

**CANADIAN MINING INDUSTRY RESEARCH  
ORGANIZATION (CAMIRO) EXPLORATION DIVISION**

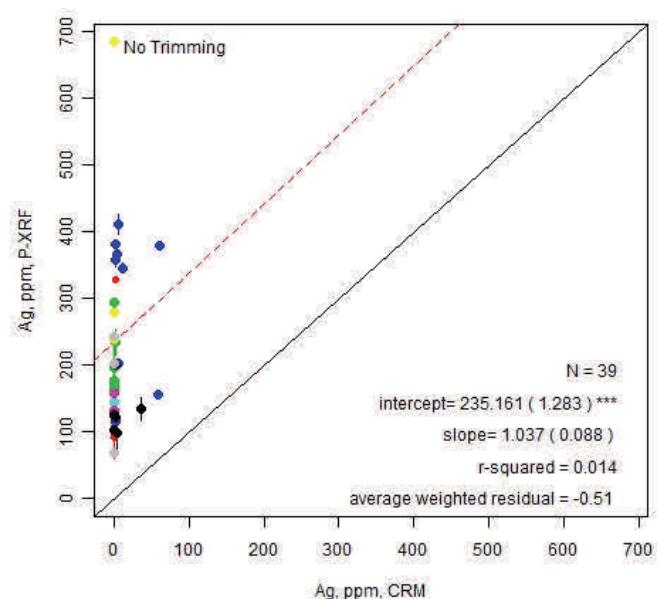
**CAMIRO PROJECT 10E01**

**Quality Control Assessment of Portable XRF Analysers:  
Development of Standard Operating Procedures,  
Performance on Variable Media and Recommended Uses**

