Figure DR1 - Location map of the Tatonduk Inlier with inset of geological map of the Tatonduk Inlier modified from Brabb & Churkin (1969) and Van Kooten et al. (1997); NAM-ancestral North America, AACP-Arctic Alaska Chukotka Microplate.

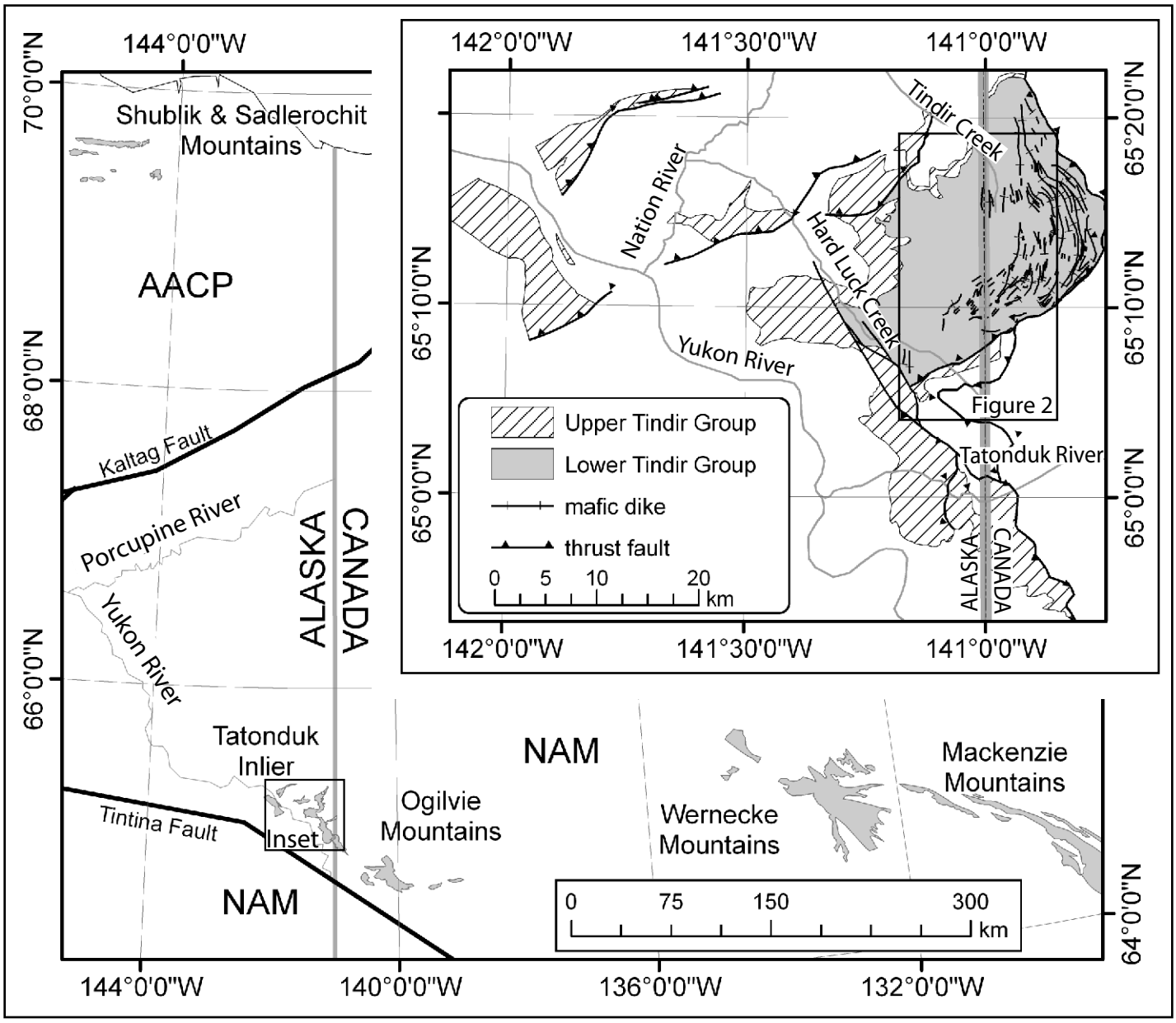
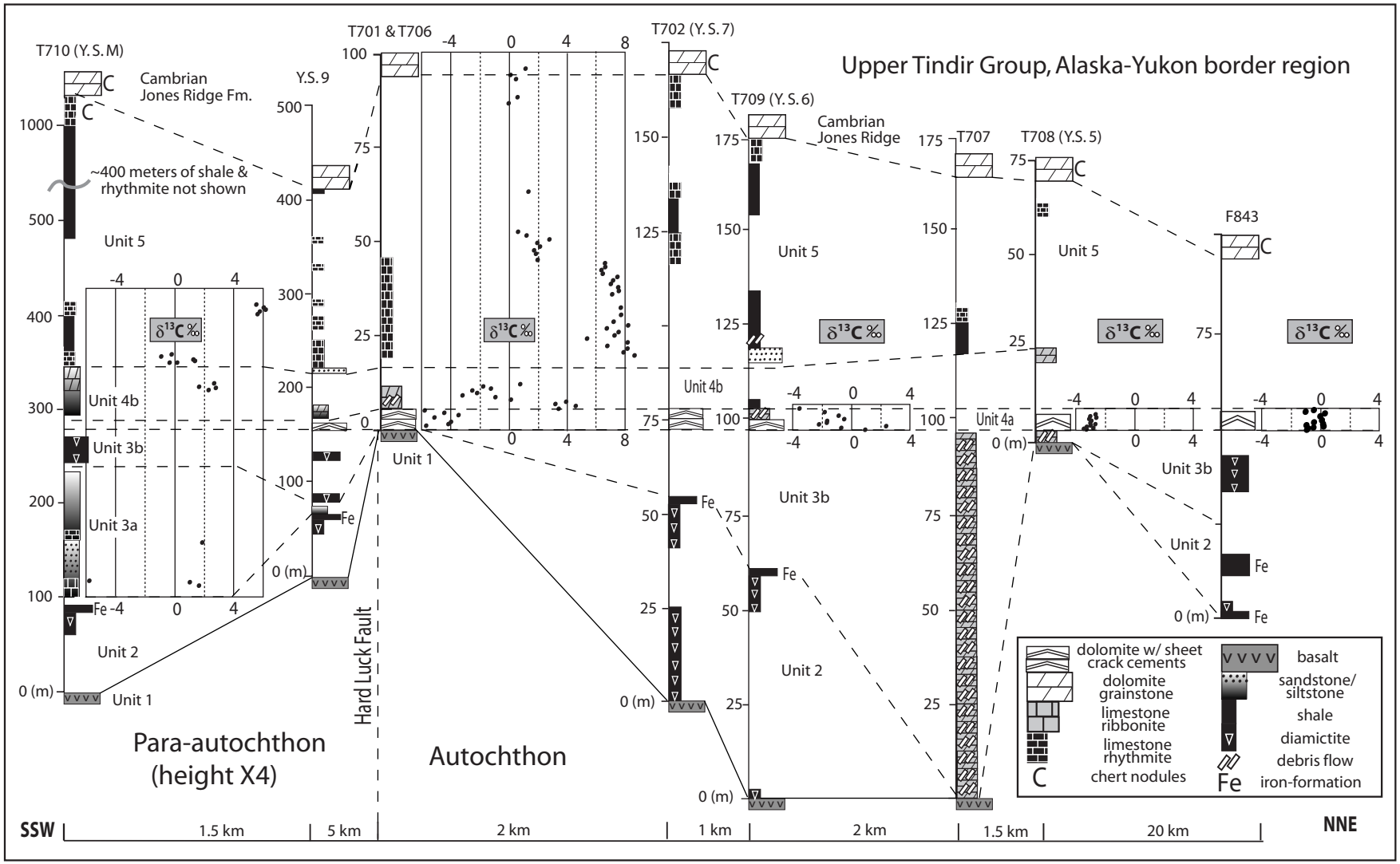


Figure DR2 - Chemo- and litho-stratigraphy of the Upper Tindir Group in the Hard Luck Creek and Pass Creek areas. Location of sections in Figure 2.



