

Geological Magazine

Caledonian terrane accretion in W. Ireland: insights derived from very low-grade metamorphism (illite-chlorite crystallinity and b_0 parameter)

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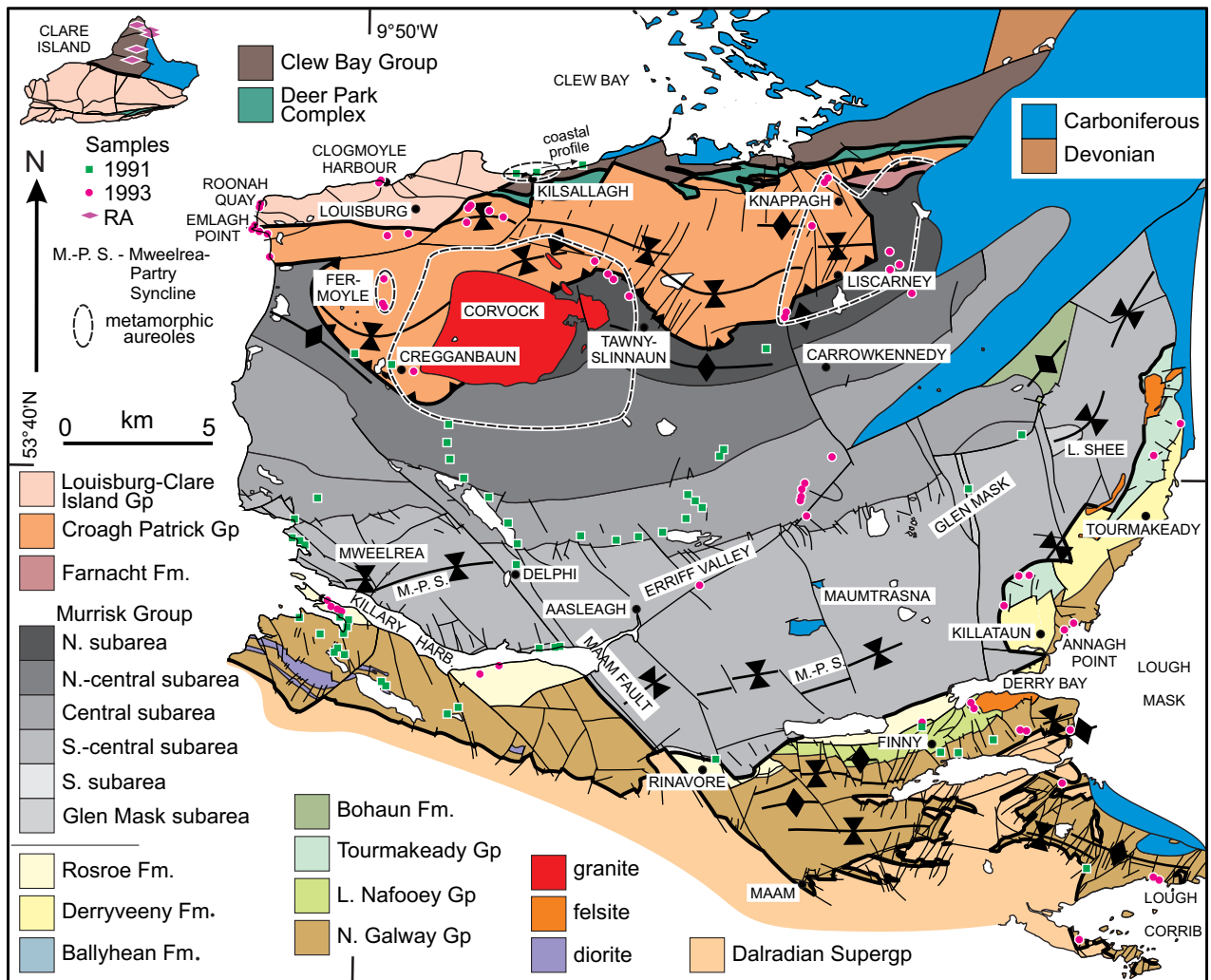


Fig. A1 Geological map of the S. Mayo area showing the sample localities, except for the S. Connemara Group (after Graham, Leake & Ryan 1989). Thicker black lines separate the terranes.

