

Supplement of Solid Earth, 8, 379–403, 2017  
<http://www.solid-earth.net/8/379/2017/>  
doi:10.5194/se-8-379-2017-supplement  
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*Supplement of*

## **Structural and rheological evolution of the Laramide subduction channel in southern California**

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**Table S1: Sample and photo locations**

Samples/Photos	Location	
	Latitude (°N)	Longitude (°W)
PS10	34.286483	117.744667
PS12, PS35, PS36, Fig. 3f	34.285767	117.744517
PS16	34.286584	117.745842
PS32, Fig. 3e	34.288578	117.746254
PS50, PS51	34.291183	117.745697
PS52	34.288703	117.746383
PS53	34.286383	117.74615
PS95	34.29822	117.7428
PS97	34.29719	117.7428
PS100, PS101	34.29682	117.74276
PS103	34.2965	117.74154
PS107	34.29256	117.74363
PS109	34.29205	117.74508
PS129	34.305633	117.732133
PS131	34.304767	117.7326
PS132	34.30335	117.734083
PS134	34.30045	117.737467
PS139	34.29715	117.743183
PS185	34.343278	117.726361
PS186, Fig. 3c and d	34.342222	117.728861
PS188	34.338361	117.727111
PS189	34.332667	117.724917
PS190	34.322361	117.728944
PS191	34.308028	117.732528
PS193	34.294817	117.741683
Fig. 3b	34.295027	117.742228
Fig. 3a	34.291852	117.744786

**Table S2: Results of Raman spectroscopy on carbonaceous material**

PS10	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	9.12E+04	1750.87	1356.20	41.66	2.57E+05	8257.29	1579.44	20.33	7.64E+03	514.29	1620.40	10.46	0.21	0.26	526.77
b	3.46E+04	673.41	1356.95	36.96	8.94E+04	3145.71	1580.12	20.14	3.68E+03	265.71	1620.40	9.29	0.21	0.27	520.40
c	1.57E+05	2999.54	1355.09	38.01	3.86E+05	11590.00	1579.54	22.08	9.01E+03	771.43	1618.07	7.75	0.26	0.28	514.41
d	3.43E+04	631.43	1355.51	42.31	9.83E+04	3157.14	1579.35	19.86	2.29E+03	231.43	1621.94	9.29	0.20	0.25	527.75
e	5.61E+04	1040.00	1351.64	40.13	9.79E+04	2947.74	1579.87	21.18	3.06E+03	270.00	1621.94	7.75	0.35	0.36	481.98
f	5.57E+05	11300.00	1352.41	37.18	8.49E+05	26570.00	1577.67	20.38	4.75E+04	2400.00	1618.85	18.59	0.43	0.38	470.58
g	4.40E+04	874.32	1355.65	37.45	9.13E+04	2831.33	1579.35	20.57	4.29E+03	260.00	1620.40	15.49	0.31	0.32	500.75
h	1.16E+05	2337.14	1353.96	35.63	2.08E+05	6337.14	1579.35	21.69	6.01E+03	302.86	1620.40	13.94	0.37	0.35	484.88
i	8.91E+04	1545.71	1353.96	43.37	2.48E+05	7762.42	1578.72	22.94	6.90E+03	362.86	1620.40	12.39	0.20	0.26	525.54
j	1.00E+05	2342.45	1354.71	40.23	2.70E+05	9227.19	1578.57	20.13	1.21E+04	917.14	1620.40	12.39	0.25	0.26	524.25
k	3.63E+04	711.43	1353.18	37.18	1.03E+05	3294.29	1579.35	20.14	3.63E+03	265.71	1621.94	9.29	0.22	0.25	527.87
m	1.98E+05	4448.43	1354.09	35.37	5.50E+05	15690.00	1577.72	23.08	7.02E+03	642.86	1621.17	7.75	0.28	0.26	524.39
														Average	510.80
														Std Dev	20.77

PS12	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
h	2.88E+04	657.89	1356.86	41.19	1.36E+05	4480.00	1580.11	20.75	2.67E+03	162.00	1621.83	10.61	0.15	0.17	564.48
i	1.43E+04	232.11	1355.93	43.99	4.73E+04	1640.00	1579.68	18.60	2.04E+03	116.00	1620.44	12.50	0.14	0.22	541.00
j	2.29E+04	393.47	1355.30	45.24	6.88E+04	2270.00	1580.52	19.31	2.55E+03	126.00	1620.59	14.20	0.17	0.24	533.09
k	1.77E+04	363.16	1355.89	39.78	8.46E+04	3040.00	1580.20	18.10	2.26E+03	165.00	1620.37	9.05	0.12	0.17	565.80
l	1.04E+04	187.37	1354.99	43.29	4.22E+04	1280.00	1579.47	21.02	1.21E+03	53.10	1620.00	14.60	0.15	0.19	554.87
m	3.00E+04	440.84	1352.57	43.68	5.72E+04	1740.00	1579.47	21.02	2.76E+03	90.00	1620.28	19.58	0.25	0.33	492.77
n	1.75E+04	386.84	1355.30	42.14	1.12E+05	3580.00	1579.17	20.59	2.35E+03	125.00	1619.77	13.34	0.11	0.13	581.73
o	3.04E+04	524.84	1355.15	43.37	8.68E+04	2510.00	1579.16	22.01	1.70E+03	88.40	1619.91	12.29	0.21	0.26	527.28
p	1.52E+04	310.11	1355.77	39.20	5.84E+04	2070.00	1579.06	18.49	2.23E+03	138.00	1620.94	10.30	0.15	0.20	551.69

q	2.84E+04	570.53	1356.08	36.66	1.34E+05	4490.00	1579.72	19.03	3.87E+03	213.00	1620.59	12.32	0.13	0.17	564.96
r	3.06E+04	514.32	1354.99	47.11	9.23E+04	2740.00	1579.56	21.54	1.76E+03	68.20	1619.88	17.88	0.19	0.25	531.87
													Average		546.32
													Std Dev		24.61