Macdonald et al., Fig. DR2.pdf

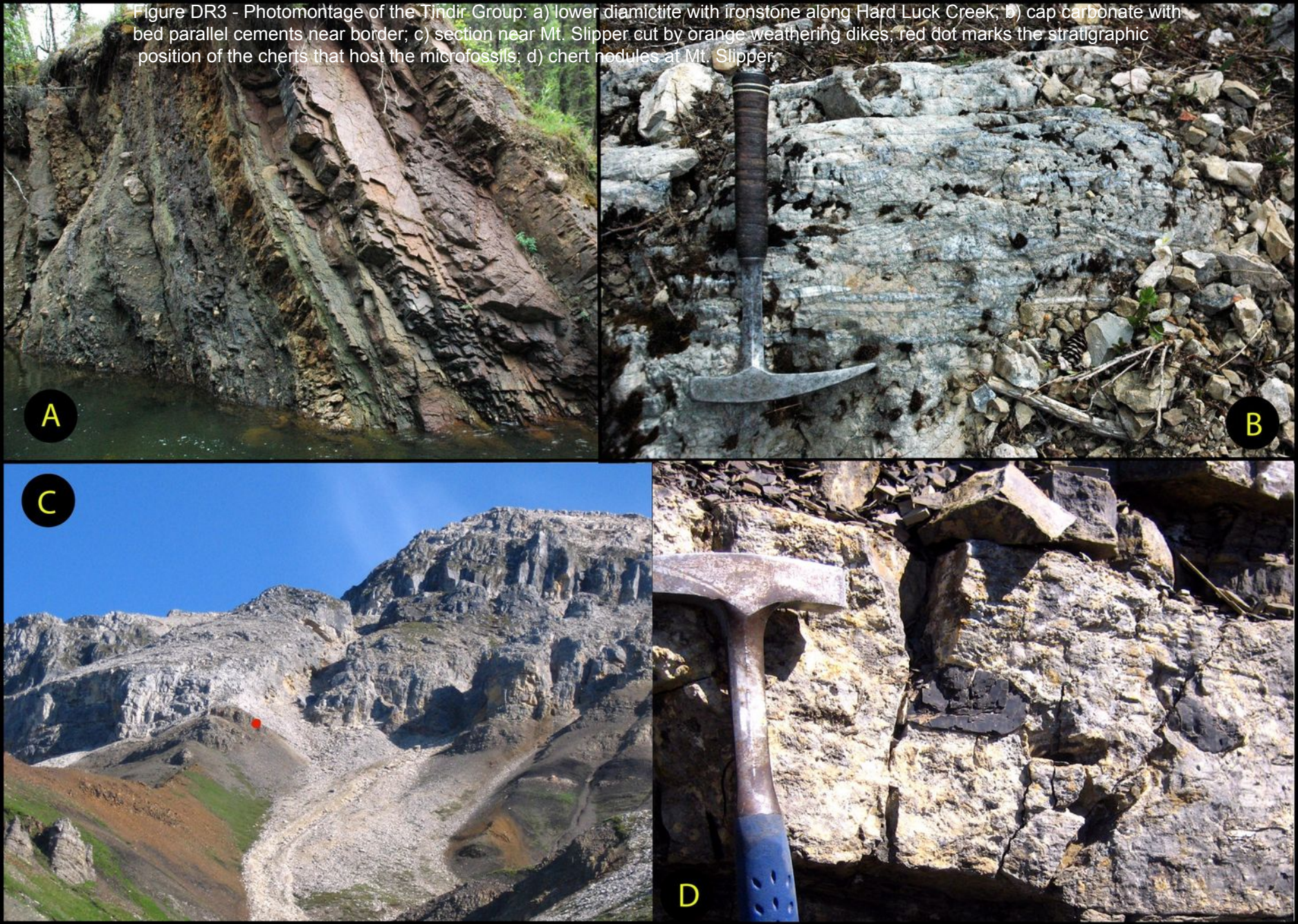
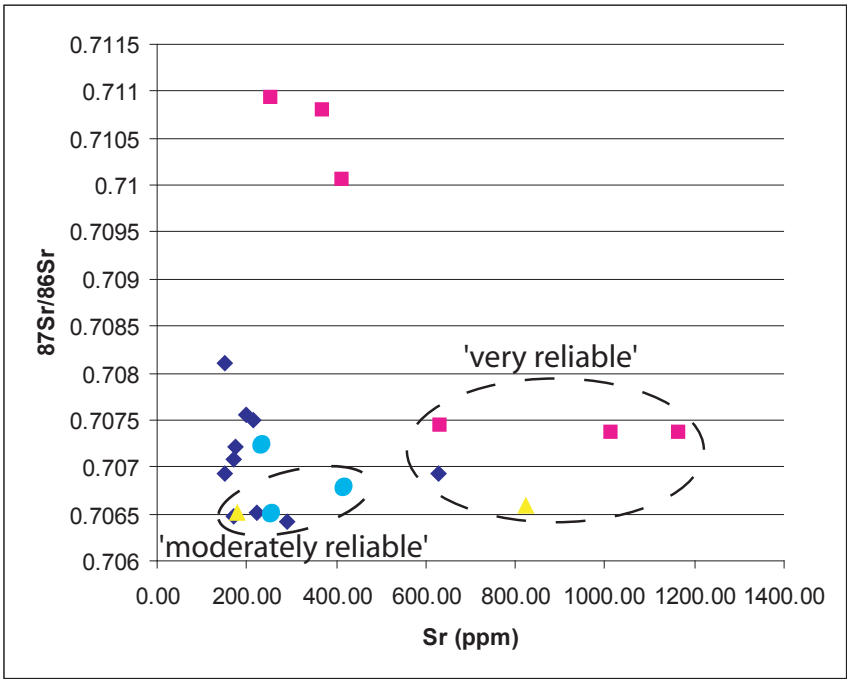


Figure DR3 - Photomontage of the Tindir Group: a) lower diamictite with ironstone along Hard Luck Creek; b) cap carbonate with bed parallel cements near border; c) section near Mt. Slipper cut by orange weathering dikes; red dot marks the stratigraphic position of the cherts that host the microfossils; d) chert nodules at Mt. Slipper

Figure DR4: - 87Sr/86Sr-Sr concentration cross-plot. Turquoise circles are from the Lower Tindir Group (section T705), pink squares are from the Upper Tindir Group (sections T710 and T702), blue diamonds are from the Mt. Slipper section (T714), and yellow triangles are from Kaufman et al., 1992. See Data Repository Table 1 for discussion of reliability.



Macdonald et al., Fig. DR4.pdf

GSA Data Repository Table DR1

Sample selection and preparation

During our mapping we collected samples for isotopic analyses within measured stratigraphic sections. All samples were cut perpendicular to lamination, revealing internal textures. Between 5 and 20 mg of powder were micro-drilled from the individual laminations (where visible), with an eye to avoid veining, fractures, and siliciclastic components. All subsequent isotopic analyses were performed on aliquots of this powder.

