NewPet for Windows

What is NewPet?

NewPet is a fairly user friendly geochemical data handling system. It has it's DOS origins in 'Igpet' by M.J.Carr many moons ago.

Bibliography

Normalization Factors

The first two sets of norm values are from George Jenner. If you want to know where he came up with them please feel free to ask him. I do, but he just keeps forgetting to tell me. He can be reached via the address at the beginning of the manual. His email address is gjenner@sparky2.esd.mun.ca. Please let me know if you get a response.

All values are ppm.

Normalized Plots

	Primitive Mantle	MORB
Cs	.007	.013
Rb	.555	1.12
Ba	6.27	14.3
Th	.088	.185
U	.022	.075
K	267	955
Nb	.65	3.58
La	.63	3.96
Ce	1.59	11.97
Sr	18.9	122
Nd	1.21	10.96
Hf	.28	2.87
Zr	9.8	90
Sm	.399	3.62
Eu	.15	1.31
Ti	1134	9000
Gd	.533	4.78
Dy	.661	5.98
Y	3.9	34.2
Er	.432	3.99
Yb	.442	3.73
Lu	.066	.56

Rare Earth Elemental Plots

	Primitive Mantle	SUN
La	.63	.329
Ce	1.59	.865
Pr	.251	.13
Nd	1.21	.63
Sm	.399	.203
Eu	.15	.077
Gd	.533	.276
Tb	.0974	.0498
Dy	.661	.343
Ho	.148	.077
Er	.432	.225
Tm	.0676	.0352

Yb	.442	.22
Lu	.066	.0339

Extended Elemental Plots

Both of these sets of norm values are from Taylor and McLennan 1985.

	Taylor Chondrite	Primitive Mantle
Li	2.4	.83
K	854	180
Rb	3.45	.55
Cs	.279	.018
Tl	.215	.006
Pb	3.65	.120
Ba	3.41	5.1
Th	.0425	.064
U	.0122	.018
Nb	.375	.56
La	.367	.551
Ce	.957	1.436
Sr	11.9	17.8
Pr	.137	.206
Nd	.711	1.607
Zr	5.54	8.3
Sm	.231	.347
Eu	.087	.131
Gd	.306	.459
Tb	.058	.087
Ti	654	960
Dy	.381	.572
Y	2.25	3.4
Ho	.0851	.128
Er	.249	.374
Tm	.0356	.054
Yb	.248	.372
Lu	.0381	.057
Sc	8.64	13
V	85	128
Zn	462	50
Cu	168	28
Ni	16500	2000
Cr	3975	3000

NewPrim

E.Anders and M.Ebihara, 1982.
Solar-System abundances of the elements,
Geochimica et Cosmochimica Acta, vol 46, pp.2363-2380.

H.J.M.Brown, 1979.
"Environmental Chemistry of the Elements," Academic Press, London, 333 pp.

B.Mason and C.B.Moore, 1982.
"Principles of Geochemistry,"
Wiley, New York, 344 pp.

S-S.Sun, 1982.
Chemical composition and origin of the Earth's primitive mantle,
Geochimica et Cosmochimica Acta, vol.46, pp.179-192.

S.R.Taylor and S.M.McLennan, 1985.
"The Continental Crust: Its Composition and Evolution,"
Blackwell, Oxford, 312 pp.

Appendix

Elemental to Oxide Concentraions

Element		Oxide	
Ag	-->	Ag2O	1.0741
Al	-->	Al2O3	1.88988
As	-->	As2O3	1.3203
As	-->	As2O5	1.5339
Au	-->	Au2O	1.0406
B	-->	B2O3	3.2202
Ba	-->	BaO	1.1165
Be	-->	BeO	2.7758
Bi	-->	Bi2O5	1.1914
C	-->	CO2	3.6644
Ca	-->	CaO	1.3992
Ca	-->	CaCO3	2.2973
Ce	-->	CeO2	1.2284
Ce	-->	Ce2O3	1.1713
Co	-->	CoO	1.2715
Cr	-->	Cr2O3	1.4615
Cs	-->	Cs2O	1.0602
Cu	-->	CuO	1.2518
Dy	-->	Dy2O3	1.1477
Er	-->	Er2O3	1.1579
Eu	-->	Eu2O3	1.1579
Fe2+	-->	FeO	1.2865
Fe3+	-->	Fe2O3	1.4297
Fe	-->	FeS	1.5741
Ga	-->	Ga2O3	1.3442
Gd	-->	Gd2O3	1.1526
Ge	-->	GeO2	1.4408
Hf	-->	HfO2	1.1793
Hg	-->	HgO	1.0798
Ho	-->	Ho2O3	1.1455
In	-->	In2O3	1.2091
Ir	-->	IrO	1.0832
K	-->	K2O	1.2046
K	-->	KCl	2.1029
La	-->	La2O3	1.1728
Li	-->	Li2O	2.1527
Lu	-->	Lu2O3	1.1371
Mg	-->	MgO	1.6579
Mn	-->	MnO	1.2912
Mn	-->	MnO2	1.5825
Mo	-->	MoO3	1.5003
N	-->	N2O5	3.8551
Na	-->	Na2O	1.3480
Nb	-->	Nb2O5	1.4305
Nd	-->	Nd2O3	1.1664
Ni	-->	NiO	1.2725
Os	-->	OsO	1.0841
P	-->	P2O5	2.2916
Pb	-->	PbO	1.0772
Pb	-->	PbO2	1.1544
Pd	-->	PdO	1.1504

Pr	-->	Pr2O3	1.1703	
Pr	-->	Pr6O11		1.2082
Pt	-->	PtO	1.0820	
Rb	-->	Rb2O	1.0936	
Re	-->	ReO	1.0859	
Rh	-->	RhO	1.5555	
Ru	-->	RuO	1.1583	
S	-->	SO3	2.4972	
Sb	-->	Sb2O5	1.3284	
Sc	-->	Sc2O3	1.5338	
Se	-->	SeO3	1.6079	
Si	-->	SiO2	2.1392	
Sm	-->	Sm2O3		1.1596
Sn	-->	SnO2	1.2696	
Sr	-->	SrO	1.1826	
Ta	-->	Ta2O5	1.2211	
Tb	-->	Tb2O3	1.1510	
Tb	-->	Tb4O7	1.1762	
Te	-->	TeO3	1.3762	
Th	-->	ThO2	1.1379	
Ti	-->	TiO2	1.6681	
Tl	-->	Tl2O3	1.1174	
Tm	-->	Tm2O3		1.1421
U	-->	UO2	1.1344	
U	-->	UO3	1.2017	
U	-->	U3O8	1.1792	
V	-->	V2O5	1.7852	
W	-->	WO3	1.2610	
Y	-->	Y2O3	1.2699	
Yb	-->	Yb2O3	1.1387	
Zn	-->	ZnO	1.2448	
Zr	-->	ZrO2	1.3508	

You have to multiply by the following to convert from ppm to wt%:

ppm	-->	wt%*100	0.0001
ppm	-->	wt%	0.000001

Conversion Factors

Elemental to Oxide Concentraions
Oxide to Elemental Concentrations

Recalculations

These recalculations do not affect the data in the data file. They are only done on the data in memory.

Data recalculation is done in the following order:

1) Iron is recalculated. Depending on the option selected.

FeO* = FeO + Fe2O3 * 0.89981 (total iron as FeO)

Fe2O3* = Fe2O3 + FeO * 1.11135 (total iron as Fe2O3)

FeO Calc = FeO / (FeO + Fe2O3)

2) If the anhydrous recalculation flag is set to "Y", the samples are recalculated anhydrously. The program checks to see if the total of the majors is between 99.98% and 100.02%. (SiO2 to P2O5) If the total lies in this range, the sample is considered to be anhydrous and will not be recalculated.

