DATA REPOSITORY (SUPPLEMENTAL MATERIALS)

TABLE DR1. LOCATIONS OF SAMPLED SECTIONS

Unit	Location Name	GPS Coordinates	Reference(s)
Uinta Basin			
Duchesne River Formation Lapoint Member	near Halfway Hollow (Type Section)	N-NE from: N 40° 18.82' W 109° 42.18' To N 40° 26.617' W 109° 44.293'	(Anderson and Picard, 1972)
Dry Gulch Creek Member	Dry Gulch Creek (Type Section)	N 40° 19.313' W 110° 09.274' (Ute Indian Land)	(Anderson and Picard, 1972)
Brennan Basin Member	Twelvemile Wash (Type Section)	From N 40° 12.984' W 109° 35.790' To N 40° 20.747' W 109° 40.572'	(Anderson and Picard, 1972)
Uinta Formation Myton Member	Devil's Playground	N 40° 05.749' W 109° 13.678'	(Hamblin, 1987)
Wagonhound Member	Wagonhound Canyon / Bonanza	N from: N 39° 58.613' W 109° 09.811'	(Cashion, 1982)
Green River Formation Sandstone and Limestone Facies	Indian Canyon	Sampled NE along U.S. 191 starting at: N 40° 07.566' W 110° 26.517' (stopped sampling across road from Duchesne cemetery)	(Bradley, 1931; Bryant et al., 1989)
Saline Facies	Indian Canyon	Sampled NE along U.S. 191 starting at: N 39° 58.721' W 110° 37.103'	(Bradley, 1931; Bryant et al., 1989)
Main Body	Willow Creek / Indian Canyon	Sampled NE along U.S. 191 starting at: N 39° 50.819' W 110° 46.076'	(Bradley, 1931; Bryant et al., 1989)

Flagstaff Basin

Sevier River Formation	Northwest Aurora Quadrangle	N 38° 58.617' W 111° 57.831'	(Willis, 1988)
Dipping Vat Formation	Redmond Canyon	N 38° 55.791' W 111° 57.074'	(Willis, 1988)
Bald Knoll Formation (Formation of Aurora)	Redmond Canyon	N 38° 55.791' W 111° 57.074'	(Willis, 1988)
Crazy Hollow Formation	Redmond Canyon	N 38° 55.791' W 111° 57.074'	(Willis, 1988)
Green River Formation (Flagstaff basin)	Soldier Canyon	N 38° 55.087' W 111° 48.477'	(Willis, 1986)

Claron Basin

Brian Head Formation	Brian Head Peak	N 37° 40.873' W 112° 49.880'	(Sable and Maldonado, 1997)
Claron Formation	Asay Bench	N 37° 34.949' W 112° 35.303'	(Moore et al., 1994)
White Member			
Red Member	Asay Bench /	[fluted sandstones of Moore on Asay Bench]:	(Moore et al., 1994)
	Cedar Breaks	N 37° 34.950' W 112° 35.712'	
		[near Cedar Breaks Natl Monument within Dixie Natl Forest]: N 37° 41.042' W 112° 51.715'	
Undivided	Pinto II	N 37° 33.080' W 113° 30.075'	(Taylor, 1993)
	Newcastle	N 37° 39.317' W 113° 33.380'	(Taylor, 1993)

TABLE DR2. AGE CONSTRAINTS OF SAMPLED UNITS

	Reported Age	Method	Details	Reference(s)
Uinta Basin				
Duchesne River Formation				
Lapoint Member **(Tdl)**				
	28.7 ± 2.0 Ma	Zircon Fission Track	**(#12 in Fig. 2)**	(Bryant et al., 1989)
	30 - 38 Ma	Biostratigraphy		(Gazin, 1959)
	32.2 ± 3.2 Ma	Zircon Fission Track		(Bryant et al., 1989)
	32.9 ± 4.5 Ma	Zircon Fission Track		(Bryant et al., 1989)
	Chron C 13	Paleomagnetic		(Bryant et al., 1989)
	(33 to 33.4 Ma)			
	33.7 ± 5.6 Ma	Zircon Fission Track		(Bryant et al., 1989)
	35.2 ± 1.6 Ma	Zircon Fission Track		(Bryant et al., 1989)
	36.9 ± 1.8 Ma	Zircon Fission Track		(Bryant et al., 1989)
	39.3 Ma	K-Ar		(reported in Anderson and Picard, 1972)
	39.3 ± 0.8 Ma	K-Ar		(McDowell and Wilson, 1973)
	39.74 ± 0.07 Ma	^{40}Ar-^{39}Ar	**(#9 in Fig. 2)**	(Prothero and Swisher, 1992)
	40 Ma	Biostratigraphy		(Rasmussen et al., 1999)
	40.3 Ma	K-Ar	**(#8 in Fig. 2)**	(McDowell and Wilson, 1973)
Dry Gulch Creek Member **(Tdd)**				
	38.0 Ma	K-Ar	**(#10 in Fig. 2)**	(Mauger, 1977), as recalibrated by (Krishtalka et al., 1987)
	35.7 Ma	K-Ar	**(#11 in Fig. 2)**	(Mauger, 1977), as recalibrated by (Krishtalka et al., 1987)
	34.5 ± 4.4 Ma	Zircon Fission Track		(Bryant et al., 1989)
	33.0 ± 3.4 Ma	Zircon Fission Track		(Bryant et al., 1989)

Brennan Basin Member **(Tdb)**				
	Chron C 19n and C 18r (~40 Ma)	Paleomagnetic		(Prothero, 1996)
	Chron C 19r (~42.5)	Paleomagnetic		(Rasmussen et al., 1999)
Uinta Formation				
Myton Member **(Tum)**				
	Late Uintan Fauna (~42.5 Ma)	Biostratigraphy		(Prothero and Swisher, 1992)
	Chron C 20n (42.5 – 43.8 Ma)	Paleomagnetic		(Prothero, 1996)
	45.0 Ma	Paleomagnetic		(Prothero, 1990)
Wagonhound Member **(Tuw)**				
	Chron C 20r (44.05 – 46.32 Ma)	Paleomagnetic		(Prothero, 1990) as recalibrated by (Smith, 2002)
	47.4 ± 0.27 Ma	^{40}Ar-^{39}Ar	**(#7 in Fig. 2)**	(Prothero, 1990)
	47.0 ± 0.5 Ma	U-Pb (SHRIMP-RG)	**(E in Fig. 2)**	(this study, see Fig. DR1)
	Chron C 21n (46.3 – 47.8 Ma)	Paleomagnetic		(Prothero, 1996)
Green River Formation				
Sandstone and Limestone Facies **(Tgsl)**				
Strawberry Tuff	30.5 ± 1.1 Ma	K-Ar	(~30 m above base of Sandstone and Limestone Facies) Unreliable biotite age.	(Bryant et al., 1989)
	37.6 ± 1.9 Ma	Zircon Fission Track	N 40°9′54″ W 110°33′2″	(Bryant et al., 1989)
	44.00 ± 0.92 Ma	^{40}Ar-^{39}Ar	N 40°9′54.0″ W 110°33′5.6″ **(#6 in Fig. 2)**	(Smith et al., 2008)
Saline Facies **(Tgs)**				
Unnamed tuff	43.9 ± 5.4 Ma	Zircon Fission Track	Unnamed tuff ~70 m above base of Saline Facies, (locality #21 of [2]) N 40°0′15″ W 111°5′32″	(Bryant et al., 1989)
	44.3 ± 0.9 Ma	U-Pb (SHRIMP-RG)	Unnamed tuff ~50 m above base of Saline Facies, likely #21 of [2] N 39°59′22.1″ W 110°36′23.3″ **(D in Fig. 2)**	(this study, see Fig. DR)
Oily Tuff	45.14 ± 0.10 Ma	^{40}Ar-^{39}Ar	(“tuff from top of Saline Facies” discussed in [8]) N 40°2′56.8″ W 110°31′42.1″ **(#5 in Fig. 2)**	(Smith et al., 2008)
Portly Tuff	*45.58 ± 0.14 Ma*	^{40}Ar-^{39}Ar	(355 meters in Indian Canyon section of (Dane, 1955)) N 39°58′47.6″ W 110°37′16.3″ **(#4 in Fig. 2)**	(Smith et al., 2008)

	46.0 ± 0.7 Ma	U-Pb (SHRIMP-RG)	Tuff from ~10 m above base of Saline Facies, probably "Portly Tuff" of [6] N 39°58′47.6″ W 110°37′16.3″ **(C in Fig. 2)**	(this study, see Fig. DR3)
	46.1 ± 0.7 Ma	U-Pb (SHRIMP-RG)	**(B in Fig. 2)**	(this study, see Fig. DR3)
Main Body **(Tgm)**				
	42.3 ± 2.0 Ma and 42.8 ± 2.2 Ma	Zircon Fission Track	"Seem too young," not used in age model of this study	(Bryant et al., 1989)
Fat Tuff	*46.34 ± 0.13 Ma*	^{40}Ar-^{39}Ar	(~10 m below base of Saline Facies in Indian Canyon) N 39°58′46.5″ W 110°37′6.9″ **(#3 in Fig. 2)**	(Smith et al., 2008)
	45.9 ± 0.7 Ma	U-Pb (SHRIMP-RG)	Unnamed tuff (~20 m below base of Saline Facies in Indian Canyon), possibly Fat Tuff N 39°52′55.7″ W 110°44′59.2″	(this study, see Fig. DR4)
	45.9 ± 0.9 Ma	K-Ar	Unnamed tuff (7 m above Wavy Tuff)	(Mauger, 1977), as recalibrated by (Krishtalka et al., 1987)
Wavy Tuff	45.6 Ma	K-Ar	(~50 m above the Mahogany zone)	(Mauger, 1977)
	46.0 ± 0.9 Ma	K-Ar		(Mauger, 1977), as recalibrated by (Krishtalka et al., 1987)
	46.7 Ma	^{40}Ar-^{39}Ar		O'Neill and others, reported in (Bryant et al., 1989)
	48.37 ± 0.23 Ma	^{40}Ar-^{39}Ar	(Gates Canyon) N 39°50′59.3″ W 110°15′17.5″ **(#2 in Fig. 2)**	(Smith et al., 2008)
	48.5 ± 0.7 Ma	U-Pb (SHRIMP-RG)	N 39°52′41.3″ W 110°45′19.2″ **(A in Fig. 2)**	(this study, Fig. DR5)
	48.66 ± 0.12 Ma	^{40}Ar-^{39}Ar	N 39°50′59.03″ W 110°15′20.19″	(Smith, 2002)
Curly Tuff	47.2 Ma	^{40}Ar-^{39}Ar	(~25 m below the Mahogany oil shale bed in Indian Canyon)	O'Neill and others, reported in (Bryant et al., 1989)
	49.02 ± 0.30 Ma	^{40}Ar-^{39}Ar	N 39°50′33.8″ W 110°15′3.1″ **(#1 in Fig. 2)**	(Smith et al., 2008)
Lower Section	Early and Middle Eocene (late Wasatchian, Bridgerian, and early Uintan)	Biostratigraphy	Early Wasatchian/Bridgerian turtles, Bridgerian mammal fauna, palynology of attrital coal below carbonate marker unit in Indian Canyon	(Fouch et al., 1976; Krishtalka et al., 1987; Remy, 1992)
Flagstaff Basin				
***Sevier River Formation* (Ts)**				
	5.2 ± 0.4 Ma	Zircon Fission Track	**(#18 in Fig. 2)**	(Willis, 1988)