Carbon and oxygen isotopic analyses

Carbonate $\delta^{13}C$ and $\delta^{18}O$ isotopic data were acquired simultaneously on a VG Optima dual inlet mass spectrometer attached to a VG Isocarb preparation device (Micromass, Milford, MA) in the Harvard University Laboratory for Geochemical Oceanography. Approximately 1-mg micro-drilled samples were reacted in a common, purified H_3PO_4 bath at 90°C. Evolved CO_2 was collected cryogenically and analyzed using an in-house reference gas. External error (1σ) from standards was better than ± 0.1‰ for both $\delta^{13}C$ and $\delta^{18}O$. Samples were calibrated to VPDB (Value of the Pee-Dee Belemnite) using the Cararra marble standard. Potential memory effect resulting from the common acid-bath system was minimized by increasing the reaction time to seven minutes for dolomite samples. Memory effect is estimated at <0.1‰ based on variability of standards run after dolomite samples. Carbon ($\delta^{13}C$) and oxygen ($\delta^{18}O$) isotopic results are reported in per mil notation of $^{13}C/^{12}C$ and $^{18}O/^{16}O$, respectively, relative to the standard VPDB. Herein we report $\delta^{13}C$ and $\delta^{18}O$ measurements of ~650 samples.

$^{87}Sr/^{86}Sr$ analysis

All $^{87}Sr/^{86}Sr$ data in Table 2 were acquired at the MIT Radiogenic Isotope Laboratory. Approximately 10 mg of each powdered carbonate sample was first leached sequentially 3-5 times for 15-45 minutes in an ultrasonic bath, in 1.0 mL of 0.2M ammonium acetate, to remove loosely bound Sr cations. The remaining solid was then washed 3 times in an ultrasonic bath with 1.0 mL of ultrapure water, to remove excess ammonium and suspended clays. Carbonate was reacted for 5 min. with 1.0 mL 1.4 M acetic acid and insoluble residue was removed by centrifuging. Sr was isolated via standard chromatographic techniques using 50 µL columns of EIChroM SR-spec resin. Samples were analyzed by thermal ionization mass spectrometry (TIMS) on a GV IsoProbe T in dynamic mode, with target intensity of 3V ^{88}Sr. All data were corrected to $^{86}Sr/^{88}Sr = 0.1194$ for internal mass bias. Each analysis represents a minimum of 60 ratio measurements, with internal precision of better than 0.001% (1-σ). Analyses were referenced against NBS SRM 987 (0.710250), with a long-term average of 0.710240 and 2-σ external precision of 0.000014.

Elemental analysis

Elemental concentrations of Sr and Ca were determined by inductively coupled plasma optical emission spectroscopy (ICP-OES) on a Jobin-Yvon 46P in the Harvard University Laboratory for Geochemical Oceanography. All samples were prepared by dissolving ~6 mg of carbonate powder in ~6 ml of 2% nitric acid. SCP single element

standards were used for element-specific instrumental calibration. External error (1-σ), determined by repeat analyses and was less than 5%.

Diagenetic considerations

Below we report 19 new $^{87}Sr/^{86}Sr$ measurements. In $^{87}Sr/^{86}Sr$ versus Sr concentration space (data repository figure 6), we define a region of 'most reliable' data with Sr concentrations greater than 500 ppm. Because different rocks of different ages and different diagenetic histories have different alteration thresholds, we follow Halverson et al. (2007) and use a moving reliability cutoff defined by the scatter of the data. Despite lacking numbers to make a robust data cutoff, data below this threshold seem to show considerable scatter. We also define a region of 'moderately reliable' data (Fig. 3) based on the absolute $^{87}Sr/^{86}Sr$ value, because diagenetic overprinting usually increases $^{87}Sr/^{86}Sr$ (Banner and Hanson, 1990), and consequently, very low values (here less than 0.7068) are likely near primary values.

References

Banner, J.L., and Hanson, G.N., 1990, Calculation of simultaneous isotopic and trace element variations during water-rock interaction with application to carbonate diagenesis: Geochimica et Cosmochimica Acta, v. 54, p. 3123-3137.

Halverson, G.P., Dudás, F.O., Maloof, A.C., and Bowring, S.A., 2007, Evolution of the $^{87}Sr/^{86}Sr$ composition of Neoproterozoic Seawater: Palaeogeography Palaeoclimatology Palaeoecology, v. 256, p. 103-129.

Results

Explanation—Lower Tindir Group: ltlc=lower carbonate unit; ltus=upper shale unit; ltuc=upper carbonate unit. Upper Tindir Group: 3a=unit 3a; 4a=unit 4a; 4b=unit 4b; 5=unit 5. CJR=Cambrian Jones Ridge. Facies prefix: d=dolomite; l=limestone. Facies suffix: gs=grainstone; ml=microbialaminite; go=giant ooids; ri=ribbonite; st=stromatolite; rh=rhythmite; tb=turbidite; df=debris flow; bc=black chert; mp=mircopeloidal; c=cements; br=breccia

section	height (m)	d13C	d18O	unit	facies	Sr (ppm)	87Sr/86Sr
T701	1.6	-5.72	-5.19	4a	dgs		
T701	2.0	-4.21	-3.11	4a	dgs		
T701	2.5	-4.04	-4.95	4a	dgs		
T701	3.0	-4.30	-5.85	4a	dgs		
T701	3.5	-5.18	-5.02	4a	dgs		
T701	4.0	-3.52	-3.32	4a	dgs		
T701	4.5	-4.50	-8.29	4a	dgs		
T701	5.0	-5.79	-4.12	4a	dgs		
T701	5.5	3.36	-6.40	4b	dbr		
T701	6.0	4.51	-0.84	4b	dbr		
T701	6.5	3.15	-1.63	4b	dbr		
T701	7.0	3.87	-4.67	4b	dbr		

T701	7.5	0.08	-8.06	4b	dbr		
T701	8.0	-1.00	-7.49	4b	dbr		
T701	8.5	-3.24	-6.88	4b	dri		
T701	9.0	-2.23	-6.58	4b	dri		
T701	9.5	-2.55	-6.63	4b	dri		
T701	10.0	-1.29	-8.20	4b	dri		
T701	10.5	-1.81	-6.73	4b	dri		
T701	11.0	0.71	-8.48	4b	dri		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T702	0.2	1.98	-4.22	5	lrh		
T702	1.0	1.75	-4.85	5	lrh	253	0.710927
T702	2.0	1.63	-3.91	5	lrh	371	0.710805
T702	3.0	2.04	-6.09	5	lrh	415	0.71006
T702	4.0	1.85	-4.79	5	lrh		
T702	5.0	2.66	-8.81	5	lrh		
T702	6.0	1.10	-6.62	5	lrh	193	
T702	7.0	0.52	-6.39	5	lrh	14	
T702	18.0	1.22	-4.55	5	lrh	0	
T702	42.5	-0.11	-7.46	5	lrh	80	
T702	44.0	0.47	-4.63	5	lrh	0	
T702	49.0	0.40	-4.37	5	lrh	0	
T702	50.0	0.00	-4.48	CJR	dgo		
T702	52.0	1.02	-4.48	CJR	dgo		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T705	0.3	2.99	-6.53	ltus	dri	234	0.70723
T705	6.1	3.68	-2.38	ltus	lrh	418	0.706793
T705	7.8	3.37	-5.40	ltus	lrh	133	
T705	8.4	2.08	-3.80	ltus	lri	105	
T705	9.5	4.70	-5.22	ltus	lri	109	
T705	10.6	4.36	-6.55	ltus	lrh	149	
T705	12.0	2.68	-4.91	ltus	lrh		
T705	13.0	4.48	-5.74	ltus	lrh	256	0.706507
T705	14.0	3.04	-6.29	ltus	lrh	148	
T705	19.8	1.91	-6.79	ltus	lrh	213	
T705	20.7	4.45	-4.83	ltus	lrh		
T705	23.0	2.18	-6.72	ltus	lrh		
T705	28.5	-5.54	0.44	ltus	lrh		
T705	29.5	-5.50	-1.47	ltus	lrh		
T705	34.5	4.77	0.29	ltuc	dri		
T705	35.5	2.88	-0.47	ltuc	dri		
T705	37.0	2.65	-4.28	ltuc	dri		