Anhydrous Recalc Factor = 100 / (majors - (LOI+H2O+CO2))

All elements except the Radiogenics are then multiplied by this factor.

3) The Mg number is then calculated.

Mg# = 100 * (MgO / MgOMW) / ((FeO* / FeOMW) + (MgO / MgOMW))

4) The Solidification Index is calculated next.

SI = 100 * (MgO / (Fe2O3 + FeO + MgO + Na2O + K2O))

Oxide to Elemental Concentrations

Oxide	Element		
Al2O3	-->	Al	0.52913
BaO	-->	Ba	0.89567
CaO	-->	Ca	0.71469
CaCO3	-->	Ca	0.40044
CeO2	-->	Ce	0.81409
CoO	-->	Co	0.78650
Cr2O3	-->	Cr	0.68425
Cs2O	-->	Cs	0.94323
CuO	-->	Cu	0.79885
FeO	-->	Fe+2	0.77731
Fe2O3	-->	Fe+3	0.69943
FeO	-->	Fe2O3	1.11135
Fe2O3	-->	FeO	0.89981
FeS	-->	Fe	0.63327
Ga2O3	-->	Ga	0.74393
K2O	-->	K	0.83013
Li2O	-->	Li	0.46452
MnO	-->	Mn	0.77443
MgO	-->	Mg	0.60317
Na2O	-->	Na	0.74191
NiO	-->	Ni	0.78578
P2O5	-->	P	0.43646
Rb2O	-->	Rb	0.91442
SiO2	-->	Si	0.46720
SrO	-->	Sr	0.84560
TiO2	-->	Ti	0.59950
ZrO2	-->	Zr	0.74030

You also have to multiply by the following to convert from wt% to ppm:

wt% --> ppm 1 000 000

wt%*100 --> ppm 10 000

Discrimination Plots

R.A.Batchelor and P.Bowden, 1985
F.Debon and P.Le Fort, 1983
J.B.Gill, 1981
T.N.Irvine and W.R.A.Barager, 1971
L.S.Jensen, 1976
R.Kerrich, 1989
P.D.Maniar and P.M.Piccoli, 1989
M.Meschede, 1986
A.Miyashiro, 1974
E.D.Mullen, 1983
M.A.Peacock, 1931
J.A.Pearce, 1975
J.A.Pearce, 1983
J.A.Pearce and J.R.Cann, 1973
J.A.Pearce and M.J.Norry, 1979
J.A.Pearce, N.B.W.Harris and A.G.Tindle, 1984
J.A.Pearce, T.Alabaster, A.W.Shelton and M.P.Searle, 1981
T.H.Pearce, B.E.Gorman and T.C.Birkett, 1977
J.W.Shervais, 1982
J.B.Whalen, K.L.Currie and B.W.Chappell, 1987
J.A.Winchester and P.A.Floyd, 1977
D.A.Wood, 1980
D.A.Wood, J-L.Joron and M.Treuil,1979

F.Debon and P.Le Fort, 1983

A chemical-mineralogical classification of common plutonic rocks and associations,
Transactions of the Royal Society of Edinburgh Earth Sciences, vol.**73**, pp.**135-149**.

Figure 1
Figure 2a
Figure 2b

R.A.Batchelor and P.Bowden, 1985

Petrogenetic interpretation of granitoid rock series using multicationic parameters, **Chemical Geology**, vol.**48**, pp.**43-55**.

J.B.Gill, 1981

"**Orogenic Andesites and Plate Tectonics,**"
Springer-Verlag, Berlin, 389 pp.

figure 5.16a
figure 5.16b
figure 5.16c
figure 12

T.N.Irvine and W.R.A.Barager, 1971

A guide to the chemical classification of the common volcanic rocks,
Canadian Journal of Earth Sciences, vol.**8**, pp.**523-548**.

Figure 2
Figure 3

L.S.Jensen, 1976

A New Cation Plot for Classifying Subalkalic Volcanic Rocks,
Ontario Division of Mines, **MP 66**, 22p.

Figure 1

R.Kerrich, 1989

Geochemical evidence on the sources of fluids and solutes for shear zone hosted mesothermal gold deposits, in: J.T.Bursnall (ed.), "Mineralization and Shear Zones", **GAC Short Course Notes**, vol.**6**, pp.**129-198**.

P.D.Maniar and P.M.Piccoli, 1989

P.D.Maniar and P.M.Piccoli, 1989
Tectonic discrimination of granitoids,
Geological Society of America Bulletin, vol.**101**, pp.**635-643**.

M.Meschede, 1986

A method of discriminating between different types of mid-ocean ridge basalts and continental tholeiites with the Nb-Zr-Y diagram,
Chemical Geology, vol.**56**, pp.**207-218**.

Figure 1

A.Miyashiro, 1974

Volcanic rock series in island arcs and active continental margins,
American Journal of Science, vol.**274**, pp.**321-355**.

E.D.Mullen, 1983

MnO/TiO2/P2O5: a minor element discriminant for basaltic rocks of oceanic environments and its implications for petrogenesis,
Earth and Planetary Science Letters, vol.**62**, pp.**53-62**.

Figure 1

M.A.Peacock, 1931

Classification of igneous rock series,
Journal of Geology, vol.**39**, pp.**54-67**.

J.A.Pearce, 1975

Basalt geochemistry used to investigate past tectonic environments on Cyprus, **Tectonophysics**, vol.**25**, pp.**41-67**.

Figure ?

J.A.Pearce, 1983

Role of the sub-continental lithosphere in magma genesis at active continental margins,
in: C.J.Hawkesworth and M.J.Norry (eds.), "**Continental Basalts and Mantle Xenoliths**,"
Shiva Publishing Limited, pp.230-249.

J.A.Pearce and J.R.Cann, 1973

Tectonic setting of basic volcanic rocks determined using trace element analyses,
Earth and Planetary Science Letters, vol.**19**, pp.**290-300**.

Figure 2
Figure 3
Figure 4

J.A.Pearce and M.J.Norry, 1979

Petrogenetic Implications of Ti, Zr, Y, and Nb Variations in Volcanic Rocks,
Contributions to Mineralogy and Petrology, vol.**69**, pp.**33-47**.

Figure 3

J.A.Pearce, N.B.W.Harris and A.G.Tindle, 1984

Trace element discrimination diagrams for the tectonic interpretation of granitic rocks,
Journal of Petrology, vol.**25**, pp.**956-983**.

Figure 3
Figure 4

J.A.Pearce, T.Alabaster, A.W.Shelton and M.P.Searle, 1981

The Oman ophiolite as a Cretaceous arc-basin complex: evidence and implications.
Philosophical Transactions of the Royal Society of London, **A300**, pp. **299-317**.

T.H.Pearce, B.E.Gorman and T.C.Birkett, 1977

The relationship between major element chemistry and tectonic environment of basic and intermediate volcanic rocks,
Earth and Planetary Science Letters, vol.**36**, pp.**121-132**.

J.W.Shervais, 1982

Ti-V plots and the petrogenesis of modern and ophiolitic lavas,
Earth and Planetary Science Letters, vol.**59**, pp.**101-118**.

Figure 2

J.B.Whalen, K.L.Currie and B.W.Chappell, 1987

A-type granites: geochemical characteristics, discrimination and petrogenesis,
Contributions to Mineralogy and Petrology, vol.**95**, pp.**407-419**.

