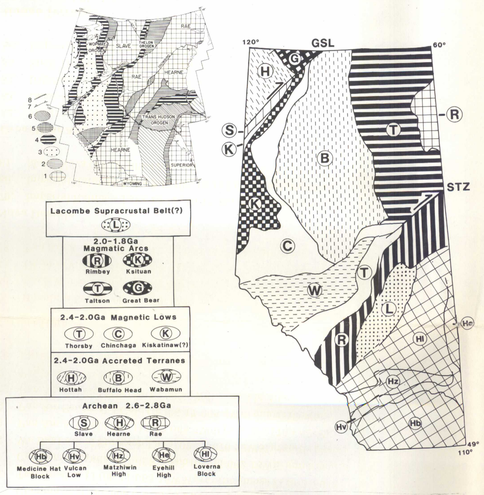

TECTONIC SUBDIVISION AND U/Pb GEOCHRONOLOGY OF THE PRECAMBRIAN BASEMENT OF THE ALBERTA BASIN, WESTERN CANADA

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The crystalline basement of Alberta has been subdivided into geophysical domains on the basis of aeromagnetic signature and to a lesser extent horizontal gravity gradient data. Detailed public domain aeromagnetic data anomaly data and proprietary data from PetroCanada were used for the delineation of domains based on the nature of the aeromagnetic signature (positive, negative, internal fabric). The composition and possible tectonic affinities of the anomalies were calibrated by comparison with the aeromagnetic expression of exposed tectonic elements of the Canadian Shield. The subdivision of the Alberta basement in this manner guided sampling of basement drill core which concentrated on igneous and metaigneous lithologies in order to provide a chronologic framework of major magmatic events.

Approximately 4000 intersections of crystalline basement have been reported from drilling records in Alberta with about 390 of those reporting core. A total of 72 intersections were sampled during this study with sample sizes that ranged from 750g (core from Energy Resources Conservation Board, Calgary and Ron Burwash, University of Alberta) to 1.5g (cuttings provided by companies). Age determinations reported here are based on 4 and 5 point discordant arrays and/or concordant zircons and monazites. Full details of the analytic data will be reported later (Villeneuve et.al. GSC Paper, in prep). Age determinations reported here are for zircon (Z) and/or monazite (M); some ages are preliminary pending final analyses. Any information that the reader could provide on the location of basement drill core would be appreciated.

The result of this work is an age domain map for the Alberta basement that effectively extends tectonic elements of the Canadian Shield into the Cordillera. This provides additional data in which to address the history of crustal growth and assembly of the Canadian Shield, the provenance of sediments within the Cordillera, the parentage of basement gneisses exposed in structural culminations in the Omineca Belt and the intriguing question of basement-cover interaction during the evolution of the Alberta basin.

ALBERTA BASEMENT

Medicine Hat Block

1. PCP Travers (01-31-013-20W4) granodiorite gneiss 2625 +/-46 (Z)
2. BA Grand Forks (12-14-012-12W4) biotite quartz monzonite 2723 +/-38 (Z)
3. Imp Calstan Lake Newell (05-01-017-14W4) pegmatitic granitic gneiss 2715 + 41-23 (Z)
4. Home Pacific Knappen (16-29-001-11W4) mylonitic quartz diorite
5. PCP Medicine Hat (12-19-014-4W4) granodiorite gneiss 2790 (Z)

Vulcan Low

6. Cal Std Parkland #4-12 (04-12-015-27W4) amphibolite 2627 + 4-3 (Z)
7. CPOG Princess (10-04-019-11W4) calcsilicate

Matzhiwin High

8. Mobil CPR Hutton (11-18-024-15W4) hbl-bio granitoid 2586 + 12- 11 (Z)

Eyehill High

9. BA et al. Canmer (06-09-031-1W4) hypersthene quartz diorite 2568 +/-9 (Z)
10. Husky DH Lloyd (10-15-049-1W4) granodiorite gneiss 2601 +/-58 (Z)
11. Calstan Pacific Marwayne (14-29-052-2W4) pegmatite phase in amphibolite 2612 + 13-12(Z); 2585(M)

