Supplementary Information for: Shallow-crustal metamorphism during Late Cretaceous anatexis in the Sevier hinterland plateau: peak temperature conditions from the Grant Range, eastern Nevada, U.S.A.

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Discussion DR1: Supporting data for Raman spectroscopy on carbonaceous material (RSCM) thermometry

Multiple grains of carbonaceous material (CM) were analyzed from each sample. The center positions, heights, widths, and areas of four first-order Raman peaks, including the G peak and three defect bands, D1, D2, and D3, are shown for individual analyses on Table DR1. These parameters were determined using a peak fitting program written in Matlab by E. Soignard, which allowed peak shapes to be fit by a combination of gaussian and lorentzian peaks, and background slope to be removed by using a 1st-order polynomial. R1 and R2 correspond to the height and area ratios as defined in equations 1 and 2 of Rahl et al. (2005), and the peak temperature (T_{peak}) for each analysis is calculated from equation 3 of Rahl et al. (2005). Analyses of each sample on Table DR1 are ordered from low to high peak temperature. Standard means of R1, R2, and T_{peak} for all analyses from each sample are shown. The internal variation of R1, R2, and T_{peak} from each sample is represented by 1 standard deviation on the mean. However, the calibration equation of Rahl et al. (2005) also introduces an external ±50°C uncertainty in T_{peak}. Therefore, after Cooper et al. (2013), in order to present a more representative uncertainty, we calculated a propagated standard error (SE) by adding internal and external uncertainties quadratically, and dividing by the square root of the number of analyses (n). Mean T_{peak} with this propagated 2 SE uncertainty is reported for each sample on Table 1 in the text.

Table DR1: Supporting data for RSCM peak temperature determinations.

sample and	peak center position				peak width				peak amplitude				peak area				ratios		T_{peak}
spot number	D1	D3	G	D2	D1	D3	G	D2	D1	D3	G	D2	D1	D3	G	D2	R1	R2	(°C)
GR29_spot18	1350	1550	1606	1623	92	70	52	15	2020	50	1720	10	291917	3722	95117	160	1.174	0.754	198
GR29_spot12	1346	1570	1609	1623	65	80	44	15	4860	1050	3400	10	496215	89332	159095	160	1.429	0.757	223
GR29_spot9	1346	1570	1609	1623	63	90	43	15	1600	250	1130	10	158336	23928	51674	160	1.416	0.754	225
GR29_spot19	1344	1565	1607	1623	62	75	52	15	1710	200	910	10	166536	15952	50324	160	1.879	0.768	236
GR29_spot20	1345	1565	1607	1623	63	75	50	15	3030	250	1830	10	299849	19940	97308	160	1.656	0.755	242
GR29_spot13	1346	1565	1609	1623	66	80	46	15	1210	200	930	10	121392	17016	45495	160	1.301	0.727	243
GR29_spot14	1346	1570	1608	1623	72	60	48	15	2180	340	1620	10	246552	21695	90586	160	1.346	0.731	243
GR29_spot10	1346	1569	1608	1623	58	80	44	15	2000	300	1210	10	170442	25523	56619	160	1.653	0.751	246
GR29_spot8	1345	1570	1606	1623	62	70	53	15	2250	130	1600	10	212049	9678	90182	160	1.406	0.702	280
GR29_spot11	1348	1575	1611	1623	57	70	44	15	1780	600	1100	10	128489	44666	51472	160	1.618	0.714	284
GR29_spot16	1345	1555	1610	1623	74	90	52	15	3330	570	2670	10	387076	54556	189915	160	1.247	0.671	296
GR29_spot7	1346	1570	1601	1623	54	70	62	15	1340	50	750	10	102650	3722	49451	160	1.787	0.675	333
GR29_spot15	1347	1565	1612	1623	74	70	55	15	1650	350	1440	10	173211	26055	108335	160	1.146	0.615	343
																mean:	**1.466**	**0.721**	**261**
																1σ (internal):	**0.224**	**0.043**	**42**
																1 SE (internal):	**0.062**	**0.012**	**12**
																prop. 2 SE (internal and external):			**36**
																n:			**13**