Figure 5a
Figure 5b

J.A.Winchester and P.A.Floyd, 1977

Geochemical discrimination of different magma series and their differentiation products using immobile elements,
Chemical Geology, vol.**20**, pp.**325-343**.

Figure 2
Figure 6

D.A.Wood, 1980

The application of a Th-Hf-Ta diagram to problems of tectonomagmatic classification and to establishing the nature of crustal contamination of basaltic lavas of the British Tertiary volcanic province,
Earth and Planetary Science Letters, vol.**50**, pp.**11-30**.

Figure 1a

D.A.Wood, J-L.Joron and M.Treuil,1979

A re-appraisal of the use of trace elements to classify and discriminate between magma series erupted in different tectonic settings.
Earth and Planetary Science Letters, vol.**45**, pp.**326-336**.

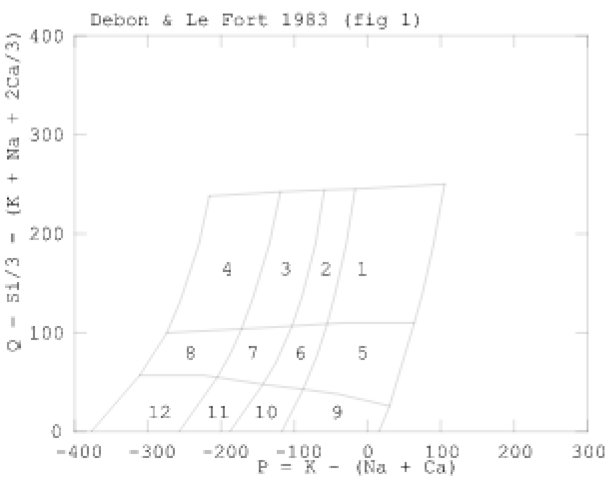
Discrimination Plot Abbreviations

Debon and Le Fort 1983: figure 1
Debon and Le Fort 1983: figure 2a
Debon and Le Fort 1983: figure 2b
Gill 1981: figure 5.16a
Gill 1981: figure 5.16b
Gill 1981: Figure 5.16c
Gill 1981: figure 12
Irvine and Baranger 1971: figure 2
Irvine and Baranger1971: figure 3
Jensen 1976: figure 1
LeMaitre 1989: figure B.12
LeMaitre 1989: figure B.14
LeMaitre 1989: figure B.15
Meschede 1986: figure 1
Middlemost 1985: figure 3.3.3
Middlemost 1985: figure 3.3.6
Mullen 1983: figure 1
Pearce 1975: figure ?
Pearce and Cann 1973: figure 2
Pearce and Cann 1973: figure 3
Pearce and Cann 1973: figure 4
Pearce and Norry 1979: figure 3
Pearce et al 1984: figure 3
Pearce et al 1984: figure 4
Shervais 1982: figure 2
Whalen et al 1987: figure 5a
Whalen et al 1987: figure 5b
Winchester and Floyd 1977: figure 2
Winchester and Floyd 1977: figure 6
Wood 1980: figure 1a

Debon and Le Fort 1983: figure 1

	Plutonic	Volcanic
1	Granite	Rhyolite
2	Adamellite	Dellenite
3	Granodiorite	Rhyodacite
4	Tonalite (trodhjemite)	Dacite
5	Quartz Syenite	Quartz Trachyte
6	Quartz Monzonite	Quartz Latite
7	Quartz Monzodiorite	Quartz Latiandesite
8	Quartz Diorite	Quartz Andesite
9	Syenite	Trachyte
10	Monzonite	Latite
11	Monzogabbro	Latibasalt
12	Gabbro	Basalt

Ref: Debon and Le Fort 1983



Debon and Le Fort 1983: figure 2a

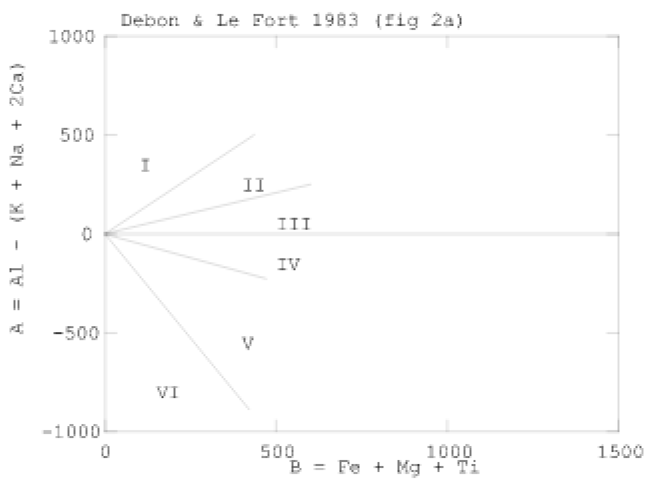
Peraluminous

I	muscovite or muscovite > biotite
II	biotite > muscovite
III	biotite

Metaluminous

IV	mainly hornblende and biotite (biotite, hornblende, orthopyroxene, clinopyroxene, primary epidote, sphene)
V	high prop cpx +/- primary epidote +/- sphene
VI	exceptional igneous rocks
LG	Leuco Granitoids

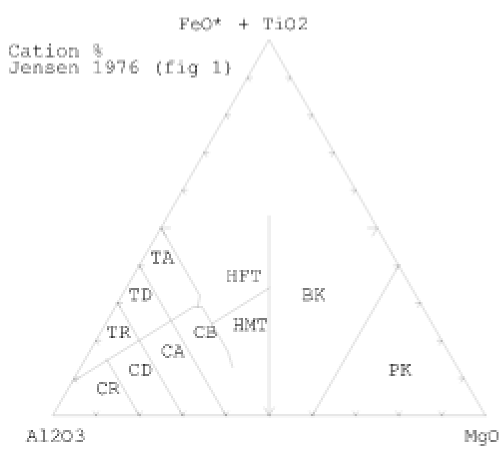
Ref: Debon and Le Fort 1983



Jensen 1976: figure 1

TR	Tholeiitic Rhyolite
TD	Tholeiitic Dacite
TA	Tholeiitic Andesite
CR	Calc-alkaline Rhyolite
CD	Calc-alkaline Dacite
CA	Calc-alkaline Andesite
CB	Calc-alkaline Basalt
HFT	High-Fe Tholeiite
HMT	High-Mg Tholeiite
BK	Basaltic Komatiite
PK	Peridotitic Komatiite

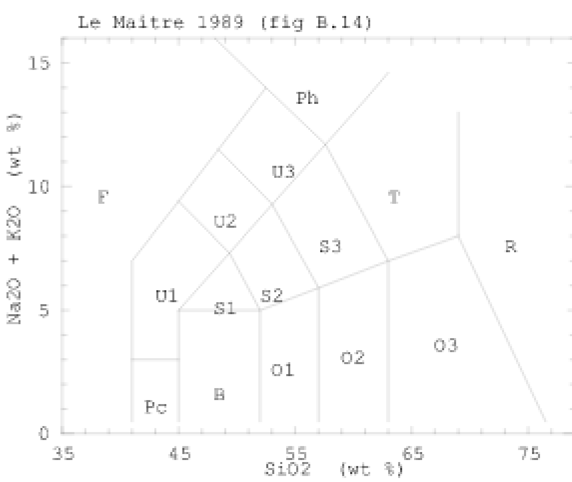
Ref: Jensen 1976



LeMaitre 1989: figure B.14

F	foidite
Pc	picrobasalt
B	basalt
O1	basaltic andesite
O2	andesite
O3	dacite
S1	trachybasalt
S2	basaltic trachyandesite
S3	trachyandesite
T	trachyte (q < 20%)
	trachydacite (q > 20%)
R	rhyolite
U1	tephrite (ol < 10%)
	basanite (ol > 10%)
U2	phonotephrite
U3	tephriphonolite
Ph	phonolite

Ref: LeMaitre 1989



General

K.G.Cox, J.D.Bell and R.J.Pankhurst, 1979
C.J.Hughes, 1982
R.W.Le Maitre (ed.), 1989
E.A.K.Middlemost, 1985
P.J.Potts, A.G.Tindle and P.C.Webb, 1992
A.Streckeisen, 1976

K.G.Cox, J.D.Bell and R.J.Pankhurst, 1979

"**The Interpretation of Igneous Rocks,**"
George Allen and Unwin, London.