TABLE A1. Statistical summary of the data by sub-area

(001) & (002) IC and (002) ChC peak-width (FWHM) data in $\Delta^{\circ}2\theta$, b_{o-wr} , b_{o-wr*} , b_{o-pwr} and $b_{o-<2\mu}$ spacing data in Å.

Data Set	Area	Parameter	N	Mean	Stand. Dev.	% Variat.	Range
1	Clew Bay Group All samples	(001) IC	37	0.33	0.05	15.15	0.19
		(002) ChC	29	0.29	0.01	3.45	0.06
		(002) IC	37	0.34	0.03	8.82	0.11
		b_{o-wr}	35	9.002	0.01	90.211	0.075
2	Clew Bay Group Ballytoohy Formation	(001) IC	5	0.37	0.05	13.51	0.13
		(002) ChC	2	0.30	-	-	0.01
		(002) IC	5	0.36	0.04	11.11	0.11
		b_{o-wr}	5	9.025	0.01	110.122	0.030
3	Clew Bay Group Killadangan Formation	(001) IC	32	0.33	0.05	15.15	0.19
		(002) ChC	27	0.28	0.01	3.57	0.06
		(002) IC	32	0.34	0.02	5.88	0.08
		b_{o-wr}	30	8.998	0.01	70.189	0.053
4	Clew Bay Group low- b_o	(001) IC	19	0.35	0.05	14.29	0.18
		(002) ChC	19	0.29	0.01	3.45	0.06
		(002) IC	19	0.35	0.02	5.71	0.08
		b_{o-wr}	19	8.987	0.01	100.111	0.039
		b_{o-pwr}	6	8.988	0.01	150.167	0.039
		$b_{o-<2\mu}$	6	8.989	0.02	200.222	0.049
5	Clew Bay Group intermediate- b_o	(001) IC	16	0.32	0.05	15.52	0.18
		(002) ChC	8	0.28	0.01	3.50	0.04
		(002) IC	16	0.34	0.03	8.83	0.11
		b_{o-wr}	16	9.020	0.00	70.078	0.030
		b_{o-pwr}	6	9.021	0.01	100.111	0.030
		$b_{o-<2\mu}$	6	9.021	0.01	100.111	0.030
6	Louisburg-Clare Island Group All samples	(001) IC	22	0.42	0.10	23.81	0.33
		(002) ChC	15	0.35	0.04	11.43	0.12
		(002) IC	22	0.40	0.06	15.00	0.17
		b_{o-wr}	22	9.020	0.01	100.111	0.036
7	Louisburg-Clare Island Group Glen Pebbly Arkose Formation	(001) IC	6	0.40	0.01	2.45	0.02
		(002) ChC	1	0.35	-	-	-
		(002) IC	6	0.41	0.02	4.60	0.06
		b_{o-wr}	6	9.007	0.00	40.049	0.011
		b_{o-pwr}	3	9.006	0.00	60.070	0.011
8	Louisburg-Clare Island Group Bunnamohaun Siltstone Formation	(001) IC	5	0.36	0.02	6.10	0.05
		(002) ChC	3	0.36	0.05	6.10	0.08
		(002) IC	5	0.37	0.02	5.98	0.05
		b_{o-wr}	5	9.017	0.00	30.028	0.007
		b_{o-pwr}	1	9.017	-	-	-
9	Louisburg-Clare Island Group Kockmore Sandstone Formation	(001) IC	7	0.54	0.05	8.65	0.13
		(002) ChC	7	0.37	0.01	2.17	0.02
		(002) IC	7	0.46	0.01	1.56	0.01
		b_{o-wr}	7	9.025	0.00	10.011	0.003
		b_{o-pwr}	1	9.025	-	-	-
10	Louisburg-Clare Island Group Strake Banded Formation	(001) IC	4	0.29	0.01	3.45	0.01
		(002) ChC	4	0.29	0.00	0.00	0.01
		(002) IC	4	0.30	0.01	3.33	0.01
		b_{o-wr}	4	9.034	0.00	40.044	0.009
		b_{o-pwr}	4	9.034	0.00	40.044	0.009
$b_{o-<2\mu}$	4	9.040	0.00	20.022	0.004		