PS16	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
d	7.38E+04	1385.54	1355.51	36.48	1.67E+05	4352.98	1581.53	24.50	9.45E+03	373.49	1620.40	17.04	0.32	0.29	509.87
e	6.69E+04	1516.72	1353.68	31.04	1.40E+05	4765.74	1580.87	18.76	2.03E+04	554.22	1619.62	24.90	0.32	0.29	509.97
f	1.23E+05	2759.30	1352.28	31.69	2.08E+05	6636.58	1581.50	21.00	3.75E+04	982.52	1617.54	26.34	0.42	0.33	492.47
h	3.26E+04	844.82	1357.97	34.11	1.20E+05	4463.24	1577.94	17.58	1.41E+04	395.43	1617.87	25.85	0.19	0.20	553.88
l	5.13E+04	1021.86	1355.97	35.94	1.06E+05	3295.93	1578.76	21.19	1.02E+04	319.28	1621.17	21.19	0.31	0.31	504.51
m	3.89E+04	807.23	1357.06	37.18	1.15E+05	4058.82	1578.98	18.54	1.10E+04	413.14	1620.36	18.66	0.20	0.24	536.32
n	6.83E+04	1510.41	1354.59	34.16	1.49E+05	5292.74	1579.73	18.55	2.15E+04	568.98	1619.25	26.35	0.29	0.29	513.67
o	5.76E+04	1194.37	1353.73	36.01	8.09E+04	2277.71	1579.11	23.69	9.63E+03	271.08	1620.40	23.69	0.52	0.39	467.87
p	4.68E+04	945.92	1354.08	36.05	7.92E+04	2330.42	1579.64	22.17	1.44E+04	339.37	1618.72	29.11	0.41	0.33	492.61
q	1.68E+04	425.21	1357.18	36.71	1.43E+05	4664.19	1578.84	20.57	7.01E+03	228.92	1623.49	20.57	0.09	0.10	596.18
													Average		517.73
													Std Dev		36.32

PS51	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	8.99E+04	1694.01	1355.79	42.40	2.35E+05	7562.86	1578.57	20.14	9.76E+03	491.43	1619.62	13.94	0.22	0.27	521.31
c	9.24E+04	1891.43	1354.73	39.57	3.10E+05	9733.89	1578.46	21.26	7.69E+03	414.29	1618.85	12.39	0.19	0.23	540.76
d	3.74E+04	688.57	1355.51	40.28	1.00E+05	3168.57	1577.80	20.14	4.31E+03	197.14	1619.62	13.94	0.22	0.26	523.59
e	4.05E+04	897.14	1356.28	35.63	2.00E+05	6031.49	1578.06	21.16	6.36E+03	417.14	1622.72	10.84	0.15	0.16	567.99
f	7.60E+04	1643.17	1353.96	35.90	2.13E+05	6306.87	1579.39	21.77	4.38E+03	280.00	1620.40	10.84	0.26	0.26	525.80
g	1.56E+05	3269.26	1354.94	36.06	4.71E+05	15570.00	1578.09	19.89	1.52E+04	714.29	1619.62	13.94	0.21	0.24	533.12
i	3.49E+04	662.86	1356.28	38.73	1.30E+05	4160.00	1578.57	20.14	4.28E+03	268.57	1622.72	10.84	0.16	0.21	549.39
j	5.73E+04	1014.47	1353.62	41.14	9.47E+04	3088.57	1578.57	19.97	2.03E+03	185.71	1619.62	7.75	0.33	0.37	475.46
k	1.68E+04	275.00	1357.06	40.33	5.07E+04	1590.00	1579.35	20.33	1.19E+03	70.00	1620.40	10.84	0.17	0.24	532.08

l	1.16E+05	2485.71	1354.73	41.43	3.72E+05	12200.00	1578.57	20.02	1.28E+04	600.00	1620.40	13.94	0.20	0.23	538.09
m	7.38E+04	1600.00	1353.96	43.36	1.70E+05	5374.96	1577.60	22.07	3.96E+03	220.00	1619.62	12.39	0.30	0.30	508.25
													Average		528.71
													Std Dev		23.62

PS52	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	3.22E+04	557.00	1354.55	43.73	6.84E+04	2020.00	1579.22	21.93	2.43E+03	135.71	1620.40	12.39	0.28	0.31	501.92
b	4.25E+04	740.00	1357.06	38.73	1.62E+05	5335.46	1579.86	19.61	3.12E+03	340.00	1621.17	6.20	0.14	0.20	550.04
c	2.76E+04	620.00	1357.06	41.82	7.87E+04	2788.38	1579.05	18.00	4.46E+03	300.00	1620.40	10.84	0.22	0.25	530.12
d	2.67E+04	600.00	1357.06	41.82	8.55E+04	2788.38	1579.05	19.55	3.74E+03	220.00	1620.40	12.39	0.22	0.23	538.48
e	3.31E+04	664.95	1357.42	36.08	1.56E+05	5606.95	1578.86	17.73	2.04E+03	140.00	1621.94	9.29	0.12	0.17	563.96
f	1.05E+04	169.71	1353.96	39.58	2.76E+04	812.57	1580.12	21.69	2.27E+03	66.86	1621.94	21.69	0.21	0.26	525.11
h	3.10E+04	670.57	1356.20	32.57	7.21E+04	2600.71	1579.66	17.68	7.33E+03	280.00	1619.62	16.70	0.26	0.28	516.20
j	3.88E+04	711.43	1356.28	41.82	9.58E+04	3299.14	1579.74	18.63	2.30E+03	105.71	1620.40	13.94	0.22	0.28	514.79
k	1.47E+05	2974.16	1356.76	38.83	3.74E+05	13270.00	1578.93	18.33	6.47E+03	542.86	1621.17	7.75	0.22	0.28	516.95
l	6.09E+04	1185.71	1357.06	39.91	2.07E+05	7200.53	1578.71	18.30	1.09E+04	542.86	1621.17	13.94	0.16	0.22	543.63
m	6.43E+04	1200.00	1355.51	37.70	1.70E+05	5409.76	1580.38	20.66	2.06E+03	180.00	1618.85	7.75	0.22	0.27	520.06
n	6.23E+04	1228.57	1354.73	37.35	1.32E+05	4128.65	1580.37	20.64	3.66E+03	251.43	1620.40	9.29	0.30	0.32	500.56
o	3.00E+04	554.29	1355.51	39.24	1.12E+05	3691.43	1578.57	21.69	4.83E+03	284.29	1620.40	10.84	0.15	0.20	549.95
														Average	528.60
														Std Dev	19.48

