

## APPENDIX A

### Observed gravity data in the study area

Gravimeter : LACOSTE & ROMBERGE G-565

$$g_{lat} = 9780318(1 + 0.0053024\sin^2 \phi + 0.0000059\sin^2 2\phi)$$

$$FAC = 3.072 \times H$$

$$BC = 0.0004191 \times \text{density} \times H ; \text{density} = 2,500 \text{ kg/m}^3$$

$$BA = g_{obs} - g_{lat} + FAC - BC + TC$$

Table A.1: Observed gravity data and correction in study area

STN	East	North	Latitude	H m	$g_{obs}$ g.u.	$g_{lat}$ g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B1	536002	968841	8.8	21.1	9781638	9781517	64.8	22.1	0.1	164
B2	536487	966919	8.7	25.9	9781613	9781512	79.6	27.2	0.3	154
B3	536629	964877	8.7	24.0	9781620	9781507	73.8	25.2	0.4	162
B4	536770	962875	8.7	14.8	9781629	9781502	45.6	15.6	0.5	157
B5	536824	960812	8.7	14.4	9781626	9781497	44.2	15.1	0.2	158
B6	536821	958743	8.7	15.2	9781620	9781492	46.8	16.0	0.1	158
B7	537481	956872	8.7	19.0	9781599	9781488	58.5	19.9	0.1	150
B8	538427	955127	8.6	22.9	9781562	9781483	70.2	24.0	0.2	126
B9	539834	954457	8.6	22.7	9781492	9781482	69.7	23.8	0.3	56
B10	540604	955712	8.6	19.1	9781468	9781485	58.8	20.0	0.9	23
B11	541418	957078	8.7	15.9	9781429	9781488	48.9	16.7	2.6	-24
B12	541016	958770	8.7	15.6	9781454	9781492	48.1	16.4	1.8	-4
B13	540906	960723	8.7	16.4	9781438	9781497	50.5	17.2	3.0	-22
B14	540532	962787	8.7	16.7	9781443	9781502	51.3	17.5	4.6	-21
B15	539907	964582	8.7	18.0	9781470	9781506	55.4	18.9	1.4	1
B16	539554	966545	8.7	20.5	9781505	9781511	62.8	21.4	0.6	36
B17	539785	968560	8.8	22.9	9781516	9781516	70.4	24.0	0.5	46
B18	539753	970534	8.8	21.6	9781543	9781521	66.4	22.6	0.5	66
B19	539798	972524	8.8	21.9	9781540	9781526	67.3	23.0	0.4	59
B20	540270	973798	8.8	23.0	9781534	9781529	70.6	24.1	1.3	53
B21	540618	975504	8.8	23.7	9781562	9781533	72.9	24.9	1.5	79
B22	540474	977271	8.8	23.8	9781604	9781538	73.2	25.0	0.8	115
B23	541382	979076	8.9	22.4	9781574	9781542	68.8	23.5	0.8	78
B24	541991	980952	8.9	23.1	9781561	9781547	70.9	24.2	0.3	61
B25	542375	982892	8.9	23.8	9781576	9781552	73.1	24.9	0.2	72
B26	543161	984771	8.9	24.5	9781616	9781556	75.2	25.6	0.2	109
B27	544125	986565	8.9	25.2	9781622	9781561	77.5	26.4	0.3	113
B28	543806	988480	8.9	24.8	9781688	9781566	76.2	26.0	0.3	173
B29	543031	990302	9.0	22.8	9781710	9781570	70.0	23.9	0.1	186
B30	542823	992331	9.0	21.9	9781709	9781575	67.3	23.0	0.1	179
B31	542109	994268	9.0	22.6	9781738	9781580	69.4	23.7	0.0	204
B32	541407	996170	9.0	23.3	9781759	9781585	71.7	24.4	0.1	222
B33	540715	998101	9.0	22.9	9781784	9781590	70.5	24.0	0.1	241
B34	540078	1000039	9.0	23.5	9781760	9781595	72.1	24.6	0.2	213

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B35	539697	1002048	9.1	23.8	9781847	9781600	73.1	24.9	0.4	296
B36	538528	1003521	9.1	23.0	9781882	9781603	70.8	24.1	0.9	326
B37	537565	1005225	9.1	21.7	9781869	9781608	66.8	22.8	4.1	309
B38	537375	1007221	9.1	21.0	9781925	9781613	64.5	22.0	0.5	355
B39	535740	1006279	9.1	21.9	9781906	9781610	67.3	22.9	0.2	340
B40	533713	1006230	9.1	20.6	9781884	9781610	63.2	21.6	0.2	315
B41	531822	1006947	9.1	22.5	9781915	9781612	69.2	23.6	0.4	349
B42	530023	1007804	9.1	20.1	9781924	9781614	61.9	21.1	0.2	351
B43	528211	1007205	9.1	18.8	9781923	9781613	57.8	19.7	0.6	348
B44	526287	1007149	9.1	19.7	9781934	9781613	60.4	20.6	0.2	362
B45	525539	1005834	9.1	18.3	9781942	9781609	56.3	19.2	0.2	370
B46	524161	1004909	9.1	19.2	9781949	9781607	58.9	20.1	0.1	380
B47	523469	1003519	9.1	17.9	9781924	9781603	54.9	18.7	0.1	357
B48	522909	1002310	9.1	19.7	9781861	9781600	60.6	20.7	0.3	301
B49	521203	1001209	9.1	19.6	9781791	9781598	60.1	20.5	0.3	234
B50	519448	1000720	9.1	20.5	9781781	9781596	62.9	21.4	0.0	226
B51	518198	999773	9.0	16.0	9781734	9781594	49.2	16.8	0.4	172
B52	518590	997780	9.0	16.1	9781774	9781589	49.6	16.9	0.3	218
B53	518799	995755	9.0	16.2	9781795	9781584	49.9	17.0	0.1	244
B54	518872	993747	9.0	15.3	9781807	9781579	46.9	16.0	0.1	260
B55	518770	991732	9.0	15.4	9781814	9781574	47.2	16.1	0.3	272
B56	517908	989893	9.0	14.9	9781844	9781569	45.9	15.6	0.0	306
B57	517415	987959	8.9	14.5	9781806	9781564	44.6	15.2	0.2	271
B58	516483	986248	8.9	14.6	9781765	9781560	44.9	15.3	0.0	234
B59	516318	984218	8.9	14.7	9781788	9781555	45.3	15.4	0.1	264
B60	516452	982198	8.9	15.9	9781747	9781550	49.0	16.7	0.1	230
B61	545669	1002846	9.1	10.7	9781770	9781602	32.7	11.2	0.2	190
B62	547249	1004163	9.1	10.9	9781792	9781605	33.4	11.4	0.5	210
B63	548740	1005535	9.1	11.5	9781852	9781609	35.5	12.1	0.7	267
B64	550361	1006805	9.1	13.4	9781854	9781612	41.0	14.0	0.9	270
B65	551874	1008139	9.1	13.5	9781823	9781615	41.6	14.2	0.2	236
B66	553416	1009497	9.1	14.2	9781827	9781619	43.7	14.9	0.3	238
B67	554909	1010851	9.1	15.5	9781836	9781622	47.6	16.2	0.3	246
B68	556450	1012203	9.2	17.9	9781857	9781626	54.9	18.7	0.2	268
B69	554830	1012591	9.2	17.5	9781864	9781627	53.6	18.3	0.0	272
B70	552823	1012840	9.2	18.7	9781868	9781627	57.5	19.6	0.6	280
B71	550777	1012983	9.2	17.3	9781883	9781628	53.1	18.1	0.1	290
B72	548840	1012391	9.2	17.5	9781873	9781626	53.6	18.3	0.1	282
B73	546839	1012240	9.2	18.7	9781906	9781626	57.5	19.6	0.2	318
B74	545228	1011266	9.1	18.9	9781904	9781623	57.9	19.8	0.5	319
B75	543319	1011263	9.1	18.5	9781889	9781623	56.8	19.4	0.1	303
B76	541346	1011443	9.1	18.7	9781907	9781624	57.5	19.6	0.0	322
B77	540085	1010434	9.1	20.0	9781919	9781621	61.4	20.9	0.1	339
B78	539539	1008473	9.1	20.7	9781924	9781616	63.5	21.7	0.4	350
B79	537739	1007503	9.1	20.3	9781928	9781614	62.3	21.3	0.6	357
B80	544050	994170	9.0	21.7	9781728	9781580	66.8	22.8	0.0	192
B81	545941	993964	9.0	21.5	9781730	9781579	66.0	22.5	0.1	194
B82	547801	993305	9.0	20.6	9781690	9781578	63.4	21.6	0.4	154
B83	549728	992822	9.0	20.4	9781616	9781576	62.5	21.3	0.9	82
B84	551174	991640	9.0	20.1	9781572	9781573	61.7	21.1	1.7	41
B85	552644	992800	9.0	19.8	9781586	9781576	60.8	20.8	1.6	51
B86	554061	993847	9.0	19.0	9781599	9781579	58.5	19.9	5.8	64

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B87	555334	994105	9.0	18.2	9781579	9781580	56.0	19.1	3.3	39
B88	557134	994774	9.0	16.9	9781577	9781581	51.8	17.7	6.8	36
B89	557249	996656	9.0	17.1	9781598	9781586	52.7	18.0	3.1	50
B90	558574	998180	9.0	16.3	9781641	9781590	50.1	17.1	2.5	87
B91	559442	999940	9.0	16.5	9781659	9781594	50.6	17.3	0.4	98
B92	558453	1001622	9.1	16.8	9781701	9781599	51.6	17.6	0.2	136
B93	557887	1003545	9.1	16.0	9781729	9781603	49.1	16.7	0.2	158
B94	557662	1005136	9.1	15.1	9781749	9781608	46.4	15.8	0.2	172
B95	556200	1006489	9.1	14.9	9781754	9781611	45.7	15.6	0.6	174
B96	554934	1008099	9.1	13.5	9781780	9781615	41.4	14.1	0.3	192
B97	560167	1004963	9.1	18.8	9781715	9781607	57.7	19.7	2.1	148
B98	562164	1005282	9.1	17.2	9781698	9781608	53.0	18.1	2.0	127
B99	564217	1005293	9.1	18.3	9781706	9781608	56.1	19.1	1.6	137
B100	566095	1006110	9.1	18.8	9781713	9781610	57.8	19.7	12.2	153
B101	566983	1007719	9.1	18.4	9781736	9781614	56.4	19.2	0.5	159
B102	568343	1009073	9.1	17.8	9781746	9781617	54.8	18.7	0.4	165
B103	569933	1008821	9.1	17.9	9781744	9781617	55.1	18.8	1.3	165
B104	571509	1010100	9.1	16.8	9781708	9781620	51.7	17.6	1.9	124
B105	571405	1010976	9.1	18.0	9781737	9781622	55.3	18.8	5.1	157
B106	569429	1011245	9.1	18.1	9781776	9781623	55.6	19.0	0.5	190
B107	567411	1011518	9.2	19.3	9781780	9781624	59.3	20.2	0.4	195
B108	565423	1011780	9.2	19.4	9781806	9781624	59.5	20.3	0.4	221
B109	563397	1011609	9.2	18.3	9781818	9781624	56.1	19.1	0.5	231
B110	561402	1011510	9.2	18.4	9781799	9781624	56.5	19.3	0.3	213
B111	559374	1011943	9.2	18.5	9781813	9781625	56.8	19.4	0.2	226
B112	557306	1012294	9.2	17.5	9781836	9781626	53.6	18.3	0.0	246
B113	574153	1010303	9.1	20.2	9781662	9781621	62.1	21.2	1.3	84
B114	573727	1012173	9.2	19.3	9781705	9781625	59.2	20.2	2.4	121
B115	573531	1014225	9.2	17.2	9781703	9781631	52.8	18.0	12.3	119
B116	574117	1016187	9.2	17.9	9781751	9781636	54.9	18.7	2.0	153
B117	574694	1018095	9.2	18.6	9781761	9781641	57.1	19.5	1.5	160
B118	575837	1019821	9.2	18.7	9781752	9781645	57.4	19.6	2.3	147
B119	576579	1021671	9.2	19.9	9781751	9781650	61.2	20.9	0.6	142
B120	577365	1023511	9.3	18.9	9781767	9781655	58.2	19.9	0.8	151
B121	577809	1025516	9.3	19.6	9781765	9781660	60.3	20.6	1.5	146
B122	577362	1027466	9.3	20.9	9781807	9781665	64.1	21.9	0.4	185
B123	577007	1029250	9.3	17.7	9781825	9781669	54.4	18.5	0.2	192
B124	575845	1030147	9.3	18.4	9781832	9781672	56.5	19.3	0.2	198
B125	564729	1013625	9.2	22.2	9781839	9781629	68.3	23.3	0.4	255
B126	564657	1015652	9.2	21.2	9781846	9781634	65.1	22.2	0.2	255
B127	564920	1017615	9.2	20.7	9781845	9781639	63.6	21.7	0.0	248
B128	565077	1019692	9.2	20.8	9781846	9781645	63.8	21.8	0.1	244
B129	564882	1021652	9.2	17.6	9781870	9781650	53.9	18.4	0.0	256
B130	565078	1023732	9.3	18.7	9781888	9781655	57.5	19.6	0.2	271
B131	562946	1020939	9.2	19.4	9781881	9781648	59.5	20.3	0.0	272
B132	560941	1021309	9.2	18.9	9781918	9781649	58.0	19.8	0.2	308
B133	558978	1021698	9.2	16.7	9781917	9781650	51.4	17.5	0.2	301
B134	556978	1022017	9.2	17.4	9781915	9781651	53.3	18.2	0.1	300
B135	555759	1021084	9.2	16.3	9781937	9781648	50.1	17.1	0.5	322
B136	555877	1019039	9.2	15.8	9781930	9781643	48.7	16.6	0.2	319
B137	555205	1017037	9.2	17.0	9781892	9781638	52.3	17.8	0.3	289
B138	553981	1015695	9.2	17.6	9781884	9781635	54.1	18.5	0.0	285

