show various values, with some cells containing error messages like "#DIV/0!". A large text box is overlaid on the spreadsheet, containing the text: "Neither funding nor expertise to implement better data workflows".

try	Mineral	Np	Dim Mass (µg)	rs (µm)	4He (nmol/g)	U (ppm)	Th (ppm)	Sm (ppm)	eU	4He (ncc)	Re (%)	U (ng)	Th (ng)	Sm (ng)	Th/U	Raw Date (Ma)							
z	1	0.93	31.87	40.559	0.194	155.64	1.87	54.28	1.19	0.00	#DIV/0!	168.4	0.849	0.004	100.0	0.1454	0.002	0.0507	0.001	0.0000	0.000	0.349	44.52
z	1	2.50	47.43	0.020	0.010	0.00	#DIV/0!	1.31	0.03	0.00	#DIV/0!	0.3	0.001	0.001	75.3	0.0000	0.000	0.0033	0.000	0.0000	0.000	#DIV/0!	12.23
z	1	1.35	37.94	0.046	0.017	0.00	#DIV/0!	5.01	0.21	0.00	#DIV/0!	1.2	0.001	0.001	27.5	0.0000	0.000	0.0068	0.000	0.0000	0.000	#DIV/0!	7.18
z	0	3.34	47.32	24.439	0.093	71.81	2.00	18.59	0.25	0.00	#DIV/0!	76.2	1.829	0.007	100.0	0.2398	0.007	0.0621	0.001	0.0000	0.000	0.259	59.23
z	0	5.81	62.85	0.009	0.003	0.00	#DIV/0!	0.91	0.03	0.00	#DIV/0!	0.2	0.001	0.000	74.6	0.0000	0.000	0.0053	0.000	0.0000	0.000	#DIV/0!	7.39
z	0	2.34	48.52	46.766	0.235	130.03	1.74	102.50	2.69	0.00	#DIV/0!	154.1	2.457	0.012	100.0	0.3048	0.004	0.2403	0.006	0.0000	0.000	0.788	56.00
z	0	14.86	87.73	18.156	0.075	28.79	0.77	23.87	0.57	0.00	#DIV/0!	34.4	6.047	0.025	100.0	0.4278	0.011	0.3547	0.008	0.0000	0.000	0.829	97.06
z	2	14.38	74.24	216.536	1.055	337.90	3.79	187.07	2.57	0.00	#DIV/0!	381.9	69.788	0.340	100.0	4.8588	0.055	2.6900	0.037	0.0000	0.000	0.554	104.24
z	2	14.09	70.48	143.113	0.679	200.18	2.00	114.60	1.02	0.00	#DIV/0!	227.1	45.206	0.215	100.0	2.8211	0.028	1.6150	0.014	0.0000	0.000	0.572	115.72
z	2	9.65	64.80	178.421	0.728	274.80	4.78	152.76	2.11	0.00	#DIV/0!	310.7	38.579	0.157	99.8	2.6509	0.046	1.4736	0.020	0.0000	0.000	0.556	105.55
z	2	9.07	64.27	238.133	0.783	444.08	5.44	178.36	2.49	0.00	#DIV/0!	486.0	48.424	0.159	100.0	4.0289	0.049	1.6182	0.023	0.0000	0.000	0.402	90.19
z	2	13.67	73.23	219.312	0.578	381.45	5.50	160.74	2.05	0.00	#DIV/0!	419.2	67.186	0.177	100.0	5.2136	0.075	2.1970	0.028	0.0000	0.000	0.421	96.24
z	2	3.66	47.11	0.054	0.003	1.08	0.14	0.00	#DIV/0!	0.00	#DIV/0!	1.1	0.004	0.000	53.2	0.0040	0.000	0.0000	0.000	0.0000	0.000	0.000	9.27
z	2	4.17	49.82	844.329	4.532	1638.61	44.87	580.49	12.17	0.00	#DIV/0!	1775.0	78.983	0.424	99.7	6.8389	0.187	2.4228	0.051	0.0000	0.000	0.354	87.58
z	2	400.95	212.48	2.629	0.003	0.0416	0.0030	0.5512	0.0115	0.0000	#DIV/0!	0.1711	23.627	0.026	21.0	0.0167	0.001	0.2210	0.005	0.0000	0.000	13.260	2542.80
z	2	261.86	222.52	2.749	0.000	0.1212	0.0052	0.0448	0.0018	0.0000	#DIV/0!	0.1317	16.134	0.002	2.9	0.0317	0.001	0.0117	0.000	0.0000	0.000	0.370	2952.29
z	0	59.70	143.44	5.279	0.020	13.52	0.20	4.55	0.15	0.00	#DIV/0!	14.6	7.064	0.027	100.0	0.8072	0.012	0.2714	0.009	0.0000	0.000	0.336	66.75
z	1	1.21	37.32	0.030	0.022	0.00	#DIV/0!	0.00	#DIV/0!	0.00	#DIV/0!	0.0	0.001	0.001	88.9	0.0000	0.000	0.0000	0.000	0.0000	0.000	#DIV/0!	#DIV/0!
z	2	8.58	66.01	96.771	0.515	665.51	7.52	371.85	10.09	0.00	#DIV/0!	752.9	18.619	0.099	99.9	5.7127	0.065	3.1919	0.087	0.0000	0.000	0.559	23.79
z	2	4.80	50.88	66.388	0.259	449.99	9.75	281.34	3.24	0.00	#DIV/0!	516.1	7.138	0.028	100.0	2.1586	0.047	1.3496	0.016	0.0000	0.000	0.625	23.81
z	2	14.03	75.23	36.573	0.184	249.26	3.95	146.62	1.94	0.00	#DIV/0!	283.7	11.504	0.058	100.0	3.4980	0.055	2.0576	0.027	0.0000	0.000	0.588	23.86
z	2	9.88	67.18	41.483	0.125	291.23	4.16	168.63	3.29	0.00	#DIV/0!	330.9	9.187	0.028	100.0	2.8777	0.041	1.6663	0.033	0.0000	0.000	0.579	23.21
z	2	11.67	71.88	17.455	0.058	125.12	2.01	78.10	0.97	0.00	#DIV/0!	143.5	4.566	0.015	100.0	1.4604	0.023	0.9115	0.011	0.0000	0.000	0.624	22.52
z	2	4.57	51.13	58.987	0.176	439.28	8.90	237.58	4.94	0.00	#DIV/0!	495.1	6.042	0.018	100.0	2.0076	0.041	1.0858	0.023	0.0000	0.000	0.541	22.06