PS107	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	5.22E+04	1089.67	1355.94	34.84	9.85E+04	3536.33	1580.77	18.84	1.19E+04	544.13	1623.43	14.18	0.31	0.32	498.17
b	8.64E+04	1858.10	1354.19	31.93	1.49E+05	5641.02	1579.16	16.90	1.27E+04	940.38	1621.76	9.89	0.33	0.35	486.05
c	5.99E+04	1321.50	1350.33	35.82	1.05E+05	3661.11	1581.27	18.28	1.15E+04	591.71	1623.37	14.33	0.36	0.34	489.89
d	4.99E+04	1121.54	1360.53	35.27	1.76E+05	6358.66	1581.72	17.76	2.06E+04	829.69	1621.56	18.13	0.18	0.20	550.84
e	8.68E+04	1800.10	1358.76	33.59	1.89E+05	6781.89	1581.14	17.87	2.67E+04	977.98	1619.24	17.63	0.27	0.29	513.26
f	9.15E+04	2035.54	1358.50	37.12	2.43E+05	8817.81	1579.84	17.98	2.93E+04	881.94	1621.14	24.06	0.23	0.25	529.11

g	4.36E+04	989.72	1355.02	32.07	2.03E+05	7568.49	1579.44	17.66	1.62E+04	683.42	1620.47	15.92	0.13	0.17	567.30
h	7.75E+04	1816.85	1358.42	32.29	1.45E+05	5278.62	1580.79	17.76	1.96E+04	608.35	1618.02	20.50	0.34	0.32	498.28
i	6.93E+04	1480.58	1358.59	32.47	1.22E+05	4137.06	1581.34	19.37	1.41E+04	644.67	1622.36	14.49	0.36	0.34	490.70
j	2.34E+05	5270.08	1355.15	33.34	4.34E+05	15310.00	1580.82	18.14	7.77E+04	2062.50	1621.24	25.74	0.34	0.31	501.28
k	3.32E+05	7248.52	1353.12	35.11	5.55E+05	18080.00	1579.13	19.90	1.18E+05	2967.09	1619.49	27.50	0.40	0.33	493.89

Average **510.80**  
Std Dev 26.99

PS109	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	3.20E+04	718.48	1358.08	37.36	6.45E+04	2411.06	1579.83	17.05	7.05E+03	334.36	1622.75	15.41	0.30	0.31	503.45
b	5.42E+04	1204.65	1355.54	36.67	1.62E+05	5804.51	1579.85	17.92	1.67E+04	591.72	1621.30	18.34	0.21	0.23	537.35
c	3.96E+04	857.38	1360.14	34.79	1.08E+05	3970.91	1580.00	17.66	6.32E+03	231.93	1621.94	17.66	0.22	0.26	526.72
d	5.26E+04	1216.26	1353.91	34.05	1.58E+05	5578.75	1578.75	18.26	1.51E+04	670.94	1619.54	16.44	0.22	0.23	537.34
e	5.06E+04	1216.35	1354.66	32.59	9.82E+04	3288.64	1580.45	19.56	1.12E+04	500.95	1616.70	16.40	0.37	0.32	500.28
f	3.78E+04	857.54	1362.33	33.72	7.47E+04	2786.55	1581.61	17.08	6.96E+03	316.20	1620.27	16.03	0.31	0.32	500.18
g	3.95E+04	1035.78	1358.92	30.00	8.26E+04	3755.87	1579.87	14.02	1.10E+04	343.50	1619.15	22.01	0.28	0.30	508.91
h	4.55E+04	1033.47	1358.55	34.52	8.43E+04	3375.91	1580.50	17.28	1.49E+04	437.75	1621.19	22.29	0.31	0.31	500.99
i	4.21E+04	1023.51	1356.53	33.25	9.12E+04	3614.69	1579.72	16.09	1.09E+04	394.85	1621.89	19.74	0.28	0.29	511.08
j	2.34E+04	502.10	1359.39	35.38	5.08E+04	2052.42	1582.33	16.34	4.63E+03	232.42	1618.32	14.77	0.24	0.30	508.91

Average **513.52**  
Std Dev 14.79

PS129	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	1.44E+05	3235.90	1353.89	34.27	5.56E+05	17640.00	1578.41	20.90	1.50E+04	642.86	1618.07	15.49	0.18	0.20	551.41
b	9.76E+04	2099.83	1354.19	34.55	2.94E+05	9987.29	1579.75	19.82	7.04E+03	382.86	1618.85	12.39	0.21	0.25	531.96
c	2.15E+05	3902.86	1351.64	37.18	3.33E+05	9196.95	1579.88	24.47	1.31E+04	634.29	1617.30	13.94	0.42	0.38	470.65
d	7.25E+04	1402.86	1353.96	40.28	1.33E+05	3537.00	1579.36	23.98	6.37E+03	271.43	1619.62	15.49	0.40	0.34	488.71
e	6.50E+04	1184.29	1353.18	38.73	1.41E+05	3824.37	1579.25	23.42	3.16E+03	130.00	1618.07	15.49	0.31	0.31	502.41
f	9.07E+04	1660.00	1353.18	37.18	1.65E+05	3895.43	1580.47	27.04	4.14E+03	258.57	1621.17	10.84	0.43	0.35	485.75

h	6.77E+04	1260.00	1354.73	36.36	9.47E+04	2591.33	1580.70	26.73	6.88E+03	250.00	1621.94	20.14	0.49	0.40	462.94	
i	2.50E+05	4371.43	1351.64	40.28	4.05E+05	11390.00	1578.83	23.25	2.87E+04	828.57	1616.52	23.25	0.38	0.37	478.27	
k	5.89E+05	10000.00	1350.09	37.55	7.60E+05	21700.00	1577.05	22.48	5.56E+04	1771.43	1614.97	20.14	0.46	0.42	454.37	
l	5.51E+04	1057.14	1353.18	39.59	2.06E+05	6081.15	1578.37	22.86	7.94E+03	234.29	1617.30	22.86	0.17	0.20	549.94	
m	1.45E+05	3029.00	1353.62	37.86	2.62E+05	6910.13	1580.37	25.84	1.39E+04	508.57	1618.07	18.59	0.44	0.34	487.66	
n	6.45E+04	1248.57	1353.18	40.28	1.34E+05	3571.52	1579.87	24.96	6.00E+03	258.57	1618.85	15.49	0.35	0.32	500.26	
o	8.18E+04	1505.71	1353.96	40.28	1.34E+05	3627.14	1580.12	26.88	6.13E+03	310.00	1621.94	18.59	0.42	0.37	477.03	
															Average	495.49
															Std Dev	31.22