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B139	552305	1014976	9.2	18.2	9781861	9781633	56.0	19.1	0.0	265
B140	552578	1013046	9.2	18.3	9781868	9781628	56.2	19.2	0.1	277
B141	516430	980254	8.9	15.5	9781718	9781545	47.5	16.2	0.1	204
B142	516536	978259	8.8	15.5	9781704	9781540	47.6	16.2	0.3	196
B143	517707	976593	8.8	18.3	9781722	9781536	56.1	19.1	0.3	223
B144	518763	975527	8.8	18.3	9781722	9781533	56.3	19.2	0.3	226
B145	519584	973847	8.8	17.3	9781756	9781529	53.1	18.1	9.6	271
B146	520150	972002	8.8	16.8	9781746	9781525	51.6	17.6	0.3	256
B147	521019	970175	8.8	17.4	9781747	9781520	53.5	18.2	0.3	262
B148	521911	968296	8.8	19.6	9781752	9781516	60.3	20.6	0.5	277
B149	522770	966482	8.7	20.2	9781723	9781511	62.1	21.2	0.4	253
B150	523638	964637	8.7	18.6	9781724	9781507	57.2	19.5	4.2	259
B151	524499	962797	8.7	19.2	9781680	9781502	59.0	20.1	0.6	218
B152	525159	960938	8.7	20.9	9781646	9781498	64.2	21.9	0.2	191
B153	526361	959357	8.7	22.1	9781683	9781494	67.8	23.1	0.4	234
B154	526754	957338	8.7	22.1	9781695	9781489	67.9	23.2	0.4	252
B155	526549	955336	8.6	22.2	9781708	9781484	68.1	23.2	0.1	269
B156	526184	953319	8.6	23.7	9781655	9781479	72.7	24.8	0.4	224
B157	525804	951266	8.6	25.5	9781656	9781474	78.4	26.7	0.3	234
B158	525435	949315	8.6	23.4	9781679	9781469	71.8	24.5	0.4	258
B159	525463	947617	8.6	22.7	9781670	9781465	69.6	23.7	0.1	250
B160	527459	947896	8.6	23.0	9781682	9781466	70.8	24.1	0.1	263
B161	528717	946810	8.6	23.4	9781683	9781463	71.9	24.5	0.1	267
B162	530276	947913	8.6	23.6	9781716	9781466	72.4	24.7	0.1	298
B163	531634	949350	8.6	22.0	9781707	9781469	67.6	23.0	0.2	282
B164	533164	950658	8.6	20.8	9781697	9781473	63.8	21.8	0.2	266
B165	534953	951275	8.6	21.7	9781640	9781474	66.7	22.7	0.2	210
B166	535878	952823	8.6	20.5	9781637	9781478	62.9	21.4	0.3	201
B167	537539	953780	8.6	21.7	9781608	9781480	66.8	22.8	0.3	172
B168	528735	987078	8.9	9.4	9781827	9781562	29.0	9.9	1.2	285
B169	528124	986731	8.9	12.1	9781822	9781561	37.1	12.7	1.1	286
B170	527473	985626	8.9	11.4	9781832	9781558	34.9	11.9	0.5	297
B171	526822	984885	8.9	17.3	9781823	9781557	53.1	18.1	0.9	302
B172	526138	984170	8.9	20.2	9781801	9781555	62.1	21.2	0.5	287
B173	525410	983478	8.9	16.7	9781809	9781553	51.4	17.5	1.7	292
B174	524684	982796	8.9	13.2	9781818	9781551	40.4	13.8	1.0	294
B175	523972	982124	8.9	9.1	9781840	9781550	28.1	9.6	0.5	309
B176	523249	981445	8.9	22.4	9781819	9781548	68.8	23.5	0.3	317
B177	522537	980770	8.9	8.7	9781836	9781546	26.8	9.1	3.8	311
B178	521614	979886	8.9	6.8	9781819	9781544	21.0	7.2	3.2	292
B179	521031	979336	8.9	4.3	9781816	9781543	13.3	4.5	0.7	282
B180	520302	978631	8.9	5.0	9781788	9781541	15.2	5.2	1.9	259
B181	519844	977762	8.8	7.2	9781775	9781539	22.2	7.6	2.3	253
B182	519525	976898	8.8	6.4	9781765	9781537	19.7	6.7	1.1	242
B183	518418	984258	8.9	19.1	9781810	9781555	58.6	20.0	0.5	294
B184	520147	983579	8.9	10.3	9781829	9781553	31.6	10.8	0.1	296
B185	520183	985634	8.9	10.6	9781842	9781558	32.5	11.1	0.1	305
B186	521754	986616	8.9	10.3	9781787	9781561	31.5	10.8	0.0	247
B187	522561	987686	8.9	10.5	9781757	9781564	32.3	11.0	0.0	215
B188	522218	988441	8.9	10.5	9781763	9781565	32.1	11.0	0.0	219
B189	523447	989933	9.0	11.8	9781734	9781569	36.3	12.4	0.0	189

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B190	522754	991653	9.0	13.2	9781732	9781574	40.4	13.8	0.0	185
B191	522720	993496	9.0	15.8	9781725	9781578	48.5	16.6	0.4	179
B192	523292	995417	9.0	15.7	9781741	9781583	48.2	16.4	0.2	190
B193	524269	997068	9.0	17.9	9781799	9781587	54.9	18.7	0.2	248
B194	524075	998897	9.0	19.5	9781826	9781592	60.0	20.5	0.6	275
B195	523983	1000712	9.1	19.9	9781878	9781596	61.0	20.8	0.3	322
B196	523389	1002478	9.1	20.0	9781887	9781601	61.3	20.9	0.3	327
B197	525833	1002737	9.1	39.3	9781915	9781601	120.8	41.2	2.2	395
B198	527294	1001548	9.1	23.2	9781967	9781598	71.2	24.3	7.4	423
B199	528942	1002059	9.1	35.7	9781912	9781600	109.8	37.4	0.7	385
B200	528384	1003857	9.1	31.0	9781922	9781604	95.3	32.5	0.8	381
B201	527452	1005445	9.1	40.3	9781899	9781608	123.9	42.2	0.4	373
B202	527155	1006942	9.1	20.6	9781923	9781612	63.4	21.6	0.3	353
B203	532893	1004548	9.1	19.3	9781911	9781606	59.2	20.2	0.5	344
B204	533153	1002641	9.1	14.3	9781912	9781601	44.0	15.0	0.1	340
B205	531972	1001115	9.1	13.7	9781939	9781597	41.9	14.3	0.2	369
B206	533010	999648	9.0	12.5	9781906	9781594	38.5	13.1	0.4	338
B207	534395	999172	9.0	6.6	9781911	9781592	20.2	6.9	0.4	332
B208	535827	999419	9.0	18.7	9781851	9781593	57.4	19.6	0.2	296
B209	533347	997105	9.0	17.0	9781886	9781587	52.2	17.8	0.2	334
B210	535050	996028	9.0	10.2	9781844	9781584	31.2	10.7	1.2	281
B211	536286	994758	9.0	13.1	9781820	9781581	40.3	13.7	0.0	265
B212	537849	993191	9.0	16.0	9781797	9781577	49.1	16.8	0.2	252
B213	537876	991369	9.0	16.2	9781778	9781573	49.7	16.9	0.1	238
B214	537102	989631	9.0	23.4	9781745	9781568	71.8	24.5	0.0	224
B215	536444	987811	8.9	21.7	9781737	9781564	66.7	22.8	0.0	218
B216	536112	986448	8.9	17.0	9781734	9781560	52.3	17.8	0.2	208
B217	535473	984624	8.9	20.1	9781724	9781556	61.8	21.1	0.2	209
B218	534635	982905	8.9	21.8	9781734	9781552	67.1	22.9	0.1	227
B219	533104	982540	8.9	18.2	9781759	9781551	55.9	19.1	0.2	245
B220	528015	989474	9.0	11.7	9781867	9781568	35.9	12.2	0.1	322
B221	528876	989389	9.0	14.4	9781862	9781568	44.2	15.1	0.0	324
B222	529588	990042	9.0	12.3	9781874	9781569	37.8	12.9	0.0	329
B223	530511	990153	9.0	12.4	9781873	9781570	38.0	13.0	0.0	328
B224	531268	990713	9.0	14.6	9781862	9781571	44.7	15.3	0.0	321
B225	531942	991421	9.0	13.9	9781864	9781573	42.6	14.5	0.1	319
B226	532245	992220	9.0	13.5	9781868	9781575	41.5	14.2	0.3	321
B227	532126	993272	9.0	17.0	9781876	9781578	52.3	17.8	0.3	333
B228	531371	993859	9.0	13.6	9781847	9781579	41.6	14.2	0.5	296
B229	530542	994430	9.0	19.9	9781919	9781580	61.2	20.9	0.1	379
B230	530241	994824	9.0	24.4	9781923	9781581	74.9	25.5	0.4	391
B231	529946	995715	9.0	28.6	9781931	9781584	87.8	30.0	1.2	406
B232	529621	997025	9.0	24.8	9781941	9781587	76.2	26.0	0.9	405
B233	529578	998010	9.0	16.6	9781956	9781590	51.0	17.4	1.0	401
B234	529706	998895	9.0	23.9	9781939	9781592	73.3	25.0	1.2	396
B235	529960	999840	9.0	27.5	9781963	9781594	84.6	28.9	1.1	426
B236	529253	1000502	9.1	29.2	9781938	9781596	89.6	30.6	1.3	403
B237	528572	1001215	9.1	34.2	9781918	9781598	105.2	35.9	1.9	392
B238	530027	1008828	9.1	17.6	9781917	9781617	53.9	18.4	0.1	336
B239	528104	1009516	9.1	17.3	9781927	9781619	53.1	18.1	0.2	344
B240	526044	1010421	9.1	17.1	9781969	9781621	52.7	18.0	0.3	383

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B241	524116	1011068	9.1	18.8	9781999	9781623	57.6	19.7	0.2	414
B242	522855	1009954	9.1	17.1	9781988	9781620	52.6	17.9	0.2	403
B243	522436	1008753	9.1	16.5	9781963	9781617	50.7	17.3	0.5	380
B244	524117	1008073	9.1	18.5	9781972	9781615	57.0	19.4	0.4	395
B245	525293	1007150	9.1	17.5	9781920	9781613	53.9	18.4	0.4	343
B246	524828	1012666	9.2	17.9	9782017	9781627	55.0	18.8	0.0	426
B247	525580	1014108	9.2	16.2	9781989	9781631	49.7	17.0	0.6	392
B248	527253	1014780	9.2	14.4	9781969	9781632	44.2	15.1	0.1	366
B249	527377	1016118	9.2	14.7	9781944	9781636	45.2	15.4	0.1	338
B250	526213	1017664	9.2	15.1	9781942	9781640	46.3	15.8	0.2	333
B251	524906	1018936	9.2	14.1	9781962	9781643	43.3	14.8	0.0	348
B252	523163	1019003	9.2	13.8	9782002	9781643	42.4	14.5	0.0	386
B253	521362	1018450	9.2	13.4	9782004	9781642	41.1	14.0	0.0	390
B254	519605	1019153	9.2	12.2	9781998	9781644	37.5	12.8	0.0	379
B255	517875	1019790	9.2	12.2	9781933	9781645	37.5	12.8	0.0	313
B256	515888	1020364	9.2	13.6	9781874	9781647	41.8	14.2	0.1	255
B257	521704	1025379	9.3	13.6	9782044	9781660	41.6	14.2	0.1	412
B258	521093	1023560	9.3	13.7	9782026	9781655	42.2	14.4	0.0	399
B259	520127	1021870	9.2	14.6	9782040	9781651	45.0	15.3	0.0	419
B260	519171	1020151	9.2	15.0	9781998	9781646	46.2	15.8	0.0	383
B261	518222	1018438	9.2	15.0	9781915	9781642	46.0	15.7	0.0	304
B262	517277	1016622	9.2	14.5	9781857	9781637	44.4	15.1	0.1	250
B263	517196	1014755	9.2	15.6	9781836	9781632	47.9	16.3	0.0	236
B264	517629	1012851	9.2	14.8	9781831	9781627	45.4	15.5	0.0	234
B265	518443	1010820	9.1	16.9	9781838	9781622	51.8	17.7	0.2	250
B266	519896	1009929	9.1	15.3	9781883	9781620	47.0	16.0	0.0	294
B267	521631	1008887	9.1	16.2	9781943	9781617	49.7	16.9	0.0	358
B268	536731	1009327	9.1	21.5	9781923	9781618	66.2	22.6	0.0	348
B269	535565	1010344	9.1	18.0	9781917	9781621	55.3	18.8	0.0	332
B270	533988	1011091	9.1	15.7	9781905	9781623	48.3	16.5	0.8	315
B271	533042	1012691	9.2	18.7	9781890	9781627	57.4	19.6	0.7	301
B272	531536	1013680	9.2	15.1	9781897	9781629	46.4	15.8	0.9	299
B273	530099	1014741	9.2	13.7	9781890	9781632	42.1	14.4	0.5	286
B274	528567	1015860	9.2	13.9	9781908	9781635	42.7	14.6	0.0	301
B275	536205	1011862	9.2	17.1	9781924	9781625	52.6	17.9	0.0	334
B276	537891	1012826	9.2	16.6	9781920	9781627	51.0	17.4	0.0	326
B277	539510	1014001	9.2	17.3	9781916	9781630	53.1	18.1	0.5	322
B278	541012	1014115	9.2	18.4	9781908	9781630	56.5	19.3	0.1	315
B279	540659	1012103	9.2	18.1	9781916	9781625	55.6	19.0	0.1	327
B280	542897	1013032	9.2	19.3	9781894	9781628	59.2	20.2	0.0	305
B281	541710	1014460	9.2	17.7	9781904	9781631	54.5	18.6	0.2	308
B282	542388	1015615	9.2	17.4	9781907	9781634	53.4	18.2	0.1	308
B283	544331	1016100	9.2	17.4	9781927	9781636	53.3	18.2	0.1	326
B284	544909	1014945	9.2	17.4	9781925	9781633	53.3	18.2	0.0	327
B285	544431	1013203	9.2	17.9	9781893	9781628	54.9	18.7	0.2	301
B286	545489	1015093	9.2	18.7	9781924	9781633	57.4	19.6	0.1	329
B287	547377	1015318	9.2	19.1	9781941	9781634	58.6	20.0	0.1	346
B288	549236	1015507	9.2	18.6	9781915	9781634	57.2	19.5	0.1	318
B289	551159	1015180	9.2	19.0	9781898	9781633	58.4	19.9	0.1	303
B290	552974	1011884	9.2	19.6	9781858	9781625	60.3	20.6	0.1	273
B291	553228	1010880	9.1	19.9	9781840	9781622	61.1	20.8	0.1	258

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
B292	553374	1010098	9.1	19.6	9781835	9781620	60.2	20.5	0.9	255
B293	554600	1009089	9.1	17.0	9781813	9781618	52.1	17.8	0.0	230
B294	555579	1008907	9.1	18.4	9781790	9781617	56.5	19.3	0.2	210
B295	556192	1009400	9.1	17.4	9781793	9781618	53.4	18.2	1.4	211
B296	556573	1010195	9.1	15.4	9781808	9781620	47.2	16.1	0.8	220
T1	538398	954405	8.6	21.0	9781552	9781481	64.5	22.0	0.2	114
T2	538675	953380	8.6	19.8	9781542	9781478	60.8	20.7	0.5	104
T3	538927	952310	8.6	17.2	9781534	9781476	52.7	18.0	0.4	93
T4	539196	951268	8.6	19.5	9781537	9781473	60.0	20.5	0.5	104
T5	538816	950302	8.6	25.1	9781537	9781471	77.3	26.3	0.4	117
T6	538327	949335	8.6	23.5	9781549	9781469	72.3	24.7	0.2	129
T7	539050	950318	8.6	20.1	9781538	9781471	61.8	21.1	0.5	108
T8	539657	951211	8.6	10.9	9781536	9781473	33.5	11.4	0.1	85
T9	540118	952192	8.6	16.0	9781511	9781476	49.3	16.8	0.4	68
T10	540534	953180	8.6	8.0	9781471	9781478	24.5	8.4	0.4	9
T11	540411	954232	8.6	6.0	9781490	9781480	18.4	6.3	0.2	22
T12	541057	954400	8.6	18.3	9781447	9781481	56.1	19.1	0.5	3
T13	541705	954862	8.6	19.6	9781427	9781482	60.2	20.5	0.5	-14
T14	541458	955871	8.6	17.8	9781430	9781484	54.5	18.6	0.8	-18
T15	542591	954243	8.6	32.1	9781404	9781480	98.7	33.7	0.6	-11
T16	543567	953635	8.6	40.6	9781379	9781479	124.6	42.5	1.0	-17
T17	544390	953700	8.6	46.4	9781275	9781479	142.5	48.6	1.2	-109
T18	545055	954490	8.6	63.8	9781252	9781481	196.0	66.9	2.9	-97
T19	545856	954914	8.6	72.7	9781221	9781482	223.4	76.2	1.7	-113
T20	546576	955346	8.6	87.5	9781174	9781483	268.8	91.7	2.5	-130
T21	546984	956188	8.6	102	9781136	9781485	313.1	106.8	3.0	-140
T22	547804	956657	8.7	124	9781083	9781486	382.0	130.3	3.0	-148
T23	548652	957222	8.7	156	9780991	9781488	479.8	163.6	3.1	-177
T24	549106	958005	8.7	187	9780924	9781490	572.8	195.4	5.5	-183
T25	541698	953851	8.6	14.0	9781453	9781480	43.0	14.7	0.4	2
T26	541911	953099	8.6	15.9	9781440	9781478	48.8	16.6	0.5	-5
T27	541847	952001	8.6	14.5	9781446	9781475	44.6	15.2	0.4	0
T28	541978	950964	8.6	26.6	9781442	9781473	81.7	27.9	0.3	23
T29	542650	950305	8.6	29.5	9781441	9781471	90.6	30.9	0.3	30
T30	543351	950210	8.6	26.1	9781429	9781471	80.1	27.3	0.4	12
T31	543782	950972	8.6	38.3	9781366	9781473	117.8	40.2	0.3	-29
T32	544623	951226	8.6	25.3	9781386	9781473	77.7	26.5	0.7	-35
T33	544254	951916	8.6	27.2	9781386	9781475	83.6	28.5	0.9	-33
T34	543362	952577	8.6	20.7	9781413	9781476	63.6	21.7	0.8	-21
T35	542508	953220	8.6	21.1	9781432	9781478	65.0	22.2	0.5	-3
T36	542505	955906	8.6	24.7	9781382	9781485	75.8	25.9	1.3	-52
T37	543225	956551	8.7	34.4	9781334	9781486	105.8	36.1	2.9	-80
T38	543897	957076	8.7	53.8	9781268	9781487	165.2	56.3	3.3	-108
T39	544749	957199	8.7	87.1	9781173	9781488	267.5	91.2	6.0	-132
T40	539522	956780	8.7	17.1	9781498	9781487	52.6	17.9	0.3	46
T41	539060	957755	8.7	4.9	9781520	9781489	15.0	5.1	0.3	41
T42	538811	958789	8.7	5.6	9781528	9781492	17.1	5.8	0.3	48
T43	538655	959820	8.7	2.4	9781538	9781494	7.5	2.6	0.3	50
T44	538501	960847	8.7	5.2	9781541	9781497	16.1	5.5	0.6	55
T45	538503	961938	8.7	2.6	9781537	9781499	8.1	2.8	0.6	44
T46	538513	963001	8.7	5.5	9781529	9781502	16.8	5.7	0.5	39