Neither funding nor expertise to  
implement better data workflows

Each lab has  
different file  
formats, data  
standards, etc.





# Sparrow

## Web-based metadata management platform for a geochemical lab's data archive

- Set embargo for projects and samples
- Manage project- and sample-level metadata
- Search and link publications
- Access analytical data
- Import, export, and track original data files

```
CU TRAIL Admin | Metadata Map Terms Test
import-grain-images Options Start Connected
1 Starting task
2 /data/Photographs and Measurement Data/UG85-1_bp_z05b.tif
3 Already imported
4 /data/Photographs and Measurement Data/UG96-1_bp_z06b.tif
5 Already imported
6 /data/Photographs and Measurement Data/UG96-1_bp_z05a.tif
7 Already imported
8 /data/Photographs and Measurement Data/UG96-1_bp_z06a.tif
9 Already imported
10 /data/Photographs and Measurement Data/UG85-1_bp_z06a.tif
11 Already imported
12 /data/Photographs and Measurement Data/UG96-1_bp_z04b.tif
13 Already imported
14 /data/Photographs and Measurement Data/UG96-1_bp_z01b.tif
15 Already imported
```

WiscAr Admin API Explorer test

Admin views Base Projects Sessions

### Projects

← Previous Next → 1 of 1 (2 records)

**Delarof Islands Magmatic Evolution**  
Eocene to Pleistocene magmatic evolution of the Delarof Islands, Aleutian Arc

**Publications**  
Eocene to Pleistocene magmatic evolution of the Delarof Islands, Aleutian Arc – DOI: 10.1002/2015GC006067

**Researchers**  
No researchers

**Samples**

<b>AMT-13-11</b> Amatignak Island gabbro	<b>AMT-13-10</b> Amatignak Island gabbro	<b>SKA-13-3</b> Skagul Island basaltic andesite	<b>SKA-13-2</b> Skagul Island basalt	<b>SKA-13-1</b> Skagul Island andesite	<b>KAV-13-2</b> Kavalga Island basalt
--	--	---	--	--	---

DRI Luminescence Laboratory Admin API Explorer test

Admin Home Projects Samples Sessions

Sessions > 79

Monday, January 1st, 2018

<b>Sample</b> HWV-TP-1-1 quartz	<b>Project</b> Hawksy Walksy Valley	<b>Technique</b> OSL
---------------------------------------	--	-------------------------

### Analysis details

**Mineral Separation**

**Material**  
mineral separate > multi-grain separate

**Data**

mask size:	4.00 mm
minimum grain size:	180 µm
maximum grain size:	250 µm





# Sparrow's role in labs

## A public data portal



- Summary statistics
- Publications links
- Maps of samples
- Sample-specific information
- Helps fulfill open-data and reporting requirements
- **Extensible** for method-specific needs

Boise State IGL | Admin | API Explorer | test

### About the lab

The Boise State University Isotope Geology Laboratory (IGL) is a state-of-the-art facility for the analysis of radiogenic isotopes in Earth materials, with a focus on in situ and high-precision geochronology (U-Pb zircon) and tracer isotope geochemistry. These tools can be applied to a variety of problems in igneous and metamorphic petrology, structural geology and tectonics, paleobiological evolution and paleoclimate change in deep time. See our [main website](#) for further details.

### Geochronology data system

The IGL is a node in the [EARTHTIME Network](#) for the Calibration of Earth History. It is also a partner in the NSF EarthCube Geochronology Infrastructure project. This [Sparrow](#) lab information management system is a product of that collaboration.

1707 measurements have been linked to their geologic metadata

Arizona LaserChron Center | Admin | API Explorer | test

The Arizona LaserChron Center is an NSF multi-user facility that addresses problems in Earth Science through the generation of U-Th-Pb geochronology data and complementary geochemical information by Laser Ablation ICP Mass Spectrometry. It is directed by Dr. George Gehrels and based within the University of Arizona Department of Geosciences.

**Accepted ages**  
84712 accepted ages ingested into the lab data system

**Age range**

WiscAr | Admin | API Explorer | Daven

### About the lab

WiscAr is the Argon geochronology laboratory at the University of Wisconsin — Madison. This implementation of [Sparrow](#) holds the lab's data archive and makes it accessible via [an API](#) and this web interface.

