

Δ_{47} Analysis Report — Letulle (2022-03)

Laboratoire des Sciences du Climat et de l'Environnement
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Summary

Number of analytical sessions	5
Number of samples (anchors + unknowns)	57 (4 + 53)
Number of analyses (anchors + unknowns)	226 (86 + 140)
Overall percentage of anchor analyses	38 %
Nominal Δ_{47} of anchor ETH-1	0.2052 ‰
Nominal Δ_{47} of anchor ETH-2	0.2085 ‰
Nominal Δ_{47} of anchor ETH-3	0.6132 ‰
Nominal Δ_{47} of anchor ETH-4	0.4511 ‰
External reproducibility of $\delta^{13}\text{C}_{\text{VPDB}}$ measurements	13.6 ppm
External reproducibility of $\delta^{18}\text{O}_{\text{VSMOW}}$ measurements	24.8 ppm
External reproducibility of Δ_{47} measurements	7.8 ppm
Regression model degrees of freedom	157 ($t_{95\%} = 1.98$)

Analytical Sessions

Session		2021-09a	2021-09b	2021-09c	2022-03c	2022-03e
N of anchor analyses		21	20	18	11	16
N of unknown analyses		27	33	27	18	35
Working gas $\delta^{13}\text{C}$	(‰ VPDB)	−3.84	−3.85	−3.85	−3.88	−3.86
Working gas $\delta^{18}\text{O}$	(‰ VSMOW)	34.57	34.55	34.59	35.17	35.18
Working gas Δ_{47}	(‰ ± SE)	1.025 ± 0.010	1.034 ± 0.010	1.037 ± 0.011	0.962 ± 0.014	0.960 ± 0.012
Scrambling factor (a)	(± SE)	0.988 ± 0.009	0.976 ± 0.009	0.979 ± 0.009	0.956 ± 0.013	0.963 ± 0.011
Compositional slope (b)	($\times 10^{-4}$ ± SE)	$−0.2 \pm 1.2$	$−0.2 \pm 1.3$	0.2 ± 1.3	1.2 ± 2.3	$−8.7 \pm 1.8$
Working gas offset (c)	(± SE)	$−1.013 \pm 0.004$	$−1.009 \pm 0.004$	$−1.014 \pm 0.005$	$−0.919 \pm 0.006$	$−0.924 \pm 0.005$
$\delta^{13}\text{C}_{\text{VPDB}}$ repeatability	(ppm)	10.0	19.7	13.0	15.1	6.2
$\delta^{18}\text{O}_{\text{VSMOW}}$ repeatability	(ppm)	29.5	30.6	23.9	20.9	20.2
Δ_{47} repeatability	(ppm)	10.2	7.5	6.7	8.5	9.5

Sample averages

Sample	N	Yield (%)	$\delta^{13}\text{C}_{\text{VPDB}}$	$\delta^{18}\text{O}_{\text{VSMOW}}$ (CO ₂)	$\delta^{18}\text{O}_{\text{VPDB}}$ (calcite*)	Δ_{47} (I-CDES)			p-value (Levene)
						\pm SE	(\pm 95 %)	SD	
ETH-1	21	100	2.03	37.03	−2.19	0.2052		0.0080	
ETH-2	18	99	−10.17	19.87	−18.69	0.2085		0.0075	
ETH-3	36	97	1.70	37.45	−1.78	0.6132		0.0068	
ETH-4	11	100	−10.20	19.79	−18.78	0.4511		0.0090	
707727	1	101	2.40	39.06	−0.24	0.6032	\pm 0.0083	(\pm 0.0163)	
707729	1	97	1.49	39.15	−0.14	0.6008	\pm 0.0082	(\pm 0.0163)	
707752	1	98	1.33	38.34	−0.92	0.5835	\pm 0.0082	(\pm 0.0162)	
A-ker-A-d	5	98	1.86	42.20	2.79	0.6747	\pm 0.0039	(\pm 0.0077)	0.0054 0.49
A-ker-C-v	5	98	2.50	42.37	2.96	0.6660	\pm 0.0039	(\pm 0.0077)	0.0059 0.65
A-ker52-vcs	3	98	2.03	42.80	3.37	0.6665	\pm 0.0048	(\pm 0.0095)	0.0005 0.04
A-ker61-vcs	5	97	1.36	41.65	2.26	0.6865	\pm 0.0039	(\pm 0.0077)	0.0067 0.79
A-ker68-vcs	5	98	1.57	41.97	2.57	0.6807	\pm 0.0039	(\pm 0.0078)	0.0072 0.83
ARD-06	4	94	1.99	36.95	−2.27	0.5885	\pm 0.0041	(\pm 0.0081)	0.0073 0.89
ARD-08	3	98	2.64	36.82	−2.38	0.5906	\pm 0.0047	(\pm 0.0092)	0.0112 0.52
BAC-02c	1	97	−2.18	37.29	−1.93	0.5245	\pm 0.0078	(\pm 0.0154)	
FSL-307829b	1	100	1.09	37.10	−2.12	0.5513	\pm 0.0079	(\pm 0.0156)	
FSL-707721	3	99	1.16	38.75	−0.53	0.5957	\pm 0.0047	(\pm 0.0094)	0.0085 0.93
FSL-707729	1	96	1.48	39.16	−0.13	0.6039	\pm 0.0081	(\pm 0.0160)	
H7	1	94	−0.52	37.09	−2.13	0.5529	\pm 0.0082	(\pm 0.0162)	
H9	2	99	−2.09	35.97	−3.21	0.5773	\pm 0.0059	(\pm 0.0116)	0.0195
L-neo-vcs	3	99	2.91	40.91	1.55	0.6290	\pm 0.0048	(\pm 0.0094)	0.0086 0.93
L-opa	1	97	0.92	36.81	−2.40	0.5377	\pm 0.0082	(\pm 0.0161)	
L-uva-vcs	3	94	0.63	42.76	3.33	0.6937	\pm 0.0048	(\pm 0.0095)	0.0087 0.99
M-fra-vcs	4	98	1.01	43.44	3.98	0.6917	\pm 0.0043	(\pm 0.0085)	0.0062 0.85
N-len-mi	5	96	1.13	39.83	0.51	0.6713	\pm 0.0039	(\pm 0.0076)	0.0072 0.75
N-nig	3	95	2.10	40.60	1.25	0.6496	\pm 0.0048	(\pm 0.0094)	0.0063 0.50
SP-1071	1	97	3.57	39.17	−0.12	0.5433	\pm 0.0079	(\pm 0.0155)	
SP-1072	1	97	3.32	39.57	0.26	0.5569	\pm 0.0079	(\pm 0.0155)	
SP-1076	1	96	1.56	38.20	−1.05	0.5662	\pm 0.0078	(\pm 0.0155)	
SP-121-cs	4	100	3.53	37.26	−1.97	0.6646	\pm 0.0042	(\pm 0.0082)	0.0031 0.12
SP-137-a	1	100	2.44	39.15	−0.15	0.5466	\pm 0.0078	(\pm 0.0155)	
SP-254-Da	3	99	5.19	38.77	−0.51	0.6333	\pm 0.0048	(\pm 0.0094)	0.0061 0.53
SP-29	3	98	3.75	37.34	−1.88	0.6691	\pm 0.0048	(\pm 0.0094)	0.0061 0.54
SP-368-Db	3	99	6.56	38.73	−0.55	0.6232	\pm 0.0048	(\pm 0.0094)	0.0082 0.89
SP-368-Oa	3	100	5.75	38.48	−0.79	0.6499	\pm 0.0048	(\pm 0.0094)	0.0073 0.73
SP-387-Da	3	99	4.93	38.47	−0.80	0.6265	\pm 0.0047	(\pm 0.0094)	0.0021 0.09
SP-459-Da	3	96	4.72	38.57	−0.70	0.6293	\pm 0.0047	(\pm 0.0094)	0.0029 0.12
SP-74-cs	4	98	4.21	34.75	−4.38	0.6649	\pm 0.0041	(\pm 0.0082)	0.0026 0.07
T-gal-4-v-mi	5	100	2.75	40.80	1.44	0.6109	\pm 0.0038	(\pm 0.0075)	0.0072 0.94
T-san-v	3	97	0.52	39.78	0.46	0.6635	\pm 0.0048	(\pm 0.0094)	0.0012 0.06
VR-100S	3	99	5.97	37.33	−1.89	0.6198	\pm 0.0050	(\pm 0.0099)	0.0065 0.63
VR-103S	3	82	7.69	38.08	−1.18	0.6396	\pm 0.0051	(\pm 0.0101)	0.0148 0.10
VR-104S	3	97	4.43	37.38	−1.84	0.6220	\pm 0.0050	(\pm 0.0098)	0.0053 0.43
VR-108S	3	100	6.41	37.71	−1.53	0.6313	\pm 0.0051	(\pm 0.0101)	0.0034 0.17
VR-110S-1	3	96	4.46	38.56	−0.72	0.6322	\pm 0.0050	(\pm 0.0099)	0.0102 0.79
VR-111S	3	99	7.65	37.94	−1.30	0.6244	\pm 0.0051	(\pm 0.0100)	0.0049 0.31
VR-120S-ext	2	99	3.96	37.52	−1.71	0.6462	\pm 0.0061	(\pm 0.0120)	0.0012
VR-120S-int	2	99	4.06	38.10	−1.15	0.6628	\pm 0.0061	(\pm 0.0120)	0.0184
VR-121S	2	99	5.48	38.96	−0.32	0.6695	\pm 0.0060	(\pm 0.0119)	0.0007
VR-26S-D2	2	99	8.12	38.30	−0.96	0.6233	\pm 0.0060	(\pm 0.0119)	0.0034
VR-55S	3	99	6.99	36.98	−2.23	0.6197	\pm 0.0050	(\pm 0.0099)	0.0025 0.11
VR-59S	1	98	6.16	37.64	−1.60	0.6326	\pm 0.0082	(\pm 0.0163)	
VR-59S-1	1	99	6.16	37.58	−1.65	0.6295	\pm 0.0083	(\pm 0.0164)	
VR-61S	2	99	6.37	36.98	−2.24	0.6369	\pm 0.0060	(\pm 0.0119)	0.0158
VR-63S-1	2	99	5.50	36.87	−2.34	0.6254	\pm 0.0060	(\pm 0.0118)	0.0010
VR-80S	3	99	5.42	39.17	−0.13	0.6332	\pm 0.0051	(\pm 0.0101)	0.0084 0.95
VR-81S	3	98	6.17	37.99	−1.26	0.6292	\pm 0.0051	(\pm 0.0100)	0.0081 0.96