C.J.Hughes, 1982

"**Igneous Petrology,**"
Elsevier, Amsterdam.

R.W.Le Maitre (ed.), 1989

"A Classification of Igneous Rocks and Glossary of Terms,"
Blackwell, Oxford, 193 pp.

Figure B.12
Figure B.14
Figure B.15

E.A.K.Middlemost, 1985

"Magmas and Magmatic Rocks,"
Longman Group Limited, Essex.

Figure 3.3.3
Figure 3.3.6

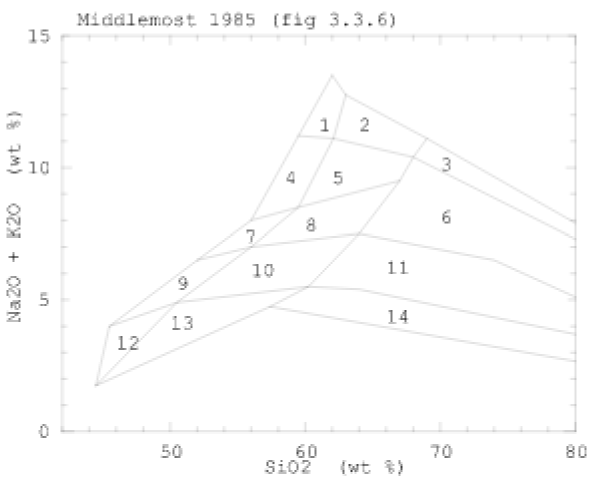
A.Streckeisen, 1976

To each plutonic rock its proper name,
Earth-Science Reviews, vol.**12**, pp.**1-33**.

Middlemost 1985: figure 3.3.6

1	Alkali feldspar Syenite
2	Alkali feldspar Quartz Syenite
3	Alkali feldspar Granite
4	Syenite
5	Quartz Syenite
6	Granite
7	Monzonite
8	Quartz Monzonite
9	Monzodiorite
10	Quartz Monzodiorite
11	Granodiorite
12	Diorite and Gabbro
13	Quartz Diorite
14	Tonalite

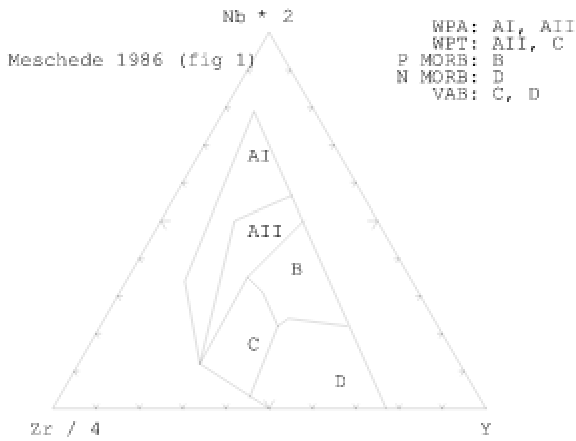
Ref: Middlemost 1985



Meschede 1986: figure 1

P MORB, N MORB Mid-Ocean Ridge Basalts
VAB Volcanic Arc Basalts
WPA Within Plate Alkaline Basalts
WPT Within Plate Tholeiites

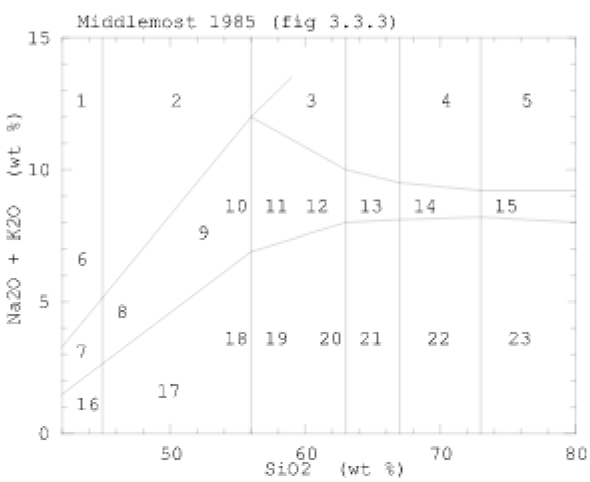
Ref: Meschede 1986



Middlemost 1985: figure 3.3.3

1	Nephelinite
2	Phonolite
3	Alkali trachyte
4	Pantellerite
5	Comendite
6	Basanite
7	Alkali picrite
8	Alkali olivine basalt
9	Trachybasalt
10	Trachyandesite basalt
11	Trachyandesite
12	Trachyte
13	Trachydacite
14	Trachyrhyolite
15	Alkali rhyolite
16	Picrite
17	Tholeiite basalt
18	Andesite basalt
19	Andesite
20	Andesite dacite
21	Dacite
22	Rhyolite dacite
23	Rhyolite

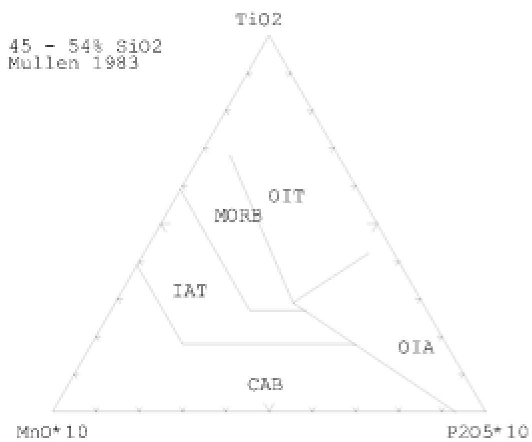
Ref: Middlemost 1985



Mullen 1983: figure 1

CAB Calc-Alkaline Basalts
IAT Island Arc Tholeiites
MORB Mid-Ocean Ridge and Marginal Basin Basalts
OIA Ocean Island Alkalic Basalts
OIT Ocean Island Tholeiites

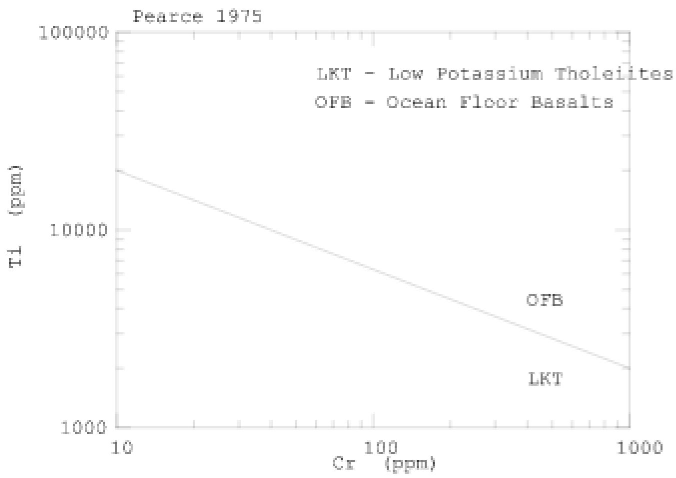
Ref: Mullen 1983



Pearce 1975: figure ?