T705	38.2	2.93	-6.24	ltuc	dri		
T705	39.5	3.12	-4.75	ltuc	drh		
T705	41.3	2.59	-5.33	ltuc	dri		
T705	42.4	3.19	-5.36	ltuc	dri		
T705	44.3	2.71	-6.26	ltuc	dri		
T705	46.0	2.17	-5.50	ltuc	drh		
T705	47.0	1.77	-5.38	ltuc	drh		
T705	48.0	1.88	-5.17	ltuc	drh		
T705	49.0	2.14	-5.24	ltuc	drh		
T705	50.0	1.92	-5.14	ltuc	drh		
T705	51.0	2.14	-5.40	ltuc	drh		
T705	52.0	2.28	-5.17	ltuc	drh		
T705	53.5	2.99	-4.35	ltuc	drh		
T705	55.0	3.47	-3.91	ltuc	drh		
T705	56.0	2.12	-5.29	ltuc	drh		
T705	57.0	2.39	-4.61	ltuc	drh		
T705	58.0	1.97	-5.21	ltuc	drh		
T705	59.0	2.12	-5.15	ltuc	drh		
T705	60.0	1.80	-5.74	ltuc	drh		
T705	61.0	1.95	-5.16	ltuc	drh		
T705	62.0	1.85	-4.97	ltuc	drh		
T705	63.0	1.53	-6.29	ltuc	drh		
T705	64.0	0.91	-5.75	ltuc	drh		
T705	65.0	1.96	-5.12	ltuc	drh		
T705	66.0	1.34	-5.45	ltuc	drh		
T705	67.0	1.32	-6.28	ltuc	drh		
T705	68.0	1.17	-5.56	ltuc	drh		
T705	69.0	1.13	-5.07	ltuc	dri		
T705	70.0	1.71	-5.11	ltuc	dri		
T705	71.0	2.44	-4.91	ltuc	dri		
T705	72.0	1.61	-4.90	ltuc	dst		
T705	73.0	2.20	-4.89	ltuc	dst		
T705	74.0	2.46	-4.69	ltuc	dst		
T705	75.0	0.68	-5.75	ltuc	dri		
T705	76.0	2.12	-2.48	ltuc	dri		
T705	77.0	1.05	-5.46	ltuc	dri		
T705	78.0	1.55	-1.70	ltuc	drh		
T705	79.0	1.98	-2.68	ltuc	drh		
T705	80.0	0.57	-5.72	ltuc	drh		
T705	81.0	1.28	-5.98	ltuc	drh		
T705	82.0	0.78	-5.18	ltuc	drh		
T705	83.0	1.17	-5.75	ltuc	drh		
T705	84.0	0.86	-5.16	ltuc	drh		
T705	85.0	1.85	-6.01	ltuc	drh		
T705	87.0	0.72	-6.05	ltuc	drh		

T705	88.0	1.75	-4.87	ltuc	drh		
T705	89.0	-2.96	0.68	ltuc	drh		
T705	90.0	-0.04	-4.71	ltuc	drh		
T705	91.5	1.13	-5.13	ltuc	drh		
T705	93.0	0.98	-5.06	ltuc	drh		
T705	94.0	1.16	-5.25	ltuc	drh		
T705	95.0	0.62	-5.59	ltuc	drh		
T705	96.0	0.86	-5.52	ltuc	drh		
T705	97.0	1.26	-5.53	ltuc	drh		
T705	98.0	0.85	-5.74	ltuc	drh		
T705	99.0	0.73	-6.09	ltuc	drh		
T705	100.0	0.86	-5.71	ltuc	drh		
T705	101.0	0.67	-5.72	ltuc	drh		
T705	102.0	0.80	-5.99	ltuc	drh		
T705	103.0	1.77	-5.47	ltuc	drh		
T705	104.0	0.75	-5.98	ltuc	drh		
T705	105.0	1.18	-5.46	ltuc	dri		
T705	106.0	0.88	-5.35	ltuc	dri		
T705	107.0	1.58	-5.53	ltuc	dri		
T705	108.5	2.02	-5.65	ltuc	drh		
T705	110.0	2.22	-5.58	ltuc	dst		
T705	111.0	2.14	-5.65	ltuc	dst		
T705	112.0	2.49	-5.52	ltuc	dst		
T705	113.0	1.88	-6.09	ltuc	dst		
T705	114.0	1.36	-4.63	ltuc	dst		
T705	115.0	1.50	-5.07	ltuc	dgs		
T705	120.0	1.60	-5.27	ltuc	dri		
T705	121.0	1.48	-5.03	ltuc	dri		
T705	122.0	2.34	-5.16	ltuc	drh		
T705	124.0	2.69	-2.94	ltuc	dri		
T705	125.0	2.31	-4.68	ltuc	ddf		
T705	152.0	-2.47	-3.25	ltuc	drh		
T705	154.1	-3.14	-0.88	ltuc	drh		
T705	155.0	-2.78	-1.82	ltuc	drh		
T705	156.5	-1.78	-7.43	ltuc	drh		
T705	158.8	0.14	-7.96	ltuc	drh		
T705	160.0	-0.97	-7.75	ltuc	drh		
T705	161.0	-1.16	-6.74	ltuc	drh		
T705	162.0	-1.45	-7.06	ltuc	drh		
T705	163.0	-1.91	-3.22	ltuc	drh		
T705	164.0	-2.33	-2.53	ltuc	drh		
T705	165.0	-2.62	-2.73	ltuc	drh		
T705	170.0	-2.32	-2.79	ltuc	drh		
T705	171.0	-2.42	-4.54	ltuc	drh		
T705	172.0	-2.99	-5.57	ltuc	drh		