* computed assuming the sample is pure calcite; adjust accordingly for different mineralogies.

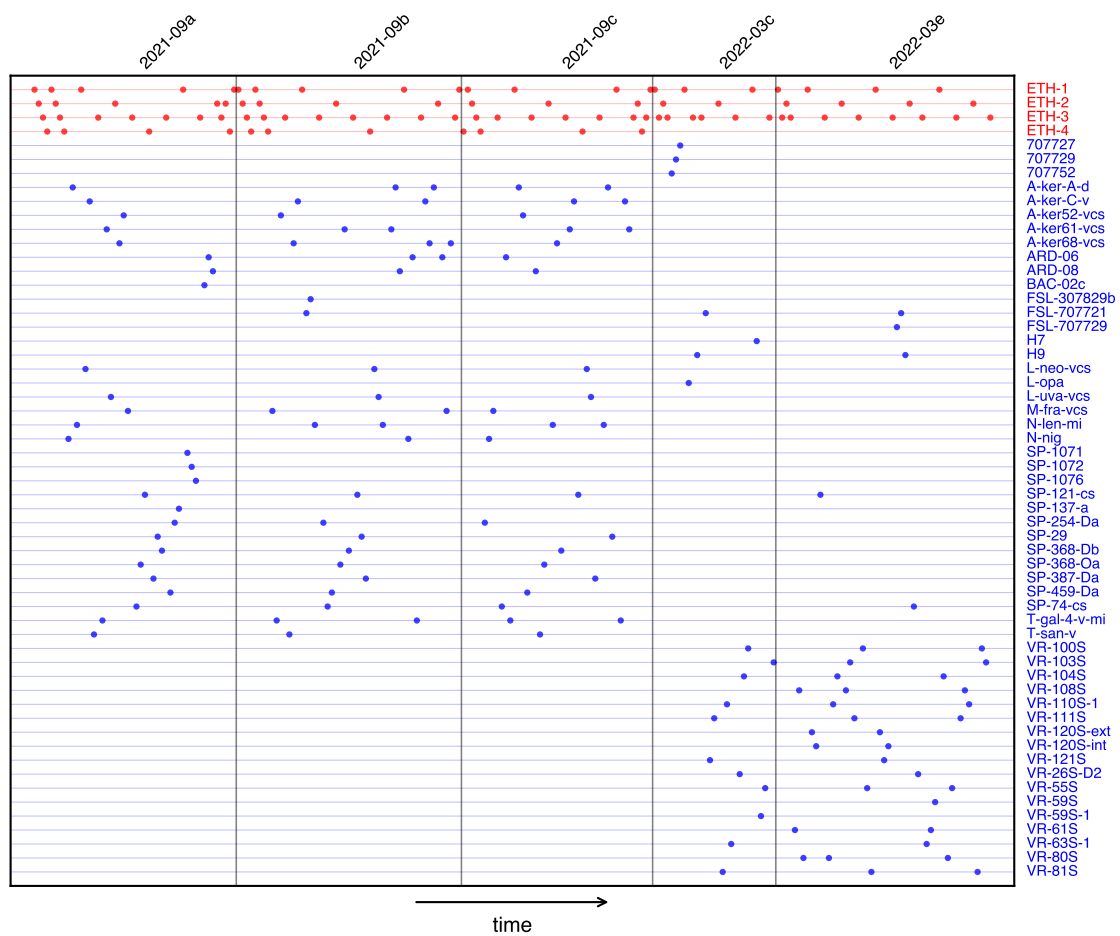
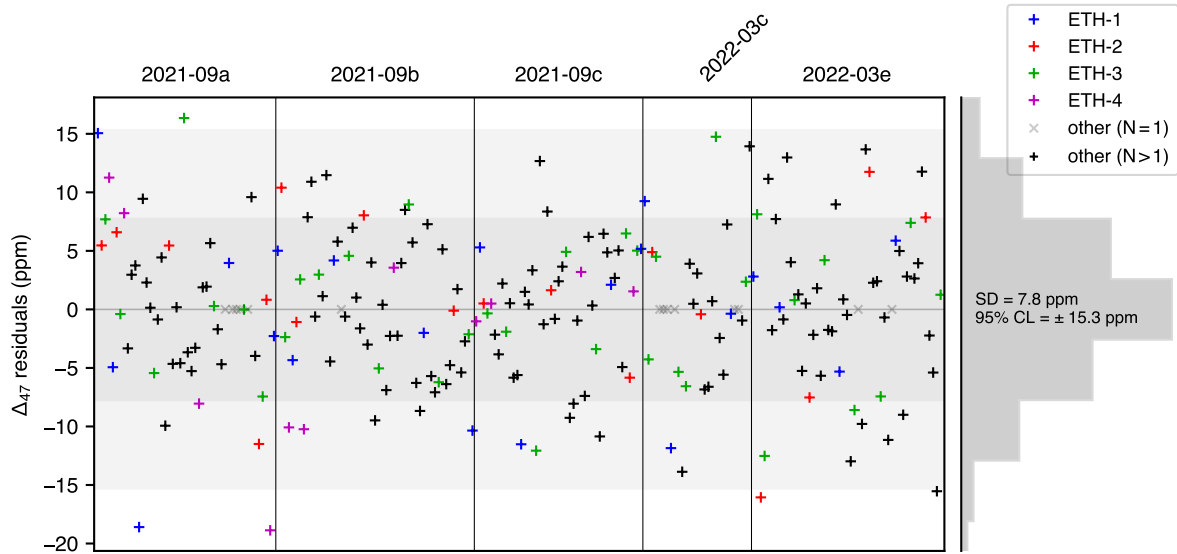
For example, for aragonite samples, $\delta^{18}\text{O}_{\text{arag}} = (1000 + \delta^{18}\text{O}_{\text{calcite}}) \times 1.00813 / ^{18}\alpha_{\text{arag}} - 1000$