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
T47	539451	961970	8.7	27.2	9781458	9781499	83.4	28.4	0.4	14
T48	540380	961677	8.7	32.1	9781402	9781499	98.7	33.7	0.8	-31
T49	540811	959984	8.7	19.8	9781454	9781494	61.0	20.8	1.5	1
T50	540614	958073	8.7	19.4	9781446	9781490	59.7	20.4	0.6	-4
T51	541151	956432	8.6	23.4	9781434	9781486	71.7	24.5	0.5	-4
T52	537628	956289	8.6	7.9	9781586	9781485	24.3	8.3	0.1	117
T53	536651	958098	8.7	4.8	9781613	9781490	14.7	5.0	0.1	133
T54	536505	960192	8.7	11.7	9781627	9781495	36.0	12.3	0.1	156
T55	536512	962277	8.7	0.1	9781627	9781500	0.2	0.1	0.2	128
T56	537491	962563	8.7	0.2	9781586	9781501	0.6	0.2	0.2	86
T57	537323	954801	8.6	17.3	9781605	9781482	53.0	18.1	0.1	158
T58	536419	955247	8.6	15.5	9781640	9781483	47.7	16.3	0.1	189
T59	535449	955679	8.6	12.7	9781670	9781484	39.0	13.3	0.1	212
T60	534691	956387	8.6	13.8	9781680	9781486	42.3	14.4	0.1	222
T61	533924	957060	8.7	10.5	9781690	9781487	32.1	11.0	0.1	224
T62	532883	957179	8.7	8.2	9781732	9781488	25.1	8.6	0.0	261
T63	532263	956788	8.7	5.9	9781733	9781487	18.0	6.1	0.1	258
T64	532666	955926	8.6	8.0	9781720	9781485	24.4	8.3	0.0	252
T65	532471	954948	8.6	9.0	9781727	9781482	27.7	9.5	0.0	263
T66	531882	954349	8.6	8.8	9781736	9781481	27.1	9.3	0.0	273
T67	531347	953957	8.6	14.6	9781727	9781480	45.0	15.3	0.0	277
T68	532177	953513	8.6	9.2	9781731	9781479	28.1	9.6	0.1	271
T69	533232	953247	8.6	13.0	9781697	9781478	39.8	13.6	0.1	245
T70	534206	952846	8.6	21.0	9781659	9781477	64.5	22.0	0.5	224
T71	535136	952555	8.6	25.2	9781642	9781476	77.4	26.4	0.6	217
T72	536446	953543	8.6	19.6	9781642	9781479	60.2	20.5	0.1	203
A53	516330	1030206	9.3	26.9	9782028	9781672	82.7	28.2	5.3	415
A54	516764	1029428	9.3	31.9	9782019	9781670	98.1	33.5	4.9	419
A55	517707	1029075	9.3	30.4	9782026	9781669	93.5	31.9	4.1	422
A56	518617	1029120	9.3	37.1	9781989	9781669	113.9	38.8	6.3	401
A57	519315	1028410	9.3	25.8	9782015	9781667	79.3	27.1	5.9	405
A58	519772	1027536	9.3	24.3	9782025	9781665	74.7	25.5	4.2	413
A59	520605	1027022	9.3	18.5	9782037	9781664	56.7	19.3	6.2	417
A60	521653	1026912	9.3	18.6	9782010	9781664	57.1	19.5	4.4	389
A61	522579	1027199	9.3	17.6	9782017	9781664	54.2	18.5	3.6	392
A62	522515	1028188	9.3	18.8	9782034	9781667	57.8	19.7	7.8	413
A63	522366	1029197	9.3	22.7	9782045	9781670	69.7	23.8	11.5	433
A64	522263	1030220	9.3	28.2	9782051	9781672	86.6	29.5	14.8	450
A124	516038	1029245	9.3	13.5	9782031	9781670	41.4	14.1	0.3	389
A125	516220	1028223	9.3	18.0	9782026	9781667	55.3	18.9	0.2	396
A126	516343	1027136	9.3	15.0	9782025	9781664	46.1	15.7	0.2	392
A127	516425	1026126	9.3	14.6	9782014	9781662	45.0	15.3	0.2	382
A128	516530	1025106	9.3	14.3	9781992	9781659	43.9	15.0	0.1	362
A129	516785	1024102	9.3	15.1	9781969	9781656	46.3	15.8	0.1	344
A130	516288	1023226	9.3	14.2	9781933	9781654	43.7	14.9	0.0	308
A131	515727	1022341	9.2	13.9	9781897	9781652	42.6	14.5	0.0	274
A132	515327	1021426	9.2	14.0	9781869	9781649	43.1	14.7	0.1	248
A133	515263	1020408	9.2	15.4	9781850	9781647	47.2	16.1	0.2	234
A134	515311	1019319	9.2	17.7	9781835	9781644	54.4	18.6	0.2	227
A135	515466	1018289	9.2	21.7	9781826	9781641	66.6	22.7	0.3	228
A136	515619	1017270	9.2	18.1	9781833	9781639	55.7	19.0	0.2	232



Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
A137	515541	1016236	9.2	13.5	9781825	9781636	41.6	14.2	0.2	217
A138	515103	1015365	9.2	14.3	9781819	9781634	44.0	15.0	0.2	214
A139	514934	1014364	9.2	14.5	9781811	9781631	44.5	15.2	0.1	210
A140	515323	1013409	9.2	14.7	9781802	9781629	45.1	15.4	0.1	203
A141	515893	1012528	9.2	14.9	9781800	9781626	45.7	15.6	0.0	204
A142	516463	1011713	9.2	14.6	9781801	9781624	44.7	15.3	0.0	206
A143	517093	1010802	9.1	14.9	9781802	9781622	45.7	15.6	0.0	210
A144	517516	1009907	9.1	15.0	9781805	9781620	46.2	15.8	0.1	216
A145	517592	1008892	9.1	15.2	9781802	9781617	46.8	16.0	0.0	215
A146	517766	1006576	9.1	15.5	9781790	9781611	47.5	16.2	0.0	210
A147	518005	1005529	9.1	15.8	9781789	9781609	48.5	16.5	0.1	213
A148	518544	1004629	9.1	13.8	9781790	9781606	42.4	14.4	0.1	212
A149	519075	1003753	9.1	13.9	9781788	9781604	42.8	14.6	0.0	212
A150	519328	1002780	9.1	15.6	9781783	9781602	48.0	16.4	0.5	214
A151	519238	1001740	9.1	15.8	9781776	9781599	48.4	16.5	0.4	209
A152	519034	1000062	9.0	16.0	9781776	9781595	49.3	16.8	0.1	214
A153	518930	998990	9.0	16.3	9781779	9781592	49.9	17.0	0.2	220
A154	519202	998009	9.0	15.3	9781780	9781590	47.1	16.1	0.3	221
A155	519746	997204	9.0	16.1	9781774	9781587	49.4	16.8	0.1	220
A156	520327	996333	9.0	16.3	9781762	9781585	50.1	17.1	0.3	210
A157	520939	995424	9.0	18.1	9781746	9781583	55.5	18.9	0.3	200
A158	521492	994590	9.0	17.2	9781734	9781581	52.8	18.0	0.3	188
A159	522133	993725	9.0	17.3	9781725	9781579	53.3	18.2	0.3	182
A160	523442	993384	9.0	17.2	9781724	9781578	52.7	18.0	0.6	182
A161	524448	993029	9.0	17.3	9781748	9781577	53.1	18.1	0.7	206
A162	524821	991817	9.0	15.4	9781754	9781574	47.2	16.1	0.2	212
A163	525541	991067	9.0	12.9	9781789	9781572	39.5	13.5	0.5	243
A164	526214	990318	9.0	11.7	9781834	9781570	35.9	12.2	0.5	288
A165	526568	989348	9.0	12.9	9781845	9781568	39.7	13.5	0.2	304
A166	527284	988649	8.9	12.5	9781855	9781566	38.5	13.1	0.4	315
A167	528243	988360	8.9	12.1	9781855	9781565	37.3	12.7	0.1	315
A168	529162	987808	8.9	12.2	9781848	9781564	37.6	12.8	0.1	309
A169	529850	987095	8.9	11.9	9781839	9781562	36.6	12.5	0.3	301
A170	530580	986356	8.9	14.7	9781813	9781560	45.0	15.3	0.3	283
A171	530944	985364	8.9	17.0	9781824	9781558	52.4	17.9	0.2	301
A172	531191	984385	8.9	16.6	9781792	9781555	51.0	17.4	0.2	270
A173	531461	983351	8.9	20.5	9781769	9781553	62.9	21.5	0.2	258
A174	532142	982600	8.9	23.4	9781761	9781551	71.8	24.5	0.2	257
A175	532566	981658	8.9	18.4	9781751	9781549	56.6	19.3	0.1	240
A176	532813	980662	8.9	26.7	9781739	9781546	82.1	28.0	0.1	247
A177	533064	979638	8.9	26.3	9781726	9781543	80.7	27.5	0.2	236
A178	533306	978665	8.9	31.3	9781703	9781541	96.0	32.7	0.3	225
A179	533557	977649	8.8	38.3	9781681	9781539	117.8	40.2	0.2	221
A180	533801	976659	8.8	44.5	9781742	9781536	136.6	46.6	0.2	297
A181	534051	975643	8.8	36.4	9781707	9781534	111.9	38.2	0.4	248
A182	534303	974621	8.8	25.1	9781716	9781531	77.1	26.3	0.2	236
A183	534494	973653	8.8	27.8	9781694	9781529	85.3	29.1	0.1	222
A184	534483	972581	8.8	35.0	9781687	9781526	107.6	36.7	0.3	232
A185	534583	971561	8.8	34.6	9781684	9781524	106.2	36.2	0.4	231
A186	535066	970659	8.8	24.5	9781685	9781521	75.2	25.7	0.3	214
A187	530142	988695	8.9	14.6	9781839	9781566	44.8	15.3	0.2	303

Table A.1 : (continued)

STN	East	North	Latitude	H m	g_obs g.u.	g_lat g.u.	FAC g.u.	BC g.u.	TC g.u.	BA g.u.
A188	530879	989418	9.0	13.8	9781847	9781568	42.5	14.5	0.2	307
A189	531639	990164	9.0	16.7	9781848	9781570	51.3	17.5	0.2	312
A190	532610	991116	9.0	17.9	9781838	9781572	55.0	18.8	0.5	302
A191	533376	991862	9.0	16.5	9781822	9781574	50.6	17.2	0.7	282
A192	534122	992590	9.0	15.7	9781812	9781576	48.2	16.4	0.3	268
A193	534861	993317	9.0	14.8	9781810	9781578	45.5	15.5	0.3	263
A194	535565	994009	9.0	14.1	9781818	9781579	43.4	14.8	0.4	267
A195	536336	994760	9.0	13.6	9781816	9781581	41.7	14.2	0.7	263
A196	537076	995486	9.0	13.0	9781809	9781583	40.0	13.7	0.5	253
A197	537818	996210	9.0	14.2	9781821	9781585	43.7	14.9	0.2	265
A198	538611	996884	9.0	13.5	9781822	9781587	41.4	14.1	0.3	263
A199	539380	997527	9.0	12.9	9781812	9781588	39.7	13.5	0.4	250
A200	540201	998211	9.0	23.1	9781791	9781590	71.1	24.2	0.5	249
A201	541009	998882	9.0	21.4	9781795	9781592	65.7	22.4	0.9	247
A202	541766	999515	9.0	21.4	9781795	9781593	65.7	22.4	0.4	245
A203	542561	1000167	9.0	14.2	9781790	9781595	43.7	14.9	0.2	224
A204	543365	1000842	9.1	13.8	9781780	9781597	42.3	14.4	0.4	212
A205	544153	1001499	9.1	9.4	9781771	9781598	28.8	9.8	0.6	192

## APPENDIX B

### Density of rock sample

Table B.1: Density of rock sample in the study area

Sample	E	N	Density kg/m <sup>3</sup>	Rock type	Sample	E	N	Density kg/m <sup>3</sup>	Rock type
s1-1	545664	976674	2440	Mudstone	s7-2	566596	988773	2572	Sandstone
s1-2	-- "	-- "	2358	-- "	s7-3	-- "	-- "	2583	-- "
s1-4	-- "	-- "	2322	-- "	s7-4	-- "	-- "	2542	-- "
s1-5	-- "	-- "	2394	-- "	s7-5	-- "	-- "	2588	-- "
s1-6	-- "	-- "	2386	-- "	s7-6	-- "	-- "	2619	-- "
s2-1	546916	978165	2650	Granite	s7-7	-- "	-- "	2542	-- "
s2-2	-- "	-- "	2604	-- "	s7-8	-- "	-- "	2524	-- "
s2-3	-- "	-- "	2617	-- "	s7-9	-- "	-- "	2611	-- "
s2-4	-- "	-- "	2595	-- "	s7-10	-- "	-- "	2640	-- "
s2-5	-- "	-- "	2594	-- "	s7-11	-- "	-- "	2613	-- "
s2-7	-- "	-- "	2605	-- "	s7-12	-- "	-- "	2631	-- "
s2-8	-- "	-- "	2588	-- "	s8-18	566952	988797	2642	Limestone
s2-9	-- "	-- "	2645	-- "	s8-6	-- "	-- "	2642	-- "
s2-10	-- "	-- "	2617	-- "	s8-7	-- "	-- "	2646	-- "
s2-11	-- "	-- "	2614	-- "	s8-20	-- "	-- "	2648	-- "
s3-10	548110	979258	2343	Mudstone	s8-21	-- "	-- "	2659	-- "
s3-7	-- "	-- "	2457	-- "	s8-4	-- "	-- "	2659	-- "
s3-8	-- "	-- "	2513	-- "	s8-15	-- "	-- "	2661	-- "
s3-5	-- "	-- "	2528	-- "	s8-17	-- "	-- "	2662	-- "
s3-9	-- "	-- "	2630	-- "	s8-16	-- "	-- "	2667	-- "
s3-13	-- "	-- "	2633	-- "	s8-22	-- "	-- "	2669	-- "
s3-6	-- "	-- "	2646	-- "	s8-9	-- "	-- "	2669	-- "
s3-2	-- "	-- "	2733	-- "	s8-14	-- "	-- "	2671	-- "
s3-12	-- "	-- "	2740	-- "	s8-2	-- "	-- "	2673	-- "
s3-4	-- "	-- "	2753	-- "	s8-5	-- "	-- "	2674	-- "
s3-1	-- "	-- "	2780	-- "	s8-24	-- "	-- "	2675	-- "
s3-3	-- "	-- "	2859	-- "	s8-10	-- "	-- "	2679	-- "
s3-11	-- "	-- "	2918	-- "	s8-23	-- "	-- "	2687	-- "
3g-1	548060	979258	2657	Granite	s8-8	-- "	-- "	2690	-- "
3g-2	-- "	-- "	2650	-- "	s8-1	-- "	-- "	2702	-- "
3g-4	-- "	-- "	2644	-- "	s8-13	-- "	-- "	2705	-- "
3g-5	-- "	-- "	2659	-- "	s8-19	-- "	-- "	2727	-- "
3g-6	-- "	-- "	2620	-- "	s8-3	-- "	-- "	2757	-- "

