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A preliminary physical property characterization of the Chilcotin Group basalts, south-central BC (092O, P, 093A, B)

Une caractérisation préliminaire des propriétés physiques des basaltes du groupe de Chilcotin, centre-sud C.B. (092O, P, 093A, B)

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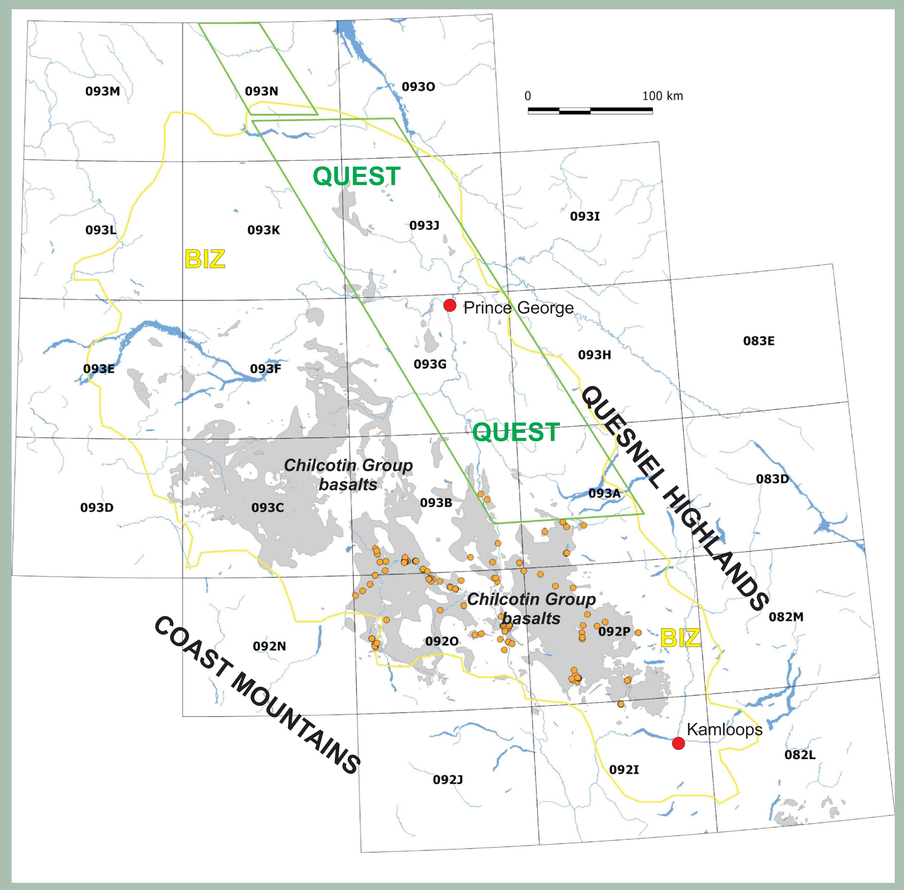
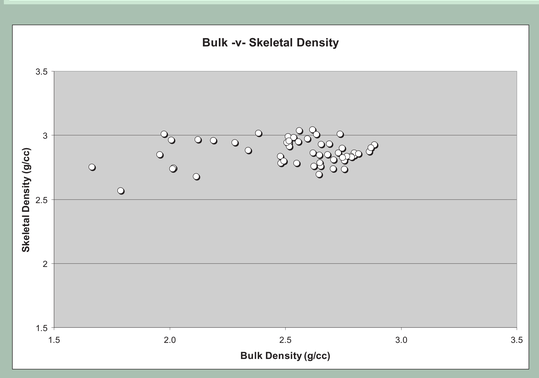
We present preliminary physical property data (density, porosity, and magnetic susceptibility) from a representative suite sample of Chilcotin Group basalts collected in south-central British Columbia (NTS map sheets 092O, P, 093A, B). The Chilcotin Group overlies and buries 55,500 km^2 of the Intermontane Belt, including potential mineral and hydrocarbon reserves in the Quesnel Trough and Nechako Basin respectively. Exploration within the area covered by the Chilcotin Group has been hindered by a lack of geological data concerning the thickness and distribution of the basalts, and on the nature and depth of the basement; as a result there are very few mineral deposits recorded in MINFILE, and a corresponding lack of staked land.