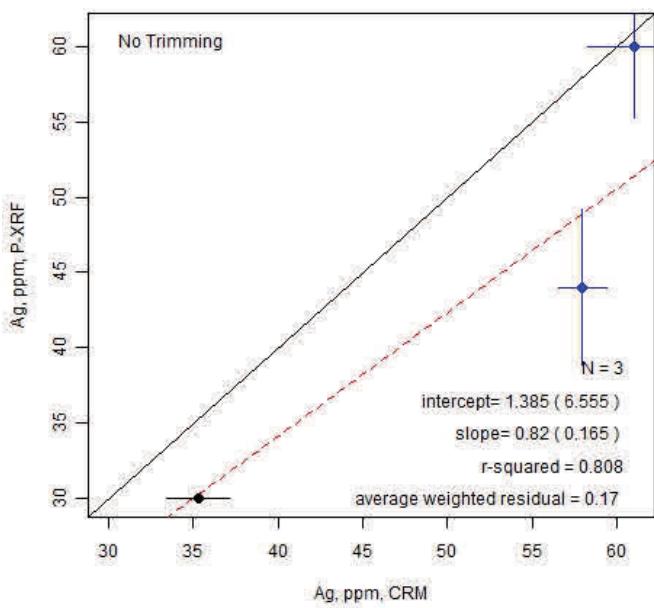
**APPENDIX 4b**

**X-Y Graphs for Mining Mode**

### Benchtop-BTBM-Mining Mode

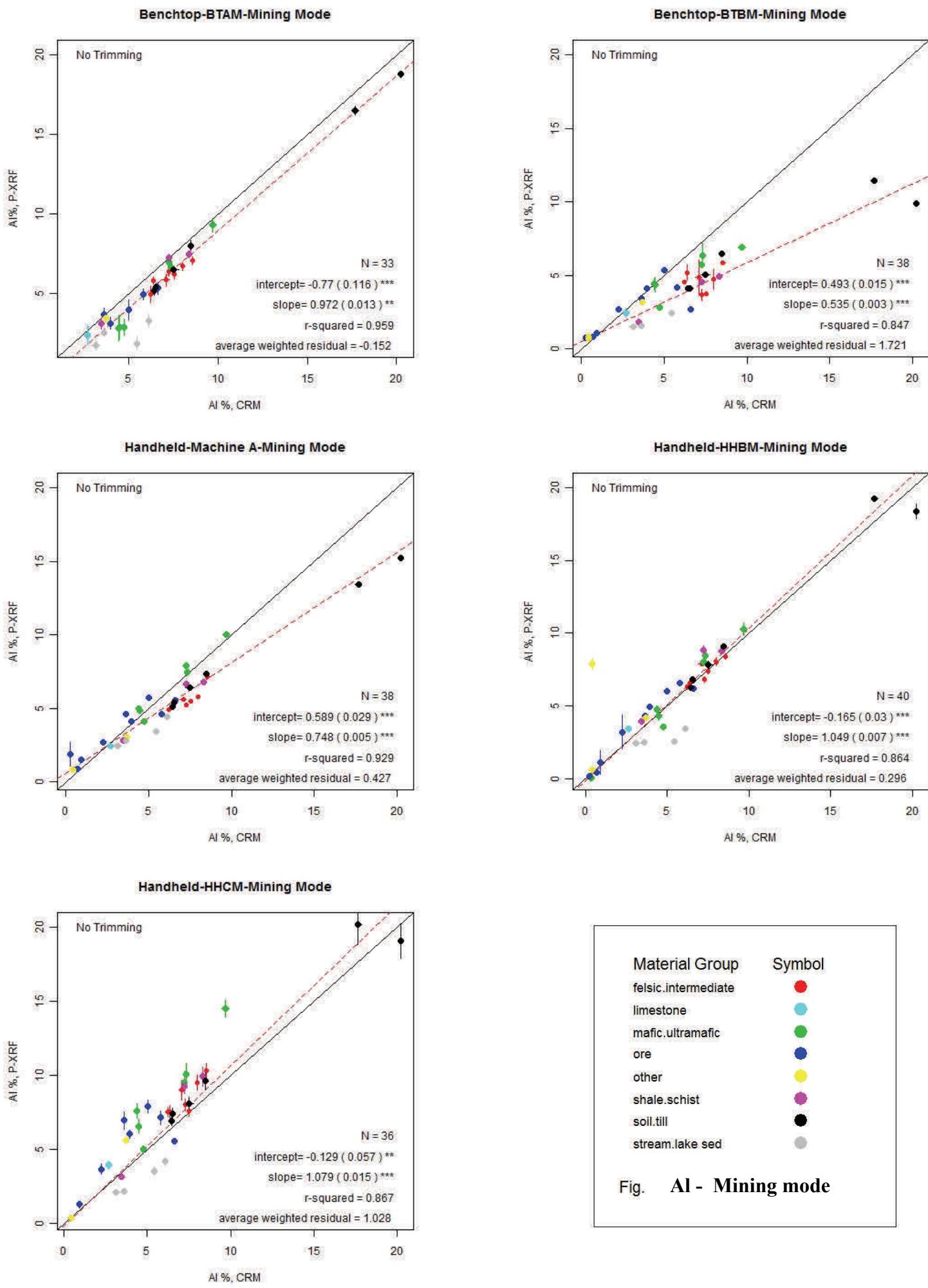


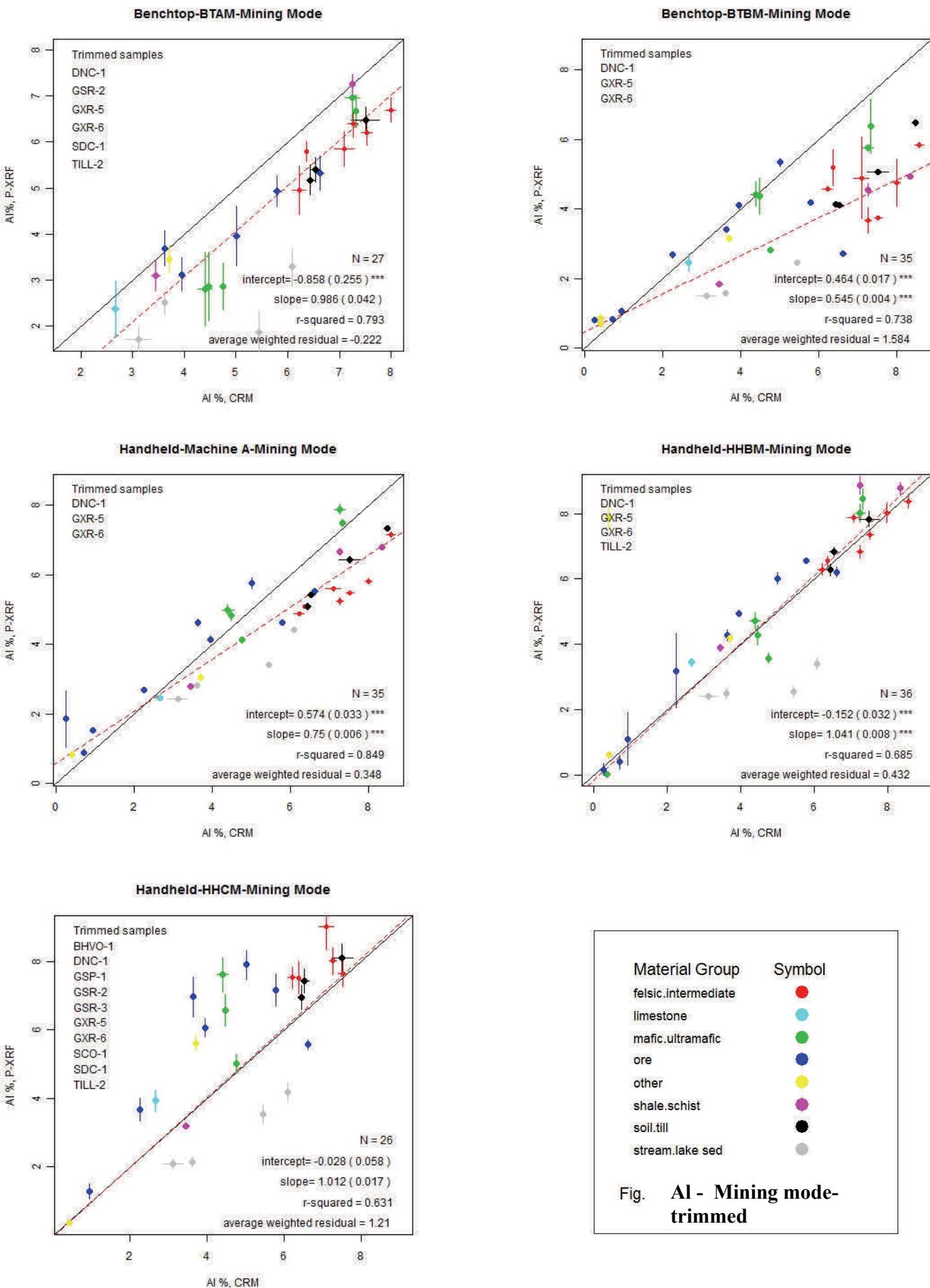