PS132	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beyssac et al 2002)	
a	1.11E+05	2566.32	1353.82	40.72	3.55E+05	9545.56	1579.42	26.19	3.74E+03	366.32	1619.19	7.02	0.27	0.24	535.77	
b	7.74E+04	1551.58	1354.52	42.66	1.59E+05	4537.61	1580.08	24.86	1.11E+04	503.16	1620.59	15.44	0.34	0.31	501.67	
c	7.56E+04	1741.05	1355.23	40.72	1.66E+05	5174.74	1580.58	21.06	1.01E+04	591.58	1619.19	11.23	0.34	0.30	507.08	
d	8.13E+04	1582.86	1353.75	36.64	1.20E+05	3137.89	1581.28	28.08	5.47E+03	198.95	1620.59	18.25	0.50	0.39	466.37	
e	3.26E+05	6322.71	1354.92	37.30	6.40E+05	17160.00	1580.58	25.27	1.74E+04	894.74	1619.89	18.25	0.37	0.33	493.49	
f	1.99E+05	3711.94	1354.07	37.41	3.50E+05	8494.74	1580.58	29.49	1.12E+04	557.89	1620.59	14.04	0.44	0.36	482.83	
g	1.59E+05	3031.37	1353.32	38.31	2.68E+05	7120.88	1579.90	25.22	5.07E+03	345.26	1620.59	9.83	0.43	0.37	477.55	
i	2.39E+05	4468.93	1352.95	38.25	5.05E+05	12850.00	1579.88	26.68	1.87E+04	684.21	1619.89	18.25	0.35	0.31	501.61	
j	4.18E+05	7792.02	1351.88	39.65	5.40E+05	16200.00	1578.37	21.27	3.43E+04	1631.58	1619.19	15.44	0.48	0.42	453.72	
k	4.09E+05	7578.95	1353.82	37.91	5.54E+05	16560.00	1578.83	23.17	5.18E+04	2157.89	1617.78	16.85	0.46	0.40	461.51	
l	3.24E+05	5789.47	1353.82	42.12	5.70E+05	17320.00	1578.47	22.46	2.83E+04	1368.42	1617.78	14.04	0.33	0.35	484.55	
m	9.99E+04	1896.84	1355.23	36.51	2.19E+05	6278.64	1579.90	25.23	8.87E+03	347.37	1619.19	16.85	0.30	0.31	505.27	
															Average	489.29
															Std Dev	23.00

PS134	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beyssac et al 2002)
a	2.99E+04	659.84	1353.44	35.23	1.48E+05	4949.47	1579.17	19.05	7.88E+02	35.79	1620.59	14.04	0.13	0.17	566.50
b	2.29E+05	4852.63	1354.52	37.91	3.97E+05	11720.00	1580.58	23.87	1.64E+04	684.21	1618.49	16.85	0.41	0.36	482.22

c	1.81E+05	3378.95	1355.23	37.91	3.35E+05	7947.37	1580.58	28.08	9.53E+03	347.37	1620.59	18.25	0.43	0.34	487.96
d	4.41E+04	827.56	1355.60	38.66	1.76E+05	5730.00	1578.90	21.91	3.83E+03	193.68	1619.89	12.64	0.14	0.20	553.43
e	9.72E+04	1964.21	1355.23	36.51	2.05E+05	6595.79	1579.17	22.46	1.20E+04	616.84	1619.89	18.25	0.30	0.31	503.41
f	1.70E+05	3210.53	1353.82	39.26	4.38E+05	13320.00	1579.17	22.46	1.10E+04	642.11	1619.89	11.23	0.24	0.27	518.81
g	1.74E+05	3463.16	1354.52	35.10	3.15E+05	8578.95	1579.88	26.68	1.45E+04	810.53	1619.89	16.85	0.40	0.35	486.90
h	1.33E+05	2684.21	1354.52	38.97	4.56E+05	17790.00	1579.88	16.85	1.27E+04	578.95	1617.08	15.44	0.15	0.22	542.78
i	9.63E+04	1715.79	1354.52	39.31	1.41E+05	4040.00	1579.88	22.46	4.35E+03	200.00	1620.59	14.04	0.42	0.40	463.26
j	6.71E+04	1447.35	1355.13	31.79	2.29E+05	8347.37	1580.58	19.66	6.07E+03	221.05	1618.49	19.66	0.17	0.22	542.28
k	9.62E+04	2203.16	1353.12	35.10	1.15E+05	3255.79	1580.58	22.46	6.75E+03	266.32	1619.19	16.85	0.68	0.44	444.35
l	4.06E+04	844.21	1355.93	36.51	1.24E+05	3901.05	1579.88	21.06	5.46E+03	225.26	1621.29	15.44	0.22	0.24	534.72
Average															510.55
Std Dev															38.39

PS139	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beyssac et al 2002)
a	9.34E+03	192.86	1356.28	40.28	5.63E+04	1864.29	1577.80	19.95	5.99E+02	35.71	1620.40	13.94	0.10	0.14	578.29
b	1.75E+04	391.52	1355.23	34.64	8.97E+04	3362.86	1577.80	17.43	5.28E+02	37.14	1621.17	9.29	0.12	0.16	568.59
c	1.27E+04	245.71	1354.73	40.10	5.20E+04	1786.00	1578.53	20.27	1.07E+03	62.86	1618.85	10.84	0.14	0.19	555.30
e	4.75E+04	928.57	1353.96	41.82	2.17E+05	7686.00	1577.90	18.33	2.98E+03	208.57	1618.07	9.29	0.12	0.18	561.85
f	4.78E+04	980.00	1354.73	38.76	2.66E+05	9420.83	1578.88	17.99	6.83E+03	351.43	1619.62	12.39	0.10	0.15	574.62
g	6.20E+04	1262.86	1354.73	46.15	3.81E+03	288.57	1620.40	12.39	2.94E+05	9717.14	1578.57	19.49	4.38	0.17	564.23
h	3.75E+04	874.29	1353.96	40.28	1.69E+05	5971.43	1578.57	18.16	1.98E+03	165.71	1621.94	9.29	0.15	0.18	560.97
i	3.71E+04	897.14	1354.73	38.87	1.74E+05	5971.43	1579.35	18.59	2.32E+03	120.00	1618.85	12.39	0.15	0.17	563.64
j	4.31E+04	954.29	1355.51	41.82	2.11E+05	7254.29	1577.80	18.59	7.78E+03	440.00	1618.07	12.39	0.13	0.16	567.93
k	7.84E+03	154.27	1358.01	38.87	8.02E+04	2724.69	1578.35	19.50	8.18E+02	50.00	1620.40	10.84	0.06	0.09	601.72
l	1.91E+04	388.57	1356.28	38.22	1.30E+05	4444.22	1578.03	18.64	3.89E+03	200.00	1621.17	12.39	0.09	0.12	585.51
m	2.86E+04	642.86	1353.18	41.82	1.13E+05	3351.43	1578.57	21.54	2.71E+03	185.71	1618.07	9.29	0.19	0.20	552.90
n	2.08E+04	439.98	1353.91	34.89	9.58E+04	3535.39	1577.44	17.32	2.83E+03	104.29	1618.07	17.32	0.12	0.17	563.64
Average															569.17
Std Dev															13.24