Table B.1: (continued)

Sample	E	N	Density kg/m <sup>3</sup>	Rock type	Sample	E	N	Density kg/m <sup>3</sup>	Rock type
s4-1	549132	989469	2580	Sandstone	s9-10	566644	983453	2388	Sandstone
s4-2	-- " --	-- " --	2589	-- " --	s9-13	-- " --	-- " --	2395	-- " --
s4-3	-- " --	-- " --	2624	-- " --	s9-14	-- " --	-- " --	2404	-- " --
s4-4	-- " --	-- " --	2585	-- " --	s9-9	-- " --	-- " --	2429	-- " --
s4-5	549132	989469	2583	Sandstone	s9-12	566644	983453	2450	Sandstone
s4-6	-- " --	-- " --	2561	-- " --	s9-11	-- " --	-- " --	2453	-- " --
s4-8	-- " --	-- " --	2616	-- " --	s9-1	-- " --	-- " --	2518	-- " --
s4-9	-- " --	-- " --	2588	-- " --	s9-5	-- " --	-- " --	2538	-- " --
s4-10	-- " --	-- " --	2592	-- " --	s9-2	-- " --	-- " --	2549	-- " --
s5-2	554668	994209	2627	Limestone	s9-6	-- " --	-- " --	2555	-- " --
s5-3	-- " --	-- " --	2705	-- " --	s9-7	-- " --	-- " --	2597	-- " --
s5-11	-- " --	-- " --	2709	-- " --	s9-4	-- " --	-- " --	2606	-- " --
s5-10	-- " --	-- " --	2727	-- " --	s9-3	-- " --	-- " --	2633	-- " --
s5-7	-- " --	-- " --	2735	-- " --	s9-8	-- " --	-- " --	2641	-- " --
s5-4	-- " --	-- " --	2744	-- " --	10s-1	567074	976176	2611	Sandstone
s5-9	-- " --	-- " --	2754	-- " --	10s-2	-- " --	-- " --	2612	-- " --
s5-14	-- " --	-- " --	2788	-- " --	10s-3	-- " --	-- " --	2596	-- " --
s5-1	-- " --	-- " --	2794	-- " --	10s-4	-- " --	-- " --	2631	-- " --
s5-8	-- " --	-- " --	2797	-- " --	10s-5	-- " --	-- " --	2615	-- " --
s5-12	-- " --	-- " --	2801	-- " --	10s-6	-- " --	-- " --	2628	-- " --
s5-6	-- " --	-- " --	2803	-- " --	10s-7	-- " --	-- " --	2624	-- " --
s5-5	-- " --	-- " --	2804	-- " --	10s-8	-- " --	-- " --	2640	-- " --
s5-13	-- " --	-- " --	2818	-- " --	10g-1	-- " --	-- " --	2628	Granite
s6-1	566727	990910	2568	Sandstone	10g-2	-- " --	-- " --	2619	-- " --
s6-2	-- " --	-- " --	2605	-- " --	10g-3	-- " --	-- " --	2606	-- " --
s6-3	-- " --	-- " --	2612	-- " --	10g-4	-- " --	-- " --	2616	-- " --
s6-6	-- " --	-- " --	2601	-- " --	10g-5	-- " --	-- " --	2633	-- " --
s6-7	-- " --	-- " --	2584	-- " --	10g-6	-- " --	-- " --	2601	-- " --
s6-8	-- " --	-- " --	2569	-- " --	10g-7	-- " --	-- " --	2609	-- " --
s6-9	-- " --	-- " --	2623	-- " --	10g-8	-- " --	-- " --	2633	-- " --
s6-10	-- " --	-- " --	2597	-- " --	10g-9	-- " --	-- " --	2626	-- " --
s6-11	-- " --	-- " --	2578	-- " --	10g-10	-- " --	-- " --	2612	-- " --
s6-12	-- " --	-- " --	2603	-- " --	10g-11	-- " --	-- " --	2600	-- " --
s7-1	566596	988773	2593	Sandstone	10g-12	-- " --	-- " --	2604	-- " --

## APPENDIX C

The parameters for gravity modeled which were used in Geo Vista AB-GMM, version 1.31.

-----				539735.3	149.2	;	---	"	---	9	--	"	--
33			;Total number of bodies in model	542414.3	149.2	;	---	"	---	10	--	"	--
	0.0		;Magnitude of terrestrial field	542409.1	59.0	;	---	"	---	11	--	"	--
	0.0		;Inclination of terrestrial field	544083.5	60.8	;	---	"	---	12	--	"	--
	0.0		;Declination of terrestrial field	544083.5	231.9	;	---	"	---	13	--	"	--
	2620.0		;Surrounding density	542414.3	231.0	;	---	"	---	14	--	"	--
	.000001		;Surrounding susceptibility	542414.3	346.3	;	---	"	---	15	--	"	--
-----				539735.3	346.3	;	---	"	---	16	--	"	--
1			;Internal body number	539726.7	13000.0	;	---	"	---	17	--	"	--
	2770.0		;density of body, 0=surrounding	499820.0	13000.0	;	---	"	---	18	--	"	--
	.000000		;suscept. of body, 0=surrounding	-----									
	.0000		;Remanent/induced magnetization	2									
	.0		;Inclination of remanence, positive down	2710.0									
	.0		;Declination of remanence pos. clockwise	.000000									
21			;Surrounding body, = 21 if none	.0000									
	20057.1		;strike length	.0									
	949961.8		;N-coordinate of body reference point	.0									
	.0		;strike angle from North anti-clockw.	21									
				20057.1									
18			;Number of corners in body	949961.8									
	499820.0	560.3	;E-coord & depth of corner	.0									
	516576.5	560.5	;	---	"	---	2	(with	strike=0.0)				
	516561.9	757.8	;	---	"	---	3	--	"	--			
	526452.9	757.8	;	---	"	---	4	--	"	--			
	526452.9	686.6	;	---	"	---	5	--	"	--			
	530437.6	686.6	;	---	"	---	6	--	"	--			
	530437.6	648.5	;	---	"	---	7	--	"	--			
	539726.7	648.5	;	---	"	---	8	--	"	--			
				25									
			;Number of corners in body	499820.0	287.4								
			;E-coord & depth of corner	516561.9	287.4	;	---	"	---	2	(with	strike=0.0)	
				516561.9	529.9	;	---	"	---	3	--	"	--
				526452.9	529.9	;	---	"	---	4	--	"	--
				526452.9	537.0	;	---	"	---	5	--	"	--



516561.9	0	;E-coord & depth of corner	1
539726.9	0.5	; --- " ---	2 (with strike=0.0)
539726.7	47.1	; --- " ---	3 -- " --
530459.1	47.1	; --- " ---	4 -- " --
530471.2	94.8	; --- " ---	5 -- " --
529060.7	94.8	; --- " ---	6 -- " --
529060.7	146	; --- " ---	7 -- " --
526429.6	145.7	; --- " ---	8 -- " --
526442.1	244.6	; --- " ---	9 -- " --
524262.8	245.9	; --- " ---	10 -- " --
524260.4	315.8	; --- " ---	11 -- " --
516561.9	316.4	; --- " ---	12 -- " --

-----

5		;Internal body number
2770.0		;density of body, 0=surrounding
.000000		;suscept. of body, 0=surrounding
.0000		;Remanent/induced magnetization
.0		;Inclination of remanence, positive down
.0		;Declination of remanence pos. clockwise
21		;Surrounding body, = 21 if none
10000.0		;strike length
965000.0		;N-coordinate of body reference point
.0		;strike angle from North anti-clockw.

32		;Number of corners in body	
500578.2	950.7	;E-coord & depth of corner	1
515988.5	947.3	; --- " ---	2 (with strike=0.0)
515988.5	982.4	; --- " ---	3 -- " --
520963.8	982.4	; --- " ---	4 -- " --
520963.8	933.2	; --- " ---	5 -- " --
524608.4	931.6	; --- " ---	6 -- " --
524608.4	991.0	; --- " ---	7 -- " --
530126.7	991.0	; --- " ---	8 -- " --
530126.7	780.5	; --- " ---	9 -- " --

531053.6	780.5	; --- " ---	10 -- " --
531053.6	761.3	; --- " ---	11 -- " --
533105.7	761.3	; --- " ---	12 -- " --
533105.7	740.8	; --- " ---	13 -- " --
534132.0	740.8	; --- " ---	14 -- " --
534132.0	634.2	; --- " ---	15 -- " --
536927.3	634.2	; --- " ---	16 -- " --
536906.3	154.8	; --- " ---	17 -- " --
539392.3	154.8	; --- " ---	18 -- " --
539392.3	55.3	; --- " ---	19 -- " --
544670.2	51.5	; --- " ---	20 -- " --
544670.2	105.8	; --- " ---	21 -- " --
539385.9	107.8	; --- " ---	22 -- " --
539403.4	437.8	; --- " ---	23 -- " --
536948.7	440.8	; --- " ---	24 -- " --
537014.1	766.2	; --- " ---	25 -- " --
534083.9	766.2	; --- " ---	26 -- " --
534083.9	901.0	; --- " ---	27 -- " --
532338.1	899.8	; --- " ---	28 -- " --
532303.9	1084.9	; --- " ---	29 -- " --
537058.6	1084.9	; --- " ---	30 -- " --
536927.3	13000.0	; --- " ---	31 -- " --
500578.2	13000.0	; --- " ---	32 -- " --

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6		;Internal body number
2710.0		;density of body, 0=surrounding
.000000		;suscept. of body, 0=surrounding
.0000		;Remanent/induced magnetization
.0		;Inclination of remanence, positive down
.0		;Declination of remanence pos. clockwise
21		;Surrounding body, = 21 if none
10000.0		;strike length
965000.0		;N-coordinate of body reference point
.0		;strike angle from North anti-clockw.

38					
					;Number of corners in body
500578.2	599.4			1	;E-coord & depth of corner
515935.4	605.9	; --- " ---		2 (with strike=0.0)	
515934.4	672.9	; --- " ---		3	-- " --
520909.8	672.9	; --- " ---		4	-- " --
520909.8	616.7	; --- " ---		5	-- " --
524608.4	616.6	; --- " ---		6	-- " --
524608.4	690.7	; --- " ---		7	-- " --
530126.7	690.7	; --- " ---		8	-- " --
530126.7	587.0	; --- " ---		9	-- " --
531053.6	587.0	; --- " ---		10	-- " --
531053.6	548.5	; --- " ---		11	-- " --
533105.7	548.5	; --- " ---		12	-- " --
533105.7	413.6	; --- " ---		13	-- " --
534132.0	413.6	; --- " ---		14	-- " --
534132.0	254.2	; --- " ---		15	-- " --
536927.3	254.2	; --- " ---		16	-- " --
536927.3	.0	; --- " ---		17	-- " --
544670.2	.0	; --- " ---		18	-- " --
544670.2	51.5	; --- " ---		19	-- " --
539347.6	53.1	; --- " ---		20	-- " --
539347.6	147.6	; --- " ---		21	-- " --
536976.4	152.6	; --- " ---		22	-- " --
536927.3	634.2	; --- " ---		23	-- " --
534132.0	634.2	; --- " ---		24	-- " --
534132.0	740.8	; --- " ---		25	-- " --
533105.7	740.8	; --- " ---		26	-- " --
533105.7	761.3	; --- " ---		27	-- " --
531053.6	761.3	; --- " ---		28	-- " --
531053.6	780.5	; --- " ---		29	-- " --
530126.6	780.5	; --- " ---		30	-- " --
530126.6	991.0	; --- " ---		31	-- " --
524608.4	991.0	; --- " ---		32	-- " --

524608.4	931.6	; --- " ---		33	-- " --
520956.8	929.9	; --- " ---		34	-- " --
520956.8	975.5	; --- " ---		35	-- " --
515974.3	975.5	; --- " ---		36	-- " --
516013.3	950.1	; --- " ---		37	-- " --
500578.2	950.7	; --- " ---		38	-- " --

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7					;Internal body number
2560.0					;density of body, 0=surrounding
.000000					;suscept. of body, 0=surrounding
.0000					;Remanent/induced magnetization
.0					;Inclination of remanence, positive down
.0					;Declination of remanence pos. clockwise
21					;Surrounding body, = 21 if none
10000.0					;strike length
965000.0					;N-coordinate of body reference point
.0					;strike angle from North anti-clockw.
34					;Number of corners in body
500578.2	.0			1	;E-coord & depth of corner
515886.9	.0	; --- " ---		2 (with strike=0.0)	
515935.4	367.9	; --- " ---		3	-- " --
520879.0	367.9	; --- " ---		4	-- " --
520879.0	302.1	; --- " ---		5	-- " --
524608.4	301.1	; --- " ---		6	-- " --
524608.4	363.5	; --- " ---		7	-- " --
530126.7	363.5	; --- " ---		8	-- " --
530126.7	286.9	; --- " ---		9	-- " --
531053.6	286.9	; --- " ---		10	-- " --
531053.6	204.8	; --- " ---		11	-- " --
533105.7	204.8	; --- " ---		12	-- " --
533105.7	111.3	; --- " ---		13	-- " --
534029.7	111.3	; --- " ---		14	-- " --
534038.8	33.3	; --- " ---		15	-- " --



535301.1	33.3	;	---	16	--" --
535301.1	.0	;	---	17	--" --
536927.3	.0	;	---	18	--" --
536927.3	254.2	;	---	19	--" --
534132.0	254.2	;	---	20	--" --
534132.0	413.6	;	---	21	--" --
533105.7	413.6	;	---	22	--" --
533105.7	548.5	;	---	23	--" --
531053.6	548.5	;	---	24	--" --
531053.6	587.0	;	---	25	--" --
530126.7	587.0	;	---	26	--" --
530126.7	690.7	;	---	27	--" --
524608.4	690.7	;	---	28	--" --
524608.4	616.6	;	---	29	--" --
520917.9	616.0	;	---	30	--" --
520917.9	671.7	;	---	31	--" --
515974.3	671.7	;	---	32	--" --
515974.3	600.8	;	---	33	--" --
500578.2	599.4	;	---	34	--" --

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8					;Internal body number
2100.0					;density of body, 0=surrounding
.000000					;suscept. of body, 0=surrounding
.0000					;Remanent/induced magnetization
.0					;Inclination of remanence, positive down
.0					;Declination of remanence pos. clockwise
21					;Surrounding body, = 21 if none
10000.0					;strike length
965000.0					;N-coordinate of body refernce point
.0					;strike angle from North anti-clockw.
16					;Number of corners in body
515886.9	.0			1	;E-coord & depth of corner
535256.0	0.5	;	---	2 (with strike=0.0)	

535256.0	33.3	;	---	3	--" --
534038.8	33.3	;	---	4	--" --
534029.7	111.3	;	---	5	--" --
533105.7	111.3	;	---	6	--" --
533108.1	204.7	;	---	7	--" --
531053.6	204.8	;	---	8	--" --
531053.6	286.9	;	---	9	--" --
530126.7	286.9	;	---	10	--" --
530126.7	363.5	;	---	11	--" --
524608.4	363.5	;	---	12	--" --
524608.4	301.1	;	---	13	--" --
520840.1	302.1	;	---	14	--" --
520840.1	367.9	;	---	15	--" --
515974.3	367.9	;	---	16	--" --

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9					;Internal body number
2770.0					;density of body, 0=surrounding
.000000					;suscept. of body, 0=surrounding
.0000					;Remanent/induced magnetization
.0					;Inclination of remanence, positive down
.0					;Declination of remanence pos. clockwise
21					;Surrounding body, = 21 if none
10000.0					;strike length
975000.0					;N-coordinate of body refernce point
.0					;strike angle from North anti-clockw.
26					;Number of corners in body
501206.3	1728.3			1	;E-coord & depth of corner
519502.3	1728.3	;	---	2 (with strike=0.0)	
519502.3	1324.5	;	---	3	--" --
533191.5	1324.5	;	---	4	--" --
533191.5	1013.7	;	---	5	--" --
539001.9	1016.3	;	---	6	--" --
539007.9	527.3	;	---	7	--" --