GR34_spot18	1357	1550	1583	1623	68	70	32	35	900	150	1320	180	96133	11166	66350	6700	0.682	0.568	313
GR34_spot17	1358	1550	1584	1625	77	75	37	40	1050	100	2010	270	126999	7976	116820	11486	0.522	0.497	353
GR34_spot7	1353	1560	1585	1624	59	75	24	15	315	50	1190	60	29193	3988	44862	957	0.265	0.389	402
GR34_spot8	1358	1555	1584	1621	58	70	23	18	205	70	1025	50	18677	5211	37032	957	0.200	0.330	446
GR34_spot20	1363	1550	1585	1622	64	75	26	35	230	100	1000	90	21629	7976	40841	3350	0.230	0.329	456
GR34_spot19	1362	1550	1585	1623	63	70	23	40	200	80	1110	70	19792	5955	40102	2978	0.180	0.315	456
GR34_spot21	1360	1545	1585	1621	61	75	22	30	230	80	1270	110	20615	6381	43888	3509	0.181	0.303	469
GR34_spot11	1358	1550	1585	1624	55	75	25	35	240	140	1000	130	18056	11166	39270	4839	0.240	0.315	474
GR34_spot14	1356	1550	1584	1622	52	75	25	15	310	10	2350	30	22868	798	92284	479	0.207	0.280	502
GR34_spot10	1360	1555	1584	1624	60	70	23	33	210	130	1380	150	17874	9678	49857	5264	0.152	0.245	523
GR34_spot9	1359	1550	1584	1623	61	70	22	20	180	70	1540	70	15576	5211	53219	1489	0.117	0.226	533
GR34_spot13	1359	1550	1586	1623	52	75	25	27	240	100	1500	80	17704	7976	58905	2297	0.160	0.231	540
																mean:	**0.261**	**0.336**	**455**
																1σ (internal):	**0.161**	**0.100**	**67**
																1 SE (internal):	**0.046**	**0.029**	**19**
																prop. 2 SE (internal and external):			**48**
																n:			**12**
GR35_spot13	1363	1572	1586	1620	46	54	23	20	915	630	3100	460	66115	36179	75826	9784	0.295	0.436	360
GR35_spot19	1356	1571	1583	1618	40	55	20	16	575	460	2150	380	36128	39741	45729	6466	0.267	0.409	381
GR35_spot14	1357	1574	1583	1620	39	66	20	22	532	440	1950	325	32591	30883	41475	7604	0.273	0.399	393
GR35_spot12	1356	1568	1582	1618	41	59	20	21	830	520	3420	480	53454	32627	72742	10720	0.243	0.390	394
GR35_spot15	1357	1573	1582	1618	40	59	20	21	815	490	3700	450	51208	30745	78697	10050	0.220	0.366	413
GR35_spot1	1353	1540	1583	1622	52	80	21	19	133	0	580	49	10408	0	19132	990	0.229	0.341	443
GR35_spot17	1358	1572	1583	1616	41	58	19	18	521	390	1870	280	22717	24056	37785	5360	0.279	0.345	452
GR35_spot5	1355	1540	1583	1622	51	80	22	19	130	0	630	30	10414	0	21771	606	0.206	0.318	461
GR35_spot11	1357	1571	1582	1616	38	61	22	19	780	500	4050	340	46558	32436	94755	6870	0.193	0.314	461
GR35_spot18	1356	1572	1582	1621	42	55	19	19	915	620	3910	555	40869	36264	79005	11214	0.234	0.312	475
GR35_spot20	1359	1573	1583	1621	39	55	19	14	870	980	3350	470	36084	84666	67690	10336	0.260	0.316	478
GR35_spot9	1354	1571	1580	1618	41	62	23	20	3750	1820	15000	1820	163509	120002	366898	38710	0.250	0.308	484
GR35_spot8	1356	1572	1583	1619	44	65	23	26	1200	800	5090	580	56151	55301	124501	16037	0.236	0.285	**504**
																mean:	**0.245**	**0.349**	**438**
																1σ (internal):	**0.028**	**0.045**	**44**
																1 SE (internal):	**0.008**	**0.012**	**12**
																prop. 2 SE (internal and external):			**37**
																n:			**13**
GR36_spot12	1324	1573	1605	1623	79	55	30	15	3100	230	1120	670	384688	13453	35733	15787	2.768	0.882	67
GR36_spot15	1333	1573	1604	1624	70	63	35	18	7120	670	2630	1400	782885	44889	97893	39584	2.707	0.851	107
GR36_spot9	1337	1571	1603	1622	67	52	34	20	6450	820	2550	1040	678820	66979	92203	32673	2.529	0.845	131
GR36_spot10	1326	1573	1605	1624	88	55	31	18	3510	370	1450	780	328485	31966	47803	22054	2.421	0.825	161
GR36_spot8	1334	1572	1603	1623	79	50	33	16	11300	1320	4900	2650	949362	103673	171963	66602	2.306	0.799	196
GR36_spot11	1346	1573	1604	1624	55	81	36	16	15800	2600	7700	2000	1365022	330810	294795	34031	2.052	0.806	196
GR36_spot14	1346	1573	1603	1622	58	68	34	18	10500	2100	4710	2400	956615	224310	170304	67858	2.229	0.801	197