PS185	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
b	2.96E+04	760.00	1359.55	36.64	2.02E+05	5840.00	1583.30	22.03	4.61E+03	240.00	1623.24	12.39	0.13	0.13	585.11
c	1.01E+05	2085.71	1357.49	37.18	2.43E+05	6588.57	1584.68	26.16	1.25E+04	485.71	1623.24	16.52	0.32	0.28	515.05
d	4.33E+04	920.00	1359.55	38.43	1.62E+05	5758.80	1583.97	17.91	4.84E+03	280.00	1625.99	11.02	0.16	0.21	549.21
e	1.40E+05	2942.86	1356.80	38.30	4.33E+05	14110.00	1582.23	22.80	1.57E+04	542.86	1623.92	18.74	0.21	0.24	535.25
f	7.89E+04	1857.14	1358.18	39.93	2.32E+05	6771.43	1584.68	22.03	1.84E+03	142.86	1623.24	8.26	0.27	0.25	528.82
g	6.47E+04	1380.00	1358.86	44.06	1.69E+05	5878.82	1582.75	18.61	5.61E+03	240.00	1625.30	15.15	0.23	0.27	520.52
h	8.69E+04	1597.14	1358.86	39.93	2.16E+05	7331.43	1583.99	18.81	9.17E+03	311.43	1625.30	18.81	0.22	0.28	517.00
l	7.31E+04	1533.29	1357.95	34.69	1.43E+05	4434.29	1585.37	20.53	5.23E+03	302.86	1623.24	11.02	0.35	0.33	493.95
j	3.84E+04	835.89	1357.20	34.66	1.05E+05	3360.12	1583.99	23.42	6.64E+03	254.29	1623.92	17.90	0.25	0.26	527.02
k	8.47E+04	1792.98	1358.45	35.22	2.22E+05	7280.00	1584.68	19.43	8.73E+03	337.14	1624.61	16.52	0.25	0.27	521.41
l	4.94E+04	1100.00	1359.55	35.60	1.43E+05	5345.80	1584.84	17.41	4.92E+03	280.00	1625.99	16.52	0.21	0.25	529.82
m	6.75E+04	1211.43	1357.49	41.31	1.43E+05	4700.57	1583.96	19.34	6.81E+03	371.43	1623.92	12.39	0.26	0.31	502.41
n	1.20E+05	2331.43	1358.86	38.55	2.72E+05	9253.00	1583.84	18.80	8.63E+03	445.71	1624.61	12.39	0.25	0.30	508.00
														Average	525.66
														Std Dev	22.91

PS188	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	9.96E+04	2342.86	1358.18	39.93	2.77E+05	7768.57	1583.99	23.41	3.44E+03	234.29	1628.06	9.64	0.30	0.26	524.38
b	1.17E+05	2592.12	1356.58	34.70	4.37E+05	12890.00	1583.30	22.03	1.14E+04	600.00	1623.92	12.39	0.20	0.21	548.59
c	1.01E+05	2081.04	1357.81	34.35	2.31E+05	5800.00	1585.37	26.16	4.52E+03	240.00	1628.06	12.39	0.36	0.30	507.61
d	1.13E+05	2142.86	1356.80	38.55	2.76E+05	8628.57	1584.68	20.40	1.36E+04	571.43	1624.61	15.15	0.25	0.28	515.85
e	3.45E+04	695.71	1358.18	33.92	1.22E+05	3807.14	1583.99	20.36	6.20E+03	194.29	1623.92	20.36	0.18	0.21	546.26
f	8.28E+04	1580.00	1358.18	37.18	1.87E+05	5712.31	1584.09	20.82	3.69E+03	220.00	1627.37	11.02	0.28	0.30	506.02
g	7.74E+04	1593.74	1357.70	34.89	1.39E+05	4091.43	1585.37	24.78	8.59E+03	251.43	1625.30	21.97	0.39	0.34	488.21
h	4.24E+04	837.14	1358.18	36.59	1.06E+05	3362.86	1583.99	20.04	4.25E+03	197.14	1625.30	13.77	0.25	0.28	516.91
i	3.73E+04	708.57	1359.55	37.18	1.21E+05	3730.00	1585.37	20.65	4.03E+03	194.29	1627.37	13.77	0.19	0.23	538.73
j	5.34E+04	1085.86	1358.86	38.18	1.25E+05	3640.00	1584.68	22.60	3.60E+03	142.86	1623.92	16.52	0.30	0.29	510.71

k	5.05E+04	1022.86	1358.18	35.17	1.41E+05	4297.14	1584.68	21.16	5.44E+03	165.71	1623.24	21.16	0.24	0.26	526.87
l	1.04E+05	1920.00	1357.49	37.18	1.96E+05	5526.10	1584.00	23.39	6.52E+03	240.00	1625.99	17.90	0.35	0.34	489.97
													Average		518.34
													Std Dev		19.69