As part of our on-going efforts to constrain the thickness and lateral distribution of the Chilcotin Group, we have collected a geo-referenced sample suite with which to characterize spatial variations in physical properties. Our initial sample suite (n = 55) has been analyzed for density, porosity (both isolated and connected), and magnetic susceptibility. These data are of immediate use to exploration geophysics projects in the area, and will enable better constrain of the basalt signature in gravity, magneto-telluric, and aeromagnetic surveys. It is our intention to expand our physical property database in 2008 to include basement samples, and to measure for electrical conductivity, seismic velocity, and permeability.



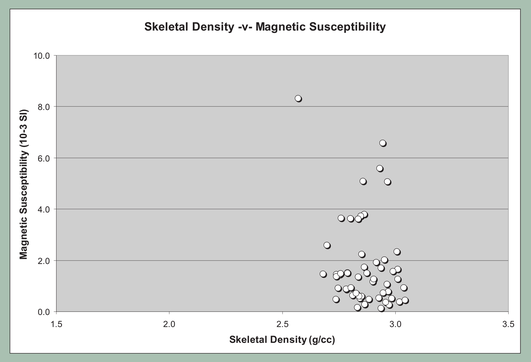
Sample ID	Easting Z 10 NAD83	Northing Z 10 NAD83	Density - Skeletal of core	Porosity (Connected)	Density - Powder	Porosity (Total)
RE-AC06-78	456527.83	5724820.50	2.963582	32.315190		
RE-AF06-55	491114.78	5762519.64	2.968046	28.547133		
RE-AK06-59	473590.52	5774296.76	3.006916	12.428187		
RE-AR06-08	641623.95	5649526.17	2.759888	3.906924		
RE-AR06-10	642074.45	5648949.73	2.861998	4.664578		
RE-AR06-13	642116.73	5649056.58	2.753351	39.598145	0.069532	38.8667
RE-AR06-15	642140.90	5649343.05	2.568705	30.380636		
RE-BL06-49	447587.75	5706130.08	2.935880	14.362798		
RE-CD06-66	446246.46	5704620.89	2.935197	8.387440		
RE-CD06-74	446451.27	5704530.49	2.873611	0.432922		
RE-CD06-75	446407.18	5704464.77	2.782803	10.893659	0.255452	13.5957
RE-CD06-76	446407.18	5704464.77	2.842200	1.595067		
RE-CH06-03	608890.41	5671477.85	2.846394	7.024237	0.405225	6.0646
RE-CH06-04	608609.74	5671734.64	2.862474	8.526096		
RE-CH06-12	609057.58	5671112.24	2.835289	12.629294	0.224501	11.1656
RE-CH06-16	609057.58	5671112.24	2.862899	2.337227		
RE-CH06-18	609005.87	5671220.16	2.800680	10.993982		
RE-CH06-19	608944.33	5671402.05	2.849852	31.339497		
RE-CH06-21	608819.39	5671573.87	2.781924	8.389284		