Loverna Block

12. Cdn Seabd White Rose Elk Pt. (07-14-057-6W4) kspar-rich granitic gneiss 1820 (M)
13. PCP Entice (07-05-028-25W4) granite porphyry
14. PCP Entice (09-06-028-23W4) biotite syenogranite
15. TGT Nacmine (06-08-028-21W4) granite
16. Rio Bravo Ronald #1-6 (01-06-038-15W4) biotite granite
17. Imperial Irma #1 (06-14-046-9W5) granite
18. Atapco Oyen (07-02-028-4W4) granite 1778.5 +/-3.1 (Z)

Red Deer Trend

19. CPOG Oberlin (10-15-038-21W4) felsic metatuff
20. Imperial Willingdon #1 (14-14-055-15W4) rhyolite

Lacombe Domain

21. Imperial Ardrossan #1 (08-17-053-21W4) bio-mu-gar leucogranite 2210 + 236-202 (Z)
22. Imperial Dinant (16-17-048-20W4) red phyllite

Rimbey High

23. BP Leming (10-10-066-6W4) garn-cord-sill paragneiss
24. Esso AEC 85 FishCk (07-11-067-6W4) granite 1831 +/-6 (Z); 1815 (M)
25. Mobil Pan Am Heart Lake (04-03-069-10W4) biotite monzogranite 1780 + 29-28 (Z)
26. Esso 83 inj Ethel Lk (08-33-064-3W4) leucogneiss
27. Imperial Leduc #530 (08-17-050-26W4) biotite leucogranite 1856 +/-3 (M)
28. Imperial Darling (16-19-062-19W4) granite

Thorsby Low

29. Imperial Clyde #1 (09-29-059-24W4) quartz diorite 2400 +/-20 (Z)
30. Imperial Bailey Selburn Riverdale (01-27-060-26W4) pegmatitic granite 1915 +/-23
31. Home CPOG Brightbank (10-05-052-2W5) quartz diorite 2294 + 67- 45 (Z)

Wabamun High

32. Mobil et al Pembina (11-27-049-8W5) biotite tonalite 2322 +/- 8 (Z)

Taltson Arc

33. Merrill Arab Chard (05-34-078-6W4) syenogranite 1973 + 9-7 (Z)
34. ROC Watchusk Lake (07-08-083-3W4) granite 1950 (M)
35. Bear Vampire #1 (07-28-087-12W4) biotite monzogranite 1966- 1932 (Z)
36. Shell Eatha EU (13-31-096-6W4) syenogranite
37. RO Corp Janvier (05-23-080-5W4) granite
38. Imperial Wolverine (07-24-076-18W4) syenogranite 2174 + 54-43 (Z); 1975 (M)
39. Cal. Std. Mikkwa (12-23-098-21W4) granite 1937 + 61-45 (Z)
40. IOE Jack Lakes (08-17-120-1W5) granite porphyry 1972 + 20-17 (Z)
41. Baysel Birch Hills (09-34-094-14W4) biotite granite

Buffalo Head Terrane (Utikuma Belt)

42. Imperial Pelican Hills (06-10-077-25W4) garnet granite 2017 + 2-1 (Z,M)
43. IOE Sylvia (10-08-073-5W5) quartz monzonite 2314 + 27-15 (Z)
44. Home et al Regent Swan Hills (08-11-068-10W5) monzonite augen gneiss
45. Imperial Joussard (11-11-073-13W5) biotite-clinopyroxene diorite 2324 + 5-4 (Z)
46. Union Red Earth (12-08-087-8W5) syenogranite gneiss
47. Chevron Hunt Creek (02-17-091-6W5) granodiorite 1995 +/-44 (Z)
48. Fina IOE Buffalo Creek (10-23-087-22W4) biotite garnet granitic gneiss 2202 + 196-79 (Z)
49. HB East Virginia Hills (05-31-065-6W5) quartz diorite 2150 (Z)

Buffalo Head Terrane (Buffalo Head High)