	7 Ma	Zircon Fission Track		(Steven et al., 1979)
	12.6 Ma	K-Ar	**(#17 in Fig. 2)**	(Rowley et al., 1975)
	15 Ma	Zircon Fission Track		(Steven et al., 1979)
***Dipping Vat Formation* (Tdv)**				
	25 Ma	K-Ar	**(#16 in Fig. 2)**	(Willis, 1986)
	34.2 ± 1.4 Ma	K-Ar		(Willis, 1986)
	34.6 ± 1.6 Ma	Zircon Fission Track		(Willis, 1988)
	35.8 ± 1.4 Ma	K-Ar	**(#15 in Fig. 2)**	(Willis, 1988)
***Bald Knoll Formation* (Tb)** (Formation of Aurora)				
	38 Ma	K-Ar	**(#14 in Fig. 2)**	(Anderson et al., 2001)
	38.4 ± 1.5 Ma	K-Ar		(Willis, 1988)
	39.6 ± 1.5 Ma	K-Ar		(Willis, 1988)
	40.5 ± 1.7 Ma	K-Ar	**(#13 in Fig. 2)**	(Willis, 1988)
***Crazy Hollow Formation* (Tch)**				
	40 – 44 Ma	Biostratigraphy		(Nelson et al., 1980)
	44 - 50 Ma	Biostratigraphy		(Nelson et al., 1980; Weiss, 1982)
Claron Basin				
***Brian Head Formation* (Tbh)**				
	29.5 Ma	K-Ar	Age of overlying Wah Wah Springs Tuff **(Tnr)** **(#21 in Fig.2)**	(Rowley et al., 1994)
	31.0 ± 0.5 Ma	K-Ar	**(#20 in Fig. 2)**	(Fleck et al., 1975)
	32.0 Ma	K-Ar		(Anderson and Kurlich, 1989)
	33.0 ± 0.13 Ma	^{40}Ar-^{39}Ar		(Snee, reported in Sable and Maldonado, 1997)
	33.7 ± 0.14 Ma	^{40}Ar-^{39}Ar		(Snee, reported in Sable and Maldonado, 1997)
	34.2 ± 2.1 Ma	K-Ar		(Mehnert, reported in Sable and Maldonado, 1997)
	34.7 ± 0.6 Ma	U-Pb (SHRIMP-RG)	***(G in Fig. 2)***	(this study, see Fig. DR6)
	35.2 ± 0.8 Ma	U-Pb (SHRIMP-RG)	***(F in Fig. 2)***	(this study, see Fig. DR7)
	36 Ma	Biostratigraphy		(Feist et al., 1997)
Claron Formation				
White Member **(Tcw)**				

	40 - 43 Ma	Biostratigraphy		(Bowers, 1972; Goldstrand, 1990b; Eaton et al., 1999)
Red Member **(Tcr)**				
	50 ± 6 Ma	Fission Track	**(#19 in Fig. 2)**	(Kowalis, reported in Goldstrand, 1990b)
Undivided **(Tcu)**				
	58 – 57 Ma	Palynology	**(#22 in Fig. 2)**	(Goldstrand, 1990a)

TABLE DR3. ISOTOPIC AND ELEMENTAL COMPOSITIONS OF SAMPLES.

Unit / Sample Number	$\delta^{18}O_{calcite}$ (V-SMOW)	$\delta^{13}C_{calcite}$ (V-PDB)	Mg (mole %)	Sr/Ca (mmol/mol)	δD_{chert} (V-SMOW)	$\delta^{18}O_{chert}$ (V-SMOW)	Estimated Age (Ma)
Duchesne River Formation Lapoint Member							
UA-DRL-01-05	22.0	-2.3	-	-	-	-	40.3
UA-DRL-01B-05	23.3	-2.6	-	-	-	-	39.6
UT-DR-04-03	17.3	-8.9	-	-	-	-	39.4
UA-DRL-01C-05	14.4	-3.9	-	-	-	-	38.9
UA-DRL-02B-05	17.6	-2.3	6.2	0.25	-	-	36.7
UT-DR-04-11	17.9	-6.3	-	-	-	-	36.0
UT-DR-04-12	17.2	-4.1	-	-	-	-	35.5
UT-DR-04-14	15.6	-3.1	-	-	-	-	34.6
UT-DR-04-15	11.8	-3.0	-	-	-	-	34.2
UA-DRL-04B-05	24.6	1.3	-	-	-	-	33.8
UT-DR-04-19	17.7	-3.2	-	-	-	-	32.9
UA-DRL-07-05	22.8	0.7	-	-	-	-	31.6
UT-DR-04-22	14.2	-2.8	-	-	-	-	31.2
UA-DRL-08-05	15.6	-1.8	-	-	-	-	30.9
UT-DR-04-23	19.6	-8.9	-	-	-	-	30.7
UT-DR-04-24	19.1	-8.6	0.8	0.34	-	-	30.3
UT-DR-04-25	18.2	-5.0	-	-	-	-	29.9
UT-DR-04-26	12.1	-3.4	-	-	-	-	29.4
UA-DRL-10-05	11.1	-2.5	-	-	-	-	28.7
Duchesne River Formation Dry Gulch Creek Member							
UT-DR-04-28	17.3	-0.7	-	-	-	-	40.0
UA-DRDG-07-05	16.1	-2.6	-	-	-	-	37.7
UA-DRDG-08-05	13.6	-3.1	-	-	-	-	36.5
UA-DRDG-11-05	13.6	-3.4	-	-	-	-	35.3
UA-DRDG-11B-05	17.6	-2.3	-	-	-	-	34.2
UA-DRDG-14-05	16.0	-3.1	-	-	-	-	33.0
Duchesne River Formation Brennan Basin Member							
UA-DRBB-01-05	18.8	-2.2	-	-	-	-	42.5
UA-DRBB-01B-05	19.4	-2.1	-	-	-	-	42.4
UA-DRBB-01C-05	19.3	-1.7	16.9	0.70	-	-	42.3
UA-DRBB-02-05	23.6	-2.0	-	-	-	-	42.3
UA-DRBB-03B-05	19.2	-1.5	11.5	0.41	-	-	42.0
UA-DRBB-03B-05	17.1	-2.9	-	-	-	-	41.9
UA-DRBB-04-05	13.0	-3.9	-	-	-	-	41.6
UA-DRBB-06B-05	23.6	-2.8	-	-	-	-	41.3
UA-DRBB-08-05	13.9	-3.7	4.9	0.34	-	-	40.9
UA-DRBB-09-05	16.2	-3.1	-	-	-	-	40.8
UA-DRBB-10-05	16.3	-4.3	13.0	0.49	-	-	40.5
UA-DRBB-11-05	20.2	-2.3	-	-	-	-	40.2
UA-DRBB-12-05	23.9	1.2	-	-	-	-	40.2
UA-DRBB-12B-05	20.7	-1.2	-	-	-	-	40.1
UA-DRBB-13-05	17.3	-3.2	7.6	0.28	-	-	40.0