LKT   Low Potassium Tholeiites
OFB   Ocean Floor Basalts

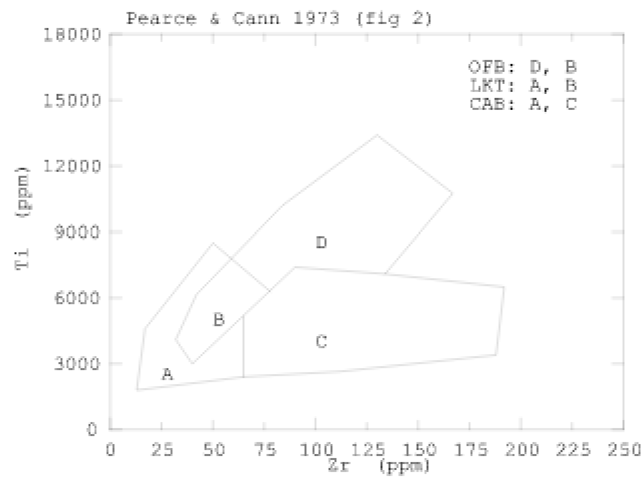
Refs: Pearce 1975



Pearce and Cann 1973: figure 2

CAB	Calc-Alkaline Basalts
IAB	Island Arc Basalts
LKT	Low Potassium Tholeiites
OFB	Ocean Floor Basalts
WPB	Within Plate Basalts

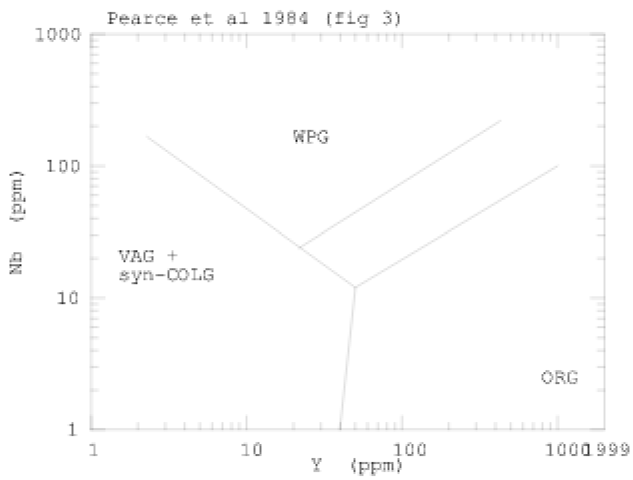
Ref: Pearce and Cann 1973



Pearce et al 1984: figure 3

ORG	Ocean Ridge Granites
syn-COLG	Syn-Collision Granites
VAG	Volcanic Arc Granites
WPG	Within Plate Granites

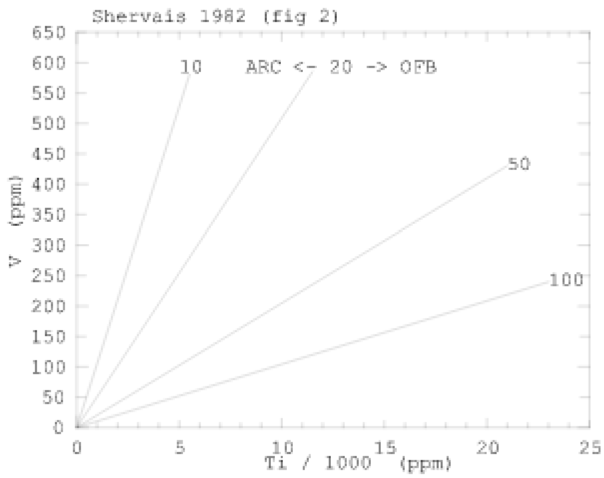
Ref: Pearce et al 1984



Shervais 1982: figure 2

ARC ARC Tholeiites
OFB Ocean Floor Basalts

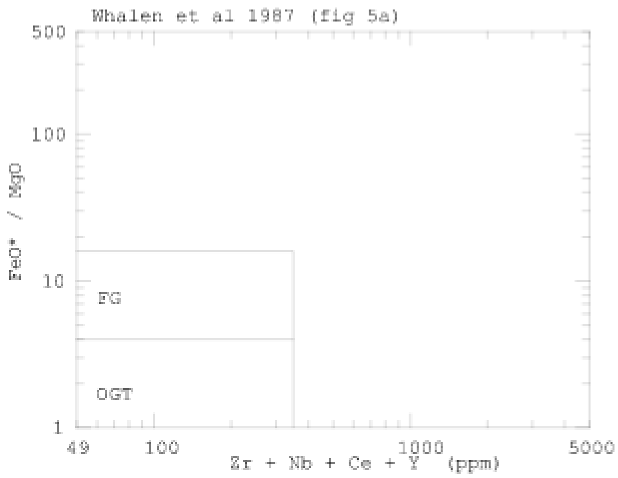
Ref: Shervais 1982



Whalen et al 1987: figure 5a

FG Fractionated Felsic Granites
OGT Orogenic Granite Types (?)
(unfractionated M-, I- and S-type granites)

Ref: Whalen et al 1987



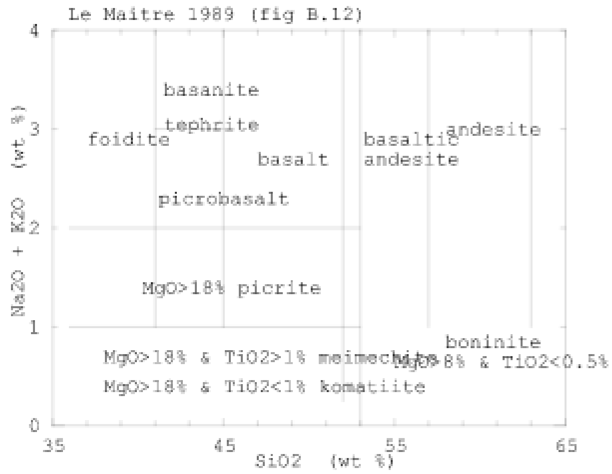
Wood 1980: figure 1a

A	N-type MORB
B	E-type MORB and tholeiitic WPB and differentiates
C	Alkaline WPB and differentiates
D	Destructive PMB and differentiates
WPB	within-plate basalts
PMB	plate-margin basalts
MORB	mid-ocean ridge basalts