T705	173.0	-2.36	-1.89	ltuc	drh		
T705	174.0	-2.48	-1.69	ltuc	drh		
T705	175.0	-2.16	-2.51	ltuc	drh		
T705	176.0	-3.15	-6.40	ltuc	drh		
T705	177.0	-3.03	-5.52	ltuc	dri		
T705	178.0	-2.36	-5.22	ltuc	dri		
T705	179.0	-4.37	-5.41	ltuc	dri		
T705	180.0	-2.73	-3.50	ltuc	drh		
T705	181.0	-2.64	-3.42	ltuc	drh		
T705	182.0	-3.20	-2.92	ltuc	drh		
T705	183.0	-2.48	-5.40	ltuc	drh		
T705	184.0	-2.78	-4.70	ltuc	drh		
T705	185.0	-3.14	-1.99	ltuc	drh		
T705	186.0	-2.76	-5.67	ltuc	drh		
T705	187.0	-3.00	-2.79	ltuc	drh		
T705	188.0	-2.61	-3.26	ltuc	drh		
T705	189.0	-3.75	-2.24	ltuc	drh		
T705	190.0	-3.66	-1.32	ltuc	dri		
T705	191.0	-3.54	-0.89	ltuc	dri		
T705	192.0	-2.40	-3.22	ltuc	drh		
T705	193.0	-3.47	-0.57	ltuc	dri		
T705	194.0	-3.94	-0.70	ltuc	dri		
T705	195.0	-3.98	0.47	ltuc	dri		
T705	196.0	-3.50	-1.15	ltuc	dri		
T705	201.0	-2.39	-7.29	ltuc	dri		
T705	202.5	-3.51	-6.95	ltuc	dri		
T705	204.0	-3.69	-6.61	ltuc	dri		
T705	206.0	-3.95	-3.51	ltuc	drh		
T705	207.0	-2.56	-6.47	ltuc	drh		
T705	208.0	-0.83	-3.44	ltuc	drh		
T705	209.0	-2.08	-6.43	ltuc	drh		
T705	210.0	-1.95	-7.13	ltuc	drh		
T705	211.0	-1.35	-3.14	ltuc	drh		
T705	212.0	-2.95	-7.00	ltuc	drh		
T705	218.5	-2.09	-3.50	ltuc	drh		
T705	232.0	-2.52	-7.04	ltuc	drh		
T705	233.0	-1.65	-6.12	ltuc	drh		
T705	234.0	-2.69	-7.90	ltuc	drh		
T705	250.0	-2.70	-7.57	ltuc	dri		
T705	251.0	-2.35	-8.86	ltuc	dri		
T705	252.0	-2.00	-7.37	ltuc	dri		
T705	253.0	-1.82	-8.29	ltuc	dri		
T705	254.0	-2.71	-9.58	ltuc	dri		
T705	255.0	-3.34	-8.62	ltuc	dri		
T705	281.0	-1.76	-7.54	ltuc	dri		

T705	282.0	-1.78	-7.26	ltuc	dri		
T705	283.0	-1.35	-7.81	ltuc	dri		
T705	284.0	-2.17	-8.00	ltuc	dri		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T706	0.1	8.76	-5.90	5	drh		
T706	1.0	7.99	-6.92	5	drh		
T706	2.0	8.25	-5.93	5	drh		
T706	3.0	6.87	-5.97	5	drh		
T706	4.0	8.27	-7.36	5	drh		
T706	5.0	5.42	-6.69	5	drh		
T706	6.0	7.35	-6.41	5	drh		
T706	7.0	7.62	-6.69	5	drh		
T706	8.0	6.83	-5.82	5	drh		
T706	9.0	8.28	-6.85	5	drh		
T706	10.0	7.28	-6.47	5	drh		
T706	12.0	7.80	-7.10	5	drh		
T706	14.0	7.79	-6.48	5	drh		
T706	18.0	7.17	-6.74	5	drh		
T706	19.0	7.63	-5.86	5	drh		
T706	20.0	7.61	-6.67	5	drh		
T706	21.0	7.09	-5.68	5	drh		
T706	22.0	7.24	-5.64	5	drh		
T706	23.0	7.52	-5.94	5	drh		
T706	24.0	6.50	-7.48	5	drh		
T706	25.0	6.44	-6.96	5	drh		
T706	26.0	6.69	-7.81	5	drh		
T706	27.0	6.67	-5.79	5	drh		
T706	28.0	2.00	-7.20	5	drh		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T708	2.0	-3.20	-3.31	4a	dgs		
T708	2.1	-3.38	-3.82	4a	dgs		
T708	2.2	-2.76	-4.26	4a	dgs		
T708	2.4	-3.20	-5.84	4a	dgsc		
T708	2.6	-2.94	-5.59	4a	dgsc		
T708	2.8	-2.64	-5.27	4a	dgsc		
T708	3.0	-2.96	-5.46	4a	dgsc		
T708	3.3	-2.89	-6.56	4a	dgsc		
T708	3.6	-3.03	-6.00	4a	dgsc		
T708	3.8	-2.57	-7.34	4a	dgsc		
T708	4.0	-2.97	-5.94	4a	dgsc		
T708	4.3	-2.61	-4.51	4a	dgsc		

section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T709	43.0	0.88	-6.42	4a	dgsc		
T709	43.5	-0.72	-5.33	4a	dgsc		
T709	44.0	2.30	-6.03	4a	dgsc		
T709	44.5	-2.21	-5.50	4a	dgsc		
T709	45.0	-1.68	-7.14	4a	dgsc		
T709	45.5	-1.69	-7.01	4a	dgsc		
T709	46.0	-0.52	-9.28	4a	ldf		
T709	47.0	-0.88	-9.01	4a	ldf		
T709	48.0	-1.84	-8.10	4a	ddf		
T709	49.0	-3.52	-4.96	4a	ddf		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T710	5.0	1.67	-3.40	3a	lrh		
T710	8.4	1.06	-2.08	3a	lrh		
T710	10.0	-5.79	2.60	3a	lrh		
T710	50.0	1.88	-3.29	3a	lrh		
T710	321.0	2.31	-4.15	4b	ltb		
T710	323.0	2.79	-4.79	4b	ltb		
T710	325.0	1.69	-3.60	4b	ltb		
T710	328.0	2.68	-4.62	4b	ltb		
T710	350.0	0.16	-5.05	5	lrh		
T710	351.0	-0.30	-4.90	5	lrh		
T710	352.0	1.41	-5.21	5	lrh		
T710	353.0	1.30	-5.69	5	lrh		
T710	356.0	-0.88	-3.97	5	lrh		
T710	358.0	-0.20	-3.76	5	lrh		
T710	401.0	4.53	-7.15	5	lrh	1015	0.707369
T710	404.0	4.65	-6.52	5	lrh	1164	0.707373
T710	406.0	5.04	-7.06	5	lrh	631	0.707442
T710	408.0	4.92	-7.58	5	lrh		
T710	410.0	4.45	-7.22	5	lrh		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T712	0.0	4.05	-5.39	ltlc	dst		
T712	4.0	3.88	-5.00	ltlc	dst		
T712	8.0	1.42	-8.33	ltlc	dst		
T712	16.0	4.67	-3.46	ltlc	dst		
T712	20.0	3.52	-5.76	ltlc	dst		
T712	24.0	4.28	-6.89	ltlc	dst		
T712	28.0	3.81	-6.16	ltlc	dst		