### Handheld-HHCM-Mining Mode

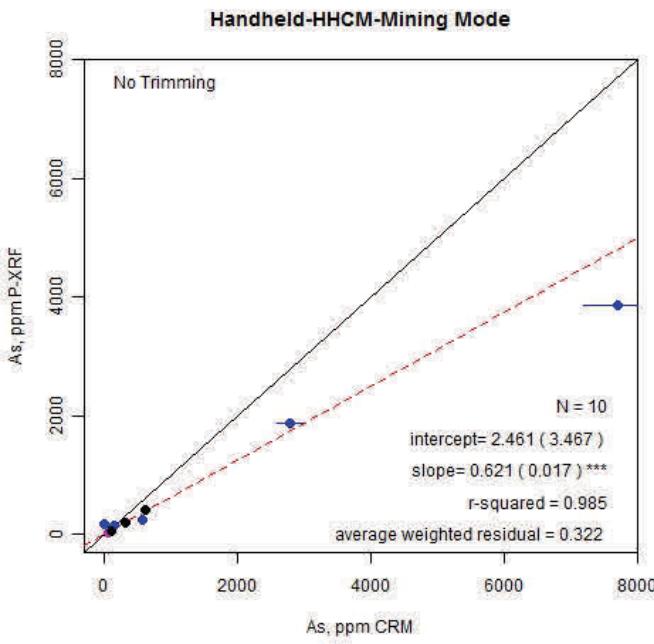
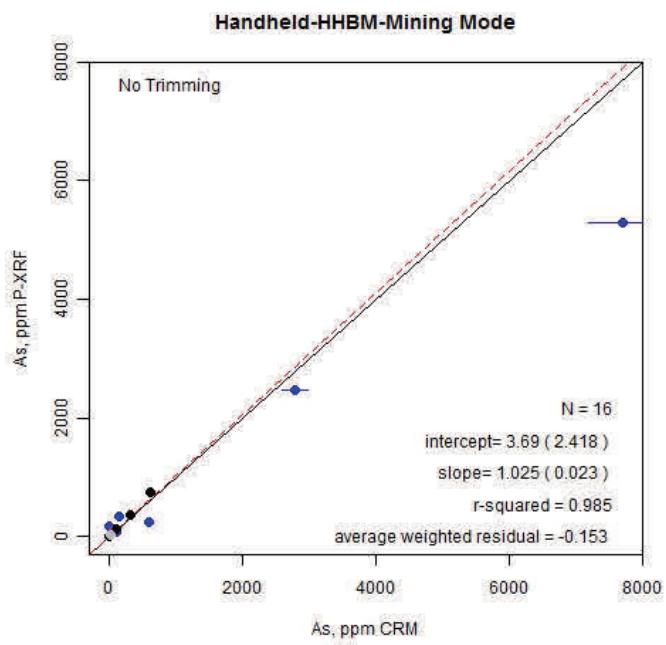
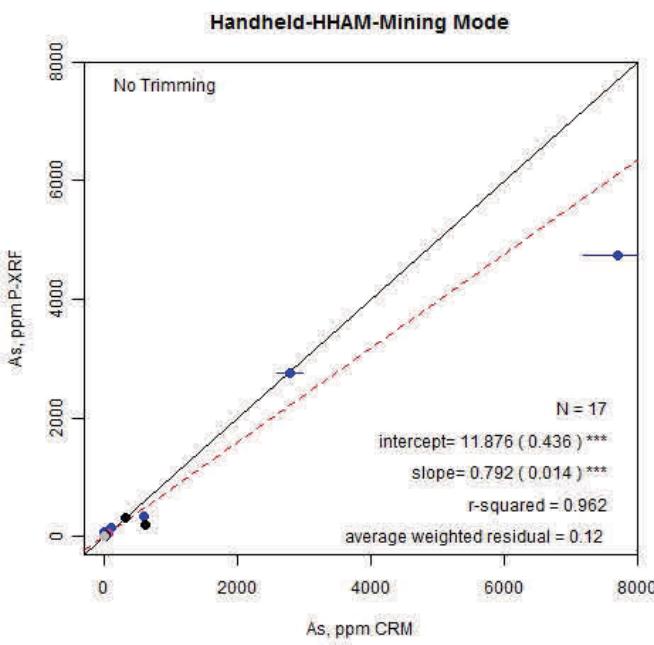
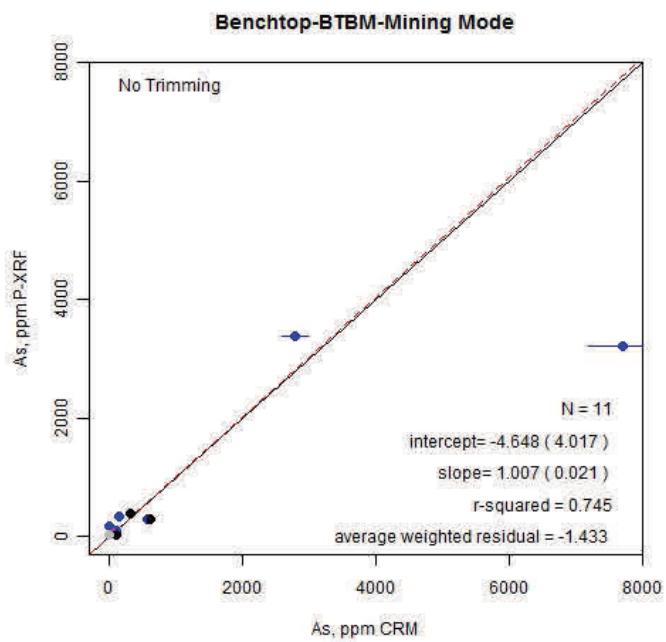
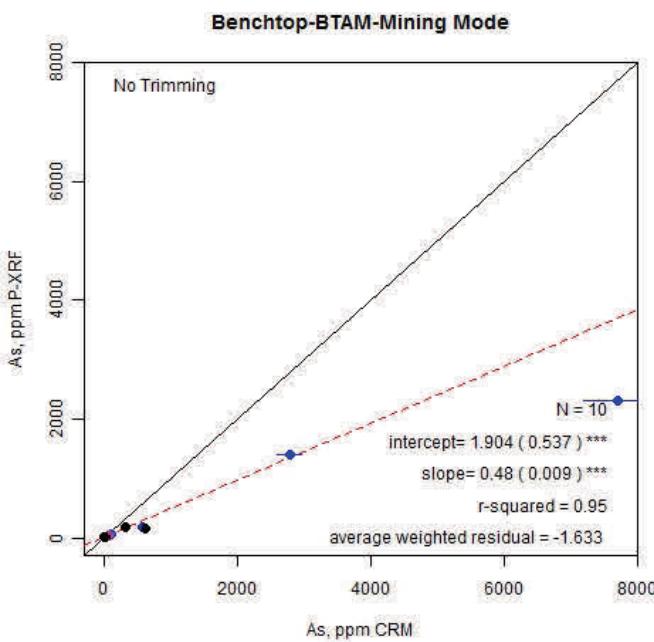