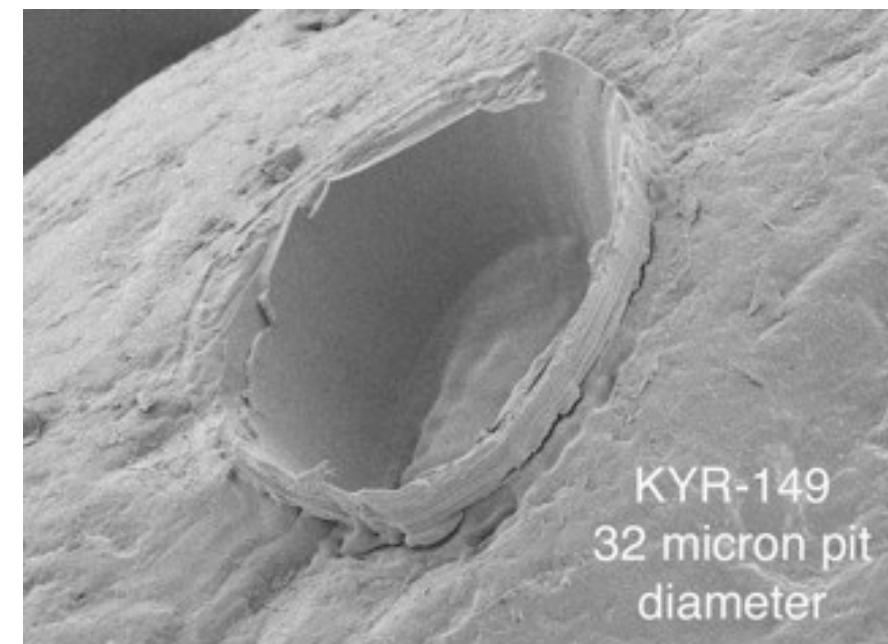


# Sparrow's database

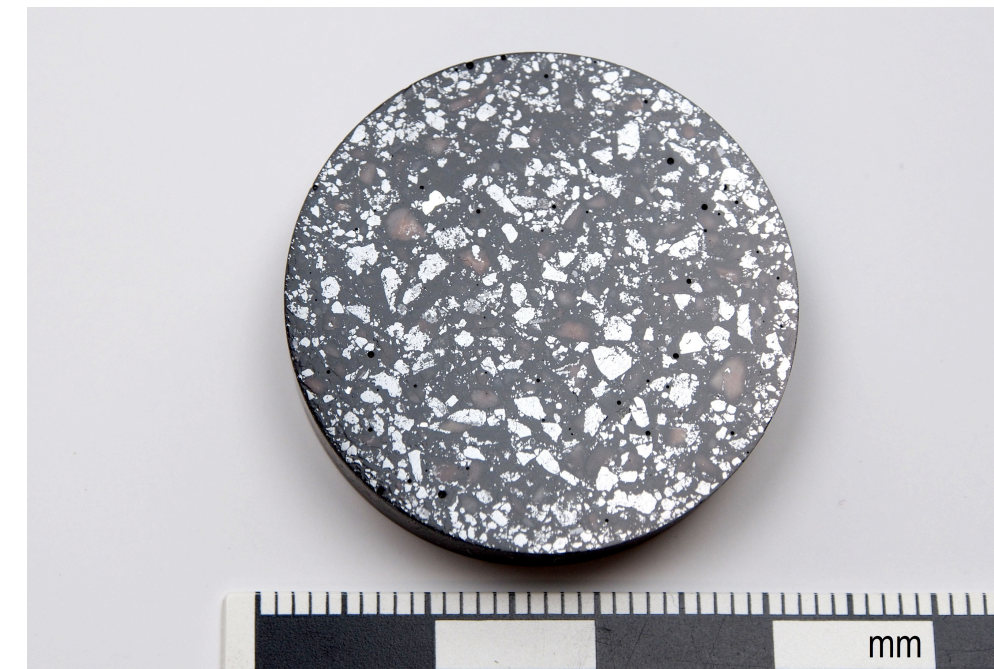
A single measured value

H2O content: 5.34 ±0.534(1s) %  
De: 21.6 ±0.900(1s) Gy  
OD: 24.0 %  
luminescence age: 5.36 ±0.342(1s) ka  
total dose rate: 4.03 ±0.195(1s) Gy/ka

An instance of space- or time-resolved data collection



Grouped measurements in a single instrument run



The geologic material that was originally collected for analysis



**Datum**

**Analysis**

**Session**

**Sample**

**Metadata tables**

Geological context, publication status, embargo...