541578.0	527.7	;	---	"	---	8	--	"	--
541578.0	170.3	;	---	"	---	9	--	"	--
543906.6	172.0	;	---	"	---	10	--	"	--
543890.8	.0	;	---	"	---	11	--	"	--
545519.7	.0	;	---	"	---	12	--	"	--
545535.4	253.3	;	---	"	---	13	--	"	--
543912.7	253.3	;	---	"	---	14	--	"	--
543890.8	549.1	;	---	"	---	15	--	"	--
541614.1	549.1	;	---	"	---	16	--	"	--
541592.5	1212.3	;	---	"	---	17	--	"	--
533177.1	1212.3	;	---	"	---	18	--	"	--
533191.5	1926.8	;	---	"	---	19	--	"	--
537186.7	1926.8	;	---	"	---	20	--	"	--
537186.7	5489.1	;	---	"	---	21	--	"	--
539787.8	5489.1	;	---	"	---	22	--	"	--
539787.8	8707.1	;	---	"	---	23	--	"	--
590121.6	8707.1	;	---	"	---	24	--	"	--
590121.6	13000.0	;	---	"	---	25	--	"	--
501206.3	13000.0	;	---	"	---	26	--	"	--

519502.3	697.3	;	---	"	---	3	--	"	--
532410.1	697.3	;	---	"	---	4	--	"	--
532410.1	177.7	;	---	"	---	5	--	"	--
541578.0	177.7	;	---	"	---	6	--	"	--
541578.0	.0	;	---	"	---	7	--	"	--
543890.8	.0	;	---	"	---	8	--	"	--
543890.8	170.3	;	---	"	---	9	--	"	--
541578.0	170.3	;	---	"	---	10	--	"	--
541578.0	527.7	;	---	"	---	11	--	"	--
539001.9	528.5	;	---	"	---	12	--	"	--
539001.9	1011.6	;	---	"	---	13	--	"	--
533177.1	1013.7	;	---	"	---	14	--	"	--
533191.5	1324.5	;	---	"	---	15	--	"	--
519502.3	1324.5	;	---	"	---	16	--	"	--
519502.3	1728.3	;	---	"	---	17	--	"	--
501206.3	1728.3	;	---	"	---	18	--	"	--

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10									
	2710.0								
	.000000								
	.0000								
	.0								
	.0								
21									
	10000.0								
	975000.0								
	.0								
18									
	501206.3	928.9				1			
	519502.3	928.9	;	---	"	---	2 (with strike=0.0)		

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11									
	2560.0								
	.000000								
	.0000								
	.0								
	.0								
21									
	10000.0								
	975000.0								
	.0								
14									
	501206.3	319.3							
	519340.1	313.9	;	---	"	---	2 (with strike=0.0)		
	519353.4	227.2	;	---	"	---	3	--	--
	522753.1	227.2	;	---	"	---	4	--	--
	522753.1	173.3	;	---	"	---	5	--	--

530064.4 173.8 ; --- " --- 6 -- " --  
 530064.4 62.4 ; --- " --- 7 -- " --  
 541578.0 62.6 ; --- " --- 8 -- " --  
 541578.0 177.7 ; --- " --- 9 -- " --  
 532410.1 177.7 ; --- " --- 10 -- " --  
 532410.1 697.3 ; --- " --- 11 -- " --  
 519502.3 697.3 ; --- " --- 12 -- " --  
 519502.3 928.9 ; --- " --- 13 -- " --  
 501206.3 928.9 ; --- " --- 14 -- " --

2770.0 ;density of body, 0=surrounding  
 .000000 ;suscept. of body, 0=surrounding  
 .0000 ;Remanent/induced magnetization  
 .0 ;Inclination of remanence, positive down  
 .0 ;Declination of remanence pos. clockwise  
 21 ;Surrounding body, = 21 if none  
 10000.0 ;strike length  
 985000.0 ;N-coordinate of body refernce point  
 .0 ;strike angle from North anti-clockw.

-----  
 12 ;Internal body number  
 2100.0 ;density of body, 0=surrounding  
 .000000 ;suscept. of body, 0=surrounding  
 .0000 ;Remanent/induced magnetization  
 .0 ;Inclination of remanence, positive down  
 .0 ;Declination of remanence pos. clockwise  
 21 ;Surrounding body, = 21 if none  
 10000.0 ;strike length  
 975000.0 ;N-coordinate of body refernce point  
 .0 ;strike angle from North anti-clockw.  
 10 ;Number of corners in body  
 501206.3 .0 ;E-coord & depth of corner 1  
 541578.0 .0 ; --- " --- 2 (with strike=0.0)  
 541578.0 62.6 ; --- " --- 3 -- " --  
 530064.4 62.4 ; --- " --- 4 -- " --  
 530050.4 169.4 ; --- " --- 5 -- " --  
 522766.7 173.8 ; --- " --- 6 -- " --  
 522766.7 222.0 ; --- " --- 7 -- " --  
 519339.8 226.0 ; --- " --- 8 -- " --  
 519325.7 331.3 ; --- " --- 9 -- " --  
 501206.3 319.3 ; --- " --- 10 -- " --

28 ;Number of corners in body  
 501258.2 1281.2 ;E-coord & depth of corner 1  
 516642.4 1281.2 ; --- " --- 2 (with strike=0.0)  
 516642.4 1107.0 ; --- " --- 3 -- " --  
 521592.5 1107.0 ; --- " --- 4 -- " --  
 521620.0 1322.1 ; --- " --- 5 -- " --  
 525952.9 1322.1 ; --- " --- 6 -- " --  
 525952.9 1154.6 ; --- " --- 7 -- " --  
 530454.4 1148.6 ; --- " --- 8 -- " --  
 530454.4 1212.1 ; --- " --- 9 -- " --  
 534988.4 1213.4 ; --- " --- 10 -- " --  
 534988.4 1148.5 ; --- " --- 11 -- " --  
 540375.6 1148.5 ; --- " --- 12 -- " --  
 540375.6 878.8 ; --- " --- 13 -- " --  
 545938.6 880.2 ; --- " --- 14 -- " --  
 545938.6 301.6 ; --- " --- 15 -- " --  
 549824.0 301.6 ; --- " --- 16 -- " --  
 549824.0 397.6 ; --- " --- 17 -- " --  
 545938.6 397.6 ; --- " --- 18 -- " --  
 545928.9 1308.9 ; --- " --- 19 -- " --  
 540334.1 1308.9 ; --- " --- 20 -- " --  
 540334.1 1854.6 ; --- " --- 21 -- " --  
 534988.4 1858.2 ; --- " --- 22 -- " --  
 534988.4 4113.5 ; --- " --- 23 -- " --

-----  
 13 ;Internal body number

539966.7 4113.5 ; --- " --- 24 -- " --  
 539966.7 5688.5 ; --- " --- 25 -- " --  
 590691.3 5688.5 ; --- " --- 26 -- " --  
 590691.3 13000.0 ; --- " --- 27 -- " --  
 501258.2 13000.0 ; --- " --- 28 -- " --

-----  
 14 ;Internal body number  
 2710.0 ;density of body, 0=surrounding  
 .000000 ;suscept. of body, 0=surrounding  
 .0000 ;Remanent/induced magnetization  
 .0 ;Inclination of remanence, positive down  
 .0 ;Declination of remanence pos. clockwise  
 21 ;Surrounding body, = 21 if none  
 10000.0 ;strike length  
 985000.0 ;N-coordinate of body reference point  
 .0 ;strike angle from North anti-clockw.

32 ;Number of corners in body  
 501258.4 855.1 ;E-coord & depth of corner 1  
 516642.4 855.1 ; --- " --- 2 (with strike=0.0)  
 516642.4 619.6 ; --- " --- 3 -- " --  
 521551.3 619.6 ; --- " --- 4 -- " --  
 521551.3 818.3 ; --- " --- 5 -- " --  
 525952.9 818.3 ; --- " --- 6 -- " --  
 525952.9 730.6 ; --- " --- 7 -- " --  
 530385.7 730.1 ; --- " --- 8 -- " --  
 530406.3 776.6 ; --- " --- 9 -- " --  
 534988.4 777.6 ; --- " --- 10 -- " --  
 534988.4 697.4 ; --- " --- 11 -- " --  
 540375.6 697.4 ; --- " --- 12 -- " --  
 540375.6 488.6 ; --- " --- 13 -- " --  
 545919.2 488.6 ; --- " --- 14 -- " --  
 545919.2 206.8 ; --- " --- 15 -- " --  
 549824.0 215.7 ; --- " --- 16 -- " --

549824.0 301.6 ; --- " --- 17 -- " --  
 545938.6 301.6 ; --- " --- 18 -- " --  
 545938.6 880.2 ; --- " --- 19 -- " --  
 540375.5 878.8 ; --- " --- 20 -- " --  
 540375.6 1148.5 ; --- " --- 21 -- " --  
 534988.4 1148.5 ; --- " --- 22 -- " --  
 534988.4 1213.4 ; --- " --- 23 -- " --  
 530447.5 1213.9 ; --- " --- 24 -- " --  
 530447.5 1157.5 ; --- " --- 25 -- " --  
 525952.9 1154.6 ; --- " --- 26 -- " --  
 525952.9 1322.1 ; --- " --- 27 -- " --  
 521620.0 1322.1 ; --- " --- 28 -- " --  
 521562.5 1107.0 ; --- " --- 29 -- " --  
 516642.4 1107.0 ; --- " --- 30 -- " --  
 516642.4 1281.2 ; --- " --- 31 -- " --  
 501258.2 1281.2 ; --- " --- 32 -- " --

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 15 ;Internal body number  
 2560.0 ;density of body, 0=surrounding  
 .000000 ;suscept. of body, 0=surrounding  
 .0000 ;Remanent/induced magnetization  
 .0 ;Inclination of remanence, positive down  
 .0 ;Declination of remanence pos. clockwise  
 21 ;Surrounding body, = 21 if none  
 10000.0 ;strike length  
 985000.0 ;N-coordinate of body reference point  
 .0 ;strike angle from North anti-clockw.  
 32 ;Number of corners in body  
 501258.4 287.6 ;E-coord & depth of corner 1  
 516642.4 287.6 ; --- " --- 2 (with strike=0.0)  
 516642.4 132.5 ; --- " --- 3 -- " --  
 521551.3 132.5 ; --- " --- 4 -- " --  
 521551.3 183.9 ; --- " --- 5 -- " --

525952.9	183.9	;	---	"	---	6	--	"	--
525952.9	80.0	;	---	"	---	7	--	"	--
530591.8	88.3	;	---	"	---	8	--	"	--
530591.8	130.6	;	---	"	---	9	--	"	--
534988.4	127.0	;	---	"	---	10	--	"	--
534988.4	112.1	;	---	"	---	11	--	"	--
540375.6	112.1	;	---	"	---	12	--	"	--
540375.6	104.7	;	---	"	---	13	--	"	--
545938.6	109.6	;	---	"	---	14	--	"	--
545938.6	.0	;	---	"	---	15	--	"	--
549824.0	.0	;	---	"	---	16	--	"	--
549824.0	215.7	;	---	"	---	17	--	"	--
545928.9	208.4	;	---	"	---	18	--	"	--
545928.9	490.2	;	---	"	---	19	--	"	--
540375.6	488.6	;	---	"	---	20	--	"	--
540375.6	697.4	;	---	"	---	21	--	"	--
534988.4	697.4	;	---	"	---	22	--	"	--
534988.4	777.6	;	---	"	---	23	--	"	--
530385.7	777.1	;	---	"	---	24	--	"	--
530385.7	730.1	;	---	"	---	25	--	"	--
525952.9	730.6	;	---	"	---	26	--	"	--
525952.9	818.3	;	---	"	---	27	--	"	--
521551.3	818.3	;	---	"	---	28	--	"	--
521551.3	619.6	;	---	"	---	29	--	"	--
516642.4	619.6	;	---	"	---	30	--	"	--
516642.4	855.1	;	---	"	---	31	--	"	--
501258.4	855.1	;	---	"	---	32	--	"	--

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16		;	Internal body number
2100.0		;	density of body, 0=surrounding
.000000		;	suscept. of body, 0=surrounding
.0000		;	Remanent/induced magnetization
.0		;	Inclination of remanence, positive down
.0		;	Declination of remanence pos. clockwise

21		;	Surrounding body, = 21 if none	
10000.0		;	strike length	
985000.0		;	N-coordinate of body refernce point	
.0		;	strike angle from North anti-clockw.	
16		;	Number of corners in body	
501206.3	.0	;	E-coord & depth of corner	
545938.6	.0	;	---	2 (with strike=0.0)
545938.6	109.6	;	---	3 -- "
540375.6	104.7	;	---	4 -- "
540375.6	112.1	;	---	5 -- "
534988.4	112.1	;	---	6 -- "
534988.4	127.0	;	---	7 -- "
530591.8	130.6	;	---	8 -- "
530591.8	88.3	;	---	9 -- "
525952.9	80.0	;	---	10 -- "
525952.9	183.9	;	---	11 -- "
521551.3	183.9	;	---	12 -- "
521551.3	132.5	;	---	13 -- "
516642.4	132.5	;	---	14 -- "
516642.4	287.6	;	---	15 -- "
501206.3	287.6	;	---	16 -- "

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17		;	Internal body number
2770.0		;	density of body, 0=surrounding
.000000		;	suscept. of body, 0=surrounding
.0000		;	Remanent/induced magnetization
.0		;	Inclination of remanence, positive down
.0		;	Declination of remanence pos. clockwise
21		;	Surrounding body, = 21 if none
10000.0		;	strike length
995000.0		;	N-coordinate of body refernce point
.0		;	strike angle from North anti-clockw.

24									
500305.6	1956.5								
517447.5	1956.5	;	---	"	---	2	(with strike=0.0)		
517447.5	2137.2	;	---	"	---	3	-- "		
519986.9	2137.2	;	---	"	---	4	-- "		
519986.9	2521.7	;	---	"	---	5	-- "		
524492.8	2521.7	;	---	"	---	6	-- "		
524492.8	2000.0	;	---	"	---	7	-- "		
527018.3	2000.0	;	---	"	---	8	-- "		
527018.3	1126.3	;	---	"	---	9	-- "		
532286.4	1126.3	;	---	"	---	10	-- "		
532286.4	1749.8	;	---	"	---	11	-- "		
538271.8	1749.8	;	---	"	---	12	-- "		
538271.8	2358.7	;	---	"	---	13	-- "		
550385.4	2358.7	;	---	"	---	14	-- "		
550385.4	1592.1	;	---	"	---	15	-- "		
561014.2	1592.1	;	---	"	---	16	-- "		
561014.2	645.5	;	---	"	---	17	-- "		
566724.7	645.5	;	---	"	---	18	-- "		
566724.7	.0	;	---	"	---	19	-- "		
572140.9	.0	;	---	"	---	20	-- "		
572140.9	1592.1	;	---	"	---	21	-- "		
550385.4	1592.1	;	---	"	---	22	-- "		
550385.4	11200.0	;	---	"	---	23	-- "		
500305.6	11200.0	;	---	"	---	24	-- "		

---

18									
2710.0									
.000000									
.0000									
.0									
.0									
21									
10000.0									

995000.0									
.0									
40									
500305.6	899.5								
517447.5	899.5	;	---	"	---	2	(with strike=0.0)		
517447.5	1015.2	;	---	"	---	3	-- "		
519986.9	1015.2	;	---	"	---	4	-- "		
519986.9	1462.0	;	---	"	---	5	-- "		
524406.3	1462.0	;	---	"	---	6	-- "		
524406.3	892.4	;	---	"	---	7	-- "		
527018.3	892.4	;	---	"	---	8	-- "		
527018.3	19.2	;	---	"	---	9	-- "		
532300.3	19.2	;	---	"	---	10	-- "		
532298.9	479.9	;	---	"	---	11	-- "		
535153.4	479.9	;	---	"	---	12	-- "		
535153.4	854.3	;	---	"	---	13	-- "		
538271.8	858.3	;	---	"	---	14	-- "		
538271.8	1266.6	;	---	"	---	15	-- "		
550385.4	1266.6	;	---	"	---	16	-- "		
550385.4	568.6	;	---	"	---	17	-- "		
555232.8	555.4	;	---	"	---	18	-- "		
555232.8	206.3	;	---	"	---	19	-- "		
561079.5	208.8	;	---	"	---	20	-- "		
561014.2	.0	;	---	"	---	21	-- "		
566724.7	.0	;	---	"	---	22	-- "		
566724.7	645.5	;	---	"	---	23	-- "		
561014.2	645.5	;	---	"	---	24	-- "		
561014.2	1592.9	;	---	"	---	25	-- "		
550385.4	1592.9	;	---	"	---	26	-- "		
550385.4	2358.7	;	---	"	---	27	-- "		
538271.8	2358.7	;	---	"	---	28	-- "		
538271.8	1749.8	;	---	"	---	29	-- "		
532286.4	1749.8	;	---	"	---	30	-- "		



995000.0 ;N-coordinate of body refernce point  
.0 ;strike angle from North anti-clockw.

