

# IGPET

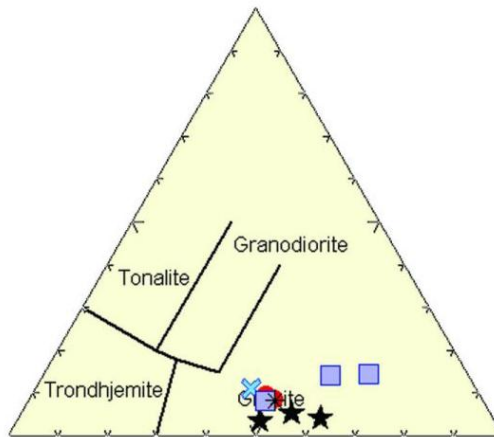
## Igneous Petrology Software

**IGPET** provides tools for teaching and research in Igneous Petrology, allowing users to develop their own data files and to use graphics routines to discover and interpret patterns of geochemical variation.

- Harker, Fenner, Discrimination, CMAS, SPIDER, REE and Pearce element ratio plots
- Linear regression, hyperbolic mixing and AFC modeling
- CIPW norms and least-squares fractionation and magma mixing calculations
- Transfer data to spreadsheets or graphics to draw programs using the clipboard
- Publication quality output

**IGPET** draws most types of petrologic diagrams, including Harker, Fenner, triangular and log plots. A calculator includes (+ - / \*), Log, square, square root, ppm and chondrite functions. Special purpose diagrams, e.g. the Irvine and Baragar (1971) rock classification scheme, are stored in control files that can be expanded easily. CMAS projections include O'Hara, Walker, Grove, Baker and Eggler etc. Spider diagrams include REES, Wood, Thompson, Sun and McDonough etc.)

**IGPET** disks come with several data sets, including low pressure cotectic data, moderate pressure cotectic data, MORB glasses, and several suites of calc-alkaline rocks from Central American volcanoes.



## Features

### List of Plots Available in IGPET

#### 1. Variable Plots

- Histograms, with a number of axis variations (summation, multiplication, division, S-norm, log, square, square root)

#### 2. Variable Plots

- XY plots, with a number of axis variations (summation, multiplication, division, S-norm, log, square, square root)

#### 3. Variable Plots (Ternary Diagrams)

- Trilinear plots, with a number of axis variations (summation, multiplication, division, S-norm, log, square, square root)

### Spider Diagrams

- REEs- Sun and McD 89 Chondrites
- REEs- Nakamura, 1974 Chondrites
- Sun/McDon. 1989-PM Primitive Mantle

- Sun/MdDon. 1989-NMorb NMORB
- Sun/McDon. 1989-EMorb EMORB
- Sun/McDon. 1989-OIB OIB
- Thompson, R.N., 1982-double Chondrites
- Thompson, R.N., 1982-no double Chondrites
- Wood, D.A. et al., 1979 Primordial Mantle
- Sun (1980) Chondrites
- Pearce, 1983 MORB
- Hickey/Frey/Gerlach 1986 Bulk Earth
- Mg-norm Minors & Majors CI (A&G)
- North American Shale Comp REE Gromet-1984 NASC
- Post-Arch. Aust. Shale REE Taylor-McLennan 1985 PAAS
- Upper Cont. Crust REE Taylor-McLennan 1985 UCC
- UpperCont. Crust SPI. Taylor-McLennan 1985 UCC**CMAS Projections**