50. Imperial Virginia Hills (06-36-063-12W5) hornblende monzonite 1998 +/-4 (Z)
51. Dome et al Peavine (16-09-075-20W5) biotite leucogranite 2072 +/-6 (Z), 1990 (Sphene)
52. Canhunter et al Golden (06-24-086-15W5) quartz monzonite 1999 +/-4 (Z)
53. Chevron Irving Cadotte (13-19-087-21W5) monzonite gneiss 2165 + 5-4 (Z)
54. CDCOG et al Helen (01-08-088-24W5) granitic gneiss 2160 + 111- 78 (Z)
55. Clear Hills 14-10 (14-10-088-2W6) felsic metavolcanic 2257 + 25-21 (Z)
56. Fina Keg River (10-27-102-21W5) monzonite gneiss 1993 + 10-4 (Z)
57. Fina et al Keg River (10-29-103-19W5) pegmatite in metasediment
58. Arco Chevron Lafond (02-23-094-10W5) granite porphyry
59. Chevron Irving Helen (16-20-087-23W5) quartzite
60. Imperial Crossroads (15-32-109-19W5) quartz monzonite
61. Union CDCOG Slave (11-15-084-14W5) granite
62. Texaco Pac-Dix A-1 (14-25-086-1W6) granite
63. Home Union HB Virginia Hills (16-12-066-13W5) metabasite

Chinchaga Low

64. Scurry Rainbow Banff Caribou Mtn #1 (06-23-112-19W5) granite porphyry 2087 + 53-44 (Z)
65. Chevron et al Sheldon (16-35-074-24W5) monzonite gneiss 2138 +/-36 (Z)
66. Two Creek 6-11 (06-11-063-16W5) granitic gneiss 2130-2150 (Z)
67. California Standard Gulf Kaybob (05-35-062-18W5) amphibolite
68. We Bakke et al Sturgeon Lake (09-27-070-23W5) granitic gneiss
69. Pan Am A-1 Bald Mtn (11-13-068-5W6) granite 2175 +/-2 (Z)
70. Pan Am Scurry C-1 Gold Ck (06-17-068-4W6) quartz diorite
71. Pan Am G-1 Gold Ck (10-16-069-5W6) garnet biotite paragneiss
72. Pan Am IOE B-1 Chinchaga (06-08-099-7W6) syenogranite
73. Imperial Clear Hills (02-28-094-9W6) monzonite gneiss

Ksituan High

74. Phillips Ksituan (07-36-077-9W6) quartz monzonite 1925 +/-25 (Z)
75. Honolulu Belloy (06-26-079-3W6) monzonite 1988 +/-3 (Z)
76. Shell Worsely (10-23-086-9W6) granitic gneiss
77. GC et al Farmton (14-27-080-11W6) granite 1900 +/-1 (Z)
78. Pan Am A-1 Doig River (10-27-090-11W6) biotite gneiss

Nova Domain

79. Imperial Rainbow Lake 16-18 (16-18-107-6W6) mafic gneiss 2808 + 30-27 (Z)
80. Imperial Rainbow Lake 2-16 (02-16-107-6W6) metarhyolite
81. Mobil Nova (15-34-109-4W6) metarhyolite >1976 (Z)