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ag - Mining mode

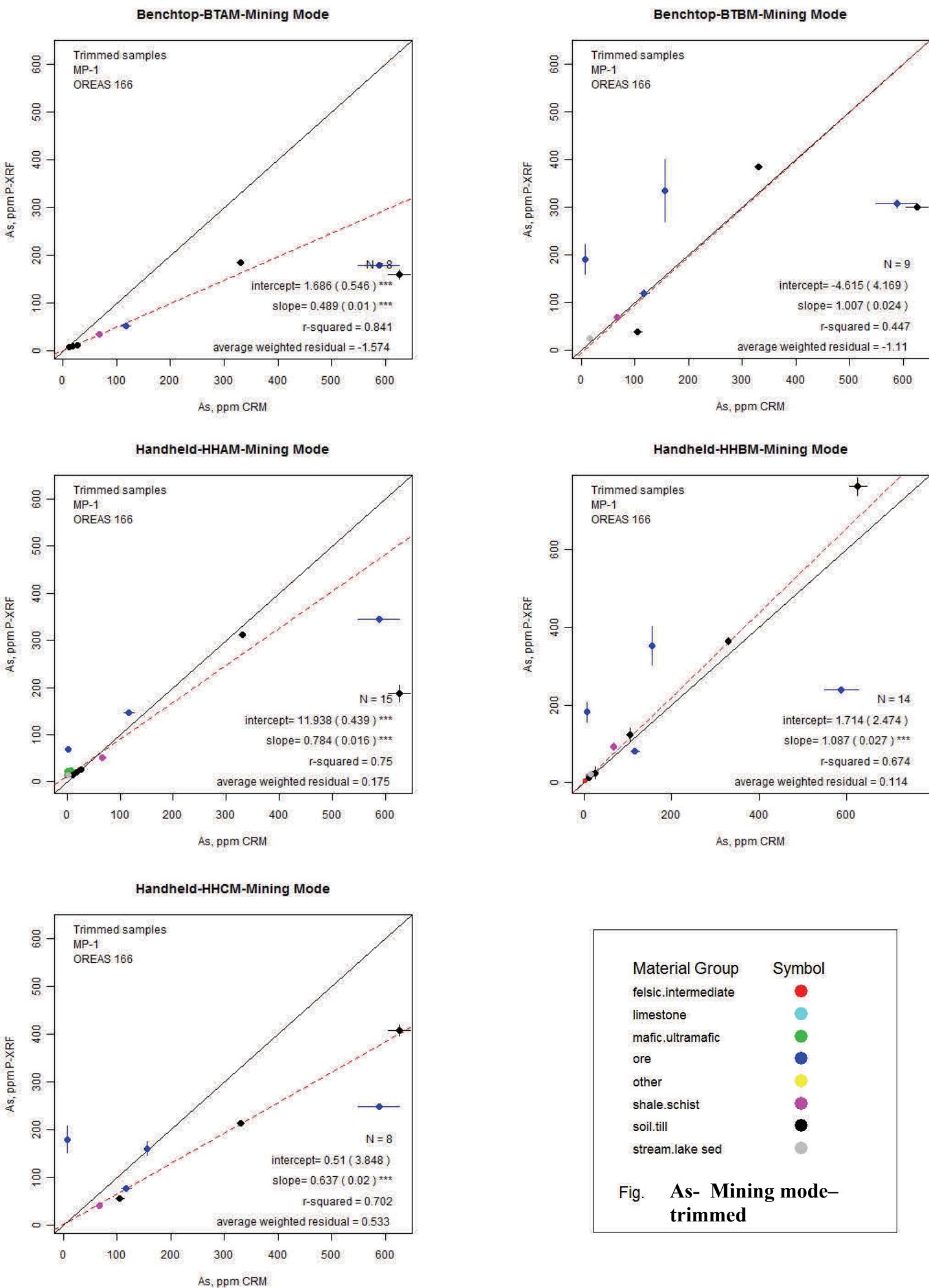




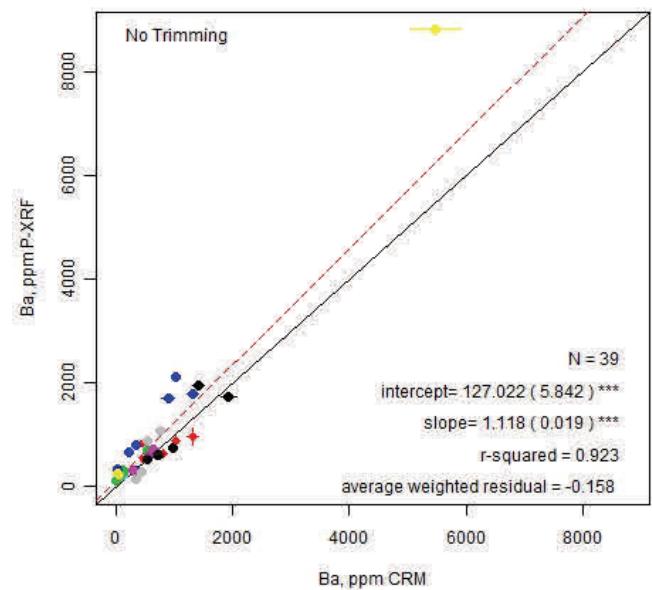


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

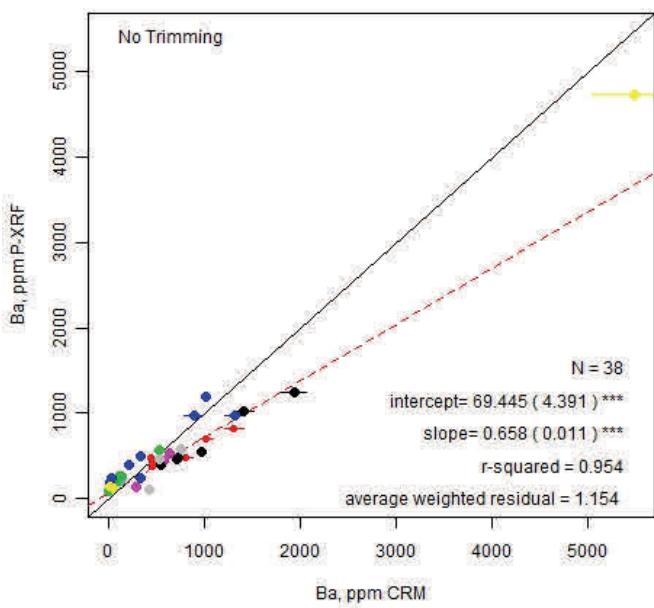
Fig. As- Mining mode-



### Benchtop-BTBM-Mining Mode



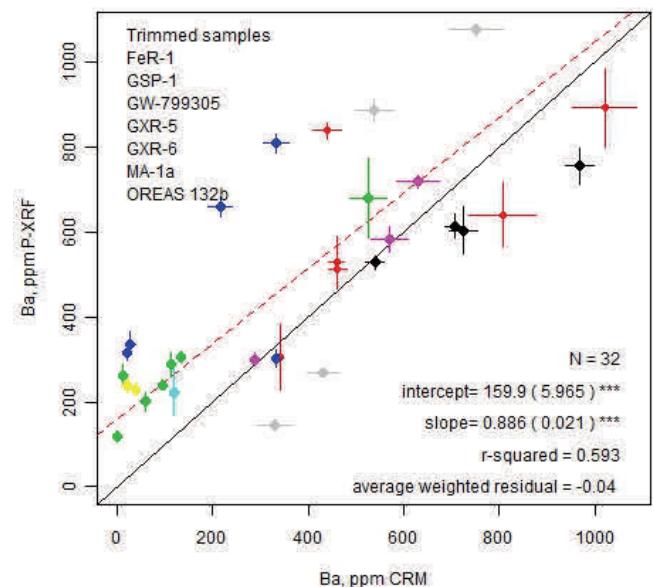
### Handheld-HHCM-Mining Mode



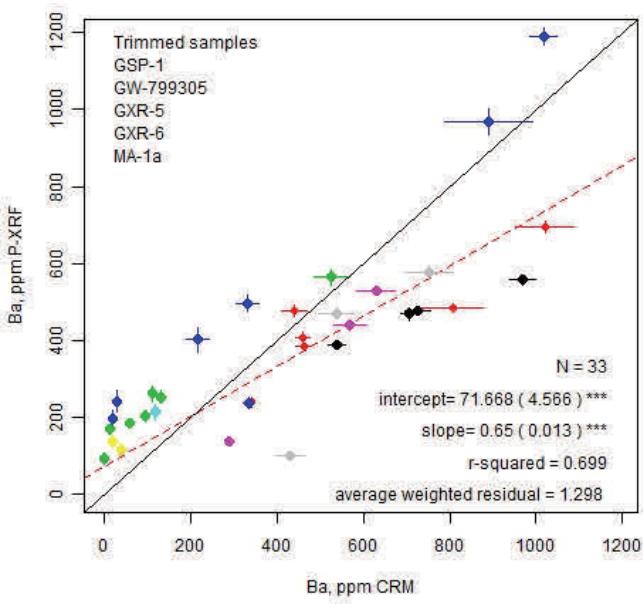
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ba- Mining mode-