T712	32.0	3.69	-7.24	ltlc	dst		
T712	36.0	3.41	-8.69	ltlc	dst		
T712	40.0	4.42	-6.34	ltlc	dst		
T712	44.0	4.20	-5.94	ltlc	dst		
T712	48.0	4.12	-7.59	ltlc	dst		
T712	52.0	3.87	-9.84	ltlc	dst		
T712	56.0	1.94	-9.74	ltlc	dst		
T712	60.0	2.08	-13.50	ltlc	dst		
T712	64.0	2.80	-8.59	ltlc	dst		
T712	68.0	2.84	-9.15	ltlc	dst		
T712	70.0	3.97	-6.71	ltlc	dst		
T712	72.0	4.36	-9.09	ltlc	dst		
T712	74.0	5.05	-2.31	ltlc	dst		
T712	76.0	4.28	-6.49	ltlc	dst		
T712	78.0	4.58	-4.30	ltlc	dst		
T712	80.0	4.93	-4.31	ltlc	dst		
T712	82.0	3.95	-6.20	ltlc	dst		
T712	84.0	4.41	-5.67	ltlc	dst		
T712	86.0	4.98	-6.86	ltlc	dst		
T712	88.0	4.20	-8.32	ltlc	lrh		
T712	90.0	4.51	-7.36	ltlc	lrh		
T712	94.0	4.71	-9.76	ltlc	lst		
T712	96.0	3.95	-12.25	ltlc	lrh		
T712	97.0	4.98	-10.64	ltlc	lrh		
T712	98.0	4.00	-8.36	ltlc	lrh		
T712	99.0	4.69	-6.76	ltlc	lrh		
T712	100.0	4.25	-7.77	ltlc	lrh		
T712	102.0	4.38	-6.30	ltlc	lst		
T712	104.0	4.58	-7.59	ltlc	lst		
T712	106.0	4.26	-7.46	ltlc	lst		
T712	112.0	7.05	-6.17	ltlc	lrh		
T712	115.0	6.35	-5.80	ltlc	lri		
T712	118.0	6.48	-6.59	ltlc	lri		
T712	119.0	6.35	-5.36	ltlc	lri		
T712	120.0	6.55	-5.84	ltlc	lri		
T712	121.0	6.31	-5.01	ltlc	lri		
T712	123.0	6.40	-4.42	ltlc	lri		
T712	124.0	6.63	-4.22	ltlc	lri		
T712	125.0	6.76	-3.94	ltlc	lri		
T712	126.0	6.85	-5.30	ltlc	lri		
T712	127.0	7.15	-4.14	ltlc	lri		
T712	128.0	6.57	-4.64	ltlc	lri		

T712	131.0	7.12	-5.61	ltlc	lri		
T712	132.0	6.51	-4.78	ltlc	lri		
T712	133.0	6.36	-4.28	ltlc	lri		
T712	134.0	6.32	-5.21	ltlc	lri		
T712	135.0	6.13	-4.97	ltlc	lri		
T712	137.0	6.44	-4.96	ltlc	lri		
T712	138.0	6.20	-4.68	ltlc	lri		
T712	139.0	6.24	-5.20	ltlc	lri		
T712	140.0	5.88	-5.72	ltlc	lri		
T712	142.0	7.02	-4.07	ltlc	lri		
T712	144.0	6.37	-4.58	ltlc	lri		
T712	148.0	6.17	-4.74	ltlc	lri		
T712	152.0	5.83	-4.41	ltlc	lri		
T712	154.0	5.69	-4.46	ltlc	lri		
T712	156.0	5.78	-4.52	ltlc	lri		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
T714	7.0	-3.27	-2.87	ltus	drh		
T714	11.0	-3.66	-2.13	ltus	drh		
T714	15.0	-2.86	-2.46	ltus	drh		
T714	20.0	-3.81	-3.88	ltus	drh	32	
T714	24.0	-2.79	-4.01	ltus	drh		
T714	94.0	-1.70	-4.45	ltus	drh		
T714	98.0	-0.23	-2.30	ltus	drh		
T714	124.0	-2.90	-7.76	ltus	lrh		
T714	126.0	-2.73	-7.37	ltus	lrh	139	
T714	128.0	-3.67	-7.40	ltus	lri		
T714	130.0	-2.88	-7.43	ltus	lri		
T714	132.0	-3.24	-7.88	ltus	lri		
T714	134.0	-2.98	-7.17	ltus	lri	79	
T714	140.0	-2.93	-5.54	ltus	lri		
T714	142.0	-1.80	-4.83	ltus	lri		
T714	144.0	-3.68	-7.54	ltus	lri		
T714	146.0	-2.10	-5.39	ltus	lri	216	0.707495
T714	147.0	-3.08	-5.15	ltus	lri		
T714	168.0	6.11	-6.41	ltus	lrh	628	0.706934
T714	172.0	4.93	-6.08	ltus	lrh		
T714	210.0	5.91	-5.55	ltus	lrh		
T714	252.0	5.01	-7.34	ltus	lri	151	0.706936
T714	253.0	4.41	-6.19	ltus	lri		
T714	254.0	2.28	-5.70	ltus	lri		
T714	255.0	3.58	-6.78	ltus	lri	130	
T714	256.0	3.33	-7.30	ltus	lri		
T714	272.0	0.83	-4.93	ltus	lrh		

T714	273.0	4.82	-7.37	ltus	lrh		
T714	274.0	4.69	-8.45	ltus	lrh	96	
T714	275.0	3.91	-5.22	ltus	lrh		
T714	276.0	-0.31	-10.52	ltus	lrh		
T714	277.0	5.06	-5.94	ltus	lrh		
T714	278.0	5.16	-7.24	ltus	lrh	122	
T714	279.0	5.50	-7.06	ltus	lrh	109	
T714	280.0	2.91	-6.06	ltus	lrh		
T714	281.0	3.57	-3.06	ltus	lrh		
T714	282.0	3.44	-4.98	ltus	lrh		
T714	284.0	2.27	-5.84	ltus	lrh	56	
T714	286.0	1.87	-9.19	ltus	lrh	150	0.7081
T714	287.0	2.08	-6.51	ltus	lrh		
T714	288.0	2.84	-5.40	ltus	lrh		
T714	289.0	1.56	-7.64	ltus	lrh	79	
T714	290.0	3.55	-5.67	ltus	lrh		
T714	291.0	3.56	-6.80	ltus	lrh	171	0.707079
T714	292.0	3.68	-4.79	ltus	lrh		
T714	293.0	4.72	-6.78	ltus	lrh	222	0.706519
T714	294.0	4.17	-6.23	ltus	lrh		
T714	295.0	3.55	-6.30	ltus	lrh		
T714	296.0	3.64	-6.62	ltus	lrh		
T714	297.0	4.65	-6.05	ltus	lrh	120	
T714	298.0	3.67	-4.16	ltus	lrh	176	0.707213
T714	299.0	4.23	-4.35	ltus	lrh		
T714	300.0	4.07	-6.34	ltus	lrh	107	
T714	301.0	4.26	-6.64	ltus	lrh		
T714	303.0	4.04	-5.57	ltus	lrh	56	
T714	304.0	4.65	-4.72	ltus	lrh		
T714	305.0	4.58	-6.21	ltus	lrh	172	0.706472
T714	306.0	4.40	-6.65	ltus	lrh		
T714	307.0	3.48	-7.03	ltus	lrh	291	0.706412
T714	308.0	2.09	-9.73	ltus	lrh	69	
T714	309.0	3.04	-1.98	ltus	lrh		
T714	310.0	-0.66	-1.10	ltus	lrh		
T714	311.0	2.55	-6.54	ltus	lrh		
T714	312.0	2.85	-5.95	ltus	lrh	199	0.707562
T714	313.0	0.06	-1.88	ltus	lrh	40	
T714	314.0	1.64	-3.98	ltuc	lrh	30	
T714	315.0	2.46	-4.56	ltuc	drh		
T714	315.5	2.50	-5.24	ltuc	drh		
T714	316.0	2.80	-4.66	ltuc	drh		
T714	317.0	1.66	-2.88	ltuc	drh		
T714	322.0	1.69	-4.80	ltuc	dgs		