Data Set	Area	Parameter	N	Mean	Stand. Dev.	% Variat.	Range
11	Croagh Patrick Group All samples	(001) IC	34	0.31	0.04	12.90	0.18
		(002) ChC	33	0.30	0.03	10.00	0.14
		(002) IC	32	0.30	0.03	10.00	0.16
		b_{o-wr}	37	9.040	0.0070	0.077	0.028
12	Croagh Patrick Group samples not in metamorphic aureoles	(001) IC	21	0.29	0.02	6.90	0.08
		(002) ChC	21	0.29	0.02	6.90	0.07
		(002) IC	21	0.29	0.02	6.90	0.07
		b_{o-wr}	21	9.045	0.0030	0.033	0.012
		b_{o-pwr}	9	9.044	0.0040	0.044	0.012
		$b_{o-<2\mu}$	9	9.046	0.0050	0.055	0.012
13	Croagh Patrick Group samples not in metamorphic aureoles; three broad peaks left out	(001) IC	18	0.28	0.01	2.79	0.03
		(002) ChC	18	0.28	0.01	2.38	0.04
		(002) IC	18	0.28	0.01	3.74	0.04
		b_{o-wr}	18	9.045	0.0040	0.039	0.012
		b_{o-pwr}	9	9.044	0.0040	0.044	0.012
		$b_{o-<2\mu}$	9	9.046	0.0050	0.055	0.012
14	Croagh Patrick Group broad peak samples metamorphic	(001) IC	3	0.33	0.01	1.92	0.02
		(002) ChC	3	0.33	0.02	4.60	0.03
		(002) IC	3	0.31	0.02	6.20	0.04
		b_{o-wr}	3	9.046	0.0010	0.014	0.003
15	Croagh Patrick Group Corvoek metamorphic aureole	(001) IC	4	0.31	0.02	6.45	0.04
		(002) ChC	5	0.32	0.05	15.63	0.12
		(002) IC	4	0.32	0.04	12.50	0.09
		b_{o-wr}	7	9.034	0.0050	0.055	0.012
		b_{o-pwr}	4	9.034	0.0050	0.055	0.010
		$b_{o-<2\mu}$	4	9.036	0.0070	0.077	0.016
16	Croagh Patrick Group Fermoyle metamorphic aureole	(001) IC	5	0.35	0.07	20.00	0.15
		(002) ChC	3	0.29	0.00	0.00	0.01
		(002) IC	3	0.29	0.01	3.45	0.02
		b_{o-wr}	5	9.028	0.0040	0.044	0.010
		b_{o-pwr}	4	9.029	0.0050	0.055	0.010
		$b_{o-<2\mu}$	4	9.034	0.0040	0.044	0.008
17	Croagh Patrick Group Corvoek and Fermoyle metamorphic aureoles	(001) IC	9	0.33	0.06	18.18	0.15
		(002) ChC	8	0.31	0.04	12.90	0.13
		(002) IC	9	0.30	0.03	10.00	0.09
		b_{o-wr}	12	9.032	0.0050	0.055	0.018
		b_{o-pwr}	8	9.032	0.0050	0.055	0.016
		$b_{o-<2\mu}$	8	9.035	0.0050	0.055	0.016
18	Croagh Patrick Group Kelly's metamorphic aureole	(001) IC	4	0.34	0.07	20.59	0.17
		(002) ChC	4	0.30	0.02	6.67	0.06
		(002) IC	4	0.34	0.06	17.65	0.14
		b_{o-wr}	4	9.037	0.0020	0.022	0.006
		b_{o-pwr}	2	9.037	-	-	0.006
		$b_{o-<2\mu}$	2	9.035	-	-	0.000
19	Croagh Patrick Group Corvoek and Kelly's metamorphic aureoles	(001) IC	8	0.32	0.05	16.49	0.17
		(002) ChC	9	0.31	0.04	13.17	0.13
		(002) IC	8	0.33	0.04	15.14	0.16
		b_{o-wr}	16	9.035	0.0050	0.055	0.018
		b_{o-pwr}	6	9.035	0.0040	0.044	0.012
		$b_{o-<2\mu}$	6	9.036	0.006	0.061	0.016
20	Croagh Patrick Group All metamorphic aureoles	(001) IC	13	0.33	0.06	18.18	0.17
		(002) ChC	12	0.31	0.04	12.90	0.13
		(002) IC	11	0.32	0.05	15.63	0.16
		b_{o-wr}	16	9.033	0.0050	0.055	0.018
		b_{o-pwr}	10	9.033	0.0050	0.057	0.018
		$b_{o-<2\mu}$	10	9.035	0.005	0.052	0.016

