A COMPUTER PROGRAM FOR THE ESTIMATION OF OXIDE COMPOSITION FROM MODAL ANALYSES OF PLUTONIC ROCKS FROM THE BUCK CREEK AREA (93L/1W)

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The calculation of oxide composition of plutonic rocks from modal mineralogy affords an inexpensive method of utilizing the many petrological plots and variation diagrams designed only for silicate analyses. To this end Wahlstrom (1955, pp. 88, 89) outlined a simple method to compute weight percentage oxides from constituent minerals.

In Table 1 (pages 190 and 191) a computerized method for the same purpose has been devised to facilitate study of the crystalline plutonic rocks of the Buck Creek area. This procedure allows comparisons with the fine-grained volcanic suite for which only chemical data are available. Although the computer program has been written specifically for the TI 99-4/A computer, this is a sufficiently simple form of the Basic language to be applicable using most desk-top computers.

Percentage estimates from a choice of 11 of the most common minerals in plutonic rocks are input to the program. Output is given as weight percentage of nine of the main oxides including FeO, Fe_2O_3, and H_2O.

The method is tested using available mineral and chemical data for the Goosly syenomonzonite stock and Waste Dump granite on the Equity mine property (Table 2, page 188). Comparison of calculated and chemical results for these rocks yields generally favourable comparisons, especially for total silica, alkalies, and lime values. Some discrepancies in ferromagnesian values might be expected owing to FeO-MgO diadochy in silicate minerals and inherent analytical difficulties in determining FeO/Fe_2O_3 ratios and H_2O content. Identifications of mineral specimens using X-ray methods could improve the estimates of oxide composition.

REFERENCE

Wahlstrom, E. E. (1955): Petrographic Mineralogy, *John Wiley & Sons Inc.*, New York, 408 pp.