Ref: Wood 1980

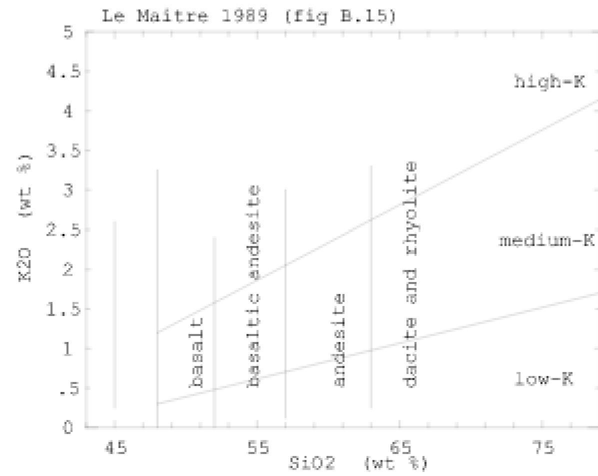
LeMaitre 1989: figure B.12

Ref: LeMaitre 1989



LeMaitre 1989: figure B.15

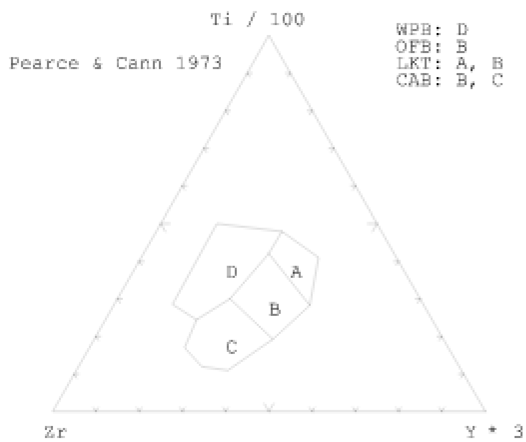
Ref: LeMaitre 1989



Pearce and Cann 1973: figure 3

CAB	Calc-Alkaline Basalts
IAB	Island Arc Basalts
LKT	Low Potassium Tholeiites
OFB	Ocean Floor Basalts
WPB	Within Plate Basalts

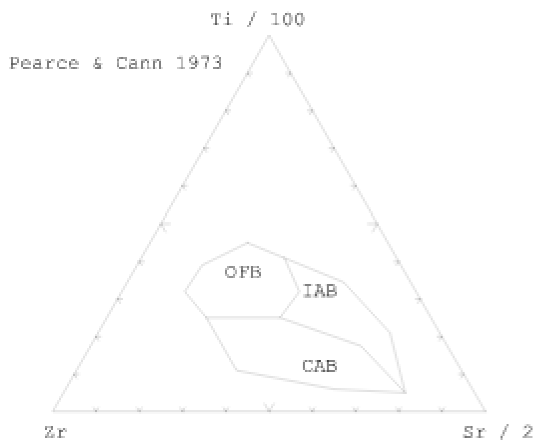
Ref: Pearce and Cann 1973



Pearce and Cann 1973: figure 4

CAB	Calc-Alkaline Basalts
IAB	Island Arc Basalts
LKT	Low Potassium Tholeiites
OFB	Ocean Floor Basalts
WPB	Within Plate Basalts

Ref: Pearce and Cann 1973



Debon and Le Fort 1983: figure 2b

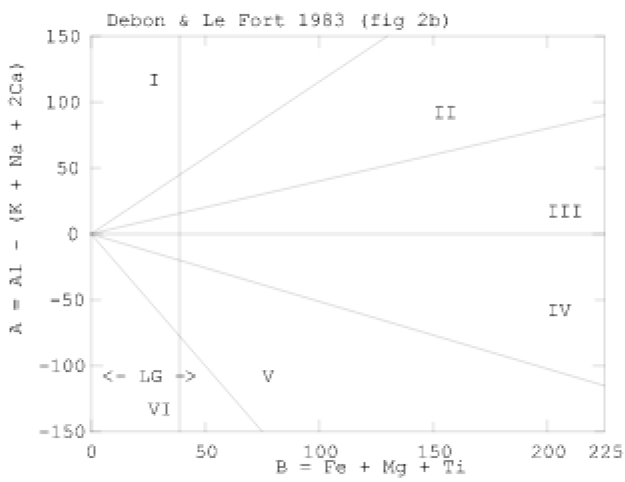
Peraluminous

I	muscovite or muscovite > biotite
II	biotite > muscovite
III	biotite

Metaluminous

IV	mainly hornblende and biotite (biotite, hornblende, orthopyroxene, clinopyroxene, primary epidote, sphene)
V	high prop cpx +/- primary epidote +/- sphene
VI	exceptional igneous rocks
LG	Leuco Granitoids

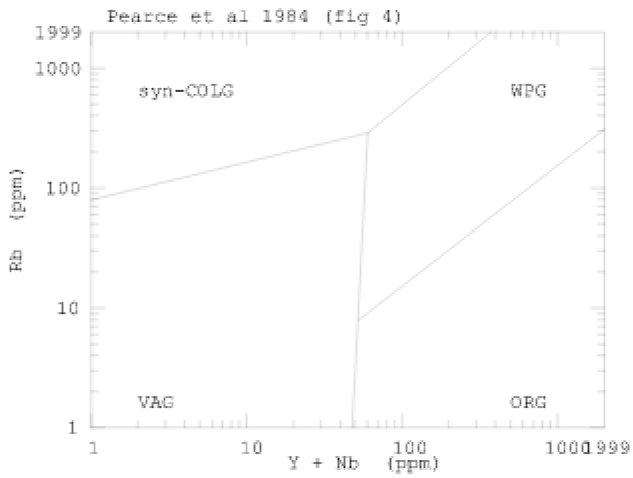
Ref: Debon and Le Fort 1983



Pearce et al 1984: figure 4

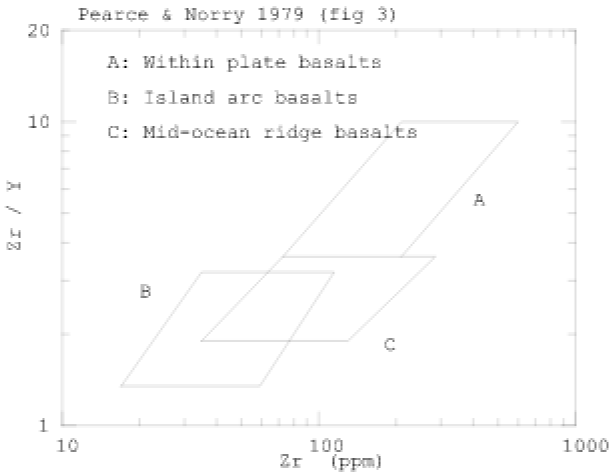
ORG	Ocean Ridge Granites
syn-COLG	Syn-Collision Granites
VAG	Volcanic Arc Granites
WPG	Within Plate Granites

Ref: Pearce et al 1984



Pearce and Norry 1979: figure 3

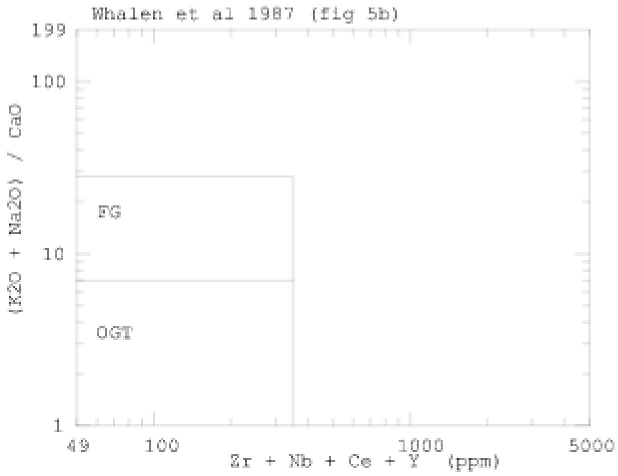
Ref: Pearce and Norry 1979



Whalen et al 1987: figure 5b

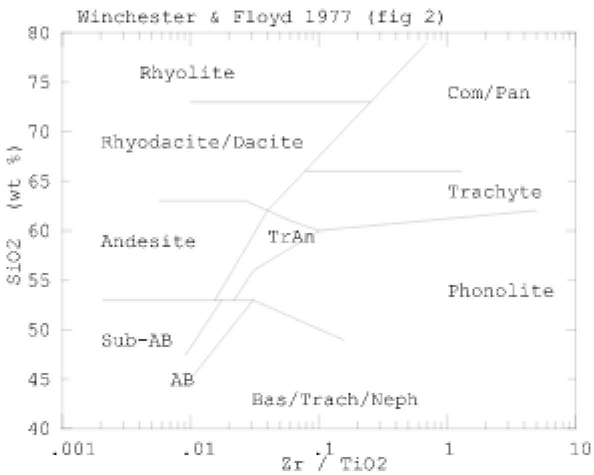
FG   Fractionated Felsic Granites
OGT   Orogenic Granite Types (?)
      (unfractionated M-, I- and S-type granites)