T714	326.0	2.22	-4.85	ltuc	dgs		
T714	315.0	2.55	-4.77	ltuc	dgs		
T714	315.5	2.50	-5.36	ltuc	dgs		
T714	316.0	2.76	-4.70	ltuc	dgs		
T714	317.0	1.72	-3.26	ltuc	dgs		
T714	322.0	1.70	-5.07	ltuc	dgs		
T714	326.0	2.23	-4.96	ltuc	dgs		
T714	330.0	1.89	-4.98	ltuc	dgs		
T714	334.0	2.06	-4.77	ltuc	dgs		
T714	338.0	1.76	-4.64	ltuc	dgs		
T714	342.0	0.83	-5.39	ltuc	dgs		
T714	346.0	0.66	-5.26	ltuc	dgs		
T714	350.0	2.31	-4.85	ltuc	dgs		
T714	354.0	2.19	-4.99	ltuc	dgs		
T714	358.0	2.73	-4.32	ltuc	dgs		
T714	362.0	2.40	-3.54	ltuc	dgs		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
F845	3.2	3.40	-4.28	ltus	lrh		
F845	4.1	4.31	-4.12	ltus	lrh		
F845	38.5	1.67	-3.00	ltus	drh		
F845	44.0	1.48	-3.53	ltus	drh		
F845	78.5	-2.15	-3.16	ltus	drh		
F845	84.0	-3.72	-3.05	ltus	drh		
F845	90.5	-3.04	-2.86	ltus	drh		
F845	93.0	-3.78	-2.86	ltus	drh		
F845	95.5	-3.33	-2.70	ltus	drh		
F845	96.8	-2.95	-2.78	ltus	drh		
F845	99.5	-3.84	-4.00	ltus	drh		
F845	101.0	-3.08	-4.43	ltus	drh		
F845	104.0	-2.33	-4.42	ltus	drh		
F845	105.0	-3.92	-4.19	ltus	drh		
F845	249.0	6.01	-5.43	ltus	lrh		
F845	250.0	5.41	-5.48	ltus	lrh		
F845	278.0	7.30	-9.71	ltus	lrh		
F845	279.0	9.03	-6.40	ltus	lrh		
F845	280.5	9.78	-8.72	ltus	lrh		
F845	282.0	6.27	-5.76	ltus	lrh		
F845	283.0	8.88	-5.76	ltus	lrh		
F845	284.0	9.22	-6.29	ltus	lrh		
F845	292.0	3.17	-7.04	ltus	lrh		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**

F846	0.2	4.51	-5.39	ltus	lrh		
F846	1.0	4.70	-6.80	ltus	lrh		
F846	6.0	4.74	-6.14	ltuc	dri		
F846	7.0	3.61	-9.81	ltuc	dri		
F846	8.0	-0.34	-8.34	ltuc	dri		
F846	9.0	-0.09	-7.44	ltuc	dri		
F846	13.0	2.87	-9.80	ltuc	dri		
F846	14.0	1.40	-9.04	ltuc	dri		
F846	15.0	0.16	-6.93	ltuc	dri		
F846	16.0	0.37	-7.14	ltuc	dri		
F846	20.0	4.49	-6.69	ltuc	dgs		
F846	21.0	3.57	-1.34	ltuc	dgs		
F846	22.0	2.56	-1.98	ltuc	dgs		
F846	23.0	2.66	-2.67	ltuc	dgs		
F846	24.0	3.20	-2.51	ltuc	dgs		
F846	25.0	3.06	-2.34	ltuc	dgs		
F846	26.0	3.31	-1.96	ltuc	dgs		
F846	28.0	3.75	-3.49	ltuc	dgs		
F846	30.0	5.20	-2.48	ltuc	dgs		
F846	32.0	3.32	-3.93	ltuc	dgs		
F846	34.0	3.56	-1.54	ltuc	dgs		
F846	40.0	3.26	-3.57	ltuc	dbr		
F846	42.0	2.29	-4.71	ltuc	dbr		
F846	44.0	2.21	-4.67	ltuc	dbr		
F846	46.0	2.17	-4.86	ltuc	dgs		
F846	50.0	3.44	-5.58	ltuc	dgs		
F846	52.0	4.25	-4.96	ltuc	dgs		
F846	54.0	0.27	-4.74	ltuc	dgs		
F846	56.0	0.50	-5.44	ltuc	dgs		
F846	58.0	-0.04	-4.46	ltuc	dgs		
F846	62.0	1.12	-5.07	ltuc	dgs		
F846	64.0	3.40	-4.49	ltuc	dgs		
F846	66.0	2.73	-4.85	ltuc	dgs		
F846	68.0	1.94	-5.05	ltuc	dgs		
F846	70.0	4.25	-4.93	ltuc	dgs		
F846	72.0	4.59	-4.86	ltuc	dgs		
F846	76.0	2.86	-4.52	ltuc	dgs		
F846	78.0	1.97	-5.29	ltuc	dgs		
F846	80.0	1.06	-5.57	ltuc	dbr		
F846	82.0	0.08	-6.09	ltuc	dbr		
F846	84.0	1.04	-4.65	ltuc	dbr		
F846	86.0	0.40	-4.84	ltuc	dbr		
F846	88.0	0.57	-2.07	ltuc	dbr		
F846	90.0	-0.17	-2.87	ltuc	dbr		
F846	92.0	0.10	-6.56	ltuc	dgs		

F846	94.0	1.11	-1.39	ltuc	dgs		
F846	96.0	-0.20	-6.69	ltuc	dgs		
F846	98.0	-0.02	-3.81	ltuc	dgs		
F846	100.0	-0.08	-5.34	ltuc	dgs		
F846	102.0	-0.57	-7.44	ltuc	dbr		
F846	104.0	-0.46	-5.78	ltuc	dbr		
F846	108.0	-0.38	-2.80	ltuc	dbr		
F846	110.0	0.99	-7.42	ltuc	dbr		
F846	112.0	-0.20	-7.27	ltuc	dbr		
F846	114.8	-0.28	-7.91	ltuc	dbr		
F846	117.0	-0.31	-5.77	ltuc	dgs		
F846	119.0	-0.22	-7.24	ltuc	dgs		
F846	121.0	0.63	-5.15	ltuc	dgs		
F846	123.0	1.41	-1.72	ltuc	dgs		
F846	125.0	3.18	-1.13	ltuc	dgs		
F846	127.0	2.55	-4.70	ltuc	dgs		
F846	129.0	2.84	-3.93	ltuc	dgs		
F846	131.0	2.44	-3.32	ltuc	dgs		
F846	133.0	1.55	-0.77	ltuc	dgs		
F846	135.0	2.18	-5.26	ltuc	dgs		
F846	137.0	2.48	-5.05	ltuc	dgs		
F846	139.0	1.21	-5.92	ltuc	dgs		
F846	141.0	0.66	-5.58	ltuc	dgs		
F846	143.0	1.12	-5.16	ltuc	dgs		
F846	145.0	1.35	-3.81	ltuc	dgs		
F846	147.0	0.40	-5.22	ltuc	dgs		
F846	149.0	1.06	-5.48	ltuc	dgs		
F846	151.0	1.35	-4.76	ltuc	dgs		
F846	153.0	1.22	-5.12	ltuc	dgs		
F846	155.0	1.31	-4.55	ltuc	dgs		
F846	157.0	-0.81	-3.82	ltuc	dgs		
F846	162.0	1.31	-5.39	ltuc	dgs		
F846	164.0	0.75	-4.31	ltuc	dgs		
F846	187.0	0.92	-4.30	ltuc	dgs		
F846	188.0	0.64	-5.01	ltuc	dgs		
F846	189.0	1.71	-4.38	ltuc	dgs		
F846	190.0	1.45	-3.70	ltuc	dgs		
F846	191.0	2.08	-3.54	ltuc	drh		
F846	192.0	0.93	-4.98	ltuc	dgs		
F846	193.0	0.08	-5.14	ltuc	dgs		
F846	194.0	3.41	-1.84	ltuc	dgs		
F846	196.0	1.42	-4.08	ltuc	dbr		
F846	198.0	0.13	-5.05	ltuc	dbr		
F846	200.0	0.88	-5.02	ltuc	dbr		
F846	206.0	1.21	-4.39	ltuc	dbr		