RE-CH06-30	608944.33	5671402.05	2.835113	1.836449		
RE-CH06-92	607729.54	5668821.24	2.803174	1.738976		
RE-CZ06-57	451326.91	5777884.81	2.930592	9.450635	0.310095	9.6207
RE-CZ06-58	451326.91	5777884.81	2.680107	21.088673		
RE-DC06-31	555488.47	5716720.98	3.010356	9.118546		
RE-DC06-32	555488.47	5716720.98	3.010020	34.384863	0.087539	34.4813
RE-DC06-34	555012.04	5716235.29	2.989692	15.979553		
RE-DC06-35	555012.04	5716235.29	2.746618	26.576037	0.103349	31.3369
RE-DC06-36	555012.04	5716235.29	2.810707	3.674223		
RE-DM06-02	647894.10	5667969.95	2.882730	18.875095	0.152727	13.4379
REF-BC-214E	500850.98	5753993.66	2.856272	1.455698		
RE-HA06-41	493650.31	5754301.80	2.900548	5.362330		
RE-HA06-42	492171.98	5756348.72	2.915106	13.694808		
RE-HA06-45	492161.57	5756284.22	3.017312	21.036550	0.143432	20.8133
RE-HA06-47	448200.78	5706799.47	2.945523	22.571675		
RE-HA06-77	517858.86	5753762.97	2.787618	5.026369		
RE-HA06-90	613237.99	5702965.53	2.961558	26.109934		
RE-HY06-28	605595.01	5678011.37	2.925591	1.450975		
RE-HY06-29	593652.07	5746228.71	2.787047	4.946039		
RE-LH06-91	541467.67	5817986.86	2.850344	5.920944		
RE-MA06-39	548933.66	5782486.56	3.042971	13.976679		
RE-MM06-38	481886.34	5771101.34	3.036186	15.683338		
RE-SK06-60	481886.34	5771101.34	2.972791	12.744689		
RE-SK06-61	481886.34	5771101.34	2.738523	26.553436		
RE-SK06-62	481886.34	5771101.34	2.943196	14.889990		
RE-SK06-64	543817.66	5767534.52	2.982593	15.022007		
RE-TL06-43	444047.79	5710328.75	2.902809	1.141179		
RE-VK06-79	444084.20	5710349.48	2.831104	1.584841		
RE-VK06-80	444084.20	5710349.48	2.738718	1.203919		
RE-VK06-81	444084.20	5710349.48	2.838223	2.589489		
RE-VK06-82	444134.51	5710383.78	2.735725	-0.644499		
RE-VK06-83	444146.34	5710408.11	2.826499	2.804723		
RE-VK06-84	444200.35	5710431.80	2.758246	4.929491		
RE-VK06-86	444254.14	5710435.66	2.957424	14.956919	0.197729	15.3935
RE-VK06-88	444254.14	5710435.66	2.697400	1.962610		
RE-VK06-89	474286.00	5771309.00	2.951856	13.436281		