PS189	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beyssac et al 2002)
a	9.28E+04	1880.00	1360.93	34.42	2.09E+05	6062.86	1584.68	22.03	8.39E+03	485.71	1625.30	11.02	0.31	0.30	508.02
b	1.83E+04	282.14	1358.86	41.32	3.39E+04	1046.43	1584.68	20.65	1.39E+03	64.29	1626.68	13.77	0.27	0.34	489.12
c	6.12E+04	1177.14	1357.49	40.48	1.65E+05	4958.42	1584.02	21.23	4.94E+03	234.29	1624.61	13.77	0.24	0.26	523.28
d	8.42E+04	1855.77	1357.62	37.13	2.93E+05	9717.14	1583.30	19.23	5.53E+03	320.00	1624.61	11.02	0.19	0.22	543.13
e	1.10E+05	1797.14	1356.80	39.93	3.34E+05	9675.35	1583.92	22.04	7.22E+03	257.14	1625.99	17.90	0.19	0.24	532.69
f	7.26E+04	1673.76	1358.26	34.56	2.52E+05	8799.91	1582.84	18.47	6.10E+03	285.71	1623.24	13.77	0.19	0.22	543.31
g	8.31E+04	1878.20	1357.59	35.21	2.12E+05	7648.35	1583.65	17.86	9.97E+03	388.57	1625.30	16.52	0.25	0.27	519.82
h	3.86E+04	824.29	1358.86	43.95	1.29E+05	3904.14	1584.05	20.99	3.64E+03	168.57	1626.68	13.77	0.21	0.23	540.48
i	5.54E+04	990.53	1353.45	42.49	1.75E+05	5400.00	1583.99	20.65	6.05E+03	280.00	1625.99	13.77	0.18	0.23	536.68
j	3.91E+04	885.71	1359.55	35.80	1.19E+05	4002.52	1584.00	18.94	3.21E+03	148.57	1625.30	13.77	0.22	0.24	533.05
k	5.51E+04	1136.04	1359.88	35.01	1.31E+05	4228.57	1583.99	19.79	5.67E+03	182.86	1625.99	19.79	0.27	0.29	513.28
l	1.40E+05	3007.72	1356.00	35.19	4.16E+05	12090.00	1583.30	22.03	2.46E+03	142.86	1623.24	11.02	0.25	0.25	529.20
m	5.34E+04	1228.57	1356.80	40.82	2.97E+05	8251.28	1582.36	23.01	2.46E+03	228.57	1623.92	6.88	0.15	0.15	573.73
n	3.00E+04	657.14	1359.55	34.18	1.02E+05	3665.71	1583.99	17.85	2.76E+03	142.86	1626.68	12.39	0.18	0.22	542.01
o	1.10E+05	2371.43	1358.18	34.11	2.60E+05	8514.29	1583.99	19.75	9.13E+03	428.57	1625.99	13.77	0.28	0.29	512.21
p	8.63E+04	1571.43	1357.49	39.63	2.15E+05	7357.03	1583.06	18.68	5.55E+03	285.71	1623.92	12.39	0.21	0.28	515.98
														Average	528.50
														Std Dev	19.39

PS190	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beyssac et al 2002)
a	3.11E+04	485.71	1359.55	46.04	8.27E+04	2262.41	1584.23	24.31	3.33E+03	107.14	1623.92	20.65	0.21	0.27	522.93
b	1.28E+05	2542.86	1359.55	36.91	3.09E+05	8041.27	1584.65	24.73	1.20E+04	657.14	1623.92	12.39	0.32	0.29	513.88
c	4.04E+05	6680.33	1353.42	41.70	8.45E+05	20460.00	1578.49	26.33	7.76E+04	2114.29	1614.29	23.41	0.33	0.30	505.57

d	1.38E+05	2960.00	1358.18	34.42	3.30E+05	9748.57	1583.30	22.03	1.87E+04	665.71	1623.92	19.28	0.30	0.28	514.72
e	9.30E+04	1809.31	1357.70	38.99	1.96E+05	5318.96	1583.94	23.50	7.98E+03	360.00	1625.30	15.15	0.34	0.31	501.64
f	4.40E+04	864.40	1358.84	37.78	8.30E+04	2094.61	1585.13	25.48	3.50E+03	192.86	1623.92	12.39	0.41	0.34	490.92
g	9.30E+04	1718.86	1357.67	38.19	1.80E+05	5160.00	1585.37	23.41	1.16E+04	620.00	1624.61	12.39	0.33	0.33	495.48
h	1.06E+05	2068.57	1357.49	37.18	1.84E+05	4766.23	1585.18	24.56	1.70E+04	714.29	1622.55	16.52	0.43	0.35	487.42
i	6.60E+04	1193.69	1358.56	37.78	1.44E+05	4226.30	1585.24	21.78	7.48E+03	354.29	1623.24	13.77	0.28	0.30	506.20
j	3.35E+04	542.65	1357.81	39.64	4.91E+04	1485.00	1584.68	25.78	6.92E+03	225.00	1621.17	28.92	0.37	0.37	474.44
k	7.21E+04	1381.65	1357.53	36.92	1.14E+05	2985.40	1586.11	25.23	8.74E+03	230.00	1623.24	25.23	0.46	0.37	475.92
l	1.34E+05	2497.14	1355.42	37.18	2.68E+05	6971.43	1583.30	26.16	1.48E+04	722.86	1622.55	13.77	0.36	0.32	497.99
														Average	498.92
														Std Dev	15.05

PS191	D1 area	D1 height	D1 center	D1 width	G area	G height	G Center	G width	D2 area	D2 height	D2 center	D2 width	R1	R2	T (Beysac et al 2002)
a	9.23E+04	1900.57	1357.14	36.23	3.49E+05	10280.00	1582.79	23.32	1.26E+04	371.43	1623.24	23.32	0.18	0.20	550.50
b	2.84E+05	5571.43	1356.11	37.18	4.84E+05	12480.00	1582.94	24.70	3.06E+04	828.57	1621.86	24.70	0.45	0.36	482.79
c	6.10E+04	1403.88	1358.90	35.23	3.58E+05	11160.00	1584.08	20.44	7.99E+03	257.14	1620.48	20.44	0.13	0.14	577.38
d	2.27E+05	5033.46	1356.59	32.51	4.28E+05	12060.00	1585.13	22.64	2.01E+04	600.00	1623.92	22.64	0.42	0.34	491.61
e	2.58E+05	5097.14	1357.49	35.80	3.37E+05	9308.61	1584.90	23.14	2.96E+04	885.71	1622.55	23.14	0.55	0.41	457.50
f	2.49E+05	5188.91	1356.15	34.29	4.63E+05	12200.00	1582.62	25.62	3.58E+04	942.86	1621.86	25.62	0.43	0.33	492.75
g	5.75E+04	1138.86	1358.61	35.13	1.31E+05	3541.46	1583.90	24.62	8.14E+03	220.00	1623.92	24.62	0.32	0.29	510.96
h	1.21E+05	2471.43	1357.49	35.12	2.67E+05	7280.00	1583.99	23.41	9.10E+03	362.86	1626.68	16.52	0.34	0.30	505.63
i	8.28E+04	1642.22	1356.47	35.16	2.10E+05	6082.32	1583.00	23.72	9.67E+03	280.00	1623.24	23.72	0.27	0.27	519.17
j	5.35E+04	1054.95	1359.18	36.48	1.44E+05	4266.24	1582.79	22.83	5.61E+03	165.71	1625.99	22.83	0.25	0.26	524.05
k	8.89E+04	1788.13	1357.50	35.95	2.09E+05	5945.70	1583.89	23.80	7.72E+03	220.00	1627.37	23.80	0.30	0.29	511.50
l	1.00E+05	1998.56	1356.58	35.00	2.07E+05	5482.53	1583.89	25.22	1.36E+04	360.00	1623.92	25.22	0.36	0.31	502.05
														Average	510.49
														Std Dev	31.16