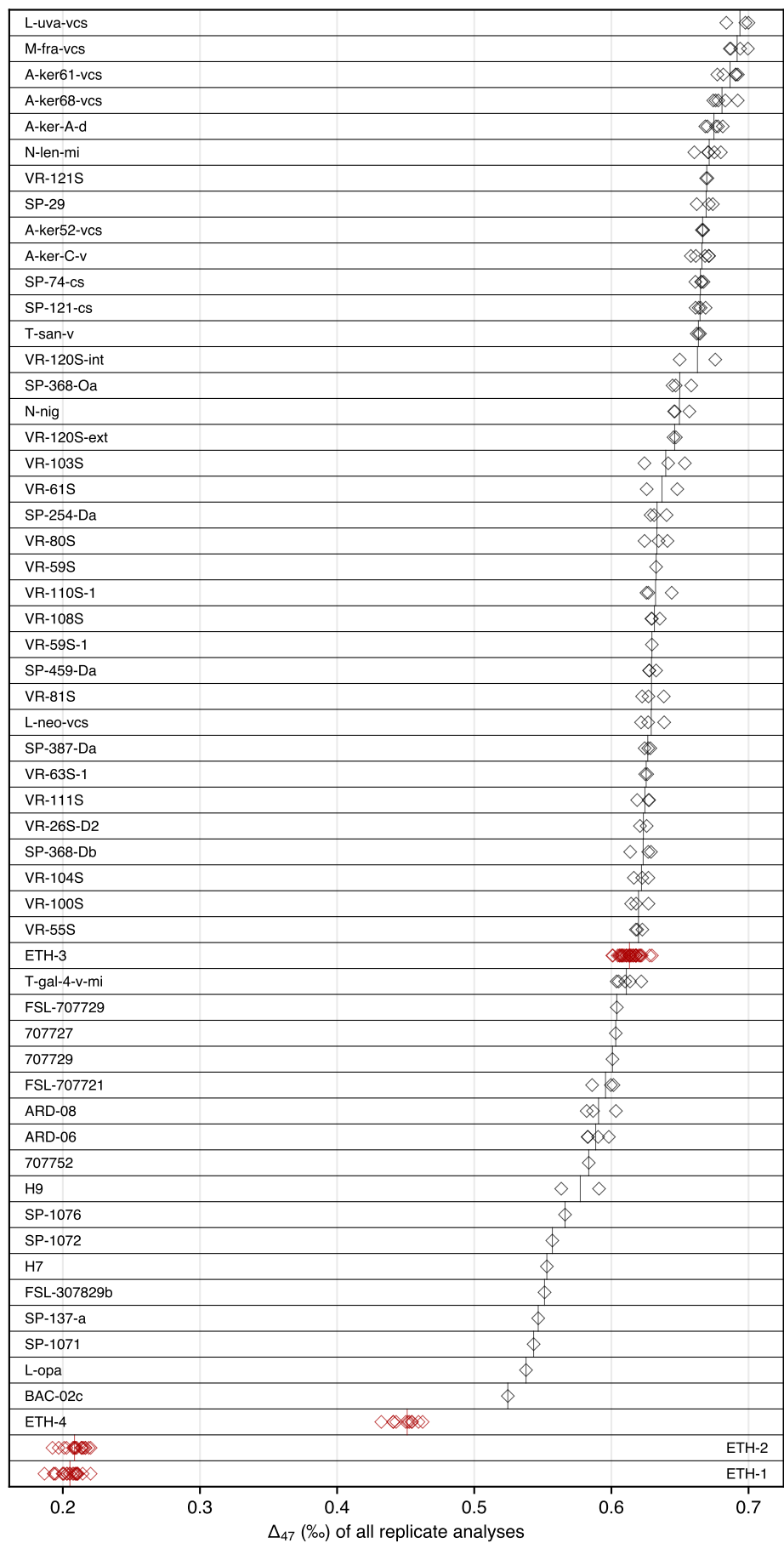
Based on Kim *et al.* [2007], at 90 °C: $\delta^{18}\text{O}_{\text{arag}} = (1000 + \delta^{18}\text{O}_{\text{calcite}}) / 1.00041 - 1000$

Temperature and water $\delta^{18}\text{O}$ reconstructions

Sample	N	Δ_{47}	T_{47}	Water $\delta^{18}\text{O}_{\text{VSMOW}}$ (‰ \pm 95 %)	
		(‰ \pm 95 %)	(°C \pm 95 %)	Kim & O'Neil [1997]	Daëron et al. [2019]
707727	1	0.6032 ± 0.0163	22.0 ± 5.3	$+1.5 \pm 1.1$	-0.2 ± 1.1
707729	1	0.6008 ± 0.0163	22.8 ± 5.3	$+1.8 \pm 1.1$	$+0.1 \pm 1.1$
707752	1	0.5835 ± 0.0162	28.6 ± 5.6	$+2.2 \pm 1.1$	$+0.4 \pm 1.1$
A-ker-A-d	5	0.6747 ± 0.0077	1.2 ± 2.0	-0.0 ± 0.5	-1.7 ± 0.5
A-ker-C-v	5	0.6660 ± 0.0077	3.5 ± 2.1	$+0.7 \pm 0.5$	-1.0 ± 0.5
A-ker52-vcs	3	0.6665 ± 0.0095	3.4 ± 2.5	$+1.0 \pm 0.6$	-0.6 ± 0.6
A-ker61-vcs	5	0.6865 ± 0.0077	-1.8 ± 1.9	-1.3 ± 0.5	-2.9 ± 0.5
A-ker68-vcs	5	0.6807 ± 0.0078	-0.3 ± 2.0	-0.6 ± 0.5	-2.2 ± 0.5
ARD-06	4	0.5885 ± 0.0081	26.9 ± 2.8	$+0.5 \pm 0.6$	-1.3 ± 0.5
ARD-08	3	0.5906 ± 0.0092	26.1 ± 3.1	$+0.2 \pm 0.6$	-1.5 ± 0.6
BAC-02c	1	0.5245 ± 0.0154	51.5 ± 6.7	$+5.4 \pm 1.1$	$+3.5 \pm 1.1$
FSL-307829b	1	0.5513 ± 0.0156	40.4 ± 6.1	$+3.3 \pm 1.1$	$+1.4 \pm 1.1$
FSL-707721	3	0.5957 ± 0.0094	24.4 ± 3.1	$+1.8 \pm 0.6$	$+0.0 \pm 0.6$
FSL-707729	1	0.6039 ± 0.0160	21.7 ± 5.2	$+1.6 \pm 1.1$	-0.1 ± 1.0
H7	1	0.5529 ± 0.0162	39.8 ± 6.3	$+3.1 \pm 1.2$	$+1.3 \pm 1.1$
H9	2	0.5773 ± 0.0116	30.8 ± 4.1	$+0.3 \pm 0.8$	-1.4 ± 0.8
L-neo-vcs	3	0.6290 ± 0.0094	14.0 ± 2.8	$+1.6 \pm 0.6$	-0.1 ± 0.6
L-opa	1	0.5377 ± 0.0161	45.9 ± 6.6	$+4.0 \pm 1.2$	$+2.1 \pm 1.1$
L-uva-vcs	3	0.6937 ± 0.0095	-3.5 ± 2.3	-0.7 ± 0.6	-2.3 ± 0.6
M-fra-vcs	4	0.6917 ± 0.0085	-3.0 ± 2.1	$+0.1 \pm 0.5$	-1.5 ± 0.5
N-len-mi	5	0.6713 ± 0.0076	2.1 ± 2.0	-2.1 ± 0.5	-3.7 ± 0.5
N-nig	3	0.6496 ± 0.0094	8.0 ± 2.6	$+0.0 \pm 0.6$	-1.7 ± 0.6
SP-1071	1	0.5433 ± 0.0155	43.6 ± 6.2	$+5.8 \pm 1.1$	$+4.0 \pm 1.1$
SP-1072	1	0.5569 ± 0.0155	38.3 ± 5.9	$+5.2 \pm 1.1$	$+3.4 \pm 1.1$
SP-1076	1	0.5662 ± 0.0155	34.8 ± 5.7	$+3.3 \pm 1.1$	$+1.5 \pm 1.1$
SP-121-cs	4	0.6646 ± 0.0082	3.9 ± 2.2	-4.2 ± 0.5	-5.8 ± 0.5
SP-137-a	1	0.5466 ± 0.0155	42.3 ± 6.2	$+5.6 \pm 1.1$	$+3.7 \pm 1.1$
SP-254-Da	3	0.6333 ± 0.0094	12.7 ± 2.8	-0.7 ± 0.6	-2.4 ± 0.6
SP-29	3	0.6691 ± 0.0094	2.7 ± 2.5	-4.4 ± 0.6	-6.0 ± 0.6
SP-368-Db	3	0.6232 ± 0.0094	15.7 ± 2.9	-0.1 ± 0.6	-1.8 ± 0.6
SP-368-Oa	3	0.6499 ± 0.0094	8.0 ± 2.6	-2.1 ± 0.6	-3.7 ± 0.6
SP-387-Da	3	0.6265 ± 0.0094	14.7 ± 2.8	-0.6 ± 0.6	-2.3 ± 0.6
SP-459-Da	3	0.6293 ± 0.0094	13.9 ± 2.8	-0.6 ± 0.6	-2.3 ± 0.6
SP-74-cs	4	0.6649 ± 0.0082	3.8 ± 2.2	-6.6 ± 0.5	-8.2 ± 0.5
T-gal-4-v-mi	5	0.6109 ± 0.0075	19.5 ± 2.4	$+2.7 \pm 0.5$	$+1.0 \pm 0.5$
T-san-v	3	0.6635 ± 0.0094	4.2 ± 2.5	-1.7 ± 0.6	-3.3 ± 0.6
VR-100S	3	0.6198 ± 0.0099	16.8 ± 3.0	-1.2 ± 0.7	-2.9 ± 0.6
VR-103S	3	0.6396 ± 0.0101	10.9 ± 2.9	-1.8 ± 0.6	-3.5 ± 0.6
VR-104S	3	0.6220 ± 0.0098	16.1 ± 3.0	-1.3 ± 0.6	-3.0 ± 0.6
VR-108S	3	0.6313 ± 0.0101	13.3 ± 3.0	-1.6 ± 0.7	-3.3 ± 0.6
VR-110S-1	3	0.6322 ± 0.0099	13.0 ± 2.9	-0.8 ± 0.6	-2.5 ± 0.6
VR-111S	3	0.6244 ± 0.0100	15.3 ± 3.0	-0.9 ± 0.7	-2.6 ± 0.6
VR-120S-ext	2	0.6462 ± 0.0120	9.0 ± 3.4	-2.7 ± 0.8	-4.4 ± 0.7
VR-120S-int	2	0.6628 ± 0.0120	4.4 ± 3.2	-3.2 ± 0.8	-4.9 ± 0.7
VR-121S	2	0.6695 ± 0.0119	2.6 ± 3.1	-2.8 ± 0.7	-4.4 ± 0.7
VR-26S-D2	2	0.6233 ± 0.0119	15.7 ± 3.6	-0.5 ± 0.8	-2.2 ± 0.8
VR-55S	3	0.6197 ± 0.0099	16.8 ± 3.0	-1.5 ± 0.7	-3.2 ± 0.6
VR-59S	1	0.6326 ± 0.0163	12.9 ± 4.8	-1.8 ± 1.1	-3.4 ± 1.0
VR-59S-1	1	0.6295 ± 0.0164	13.8 ± 4.9	-1.6 ± 1.1	-3.3 ± 1.0
VR-61S	2	0.6369 ± 0.0119	11.6 ± 3.5	-2.7 ± 0.8	-4.3 ± 0.7
VR-63S-1	2	0.6254 ± 0.0118	15.1 ± 3.5	-2.0 ± 0.8	-3.7 ± 0.7
VR-80S	3	0.6332 ± 0.0101	12.7 ± 3.0	-0.3 ± 0.7	-2.0 ± 0.6
VR-81S	3	0.6292 ± 0.0100	13.9 ± 3.0	-1.2 ± 0.6	-2.9 ± 0.6