Data Set	Area	Parameter	N	Mean	Stand. Dev.	% Variat.	Range
21	S. Mayo Ordovician All samples	(001) IC	92	0.39	0.10	26.75	0.53
		(002) ChC	94	0.32	0.04	11.87	0.18
		(002) IC	83	0.37	0.09	23.64	0.43
		b_{o-wr^*}	103	9.028	0.0140.151		0.067
		b_{o-wr}	102	9.028	0.0130.142		0.054
22	Murrisk Group All samples	(001) IC	68	0.34	0.05	14.20	0.20
		(002) ChC	76	0.32	0.03	10.72	0.15
		(002) IC	63	0.35	0.05	14.51	0.20
		b_{o-wr^*}	77	9.034	0.0090.101		0.067
		b_{o-wr}	76	9.034	0.0070.075		0.029
23	Murrisk Group All not aureole samples	(001) IC	59	0.35	0.05	13.69	0.20
		(002) ChC	66	0.32	0.04	10.94	0.15
		(002) IC	56	0.35	0.05	13.34	0.20
		b_{o-wr}	67	9.036	0.0050.058		0.022
24	Murrisk Group North sub-area All Letterbrock and Derrymore Formations	(001) IC	13	0.31	0.05	17.17	0.20
		(002) ChC	14	0.30	0.02	6.60	0.07
		(002) IC	12	0.28	0.02	7.69	0.07
		b_{o-wr^*}	14	9.023	0.0140.159		0.057
		b_{o-wr}	13	9.027	0.0070.083		0.019
25	Murrisk Group North sub-area Letterbrock and Derrymore Formations not in aureole	(001) IC	4	0.34	0.09	24.94	0.20
		(002) ChC	5	0.31	0.03	9.40	0.07
		(002) IC	5	0.29	0.02	6.92	0.05
		b_{o-wr}	5	9.035	0.0020.019		0.004
		b_{o-pwr}	2	9.035	-	-	0.004
		$b_{o-<2\mu}$	2	9.032	-	-	0.006
26	Murrisk Group North-Central sub-area All Sheefry Fm.	(001) IC	1	0.28	-	-	-
		(002) ChC	7	0.30	0.03	8.71	0.06
		(002) IC	1	0.28	-	-	-
		b_{o-wr}	8	9.034	0.0030.036		0.011
27	Murrisk Group North-Central sub-area Sheefry Formation not in aureole	(001) IC	1	0.28	-	-	-
		(002) ChC	6	0.31	0.03	9.19	0.06
		(002) IC	1	0.28	-	-	-
		b_{o-wr}	7	9.034	0.0020.027		0.006
		b_{o-pwr}	3	9.034	0.0030.033		0.005
		$b_{o-<2\mu}$	3	9.034	0.0040.040		0.007
28	Murrisk Group Central sub-area All Derrylea and Glenummera Formations	(001) IC	31	0.32	0.03	9.38	0.11
		(002) ChC	32	0.30	0.01	3.33	0.06
		(002) IC	29	0.34	0.03	8.82	0.11
		b_{o-wr}	32	9.038	0.0060.066		0.022
		b_{o-pwr}	5	9.037	0.0100.111		0.022
$b_{o-<2\mu}$	5	9.042	0.0090.100		0.019		
29	Murrisk Group South-Central sub-area All Glenummera and Mweelrea Formations	(001) IC	14	0.38	0.02	5.26	0.08
		(002) ChC	14	0.34	0.02	5.88	0.05
		(002) IC	13	0.39	0.02	5.13	0.06
		b_{o-wr}	14	9.035	0.0040.044		0.013
		b_{o-pwr}	5	9.034	0.0050.055		0.013
$b_{o-<2\mu}$	5	9.038	0.0040.044		0.009		
30	Murrisk Group South-Central sub-area Glenummera Fm.	(001) IC	5	0.37	0.03	8.11	0.06
		(002) ChC	5	0.34	0.02	5.88	0.05
		(002) IC	5	0.39	0.02	5.13	0.06
		b_{o-wr}	5	9.035	0.0060.066		0.013
31	Murrisk Group South-Central sub-area Mweelrea Fm.	(001) IC	9	0.39	0.02	5.13	0.07
		(002) ChC	9	0.34	0.02	5.88	0.05
		(002) IC	8	0.39	0.02	5.13	0.05
		b_{o-wr}	9	9.036	0.0030.033		0.009