GR36_spot7	1345	1573	1603	1623	52	48	33	16	5300	590	3158	1350	432911	44485	110829	22971	1.678	0.764	234
GR36_spot3	1343	1550	1603	1622	77	70	46	20	660	40	420	80	79828	2978	30348	1702	1.571	0.714	281
GR36_spot1	1343	1540	1602	1622	77	80	39	19	740	50	550	180	83723	4254	33694	3637	1.345	0.692	285
GR36_spot6	1346	1540	1603	1620	64	80	51	20	1350	90	780	60	131334	7657	50377	1276	1.731	0.718	285
GR36_spot4	1346	1550	1604	1626	69	70	44	21	1500	150	1030	190	162577	11166	71188	4243	1.456	0.683	305
GR36_spot2	1346	1550	1605	1623	72	70	46	20	660	35	440	90	72233	2606	31793	1914	1.500	0.682	310
GR36_spot5	1348	1545	1603	1622	65	80	46	25	1280	100	860	210	130690	8508	62141	5583	1.488	0.659	333
																mean:	**1.984**	**0.766**	**221**
																1σ (internal):	**0.485**	**0.071**	**80**
																1 SE (internal):	**0.130**	**0.019**	**21**
																		prop. 2 SE (internal and external):	**50**
																		n:	**14**
GR38_spot12	1346	1577	1606	1623	60	65	36	29	3150	540	1780	310	296881	55135	68147	9561	1.770	0.813	185
GR38_spot13	1345	1577	1606	1624	61	71	37	27	4450	800	2500	360	426393	89221	98371	10337	1.780	0.797	203
GR38_spot11	1345	1576	1606	1621	62	75	39	28	6800	1000	4350	250	662248	117810	180418	7444	1.563	0.786	203
GR38_spot10	1343	1577	1605	1623	62	83	37	26	12700	2600	8200	900	1236845	338978	322657	24885	1.549	0.781	208
GR38_spot17	1343	1576	1602	1624	60	67	39	19	8760	1730	4700	930	825611	182071	194934	18792	1.864	0.794	208
GR38_spot15	1344	1577	1606	1626	61	76	40	18	5650	830	3400	250	541375	99086	144632	4786	1.662	0.784	211
GR38_spot9	1344	1575	1604	1623	63	85	41	26	4500	1050	2600	250	445321	140194	113366	6913	1.731	0.787	211
GR38_spot16	1346	1577	1604	1625	62	73	39	21	10350	1980	6300	850	1007980	227043	261295	18983	1.643	0.782	212
GR38_spot14	1344	1576	1604	1628	60	65	36	21	11400	1850	8100	1700	1074425	188888	310109	37966	1.407	0.755	224
GR38_spot8	1345	1577	1605	1622	55	75	41	30	11350	2050	6650	300	980570	241510	289956	9571	1.707	0.766	233
GR38_spot7	1347	1545	1608	1620	69	80	54	25	540	55	350	10	58528	4679	20100	266	1.543	0.744	247
GR38_spot2	1347	1545	1603	1620	67	80	51	20	300	35	185	25	30553	2978	10034	532	1.622	0.743	253
GR38_spot4	1342	1545	1605	1623	71	80	38	20	150	0	90	33	16729	0	5372	702	1.667	0.734	265
GR38_spot5	1348	1545	1604	1620	62	80	50	25	775	40	460	60	75477	3403	27960	1595	1.685	0.719	282
																mean:	**1.657**	**0.770**	**225**
																1σ (internal):	**0.112**	**0.026**	**26**
																1 SE (internal):	**0.030**	**0.007**	**7**
																		prop. 2 SE (internal and external):	**30**
																		n:	**14**
GR49_spot17	1352	1565	1581	1622	48	85	20	16	1350	40	3300	290	68913	5341	103673	4935	0.409	0.388	441
GR49_spot3	1353	1540	1581	1623	48	80	20	17	85	5	360	12	5995	425	11310	217	0.236	0.342	444
GR49_spot11	1355	1568	1582	1624	47	75	21	9	330	50	1470	100	24363	5890	48490	957	0.224	0.330	453
GR49_spot4	1351	1540	1581	1622	53	80	21	25	91	5	390	35	6353	425	12865	931	0.233	0.315	472
GR49_spot6	1350	1540	1580	1622	52	80	21	20	125	0	560	28	8561	0	18473	596	0.223	0.310	474
GR49_spot13	1355	1570	1581	1623	44	70	19	7	730	15	3300	150	34159	1649	98489	1117	0.221	0.255	532
GR49_spot10	1354	1570	1582	1623	43	70	18	10	430	15	2175	60	19664	1649	61497	638	0.198	0.242	539
GR49_spot15	1359	1570	1581	1624	42	75	18	10	500	24	2550	90	22333	2827	72100	957	0.196	0.234	547
GR49_spot9	1357	1570	1581	1622	42	70	19	19	810	50	3700	220	36179	5498	110427	4445	0.219	0.240	548
GR49_spot12	1354	1570	1581	1621	48	70	19	14	360	10	2290	120	18377	1100	68345	1787	0.157	0.208	564
GR49_spot18	1355	1560	1581	1620	43	75	20	14	670	60	3670	240	30639	7069	115296	3573	0.183	0.205	575
GR49_spot8	1356	1571	1582	1622	40	70	19	10	610	20	3540	40	25949	2199	105652	425	0.172	0.197	580
GR49_spot14	1357	1570	1582	1623	38	70	18	22	630	20	4150	290	25460	2199	117338	6785	0.152	0.170	603
GR49_spot16	1357	1560	1582	1620	40	80	18	11	465	90	3750	110	19781	11310	106029	1287	0.124	0.156	609
																mean:	**0.211**	**0.257**	**527**
																1σ (internal):	**0.064**	**0.067**	**57**
																1 SE (internal):	**0.017**	**0.018**	**15**
																		prop. 2 SE (internal and external):	**41**
																		n:	**14**
GR50_spot8	1351	1535	1583	1610	98	80	24	60	1450	340	4180	950	223210	28926	157582	60618	0.347	0.506	299
GR50_spot21	1350	1550	1584	1615	87	80	19	50	655	170	2650	470	89512	14463	79090	24992	0.247	0.462	319
GR50_spot9	1349	1545	1583	1617	95	80	20	40	650	200	3310	450	96997	17016	103987	19143	0.196	0.441	327
GR50_spot7	1350	1540	1584	1615	73	80	25	60	1000	300	2600	480	114668	25523	102102	30628	0.385	0.463	355
GR50_spot18	1350	1540	1584	1622	75	75	18	35	360	50	3440	180	42412	3988	97264	6700	0.105	0.290	461
GR50_spot10	1356	1550	1584	1625	58	70	20	15	127	10	1020	25	11570	744	32044	399	0.125	0.263	496
GR50_spot12	1355	1545	1584	1623	60	75	21	24	110	20	925	60	10032	1595	30513	1531	0.119	0.238	520
GR50_spot16	1355	1540	1584	1624	57	75	19	20	240	60	2300	120	21488	4786	68644	2552	0.104	0.232	522
GR50_spot19	1356	1540	1584	1625	48	75	18	20	210	10	1600	80	13788	798	45239	1702	0.131	0.227	536
GR50_spot11	1354	1550	1584	1626	48	70	20	15	230	20	1680	60	15661	1489	52779	957	0.137	0.226	539
																mean:	**0.190**	**0.335**	**437**
																1σ (internal):	**0.098**	**0.111**	**95**
																1 SE (internal):	**0.031**	**0.035**	**30**
																		prop. 2 SE (internal and external):	**68**