**Instrument session**

**Project**

**Location Entity (e.g. geologic unit)**

**Publication**

**Researcher**



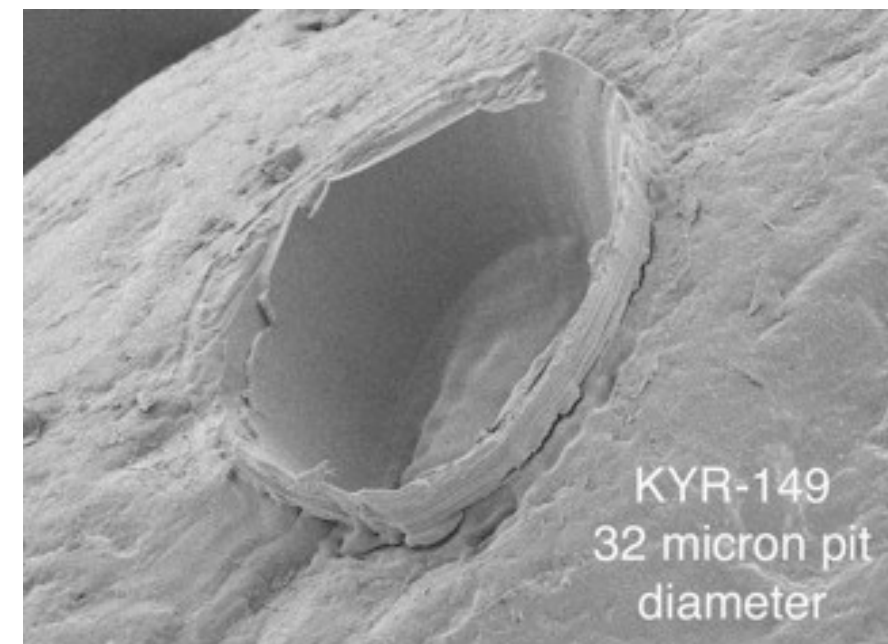
# Sparrow's database

## *A platform for data curation*

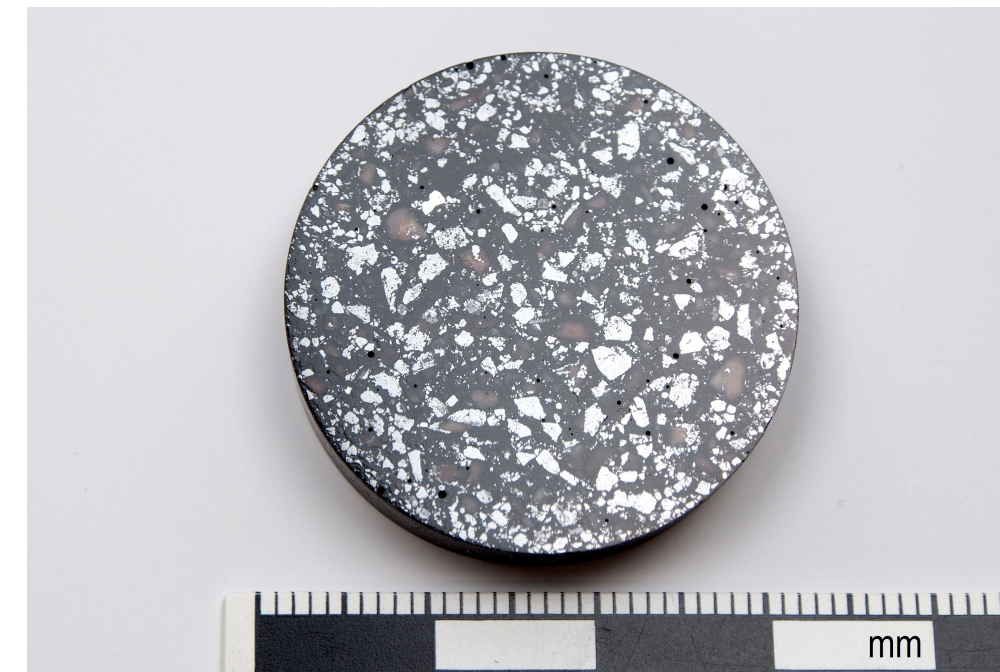
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**Project**



Location Entity (e.g. geologic unit)