Great Bear Arc

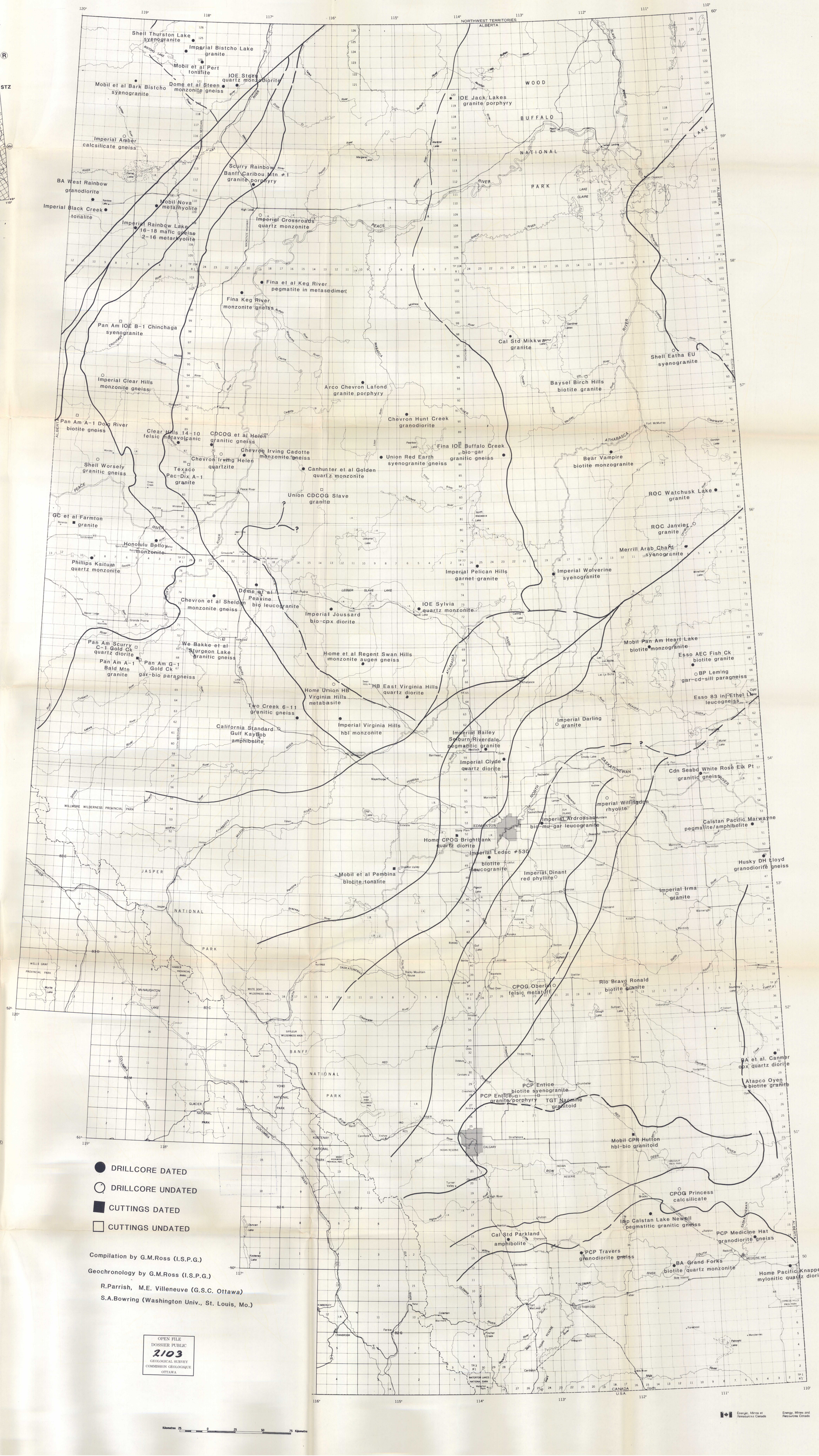
82. Mobil et al Pert (11-15-123-1W6) tonalite 1779 + 81-73 (Z)
83. Dome et al Steen (03-12-121-22W5) monzonite gneiss
84. IOE Steen (12-19-121-21W5) quartz monzodiorite
85. Shell Thurston Lake (12-30-125-2W6) syenogranite
86. Imperial Bistcho Lake (07-07-124-2W6) granite

Hottah Terrane

87. Imperial Black Creek (10-27-109-9W6) tonalite 1864 +/-7 (Z)
88. BA West Rainbow (06-33-110-10W6) granodiorite 1845 + 61-45 (Z)
89. Imperial Amber (13-11-116-8W6) calcsilicate gneiss
90. Mobil et al Bark Bistcho (14-16-121-7W6) syenogranite 1924 + 25-20 (Z)

Kiskatinaw Low

91. Home Pembina Farmington (6-18-80-15W6) granitoid



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