Ref: Whalen et al 1987



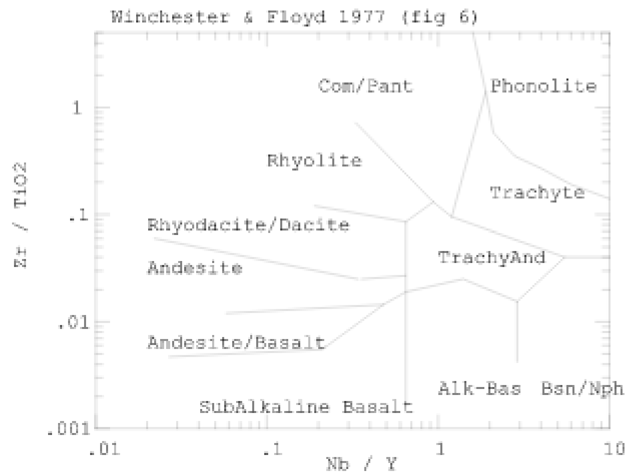
Winchester and Floyd 1977: figure 2

Ref: Winchester and Floyd 1977



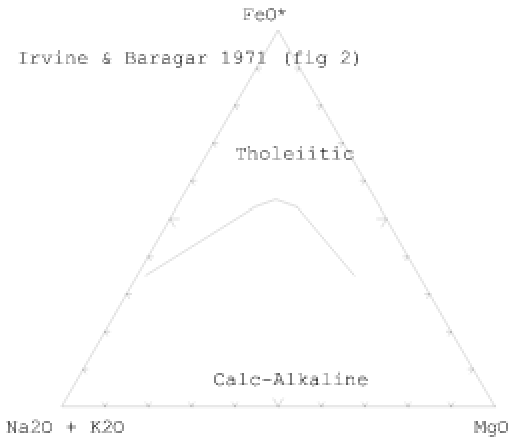
Winchester and Floyd 1977: figure 6

Ref: Winchester and Floyd 1977



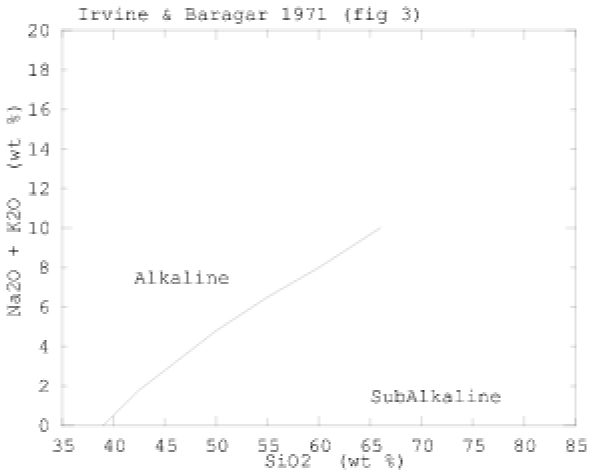
Irvine and Baranger 1971: figure 2

Ref: Irvine and Baranger 1971



Irvine and Baranger1971: figure 3

Ref: Irvine and Baranger 1971



Normative Refs

M.H.F.Kosinowski, 1982
R.W.LeMaitre, 1976
E.A.K.Middlemost, 1989

E.A.K.Middlemost, 1989

Iron oxidation ratios, norms and the classification of volcanic rocks,
Chemical Geology, vol.**77**, pp.**19-26**.

R.W.LeMaitre, 1976

Some Problems of the Projection of Chemical Data into Mineralogical Classifications,
Contributions to Mineralogy and Petrology, vol.**56**, pp.**181-189**.

M.H.F.Kosinowski, 1982

MSONRM, a FORTRAN program for the improved version of mesonorm calculation,
Computers & Geosciences, vol.**8**, no.**1**, pp.**111-120**.

Melt Modelling

C.J.Allegre and J.F.Minister, 1978
C.J.Allegre, M.Treuil, J.F.Minister and F.Albarade, 1977
J.G.Arth, 1976
W.K.Conrad, 1987
D.J.DePaolo, 1981
R.Powell, 1984

R.Powell, 1984

Inversion of the assimilation and fractional crystallization (AFC) equations; characterization of contaminants from isotope and trace element relationships in volcanic suites,
Journal of Geological Society London, vol.**141**, pp.**447-452**.

D.J.DePaolo, 1981

Trace element and isotopic effects of combined wallrock assimilation and fractional crystallization,
Earth and Planetary Science Letters, vol.**53**, pp.**189-202**.

W.K.Conrad, 1987

A FORTRAN program for simulating major- and trace-element variations during rayleigh fractionation with melt replenishment or assimilation,
Computers and Geosciences, vol.**13**, no.**1**, pp.**1-12**.

J.G.Arth, 1976

Behavior of trace elements during magmatic processes - a summary of theoretical models and their applications,
Journal of Research USGS, vol.**4**, no.**1**, pp.**41-47**.

C.J.Allegre, M.Treuil, J.F.Minister and F.Albarade, 1977

Systematic use of trace elements in igneous processes. Part 1: Fractional crystallization processes in volcanic suites,
Contributions to Mineralogy and Petrology, vol.**60**, pp.**57-75**.

C.J.Allegre and J.F.Minister, 1978

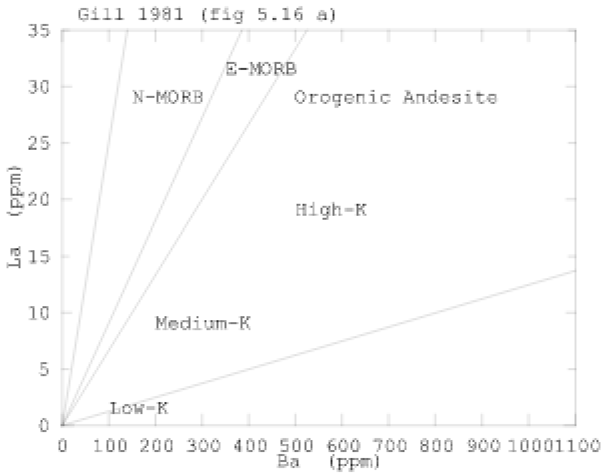
Quantitative models of trace element behaviour in magmatic processes,
Earth and Planetary Science Letters, vol.**38**, pp.**1-25**.

P.J.Potts, A.G.Tindle and P.C.Webb, 1992

"Geochemical Reference Material Compositions: Rocks, Minerals, Sediments, Soils, Carbonates, Refractories & Ores Used in Research & Industry,"
CRC Press, Boca Raton.