**NSF ID**

**Publication**

**DOI**



**Researcher**

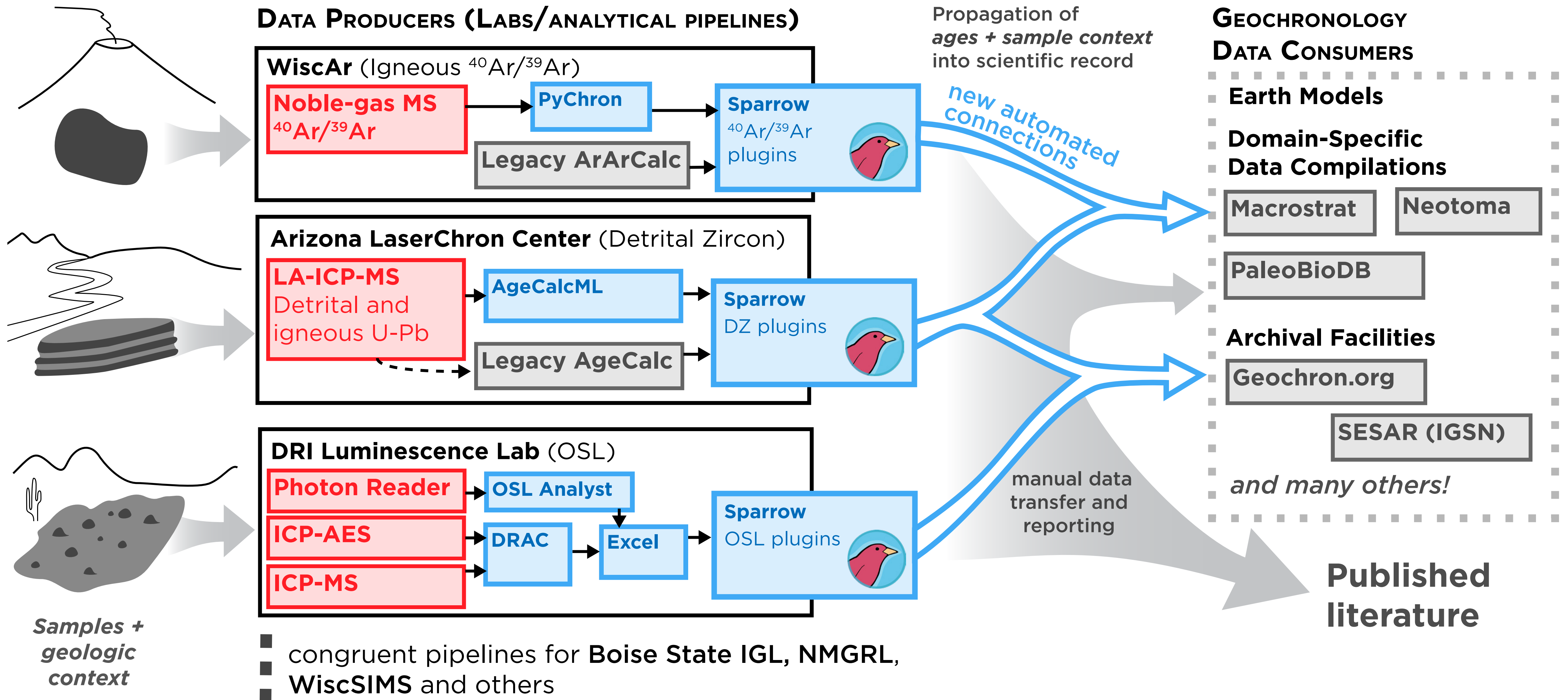
**ORCID**





# Vision: connecting lab data systems to the community

*...in a way where labs also benefit on their own terms*



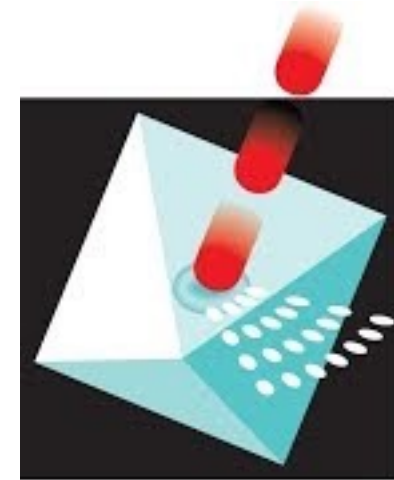


# SO HOW'S THAT GOING?

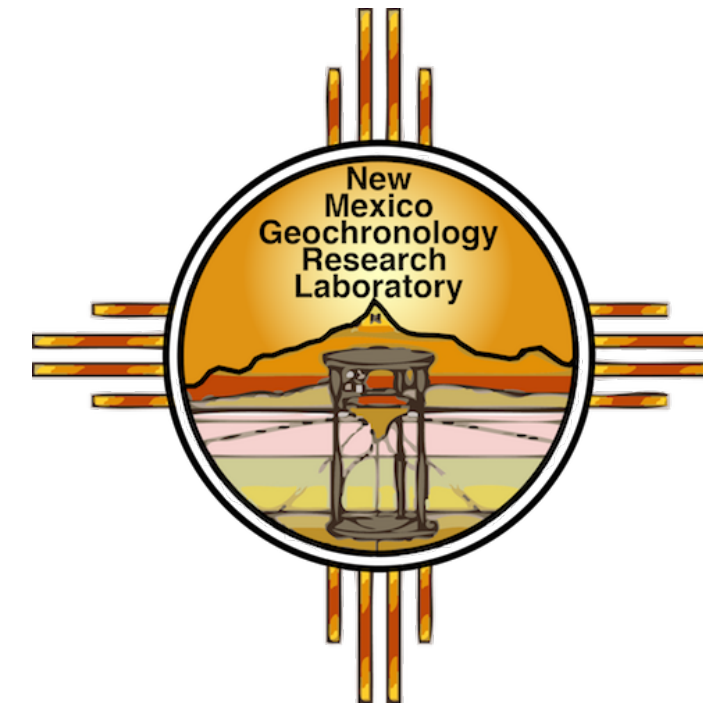


~10 in-progress laboratory implementations **across domains** of geochronology and geochemistry

- Uranium–Lead
- Argon–Argon
- Cosmogenic nuclides
- (U+Th)/He thermochronology
- Optically-stimulated luminescence
- In-situ stable isotope geochemistry (SIMS)
- Electron Microprobe
- Carbon radioisotopes/AMS (*planned*)



ARIZONA  
LASERCHRON  
CENTER  
Department of Geosciences  
University of Arizona