### Benchtop-BTBM-Mining Mode

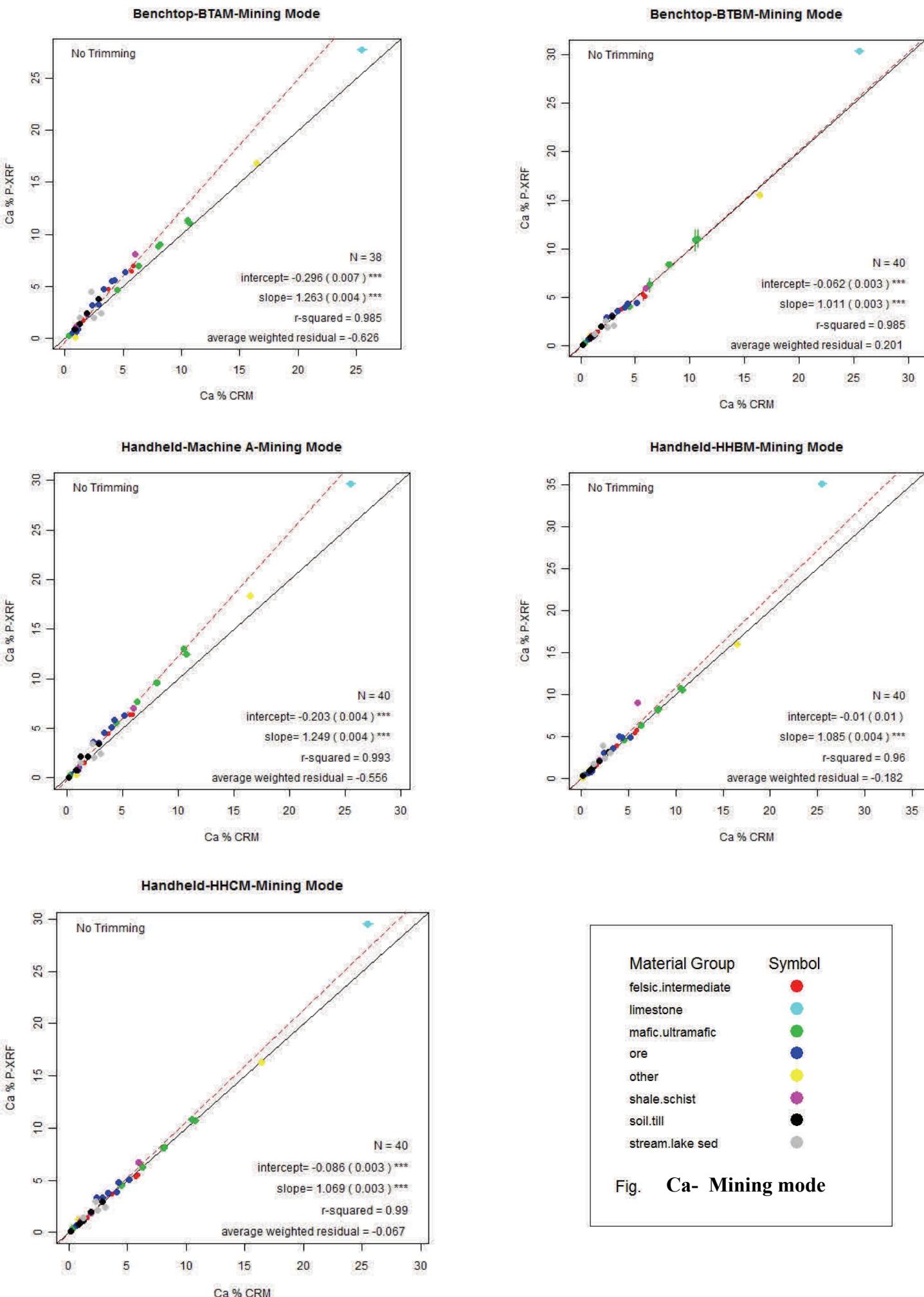


### Handheld-HHCM-Mining Mode

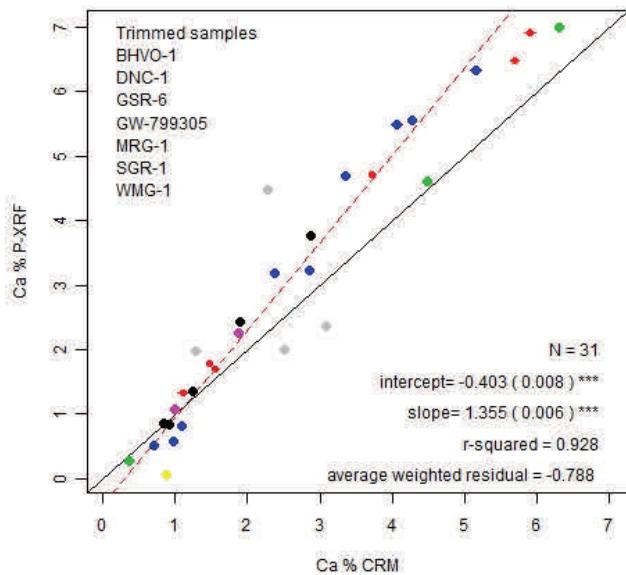


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

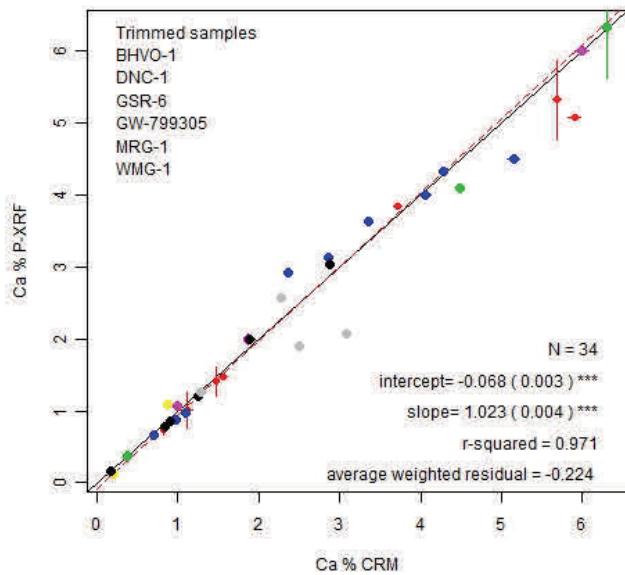
Fig. Ba- Mining mode– trimmed



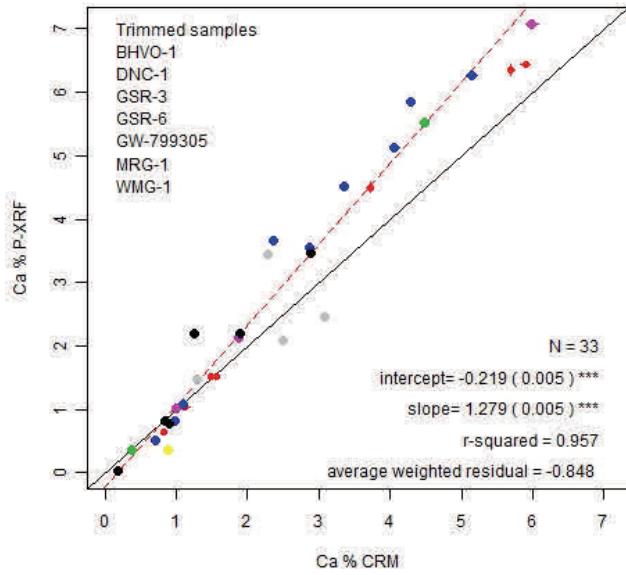
### Benchtop-BTAM-Mining Mode



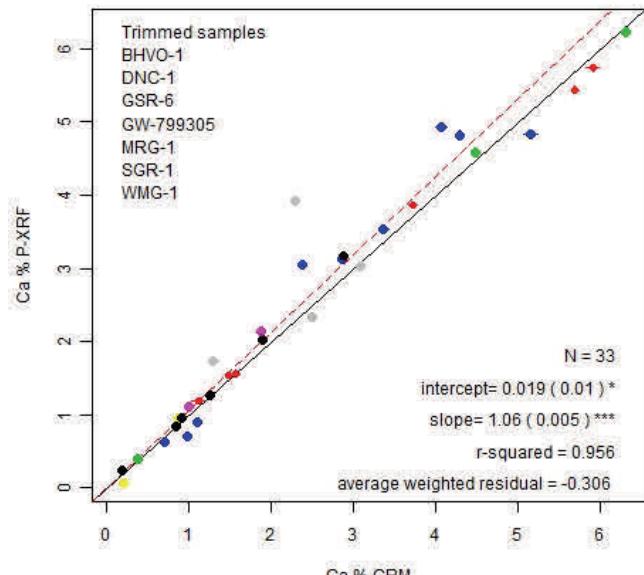
### Benchtop-BTBM-Mining Mode



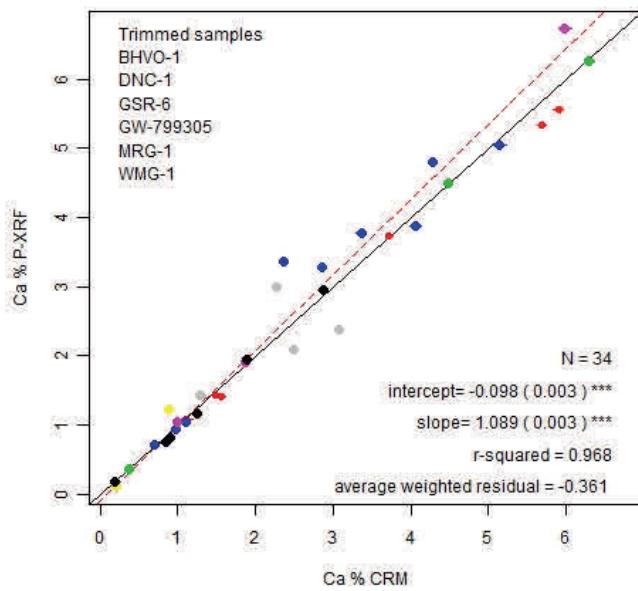
### Handheld-HHAM-Mining Mode



### Handheld-HHBM-Mining Mode



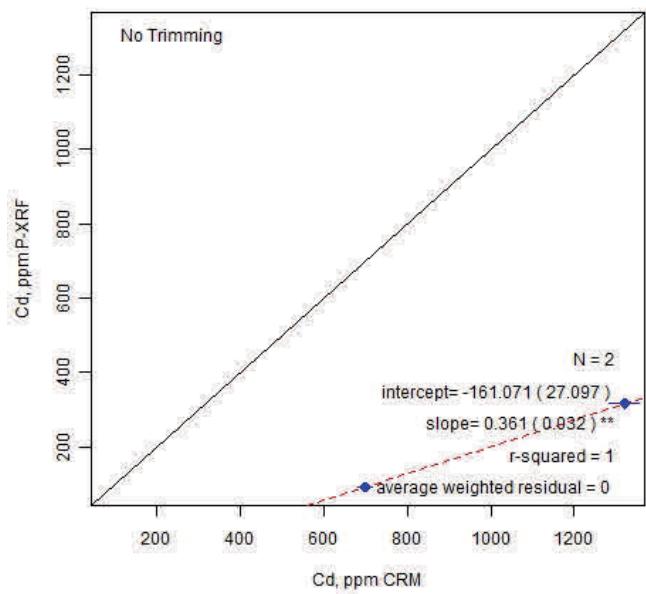
### Handheld-HHCM-Mining Mode



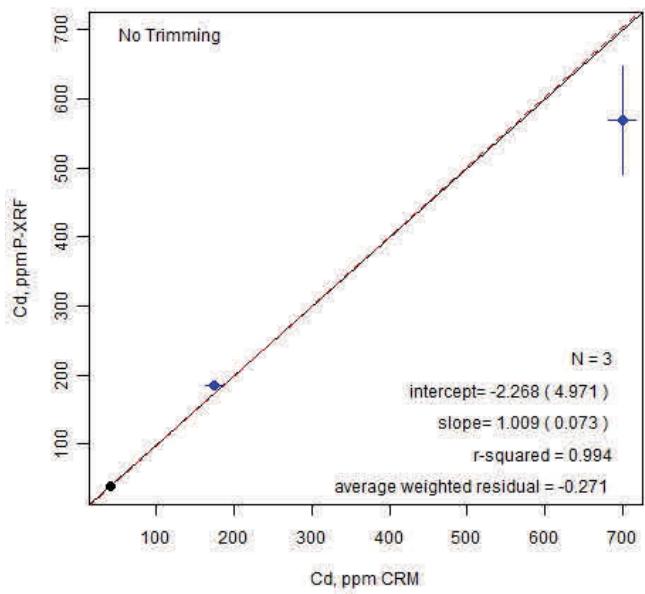
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ca- Mining mode  
trimmed

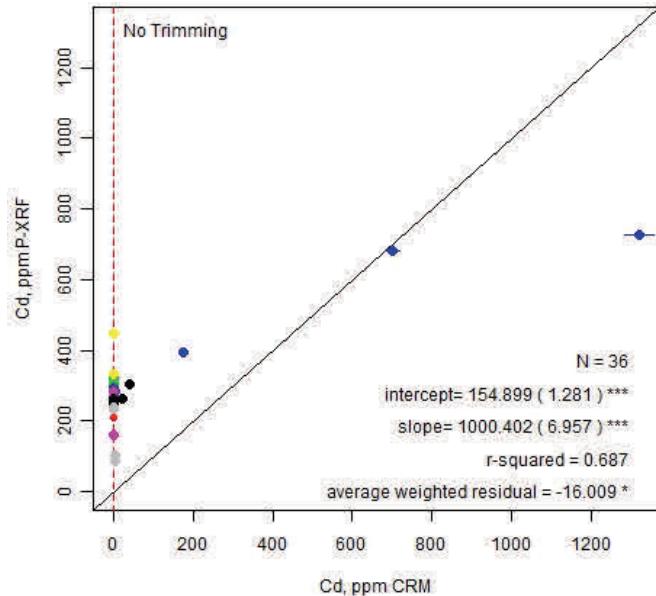
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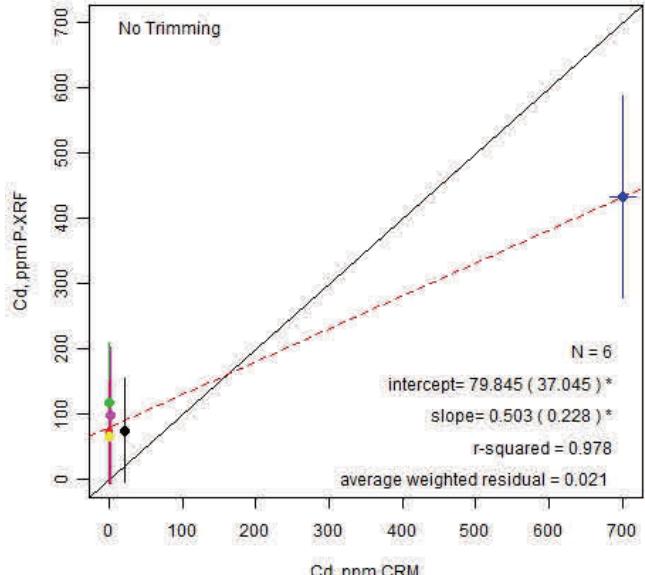
### Benchtop-BTBM-Mining Mode