TABLE 1

COMPUTER PROGRAM IN T1 BASIC TO DETERMINE SILICATE COMPOSITIONS FROM MODAL MINERALOGY

```
10 REM  "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
20 REM  "X                                                    X"
40 REM  "X CALCULATE SILICATE COMPOSITIONS FROM MODAL DATA "
60 REM  "X                                                    X"
80 REM  "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
100 REM
120 REM
140 INPUT "SAMPLE NO.":Z(0)
160 INPUT "QUARTZ     ":Z(1)
180 INPUT "ORTHOCLASE":Z(2)
200 INPUT "ALBITE     ":Z(3)
220 INPUT "OLIGOCLASE":Z(4)
240 INPUT "ANDESINE   ":Z(5)
260 INPUT "LABRADORIT":Z(6)
280 INPUT "MUSCOVITE ":Z(7)
300 INPUT "BIOTITE    ":Z(8)
320 INPUT "HORNBLENDE":Z(9)
340 INPUT "AUGITE     ":X(1)
360 INPUT "MAGNETITE ":X(2)
365 REM
366 REM  S.G. FACTORS
380 Q(0)=2.65*Z(1)
400 K(0)=2.57*Z(2)
420 A(0)=2.62*Z(3)
440 O(0)=2.65*Z(4)
460 P(0)=2.68*Z(5)
480 L(0)=2.70*Z(6)
500 W(0)=2.84*Z(7)
520 B(0)=3.00*Z(8)
540 H(0)=3.30*Z(9)
560 C(0)=3.00*X(1)
580 M(0)=4.96*X(2)
582 REM
600 Y=Z(1)+Z(2)+Z(3)+Z(4)+Z(5)+Z(6)+Z(7)+Z(8)+Z(9)+X(1)+X(2)
610 REM
620 REM  CALCULATE WEIGHT %
640 Q(9)=100*Q(0)/Y
660 K(9)=100*K(0)/Y
680 A(9)=100*A(0)/Y
700 O(9)=100*O(0)/Y
720 P(9)=100*P(0)/Y
740 L(9)=100*L(0)/Y
760 W(6)=100*W(0)/Y
780 B(6)=100*B(0)/Y
800 H(9)=100*H(0)/Y
820 C(9)=100*C(0)/Y
840 M(9)=100*M(0)/Y
842 REM
850 REM
860 Q(1)=1.00*Q(9)
880 K(1)=.647*K(9)
900 K(2)=.184*K(9)
920 K(8)=.169*K(9)
940 A(1)=.687*A(9)
960 A(2)=.195*A(9)
980 A(7)=.118*A(9)
1000 O(1)=.636*O(9)
1020 O(2)=.230*O(9)
1040 O(6)=.040*O(9)
1060 O(7)=.094*O(9)
1080 P(1)=.583*P(9)
1100 P(2)=.264*P(9)
1120 P(6)=.080*P(9)
1140 P(7)=.070*P(9)
1160 L(1)=.534*L(9)
1180 L(2)=.298*L(9)
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1200 L(6)=.120*L(9)