22 ;Number of corners in body  
500305.6 .0 ;E-coord & depth of corner 1  
561014.2 .0 ; --- " --- 2 (with strike=0.0)  
561014.2 58.0 ; --- " --- 3 -- " --  
550385.4 58.0 ; --- " --- 4 -- " --  
550385.4 66.9 ; --- " --- 5 -- " --  
538271.8 66.9 ; --- " --- 6 -- " --  
538271.8 21.5 ; --- " --- 7 -- " --  
532300.3 21.5 ; --- " --- 8 -- " --  
532300.3 19.2 ; --- " --- 9 -- " --  
530435.8 18.2 ; --- " --- 10 -- " --  
530435.8 4.0 ; --- " --- 11 -- " --  
529225.5 4.0 ; --- " --- 12 -- " --  
529225.5 18.2 ; --- " --- 13 -- " --  
527018.3 19.2 ; --- " --- 14 -- " --  
527018.3 103.5 ; --- " --- 15 -- " --  
524622.4 103.5 ; --- " --- 16 -- " --  
524622.4 317.0 ; --- " --- 17 -- " --  
520180.1 317.0 ; --- " --- 18 -- " --  
520180.1 93.4 ; --- " --- 19 -- " --  
517447.5 93.4 ; --- " --- 20 -- " --  
517447.5 29.0 ; --- " --- 21 -- " --  
500305.6 29.0 ; --- " --- 22 -- " --

-----  
21 ;Internal body number  
2840.0 ;density of body, 0=surrounding  
.000000 ;suscept. of body, 0=surrounding  
.0000 ;Remanent/induced magnetization  
.0 ;Inclination of remanence, positive down  
.0 ;Declination of remanece pos. clockwise  
5 ;Surrounding body, = 21 if none

10099.8 ;strike length  
995000.0 ;N-coordinate of body refernce point  
.0 ;strike angle from North anti-clockw.

5 ;Number of corners in body  
527013.8 282.5 ;E-coord & depth of corner 1  
527013.8 18.2 ; --- " --- 2 (with strike=0.0)  
529830.6 4.0 ; --- " --- 3 -- " --  
532292.8 18.2 ; --- " --- 4 -- " --  
532293.1 280.6 ; --- " --- 5 -- " --

-----  
22 ;Internal body number  
2770.0 ;density of body, 0=surrounding  
.000000 ;suscept. of body, 0=surrounding  
.0000 ;Remanent/induced magnetization  
.0 ;Inclination of remanence, positive down  
.0 ;Declination of remanece pos. clockwise  
21 ;Surrounding body, = 21 if none  
10000.0 ;strike length  
1005000.0 ;N-coordinate of body refernce point  
.0 ;strike angle from North anti-clockw.

24 ;Number of corners in body  
503842.2 2597.0 ;E-coord & depth of corner 1  
515054.6 2597.0 ; --- " --- 2 (with strike=0.0)  
515054.6 2263.3 ; --- " --- 3 -- " --  
519918.1 2263.3 ; --- " --- 4 -- " --  
519918.1 1200.0 ; --- " --- 5 -- " --  
541695.3 1200.0 ; --- " --- 6 -- " --  
541695.3 2267.9 ; --- " --- 7 -- " --  
546695.4 2267.9 ; --- " --- 8 -- " --  
546695.4 2082.9 ; --- " --- 9 -- " --  
552180.1 2082.9 ; --- " --- 10 -- " --  
552180.1 2388.6 ; --- " --- 11 -- " --





2100.0						515054.6	283.5	;	---	---	24	--	--	
.000000						515054.6	399.8	;	---	---	25	--	--	
.0000						503842.2	399.8	;	---	---	26	--	--	
.0						-----								
.0						25								
21						2560.0								
10000.0						.000000								
1005000.0						.0000								
.0						.0								
						.0								
26						21								
503842.2	.0					10193.6								
589869.9	.0					1005000.0								
589869.9	132.2					.0								
565284.5	123.4													
565284.5	208.2													
559145.3	208.2					24								
559145.3	147.6					503842.0	399.6							
552180.1	156.4					515054.4	399.6							
552180.1	85.6					515054.4	283.3							
546995.8	85.6					519917.9	283.3							
546995.8	145.8					519917.9	133.8							
541695.3	145.8					521163.7	133.8							
541695.3	95.5					521163.7	65.0							
532480.0	74.2					522923.6	65.0							
532480.0	27.9					522923.6	25.1							
529211.8	27.9					529211.6	25.1							
529211.8	25.3					529211.6	27.7							
522923.8	25.3					532479.8	27.7							
522923.8	65.2					532479.8	74.0							
521163.9	65.2					541695.1	95.3							
521163.9	134.0					541695.1	383.8							
519918.1	134.0					532410.1	383.8							
519918.1	283.5					532410.1	505.1							
						521133.5	505.0							



.0	;Declination of remanece pos. clockwise			.000000	;suscept. of body, 0=surrounding		
21	;Surrounding body, = 21 if none			.0000	;Remanent/induced magnetization		
10198.0	;strike length			.0	;Inclination of remanence, positive down		
1005000.0	;N-coordinate of body refernce point			.0	;Declination of remanece pos. clockwise		
.0	;strike angle from North anti-clockw.			21	;Surrounding body, = 21 if none		
24	;Number of corners in body			20000.0	;strike length		
541695.1	145.6	;E-coord & depth of corner 1		1020000.0	;N-coordinate of body refernce point		
546995.9	145.6	; --- " --- 2 (with strike=0.0)		.0	;strike angle from North anti-clockw.		
546995.9	85.4	; --- " --- 3 -- " --		28	;Number of corners in body		
552179.9	85.4	; --- " --- 4 -- " --		491218.5	2243.4	;E-coord & depth of corner 1	
552179.9	156.0	; --- " --- 5 -- " --		513233.8	2243.4	; --- " --- 2 (with strike=0.0)	
559145.3	147.6	; --- " --- 6 -- " --		513233.8	1772.4	; --- " --- 3 -- " --	
559145.3	208.2	; --- " --- 7 -- " --		518495.3	1772.4	; --- " --- 4 -- " --	
565284.5	208.2	; --- " --- 8 -- " --		518495.3	1804.5	; --- " --- 5 -- " --	
565296.1	122.5	; --- " --- 9 -- " --		528150.4	1804.5	; --- " --- 6 -- " --	
576515.8	131.8	; --- " --- 10 -- " --		528150.4	1279.2	; --- " --- 7 -- " --	
576515.8	132.2	; --- " --- 11 -- " --		534577.5	1279.2	; --- " --- 8 -- " --	
589869.9	132.2	; --- " --- 12 -- " --		534578.6	1136.4	; --- " --- 9 -- " --	
589869.9	1241.0	; --- " --- 13 -- " --		544267.6	1136.4	; --- " --- 10 -- " --	
576515.8	1241.0	; --- " --- 14 -- " --		544267.9	1396.8	; --- " --- 11 -- " --	
576515.8	970.1	; --- " --- 15 -- " --		549729.8	1399.3	; --- " --- 12 -- " --	
565497.1	970.1	; --- " --- 16 -- " --		549714.2	961.6	; --- " --- 13 -- " --	
565490.0	1358.4	; --- " --- 17 -- " --		571034.6	961.6	; --- " --- 14 -- " --	
559221.1	1354.3	; --- " --- 18 -- " --		571025.8	690.8	; --- " --- 15 -- " --	
559221.1	1245.2	; --- " --- 19 -- " --		590129.6	690.8	; --- " --- 16 -- " --	
552179.9	1245.2	; --- " --- 20 -- " --		590129.6	1094.3	; --- " --- 17 -- " --	
552179.9	949.5	; --- " --- 21 -- " --		571020.3	1097.7	; --- " --- 18 -- " --	
546995.9	949.5	; --- " --- 22 -- " --		571020.3	1389.9	; --- " --- 19 -- " --	
546995.9	1031.9	; --- " --- 23 -- " --		549708.6	1389.9	; --- " --- 20 -- " --	
541695.1	1031.9	; --- " --- 24 -- " --		549729.8	2532.8	; --- " --- 21 -- " --	
-----	-----	-----		565000.0	2532.8	; --- " --- 22 -- " --	
29	;Internal body number			565000.0	2921.4	; --- " --- 23 -- " --	
2770.0	;density of body, 0=surrounding			571027.7	2921.4	; --- " --- 24 -- " --	

571027.7 5682.6 ; --- " --- 25 -- " --  
 590075.2 5682.6 ; --- " --- 26 -- " --  
 590075.2 13000.0 ; --- " --- 27 -- " --  
 491218.5 13000.0 ; --- " --- 28 -- " --

-----  
 30 ;Internal body number  
 2710.0 ;density of body, 0=surrounding  
 .000000 ;suscept. of body, 0=surrounding  
 .0000 ;Remanent/induced magnetization  
 .0 ;Inclination of remanence, positive down  
 .0 ;Declination of remanence pos. clockwise  
 21 ;Surrounding body, = 21 if none  
 20000.0 ;strike length  
 1020000.0 ;N-coordinate of body refernce point  
 .0 ;strike angle from North anti-clockw.  
 36 ;Number of corners in body  
 491218.5 1345.1 ;E-coord & depth of corner 1  
 513233.8 1345.1 ; --- " --- 2 (with strike=0.0)  
 513233.8 801.3 ; --- " --- 3 -- " --  
 518495.3 801.3 ; --- " --- 4 -- " --  
 518495.3 399.8 ; --- " --- 5 -- " --  
 520634.8 399.8 ; --- " --- 6 -- " --  
 520558.8 145.4 ; --- " --- 7 -- " --  
 527521.4 153.4 ; --- " --- 8 -- " --  
 527521.4 216.3 ; --- " --- 9 -- " --  
 528150.4 216.3 ; --- " --- 10 -- " --  
 528150.4 492.9 ; --- " --- 11 -- " --  
 534623.1 492.9 ; --- " --- 12 -- " --  
 534623.1 329.3 ; --- " --- 13 -- " --  
 544389.8 329.3 ; --- " --- 14 -- " --  
 544389.8 43.0 ; --- " --- 15 -- " --  
 550996.3 43.0 ; --- " --- 16 -- " --  
 550996.3 33.0 ; --- " --- 17 -- " --

571027.7 33.0 ; --- " --- 18 -- " --  
 571027.7 .0 ; --- " --- 19 -- " --  
 590075.2 .0 ; --- " --- 20 -- " --  
 590075.2 691.0 ; --- " --- 21 -- " --  
 571027.7 691.0 ; --- " --- 22 -- " --  
 571027.7 963.5 ; --- " --- 23 -- " --  
 549729.8 963.5 ; --- " --- 24 -- " --  
 549729.8 1399.3 ; --- " --- 25 -- " --  
 544389.8 1399.3 ; --- " --- 26 -- " --  
 544267.6 1136.4 ; --- " --- 27 -- " --  
 534578.6 1136.4 ; --- " --- 28 -- " --  
 534577.5 1279.2 ; --- " --- 29 -- " --  
 528150.4 1279.2 ; --- " --- 30 -- " --  
 528150.4 1804.5 ; --- " --- 31 -- " --  
 518495.3 1804.5 ; --- " --- 32 -- " --  
 518495.3 1772.4 ; --- " --- 33 -- " --  
 513233.8 1772.4 ; --- " --- 34 -- " --  
 513233.8 2243.3 ; --- " --- 35 -- " --  
 491218.5 2243.3 ; --- " --- 36 -- " --

-----  
 31 ;Internal body number  
 2560.0 ;density of body, 0=surrounding  
 .000000 ;suscept. of body, 0=surrounding  
 .0000 ;Remanent/induced magnetization  
 .0 ;Inclination of remanence, positive down  
 .0 ;Declination of remanence pos. clockwise  
 21 ;Surrounding body, = 21 if none  
 20000.0 ;strike length  
 1020000.0 ;N-coordinate of body refernce point  
 .0 ;strike angle from North anti-clockw.  
 30 ;Number of corners in body  
 491218.5 452.6 ;E-coord & depth of corner 1  
 513233.8 452.6 ; --- " --- 2 (with strike=0.0)

513233.8	258.2	;	---	"	---	3	--	"	--	.0		;Declination of remanence pos. clockwise
517957.9	243.1	;	---	"	---	4	--	"	--	10		;Surrounding body, = 21 if none
517957.9	137.7	;	---	"	---	5	--	"	--	20000.0		;strike length
520634.8	137.7	;	---	"	---	6	--	"	--	1020000.0		;N-coordinate of body refernce point
520634.8	67.8	;	---	"	---	7	--	"	--	.0		;strike angle from North anti-clockw.
522198.1	30.4	;	---	"	---	8	--	"	--			
522152.5	30.4	;	---	"	---	9	--	"	--	22		;Number of corners in body
526256.1	30.4	;	---	"	---	10	--	"	--	491200.0	.0	;E-coord & depth of corner 1
526256.1	68.9	;	---	"	---	11	--	"	--	571027.7	.0	; 2 (with strike=0.0)
529285.7	68.9	;	---	"	---	12	--	"	--	571027.7	35.0	; 3 --" --
529285.7	179.4	;	---	"	---	13	--	"	--	550996.3	35.0	; 4 --" --
534623.1	178.6	;	---	"	---	14	--	"	--	550996.3	43.0	; 5 --" --
534623.1	113.2	;	---	"	---	15	--	"	--	544389.8	43.0	; 6 --" --
544389.8	113.2	;	---	"	---	16	--	"	--	544389.8	113.2	; 7 --" --
544389.8	329.3	;	---	"	---	17	--	"	--	534623.1	113.2	; 8 --" --
534623.1	329.3	;	---	"	---	18	--	"	--	534623.1	178.6	; 9 --" --
534623.1	492.9	;	---	"	---	19	--	"	--	529280.6	180.3	; 10 --" --
528150.4	492.9	;	---	"	---	20	--	"	--	529272.9	67.8	; 11 --" --
528150.4	216.3	;	---	"	---	21	--	"	--	526256.1	68.9	; 12 --" --
527521.4	216.3	;	---	"	---	22	--	"	--	526256.1	30.4	; 13 --" --
527521.4	153.4	;	---	"	---	23	--	"	--	522132.2	31.0	; 14 --" --
520558.8	145.4	;	---	"	---	24	--	"	--	522132.2	71.1	; 15 --" --
520634.8	399.8	;	---	"	---	25	--	"	--	520634.8	67.8	; 16 --" --
518495.3	399.8	;	---	"	---	26	--	"	--	520634.8	137.7	; 17 --" --
518495.3	801.3	;	---	"	---	27	--	"	--	517957.9	137.7	; 18 --" --
513233.8	801.3	;	---	"	---	28	--	"	--	517957.9	243.1	; 19 --" --
513233.8	1345.1	;	---	"	---	29	--	"	--	513233.8	258.2	; 20 --" --
491218.5	1345.1	;	---	"	---	30	--	"	--	513233.8	452.6	; 21 --" --
										491218.5	452.6	; 22 --" --

-----  
32 ;Internal body number  
2100.0 ;density of body, 0=surrounding  
.000000 ;suscept. of body, 0=surrounding  
.0000 ;Remanent/induced magnetization  
.0 ;Inclination of remanence, positive down

-----  
33 ;Internal body number  
2840.0 ;density of body, 0=surrounding  
.000000 ;suscept. of body, 0=surrounding  
.0000 ;Remanent/induced magnetization

.0									520558.8	145.4	;	---	"	---		3	--	"	--
.0									522147.4	149.1	;	---	"	---		4	--	"	--
13									522152.5	30.4	;	---	"	---		5	--	"	--
20033.7									526256.1	30.4	;	---	"	---		6	--	"	--
1020000.0									526256.1	155.4	;	---	"	---		7	--	"	--
.0									527521.4	153.4	;	---	"	---		8	--	"	--
									527521.4	216.3	;	---	"	---		9	--	"	--
12									528150.4	216.3	;	---	"	---		10	--	"	--
518495.3	399.8								528150.4	1804.5	;	---	"	---		11	--	"	--
520551.5	398.8								518495.3	1804.5	;	---	"	---		12	--	"	--

## APPENDIX D

Table D.1: Observed resistivity data, around the SR7 and SR8 hot springs, AB/2 and MN/2 in m, resistivity in ohm-m.