Temperature reconstructions based on a composite I-CDES calibration for calcite based on several studies [Peral et al., 2018; Jautzy et al., 2020; Anderson et al., 2021; Fiebig et al., 2021; Huyghe et al., 2022].





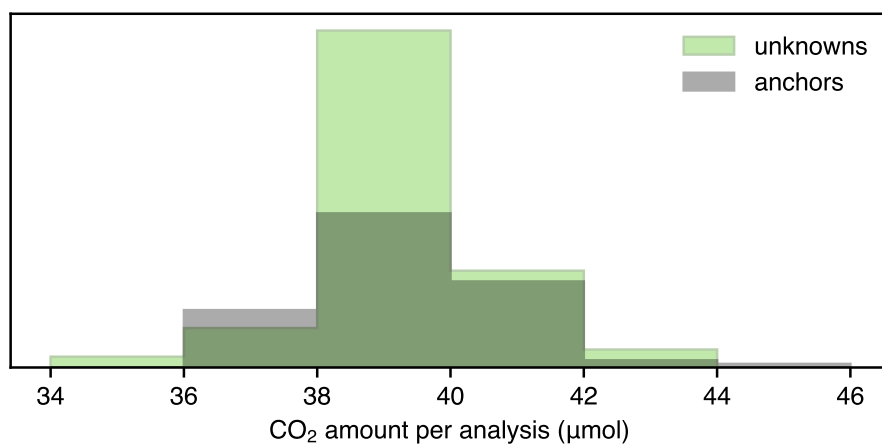
ETH-1				x x x x x x x x	
ETH-2				x x x x x x x x	
ETH-3				x x x x x x x x	
ETH-4				x x x x x x x x	
707727					x
707729				x	
707752				x	
A-ker-A-d				x x	x
A-ker-C-v				x x	
A-ker52-vcs				x x x	
A-ker61-vcs				x x x x	
A-ker68-vcs				x x x x x	
ARD-06				x x x x	
ARD-08				x x x	
BAC-02c				x	
FSL-307829b					x
FSL-707721				x	x
FSL-707729				x	
H7				x	
H9				x	
L-neo-vcs				x x x	
L-opa				x	
L-uva-vcs				x x	
M-fra-vcs				x x x x	
N-len-mi				x x x x	
N-nig				x x x x	
SP-1071				x	
SP-1072				x	
SP-1076				x	
SP-121-CS					x x x
SP-137-a					x
SP-254-Da					x x
SP-29				x	x x
SP-368-Db				x	x x
SP-368-Oa					x x
SP-387-Da					x x
SP-459-Da				x	x x
SP-74-CS					x x x
T-gal-4-V-MI				x	x x x
T-san-v				x	x x
VR-100S					x x x
VR-103S				x x	
VR-104S				x x x	
VR-108S					x x x
VR-110S-1				x x x	
VR-111S					x x x
VR-120S-ext					x x
VR-120S-int					x x
VR-121S				x	x
VR-26S-D2					x x
VR-55S					x x
VR-59S				x	
VR-59S-1					x
VR-61S					x x
VR-63S-1					x
VR-80S					x x x
VR-81S					x x