ISOTOPE  
GEOLOGY  
LABORATORY  
BOISE STATE UNIVERSITY



WU Cosmogenic  
Nuclide Lab



CU  
TRAIL  
Thermochronology Research and Instrumentation Laboratory



DRI  
Desert Research Institute



CONCORD U  
Microprobe lab



NAU  
Paleoclimate  
Dynamics Lab



British  
Geological  
Survey

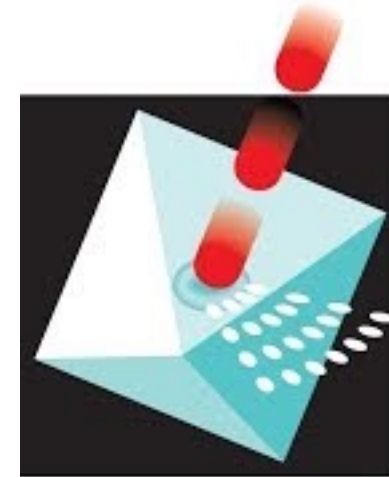




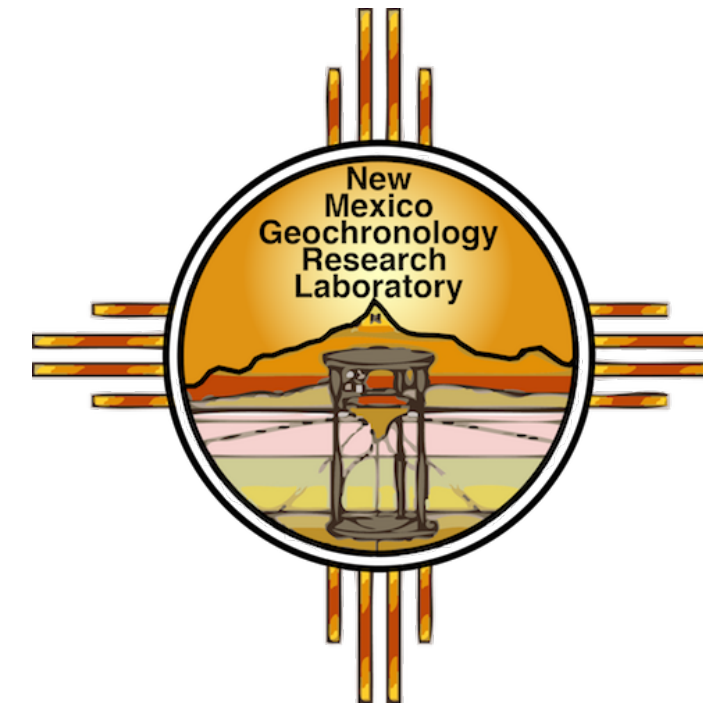
# SO HOW'S THAT GOING? *But really, how is it going? (five years in)*

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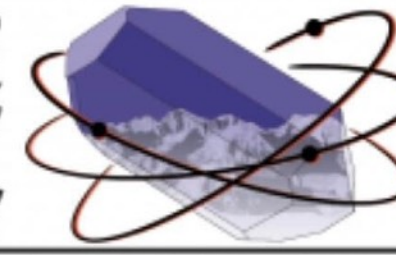
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ARIZONA LASERCHRON CENTER  
Department of Geosciences  
University of Arizona



ISOTOPE GEOLOGY LABORATORY  
BOISE STATE UNIVERSITY



UW Cosmogenic Nuclide Lab



*One operational pipeline*



NAU  
Paleoclimate  
Dynamics Lab



British  
Geological  
Survey





# SO HOW'S THAT GOING? *But really, how is it going? (five years in)*

~10 in-progress laboratory implementations **across domains** of geochronology and geochemistry

- Ura
- Arg
- Cos
- (U+
- Opt
- In-s
- Elec
- Car



Academic labs lack expertise to implement/  
 manage metadata tracking.

*It is just not their core task and is treated accordingly.*

Even with purpose-built software, the “last-mile”  
 problem is difficult to solve.