F846	208.0	1.07	-4.72	ltuc	dbr		
F846	212.0	0.53	-5.14	ltuc	dbr		
F846	214.5	0.46	-4.04	ltuc	dgs		
F846	217.0	1.88	-3.55	ltuc	dgs		
F846	221.0	0.82	-4.52	ltuc	dgs		
F846	225.0	0.49	-4.70	ltuc	dgs		
F846	230.0	0.80	-3.01	ltuc	dgs		
F846	234.0	-0.64	-4.61	ltuc	dbr		
F846	238.0	1.51	-5.11	ltuc	dgs		
F846	240.0	-0.83	-4.80	ltuc	drh		
F846	242.0	-1.37	-4.73	ltuc	drh		
F846	243.0	-0.32	-4.81	ltuc	dri		
F846	244.0	0.31	-4.65	ltuc	dgs		
F846	246.0	0.22	-4.62	ltuc	dgs		
F846	248.0	0.19	-4.34	ltuc	dgs		
F846	250.0	0.52	-4.64	ltuc	dgs		
F846	252.0	1.14	-3.58	ltuc	dgs		
F846	254.0	2.54	-2.87	ltuc	dgs		
F846	256.0	-0.90	-2.28	ltuc	dgs		
F846	258.0	-0.25	-4.71	ltuc	dgs		
F846	263.0	3.52	-2.42	ltuc	dgs		
F846	265.0	0.36	-4.31	ltuc	dgs		
F846	267.0	-0.67	-4.35	ltuc	dgs		
F846	274.0	-1.11	-4.12	ltuc	drh		
F846	276.0	-1.62	-4.04	ltuc	drh		
F846	279.0	-2.89	-4.27	ltuc	dgs		
F846	281.0	-1.59	-3.22	ltuc	dbr		
F846	283.0	-0.68	-2.65	ltuc	dbr		
F846	285.5	-1.96	-3.97	ltuc	drh		
F846	287.0	-2.62	-4.04	ltuc	drh		
F846	289.0	-1.65	-4.04	ltuc	drh		
F846	291.0	-2.28	-4.31	ltuc	drh		
F846	293.0	-2.86	-4.38	ltuc	drh		
F846	295.0	-3.60	-4.18	ltuc	drh		
F846	297.0	-2.86	-3.47	ltuc	drh		
F846	299.0	-3.07	-2.93	ltuc	ddf		
F846	301.0	-2.96	-2.54	ltuc	drh		
F846	303.0	-3.07	-0.98	ltuc	drh		
F846	305.0	-3.04	-1.04	ltuc	drh		
F846	307.0	-2.65	-1.72	ltuc	drh		
section	**height (m)**	**d13C**	**d18O**	**unit**	**facies**	**Sr (ppm)**	**87Sr/86Sr**
F847	0.2	5.78	-4.42	ltlc	lri		
F847	3.0	5.44	-4.11	ltlc	lri		

F847	5.0	4.97	-4.66	ltlc	lri		
F847	9.0	3.83	-4.59	ltlc	lst		
F847	11.0	3.94	-4.26	ltlc	lst		
F847	13.0	3.69	-1.03	ltlc	lst		
F847	15.0	4.12	-3.55	ltlc	lst		
F847	17.0	4.26	-3.78	ltlc	lst		
F847	19.0	3.90	-5.53	ltlc	lst		
F847	21.0	3.52	-3.13	ltlc	lst		
F847	23.0	4.96	-4.21	ltlc	lst		
F847	25.0	4.19	-2.53	ltlc	lst		
F847	29.0	5.16	-3.60	ltlc	lst		
F847	31.0	4.74	-2.85	ltlc	lst		
F847	33.0	5.25	-3.16	ltlc	lst		
F847	35.0	4.71	-4.61	ltlc	lst		
F847	39.0	4.81	-4.29	ltlc	lst		
F847	42.0	4.32	-4.80	ltlc	lst		
F847	53.0	4.28	-4.73	ltlc	lst		
F847	55.0	4.57	-5.04	ltlc	lst		
F847	57.0	4.18	-4.39	ltlc	lst		
F847	59.0	4.14	-5.39	ltlc	lst		
F847	63.0	4.39	-5.16	ltlc	lst		
F847	65.0	4.74	-5.16	ltlc	lst		
F847	67.0	4.31	-5.55	ltlc	lst		
F847	69.0	4.05	-5.77	ltlc	lst		
F847	71.0	4.14	-4.60	ltlc	lst		
F847	75.0	4.03	-6.45	ltlc	lst		
F847	77.0	3.81	-5.11	ltlc	lst		
F847	79.0	4.10	-5.66	ltlc	lst		
F847	81.0	4.11	-5.62	ltlc	lst		
F847	83.0	3.65	-5.97	ltlc	lst		
F847	85.0	4.27	-5.88	ltlc	lst		
F847	87.0	3.83	-5.98	ltlc	lst		
F847	90.0	3.95	-5.79	ltlc	lst		
F847	92.0	4.31	-4.06	ltlc	lst		
F847	94.0	4.12	-4.89	ltlc	lst		
F847	96.0	4.44	-4.13	ltlc	lst		
F847	98.0	4.28	-3.46	ltlc	lst		
F847	100.0	4.25	-3.33	ltlc	lst		
F847	102.0	3.63	-3.81	ltlc	lst		
F847	104.0	4.43	-3.61	ltlc	lst		
F847	106.0	4.41	-3.28	ltlc	lst		
F847	108.0	4.64	-3.82	ltlc	lst		
F847	110.0	4.28	-4.16	ltlc	lst		
F847	112.0	4.51	-4.30	ltlc	lst		
F847	114.0	4.40	-3.66	ltlc	lst		

F847	116.0	4.22	-4.89	ltlc	lst		
F847	118.0	4.07	-4.16	ltlc	lst		
F847	120.0	3.67	-5.39	ltlc	lst		
F847	126.0	4.44	-3.62	ltlc	lst		
F847	128.0	4.50	-4.97	ltlc	lst		
F847	130.0	4.48	-4.45	ltlc	lst		
F847	132.0	4.56	-4.53	ltlc	lst		
F847	134.0	4.75	-4.41	ltlc	lst		
F847	136.0	4.44	-5.00	ltlc	lst		
F847	138.0	4.75	-4.57	ltlc	lst		
F847	140.0	5.37	-3.99	ltlc	lst		
F847	142.0	3.97	-3.43	ltlc	lst		
F847	144.0	4.21	-3.14	ltlc	lst		
F847	146.0	4.41	-3.31	ltlc	lst		
F847	148.0	4.65	-3.27	ltlc	lst		
F847	150.0	4.16	-3.33	ltlc	lst		
F847	152.0	3.70	-4.01	ltlc	lst		
F847	154.0	3.49	-2.68	ltlc	lst		
F847	156.0	3.70	-4.21	ltlc	lst		
F847	158.0	3.54	-3.05	ltlc	lst		