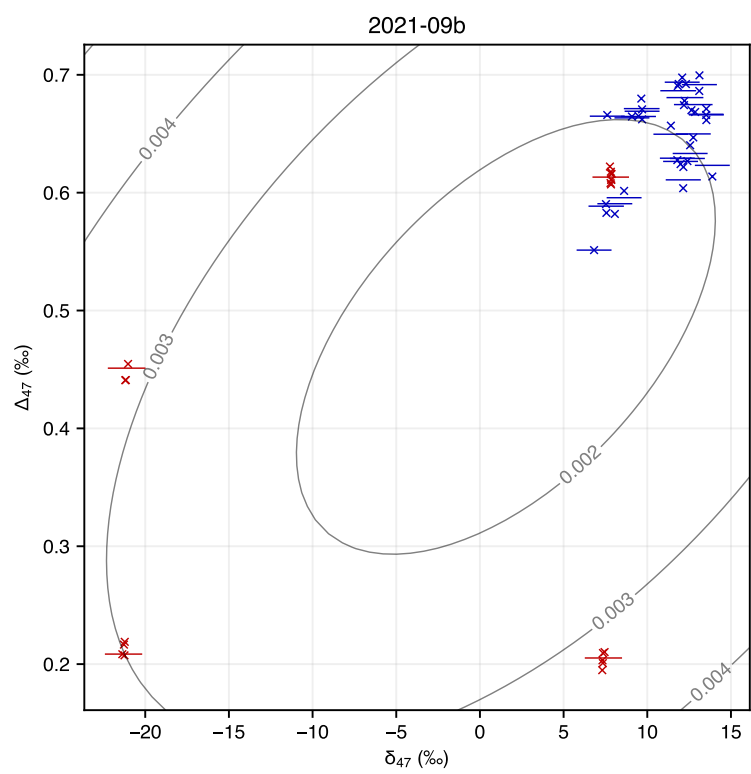
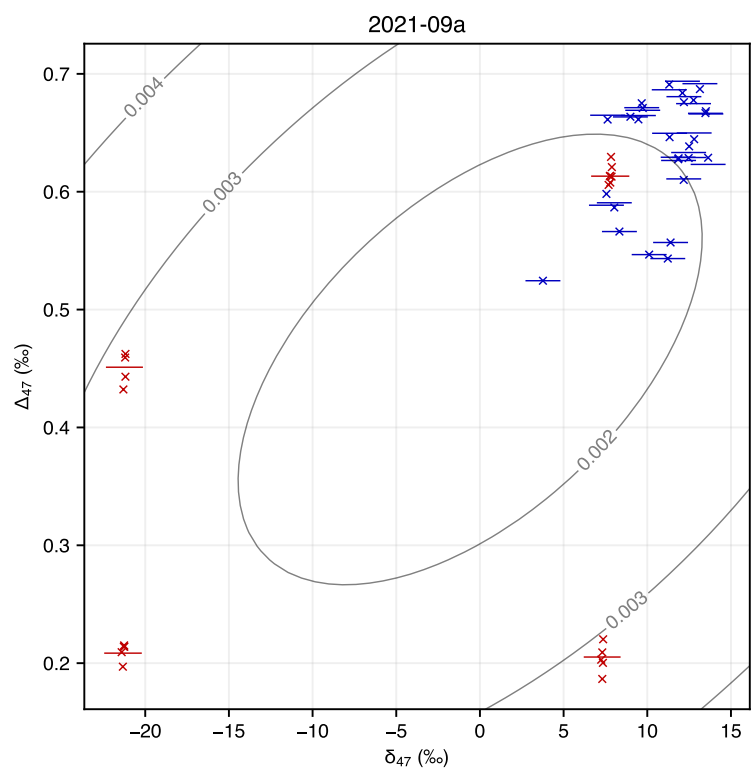
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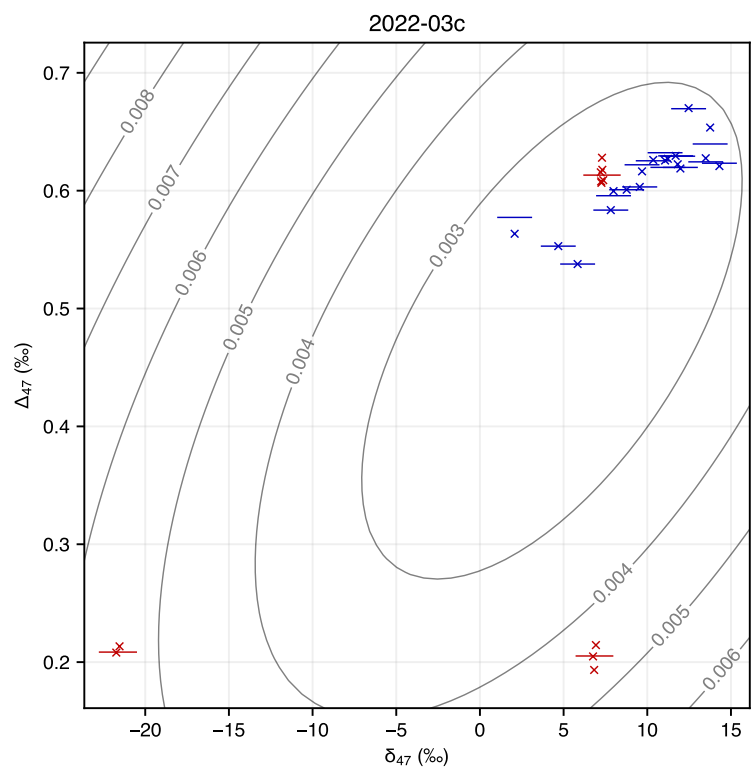
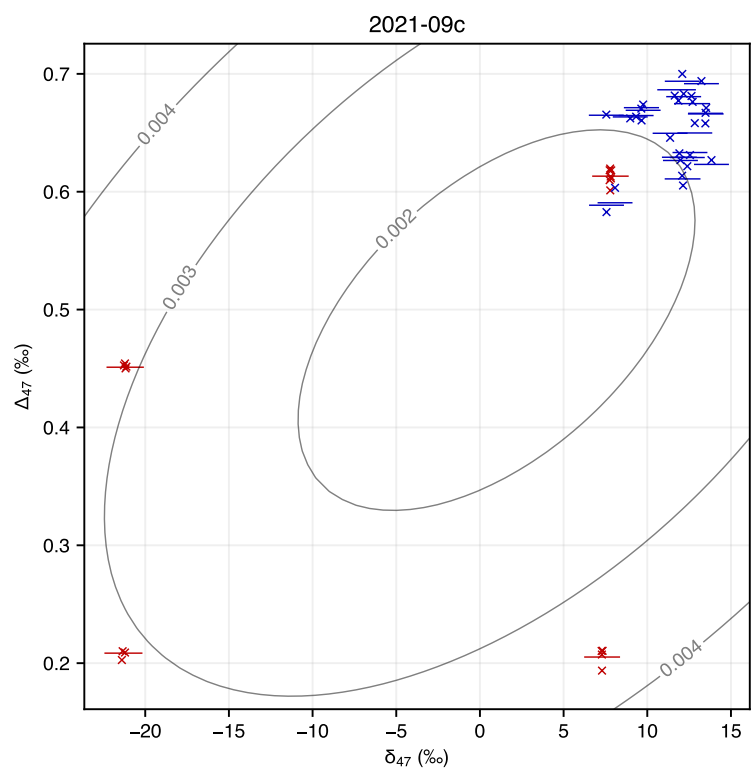
Acid reaction yield (assuming pure CaCO_3) of all analyses

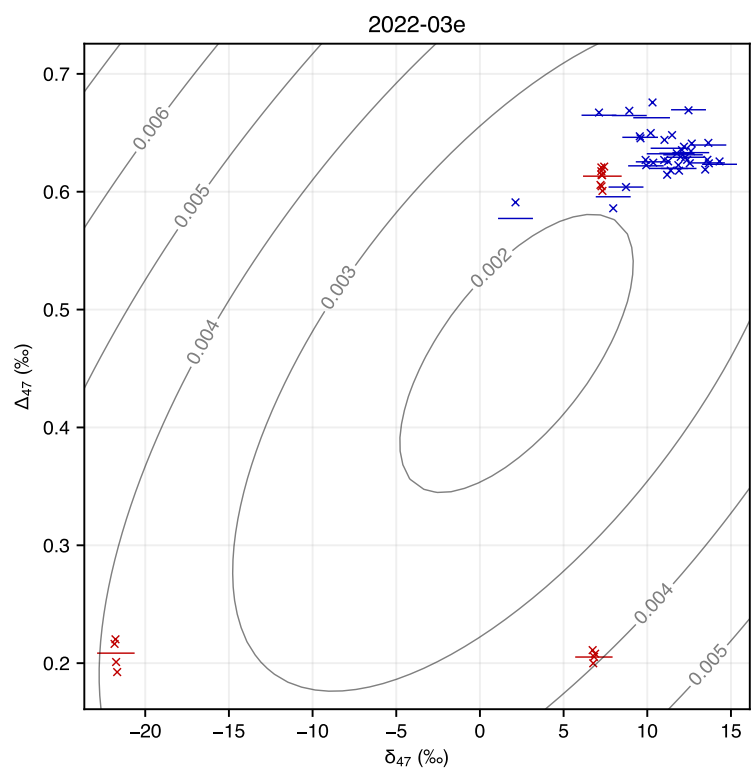
Methods

Carbonate samples were converted to CO_2 by phosphoric acid reaction at 90°C in a common, stirred acid bath for 15 minutes. Initial phosphoric acid concentration was 103 % (1.91 g/cm^3) and each batch of acid was used for 7 days. After cryogenic removal of water, the evolved CO_2 was helium-flushed at 25 mL/mn through a purification column packed with Porapak Q (50/80 mesh, 1 m length, 2.1 mm ID) and held at -20°C , then quantitatively recollected by cryogenic trapping and transferred into an Isoprime 100 dual-inlet mass spectrometer equipped with six Faraday collectors (m/z 44–49). Each analysis took about 2.5 hours, during which analyte gas and working reference gas were allowed to flow from matching, 10 mL reservoirs into the source through deactivated fused silica capillaries (65 cm length, $110\text{ }\mu\text{m}$ ID). Every 20 minutes, gas pressures were adjusted to achieve $m/z = 44$ current of 80 nA, with differences between analyte gas and working gas generally below 0.1 nA. Pressure-dependent background current corrections were measured 12 times for each analysis. All background measurements from a given session within ± 6 hours of any given analysis were used to determine a mass-specific relationship for that analysis, linking background intensity (Z_m), total $m/z = 44$ intensity (I_{44}), and time (t): $Z_m = aI_{44} + P(t)$, with P being a polynomial of degree 2 to 4. Background-corrected ion current ratios (δ_{45} to δ_{49}) were converted to $\delta^{13}\text{C}$, $\delta^{18}\text{O}$, and “raw” Δ_{47} values as described by *Daëron et al.* [2016] using the IUPAC oxygen-17 correction parameters [Brand et al., 2010]. The isotopic composition ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$) of our working reference gas was computed based on the nominal isotopic composition of all ETH carbonate standards [Bernasconi et al., 2018] and an oxygen-18 acid fractionation factor of 1.00813 [Kim et al., 2007]. Raw Δ_{47} values were then converted to the I-CDES reference frame [Bernasconi et al., 2021] using a pooled regression approach [Daëron, 2021] as implemented by the *D47crunch* Python library. Full analytical errors are derived from the external reproducibility of unknowns and standards ($N_f = 157$) and conservatively account for the uncertainties in raw Δ_{47} measurements as well as those associated with the conversion to the I-CDES reference frame [Daëron, 2021].