																		n:	**10**
GR53_spot17	1357	1570	1581	1621	44	75	21	8	260	50	1560	65	17970	5890	51459	553	0.167	0.257	514
GR53_spot11	1356	1570	1582	1623	43	70	19	13	360	50	2430	200	24316	5498	72524	2765	0.148	0.244	523
GR53_spot8	1356	1562	1582	1622	43	75	18	12	380	40	3300	100	25667	4712	93305	1276	0.115	0.213	546
GR53_spot13	1356	1568	1582	1622	47	75	19	10	850	20	4900	170	42486	1595	146241	1808	0.173	0.223	552
GR53_spot10	1354	1565	1582	1620	45	60	19	13	520	15	3180	250	24885	1414	94908	3456	0.164	0.202	572
GR53_spot7	1355	1560	1582	1623	43	70	19	14	600	20	4050	170	27438	2199	120873	2531	0.148	0.182	589
GR53_spot16	1357	1555	1581	1622	51	80	20	11	180	20	2730	30	14420	2513	85765	351	0.066	0.143	606
GR53_spot18	1356	1571	1581	1622	42	70	19	10	250	10	3650	60	16493	1100	108935	638	0.068	0.131	619
GR53_spot14	1356	1565	1581	1623	48	75	20	11	420	90	4450	105	21440	10603	139801	1228	0.094	0.132	626
GR53_spot15	1354	1560	1581	1623	47	85	20	13	380	20	4650	70	18994	2670	146084	968	0.082	0.114	641
GR53_spot6	1358	1560	1582	1620	43	70	17	14	250	50	4340	20	11432	5498	115893	298	0.058	0.090	660
																mean:	**0.117**	**0.176**	**586**
																1σ (internal):	**0.043**	**0.054**	**46**
																1 SE (internal):	**0.013**	**0.016**	**14**
																		prop. 2 SE (internal and external):	**41**
																		n:	**11**
GR55_spot11	1354	1560	1582	1623	45	70	19	13	610	20	2400	200	43118	1489	71628	2765	0.254	0.367	422
GR55_spot6	1353	1545	1582	1622	54	70	23	15	42	0	220	10	3563	0	7948	160	0.191	0.305	470
GR55_spot12	1353	1565	1581	1623	42	75	19	12	1050	10	6800	180	69272	798	202947	2297	0.154	0.252	516
GR55_spot7	1353	1560	1582	1621	45	70	18	12	850	30	6570	200	60083	2233	185762	2552	0.129	0.242	519
GR55_spot14	1357	1565	1582	1624	40	75	18	11	400	25	3100	110	25133	1994	87650	1287	0.129	0.220	543
GR55_spot13	1356	1560	1582	1623	40	70	17	16	430	20	3600	100	27018	1489	96133	1702	0.119	0.216	544
GR55_spot8	1356	1565	1581	1623	42	75	18	10	370	20	3500	60	24410	1595	98960	638	0.106	0.197	560
GR55_spot15	1351	1560	1581	1623	43	75	18	10	1100	20	6900	240	50302	1595	195093	2552	0.159	0.203	570
GR55_spot9	1355	1565	1581	1621	43	75	17	12	440	10	4070	60	20121	798	108683	766	0.108	0.155	606
GR55_spot10	1360	1565	1581	1624	45	75	19	13	250	10	6970	110	11964	798	208021	1521	0.036	0.054	691
																mean:	**0.139**	**0.221**	**544**
																1σ (internal):	**0.055**	**0.079**	**69**
																1 SE (internal):	**0.017**	**0.025**	**22**
																		prop. 2 SE (internal and external):	**54**
																		n:	**10**
GR56_spot4	1353	1545	1582	1619	57	70	20	29	95	0	440	45	7682	0	13823	1388	0.216	0.357	422
GR56_spot7	1351	1560	1582	1623	44	70	19	13	2700	10	5500	550	126341	744	164148	7604	0.491	0.424	423
GR56_spot6	1356	1545	1582	1619	53	70	19	18	53	0	300	0	4412	0	8954	0	0.177	0.330	439
GR56_spot3	1351	1545	1582	1621	55	70	19	17	85	0	410	17	6395	0	12237	307	0.207	0.338	440
GR56_spot1	1356	1545	1582	1622	50	70	18	15	53	0	350	12	3894	0	9896	191	0.151	0.278	487
GR56_spot2	1352	1545	1582	1620	45	70	16	15	59	0	400	13	3362	0	10053	207	0.147	0.247	519
GR56_spot8	1354	1570	1582	1624	45	70	17	11	550	20	3100	100	26321	1489	82781	1170	0.177	0.239	537
GR56_spot14	1357	1560	1582	1624	38	80	18	15	670	120	4070	200	27076	10209	115077	3190	0.165	0.186	590
GR56_spot15	1358	1560	1582	1622	39	75	18	22	400	90	2690	100	16590	7178	76058	2340	0.149	0.179	592
GR56_spot10	1359	1565	1582	1622	39	70	16	11	570	30	4600	250	23641	2233	115611	2925	0.124	0.166	599
GR56_spot13	1355	1565	1582	1620	41	70	17	13	700	20	5610	230	30522	1489	149807	3180	0.125	0.166	599
GR56_spot16	1358	1565	1582	1623	42	70	16	11	550	20	5400	110	24566	1489	135717	1287	0.102	0.152	607
GR56_spot11	1357	1565	1581	1623	40	70	15	8	630	30	6900	180	26800	2233	162577	1531	0.091	0.140	616
GR56_spot9	1357	1570	1582	1622	43	75	16	10	350	30	6500	20	16005	2393	163363	213	0.054	0.089	659
GR56_spot12	1359	1560	1581	1620	42	75	16	9	330	120	8200	170	14740	9571	206088	1627	0.040	0.066	680
																mean:	**0.161**	**0.224**	**547**
																1σ (internal):	**0.101**	**0.100**	**84**
																1 SE (internal):	**0.026**	**0.026**	**22**
																		prop. 2 SE (internal and external):	**51**
																		n:	**15**
GR58_spot3	1353	1540	1584	1624	51	75	22	20	330	60	930	115	26437	4786	32138	2446	0.355	0.433	379
GR58_spot6	1349	1545	1583	1624	44	75	20	17	680	10	1300	180	39409	798	40841	3254	0.523	0.472	379
GR58_spot9	1352	1550	1584	1625	48	70	22	20	460	30	1000	110	30202	2233	34558	2340	0.460	0.450	388
GR58_spot10	1357	1550	1584	1624	52	80	24	22	250	50	820	70	20420	4254	30913	1638	0.305	0.385	417
GR58_spot13	1355	1550	1587	1626	60	70	33	18	280	15	740	70	26389	1117	38359	1340	0.378	0.399	421
GR58_spot14	1356	1550	1589	1625	57	70	33	20	280	20	700	70	24260	1489	36285	1489	0.400	0.391	436
GR58_spot2	1350	1545	1583	1625	44	70	20	16	600	20	2350	110	41469	1489	73827	1872	0.255	0.354	436
GR58_spot12	1354	1550	1584	1624	52	70	24	18	510	0	2400	110	38967	0	90478	2106	0.212	0.296	486
GR58_spot1	1354	1545	1584	1627	47	70	24	18	220	30	1090	50	16242	2233	41092	957	0.202	0.279	501
GR58_spot4	1352	1545	1584	1624	48	75	20	15	280	30	1650	25	17702	2393	51836	399	0.170	0.253	520
GR58_spot7	1351	1545	1583	1622	49	75	22	12	210	10	1450	20	16163	798	50108	255	0.145	0.243	523
GR58_spot5	1352	1545	1583	1625	49	75	20	16	210	10	1560	30	14075	798	49009	510	0.135	0.221	543