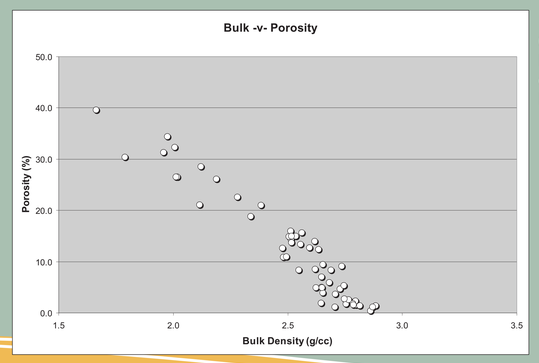
Sample ID	Locality	Easting Z 10 NAD83	Northing Z 10 NAD83	Rock Type	Mag Sus (10-3 SI)	n
RE-AC06-78	Tete Angela Creek	456527.83	5724820.50	coherent basalt	5.080	3
RE-AF06-55	SE Anahim Flats	491114.78	5762519.64	coherent basalt	0.780	3
RE-AK06-59	Alexis Lake Road	473590.52	5774296.76	coherent basalt	2.350	3
RE-AR06-08	Arrowstone	641623.95	5649526.17	coherent basalt	3.650	3
RE-AR06-10	Arrowstone	642074.45	5648949.73	coherent basalt	3.810	3
RE-AR06-13	Arrowstone	642116.73	5649056.58	coherent basalt	1.450	3
RE-AR06-15	Arrowstone	642140.90	5649343.05	coherent basalt	8.330	3
RE-BL06-49	Big Lake	447587.75	5706130.08	coherent basalt	0.129	3
RE-CD06-66	Cardiff Mtn- BCTel	446246.46	5704620.89	coherent basalt	1.710	3
RE-CD06-74	Cardiff Mountain	446451.27	5704530.49	coherent basalt	1.510	3
RE-CD06-75	Cardiff Mountain	446407.18	5704464.77	coherent basalt	0.865	3
RE-CD06-76	Cardiff Mountain	446407.18	5704464.77	coherent basalt	0.515	3
RE-CH06-03	Double RR Bar	608890.41	5671477.85	coherent basalt	3.740	3
RE-CH06-04	Chasm	608609.74	5671734.64	coherent basalt	1.750	3
RE-CH06-12	Chasm	609057.58	5671112.24	coherent basalt	3.610	3
RE-CH06-16	Chasm	609057.58	5671112.24	coherent basalt	0.289	3
RE-CH06-18	Double RR Bar	609005.87	5671220.16	coherent basalt	3.630	3
RE-CH06-19	Double RR Bar	608944.33	5671402.05	coherent basalt	0.602	3
RE-CH06-21	RR Bar Ranch	608819.39	5671573.87	coherent basalt	0.886	3
RE-CH06-30	Double RR Bar	608944.33	5671402.05	coherent basalt	1.350	3
RE-CH06-92	West Chasm S Top	607729.54	5668821.24	coherent basalt	0.946	3
RE-CZ06-57	Chezacut Road	451326.91	5777884.81	coherent basalt	5.590	3
RE-CZ06-58	Chezacut Road	451326.91	5777884.81	coherent basalt	1.470	3
RE-DC06-31	Dog Creek	555488.47	5716720.98	coherent basalt	1.270	3
RE-DC06-32	Dog Creek	555488.47	5716720.98	coherent basalt	1.650	3
RE-DC06-34	Dog Creek	555012.04	5716235.29	coherent basalt	1.570	3
RE-DC06-35	Dog Creek	555012.04	5716235.29	coherent basalt	0.913	3
RE-DC06-36	Dog Creek	555012.04	5716235.29	coherent basalt	0.643	3
RE-DM06-02	Deadman Valley	647894.10	5667969.95	coherent basalt	0.494	3
REF-BC-214E	Bull Canyon	500850.98	5753993.66	coherent basalt	5.100	3
RE-HA06-41	Hanceville- Lee's Corner	493650.31	5754301.80	coherent basalt	1.170	3
RE-HA06-42	Hanceville Scar	492171.98	5756348.72	coherent basalt	1.930	3
RE-HA06-45	Hanceville Scar	492161.57	5756284.22	coherent basalt	0.385	3
RE-HA06-47	Hanceville -Nemaiah Valley	448200.78	5706799.47	coherent basalt	0.736	3
RE-HA06-77	Btw Hanceville & Riske Ck	517858.86	5753762.97	coherent basalt	1.520	3
RE-HA06-90	Mile 83 Roadcut	613237.99	5702965.53	coherent basalt	1.080	3
RE-HY06-28	Road cut mile 63	605595.01	5678011.37	coherent basalt	0.530	3
RE-HY06-29	Lac La Hache	593652.07	5746228.71	coherent basalt	1.510	3
RE-LH06-91	Marguerite-East Fraser	541467.67	5817986.86	coherent basalt	2.240	3