UID	Session	Sample	Mass (mg)	CO ₂ yield (if CaCO ₃)	δ45 (‰ WG)	δ46 (‰ WG)	δ47 (‰ WG)	δ48 (‰ WG)	δ49 (‰ WG)	δ ¹³ C _{V-PDB} (‰)	δ ¹⁸ O _{V-SMOW} (‰)	Δ ⁴⁵ _{AN} (‰)	Δ ⁴⁷ _{AN} (‰)
1224	2021-09a	ETH-1	4.03	1.01	5.585006	2.429445	7.362685	4.432815	-1.237147	2.030	37.001	-0.795560	0.220256
1225	2021-09a	ETH-2	4.14	1.00	-6.406381	-14.184762	-21.248697	-28.973111	-1.933536	-10.158	19.859	-0.801154	0.213965
1226	2021-09a	ETH-3	3.92	0.96	5.297236	2.853776	7.883517	5.403550	-1.494947	1.707	37.459	-0.399741	0.620895
1227	2021-09a	ETH-4	4.11	1.01	-6.462800	-14.302426	-21.180531	-29.314712	-2.953794	-10.214	19.753	-0.555741	0.462360
1228	2021-09a	ETH-1	3.96	1.01	5.591305	2.429640	7.349471	4.321416	-1.044539	2.037	37.033	-0.815314	0.200262
1229	2021-09a	ETH-2	3.68	0.99	-6.401020	-14.205336	-21.262240	-29.168824	-2.723346	-10.151	19.865	-0.800041	0.215091
1230	2021-09a	ETH-3	3.74	0.97	5.300694	2.839457	7.864884	5.402809	-1.689432	1.711	37.468	-0.407734	0.612804
1231	2021-09a	ETH-4	4.21	1.01	-6.461610	-14.320981	-21.200378	-29.467295	-2.090002	-10.212	19.755	-0.558744	0.459321
1232	2021-09a	N-nig	3.89	0.93	5.762743	5.829851	11.332279	11.570669	-1.565708	2.094	40.568	-0.374755	0.646260
1233	2021-09a	A-ker-A-d	3.94	0.97	5.619749	7.397237	12.764542	14.768409	-0.767338	1.883	42.192	-0.343722	0.677702
1234	2021-09a	N-len-mi	4.05	0.96	4.836217	5.088340	9.667583	9.991417	-1.558302	1.132	39.811	-0.346261	0.675064
1235	2021-09a	ETH-1	4.46	1.00	5.590324	2.405332	7.310836	4.656698	-0.798511	2.036	37.038	-0.828808	0.186603
1236	2021-09a	L-neo-vcs	4.10	0.99	6.568124	6.175677	12.502103	12.220450	-1.040900	2.941	40.937	-0.382468	0.638479
1237	2021-09a	A-ker-C-v	3.97	0.98	6.198572	7.544048	13.501725	15.008857	-1.188803	2.496	42.356	-0.353020	0.668307
1238	2021-09a	T-san-v	3.93	0.97	4.240090	5.040791	8.991263	9.835464	-1.559079	0.497	39.775	-0.357567	0.663605
1239	2021-09a	ETH-3	4.19	0.96	5.283543	2.786345	7.789644	5.152259	-1.451988	1.695	37.445	-0.412716	0.607761
1240	2021-09a	T-gal-4-v-mi	4.09	0.96	6.381836	6.072878	12.178634	11.991223	-0.483898	2.746	40.842	-0.410581	0.610017
1241	2021-09a	A-ker61-vcs	4.05	0.97	4.842316	6.730655	11.311711	13.276336	-1.891830	1.078	41.528	-0.330651	0.690936
1242	2021-09a	L-uva-vcs	3.93	0.94	4.465562	7.794133	12.101428	15.879436	-2.455138	0.631	42.774	-0.337681	0.683802
1243	2021-09a	ETH-2	4.20	0.99	-6.422034	-14.191833	-21.278688	-29.270938	-2.091553	-10.174	19.915	-0.801161	0.213957
1244	2021-09a	A-ker68-vcs	4.02	0.97	5.323178	7.127782	12.188467	14.185604	-1.203499	1.576	41.943	-0.345385	0.676006
1245	2021-09a	A-ker52-vcs	3.97	0.97	5.720236	7.956191	13.474687	15.915650	-1.204722	2.086	42.801	-0.354598	0.666709
1246	2021-09a	M-fra-vcs	3.96	0.98	4.863261	8.568547	13.144672	17.191137	-1.069324	1.032	43.438	-0.334466	0.687079
1247	2021-09a	ETH-3	4.05	0.96	5.296389	2.795531	7.833707	5.203762	-1.501028	1.708	37.469	-0.391192	0.629547
1248	2021-09a	SP-74-cs	4.06	1.00	7.552751	0.202492	7.630472	-0.007205	-1.252281	4.214	34.784	-0.359835	0.661231
1249	2021-09a	SP-368-Oa	4.08	1.01	9.137850	3.782764	12.800988	7.398396	-2.688276	5.774	38.484	-0.376448	0.644579
1250	2021-09a	SP-121-cs	4.02	1.00	7.013223	2.621693	9.468925	5.010487	-2.688276	3.548	37.289	-0.359798	0.661358
1251	2021-09a	ETH-4	4.09	1.00	-6.452046	-14.298029	-21.183992	-29.602609	-2.449508	-10.202	19.827	-0.574818	0.443051
1252	2021-09a	SP-387-Da	4.01	0.99	8.299666	3.735426	11.870171	7.287429	-1.091013	4.880	38.441	-0.392416	0.628397
1253	2021-09a	SP-29	3.92	0.99	7.219881	2.627892	9.281210	5.014311	-1.521771	3.767	37.331	-0.350240	0.670337
1254	2021-09a	SP-368-Db	3.93	0.98	9.718430	4.010128	13.635761	7.678310	-1.653945	6.410	38.724	-0.392016	0.628840
1255	2021-09a	ETH-3	4.18	0.96	5.287360	2.766614	7.797797	5.237173	-2.142560	1.700	37.450	-0.407060	0.613485
1256	2021-09a	SP-459-Da	3.95	0.97	8.185682	3.830171	7.455231	7.269096	-1.679492	4.755	38.544	-0.393250	0.627552
1257	2021-09a	SP-254-Da	3.89	1.00	8.584440	4.044068	12.471148	7.224201	-1.299509	5.173	38.766	-0.392252	0.628576
1258	2021-09a	SP-137-a	3.97	1.00	6.039006	4.406767	10.112224	8.555686	-1.250015	2.441	39.148	-0.473148	0.546646
1259	2021-09a	ETH-1	4.06	1.00	5.592721	2.379321	7.310085	4.284824	-1.374208	2.060	37.054	-0.806519	0.209163
1260	2021-09a	SP-1071	3.96	0.97	7.094893	4.429496	11.225032	8.647567	-2.570532	3.568	39.171	-0.476492	0.543385
1261	2021-09a	SP-1072	3.92	0.97	6.872666	4.817298	11.932259	9.410323	-1.741221	3.317	39.574	-0.463016	0.556929
1262	2021-09a	SP-1076	4.05	0.96	5.178937	3.489279	8.334509	6.748175	-1.222594	1.557	38.205	-0.453786	0.566204
1263	2021-09a	ETH-3	4.03	0.96	5.281277	2.758427	7.765126	5.188946	-1.298004	1.693	37.450	-0.407349	0.613192
1264	2021-09a	BARC-02e	4.15	0.97	1.651911	2.596606	3.764472	4.867119	-1.369256	-2.177	37.292	-0.494905	0.524484
1265	2021-09a	ARD-06	3.88	0.93	5.557553	2.275511	7.585850	4.308405	-2.328680	2.006	36.952	-0.422216	0.598139
1266	2021-09a	ARD-08	3.93	0.98	6.154847	2.139266	8.029744	3.818731	-1.725079	2.649	36.810	-0.433579	0.586649
1267	2021-09a	ETH-2	4.00	0.97	-6.428842	-14.235154	-21.337122	-29.542191	-2.141923	-10.180	19.909	-0.817910	0.197003
1268	2021-09a	ETH-3	3.97	0.96	5.268439	2.701794	7.688489	5.056971	-1.526538	1.682	37.396	-0.414691	0.605759
1269	2021-09a	ETH-2	3.98	0.99	-6.435960	-14.313290	-21.408698	-29.787826	-2.506730	-10.185	19.829	-0.805737	0.209322
1270	2021-09a	ETH-4	3.90	0.97	-6.471254	-14.392153	-21.305872	-29.790153	-2.833755	-10.219	19.749	-0.585510	0.432924
1271	2021-09a	ETH-1	4.04	0.99	5.581618	2.332558	7.246197	4.166898	-1.570863	2.030	37.015	-0.812681	0.202292
1272	2021-09b	ETH-1	3.88	1.02	5.598753	2.510931	7.449037	4.578189	-1.015499	2.033	37.046	-0.803857	0.210210
1273	2021-09b	ETH-2	4.00	1.00	-6.419589	-14.151853	-21.223698	-29.549051	-2.902192	-10.172	19.863	-0.794722	0.218900
1274	2021-09b	ETH-3	3.95	0.97	5.283803	2.839768	7.842389	5.352725	-1.389419	1.685	37.425	-0.413023	0.610833
1275	2021-09b	ETH-4	3.89	1.01	-6.455938	-14.260555	-21.158899	-29.527654	-2.186313	-10.207	19.775	-0.578026	0.441020
1276	2021-09b	ETH-1	4.02	1.01	5.590794	2.421543	7.343304	4.319884	-1.322802	2.028	37.013	-0.812972	0.200864
1277	2021-09b	ETH-2	3.91	1.01	-6.418698	-14.158590	-21.240338	-29.501983	-2.153332	-10.171	19.898	-0.805921	0.207421
1278	2021-09b	ETH-3	3.97	0.97	5.301197	2.839524	7.864986	5.310717	-1.577173	1.703	37.457	-0.408214	0.615762
1279	2021-09b	ETH-4	4.04	1.01	-6.457640	-14.298360	-21.193291	-29.785220	-2.150823	-10.208	19.764	-0.578178	0.440864
1280	2021-09b	M-fra-vcs	3.88	0.97	4.814079	8.584046	13.116795	17.326991	-2.550109	0.971	43.408	-0.326591	0.699551
1281	2021-09b	T-gal-4-v-mi	4.14	1.01	6.389767	6.033780	12.156434	12.105243	-1.046842	2.747	40.769	-0.402439	0.621783
1282	2021-09b	A-ker52-vcs	3.98	0.98	5.791115	7.993358	13.515978	16.077569	-1.204538	2.035	42.801	-0.359418	0.659192
1283	2021-09b	ETH-3	3.95	0.98	5.304413	2.802728	7.832356	5.339378	-1.251882	1.708	37.436	-0.407815	0.616171
1284	2021-09b	T-san-v	4.06	0.96	4.284803	5.089688	9.082811	10.030757	-1.113860	0.535	39.806	-0.360603	0.664594
1285	2021-09b	A-ker68-vcs	4.06	0.98	5.364889	7.193788	12.308733	14.478298	-1.565230	1.610	41.981	-0.333815	0.692128
1286	2021-09b	A-ker-C-v	3.97	0.98	6.218241	7.563385	13.530498	15.005748	-1.197200	2.507	42.364	-0.363662	0.661563
1287	2021-09b	ETH-1	4.04	1.00	5.599126	2.413001	7.351852	4.384758	-0.762645	2.037	37.040	-0.804663	0.209381
1288	2021-09b	FSL-707721	3.99	0.98	4.840725	4.095406	8.615024	7.956987	-1.174691	1.165	38.784	-0.422135	0.601511
1289	2021-09b	FSL-307829b	4.02	1.00	4.709339	2.645590	6.820230	4.571544	-1.068958	1.085	37.100	-0.471114	0.551264
1290	2021-09b	N-len-mi	4.03	0.94	4.847189	5.107452	9.689346	10.116542	-1.604114	1.135	39.833	-0.354663	0.670696
1291	2021-09b	ETH-3	3.90	0.98	5.295809	2.800818	7.823150	5.210376	-2.153393	1.699	37.448	-0.406248	0.617777
1292	2021-09b	SP-254-Da	3.96	0.99	8.621602	4.088690	12.561779	8.139033	-1.563710	5.200	38.773	-0.384445	0.640236
1293	2021-09b	SP-74-cs	3.95	0.97	7.557361	0.174821	7.608416	-0.090933	-2.200184	4.209	34.729	-0.359287	0.665907
1294	2021-09b	SP-459-Da	4.02	0.97	8.086323	3.887913	11.796067	7.573715	-1.383445	4.636	38.569	-0.396727	0.627629
1295	2021-09b	ETH-2	3.91	0.97	-6.409679	-14.210884	-21.273504	-29.746705	-2.706126	-10.160	19.885	-0.797028	0.216536
1296	2021-09b	SP-368-Oa	4.06	0.99									