**Table S3: Representative microprobe analyses of white mica**

Sample_Analysis	PS16_61	PS16_84	PS35_25	PS35_37	PS36_16	PS36_24	PS107_2	PS129_56	PS132_30	PS134_55	
Wt.% of oxides	SiO2	47.098	48.925	47.582	48.594	47.630	49.437	50.618	50.055	50.089	49.726
	TiO2	0.200	0.146	0.229	0.142	0.231	0.135	0.090	0.101	0.131	0.139
	Al2O3	29.190	28.213	28.414	27.417	28.546	27.661	28.331	26.661	26.887	26.606
	Cr2O3	0.000	0.000	0.057	0.014	0.018	0.043	0.000	0.019	0.000	0.034
	FeO	3.690	3.565	3.337	2.487	3.301	2.850	2.869	3.612	3.763	3.762
	MnO	0.042	0.050	0.022	0.000	0.000	0.000	0.041	0.057	0.029	0.008
	MgO	2.584	2.595	2.562	2.793	2.583	2.704	2.745	2.680	2.982	2.907
	CaO	0.029	0.000	0.000	0.011	0.000	0.005	0.000	0.000	0.000	0.009
	Na2O	0.237	0.388	0.261	0.486	0.309	0.402	0.406	0.180	0.185	0.184
	K2O	11.161	10.753	11.105	10.425	10.977	10.689	10.792	11.124	11.276	11.075
No. of ions in formula (12 O and OH per unit formula)	Si	3.229	3.321	3.276	3.356	3.274	3.364	3.369	3.404	3.382	3.387
	Ti	0.010	0.007	0.012	0.007	0.012	0.007	0.005	0.005	0.007	0.007
	Al	2.358	2.257	2.306	2.232	2.313	2.218	2.223	2.137	2.140	2.136
	Cr	0.000	0.000	0.003	0.001	0.001	0.002	0.000	0.001	0.000	0.002
	Fe2+	0.212	0.202	0.192	0.144	0.190	0.162	0.160	0.205	0.213	0.214
	Mn	0.002	0.003	0.001	0.000	0.000	0.000	0.002	0.003	0.002	0.000
	Mg	0.264	0.263	0.263	0.288	0.265	0.274	0.272	0.272	0.300	0.295
	Ca	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001
	Na	0.032	0.051	0.035	0.065	0.041	0.053	0.052	0.024	0.024	0.024
	K	0.976	0.931	0.975	0.919	0.963	0.928	0.916	0.965	0.971	0.962
Deformation	D3	D2	D3	D2	D3	D2	D2	D2	D2	D2	

**Table S4: TitaniQ analysis results**

Sample_Analysis	27Al/30Si	σmean	40Ca/30Si	σmean	48Ti/30Si	σmean	49Ti/Si	σmean	Si/1	Ti ppm (48)	σmean	Ti ppm (49)	σmean
PS35_131112@1	1.44E-02	4.68E-04	2.95E-02	9.28E-04	1.51E-04	5.01E-06	8.32E-06	4.58E-07	4.81E+05			Low Si*	
PS35_131112@2	1.57E-02	5.82E-04	4.87E-02	2.22E-03	2.05E-04	8.12E-06	1.02E-05	5.23E-07	5.21E+05	2.09E+00	8.29E-02	1.39E+00	7.16E-02
PS35_131112@3	1.85E-02	5.90E-04	4.21E-02	1.73E-03	1.93E-04	8.57E-06	1.02E-05	5.66E-07	5.34E+05	1.97E+00	8.75E-02	1.40E+00	7.76E-02
PS35_131112@4	2.14E-02	8.15E-04	3.21E-02	1.22E-03	1.87E-04	7.70E-06	1.02E-05	4.92E-07	5.57E+05	1.91E+00	7.87E-02	1.40E+00	6.74E-02
PS35_131112@5	1.30E-01	1.61E-02	1.16E-01	9.31E-03	7.18E-04	5.93E-05	3.83E-05	3.32E-06	5.71E+05			Inclusions*	
PS35_131112@6	2.68E-02	7.37E-04	2.32E-02	6.87E-04	1.97E-04	7.86E-06	1.19E-05	6.55E-07	5.70E+05	2.01E+00	8.03E-02	1.63E+00	8.97E-02
PS35_131112@7	2.87E-02	9.93E-04	6.15E-02	1.54E-03	3.21E-04	1.31E-05	1.54E-05	8.36E-07	5.65E+05			Outlier*	
PS35_131112@8	1.42E-01	9.63E-03	2.65E-01	1.32E-02	1.00E-03	5.41E-05	3.99E-05	2.27E-06	5.74E+05			Inclusions*	
PS35_131112@9	2.21E-02	8.51E-04	1.82E-01	8.72E-03	4.90E-04	2.14E-05	1.24E-05	6.97E-07	5.96E+05			Inclusions*	
PS35_131112@10	1.56E-02	5.85E-04	1.81E-01	7.38E-03	4.72E-04	1.99E-05	1.06E-05	5.14E-07	5.98E+05			Inclusions*	
PS35_131112@11	1.54E-02	5.91E-04	1.83E-01	8.60E-03	4.72E-04	2.05E-05	9.56E-06	4.92E-07	6.02E+05			Inclusions*	
PS35_131112@12	2.36E-02	1.09E-03	1.83E-01	7.70E-03	5.27E-04	2.29E-05	1.43E-05	6.54E-07	5.87E+05			Inclusions*	
PS35_131112@13	2.01E-02	7.78E-04	8.38E-02	3.81E-03	3.19E-04	1.39E-05	1.21E-05	4.86E-07	6.07E+05			Outlier*	
PS35_131112@14	2.61E-02	9.55E-04	5.77E-02	2.35E-03	2.51E-04	1.14E-05	1.06E-05	5.15E-07	6.10E+05	2.56E+00	1.17E-01	1.45E+00	7.06E-02
PS35_131112@15	3.03E-02	1.95E-03	6.89E-02	2.94E-03	3.53E-04	1.75E-05	1.65E-05	8.71E-07	6.45E+05			Outlier*	
PS35_131112@16	2.31E-02	1.16E-03	4.77E-02	2.48E-03	2.74E-04	1.37E-05	1.37E-05	5.90E-07	6.14E+05	2.80E+00	1.40E-01	1.88E+00	8.09E-02
PS35_131112@17	1.74E-02	7.08E-04	6.41E-02	2.94E-03	2.71E-04	1.12E-05	1.14E-05	5.36E-07	5.83E+05	2.77E+00	1.14E-01	1.56E+00	7.34E-02
PS35_131112@18	1.11E-02	4.20E-04	1.86E-02	7.57E-04	1.36E-04	5.05E-06	7.37E-06	4.75E-07	4.95E+05			Low Si*	
PS35_131112@19	1.12E-02	5.00E-04	1.81E-02	9.10E-04	1.39E-04	5.92E-06	8.52E-06	4.39E-07	5.22E+05			Outlier*	
										Ti ppm (48) Avg		Ti ppm (49) Avg	
										2.30		1.55	
										Ti ppm (48) StDev		Ti ppm (49) StDev	
										0.39		0.17	