GR58_spot15	1353	1550	1583	1624	44	80	22	15	720	40	4330	140	41727	3403	149634	2233	0.166	0.216	558
																mean:	**0.285**	**0.338**	**461**
																1σ (internal):	**0.123**	**0.087**	**62**
																1 SE (internal):	**0.034**	**0.024**	**17**
																		prop. 2 SE (internal and external):	**44**
																		n:	**13**
GR59_spot21	1352	1540	1583	1627	57	80	23	19	320	20	1470	60	26801	1702	53109	1212	0.218	0.330	451
GR59_spot19	1355	1540	1583	1623	55	80	24	24	310	35	1400	60	26782	2978	52779	1531	0.221	0.330	452
GR59_spot7	1356	1550	1584	1624	47	80	22	15	200	20	790	0	13812	1702	27300	0	0.253	0.336	455
GR59_spot9	1356	1540	1584	1627	54	80	23	20	210	50	1060	60	17813	4254	38296	1276	0.198	0.310	467
GR59_spot13	1362	1540	1584	1623	50	80	24	22	180	45	820	40	12767	3829	30913	936	0.220	0.286	499
GR59_spot18	1358	1540	1583	1622	55	80	23	22	150	30	960	70	12959	2552	34683	1638	0.156	0.263	505
GR59_spot14	1356	1545	1584	1625	56	70	22	18	150	10	1100	20	13195	744	38013	383	0.136	0.256	506
GR59_spot20	1352	1540	1583	1623	45	80	23	19	510	70	2470	80	33721	5955	89237	1616	0.206	0.271	511
GR59_spot17	1355	1540	1583	1625	59	80	21	20	155	30	1200	50	13437	2552	39584	1063	0.129	0.248	513
GR59_spot16	1355	1545	1584	1627	54	70	21	26	185	40	1250	60	14172	2978	41233	1659	0.148	0.248	518
GR59_spot8	1352	1550	1584	1622	46	80	22	15	390	0	1900	30	23629	0	65659	479	0.205	0.263	519
GR59_spot10	1354	1540	1583	1625	49	80	23	18	270	0	1680	50	20110	0	60696	957	0.161	0.246	524
GR59_spot15	1357	1545	1583	1623	56	70	21	25	95	10	1020	30	8357	744	33646	798	0.093	0.195	558
GR59_spot12	1355	1545	1584	1627	53	80	24	20	130	20	1130	10	10473	1702	42600	213	0.115	0.197	563
																mean:	**0.176**	**0.270**	**503**
																1σ (internal):	**0.046**	**0.043**	**35**
																1 SE (internal):	**0.012**	**0.012**	**9**
																		prop. 2 SE (internal and external):	**32**
																		n:	**14**
GR64_spot14	1353	1560	1582	1623	46	70	20	12	1100	10	4500	320	79482	744	141372	4084	0.244	0.353	434
GR64_spot15	1354	1560	1582	1622	39	70	20	11	970	10	3300	140	59423	744	103673	1638	0.294	0.361	439
GR64_spot8	1356	1565	1581	1623	42	70	19	8	670	20	3200	140	44202	1489	95504	1191	0.209	0.314	466
GR64_spot10	1355	1560	1581	1622	45	80	20	15	480	90	2250	210	33929	7657	70686	3350	0.213	0.314	467
GR64_spot6	1354	1545	1583	1622	49	70	20	17	82	0	350	16	5292	0	10996	289	0.234	0.319	468
GR64_spot7	1354	1565	1581	1623	39	70	19	9	1150	20	5000	250	70450	1489	149226	2393	0.230	0.317	469
GR64_spot3	1352	1545	1582	1623	50	70	21	18	45	0	235	0	3192	0	7752	0	0.191	0.292	484
GR64_spot4	1352	1545	1582	1623	48	70	22	20	60	0	270	10	3793	0	9331	213	0.222	0.284	502
GR64_spot2	1352	1545	1582	1623	52	70	22	18	54	0	290	13	3699	0	10022	249	0.186	0.265	511
GR64_spot1	1354	1545	1582	1619	44	70	18	18	58	0	300	14	3102	0	8482	268	0.193	0.262	517
GR64_spot5	1355	1545	1583	1624	46	70	21	17	60	0	340	10	3915	0	11215	181	0.176	0.256	518
GR64_spot11	1354	1560	1581	1622	48	80	19	15	750	10	4290	170	38285	851	128036	2712	0.175	0.226	550
GR64_spot9	1358	1560	1581	1620	39	75	19	11	600	100	6330	100	24885	7976	188920	1170	0.095	0.116	643
																mean:	**0.205**	**0.283**	**498**
																1σ (internal):	**0.045**	**0.061**	**53**
																1 SE (internal):	**0.012**	**0.017**	**15**
																		prop. 2 SE (internal and external):	**40**
																		n:	**13**
GR67_spot2	1352	1545	1583	1617	46	70	22	21	190	0	430	30	13285	0	14860	670	0.442	0.461	371
GR67_spot4	1353	1545	1586	1623	42	70	25	20	105	0	200	8	6927	0	7854	170	0.525	0.463	390
GR67_spot12	1356	1560	1582	1624	44	80	20	14	690	30	2070	190	47689	2552	65031	2829	0.333	0.413	395
GR67_spot9	1354	1560	1581	1623	44	70	18	12	1400	10	5850	360	96761	744	165405	4594	0.239	0.363	422
GR67_spot10	1355	1550	1583	1623	42	70	21	14	650	20	2300	190	42883	1489	75869	2829	0.283	0.353	445
GR67_spot7	1355	1560	1584	1624	38	70	24	15	1010	10	2600	230	60287	744	98018	3669	0.388	0.372	453
GR67_spot8	1354	1560	1583	1622	38	70	23	16	1140	10	3250	290	68047	744	117417	4935	0.351	0.357	459
GR67_spot11	1355	1550	1583	1623	40	70	21	12	630	5	2500	140	39584	372	82467	1787	0.252	0.320	472
GR67_spot14	1354	1560	1582	1623	42	80	19	11	1150	10	4900	250	66068	851	141518	2925	0.235	0.314	473
GR67_spot3	1355	1545	1585	1622	42	70	25	21	90	0	300	16	5938	0	11781	357	0.300	0.328	476
GR67_spot1	1353	1545	1583	1623	47	70	22	21	92	5	380	19	6134	372	13132	424	0.242	0.312	477
GR67_spot5	1356	1545	1584	1622	42	70	24	20	129	0	450	25	7961	0	16965	532	0.287	0.313	489
GR67_spot6	1357	1545	1583	1622	42	70	25	20	132	0	490	0	8427	0	19242	0	0.269	0.305	492
GR67_spot13	1353	1560	1582	1622	42	80	22	13	800	10	3200	200	44256	851	110584	2765	0.250	0.281	513
GR67_spot15	1355	1560	1582	1622	41	80	22	16	1000	10	4250	220	51922	851	137382	3743	0.235	0.269	521
																mean:	**0.309**	**0.348**	**457**
																1σ (internal):	**0.083**	**0.057**	**43**
																1 SE (internal):	**0.021**	**0.015**	**11**
																		prop. 2 SE (internal and external):	**34**
																		n:	**15**
GR68_spot5	1355	1550	1584	1623	46	75	21	21	195	10	500	55	14090	798	16493	1228	0.390	0.443	378