AB/2	MN/2	S01	S02	S03	S04	S05	S06	S07	S08	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22
1.5	0.5	199	56	621	1211	69	28	182	110	63	324	123	129	136	70	3081	260	54	72	20	246	23
2.0	0.5	291	58	331	983	69		176	120	50	392	90	115	131	82	3882	319	62		17	227	21
3.0	0.5	451	58	177	1663	83	23	194	107	38	457	69	110	160	125	4390	461	72	78	17	313	17
4.5	0.5	717	58	160	1364	64	20	186	102	22	448	38	82	119	146	2898	538	72	71	10	241	14
7.0	0.5	957	51	180	1186	51	17	129	76	13	497	21	69	72	159	1417	593	73	39	6	116	12
7.0	2.0	786	40		1222	46	15	124	93	13	474	16	60	79	137	1283	554	66	35	10	129	11
10.0	2.0	877	36	196	962	48	15	76	49	9	405	10	50	52	123	586	519	63	24	9	56	12
15.0	2.0	660	16	134	609	56	16	60	16	9	334	8	49	44		155	376	56	27	9	20	12
20.0	2.0	449	9	97	510	67	17	59	12	10	292	8	49	44	93	68	246	52	32	7	16	12
20.0	6.0	468	10	101	627	55	16	58	19	10	461	7	44	48	88	120	287	57	32	8	15	
30.0	6.0	290	6	48		77	17	60	13	11	412	9	37	40	71	27	89	45	41	13	14	
45.0	6.0	112	6		324	89	17	60	13	11	228	12	27	40	49	16	34	34	48	19	14	11
45.0	10.0		6		342	80	17	60	13	11	299	11	30	57	52	19	38	35	52	20	13	
60.0	10.0	77	6	24	252	98	16	55	13	10	160	15	26	40	37	18	24	30	55	25	13	13
60.0	20.0	84	6	28	227	93	16	55	13	6	143	15	28	36	45	18	29	30	56	32	13	12
90.0	20.0	70	8	27	74	92	15	44	12	13	96	23	24	46	25	32	22	25	69	40	14	15
90.0	30.0	55	8	28	74	91	16	47	12	13	105	22	26	50	27	20	22	25	63	35	13	14
150.0	30.0	35	9	29	44	88	14	31	12	12	63	38	32	45	18	40	24	19	66	34	16	18
150.0	50.0		8	34	48	69	13	33	12	14	72	38	30	43	21	34	22	20	74	32	16	18
225.0	50.0		9	71	58	73	13	30	12		42	53	38	51	23	54	24	16	73	27	20	20
350.0	50.0		10		65	68	13	32	13	20	33	68	35	48	31	52	27	16	55	26	27	21
500.0	50.0							27	13		42							25		27	30	22



## APPENDIX E

### Chemical analyses of water from thermal springs in Surat Thani Province

Table E.1: Chemical analyses of water from thermal springs in Surat Thani Province, constituents in mg/l, TDS = Total dissolved solid, T°C geothermometer refer to the equation from Fournier (1981) (Chaturongkawanich, 2001). \* Taken from Department of Health, 1998

	Surface T°C	pH	TDS	Na	K	Ca	Mg	Fe	Mn	Cl	HCO <sub>3</sub>	SO <sub>4</sub>	SiO <sub>2</sub>	F
SR1	65	7.60	12300	3452	172.0	790	88.5	0.04	0.03	6860	170	785	52.4	2.44
SR2	42	7.74	5900	1714	58.5	392	53.3	0.06	0.03	3135	254	364	32.7	1.26
SR3	45	7.92	12300	3547	154.0	373	86.0	0.04	0.03	6860	150	763	51.3	2.91
SR4	39	7.90	350	22	3.5	27	16.4	0.30	0.06	7	360	15	32.7	0.27
SR5	38	8.30	310	77	6.0	16	0.2	0.21	0.06	14	224	7	74.5	8.68
SR6	45	7.95	650	15	5.5	128	18.6	0.74	0.05	7	320	260	50.9	1.46
SR7	70	7.94	1740	36	16.2	387	49.2	0.04	0.03	7	215	1080	57.3	3.18
SR8	56	8.04	1790	35	19.0	392	49.2	0.06	0.03	14	216	1150	56.3	2.97
*SR9	60	8.20						0.26		4		454		3.44

**APPENDIX F**

**PUBLICATION**



**Geophysical model of Ban Na Doem Hot-spring in Surat Thani Province, Thailand**

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**Abstract**

Geophysical measurement was conducted in Ban Na Doem district of Surat Thani province. The aim of this work is to determine the subsurface geological structure which related to hot springs in the study area. Four hundred and sixty two gravity points and twenty one resistivity soundings were measured. Positive gravity anomaly of about 170 g.u. was observed in vicinity of hot-spring sites. Shallow Permian limestone of about 4.5 km thick was modeled to explain this positive gravity anomaly. Depths to the top of this limestone agree with the depths to resistive bedrock (670 to 1,080  $\Omega$ -m) determined from resistivity sounding measurement. Fractures in this limestone are probably the pathways of hot water from a deep heat source.

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**Keywords :** geophysical, gravity, VES, hot-spring, Surat Thani

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บัณฑิตวิทยาลัย มหาวิทยาลัยสงขลานครินทร์  
 ตู้ ปณ. ๘ ปทผ. คอหงส์ อ.หาดใหญ่  
 จ.สงขลา ๙๐112

หนังสือรับรองฉบับนี้ให้ไว้เพื่อรับรองว่า ผลงานวิจัยหัวข้อเรื่อง แบบจำลองธรณีฟิสิกส์ของแหล่งน้ำพุร้อนบ้านนาเดิม จังหวัดสุราษฎร์ธานี (Geophysical model of Ban Na Deom Hot-spring in Surat Thani Province, Thailand) โดย นายประยุทธ ขาวดี เป็นนักศึกษาระดับบัณฑิตศึกษา หลักสูตรวิทยาศาสตรมหาบัณฑิต สาขาวิชาธรณีฟิสิกส์ มหาวิทยาลัยสงขลานครินทร์ วิทยาเขตหาดใหญ่ นั้น ได้รับการตีพิมพ์ใน Proceedings ของการจัดประชุมเสนอผลงานวิจัยระดับบัณฑิตศึกษาแห่งชาติ ครั้งที่ 7 (7<sup>th</sup> National Grad Research Conference) ในวันที่ 4-5 เมษายน 2550 ณ มหาวิทยาลัยสงขลานครินทร์ เขตการศึกษาสุราษฎร์ธานี และสามารถนำมาใช้เป็นเกณฑ์สำหรับการสำเร็จการศึกษาในระดับบัณฑิตศึกษาได้

ให้ไว้ ณ วันที่ ๑ พฤษภาคม พ.ศ. 2550

(รองศาสตราจารย์ ดร.ดำรงศักดิ์ ฟ้ารุ่งแสง)  
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## Geophysical model of Ban Na Doem Hot-spring in Surat Thani Province, Thailand

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### Abstract

Geophysical measurements were conducted in the Ban Na Doem District of Surat Thani Province. The aim of this work was to determine the subsurface geological structure, which related to hot springs in the study area. Four hundred and sixty two gravity points and twenty one resistivity soundings were measured. A positive gravity anomaly of about 170 g.u. was observed in the vicinity of the hot-spring sites. Shallow Permian limestone of about 4.5 km thickness was modeled to explain this positive gravity anomaly. The depths to the top of this limestone is in agreement with the depths to the resistivitive bedrock (670 to 1,080  $\Omega$ -m) determined from resistivity sounding measurement. Fractures in this limestone are probably the pathways of hot water from a deeper heat source.

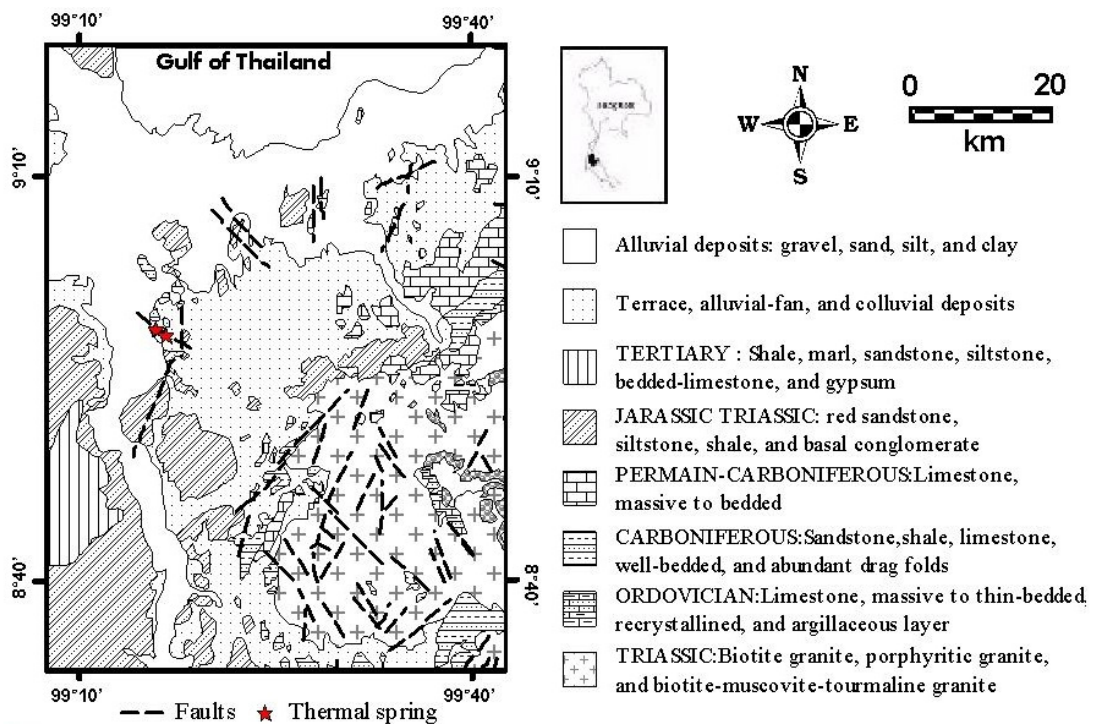
### 1. INTRODUCTION

The Ban Na Doem geothermal areas are situated about 670 kilometers south of Bangkok and about 20 kilometers southwest of Surat Thani City. The study area is in the Phun Phin and Ban Na Doem District, Surat Thani Province. There are two hot-spring sites in the study area (Figure 1): the Ban Tha Sathon thermal spring (SR7) in Phun Phin District and the Ban Khao Phlu thermal spring (SR8) in Ban Na Doem District.

The general geology of Ban Na Deom geothermal area is shown in Figure 1. The oldest stratigraphic unit is the Laem Tap Formation in the Tanaosi Group of Carboniferous-Devonian-Silurian age. It comprises shale, sandstone, pebbly sandstone, quartzite, mudstone, slate and limestone, greenish gray, brow light gray to dark gray, well-bedded, laminated, cross-laminated, and abundant drag folds, with brachiopods, corals, ammonoids, bryozoas, pelecypods, and crinoids. This formation is overlain by Permian Ratburi Group, which comprises mainly limestone, light gray to dark gray, massive to bedded, coarse to finely crystalline, locally with chert nodules and layers, and interbeds of sandstone and shale. Triassic-Jurassic rocks overlie this Permian Unit. It comprises mainly red, reddishbrown, and brown, fine- to medium-grained sandstone, siltstone, shale, and basal conglomerate. The upper sequences are terrace deposits of gravel, sand, lateritic soil, tufa, and alluvial deposits that are gravel, sand, silt, clay, and beach sand (Chaturongkawanich, 2001).

The major structures in the study area are the NW-SE trending faults and fractures, whereas the minor structures are N-S trending faults and fractures. The hot spring areas, SR7 and SR8, are controlled by faults or fractures (Chaturongkawanich, 2001). In addition, the study of Raksaskulwong and Thienprasert (1995) found that zones of high heat flow, greater than  $100 \text{ mW/m}^2$ , coincide with N-S and NNW-SSE trending basins in the Gulf of Thailand.

The major structures in the study area are following the same orientation as the Three Pagoda Fault Zone which developed during the Cenozoic time. Approximately 55 Ma ago the India continent collided drastically with Asia and caused anti-clockwise rotation of South China plate and extrusion of continental SE Asia southeastward (Packham, 1993). The NW-SE strike-slip faults and their conjugate NE-SW strike-slip faults were developed in this period of time. Two NE-SW strike slip faults named Klong Marui Fault Zone and Ranong Fault Zones are near the study area.



**Figure 1.** Geological map of the study area.

Raksaskulwong and Thienprasert (1995) suggested that hot springs in Thailand may be associated with granitic rocks which are heated by the decay of the anomalously high content of radioactive elements in them or at the active fault zones which accumulate heat due to leakage and circulation of heat from deeper and hotter zones.

The objective of this study was to utilize contrasts in physical properties in delineating subsurface plutons or fault systems within the study area, which then can provide further information about the subsurface geology, the possible source and pathways of the geothermal waters. The main geophysical methods used in this study

were gravity (density contrasts, e.g. Kalong, 1983; Hunt et al., 2002; Kheawtawan, 2004) and electrical resistivity method (contrast in electrical resistivity, e.g. Thongchit and Thamvitawas, 1983).

## **2. MATERIAL AND METHODS**

### **2.1 Gravity measurement**

Four hundred and sixty two gravity-measuring points were placed along roads available in the study area. Gravity measurements were conducted in leap-frog loops with a period for each closing loop of 2 to 3 hrs. The spacing between measuring points was 1 to 2 km.

The gravity value of each measuring point was measured with a LaCoste and Romberg gravimeter, model G-565. The location of measuring points was determined with a Trimble Pathfinder basic-plus GPS. The elevation of gravity points was measured with a MDM5 Paulin altimeter. The measured gravity data were corrected for the effects of tides and instrumental drift, latitude, elevation, and topography. The corrected data are gravity anomaly at mean sea level, called Bouguer anomaly, in g.u. unit (10 gravity units = 1 milligal). The Bouguer anomaly map was drawn and used for qualitative and quantitative interpretation in order to determine the geological structures at depths.

### **2.2 Vertical electrical sounding**

Twenty one electrical resistivity soundings with Schlumberger electrode configuration were conducted in the study area. Their locations, intentionally placed close to gravity profiles, are shown in Figure 2. The maximum spacing between current electrodes of Schlumberger sounding was planned at 1,000 meters. The ground resistivity was measured with the ABEM Terrameter SAS-1000 and the Resist87 program (Vander, 1988) was used for interpretation of field sounding data.