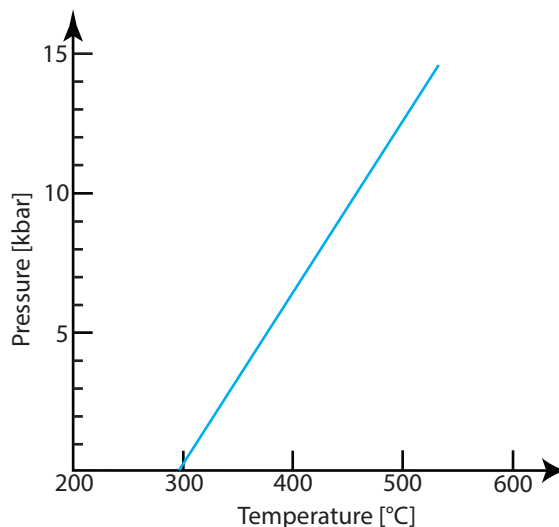
\* Analyses of the following cases are excluded for final Ti concentration calculations: (1) Si count is less than 5e+5; (2) inclusions as indicated by high Ca/Si ratio or Al/Si ratio; (3) more than one standard deviation beyond the average Ti concentration.

## TitaniQ Calculations

The Ti concentration measured by ion probe can be calculated using either  $^{48}\text{Ti}$  or  $^{49}\text{Ti}$ .  $^{49}\text{Ti}$  was used in this study as it is less interfered than  $^{48}\text{Ti}$  (Behr et al., 2011). The Ti concentration calculated directly from ion probe results will be the weight percentage in ppm. The molar fraction of Ti in quartz can be calculated using the equation outlined in the appendix of Thomas et al. (2010). The calibration of Thomas et al. (2010) is

$$RT \ln X_{\text{TiO}_2}^{\text{quartz}} = -60952 + 1.520 T - 1741 P + RT \ln a_{\text{TiO}_2} \quad (\text{S1})$$

where  $R$  is the gas constant,  $X_{\text{TiO}_2}^{\text{quartz}}$  the molar fraction of Ti in quartz measured by ion probe,  $T$  the temperature in K,  $P$  the pressure in kbar,  $a_{\text{TiO}_2}$  the activity of  $\text{TiO}_2$  in the system. The activity of  $\text{TiO}_2$  can be estimated following Ghent and Stout (1984). Then a relationship between  $P$  and  $T$  can be set up as shown in Fig. S1. Another independent thermobarometer is needed to obtain a specific point in the P-T space.



**Fig. S1 The pressure-temperature curve determined by the Ti content of PS35 using the calibration of Thomas et al. (2010).**

### References:

- Behr, W.M., Thomas, J.B., Hervig, R.L., 2011. Calibrating Ti concentrations in quartz for SIMS determinations using NIST silicate glasses and application to the TitaniQ geothermobarometer. *American Mineralogist* 96, 1100–1106. doi:10.2138/am.2011.3702
- Ghent, E.D., Stout, M.Z., 1984.  $\text{TiO}_2$  activity in metamorphosed pelitic and basic rocks: principles and applications to metamorphism in southeastern Canadian Cordillera. *Contributions to Mineralogy and Petrology* 86, 248–255. doi:10.1007/BF00373670
- Thomas, J.B., Watson, E.B., Spear, F.S., Shemella, P.T., Nayak, S.K., Lanzirrotti, A., 2010. TitaniQ under pressure: the effect of pressure and temperature on the solubility of Ti in quartz. *Contributions to Mineralogy and Petrology* 160, 743–759. doi:10.1007/s00410-010-0505-3

**Table S5: Summary of detrital zircon fission track analysis**

Sample	Age (Ma)	95%-CI (Ma)	95%+CI (Ma)	$\zeta$	$1\sigma \zeta$	Number of Spots	$N_s$	P	$1\sigma P$	$\chi^2$	$Q(\chi^2)$	Uranium (ppm)
PS53	46.86	10.99	14.34	2847888	54650.94	4	110	6.6541	0.61352	9.5685	0.0226	135.02
PS52	40.6	4.75	5.37	2847888	54650.94	22	611	42.693	1.8502	21.4376	0.4325	170.61
PS50	13.5	2.17	2.58	2742223	56169.79	18	603	122	9.17	271.5548	0	299.65
PS191	30.68	3.33	3.74	6658103	206438	22	429	92.822	0.50176	76.8839	0	173.83
PS190	23.51	2.57	2.89	6658103	206438	22	419	118.4	0.62251	93.551	0	237.07
PS185	21.63	2.33	2.61	6658103	206438	22	439	134.79	0.65527	78.7549	0	248.31

Note:  $\zeta$ , calibration factor;  $1\sigma \zeta$ , standard error of  $\zeta$ ;  $N_s$ , number of spontaneous fission tracks over a selected grain area; P, sum of the  $^{238}\text{U}/^{43}\text{Ca}$  ratio over the selected area;  $1\sigma P$ , standard error of P.