UID	Session	Sample	Mass (mg)	CO ₂ yield (if CaCO ₃)	δ45 (‰ WG)	δ46 (‰ WG)	δ47 (‰ WG)	δ48 (‰ WG)	δ49 (‰ WG)	δ ¹³ C _{VPDB} (‰)	δ ¹⁸ O _{VSMOW} (‰)	Δ _{carb} ^{carb} (‰)	Δ _{org} ^{org} (‰)
1334	2021-09c	SP-74-cs	3.93	0.99	7.550775	0.127552	7.551040	-0.152486	-1.338662	4.211	34.681	-0.363022	0.665420
1335	2021-09c	ARD-06	4.05	0.96	5.523609	2.338802	7.563385	4.328031	-1.411278	1.964	36.975	-0.443964	0.582715
1336	2021-09c	T-gal-4-v-mi	3.90	1.01	6.396143	6.026673	12.136427	12.111332	-2.152122	2.759	40.790	-0.421790	0.605270
1337	2021-09c	ETH-1	4.04	1.01	5.594262	2.381659	7.295646	4.276241	-1.509354	2.037	37.025	-0.824714	0.193679
1338	2021-09c	A-ker-A-d	4.04	0.97	5.594290	7.378344	12.710705	14.951452	-0.379382	1.852	42.195	-0.352320	0.676240
1339	2021-09c	A-ker52-vcs	3.94	0.99	5.779567	7.973362	13.482202	16.167075	-1.496606	2.028	42.812	-0.361396	0.666948
1340	2021-09c	SP-459-Da	3.96	0.94	8.194321	3.896879	11.918466	7.581473	-2.483598	4.758	38.593	-0.395054	0.632593
1341	2021-09c	ETH-3	4.05	0.97	5.296404	2.784738	7.788030	5.538923	-1.205987	1.704	37.451	-0.425934	0.601132
1342	2021-09c	ARD-08	4.01	0.97	6.135623	2.193392	8.073260	4.120649	-1.948699	2.623	36.840	-0.423809	0.603298
1343	2021-09c	T-san-v	4.03	0.97	4.260588	5.017939	8.981297	10.038992	-1.109042	0.515	39.767	-0.366146	0.662196
1344	2021-09c	SP-368-Oa	3.92	0.99	9.149284	3.802930	12.839405	7.515151	-2.146164	5.782	38.501	-0.369963	0.658210
1345	2021-09c	ETH-2	4.01	0.98	-6.423031	-14.265334	-21.350419	-30.168062	-2.475973	-10.179	19.857	-0.809234	0.210137
1346	2021-09c	N-len-mi	4.02	0.97	4.853840	5.058304	9.644326	9.969534	-1.374197	1.147	39.813	-0.358005	0.670500
1347	2021-09c	A-ker68-vcs	3.94	0.95	5.301499	7.136017	12.173811	14.331476	-2.297405	1.549	41.962	-0.345655	0.683062
1348	2021-09c	SP-368-Db	3.98	0.99	9.911856	4.042526	13.835646	7.843513	-1.712147	6.588	38.753	-0.400650	0.626833
1349	2021-09c	ETH-3	4.01	0.94	5.314260	2.807505	7.845754	5.272565	-2.019156	1.723	37.487	-0.409312	0.618116
1350	2021-09c	A-ker61-vcs	4.01	0.98	5.229035	6.903046	11.862587	13.983370	-0.942068	1.480	41.724	-0.351364	0.677236
1351	2021-09c	A-ker-C-v	3.94	0.98	6.205659	7.523503	13.471359	15.099906	-0.688872	2.500	42.365	-0.370195	0.657959
1352	2021-09c	SP-121-cs	4.02	0.99	6.979770	2.524771	9.334672	4.733135	-1.279653	3.512	37.195	-0.364679	0.663687
1353	2021-09c	ETH-4	3.91	1.00	-6.453855	-14.326438	-21.209115	-30.264870	-2.613515	-10.210	19.802	-0.570275	0.454297
1354	2021-09c	L-neo-vcs	4.02	0.98	6.522149	6.155921	12.391470	12.204694	-1.946994	2.890	40.933	-0.405764	0.621640
1355	2021-09c	L-uva-vcs	4.02	0.94	4.475347	7.904126	12.090615	16.063660	-1.747088	0.638	42.767	-0.329148	0.699930
1356	2021-09c	SP-387-Da	3.95	0.99	8.383722	3.767459	11.980575	7.240731	-1.600644	4.966	38.481	-0.400679	0.626844
1357	2021-09c	ETH-3	3.95	0.96	5.280824	2.754166	7.750268	5.236266	-2.023173	1.689	37.442	-0.417447	0.609805
1358	2021-09c	N-len-mi	4.02	0.93	4.826245	5.111722	9.658551	10.055672	-2.215022	1.116	39.881	-0.367833	0.660458
1359	2021-09c	A-ker-A-d	3.95	0.98	5.553245	7.345958	12.640968	14.845850	-1.246702	1.810	42.191	-0.347467	0.681200
1360	2021-09c	SP-29	3.95	0.99	7.205093	2.702324	9.752408	5.256509	-1.052997	3.746	37.386	-0.354613	0.673963
1361	2021-09c	ETH-1	3.90	1.01	5.592789	2.360939	7.287098	4.241866	-1.724123	2.037	37.037	-0.811378	0.207306
1362	2021-09c	T-gal-4-v-mi	3.95	1.01	6.386947	5.974522	12.083521	12.042885	-1.575225	2.751	40.773	-0.413672	0.613566
1363	2021-09c	A-ker-C-v	3.88	0.98	6.205637	7.558025	13.518464	15.279560	-2.044398	2.499	42.412	-0.357386	0.671046
1364	2021-09c	A-ker61-vcs	3.91	0.98	5.101067	6.807811	11.639900	13.662415	-2.377321	1.347	41.639	-0.347127	0.681570
1365	2021-09c	ETH-3	4.02	0.97	5.288252	2.768861	7.782220	5.379299	-1.679462	1.696	37.463	-0.407776	0.619687
1366	2021-09c	ETH-2	3.97	0.98	-6.432348	-14.293823	-21.396611	-30.415625	-3.022405	-10.188	19.847	-0.816546	0.202667
1367	2021-09c	ETH-4	3.91	1.00	-6.467559	-14.374145	-21.271207	-30.491266	-2.620589	-10.223	19.764	-0.571897	0.452641
1368	2021-09c	ETH-3	4.02	0.96	5.284448	2.744136	7.752407	5.125557	-1.864567	1.693	37.439	-0.409212	0.618220
1369	2021-09c	ETH-1	4.08	1.00	5.588011	2.347344	7.271754	4.390988	-0.961334	2.032	37.029	-0.808375	0.210374
1246	2022-03c	ETH-1	3.77	0.97	5.589121	1.903381	6.929905	3.989962	-2.981285	2.039	37.033	-0.713500	0.214448
1247	2022-03c	ETH-3	3.88	0.95	5.300699	2.263184	7.367497	4.790696	-3.005001	1.717	37.433	-0.336300	0.608930
1248	2022-03c	ETH-2	3.85	1.00	-6.346757	-14.624124	-21.535412	-34.308313	-1.004150	-10.143	19.895	-0.717863	0.213395
1249	2022-03c	ETH-3	4.27	0.97	5.286059	2.216156	7.314336	4.849568	0.341553	1.703	37.423	-0.327919	0.617703
1250	2022-03c	707752	3.93	0.98	4.971271	3.090737	7.819989	6.974956	0.383459	1.333	38.344	-0.360553	0.583507
1251	2022-03c	707729	4.10	0.97	5.142577	3.854772	8.768854	8.705469	-0.041709	1.488	39.150	-0.343914	0.600793
1252	2022-03c	707727	4.01	1.01	5.988755	3.757690	9.551367	8.489111	-0.235936	2.399	39.056	-0.341546	0.603174
1253	2022-03c	ETH-1	3.89	1.00	5.579995	1.828055	6.825711	3.973428	-0.756994	2.032	37.054	-0.733684	0.193349
1254	2022-03c	L-opa	3.93	0.97	4.536625	1.583672	5.838008	3.147197	-0.163287	0.923	36.808	-0.404543	0.537740
1255	2022-03c	ETH-3	4.21	0.97	5.274137	2.167268	7.244214	4.767833	0.443148	1.692	37.439	-0.337336	0.607862
1256	2022-03c	H9	3.99	0.99	1.673597	0.740442	2.074646	1.452197	-0.473230	-2.116	35.967	-0.380412	0.563444
1257	2022-03c	ETH-3	4.11	0.97	5.281292	2.177453	7.260496	4.746032	-0.332457	1.699	37.458	-0.338506	0.606637
1258	2022-03c	FSL-707721	4.25	1.00	4.817509	3.402552	7.984425	6.905456	-0.052392	1.156	38.737	-0.345128	0.599621
1259	2022-03c	VR-121S	3.94	0.97	8.870869	3.626318	12.469933	8.229912	0.498582	5.494	38.963	-0.277295	0.670018
1260	2022-03c	VR-111S	4.19	0.99	10.848169	2.637754	13.493169	5.842854	0.184810	7.652	37.930	-0.317803	0.627522
1261	2022-03c	ETH-2	3.91	1.00	-6.400936	-14.762393	-21.730424	-34.767736	-0.706268	-10.196	19.848	-0.722962	0.208085
1262	2022-03c	VR-81S	3.96	0.97	9.282384	2.587698	11.891116	5.664219	0.960949	5.974	37.885	-0.322891	0.622407
1263	2022-03c	VR-110S-1	4.19	0.97	7.920762	3.243463	11.063861	7.225267	0.205263	4.490	38.573	-0.319942	0.625585
1264	2022-03c	VR-63S-1	4.30	0.99	8.810152	1.601369	10.355868	3.464542	0.116041	5.505	36.863	-0.319572	0.626059
1265	2022-03c	ETH-3	3.90	0.97	5.288015	2.183958	7.294409	4.853545	0.575620	1.706	37.479	-0.318126	0.627948
1266	2022-03c	VR-26S-D2	4.20	0.99	11.319249	2.975585	14.309898	6.632321	0.200855	8.144	38.291	-0.324085	0.620851
1267	2022-03c	VR-104S	4.06	0.96	7.774732	2.015142	9.686738	4.457448	0.173136	4.379	37.300	-0.328904	0.616381
1268	2022-03c	VR-100S	4.28	0.99	9.240377	2.033092	11.229745	4.535926	1.273833	5.950	37.316	-0.318551	0.627019
1269	2022-03c	ETH-1	3.81	1.00	5.580546	1.748345	6.758570	3.681277	0.151790	2.036	37.030	-0.722714	0.204832
1270	2022-03c	H7	4.06	0.94	3.196315	1.799886	4.681232	4.011661	1.038691	-0.523	37.090	-0.390151	0.552936
1271	2022-03c	VR-59S-1	4.28	0.99	9.446352	2.284359	11.694483	4.938830	0.752455	6.161	37.581	-0.316103	0.629522
1272	2022-03c	VR-55S	4.12	0.98	10.252583	1.740797	11.977651	3.824680	-0.012105	7.046	37.014	-0.326328	0.618792
1273	2022-03c	ETH-3	3.96	0.96	5.276395	2.133510	7.220606	4.651154	0.074507	1.695	37.435	-0.329975	0.615564
1274	2022-03c	VR-103S	4.27	0.82	10.900126	2.823715	13.757011	6.260376	4.162344	7.700	38.142	-0.292885	0.653553
1308	2022-03c	ETH-1	3.98	1.00	5.581682	1.868731	6.883760	3.501770	-1.558796	2.037	36.996	-0.717689	0.208006
1309	2022-03c	ETH-3	3.89	0.97	5.296194	2.311661	7.426607	4.451753	-1.144330	1.715	37.474	-0.320557	0.621325
1310	2022-03c	ETH-2	4.00	1.00	-6.406484	-14.715891	-21.676919	-30.514039	-1.434261	-10.165	19.894	-0.708921	0.192441
1311	2022-03c	ETH-3	3.91	0.97	5.278441	2.245584	7.322032	4.332022	-1.247463	1.698	37.440	-0.341324	0.606862
1312	2022-03c	VR-61S	4.04	0.99	9.690103	1.798667	11.480773	3.457844	-1.081632	6.433	36.978	-0.299809	0.648030
1313	2022-03c	VR-108S	4.03	1.01	9.538131	2.459579	11.996850	4.863418	-1.038189	6.244	37.708	-0.318532	0.629557
1314	2022-03c	VR-80S	4.06	1.00	8.822271	3.897965	12.657252	7.663196	-1.516484	5.427	39.169	-0.308688	0.640877
1315	2022-03c	ETH-1	4.09	1.00	5.578316	1.813804							