## **3. RESULT AND DISCUSSION**

### **3.1 GRAVITY RESULT**

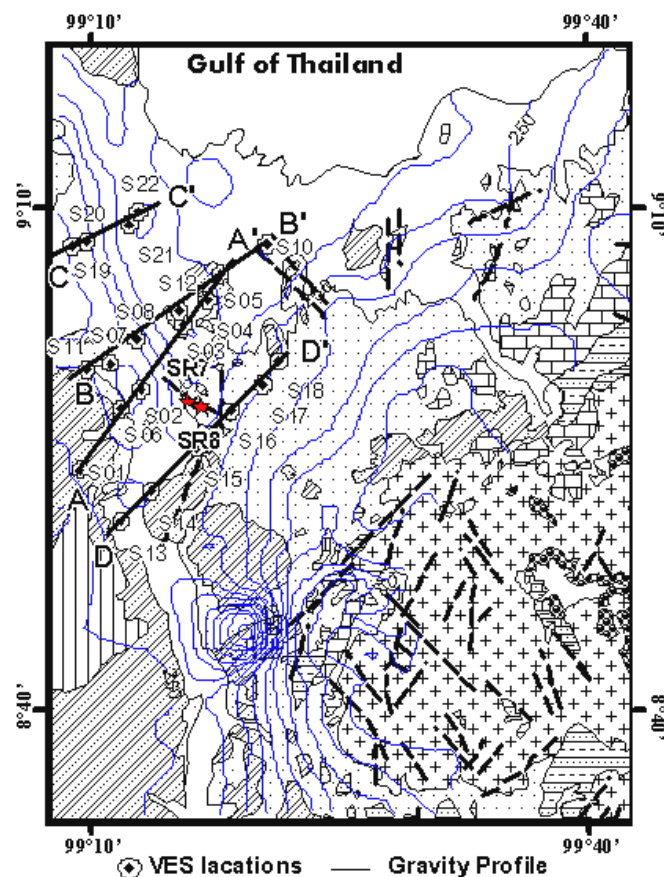
Contours of Bouguer anomaly superimposed on the geological map of the study area are shown in Figure 3. Four distinct areas categorized by Bouguer anomaly are the followings; (1) very low Bouguer anomaly of -200 to 150 g.u. on granitic outcrop in the south-east, (2) low Bouguer anomaly of 150 to 300 g.u. with an elongated shape trending NW-SE on Quaternary sediment in the northwest, (3) high Bouguer anomaly of 300 to 420 g.u. with elongated shape trending 020-200 on Permian limestone, Jurassic sandstone, and Quaternary sediments in the northwest and the northeast, and

(4) very high Bouguer anomaly of 300 to 600 g.u. on Jurassic sedimentary rock in the south.

Subsurface geological structures around the hot-springs SR7, and SR8, were modeled on four gravity profiles, namely; AA', BB', CC' and DD'. Constrains used in the modeling are surface geology and ground resistivity models obtained from the electrical resistivity sounding measurements. In the gravity modeling following densities was used: Permian limestone  $2,750 \text{ kg/m}^3$ , Carboniferous sandstone  $2,600 \text{ kg/m}^3$ , Jurassic sandstone  $2,250 \text{ kg/m}^3$  and Quaternary sediments  $2,000 \text{ kg/m}^3$ . They are densities of rocks outcrop in Songkhla and Phattalung and Trang Province, south of the study area (Phethuayluk, 1997).

### 3.1.1 Subsurface geological model of the profile AA'

Gravity anomaly, subsurface geological model and ground resistivity model of the profile AA' are shown in Figure 3. The profile AA' is about 30 km long and runs across the thermal spring SR7, SR8 (Figure 2). The residual Bouguer anomaly on the eastern part of the profile is about 150 g.u. higher than the anomaly on the western



**Figure 2.** Contour map of Bouguer anomalies in gravity unit over the study area geological map and vertical electrical sounding locations

part of the profile (Figure 3.a). In gravity modeling, Carboniferous rock was assigned



as the basement rock. Thick layer of Permian limestone overlying Carboniferous rock was modeled to explain high Bouguer anomaly on the eastern end of the profile (Figure 3.b). A step change in thickness of Permian limestone was observed at the distances 13 to 16 km from the western end of the profile. The change is probably caused by a normal fault of NW-SE strike and 3 km vertical displacement. In accordance with surface geology, Jurassic rocks overlying Permian limestone and overlain by Quaternary sediment were modeled on the shallow part of the profile.

The geoelectric cross-section of profile AA' is shown in Figure 3.c. The bedrock of high resistivity (850 to 1,079 Ohm-m) was observed at only two sounding points (S03 and S04) near the eastern end of the profile at depths of 118 to 137 m. These depths agree with the depths to the limestone in the gravity model. The bedrock is overlain by a low resistivity layer of 13 to 23 Ohm-m. This low resistivity layer is about 130 m thick on the eastern part of the profile and it is very thick on the western part of the profile. A normal fault is expected between sounding points S02 and S03.

### **3.1.2 Subsurface geological model of the profile BB'**

Gravity anomaly, subsurface geological model and ground resistivity model of profile BB' are shown in Figure 4. The profile BB' is about 30 km long, and intercepts the profile AA' at the sounding station S05 (Figure 2). The residual Bouguer anomaly on the middle part of the profile is about 160 g.u. higher than the anomaly on the western part of the profile (Figure 4.a). In gravity modeling, Carboniferous rock was assigned as the basement rock. Thick layer of Permian limestone overlying Carboniferous rock was modeled to explain high Bouguer anomaly at the middle of the profile (Figure 4.b). A step change in thickness of Permian limestone was observed at the distances 10 to 13 km from the western end of the profile. The change is probably caused by a normal fault system with a NW-SE strike and a vertical displacement of 3 km. Jurassic rocks overlying Permian limestone and overlain by Quaternary sediment were modeled on the shallow part of the profile.

The geoelectric cross-section of profile BB' is shown in Figure 4(c). The bedrock of high resistivity (801 to 959 Ohm-m) is observed at only two sounding points (S12 and S10) near the eastern end of the profile at depths of 30 to 161 m. These depths agree with depths of the limestone in the gravity model. The bedrock is overlain by a low resistivity layer of 7 to 28 Ohm-m. However, 63 Ohm-m at S05 probably represents an aquifer layer. This low resistivity layer is about 160 m thick on the eastern end, 236 m on the western end, and much thicker in the middle of the profile. A normal fault is expected between sounding points S08 and S12.

### **3.1.3 Subsurface geological model of the profile CC'**

Gravity anomaly, subsurface geological model and ground resistivity model of profile CC' are shown in Figure 5. The profile CC' is about 14 km long and runs parallel with profile BB' (Figure 2). The residual Bouguer anomaly on the eastern part of the profile is about 170 g.u. higher than the anomaly on the western part of the profile

(Figure 5.a). In gravity modeling, Carboniferous rocks were also assigned as the basement rock. A thick layer of Permian limestone overlying Carboniferous rocks was modeled to explain high Bouguer anomaly on the eastern end of the profile (Figure 5.b). A step change in thickness of Permian limestone was observed at the distances 7 to 12 km from the western end of the profile. The change is probably caused by a normal fault system with a NW-SE strike and a vertical displacement of 5 km. Jurassic rocks overlying Permian limestone and overlain by Quaternary sediment were modeled on the shallow part of the profile.

The geoelectric cross-section of profile CC' is shown in Figure 5(c). The bedrock of high resistivity (912 Ohm-m) was observed at only sounding points (S21) near the eastern end of the profile at a depth of 186 m. This depth agrees with depths of the limestone in the gravity model. The bedrock is overlain by a low resistivity layer of 11 to 34 Ohm-m. This low resistivity layer is about 180 m thick on the eastern part and is much thicker on the western part of the profile. A normal fault is expected between sounding points S20 and S21.

### **3.1.4 Subsurface geological model of the profile DD'**

Gravity anomaly, subsurface geological model and ground resistivity model of profile DD' are shown in Figure 6. The profile DD' is about 30 km long and runs across the thermal spring SR7, SR8 (Figure 2). The residual Bouguer anomaly on the western part of the profile is about 60 g.u. higher than the anomaly on the eastern part of the profile (Figure 6.a). In gravity modeling, Carboniferous rock was assigned as the basement rock. A thick layer of Permian limestone overlying Carboniferous rock was modeled to explain high Bouguer anomaly on the western end of the profile (Figure 6.b). A decrease in gravity anomaly toward the eastern end of profile was modeled with a thin layer of Permian limestone.

The geoelectric cross-section of profile DD' is shown in Figure 6.c. The bedrock of high resistivity (850 to 1,079 Ohm-m) was observed at four sounding points (S15, S16, S17, and S18) at depths of 75 to 280 m on the eastern part of the profile. These depths agree with depths of the limestone obtained from gravity modeling. The bedrock is overlain by a low resistivity layer of 11 to 46 Ohm-m. This low resistivity layer is about 245 m thick on the eastern part and is much thicker on the western part of the profile.

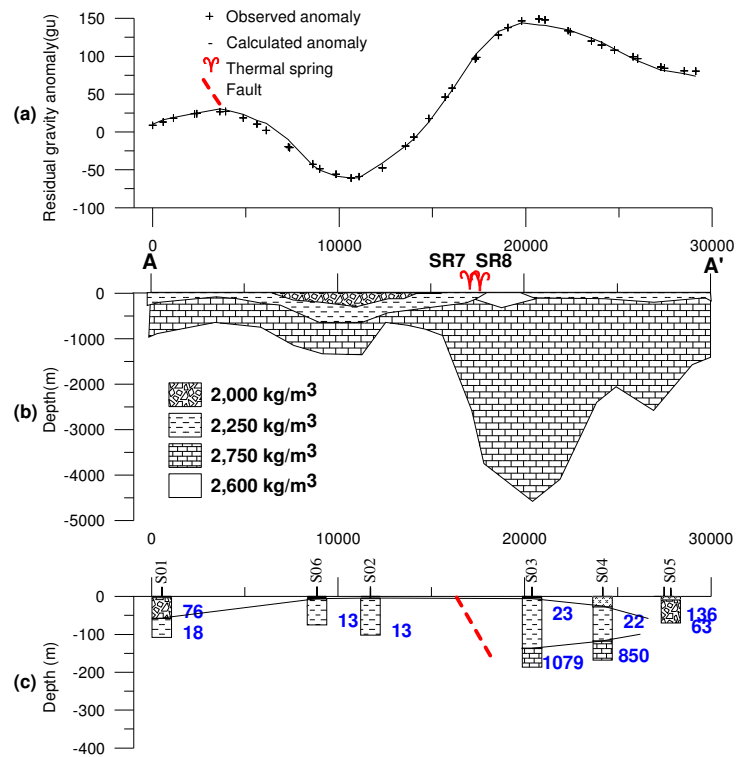
## **4. CONCLUSION**

Subsurface geological structures of the geothermal area, SR7 and SR8, of Surat Thani province were modeled from gravity anomaly and resistivity sounding results. A thick layer of Permian limestone was modeled to explain the positive Bouguer anomaly on the eastern part of study area near the shoreline to the Gulf of Thailand. Abrupt change in thickness of Permian limestone near the northwestern end of the study area was probably caused by NW-SE normal fault zone. The gravity model of geological structures was confirmed by results obtained from resistivity soundings. It is observed

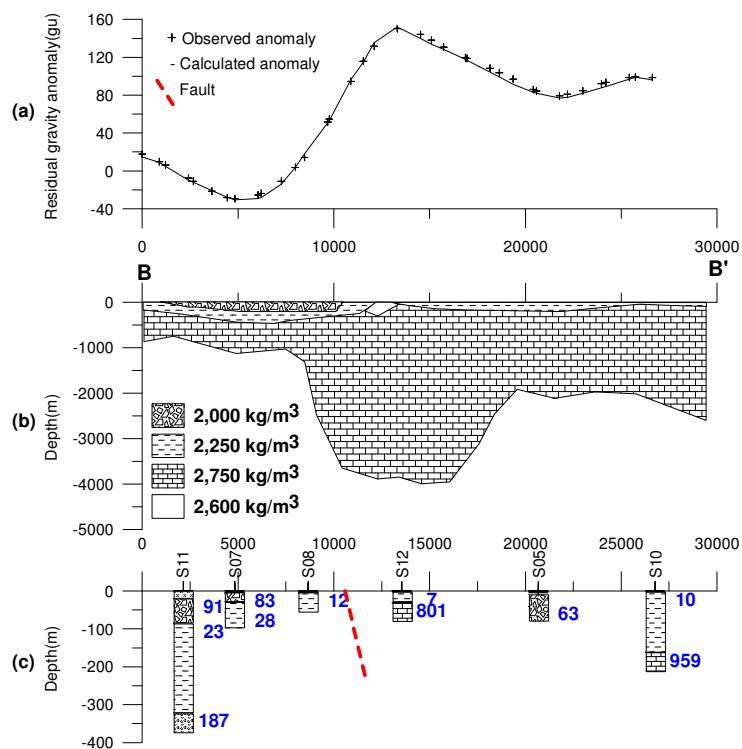
that hot-springs SR7 and SR8 are situated on the areas of thick limestone close to the interpreted NW-SE fault zone. It is, therefore, possible that the fault zone or fractures in Permian limestone are pathways of hot water from a deep heat source.

### **ACKNOWLEDGEMENTS**

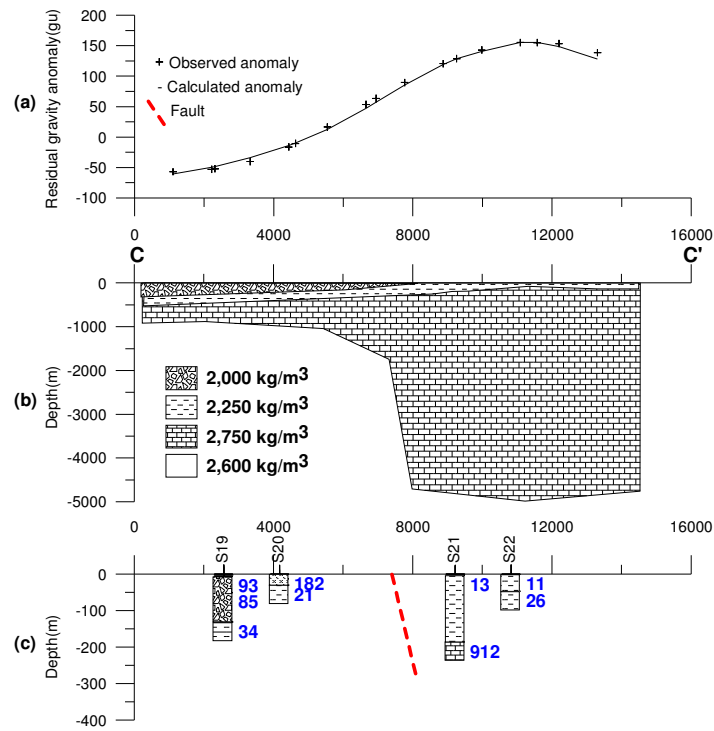
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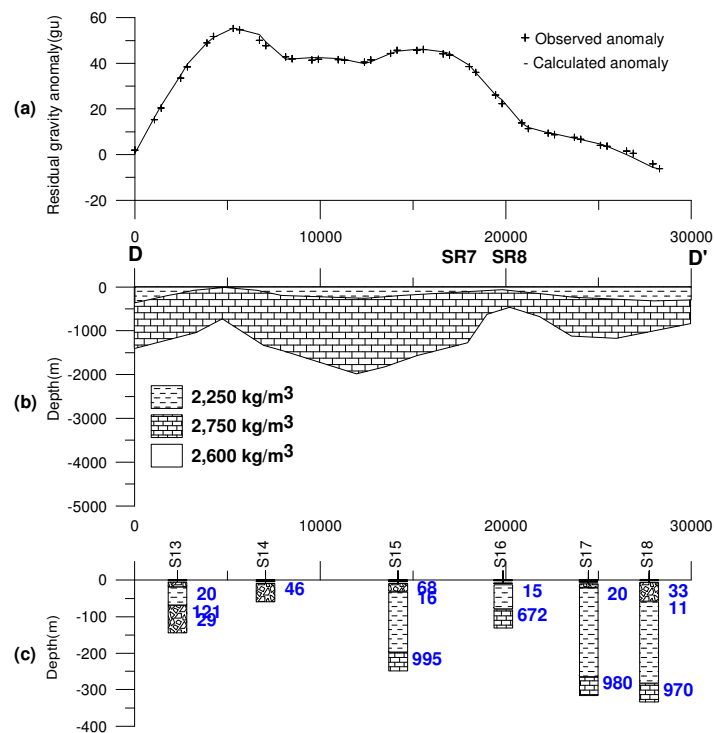
**Figure 3.** Profile AA': Bouguer gravity measured, in gu, (a), calculated with the geological model in (b), geoelectric sounding along the profile, values in ohm-m (c).



**Figure 4.** Profile BB': Bouguer gravity measured, in gu, (a), calculated with the geological model in (b), geoelectric sounding along the profile, values in ohm-m (c).



**Figure 5.** Profile CC': Bouguer gravity measured, in gu, (a), calculated with the geological model in (b), geoelectric sounding along the profile, values in ohm-m (c).



**Figure 6.** Profile DD': Bouguer gravity measured, in gu, (a), calculated with the geological model in (b), geoelectric sounding along the profile, values in ohm-m (c).

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