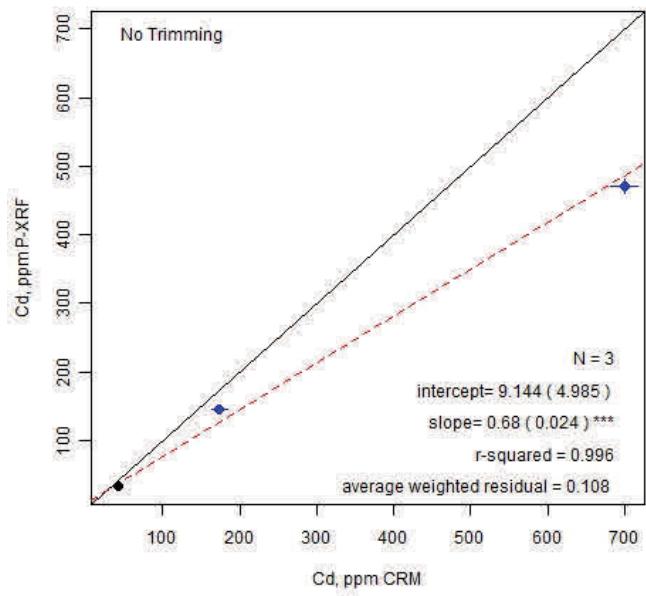
### Handheld-HHAM-Mining Mode



### Handheld-HHBM-Mining Mode

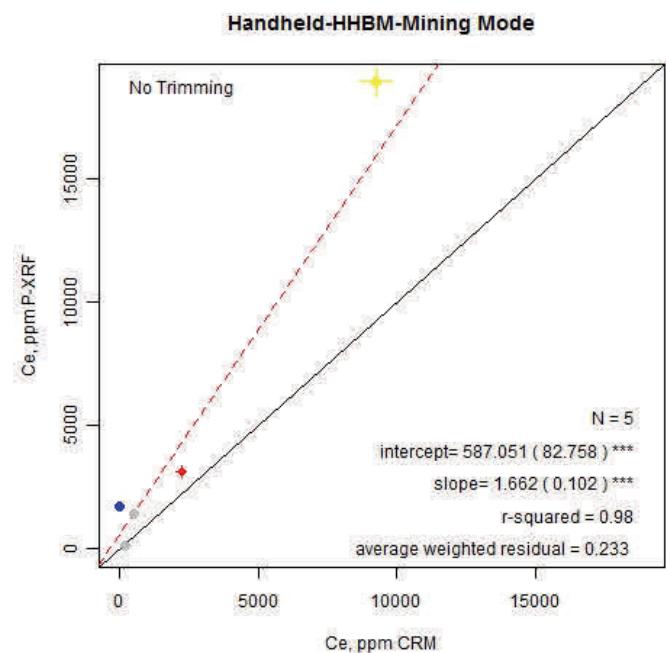


### Handheld-HHCM-Mining Mode



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

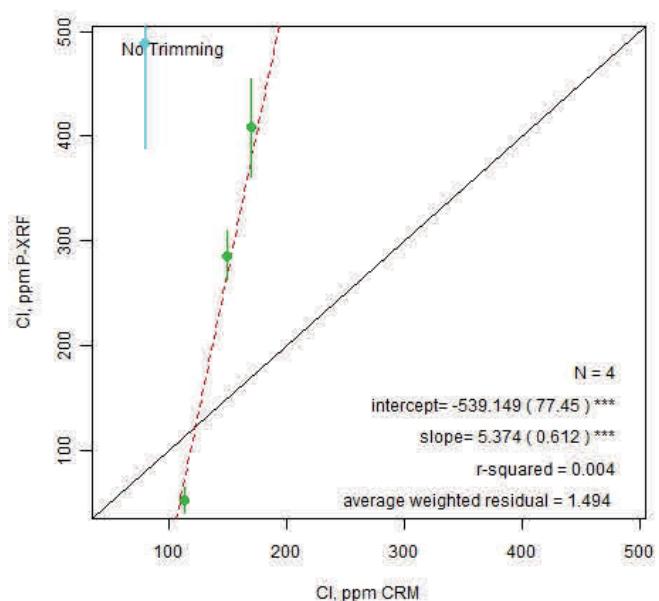
Fig. Cd- Mining mode



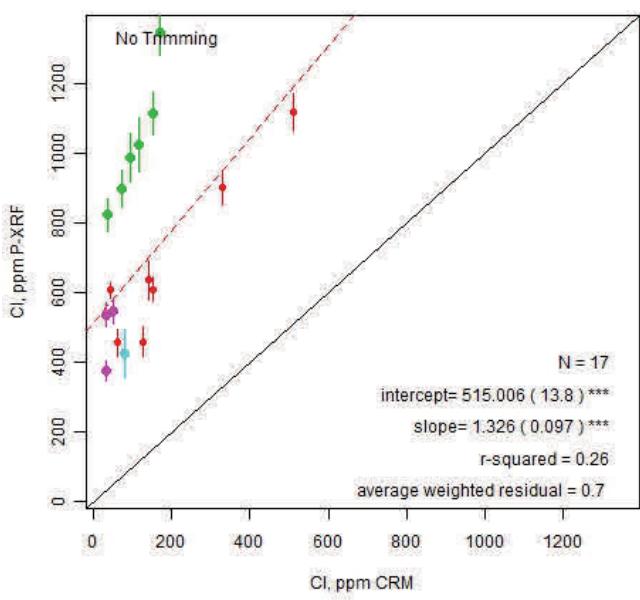
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ce- Mining mode