GR68_spot4	1354	1545	1582	1620	48	70	20	22	190	0	720	55	14326	0	22619	1287	0.264	0.375	416
GR68_spot6	1354	1550	1583	1622	41	75	24	21	185	0	500	40	11914	0	18850	893	0.370	0.376	444
GR68_spot14	1355	1560	1582	1623	46	80	24	20	1150	40	3300	320	72360	3403	124407	6806	0.348	0.355	460
GR68_spot11	1355	1565	1582	1622	47	70	24	10	1470	10	4780	230	94506	744	180202	3613	0.308	0.340	466
GR68_spot10	1354	1565	1582	1623	48	70	25	16	2000	240	7010	580	141056	17866	275282	14577	0.285	0.327	473
GR68_spot12	1354	1565	1582	1622	45	70	25	17	1590	10	6100	350	101501	744	231810	9346	0.261	0.305	490
GR68_spot8	1354	1565	1582	1621	47	90	26	25	2050	500	5400	820	126906	47856	220540	32201	0.380	0.334	491
GR68_spot13	1354	1565	1582	1622	44	70	23	16	1450	10	5900	400	90507	744	206273	8430	0.246	0.297	494
GR68_spot7	1355	1565	1583	1623	42	90	26	13	990	60	2700	190	54766	5743	110270	2627	0.367	0.327	495
GR68_spot16	1355	1565	1582	1625	43	75	24	21	1050	30	4000	170	61759	2393	145926	3797	0.263	0.292	505
GR68_spot15	1356	1565	1584	1624	45	70	24	18	900	10	3000	190	49235	744	113097	3637	0.300	0.297	509
GR68_spot9	1359	1560	1581	1623	47	80	22	15	1280	110	8330	200	82291	9359	287864	4712	0.154	0.220	550
																mean:	**0.303**	**0.330**	**475**
																1σ (internal):	**0.065**	**0.051**	**42**
																1 SE (internal):	**0.018**	**0.014**	**12**
																		prop. 2 SE (internal and external):	**36**
																		n:	**13**
GR69_spot6	1353	1550	1584	1625	39	80	22	16	330	0	570	60	20216	0	19698	1021	0.579	0.494	369
GR69_spot3	1353	1550	1584	1623	38	75	20	18	470	0	940	140	28054	0	29531	2680	0.500	0.466	380
GR69_spot4	1352	1550	1584	1624	38	75	21	11	360	0	700	90	20794	0	23091	1053	0.514	0.463	387
GR69_spot12	1351	1565	1582	1617	51	60	24	35	900	120	3070	340	67442	7657	100784	12655	0.293	0.401	397
GR69_spot16	1354	1565	1583	1623	37	75	21	15	2650	40	5000	670	144068	3190	164934	10688	0.530	0.451	404
GR69_spot13	1357	1560	1583	1622	39	70	24	18	3500	280	5650	850	200564	20844	213000	16271	0.619	0.467	407
GR69_spot14	1354	1560	1583	1622	35	70	21	16	3200	10	5950	920	170247	744	196271	15654	0.538	0.445	412
GR69_spot5	1352	1550	1584	1624	41	80	26	22	298	10	550	85	19192	851	22462	1989	0.542	0.440	418
GR69_spot17	1354	1565	1583	1623	36	75	22	15	2550	10	5190	650	134885	798	173561	10369	0.491	0.423	424
GR69_spot8	1355	1570	1583	1622	39	70	22	16	1250	20	3500	320	74103	1489	113139	5445	0.357	0.385	431
GR69_spot15	1354	1565	1583	1622	36	75	21	14	2400	100	5000	600	118184	7976	164934	8933	0.480	0.405	441
GR69_spot11	1354	1570	1583	1621	36	70	24	21	2750	10	6500	650	135419	744	213387	14516	0.423	0.373	461
GR69_spot10	1352	1570	1583	1621	29	70	24	17	3050	20	5850	700	134450	1489	199171	12655	0.521	0.388	469
GR69_spot9	1351	1570	1581	1620	48	70	19	32	750	50	8100	150	56549	3722	233938	5105	0.093	0.195	558
																mean:	**0.463**	**0.414**	**425**
																1σ (internal):	**0.131**	**0.070**	**46**
																1 SE (internal):	**0.035**	**0.019**	**12**
																		prop. 2 SE (internal and external):	**36**
																		n:	**14**