Uinta Formation							
Myton Member							
UA-UAM-02-05	16.6	-5.9	3.0	0.52	-	-	45.0
UA-UAM-06-05	16.0	-5.7	-	-	-	-	44.5
UA-UAM-07-05	24.6	-1.0	-	-	-	-	44.3
UA-UAM-13-05	22.7	-5.4	-	-	-	-	43.6
UA-UAM-15-05	24.2	-2.1	-	-	-	-	43.3
UA-UAM-16-05	21.0	-4.8	10.6	0.47	-	-	43.2
UA-UAM-17-05	18.0	-5.2	-	-	-	-	43.0
UA-UAM-21-05	24.4	-0.8	-	-	-	-	42.5
Uinta Formation							
Wagonhound Member							
UA-UAW-01B-05	23.2	5.7	-	-	-	-	47.8
UA-UAW-02-05	26.1	7.5	-	-	-	-	47.7
UA-UAW-04-05	21.5	-0.3	-	-	-	-	47.5
UA-UAW-06-05	24.3	4.7	-	-	-	-	47.2
UA-UAW-07B-05	13.3	4.2	-	-	-	-	46.9
UA-UAW-08-05	22.7	6.7	45.0	3.76	-	-	46.9
UA-UAW-09B-05	15.0	2.9	-	-	-	-	46.7
UA-UAW-11D-05	17.9	-0.7	-	-	-	-	46.3
UA-UAW-13-05	17.7	-4.2	-	-	-	-	46.2
UA-UAW-15-05	18.0	-4.9	12.7	1.99	-	-	47.0
UA-UAW-17-05	15.9	-2.9	-	-	-	-	45.7
UA-UAW-23C-05	20.6	-2.8	-	-	-	-	45.0
Green River Formation							
Sandstone and Limestone Facies							
UA-GRSL-31S-05	28.5	-0.9	-	-	-	-	44.2
UA-GRSL-31LS-05	29.2	-0.8	48.2	4.73	-	-	44.2
UA-GRSL-30C-05	25.8	-3.0	-	-	-	-	44.1
UA-GRSL-29-05	28.1	-1.7	47.5	2.49	-	-	44.1
UA-GRSL-27-05	28.5	-1.5	-	-	-	-	44.0
UA-GRSL-26-05	28.5	-1.3	45.4	2.95	-	-	44.0
UA-GRSL-25-05	26.9	-2.9	-	-	-	-	44.0
UA-GRSL-24B-05	27.9	-2.3	25.0	2.71	-	-	43.9
UA-GRSL-24A-05	27.5	-2.4	-	-	-	-	43.9
UA-GRSL-23-05	25.9	-3.5	10.9	2.23	-	-	43.9
UA-GRSL-22-05	27.1	-2.5	-	-	-	-	43.8
UA-GRSL-18LS-05	23.2	-3.6	0.7	1.76	-	-	43.6
UA-GRSL-17-05	23.0	-2.7	-	-	-	-	43.6
UA-GRSL-16-05	24.3	-2.8	42.5	3.25	-	-	43.6
UA-GRSL-13-05	24.1	-3.5	-	-	-	-	43.5
UA-GRSL-12-05	25.8	-4.0	46.8	3.01	-	-	43.4
UA-GRSL-11-05	23.6	-2.5	-	-	-	-	43.4
UA-GRSL-10-05	21.9	-3.2	8.2	1.89	-	-	43.4
UA-GRSL-08-05	22.4	-3.8	-	-	-	-	43.3
UA-GRSL-07-05	25.9	-2.1	24.3	1.97	-	-	43.3
UA-GRSL-06-05	19.0	0.3	-	-	-	-	43.3
UA-GRSL-03-05	20.0	-2.4	14.1	1.67	-	-	43.2
UT-GR-04-140	20.5	-3.2	-	-	-111	-	43.2
UA-GRSL-02-05	20.7	-2.4	3.4	1.17	-	-	43.1
UT-GR-04-141	20.1	-2.1	-	-	-101	24.3	43.1
UA-GRSL-01-05	20.9	-1.0	10.1	2.19	-	-	43.1
Green River Formation							
Saline Facies							
UT-GR-04-114	26.0	4.3	22.8	2.42	-	-	46.0
UA-GRS-37-05	29.5	4.0	-	-	-	-	45.6
UT-GR-04-119	27.1	2.1	13.0	3.47	-	-	45.4
UT-GR-04-120	27.4	2.0	-	-	-	-	45.4
UT-GRC2-01-04	-	-	-	-	-129	32.5	45.4

UT-GRC2-04-04	-	-	-	-	-109	-	45.4
UT-GRC2-05-04	29.6	5.6	49.1	3.23	-	-	45.4
UT-GRC2-06-04	-	-	-	-	-128	31.7	45.4
UT-GRC2-10-04	30.2	5.5	-	-	-	-	45.4
UTGRC2-11-04	-	-	-	-	-128	31.5	45.4
UT-GRC2-12-04	29.6	5.2	47.5	3.14	-	-	45.4
UT-GRC2-12A-04	-	-	-	-	-133	32.6	45.4
UT-GRC2-12B-04	-	-	-	-	-128	31.6	45.4
UT-GRC2-12C-04	-	-	-	-	-130	-	45.4
UT-GRC2-13-04	29.7	5.8	-	-	-	-	45.4
UT-GRC2-14-04	28.4	5.1	43.3	2.85	-	-	45.4
UT-GRC2-15-04	-	-	-	-	-123	29.5	45.4
UT-GRC2-16-04	29.0	5.0	-	-	-	-	45.4
UT-GRC2-17-04	-	-	-	-	-132	31.1	45.4
UT-GRC2-17L-04	29.5	5.6	48.2	2.75	-	-	45.4
UT-GRC2-18-04	-	-	-	-	-132	32.0	45.4
UT-GRC2-19-04	29.7	6.0	-	-	-	-	45.4
UT-GRC2-21-04	-	-	-	-	-119	31.6	45.4
UT-GRC2-21L-04	29.0	6.4	39.9	4.22	-	-	45.4
UT-GRC2-21-04	-	-	-	-	-124	-	45.4
UT-GR-04-125	26.0	2.2	-	-	-	-	45.1
UT-GR-04-132	30.1	-1.2	50.9	4.05	-	-	44.9
UT-GRC-01-04	29.5	3.3	-	-	-	-	44.8
UT-GRC-02-04	-	-	-	-	-121	31.5	44.8
UT-GRC-03-04	29.4	3.3	-	-	-	-	44.8
UT-GRC-04-04	-	-	-	-	-120	-	44.8
UT-GRC-05-04	29.1	3.1	-	-	-	-	44.8
UT-GRC-06-04	-	-	-	-	-128	31.8	44.8
UT-GRC-06(1)-04	-	-	-	-	-125	31.9	44.8
UT-GRC-06(2)-04	-	-	-	-	-125	-	44.8
UT-GRC-06(3)-04	-	-	-	-	-134	-	44.8
UT-GRC-06(4)-04	-	-	-	-	-131	31.8	44.8
UT-GRC-07-04	28.7	2.8	-	-	-	-	44.8
UT-GRC-08-04	-	-	-	-	-129	31.9	44.8
UT-GRC-09-04	29.1	3.3	-	-	-	-	44.8
UT-GRC-10-04	-	-	-	-	-124	30.8	44.8
UT-GRC-11-04	29.6	3.6	-	-	-	-	44.8
UT-GRC-12-04	29.2	3.5	-	-	-	-	44.8
UT-GRC-13-04	-	-	-	-	-125	32.1	44.8
UT-GRC-14-04	29.2	3.2	43.1	3.33	-	-	44.8
UT-GRC-15-04	-	-	-	-	-130	32.6	44.8
UT-GRC-17-04	-	-	-	-	-129	32.1	44.8
UT-GRC-18-04	29.8	3.2	-	-	-	-	44.8
UT-GRC-19-04	-	-	-	-	-125	32.2	44.8
UT-GRC-20-04	28.8	3.3	48.4	3.26	-	-	44.8
UT-GRC-21-04	30.0	3.7	-	-	-	-	44.8
UT-GRC-22-04	-	-	-	-	-127	-	44.8
UT-GRC-23-04	29.4	3.6	48.5	3.03	-	-	44.8
UT-GRC-24-04	-	-	-	-	-122	31.9	44.8
UT-GRC-25-04	28.7	3.0	-	-	-	-	44.8
UA-GRS-14-05	28.2	2.7	44.0	3.88	-	-	44.7
UA-GRS-13-05	27.2	3.8	-	-	-	-	44.6
UA-GRS-12-05	28.6	5.1	40.8	2.62	-	-	44.6
UA-GRS-10-05	29.1	4.3	-	-	-	-	44.5
UA-GRS-08-05	29.0	2.4	47.5	4.77	-	-	44.5
UA-GRS-07-05	27.2	1.4	-	-	-	-	44.4
UA-GRS-05-05	28.1	0.5	34.3	1.99	-	-	44.4

Green River Formation

Main Body

UT-GR-04-07	24.3	3.3	-	-	-	-	52.4
UT-GR-04-08	23.9	4.0	28.3	1.11			52.3
UT-GR-04-09	28.3	3.2	-	-	-	-	52.3
UT-GR-04-11	30.6	4.1	44.9	1.56			52.2
UT-GR-04-12	29.2	5.3	-	-	-	-	52.2
UT-GR-04-13	29.4	6.6	46.4	1.96			52.2
UT-GR-04-14	29.9	3.5	-	-	-	-	52.1
UT-GR-04-15	30.2	6.2	45.8	1.90			52.1
UT-GR-04-16	27.9	5.3	-	-	-	-	52.0
UT-GR-04-17	27.9	4.0	29.1	1.88			52.0
UT-GR-04-18	27.2	4.8	-	-	-	-	51.9
UT-GR-04-20	20.8	-1.8	19.7	1.23			51.8
UT-GR-04-23	24.4	1.3	-	-	-	-	51.7
UT-GR-04-24	28.9	1.2	47.8	1.72			51.7
UT-GR-04-25	27.3	2.9	-	-	-	-	51.6
UT-GR-04-26	26.6	3.9	32.5	1.77			51.6
UT-GR-04-27	21.2	-4.9	-	-	-	-	51.5
UT-GR-04-28	19.5	-4.5	19.5	0.75			51.5
UT-GR-04-29	21.0	-2.3	-	-	-	-	51.5
UT-GR-04-31	17.9	-3.8	9.6	1.04			51.4
UT-GR-04-32	20.1	-3.6	-	-	-	-	51.4
UT-GR-04-43	25.8	-1.7	17.4	1.61			50.9
UT-GR-04-44	26.8	-2.4	-	-	-	-	50.9
UT-GR-04-45	26.3	-2.8	-	-	-	-	50.9
UT-GR-04-47	26.2	-1.6	-	-	-	-	50.8
UT-GR-04-48	20.6	-3.2	-	-	-	-	50.8
UT-GR-04-50	25.6	-3.2	-	-	-	-	50.8
UT-GR-04-51	21.5	-3.3	18.2	1.10			50.6
UT-GR-04-54	25.7	0.5	-	-	-	-	50.5
UT-GR-04-55	-	-	-	-	-120	31.5	50.5
UT-GR-04-56	-	-	-	-	-119	32.0	50.5
UT-GR-04-57	21.7	-2.3	34.0	1.08			50.5
UT-GR-04-58	21.9	-2.5	-	-	-	-	50.3
UT-GR-04-70	24.9	-2.7	15.7	1.15			50.3
UT-GR-04-73	26.3	-0.3	-	-	-	-	49.8
UT-GR-04-74	27.3	-1.3	-	-	-	-	49.6
UT-GR-04-77	26.4	-1.0	-	-	-	-	49.6
UT-GR-04-78	27.1	0.1	25.0	1.54			49.5
UT-GR-04-80	27.2	-0.1	-	-	-	-	49.4
UT-GR-04-85	25.9	-2.0	15.2	1.72			49.3
UA-GRMB-06-05	28.9	2.6	-	-	-	-	49.0
UT-GR-04-96	-	-	-	-	-133	32.3	48.5
UT-GR-04-97	-	-	-	-	-133	31.7	48.5
UT-GR-04-98	-	-	-	-	-137	32.8	48.5
UT-GR-04-99	-	-	-	-	-141	31.0	48.5
UT-GR-04-100	-	-	-	-	-128	26.2	48.5
UT-GR-04-108	26.2	3.0	15.7	2.58	-	-	48.5
UT-GR-04-104	27.8	7.2	-	-	-	-	48.0
UT-GR-04-110	23.7	2.9	9.4	2.98	-	-	47.9
UA-GRMB-10-05	27.3	7.2	-	-	-	-	47.7
UA-GRMB-13-05	26.3	5.1	22.0	2.20	-	-	47.5
UA-GRMB-15S-05	27.4	5.7	-	-	-	-	47.2
UA-GRMB-15LS-05	27.4	5.2	36.9	1.86	-	-	47.2
UT-GR-04-113	26.1	4.0	31.4	2.51	-	-	47.0
UA-GRMB-12-05	26.2	5.0	-	-	-	-	47.0
UA-GRMB-11-05	27.7	5.9	41.9	2.36	-	-	46.9
UA-GRMB-10-05	26.4	5.1	-	-	-	-	46.9
UA-GRMB-09-05	27.2	4.6	43.3	2.55	-	-	46.8
UA-GRMB-05-05	26.5	3.0	-	-	-	-	46.5
UA-GRMB-01-05	27.5	3.0	33.5	2.37	-	-	46.0