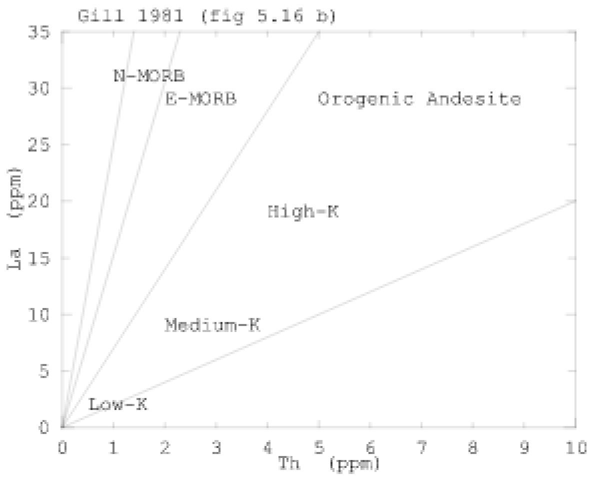
Gill 1981: figure 5.16a

Ref: Gill 1981



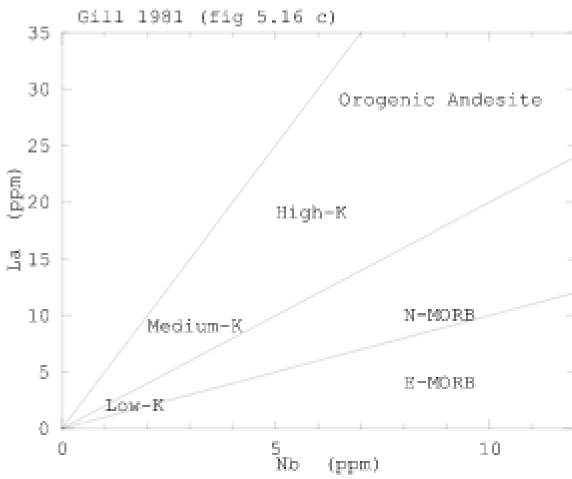
Gill 1981: figure 5.16b

Ref: Gill 1981



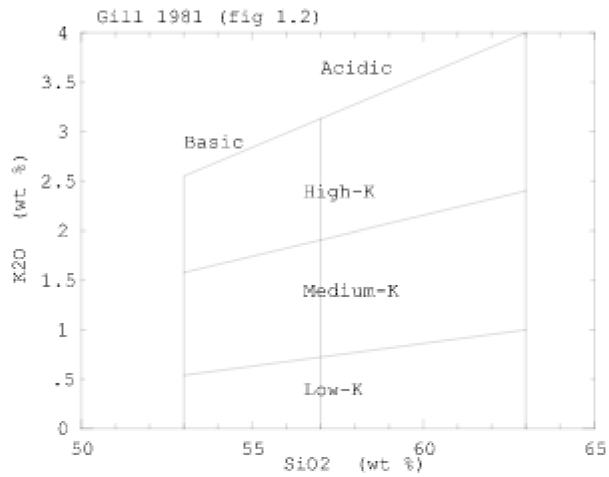
Gill 1981: Figure 5.16c

Ref: Gill 1981



Gill 1981: figure 12

Ref: Gill 1981



Registration Info

NewPet is Shareware. In other words, you can try it before you buy it. You may distribute copies of this package as long as the files are not modified in any way and are distributed intact. You cannot charge for copies of the program itself, only the media.

If you like it, let us know. A voluntary registration of **$25 CDN** (no GST or PST) or **$20 US** would be greatly appreciated and would help to expedite future enhancements. I also keep a mailing list of users and will let you know when a major revision is available.

Make any cheques or money orders payable to:

> **Memorial University of Newfoundland**
> **Department of Earth Sciences**

and send them along with your mailing address to the address below.
We can also handle credit cards (**Visa** or **Master Card** only, please include expiration date and signature) and purchase orders. In these cases we need a hard copy of the request (a fax will do.)

Please indicate what size disk that you prefer (3.5" or 5.25".)

If you have questions, suggestions, or are registering please contact:

Daryl Clarke
Memorial University of Newfoundland
Department of Earth Sciences
Centre for Earth Resources Research
St. John's, NF, Canada A1B 3X5

(709) 737 8346 telephone
(709) 737 8142
(709) 737 2589 fax

daryl@sparky2.esd.mun.ca email
daryl@cs.mun.ca

Getting NewPet via Internet

Getting NewPet via the Internet

If you have Internet ftp access, you can get the latest version of NewPet at the following site:
sparky2.esd.mun.ca (IP address 134.153.11.101)

Here is a sample session showing the procedure. What you have to type is in plain text.
What you see is in **bold** text.

ftp -i

ftp> open sparky2.esd.mun.ca

Connected to sparky2.esd.mun.ca.

220 sparky2 FTP server (SunOS 4.1) ready.

Name (sparky2.esd.mun.ca:daryl): ftp

331 Guest login ok, send ident as password.

Password: daryl@garfield.cs.mun.ca

230 Guest login ok, access restrictions apply.

ftp> dir

200 PORT command successful.

150 ASCII data connection for /bin/ls (134.153.1.1,3725) (0 bytes).

total 6

dr-xr-xr-x 2 14 1 512 Apr 1 1991bin

dr-xr-xr-x 2 14 1 512 Apr 1 1991 dev

dr-xr-xr-x 2 14 1 512 Jun 3 1991 etc

drwxr-xr-x 2 0 1 512 Oct 8 18:54 jody

drwxr-xr-x 3 11 1 512 Sep 14 10:41 pub

dr-xr-xr-x 3 14 1 512 Apr 1 1991 usr

226 ASCII Transfer complete.

364 bytes received in 0.75 seconds (0.48 Kbytes/s)

ftp> cd pub

250 CWD command successful.

ftp> dir

200 PORT command successful.

150 ASCII data connection for /bin/ls (134.153.1.1,3731) (0 bytes).

total 7

drwxr-xr-x   2 11   10   512 Sep 14 10:43 geo-progs

-rwxr-xr-x   1 11   10   5647 Jun 30 17:06 price.xrf

226 ASCII Transfer complete.

139 bytes received in 0.1 seconds (1.3 Kbytes/s)

ftp> cd geo-progs

250 CWD command successful.

ftp> dir

200 PORT command successful.

150 ASCII data connection for /bin/ls (134.153.1.1,3736) (0 bytes).

total 1031

-rwxr-xr-x   1 11   10   141 Sep 14 10:45 .message

-rwxr-xr-x   1 11   10   0 Apr   1   1993 000_these_are_BINARY_files

-rwxr-xr-x   1 11   10   0 Apr   1   1993 001_set_ftp_transfer_accordingly

-rwxr-xr-x   1 11   1   9 Apr   1   1993 002_NewPet_version:_93.02.16

-rwxr-xr-x   1 11   10   303 Oct 12 19:02 INDEX

-rwxr-xr-x   1 11   1   1772 Apr   8   1993 README

-rwxr-xr-x   1 11   1   133275 Apr   1   1993 amphibol.zip

-rwxr-xr-x   1 11   10   590469 Apr   1   1993 np2x.exe

-rwxr-xr-x   1 11   10   279013 Apr   1   1993 quikplot.exe

-rwxr-xr-x   1 11   10   1383 Apr   1   1993 readme.qp

226 ASCII Transfer complete.

718 bytes received in 0.083 seconds (8.5 Kbytes/s)

ftp> binary

200 Type set to I.

ftp> get np2x.exe

200 PORT command successful.

150 Binary data connection for np2x.exe (134.153.1.1,3739) (590469 bytes).

226 Binary Transfer complete.

local: np2x.exe remote: np2x.exe

590469 bytes received in 4.6 seconds (1.3e+02 Kbytes/s)

ftp> quit

221 Goodbye.