Discussion DR2: Supporting data for vitrinite reflectance thermometry

Multiple random reflectance measurements on solid bitumen (R_{SB}) were made from each sample, as no primary vitrinite fragments were identified. Data from individual analyses from each sample are shown on Table DR2. These R_{SB} values were converted into equivalent vitrinite reflectance (R_{VE}) values using the equation of Jacob (1989) ($R_{VE} = 0.618*R_{SB} + 0.40$). The mean and 1 standard deviation for all R_{SB} and R_{VE} data from each sample are shown at the bottom of Table DR2. Peak temperatures and uncertainties are shown on Table 2 in the text, and were obtained from the mean R_{VE} value plus or minus 2 standard deviations, using the equation for burial heating from Barker and Pawlewicz (1994): ($T_{peak} = (\ln(R_{VE}) + 1.68) / 0.0124$).

Table DR2: Supporting data for peak temperature determinations from vitrinite reflectance.

sample	GR04		GR08B		GR09		GR14		GR37		GR42	
	R_{SB} (%)	R_{VE} (%)	R_{SB} (%)	R_{VE} (%)	R_{SB} (%)	R_{VE} (%)	R_{SB} (%)	R_{VE} (%)	R_{SB} (%)	R_{VE} (%)	R_{SB} (%)	R_{VE} (%)
random reflectance values	0.92	0.97	0.91	0.96	0.85	0.93	0.77	0.88	0.75	0.86	0.71	0.84
	1.06	1.06	1.43	1.28	0.91	0.96	0.8	0.89	0.75	0.86	0.75	0.86
	1.07	1.06			1.01	1.02	0.83	0.91	0.79	0.89	0.77	0.88
	1.11	1.09			1.04	1.04	0.83	0.91	0.8	0.89	0.79	0.89
	1.11	1.09			1.06	1.06	0.84	0.92	0.92	0.97	0.82	0.91
	1.15	1.11			1.28	1.19	0.84	0.92	1.15	1.11	0.82	0.91
	1.16	1.12			1.44	1.29	0.85	0.93	1.22	1.15	0.83	0.91
	1.18	1.13			1.55	1.36	0.86	0.93			0.84	0.92
	1.18	1.13					0.93	0.97			0.88	0.94
	1.19	1.14					0.96	0.99			0.88	0.94
	1.2	1.14					0.96	0.99			0.89	0.95
	1.22	1.15					1.02	1.03			0.89	0.95
	1.24	1.17					1.12	1.09			0.91	0.96
	1.24	1.17					1.16	1.12			0.92	0.97
	1.25	1.17					1.21	1.15			0.94	0.98
	1.26	1.18					1.21	1.15			0.95	0.99
	1.29	1.20									0.96	0.99
	1.29	1.20									1.02	1.03
	1.31	1.21									1.03	1.04
	1.31	1.21									1.04	1.04
	1.32	1.22									1.06	1.06
	1.32	1.22									1.12	1.09
	1.36	1.24									1.15	1.11
	1.37	1.25										
	1.38	1.25										
	1.41	1.27										
	1.42	1.28										
	1.45	1.30										
	1.46	1.30										
	1.54	1.35										
mean	1.26	1.18	1.17	1.12	1.14	1.11	0.95	0.99	0.91	0.96	0.91	0.96
1σ	0.136	0.083	0.368	0.161	0.253	0.146	0.150	0.090	0.196	0.112	0.117	0.071
n	30	30	2	2	8	8	16	16	7	7	23	23

Abbrevations: R_{SB} = solid bitumen reflectance; R_{VE} = vitrinite reflectance equivalent

Footnote: R_{SB} was converted into R_{VE} using the equation of Jacob (1989): $R_{VE} = 0.618*R_{SB} + 0.40$