Sevier River Formation

UT-SE-04-04	17.2	-4.9	-	-	-	-	15.0
UT-SE-04-03	19.2	-3.4	-	-	-	-	14.5
UT-SE-04-05	15.5	-6.1	13.1	0.65	-	-	14.1
UT-SE-04-01	18.2	-4.7	-	-	-	-	13.5
UT-SE-04-02	18.5	-4.9	-	-	-	-	13.4
UT-SE-04-12	15.4	-5.8	-	-	-	-	12.7
UT-SE-04-06	21.0	-3.8	37.7	1.48	-	-	12.3
UT-SE-04-07	17.2	-5.3	-	-	-	-	11.4
UT-SE-04-10	18.4	-4.7	-	-	-	-	10.3
Dipping Vat Formation							
UT-DV-04-15	15.6	0.5	2.0	0.36	-	-	25.0
UT-DV-04-14	14.7	0.8	-	-	-	-	25.2
UT-DV-04-13	16.1	0.7	2.3	0.33	-	-	25.2
UT-DV-04-12	15.4	0.4	-	-	-	-	25.4
UT-DV-04-11	14.9	0.7	-	-	-	-	25.6
UT-DV-04-10	15.4	0.6	-	-	-	-	25.7
UT-DV-04-09	15.3	0.1	-	-	-	-	25.9
UT-DV-04-08	15.7	1.3	-	-	-	-	26.2
UT-DV-04-06	15.6	0.6	-	-	-	-	30.5
UT-DV-04-02	15.1	1.2	-	-	-	-	33.3
UT-DV-04-01	15.7	1.4	4.2	0.36	-	-	34.6
Bald Knoll Formation (Formation of Aurora)							
UT-AU-04-21	18.5	-3.8	-	-	-	-	38.0
UT-AU-04-22	13.3	-2.6	-	-	-	-	38.0
UT-AU-04-20	20.4	-2.6	-	-	-	-	38.2
UT-AU-04-18	19.7	-1.3	-	-	-	-	38.3
UT-AU-04-17	13.7	-2.5	-	-	-	-	38.4
UT-AU-04-16	19.7	-1.9	-	-	-	-	38.4
UT-AU-04-15	13.8	-2.2	10.4	0.54	-	-	38.6
UT-AU-04-14	17.6	-1.1	-	-	-	-	38.6
UT-AU-04-13	16.9	-2.0	16.6	0.67	-	-	38.9
UT-AU-04-12A	17.2	-1.9	-	-	-	-	39.2
UT-AU-04-12	16.4	-1.4	-	-	-	-	39.2
UT-AU-04-11	17.6	-0.8	-	-	-	-	39.3
UT-AU-04-10	17.7	-0.9	-	-	-	-	39.4
UT-AU-04-09	19.7	-0.1	-	-	-	-	39.5
UT-AU-04-08	18.6	-0.9	-	-	-	-	39.5
UT-AU-04-07	17.4	-1.0	-	-	-	-	39.6
UT-AU-04-06	15.7	-1.5	-	-	-	-	39.6
UT-AU-04-04	18.9	-1.7	-	-	-	-	40.1
UT-AU-04-02	23.3	-0.9	-	-	-	-	40.4
UT-AU-04-01	19.0	-2.0	-	-	-	-	40.5
Crazy Hollow Formation							
UT-CH-04-01	17.2	-1.3	-	-	-	-	44.0
UT-CH-04-02	14.9	-0.6	-	-	-	-	43.5
UT-CH-04-03	15.0	-1.1	-	-	-	-	43.2
UT-CH-04-04	14.0	-1.5	-	-	-	-	42.7
UT-CH-04-06	13.9	-2.3	14.8	0.41	-	-	41.7
UT-CH-04-07	15.1	-2.2	-	-	-	-	41.1
UT-CH-04-08	13.4	-2.5	-	-	-	-	40.8
UT-CH-04-09	19.9	-2.1	30.7	0.48	-	-	40.5
UT-CH-04-10	13.2	-1.6	-	-	-	-	40.5
Green River Formation Flagstaff basin							
UT-GR-04-214	24.9	-3.4	-	-	-	-	48.0
UT-GR-04-215	28.8	-1.2	48.3	2.66	-	-	47.8
UT-GR-04-216	23.4	-3.1	-	-	-	-	47.6
UT-GR-04-217	28.4	-1.0	-	-	-	-	47.5

UT-GR-04-218	29.0	-1.7	-	-	-	-	47.4
UT-GR-04-219	29.7	-0.8	48.7	2.48	-	-	47.2
UT-GR-04-222	28.2	-0.7	-	-	-	-	46.8
UT-GR-04-223	25.6	-1.4	-	-	-	-	46.7
UT-GR-04-224	27.4	-1.4	-	-	-	-	46.6
UT-GR-04-225	22.7	-2.3	24.3	1.03	-	-	46.4
UT-GR-04-227	26.8	-1.2	-	-	-	-	46.0
UT-GR-04-228	29.6	-1.2	47.1	2.21	-	-	45.9
UT-GR-04-228B	29.6	-1.0	-	-	-	-	45.8
UT-GR-04-229	25.0	-0.1	45.2	2.27	-	-	45.6
UT-GR-04-229A	29.4	-0.5	1.3	0.84	-	-	45.5
UT-GR-04-229B	29.9	-0.9	-	-	-	-	45.4
UT-GR-04-230D	24.3	-1.3	48.5	1.71	-	-	45.2
UT-GR-04-230C	27.7	-1.4	-	-	-	-	45.1
UT-GR-04-231	30.5	0.3	-	-	-	-	44.7
UT-GR-04-233	24.5	-0.6	-	-	-	-	44.4
UT-GR-04-234	27.6	-1.5	-	-	-	-	44.3
UT-GR-04-235A	22.9	-0.6	-	-	-	-	44.0
UT-GR-04-236	29.3	-0.3	-	-	-	-	44.0
UT-GR-04-200	25.7	0.3	-	-	-	-	51.0
UT-GR-04-203	28.6	-1.5	48.2	2.75	-	-	50.5
UT-GR-04-205	27.4	-2.4	-	-	-	-	49.8
UT-GR-04-206	24.0	-2.3	-	-	-	-	49.6
UT-GR-04-209	27.4	-2.0	47.5	2.93	-	-	48.7
UT-GR-04-212	27.5	-2.2	-	-	-	-	48.0
Brian Head Formation							
SWU-BH-00-05	16.9	-0.9	3.7	0.36	-	-	29.5
SWU-BH-02-05	15.2	0.9	-	-	-	-	30.0
SWU-BH-03-05	16.7	-2.7	-	-	-	-	30.3
SWU-BH-04-05	15.5	0.4	-	-	-	-	30.6
SWU-BH-07-05	13.8	0.4	5.0	0.23	-	-	31.4
SWU-BH-08-05	14.4	0.2	-	-	-	-	31.7
SWU-BH-09-05	14.4	-0.5	3.3	0.25	-	-	32.0
SWU-BH-10-05	13.9	-0.2	-	-	-	-	32.2
SWU-BH-11-05	14.9	-0.6	-	-	-	-	32.5
SWU-BH-12-05	15.5	-1.2	-	-	-	-	32.8
SWU-BH-13-05	14.4	-0.3	-	-	-	-	33.1
SWU-BH-14-05	15.0	0.0	-	-	-	-	33.3
SWU-BH-15-05	15.1	0.0	9.2	0.30	-	-	33.6
SWU-BH-16-05	14.5	-0.6	-	-	-	-	33.9
SWU-BH-17-05	14.6	-0.2	-	-	-	-	34.2
SWU-BH-18-05	13.6	-0.8	-	-	-	-	34.4
SWU-BH-19-05	14.1	-5.7	2.8	0.33	-	-	34.7
SWU-BH-20-05	14.3	-0.9	-	-	-	-	34.7
SWU-BH-22-05	13.0	-0.1	-	-	-	-	34.8
SWU-BH-24-05	13.6	2.1	-	-	-	-	34.9
SWU-BH-25-05	12.9	0.7	-	-	-	-	34.9
SWU-BH-26-05	12.9	2.2	-	-	-	-	34.9
SWU-BH-27-05	15.7	-0.3	-	-	-	-	35.0
SWU-BH-30-05	17.2	-0.2	-	-	-	-	35.1
SWU-BH-31-05	11.8	0.9	2.8	0.20	-	-	35.1
SWU-BH-32-05	14.8	-0.8	-	-	-	-	35.1
SWU-BH-33-05	15.6	-0.1	6.3	0.33	-	-	35.2
SWU-BH-34-05	14.8	0.2	-	-	-	-	35.2
SWU-BH-36-05	16.0	-0.2	-	-	-	-	35.4
SWU-BH-37-05	17.6	0.3	-	-	-	-	35.5
SWU-BH-39-05	13.6	0.2	4.7	0.28	-	-	35.7
SWU-BH-40-05	13.5	0.3	-	-	-	-	35.8
SWU-BH-41-05	15.7	0.0	1.6	0.26	-	-	35.9
SWU-BH-42-05	17.8	-2.0	-	-	-	-	36.0
Claron Formation							
White Member							
SWU-CL-20-05	14.7	-1.1	-	-	-	-	37.0
SWU-CL-22-05	14.6	-1.4	-	-	-	-	37.3