### Benchtop-BTBM-Mining Mode

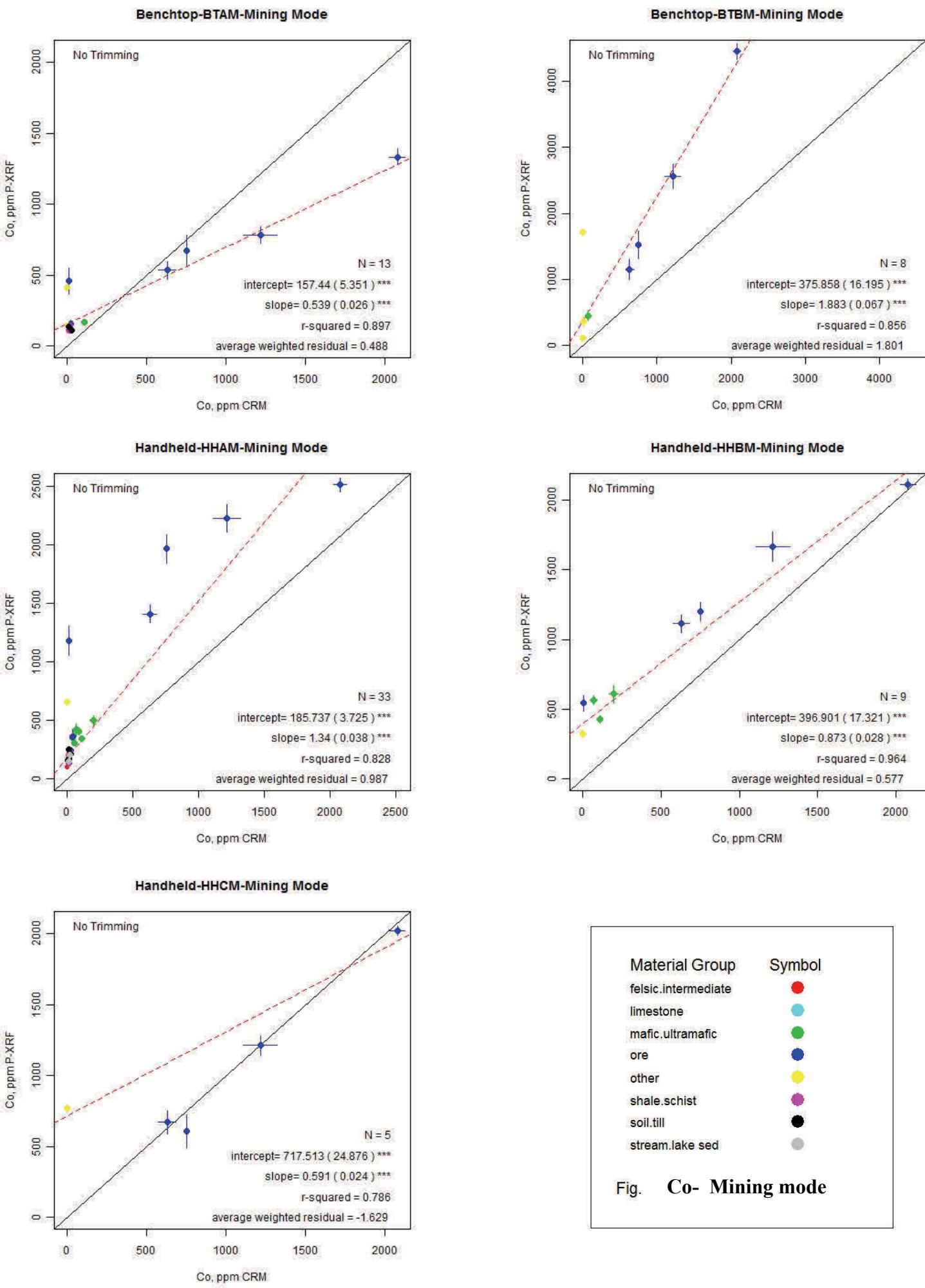


### Handheld-HHCM-Mining Mode

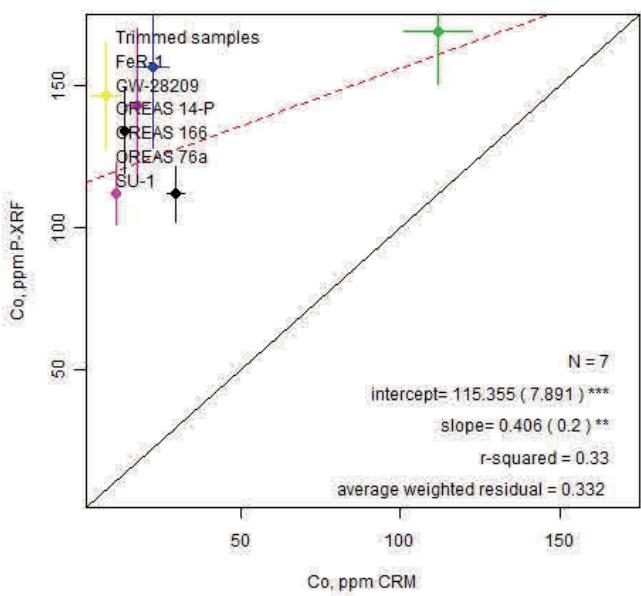


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

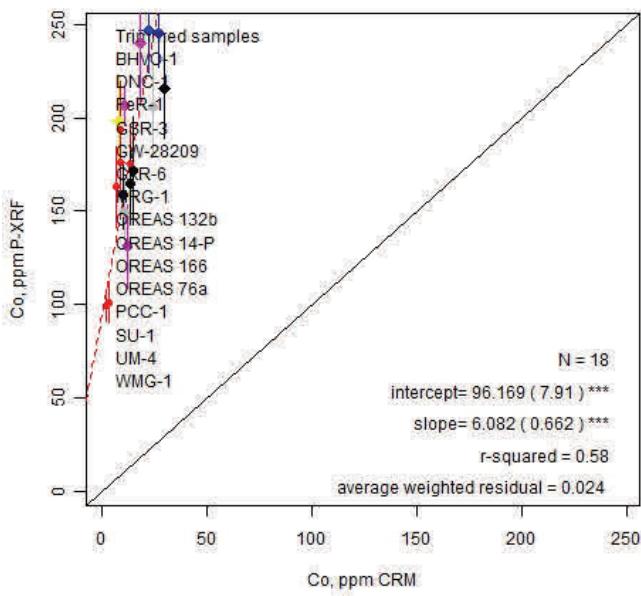
Fig. Cl- Mining mode



### Benchtop-BTAM-Mining Mode

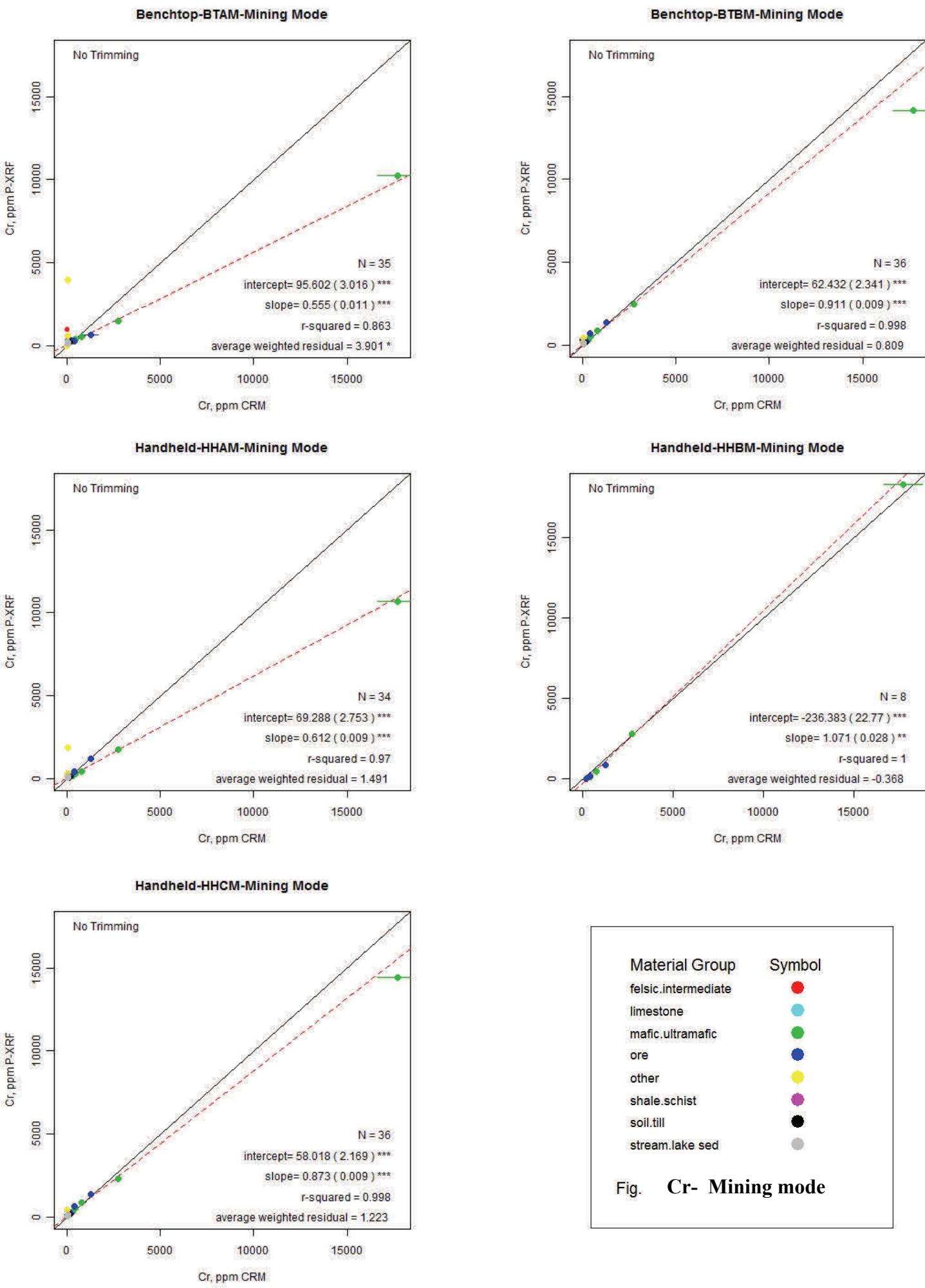