Data Set	Area	Parameter	N	Mean	Stand. Dev.	% Variat.	Range
32	Murrisk Group South sub-area Glennumera Formation	(001) IC	5	0.41	0.02	4.88	0.05
		(002) ChC	5	0.40	0.02	5.00	0.05
		(002) IC	5	0.42	0.02	4.76	0.06
		b_{o-wr}	5	9.031	0.0010.011		0.003
		b_{o-pwr}	3	9.030	0.0010.011		0.003
		$b_{o-<2\mu}$	3	9.035	0.0030.033		0.005
33	Murrisk Group Glen Mask Member All samples (data sets 22, 38 & 39)	(001) IC	4	0.40	0.05	12.50	0.11
		(002) ChC	4	0.35	0.03	8.57	0.05
		(002) IC	3	0.39	0.04	10.26	0.08
		b_{o-wr}	4	9.032	0.0040.044		0.009
		b_{o-pwr}	1	9.033	-	-	-
		$b_{o-<2\mu}$	1	9.038	-	-	-
34	Murrisk Group Central, South- Central, South & Glen Mask. All Samples	(001) IC	54	0.35	0.04	12.67	0.17
		(002) ChC	55	0.32	0.04	11.11	0.14
		(002) IC	50	0.36	0.04	11.73	0.16
		b_{o-wr}	55	9.036	0.0060.062		0.022
35	Murrisk Group Corvock metamorphic aureole	(001) IC	2	0.31	0.06	19.35	0.09
		(002) ChC	3	0.29	0.00	0.00	0.00
		(002) IC	1	0.28	-	-	-
		b_{o-wr}	3	9.024	0.0030.033		0.006
36	Murrisk Group Kelly's metamorphic aureole	(001) IC	7	0.30	0.02	8.13	0.07
		(002) ChC	7	0.30	0.01	4.87	0.04
		(002) IC	6	0.28	0.02	7.16	0.06
		b_{o-wr^*}	7	9.015	0.0160.174		0.047
		b_{o-wr}	6	9.021	0.0030.034		0.008
		b_{o-pwr}	2	9.003	-	-	0.047
		$b_{o-<2\mu}$	2	9.008	-	-	0.045
37	Murrisk Group All metamorphic aureole samples	(001) IC	9	0.30	0.03	10.22	0.09
		(002) ChC	10	0.29	0.01	4.27	0.04
		(002) IC	7	0.28	0.02	6.54	0.06
		b_{o-wr^*}	10	9.018	0.0110.122		0.048
		b_{o-wr}	9	9.022	0.0030.037		0.009
38	Rosroe Formation All samples	(001) IC	13	0.41	0.04	9.76	0.15
		(002) ChC	12	0.35	0.04	11.43	0.13
		(002) IC	13	0.38	0.04	10.53	0.14
		b_{o-wr}	12	9.016	0.0070.078		0.023
		b_{o-pwr}	6	9.017	0.0080.089		0.023
		$b_{o-<2\mu}$	6	9.021	0.0090.100		0.022
39	Lough Nafoeoy and Tourmakeady Groups All samples	(001) IC	11	0.62	0.08	12.90	0.29
		(002) ChC	6	0.37	0.05	13.51	0.13
		(002) IC	7	0.61	0.07	11.48	0.20
		b_{o-wr}	14	9.006	0.0090.100		0.035
40	Tourmakeady Group All samples	(001) IC	9	0.61	0.04	6.56	0.11
		(002) ChC	3	0.36	0.07	19.44	0.13
		(002) IC	7	0.61	0.07	11.48	0.20
		b_{o-wr}	10	9.004	0.0110.122		0.035
		b_{o-pwr}	4	9.007	0.0080.089		0.016
		$b_{o-<2\mu}$	4	9.006	0.0110.122		0.021
41	Lough Nafoeoy Group All samples	(001) IC	2	0.65	0.21	32.31	0.29
		(002) ChC	3	0.38	0.01	2.63	0.02
		b_{o-wr}	4	9.011	0.0020.022		0.003
		b_{o-pwr}	1	9.013	-	-	-
		$b_{o-<2\mu}$	1	9.017	-	-	-
42	North Galway Group All samples	(001) IC	35	0.46	0.09	19.57	0.41
		(002) ChC	36	0.37	0.04	10.81	0.14
		(002) IC	32	0.44	0.06	13.64	0.24
		b_{o-wr}	34	9.015	0.0100.111		0.045
		b_{o-pwr}	8	9.012	0.0150.161		0.044
		$b_{o-<2\mu}$	8	9.014	0.0130.140		0.034