SWU-CL-25-05	20.1	-2.6	-	-	-	-	37.8
SWU-CL-26-05	16.5	-1.7	-	-	-	-	38.0
SWU-CL-29-05	24.3	-2.8	-	-	-	-	38.5
SWU-CL-31-05	23.5	-3.2	-	-	-	-	38.8
SWU-CL-33-05	18.2	-1.9	-	-	-	-	39.1
SWU-CL-35-05	19.8	-4.2	-	-	-	-	39.4
SWU-CL-37-05	20.6	-3.0	-	-	-	-	39.7
SWU-CL-38-05	22.5	-2.4	-	-	-	-	39.9
SWU-CL-39-05	21.0	-3.1	-	-	-	-	40.0
Claron Formation							
Red Member							
SWU-CL-40-05	22.7	-3.3	-	-	-	-	40.0
SWU-CL-41-05	22.3	-3.5	-	-	-	-	40.1
SWU-CL-42-05	22.0	-4.2	-	-	-	-	40.3
SWU-CL-43-05	21.4	-3.7	-	-	-	-	40.4
SWU-CL-44-05	18.9	-3.0	-	-	-	-	40.6
SWU-CL-45-05	20.2	-3.2	-	-	-	-	40.7
SWU-CL-46-05	20.6	-2.9	17.5	0.25	-	-	40.9
SWU-CL-47-05	20.7	-3.6	-	-	-	-	41.1
SWU-CLR-01-05	19.9	-4.5	-	-	-	-	39.9
SWU-CLR-02-05	20.3	-5.3	0.3	0.21	-	-	40.1
SWU-CLR-03-05	20.1	-5.3	-	-	-	-	40.3
SWU-CLR-10-05	20.6	-5.6	15.1	0.27	-	-	41.9
SWU-CLR-11-05	20.7	-4.9	-	-	-	-	42.1
SWU-CLR-14-05	20.0	-5.0	15.2	0.23	-	-	42.8
SWU-CLR-16-05	19.5	-6.0	-	-	-	-	43.2
SWU-CLR-17-05	22.0	-4.4	46.0	0.97	-	-	43.4
SWU-CLR-18-05	19.5	-6.3	-	-	-	-	43.7
SWU-CLR-19-05	19.3	-6.5	1.1	0.18	-	-	43.9
SWU-CLR-22-05	18.8	-5.7	-	-	-	-	44.6
SWU-CLR-23-05	21.9	-4.9	43.4	0.84	-	-	44.8
SWU-CLR-24-05	22.3	-4.7	-	-	-	-	45.0
Claron Formation							
Undivided							
BRCL32	14.20	0.57	-	-	-	-	57.49
BRCL30	13.98	0.86	-	-	-	-	52.68
BRCL29	13.85	0.97	-	-	-	-	51.75
BRCL28	13.94	0.4	-	-	-	-	51.49
BRCL27	13.52	0.75	-	-	-	-	48.45
BRCL26	13.50	0.91	-	-	-	-	48.11
BRCL25	13.80	0.63	-	-	-	-	47.86
BRCL24	14.18	0.39	-	-	-	-	47.61
BRCL23	14.54	1.73	-	-	-	-	47.35
BRCL13	15.25	2.15	-	-	-	-	35.86
BRCL12	14.48	2.74	-	-	-	-	35.77
BRCL10	14.41	2.6	-	-	-	-	35.27
BRCL09b	13.99	3.09	-	-	-	-	35.18
BRCL09a	14.16	2.48	-	-	-	-	35.10
BRCL08	14.43	2.54	-	-	-	-	34.93
BRCL07	13.94	2.41	-	-	-	-	34.85
BRCL06	14.18	3.72	-	-	-	-	34.59
BRCL05	14.12	2.63	-	-	-	-	34.42
BRCL04	13.76	2.86	-	-	-	-	34.25
BRCL03b	12.41	4.22	-	-	-	-	34.08
BRCL03a	13.15	3.06	-	-	-	-	34.00
NCCL 1	14.36	-4.7	-	-	-	-	57.79
NCCL3	16.33	-5.72	-	-	-	-	57.37
NCCL-4	15.95	-4.47	-	-	-	-	57.16
NCCL-5	15.25	-5.97	-	-	-	-	56.95
NCCL-6A	14.97	-5.92	-	-	-	-	56.74
NCCL 7	14.24	-7.11	-	-	-	-	56.53
NCCL-8A	14.66	-6.14	-	-	-	-	56.32
NCCL-9	14.63	-5.01	-	-	-	-	56.11
NCCL 10A	14.77	-5.89	-	-	-	-	55.90

NCCL 11A	16.25	-3.74	-	-	-	-	55.69
NCCL-13	14.83	-5.99	-	-	-	-	55.27
NCCL 14	14.71	-5.58	-	-	-	-	54.64
NCCL-20	13.63	-6.04	-	-	-	-	52.95
NCCL-52	16.10	-4.14	-	-	-	-	39.15
NCCL 57B	15.80	-3.32	-	-	-	-	37.89
NCCL-61A	15.13	-3.05	-	-	-	-	36.63
NCCL-62A	10.76	-1.92	-	-	-	-	36.42
NCCL 62B	13.94	-1.5	-	-	-	-	36.42
NCCL 65A	11.81	-2.25	-	-	-	-	35.15
NCCL 66	9.54	-2.3	-	-	-	-	34.94
NCCL-67	12.45	-2.44	-	-	-	-	34.73
NCCL 73	8.89	-2.03	-	-	-	-	33.19
NCCL-74	8.08	-3.3	-	-	-	-	32.49
NCCL 75	8.00	-2.78	-	-	-	-	32.28
NCCL 76	6.64	-3.07	-	-	-	-	32.00

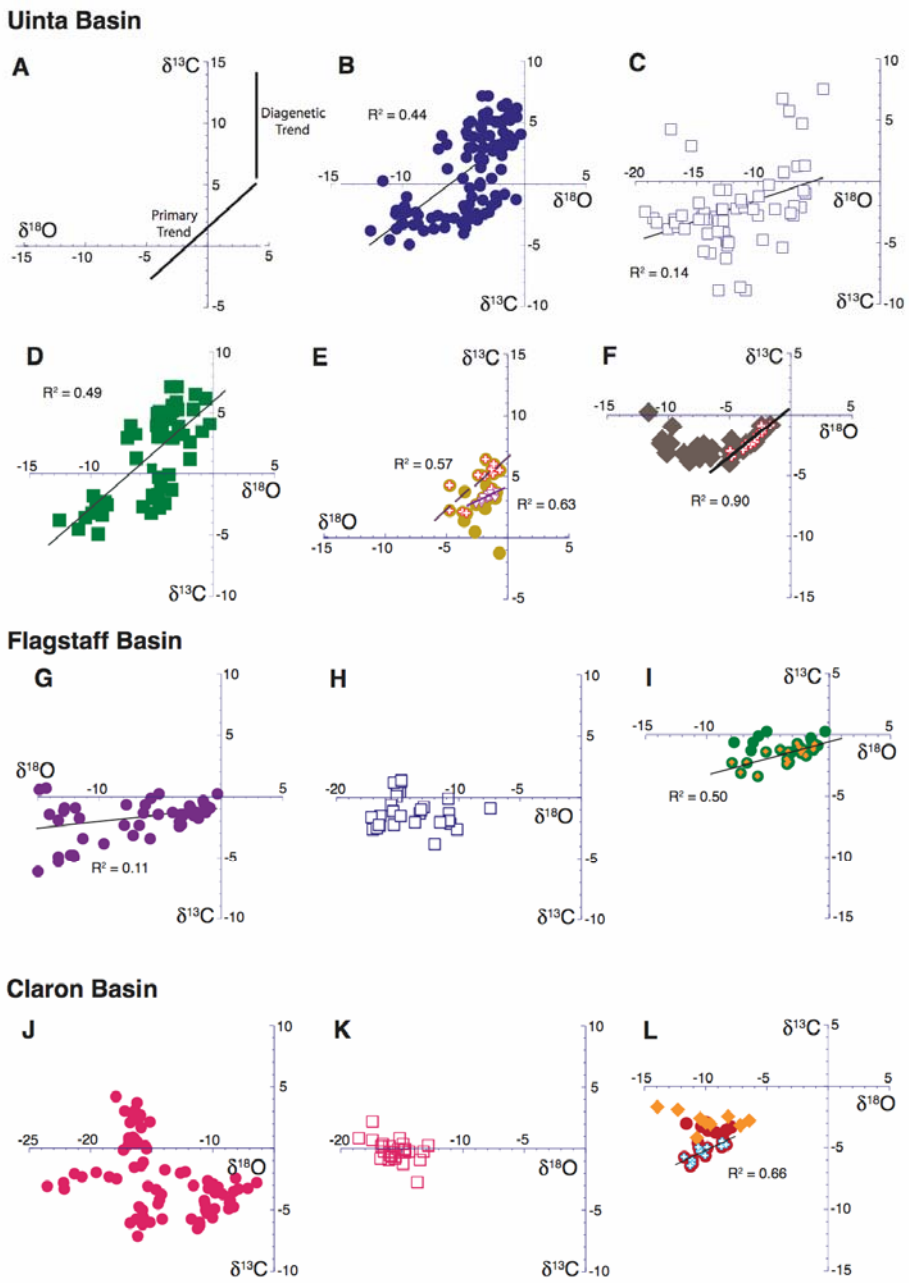

Figure DR1. Covariance of δ13C and δ18O measured in carbonate samples. Panel A shows the typical primary and diagenetic trends (Talbot and Kelts, 1990). Panel B shows all limestone and marl samples collected in the Uinta Basin. Panel C shows all calcite cement samples collected in the Uinta Basin. Panels D, E, and F show the Main Body, Saline Facies, and Sandstone and Limestone Facies, respectively, of the Green River Formation in the Uinta Basin. Inscribed crosses and triangles in Panel E denote the regressed subsets of stratigraphically consecutive Saline Facies samples described in the text. Inscribed crosses in Panel F denote the regressed subset of stratigraphically consecutive Sandstone and Limestone Facies samples described in the text. Panel G shows all limestone and marl samples collected in the Flagstaff Basin. Panel H shows all calcite cement samples collected in the Flagstaff Basin. Panel I shows samples of the Green River Formation in the Flagstaff Basin; inscribed diamonds denote the regressed subset of stratigraphically consecutive samples described in the text. Panel J shows all limestone and marl samples collected in the Claron Basin. Panel K shows all calcite cement samples collected in the Claron Basin. Panel L shows samples of the Claron Formation collected on the Markagunt Plateau; diamonds denote White Member samples; circles denote Red Member samples, and inscribed crosses denote the regressed subset of the Red Member samples described in the text.