*One operational pipeline*



Desert Research Institute

*Microprobe lab*



NAU  
Paleoclimate  
Dynamics Lab

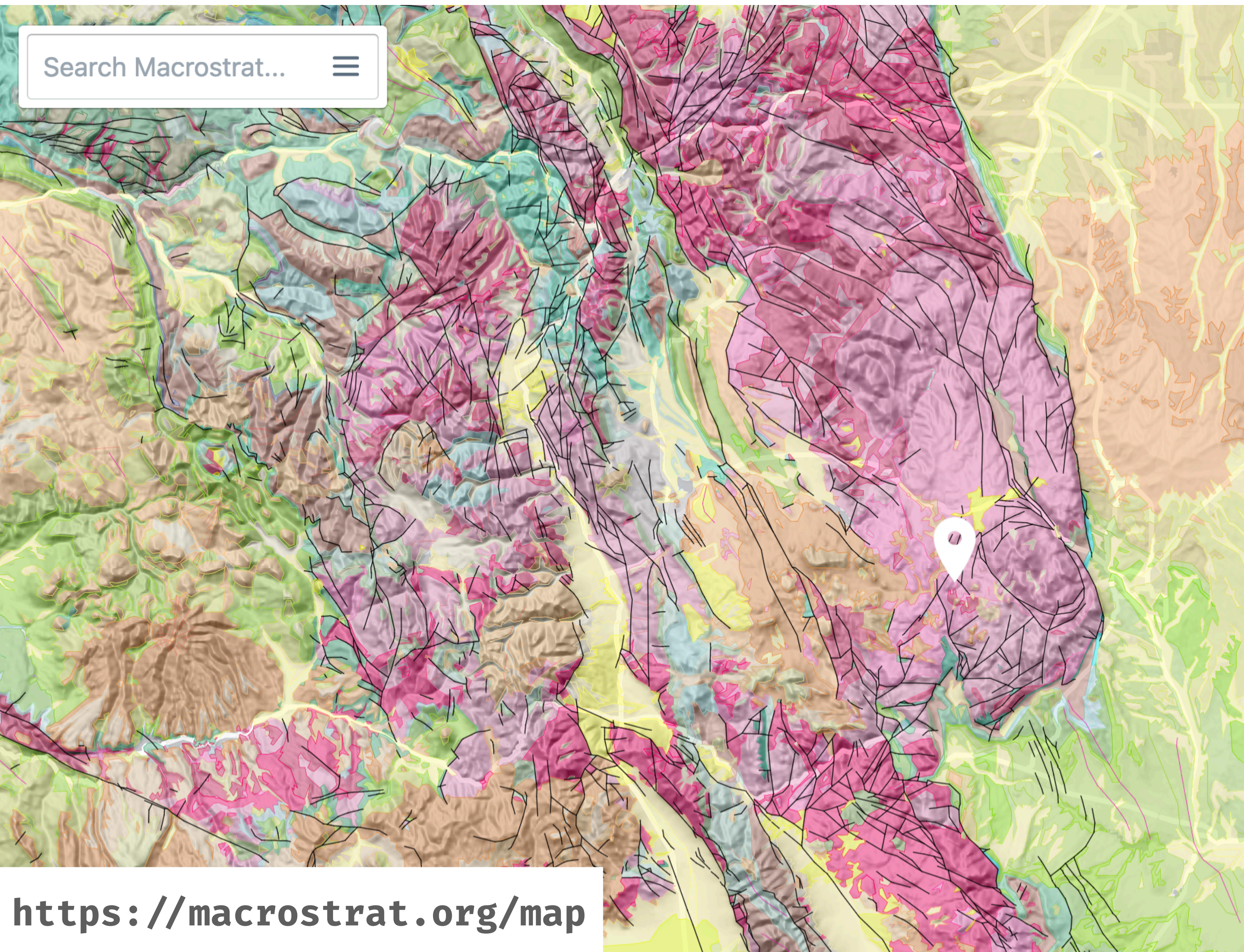


British  
Geological  
Survey

SC  
IS



# Final note: Automation to the rescue? 🤖



📍 -105.2245, 38.7848 2737m | 8980ft ✕

### Primary literature

via xDD ^

Robinson, Charles Sherwood, [Geology and ore deposits of the Whitepine area, Tomichi mining district, Gunnison County, Colorado.](#) ▾

Nash, J. Thomas, [Supergene uranium deposits in brecciated zones of Laramide upthrusts; concepts and applications.](#) ▾

Young, E. J., [Felsic-mafic ratios and silica saturation ratios; their rationale and use as petrographic and petrologic indicators.](#) ▾

Hills, F. A., Dickinson, K. A., [Silver Plume Granite; possible source of uranium in sandstone uranium deposits, Tallahassee Creek and High Park areas, Fremont and Teller counties, Colorado.](#) ▾

Finch, Warren Irvin, [Stratigraphic distribution of uranium clusters in the Rocky Mountain and Intermontane Basins Uranium Province.](#) ▾

Braddock, William A., Cole, James C., [Preliminary geologic map of the Greeley 1 degree by 2 degrees Quadrangle, Colorado and Wyoming.](#) ▾

Snyder, George L., [Preliminary geologic map of the central Laramie Mountains, Albany and Platte counties, Wyoming.](#) ▾