Data Set	Area	Parameter	N	Mean	Stand. Dev.	% Variat.	Range
43	North Galway Group	(001) IC	17	0.48	0.07	14.58	0.20
		(002) ChC	18	0.37	0.03	8.11	0.11
	East of Maam Fault	(002) IC	14	0.45	0.06	13.33	0.17
		b_{o-wr}	16	9.016	0.0120	133	0.038
44	North Galway Group	(001) IC	18	0.45	0.10	22.22	0.41
		(002) ChC	18	0.37	0.05	13.51	0.14
	West of Maam Fault	(002) IC	18	0.42	0.06	14.29	0.24
		b_{o-wr}	18	9.013	0.0090	100	0.034
45	South Connemara Group	(001) IC	8	0.33	0.03	9.09	0.08
		(002) ChC	9	0.35	0.01	2.86	0.04
	All samples	(002) IC	8	0.32	0.02	6.25	0.08
		b_{o-wr}	9	9.012	0.0250	277	0.061
46	South Connemara Group	(001) IC	5	0.34	0.03	8.82	0.06
		(002) ChC	6	0.35	0.01	2.86	0.04
	low- b_o Lettermullen and Ryan's Farm Formations	(002) IC	5	0.33	0.02	6.06	0.06
		b_{o-wr}	6	8.996	0.0040	0.044	0.010
		b_{o-pwr}	6	8.996	0.0040	0.044	0.010
		$b_{o-<2\mu}$	6	8.994	0.0090	100	0.021
47	South Connemara Group	(001) IC	3	0.31	0.02	6.45	0.03
		(002) ChC	3	0.35	0.02	5.71	0.04
	high- b_o Loch Faoleán Formation	(002) IC	3	0.31	0.03	9.68	0.05
		b_{o-wr}	3	9.046	0.0070	0.077	0.012
		b_{o-pwr}	1	9.041	-	-	-
		$b_{o-<2\mu}$	1	9.044	-	-	-
48	All metamorphic aureoles	(001) IC	22	0.32	0.05	15.87	0.19
		(002) ChC	22	0.30	0.03	9.46	0.13
	All samples	(002) IC	18	0.30	0.04	13.54	0.17
		b_{o-wr}^*	26	9.027	0.0120	131	0.060
		b_{o-wr}	25	9.029	0.0070	0.079	0.021
49	Kelly's metamorphic aureole	(001) IC	11	0.31	0.05	15.69	0.17
		(002) ChC	11	0.30	0.02	5.94	0.06
	All samples	(002) IC	10	0.31	0.05	16.03	0.17
		b_{o-wr}^*	11	9.023	0.0160	182	0.060
		b_{o-wr}	10	9.027	0.0090	0.097	0.021
50	Corvock, Fermoyle metamorphic aureoles	(001) IC	11	0.32	0.05	15.63	0.17
		(002) ChC	11	0.30	0.04	13.33	0.13
	All samples	(002) IC	8	0.30	0.03	10.00	0.09
		b_{o-wr}	15	9.030	0.0060	0.064	0.018