UID	Session	Sample	Mass (mg)	CO ₂ yield (if CaCO ₃)	δ^{45} (‰ WG)	δ^{46} (‰ WG)	δ^{47} (‰ WG)	δ^{48} (‰ WG)	δ^{49} (‰ WG)	$\delta^{13}\text{C}_{\text{VPDB}}$ (‰)	$\delta^{18}\text{O}_{\text{VSMOW}}$ (‰)	Δ_{47}^{SW} (‰)	Δ_{47}^{AS} (‰)
J353	2022-03e	VR-110S-1	3.93	0.96	7.890207	3.242299	11.027582	6.577984	-0.276648	4.454	38.557	-0.323408	0.643963
J354	2022-03e	ETH-2	3.96	0.99	-6.423062	-14.859918	-21.832757	-31.501732	-1.410320	-10.177	19.851	-0.707286	0.216356
J355	2022-03e	VR-81S	3.97	0.98	9.640267	2.801261	12.381966	5.656340	-0.541300	6.342	38.098	-0.341874	0.627015
J356	2022-03e	VR-100S	4.03	0.98	9.224808	2.042735	11.187861	3.926022	-1.217207	5.926	37.314	-0.353505	0.614370
J357	2022-03e	VR-103S	4.30	0.82	10.925407	2.774291	13.679362	5.515150	-0.174989	7.717	38.068	-0.346792	0.624085
J358	2022-03e	ETH-3	3.94	0.96	5.279017	2.194732	7.262622	4.311697	0.052807	1.701	37.481	-0.351004	0.614451

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