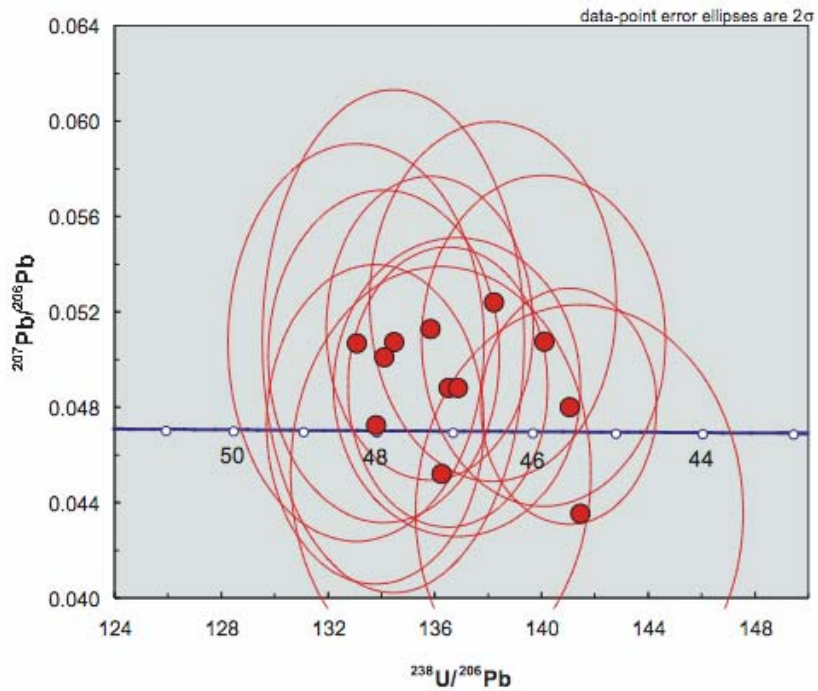

Figure DR2. Tera-Waserburg plot of Sample UA-UAW-14-05

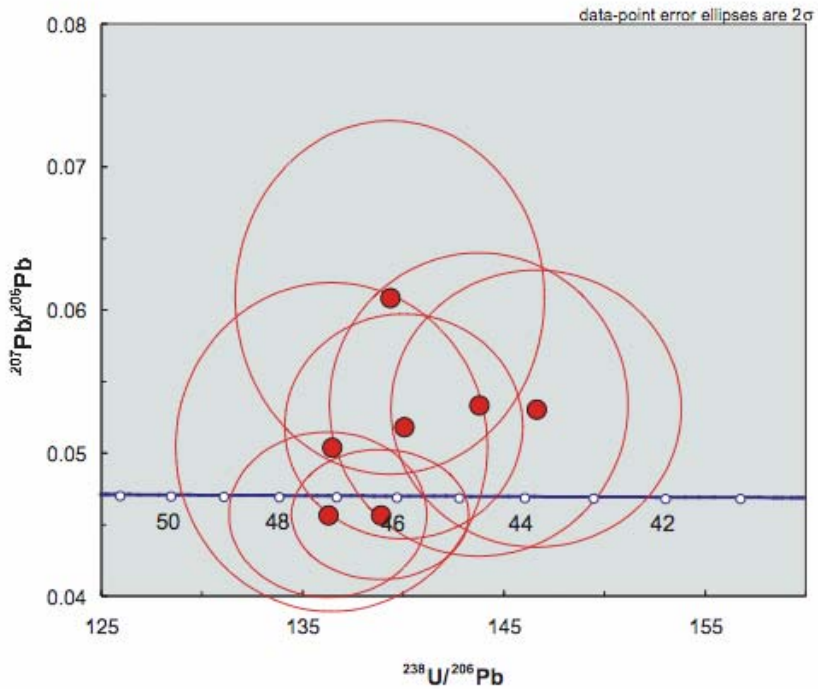

Figure DR3. Tera-Waserburg plot of Sample UA-GRS-32-05

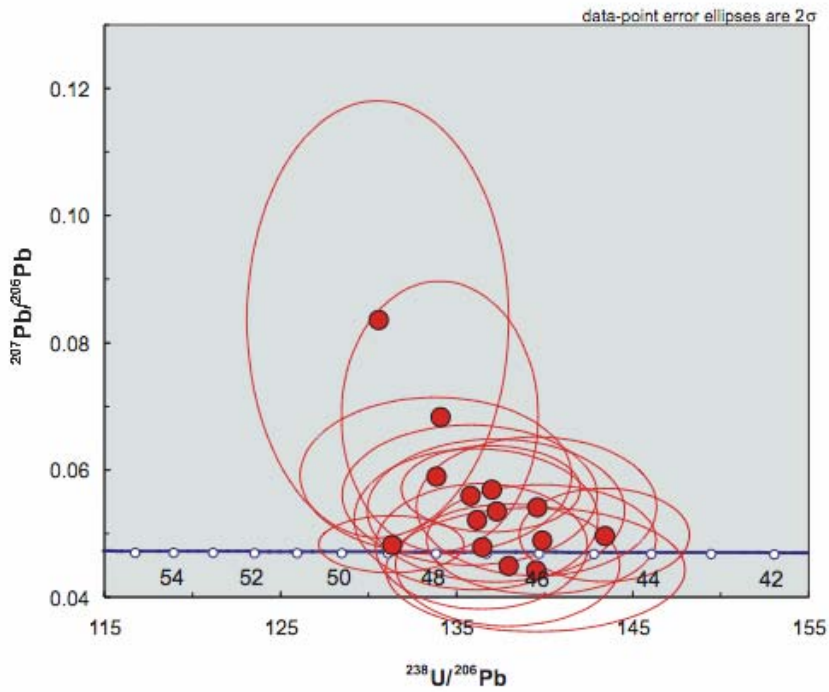

Figure DR4. Tera-Waserburg plot of Sample UA-GRS-37-05

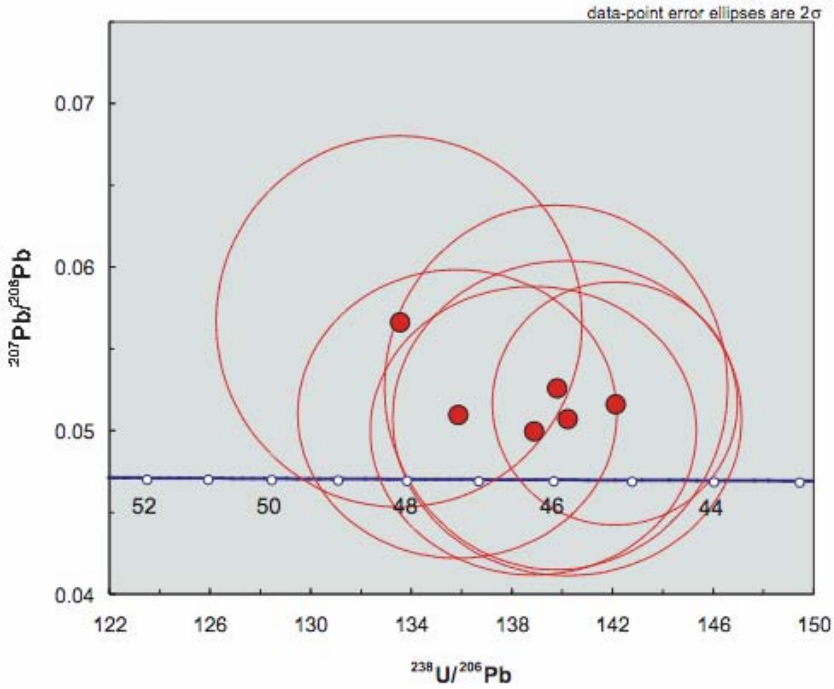

Figure DR5. Tera-Waserburg plot of Sample UA-GR-04-07

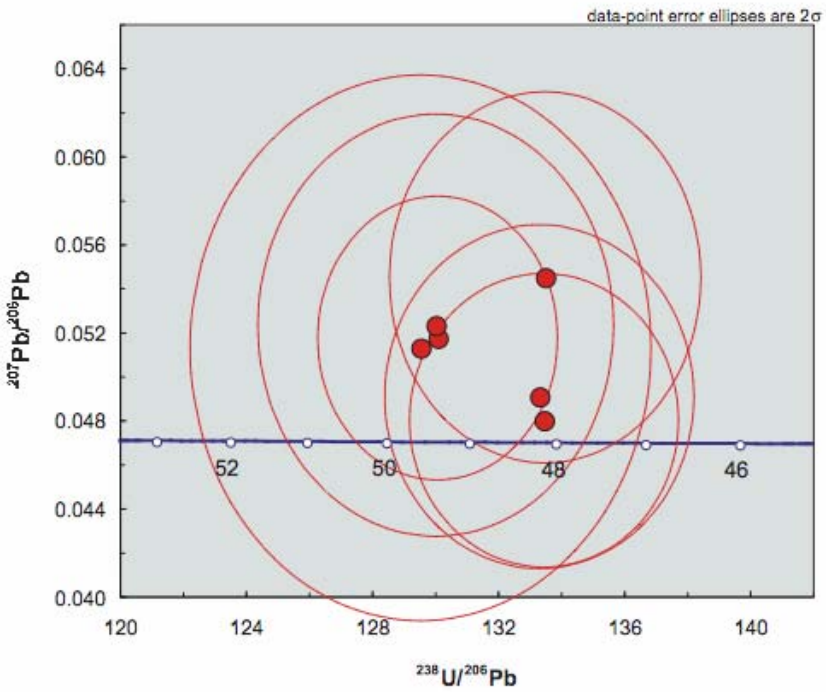

Figure DR6. Tera-Waserburg plot of Sample UA-GRMB-04-05

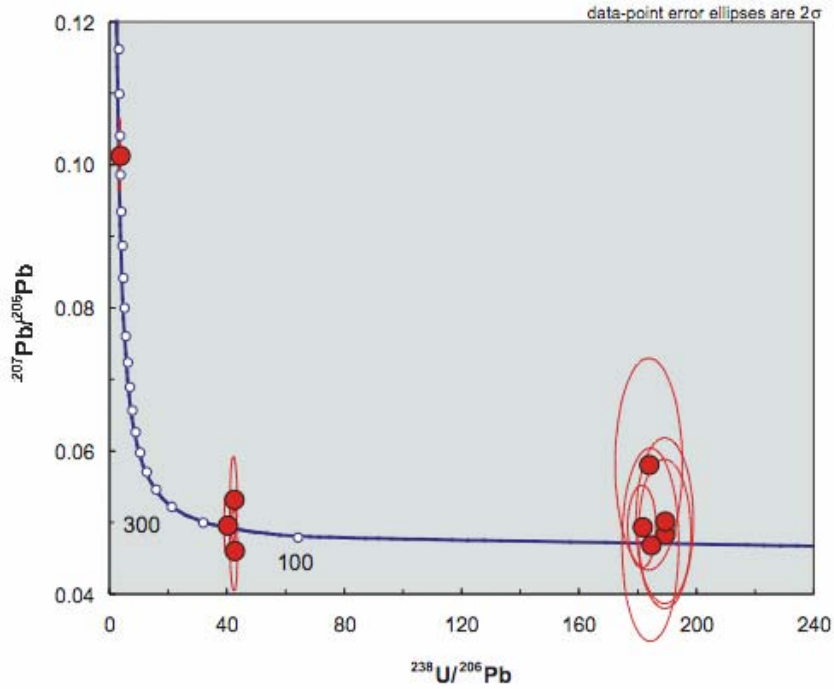

Figure DR7. Tera-Waserburg plot of Sample SWU-BH-19-05