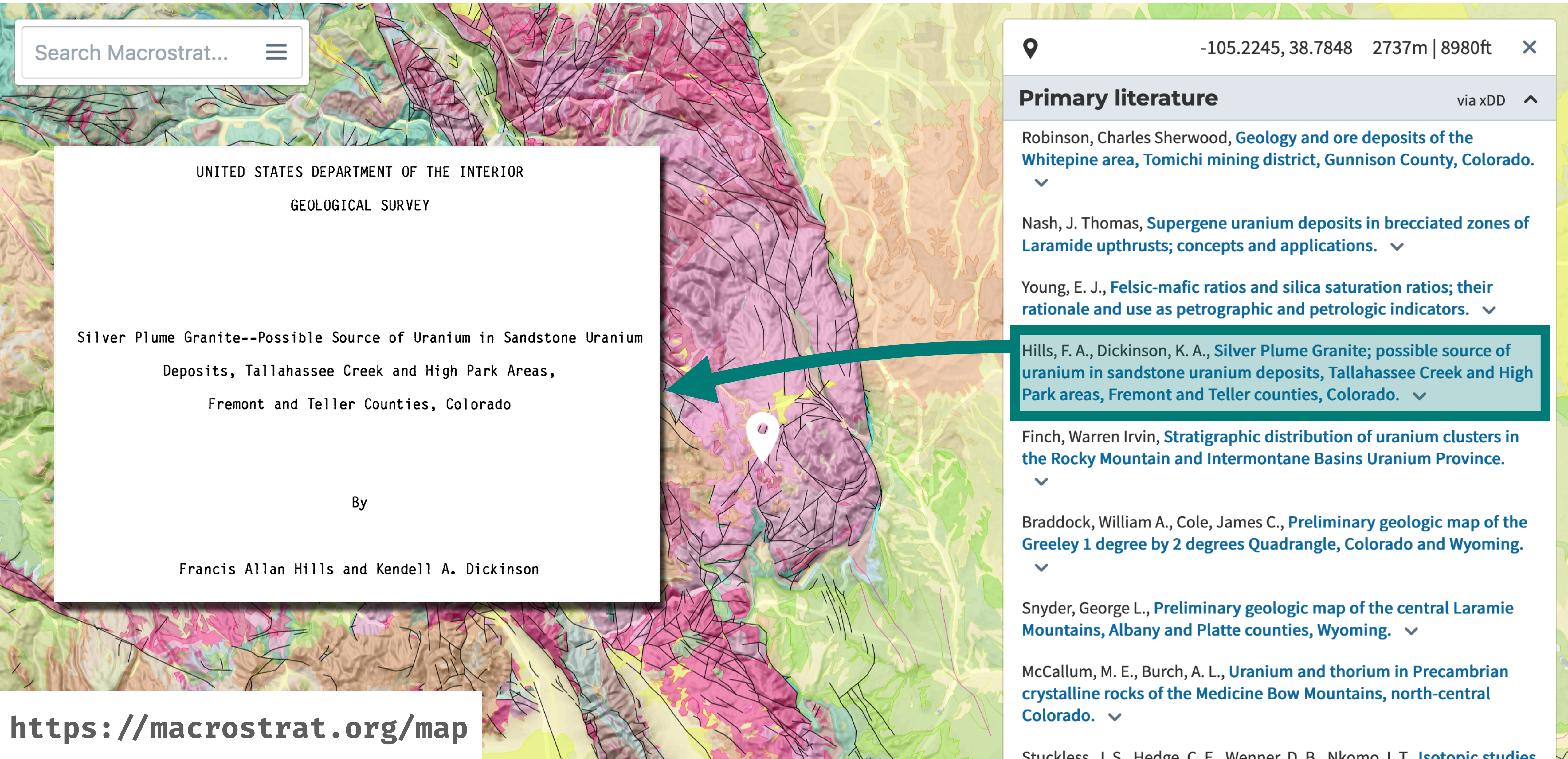
McCallum, M. E., Burch, A. L., [Uranium and thorium in Precambrian crystalline rocks of the Medicine Bow Mountains, north-central Colorado.](#) ▾


Stuckless, J. S., Hedge, C. E., Wenner, D. B., Nkomo, J. T., [Isotopic studies](#)

<https://macrostrat.org/map>



# Final note: Automation to the rescue?





Search Macrostrat... 


UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY


Silver Plume Granite--Possible Source of Uranium in Sandstone Uranium Deposits, Tallahassee Creek and High Park Areas, Fremont and Teller Counties, Colorado


By  
Francis Allan Hills and Kendell A. Dickinson


<https://macrostrat.org/map>


 -105.2245, 38.7848 2737m | 8980ft 


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**Hills, F. A., Dickinson, K. A., [Silver Plume Granite; possible source of uranium in sandstone uranium deposits, Tallahassee Creek and High Park areas, Fremont and Teller counties, Colorado.](#) **

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# Final note: Automation to the rescue?

Macrostrat is linked to the xDD (formerly, GeoDeepDive) machine reading library, data infrastructure, and API


**16,909,371** documents

108,486 added this month

25,112 added this week


3,683 added in the last 24 hours

- Detecting and surfacing references to geologic units in the scientific literature
- These aren't real metadata-level links, but they are pretty useful

 -105.2245, 38.7848 2737m | 8980ft 


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Nash, J. Thomas, S. [Laramide upthrust](#)

Young, E. J., [Tectonic-rational and use](#)

Hills, F. A., Dickinson, K. A., [Silver Plume Granite; possible source of uranium in sandstone uranium deposits, Tallahassee Creek and High Park areas, Fremont and Teller counties, Colorado.](#) 

Finch, Warren Irvin, [the Rocky Mountains](#)

Braddock, William, [Greeley 1 degree block](#)

Snyder, George L., [Tertiary volcanic rocks of the Rocky Mountains, Albany and Platte counties, Wyoming.](#) 

...Anomalously high concentrations of thorium and of the light rare earth elements lanthanum and cerium suggest that the actinides and light lanthanides were enriched to an abnormal degree by the magmatic processes that formed the Proterozoic Y **Silver Plume Granite** in areas adjoining Tallahassee Creek and High Park ....

...Although a significant contribution of uranium from Tertiary volcanic rocks can not be ruled out and is even probable ( Dickinson and Hills , 1982 ) , it appears probable that some of the uranium in deposits of the Tallahassee Creek area was derived from **Silver Plume Granite** ....

...Although uranium presently does not appear to be significantly enriched in sampled outcrops of **Silver Plume Granite** , a large part of the original uranium content of Silver Plume may have been removed by oxidizing ground waters , leaving behind mainly the uranium bound in resistate minerals such as zircon and monazite ....

...Creek area was **Silver Plume Granite** , and Tertiary volcanic rocks also probably supplied significant amounts of uranium ( Dickinson and Hills , 1982 ) , the inferred fertility of the **Silver Plume Granite** , its abundance in areas adjoining Tallahassee Creek , and the demonstrated former existence of an appropriate paleohydrologic system for transporting lead from the Silver Plume and depositing it in the Tallahassee Creek area make highly probable that the **Silver Plume Granite** supplied part of the uranium now found in the Tallahassee Creek deposits ....

<https://xdd.wisc.edu>