Discussion DR3: Supporting data for Rock-Eval pyrolysis thermometry

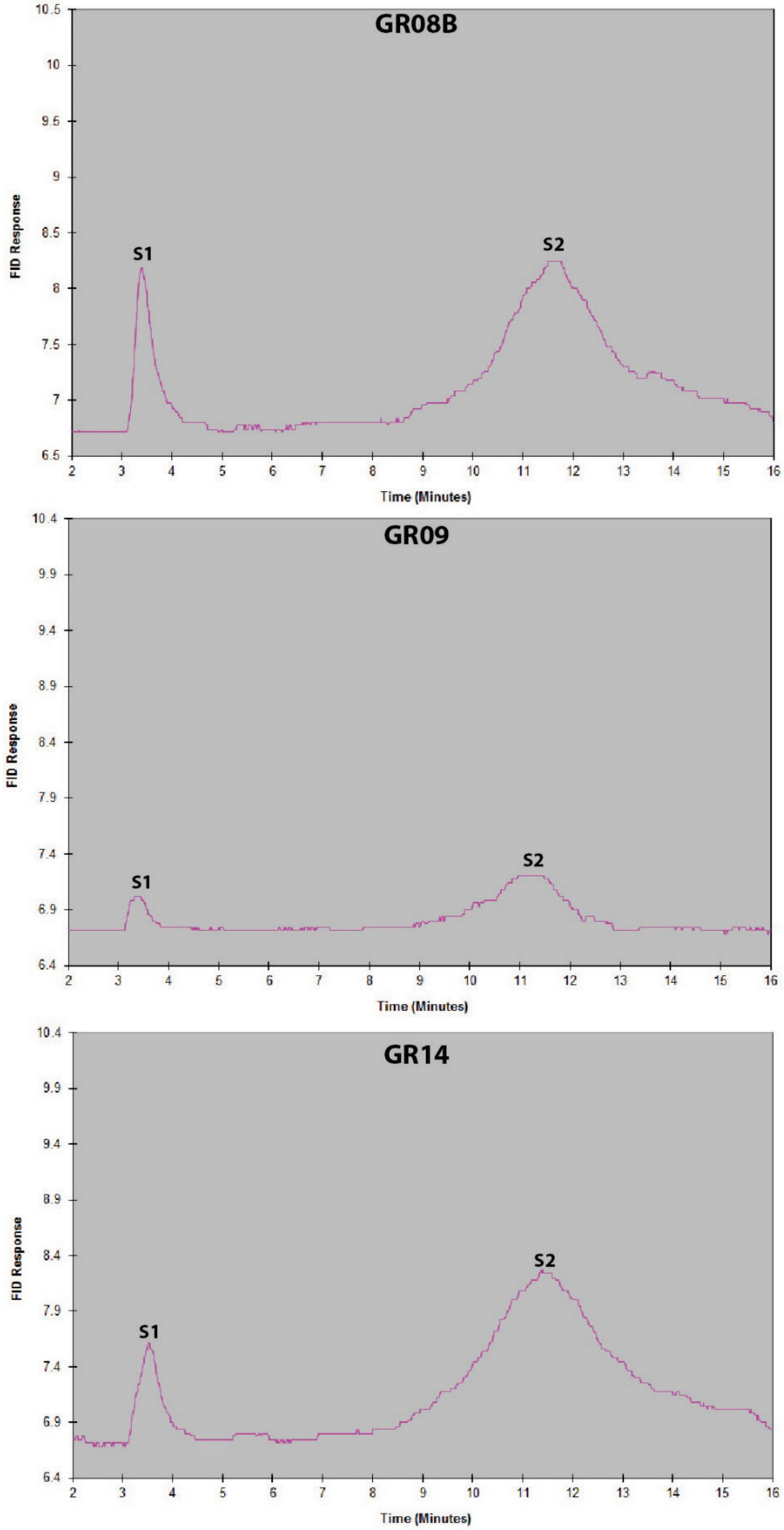
Supporting data for Rock-Eval pyrolysis analyses, including measured parameters such as the S1, S2, and S3 peaks, and T_{max}, are shown in Table DR3. T_{max} was converted into cal. R_V using the equation: cal. $R_V = 0.0180*T_{max} – 7.16$ (Jarvie et al., 2001), and T_{peak} was calculated from cal. R_V using the equation: $T_{peak} = (\ln(\text{cal. } R_V) + 1.68) / 0.0124$ (Barker and Pawlewicz, 1994). Errors of ±0.2 cal. R_V were assigned to T_{peak} estimates, which results in a typical error range of ±15-30°C, which is comparable to the typical ±2σ error range for vitrinite reflectance peak temperature estimates.

Table DR3: Supporting data for peak temperature determinations from Rock-Eval pyrolysis.

sample	TOC	S1	S2	S3	T_{max} (°C)	HI	OI	S2/S3	(S1/TOC) *100	PI	cal. R_V (%)	T_{peak} (°C)	-0.2 cal. R_V error (°C)	+0.2 cal. R_V error (°C)
GR08B	0.72	0.21	1.40	0.30	447	194	42	4.7	30	0.13	0.89	126	21	16
GR09	0.08	0.07	0.40	0.19	433	506	241	2.1	88	0.15	0.63	99	31	22
GR14	2.18	0.17	1.54	0.98	440	71	45	1.6	8	0.10	0.76	113	25	19

Abbreviations:
TOC: total organic carbon (weight %)
S1: volatile hydrocarbon (HC) content (mg HC / g rock)
S2: remaining HC generative potential (mg HC / g rock)
S3: carbon dioxide content (mg CO_2 / g rock)
T_{max}: oven temperature at which maximum amount of S2 hydrocarbons are released (°C)
HI: hydrogen index = (S2x100)/TOC (mg HC / g TOC)
OI: oxygen index = (S3x100)/TOC (mg CO_2 / g TOC)
PI: production index = S1/(S1+S2)
Cal. R_V = calculated vitrinite reflectance, calculated from Jarvie et al. (2001): cal. $R_V = 0.0180 * T_{max} - 7.16$
T_{peak} = peak temperature; calculated from Barker and Pawlewicz (1994): $T_{peak} = (\ln(\text{cal. } R_V) + 1.68) / 0.0124$

Figure DR1: Pyrograms for Rock-Eval pyrolysis analysis of each sample (Abbreviation: FID = flame ionization detector).



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