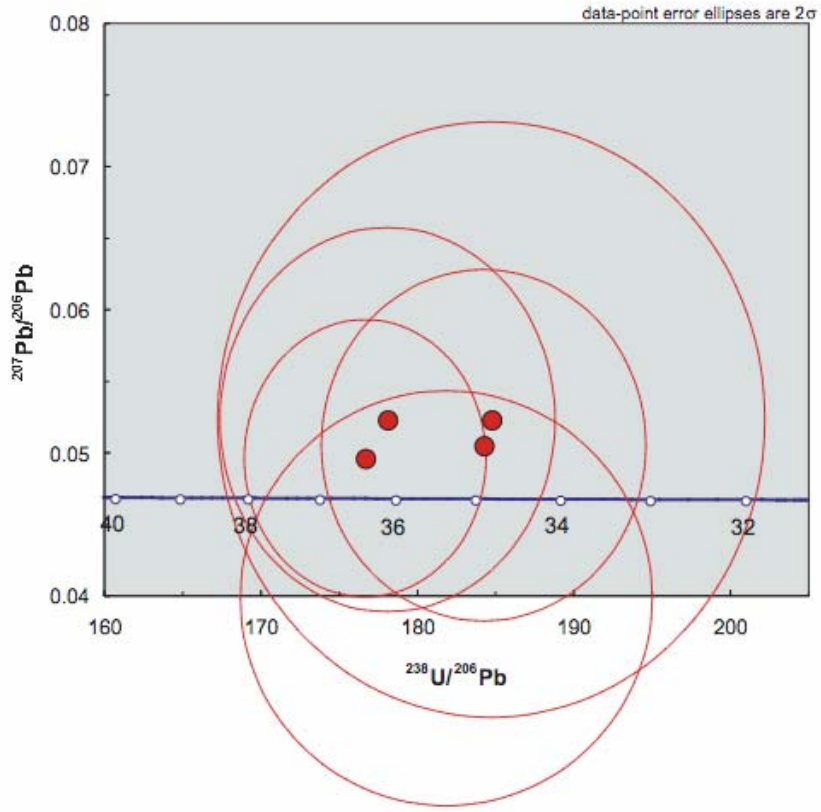

Figure DR8. Tera-Waserburg plot of Sample SWU-BH-34-05

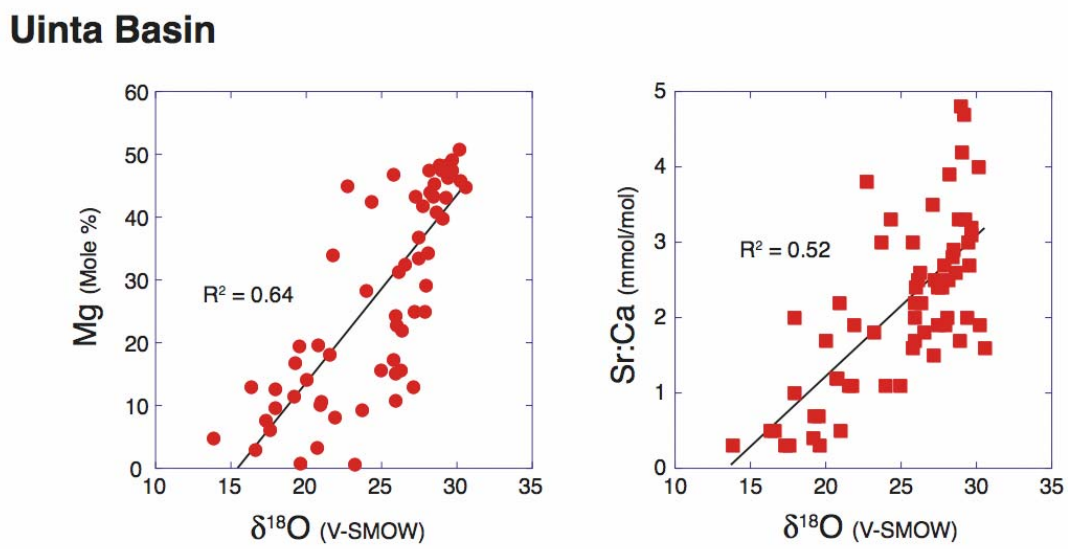

Figure DR9. Correlation of $\delta^{18}O$ and Mg mole % and Sr/Ca ratios in all samples from the Uinta Basin.

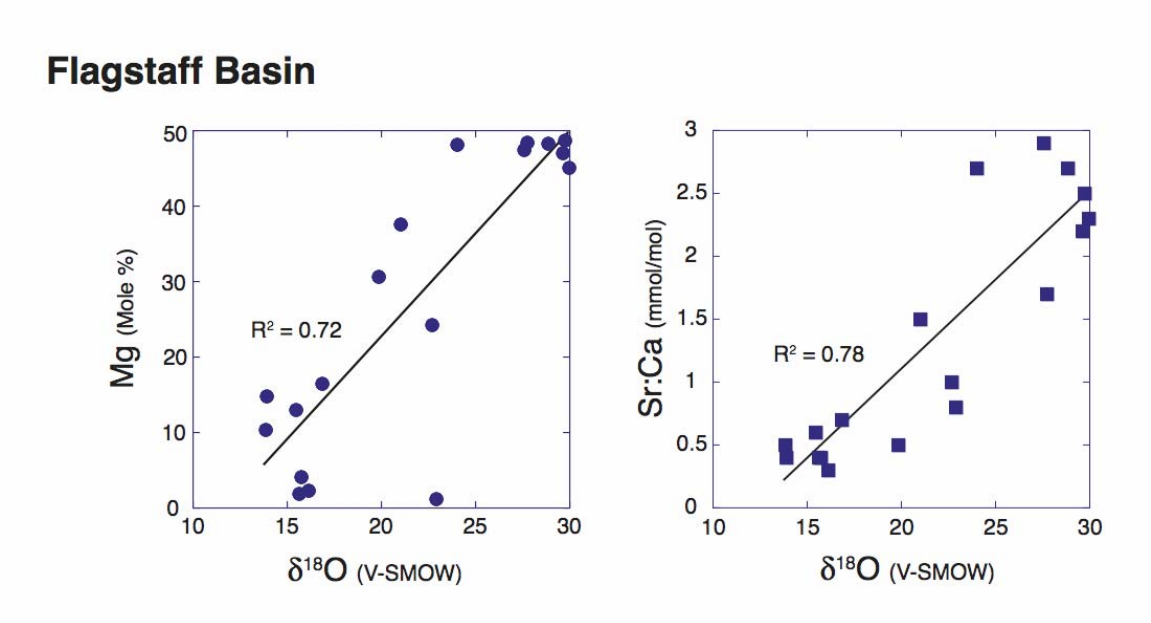

Figure DR10. Correlation of $\delta^{18}O$ and Mg mole % and Sr/Ca ratios in all samples from the Flagstaff Basin.

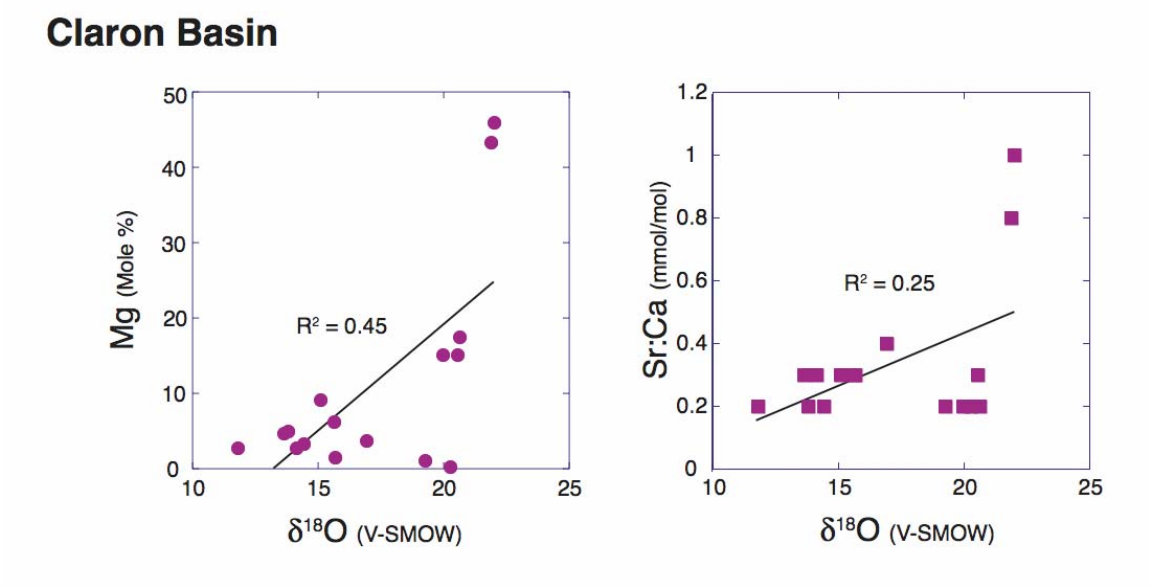

Figure DR11. Correlation of $\delta^{18}O$ and Mg mole % and Sr/Ca ratios in all samples from the Claron Basin.