1220 L(7)=.047*L(9)
1240 W(1)=.452*W(6)
1260 W(2)=.385*W(6)
1280 W(8)=.118*W(6)
1300 W(9)=.045*W(6)
1320 B(1)=.425*B(6)
1340 B(2)=.172*B(6)
1360 B(3)=.022*B(6)
1380 B(4)=.027*B(6)
1400 B(5)=.250*B(6)
1420 B(8)=.090*B(6)
1440 B(9)=.014*B(6)
1460 H(1)=.480*H(9)
1480 H(2)=.080*H(9)
1500 H(3)=.050*H(9)
1520 H(4)=.110*H(9)
1540 H(5)=.140*H(9)
1560 H(6)=.120*H(9)
1580 H(7)=.015*H(9)
1600 H(8)=.005*H(9)
1620 C(1)=.477*C(9)
1640 C(2)=.074*C(9)
1660 C(3)=.046*C(9)
1680 C(4)=.069*C(9)
1700 C(5)=.126*C(9)
1720 C(6)=.208*C(9)
1740 M(3)=.690*M(9)
1760 M(4)=.310*M(9)
1765 REM
1780 REM  CALCULATE OXIDE %
1800 S(0)=Q(1)+K(1)+A(1)+O(1)+P(1)+L(1)+W(1)+B(1)+H(1)+C(1)
1820 D(0)=K(2)+A(2)+O(2)+P(2)+L(2)+W(2)+B(2)+H(2)+C(2)
1840 U(0)=B(3)+H(3)+C(3)+M(3)
1860 V(0)=B(4)+H(4)+C(4)+M(4)
1880 E(0)=B(5)+H(5)+C(5)
1900 G(0)=O(6)+P(6)+H(6)+C(6)+L(6)
1920 N(0)=A(7)+O(7)+P(7)+L(7)+H(7)
1940 R(0)=K(8)+W(8)+B(8)+H(8)
1960 J(0)=W(9)+B(9)
1961 REM
1962 T=S(0)+D(0)+U(0)+V(0)+E(0)+G(0)+N(0)+R(0)+J(0)
1963 REM
1964 S(1)=100*S(0)/T
1966 D(1)=100*D(0)/T
1968 U(1)=100*U(0)/T
1970 V(1)=100*V(0)/T
1972 E(1)=100*E(0)/T
1974 G(1)=100*G(0)/T
1976 N(1)=100*N(0)/T
1978 R(1)=100*R(0)/T
1979 J(1)=100*J(0)/T
1980 PRINT "SAMPLE NO.=",Z(0)
1981 REM
2000 PRINT "SIO2   =",S(1)
2020 PRINT "AL2O3  =",D(1)
2040 PRINT "FE2O3  =",U(1)
2060 PRINT "FEO    =",V(1)
2080 PRINT "MGO    =",E(1)
2100 PRINT "CAO    =",G(1)
2120 PRINT "NA2O   =",N(1)
2140 PRINT "K2O    =",R(1)
2160 PRINT "H2O    =",J(1)
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Note: Coefficients for the conversion of mineral species to constituent oxides have been adapted from Wahlstrom (1955, pp. 88, 89).

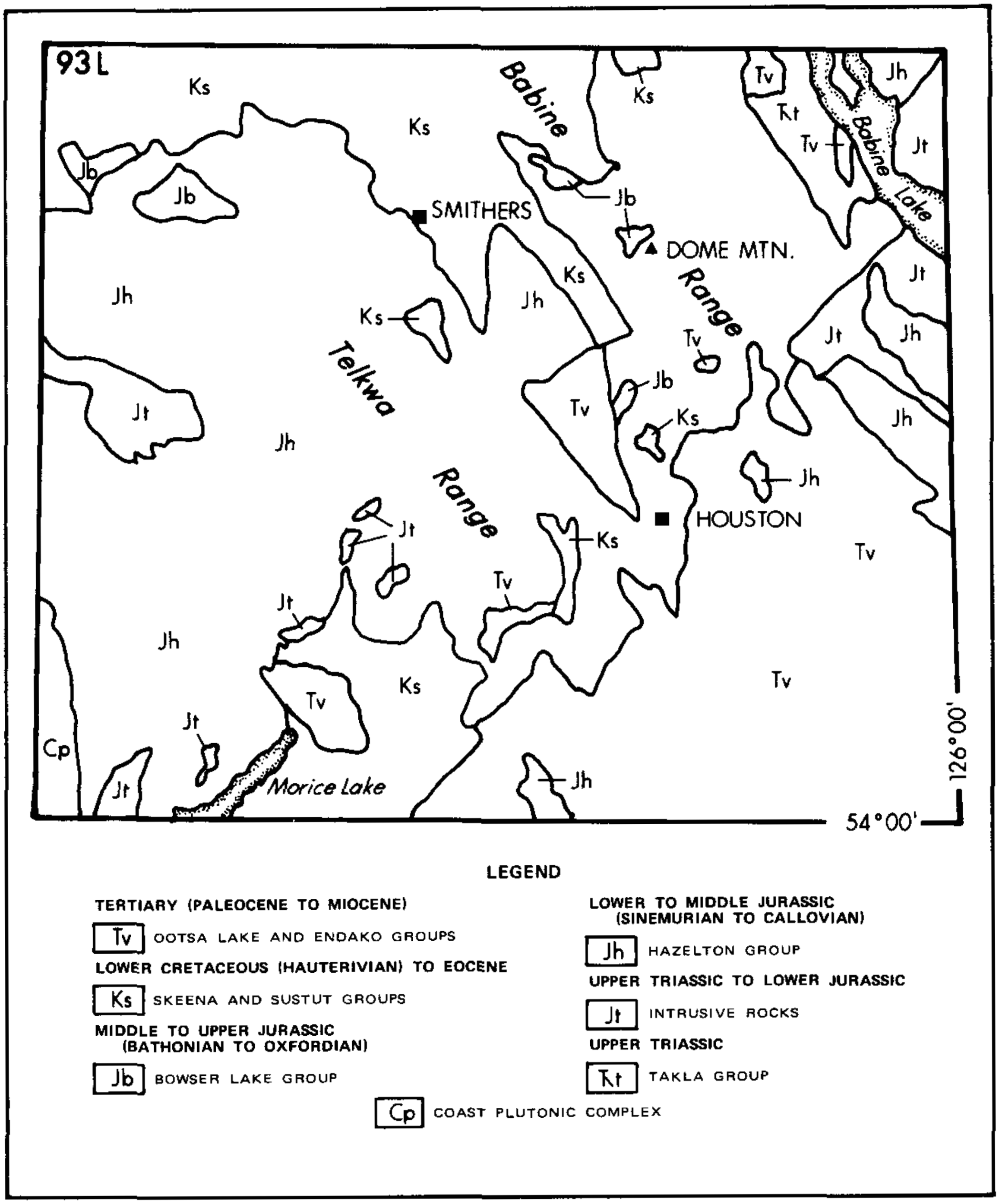

Figure 64. Location of Dome Mountain gold camp and general geology of the Smithers map-area.