- Be
- Elthon
- Grove
- Laroche
- Ohara
- Sackwalk

#### **Discrimination Diagrams**

- Nb/Y vs Zr/Ti Winchester and Floyd, 1977
- Nb/Y vs Zr/Ti revised Winchester and Floyd 1977; Pearce 1996
- Zr/Ti vs SiO<sub>2</sub> Winchester and Floyd, 1977
- Ti-V Servais 1982
- Zr-Zr/Y Pearce & Norry, 1979
- Zr-Zr/y Pearce 1983
- Th-Zr/117-Nb/16 Wood 1980
- Th-Hf/3-Ta Wood 1980
- Zr/4-Nb\*2-Y Meschede 1986
- Zr vs Ti Pearce and Cann 1973
- Zr-Ti/100-Y\*3 Pearce and Cann 1973
- Zr-Ti/100-Sr/2 Pearce and Cann 1973
- MnO-TiO<sub>2</sub>/10-P<sub>2</sub>O<sub>5</sub> Mullen 1983
- Y vs Nb Pearce et al., 1984
- Y\_Nb vs Rb Pearce et al., 1984
- Yb\_Ta vs Rb Pearce et al., 1984
- Yb vs Ta Pearce et al., 1984
- Y vs Cr Pearce, 1982
- MgO-FeO-Al<sub>2</sub>O<sub>3</sub> Pearce et al. 1977
- La-10-Y/15-Nb/8 Cabanis Lecolle 89

#### **Fenner Diagrams**

- |   |  |
|---|--|
| • Al <sub>2</sub> O <sub>3</sub> vs MgO | • Na <sub>2</sub> O vs MgO             |
| • SiO <sub>2</sub> vs MgO               | • CaO vs MgO                           |
| • FeO* vs MgO                           | • K <sub>2</sub> O vs MgO              |
| • TiO <sub>2</sub> vs MgO               | • P <sub>2</sub> O <sub>5</sub> vs MgO |

## Granite

- Shand's Index Maniar and Piccoli, 1989
- Ab-An-Or Classif. Barker 79
- Y+Nb vs Rb Pearce et al. 1984
- Y vs Nb Pearce et al. 1984
- Yb vs Ta Pearce et al. 1984
- Ga/Al-Zr Whalen et al. 1987

## Harker Diagrams

- Al<sub>2</sub>O<sub>3</sub> vs SiO<sub>2</sub> Harker
- MgO vs SiO<sub>2</sub> Harker
- FeO\* vs SiO<sub>2</sub> Harker
- TiO<sub>2</sub> vs SiO<sub>2</sub> Harker
- Na<sub>2</sub>O vs SiO<sub>2</sub> Harker
- CaO vs SiO<sub>2</sub> Harker
- K<sub>2</sub>O vs SiO<sub>2</sub> Harker
- P<sub>2</sub>O<sub>5</sub> vs SiO<sub>2</sub> Harker
- Ba vs SiO<sub>2</sub> Harker
- Sr vs SiO<sub>2</sub> Harker
- Rb vs SiO<sub>2</sub> Harker
- Zr vs SiO<sub>2</sub> Harker
- V vs SiO<sub>2</sub> Harker
- Cr vs SiO<sub>2</sub> Harker
- Ni vs SiO<sub>2</sub> Harker
- Sc vs SiO<sub>2</sub> Harker

## AFM

- AFM thol vs calc-alk
- %An-Al<sub>2</sub>O<sub>3</sub> thol vs calc-alk
- SiO<sub>2</sub>-alk alk vs subalk
- Ne'-Ol'-Q' alk vs subalk
- %An-CI bas-and-dac-rhy
- %An-CI K-rich alk
- %An-CI Na-rich alk
- Ab'-An-Or subalk; K+ or K-
- Ab'-An-Or alk; K or Na

## Komatiite

- Komat vs. Thol. Jensen 76
- Komat vs Thol Jensen Pyke 82
- Al<sub>2</sub>O<sub>3</sub> vs F/F+M Komat vs Thol, Arnd 1976

## Mantle

- Sr/Nd Mantle components
- Pb/Nd Mantle components
- Pb/Sr Mantle components
- Pb<sub>206</sub>/Pb<sub>207</sub> Mantle components

## Other Petrology

- TAS Alkalies-Silica, Lebas et al. 1986
- Alkalies-Silica, Cox-Bell-Pank. 1979
- SiO<sub>2</sub>-K<sub>2</sub>O andeiste types, Gill 1981
- F/M-TiO<sub>2</sub>, Miyashiro 1974
- SiO<sub>2</sub>-F/M, Miyahsiro 1974
- Rb vs Cr Process identification