Data Repository References

Anderson, D. W., and Picard, M. D., 1972, Stratigraphy of the Duchesne River Formation (Eocene-Oligocene?), Northern Uinta Basin, Northeastern Utah: Utah Geological and Mineralogical Survey Bulletin, v. 97, p. 1-23.

Anderson, J. J., and Kurlich, R. A., 1989, Post-Claron Formation, pre-regional ash-flow tuff early Tertiary stratigraphy of the southern High Plateaus of Utah: GSA Abstracts with Programs, v. 21, no. 5, p. 50.

Anderson, R. E., Diehl, S. F., and Barnhard, T. P., 2001, Age and style of deformation and stratal thinning at the transition, Wasatch Plateau to Great Basin, central Utah: Rocky Mountain Geology, v. 36, no. 1, p. 49-89.

Bowers, W. E., 1972, The Canaan Peak, Pine Hollow, and Wasatch Formations in the Table Cliff Region, Garfield County, Utah: USGS Bulletin, v. 1331-B, p. 1-39.

Bradley, W. H., 1931, Origin and microfossils of the oil shale of the Green River Formation of Colorado and Utah: United States Geological Survey Professional Paper, v. 168.

Bryant, B., Naeser, C. W., Marvin, R. F., and Mehnert, H. H., 1989, Upper Cretaceous and Paleogene sedimentary rocks and isotopic ages of Paleogene tuffs, Uinta Basin, Utah: USGS Bulletin, v. 1787-J.

Cashion, W. B., 1982, Descriptions of four stratigraphic sections of parts of the Green River and Uinta Formations in the eastern Uinta Basin, Uintah Couty, Utah, and Rio Blanco County, Colorado.

Dane, C. H., 1955, Stratigraphic and facies relationships of upper part of Green River Formation and lower part of the Uinta Formation in Duchesne, Uintah, and Wasatch counties: Bulletin of the American Association of Petroleum Geologists, v. 38, p. 405-425.

Eaton, J. G., Hutchison, J. H., Holroyd, P. A., Korth, W. W., and Goldstrand, P. M., 1999, Vertebrates of the Turtle Basin local fauna, middle Eocene, Sevier Plateau, south-central Utah, *in* Gilleue, D. D., ed., Vertebrate paleontology in Utah, Utah Geological Survey Miscellaneous Publication, p. 463-468.

Feist, M., Eaton, J. G., Brouwers, E. M., and Maldonado, F., 1997, Significance of Charophytes from the lower Tertiary variegated and volcaniclastic units, Brain Head Formation, Casto Canyon area, southern Sevier Plateau, southwestern Utah: USGS Bulletin, v. 2153, no. B, p. 29-29.

Fleck, R. J., Anderson, J. J., and Rowley, P. D., 1975, Chronology of mid-Tertiary volcanism in High Plateaus region of Utah, Cenozoic geology of the southwestern High Plateaus of Utah, p. 53-62.

Fouch, T. D., Cashion, W. B., Ryder, R. T., and Campbell, J. A., 1976, Field guide to lacustrine and related nonmarine depositional environments in Tertiary rocks, Uinta basin, Utah, *in* Epis, R. C., and Weimer, R. J., eds., Studies in Colorado field geology: Professional Contributions, Colorado School of Mines, p. 358-385.

Gazin, C. L., 1959, Paleontological exploration and dating of the early Tertiary deposits in basins adjacent to the Uinta Mountains, Intermountain Association of Petroleum Geologists Annual Field Conference, p. 131-138.

Goldstrand, P. M., 1990a, Stratigraphy and ages of the basal Claron, Pine Hollow, Canaan Peak, and Grapevine Wash Formations, southwest Utah: Utah Geological and Mineral Survey Open File Report, p. 188.

-, 1990b, Stratigraphy and paleogeography of late Cretaceous and Paleogene rocks of southwest Utah, Utah Geological and Mineral Survey Miscellaneous Publication, Utah Geological and Mineral Survey, 58 p.

Hamblin, A. H., 1987, Paleogeography and paleoecology of the Myton Pocket, Uinta Basin, Utah (Uinta Formation - Upper Eocene): Brigham Young University Geology Studies, v. 34, p. 33-60.

Krishtalka, L., West, R. M., Black, C. C., Dawson, M. R., Flynn, J. J., Turnbull, W. D., Stcuky, R. K., McKenna, M. C., Brown, T. M., Golz, D. J., and Lillegraven, J. A., 1987, Eocene (Wasatchian through Duchesnean) biochronology of North America, *in* Woodburne, M. O., ed., Cenozoic mammals of North America: Berkeley, University of California Press, p. 77-117.

Mauger, R. L., 1977, K-Ar ages of biotites from tuffs in Eocene rocks of the Green River, Washakie, and Uinta basins, Utah, Wyoming, and Colorado: University of Wyoming Contributions to Geology, v. 15, no. 1, p. 17-41.

McDowell, F. W., and Wilson, J. A., 1973, K-Ar dates for biotite from two paleontologically significant localities: Duchesne River Formation, Utah and Chadron Formation, South Dakota: Isochron/West, v. 7, p. 11-13.

Moore, D. W., Nealey, L. D., and Sable, E. G., 1994, Preliminary report, measured sections, and map of the geology of the Asay Bench Quadrangle, Garfield and Kane Counties, Utah: USGS Open File Report, v. 94, no. 10, p. 1-26.

Nelson, M. E., Madsen, J. H., and Stokes, W. L., 1980, A titanothere from the Green River Formation, central Utah; Telodus uintensis (Perissodactyla; Bronotheriidae): Rocky Mountain Geology, v. 18, no. 2, p. 127-134.

Prothero, D. R., 1990, Magnetostratigraphy and $^{40}Ar/^{39}Ar$ dating of the Middle Eocene Uinta Formation, Uinta Basin, Utah: GSA Abstracts with Programs.

-, 1996, Magnetic stratigraphy and biostratigraphy of the Middle Eocene Uinta Formation, Uinta Basin, Utah, *in* Prothero, D. R., and Emry, R. J., eds., The Terrestrial Eocene-Oligocene Transition in North America, Cambridge, p. 3-24.

Prothero, D. R., and Swisher, C. C., III, 1992, Magnetostratigraphy and geochronology of the terrestrial Eocene-Oligocene transition in North America, *in* Prothero, D. R., and Berggren, W. A., eds., Eocene-Oligocene climatic and biotic evolution: Princeton, New Jersey, Princeton University Press, p. 46-73.

Rasmussen, D. T., Hamblin, A. H., and Tabrum, A. R., 1999, The mammals of the Eocene Duchesne River Formation, *in* Gillette, D. D., ed., Vertebrate Paleontology in Utah: Miscellaneous Publication, Utah Geological Survey, p. 553.

Remy, R. R., 1992, Stratigraphy of the Eocene Part of the Green River Formation in the South-Central Part of the Uinta Basin, Utah: USGS Bulletin, v. 1787-BB, p. 1-79.

Rowley, P. D., Anderson, J. J., and Williams, P. L., 1975, A summary of Tertiary volcanic stratigraphy of the southwestern high plateaus and adjacent Great Basin, Utah: USGS Bulletin, v. 1405-B, p. 1-20.

Rowley, P. D., Mehnert, H. H., Naeser, C. W., Snee, L. W., Cunningham, C. G., Steven, T. A., Anderson, J. J., Sable, E. G., and Anderson, R. E., 1994, Isotopic ages and

stratigraphy of Cenozoic rocks of the Marysvale Volcanic Field and adjacent areas, west-central Utah: USGS Bulletin, v. 2071, p. 1-35.

Sable, E. G., and Maldonado, F., 1997, The Brian Head Formation (Revised) and Selected Tertiary Sedimentary Rock Units, Markagunt Plateau and Adjacent Areas, Southwestern Utah: U.S. Geological Survey Bulletin, v. 2153-A, p. 5-26.

Smith, M. E., 2002, $^{40}Ar/^{39}Ar$ Geochronology of the Eocene Green River Formation, Wyoming and Utah [Master of Science thesis]: University of Wisconsin - Madison, 71 p.

Smith, M. E., Carroll, A. R., and Singer, B. S., 2008, Synoptic reconstruction of a major ancient lake system: Eocene Green River Formation, western United States: GSA Bulletin, v. 120, no. 1/2, p. 54-84.

Steven, T. A., Cunningham, C. G., Naeser, C. W., and Mehnert, H. H., 1979, Revised stratigraphy and radiometric ages of volcanic rocks and mineral deposits in the Marysvale area, west-central Utah: USGS Bulletin, v. 1469, p. 40.

Talbot, M. R., and Kelts, K., 1990, Paleolimnological signatures from carbon and oxygen isotopic ratios in carbonates from organic carbon-rich lacustrine sediments: AAPG Memoir, v. 50, p. 99-112.

Taylor, W. J., 1993, Stratigraphic and lithologic analysis of the Claron Formation in southwestern Utah: Utah Geological Survey Miscellaneous Publication.

Weiss, M. P., 1982, Relation of the Crazy Hollow Formation to the Green River Formation, Central Utah, Overthrust Belt of Utah: Utah Geological Association Publication 10, p. 285-289.

Willis, G. C., 1986, Geologic Map of the Salina Quadrangle, Sevier County, Utah: Utah Geological and Mineral Survey, scale 1:24,000.

-, 1988, Geologic Map of the Aurora Quadrangle, Sevier County, Utah: Utah Geological and Mineral Survey, scale 1:24,000.