RE-MA06-39	Meldrum 1100 Rd - W Fraser	548933.66	5782486.56	coherent basalt	0.459	3
RE-MM06-38	Stum Lake Rd	481886.34	5771101.34	coherent basalt	0.943	3
RE-SK06-60	Stum Lake Rd	481886.34	5771101.34	coherent basalt	0.263	3
RE-SK06-61	Stum Lake Rd	481886.34	5771101.34	coherent basalt	1.460	3
RE-SK06-62	Stum Lake Rd	481886.34	5771101.34	coherent basalt	6.580	3
RE-SK06-64	Stum Lake Rd	543817.66	5767534.52	coherent basalt	0.519	3
RE-TL06-43	Till Lake	444047.79	5710328.75	coherent basalt	1.270	3
RE-VK06-79	Vedan Section 1	444084.20	5710349.48	coherent basalt	0.173	3
RE-VK06-80	Vedan Lake E	444084.20	5710349.48	coherent basalt	1.370	3
RE-VK06-81	Vedan Lake E	444084.20	5710349.48	coherent basalt	0.595	3
RE-VK06-82	Vedan Lake E	444134.51	5710383.78	coherent basalt	0.493	3
RE-VK06-83	Vedan Lake E	444146.34	5710408.11	coherent basalt	0.722	3
RE-VK06-84	Vedan Lake E	444200.35	5710431.80	coherent basalt	1.490	3
RE-VK06-86	Vedan Lake E	444254.14	5710435.66	coherent basalt	0.366	3
RE-VK06-88	Vedan Lake E	444254.14	5710435.66	coherent basalt	2.590	3
RE-VK06-89	Bull Canyon	474286.00	5771309.00	coherent basalt	2.030	3
06REF**070	Canoe Creek	556768.51	5701498.60	hyaloclastite	0.690	10
06REF**070	Canoe Creek	556768.51	5701498.60	hyaloclastite	0.850	10
06REF**070	Canoe Creek	556768.51	5701498.60	hyaloclastite	0.720	10
06REF**060	Dog Creek	555293.95	5716657.49	coherent basalt	6.860	10
06REF**060	Dog Creek	555293.95	5716657.49	coherent basalt	8.940	10
06REF**060	Dog Creek	555293.95	5716657.49	coherent basalt	6.360	10
06REF**093	Hanceville Scar	492161.57	5756284.22	coherent basalt	13.900	10
06REF**093	Hanceville Scar	492161.57	5756284.22	coherent basalt	6.560	10
06REF**093	Hanceville Scar	492161.57	5756284.22	coherent basalt	11.200	10
06REF**093	Hanceville Scar	492161.57	5756284.22	coherent basalt	7.010	10
06REF**093	Hanceville Scar	492161.57	5756284.22	coherent basalt	4.510	10
06REF**093	Hanceville Scar	492161.57	5756284.22	coherent basalt	2.560	10
06REF**093	Hanceville Scar	492161.57	5756284.22	hyaloclastite	0.470	10
06REF**020	Chasm	609005.87	5671220.16	coherent basalt	11.600	10
06REF**020	Chasm	609005.87	5671220.16	coherent basalt	6.370	10
06REF**020	Chasm	609005.87	5671220.16	coherent basalt	3.070	10
06REF**020	Chasm	609005.87	5671220.16	coherent basalt	26.000	10



LEFT.
90% variation in bulk density, from 1.5 to 2.9 g/cc. Skeletal (rock) density ~2.8 g/cc.

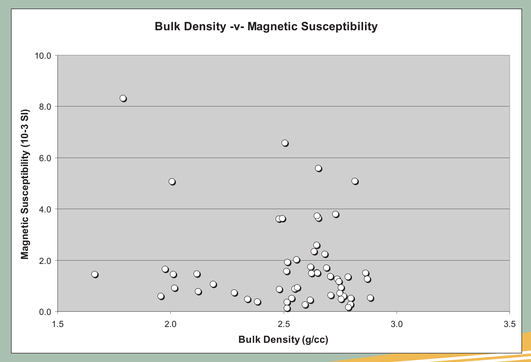
RIGHT.
80% variation in magnetic susceptibility within the Chilcotin Group, plotted against skeletal density (~2.8 g/cc).





LEFT.
0 to 40% porosity negatively correlated with bulk density. Increased porosity (vesicles) decreases bulk density. Chilcotin Group basalts typically 10 to 15% porosity.

RIGHT.
There is no obvious relationship between variations in magnetic susceptibility and bulk density (i.e. Porosity).



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