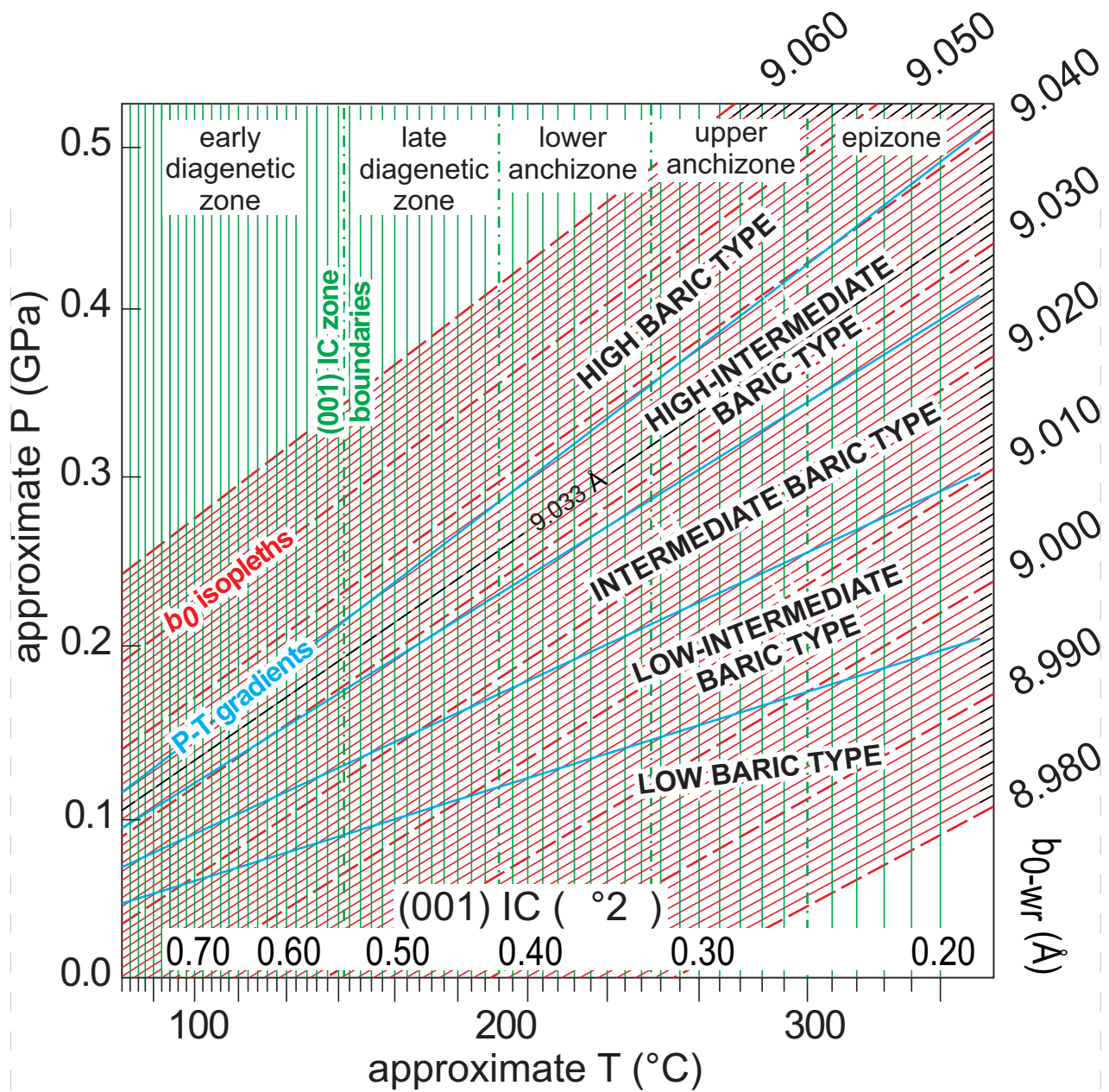


Fig. A2 Pseudo P-T plot for very low-grade metamorphism, using illite crystallinity and the b_0 spacing methods. Table 1 gives the values for the intersection points of IC and b_0 zone boundaries. For construction purposes, b_0 isopleths converge to the non-real point of $-899\text{ }^\circ\text{C}$; -1.15 Gpa . A copy of the diagram in Coreldraw can be obtained from the corresponding author.