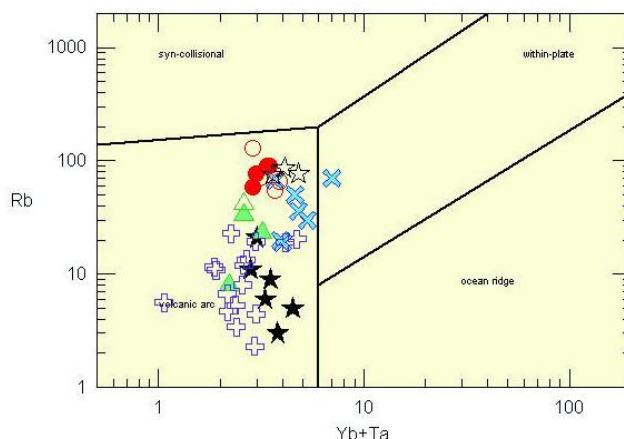
## Mineral Classification

- Lindsley-Anderson isotherms CPX
- Felspar Triangle PL
- Anorthite corner PL
- Simple Pyroxene Quadrilateral CPX
- Pyroxene Quadrilateral with Olivines PX
- LHS of Pyroxene Quadrilateral with Olivines PX

## New in IGPET

- Error bar plotting
- Igpets has legend capabilities!
- Equation parser in the variables window
- Ce\*, Eu\*, Nb\* added to the "Extra parameters" function
- Double the number of symbols
- Switch X and Y axis variables with the click of a button

- The Macintosh version of Igpert 2006 is now fully compatible with OS X



### Recent Updates

- May 16, 2012 Fixed various flaws in histogram, principally concerning Log values. Added logic to allow user to change the suggested % melts for Spider modeling. File PercentFs.txt holds the strings of melt %s .
- Apr 19, 2012 Found and fixed a serious flaw in the AFC calculations for isotopes in the Spider modeling section.
- Dec 2, 2011 Improved the Histogram plotting logic and fixed a flaw in the SubSelect Match and Exclude functions
- July, 13, 2011 Added a new Legend option, a separate legend diagram
- Dec 19, 2010 Fixed the equation for equilibrium crystallization in the Spider Model section, another long-lived flaw! Thanks Jurgen
- Nov 12 2010 Fixed an error in converting CaO to ppm. An ancient mistake!, probably never found because never used! Thanks Sara.
- Nov 3 2010 Fixed gross flaw in Pearce, JA (2008) diagram found by Louis R. Bernier.
- Oct-Nov 2010 Repaired a round off error in the Histogram plotting logic. This was a tiny fix (from Int to Cint) but a substantial rounding error. Histograms will now be smoother looking. Fixed a flaw in Pearce 2008 diagram.
- Aug 31, 2010 further effort to stabilize and make logical the various recalculations of ferric/ferrous ratio.
- Aug 11, 2010 Fixed flaw in Sack et al recalculation of ferric/ferrous ratio that caused incorrect plotting on CMAS diagrams sometimes when the ferric/ferrous ratio was reset.
- Jan 1, 2010 Extensive effort to make a user friendly version of a REE inversion method devised by Feigenson and Hoffman (see Feigenson et al. 2003 and references therein).
- Aug 26, 2009 A series of significant changes. Added more diagrams from IUGS nomenclature and Peacock index. Improved transfer of drawings from Igpert to Word and Powerpoint. Made significant improvement to handling of Isotopic data. Added Hf and Os into AFC modeling. The Model section of Spiderplots now does AFC calcs for Isotopes as well as trace elements.
- March 2008 Significant upgrade. Added logic for Hf and Os isotopes. Added AFM calcs for isotopes (Sr, Nd, Hf, Os, Pb) in the spiderplot modeling section. Added Isotope mixing in the Spider Mixing section. Improved screen logic to better handle screens that do not have a 4/3 aspect ratio. Fixed error bars for log plots, bug in Diagram printing, added a few new diagrams