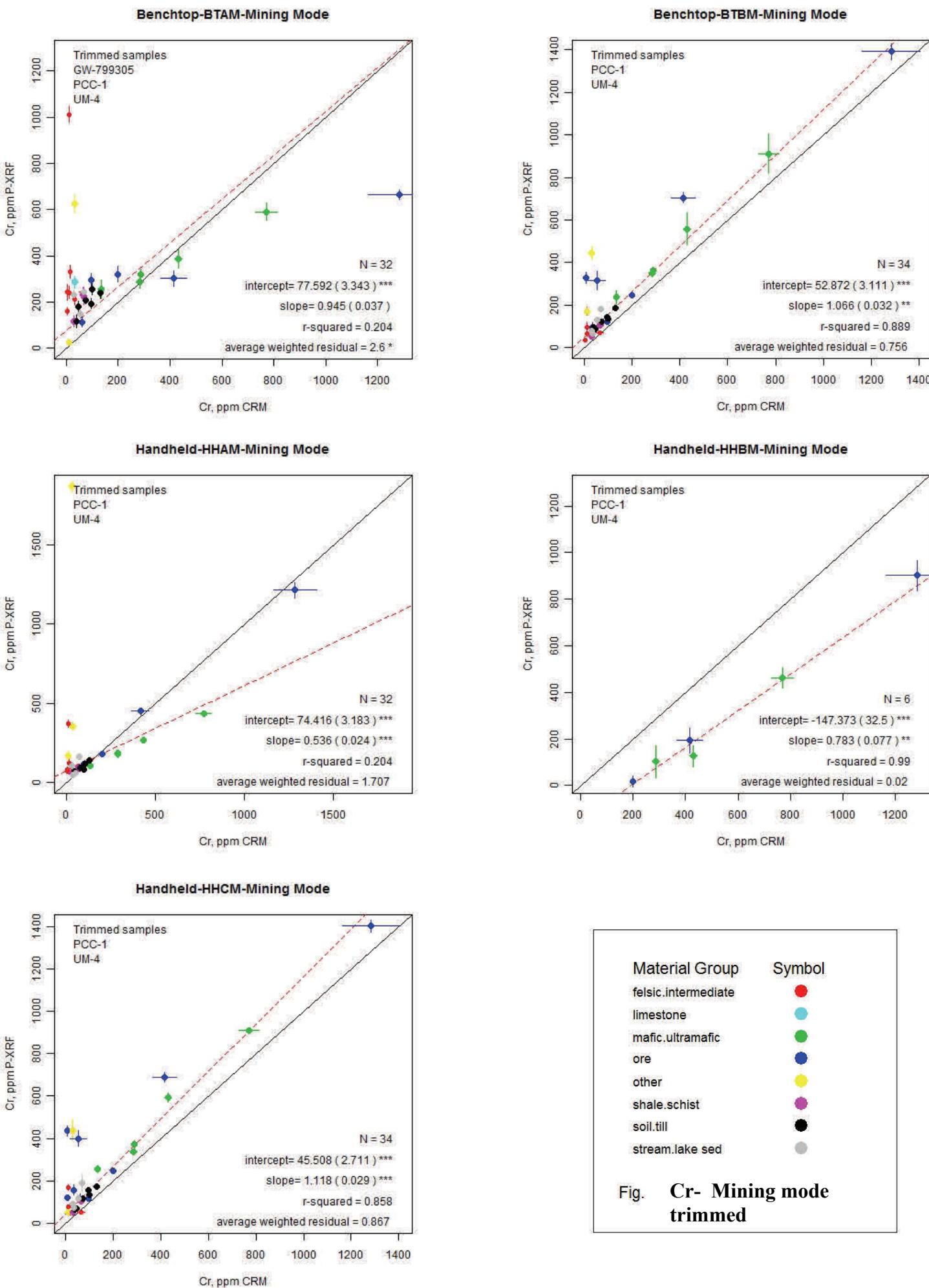
### Handheld-HHAM-Mining Mode

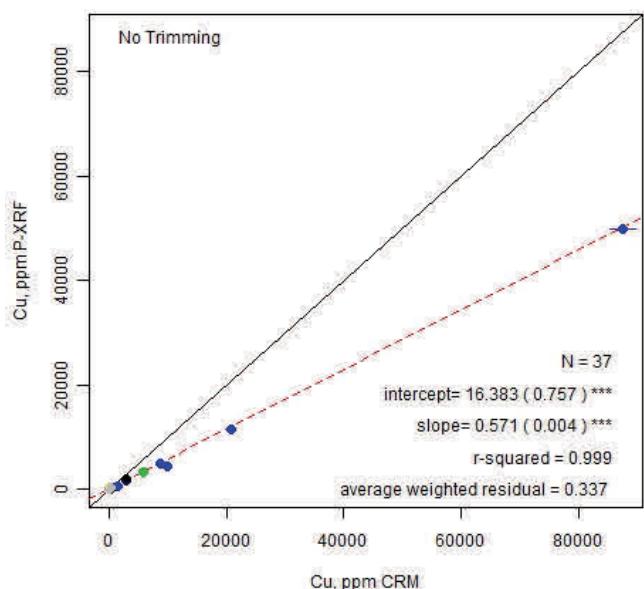
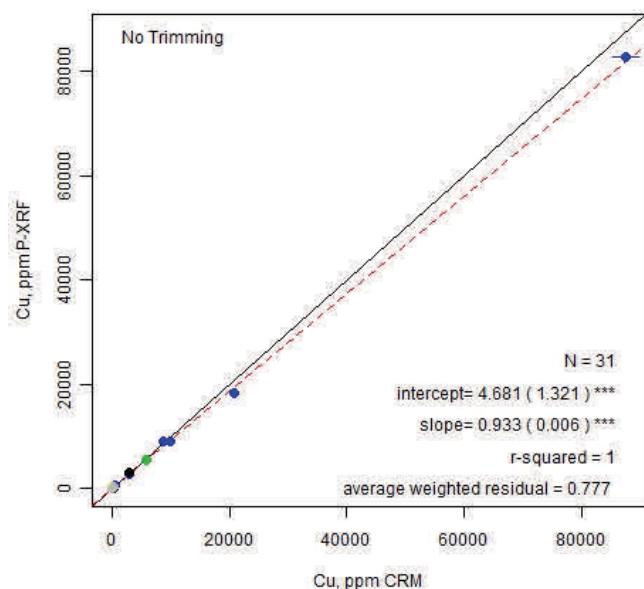
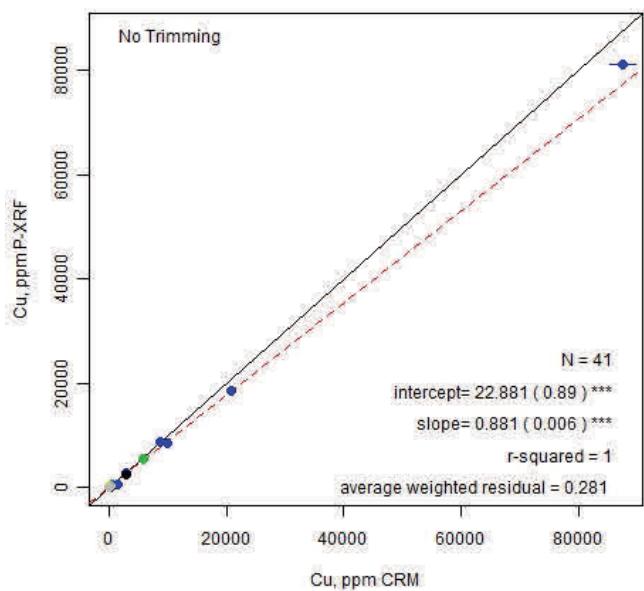
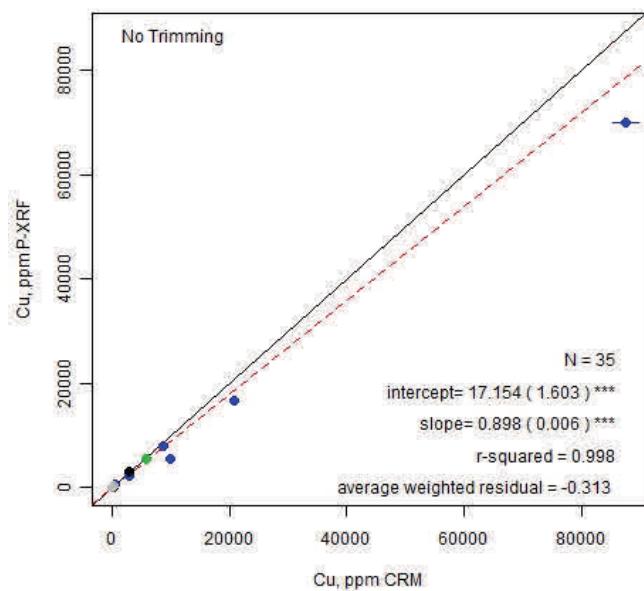
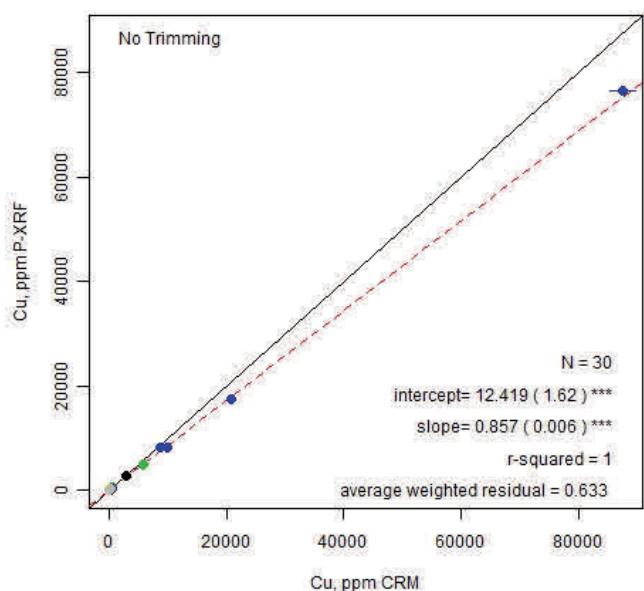


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Co- Mining mode trimmed

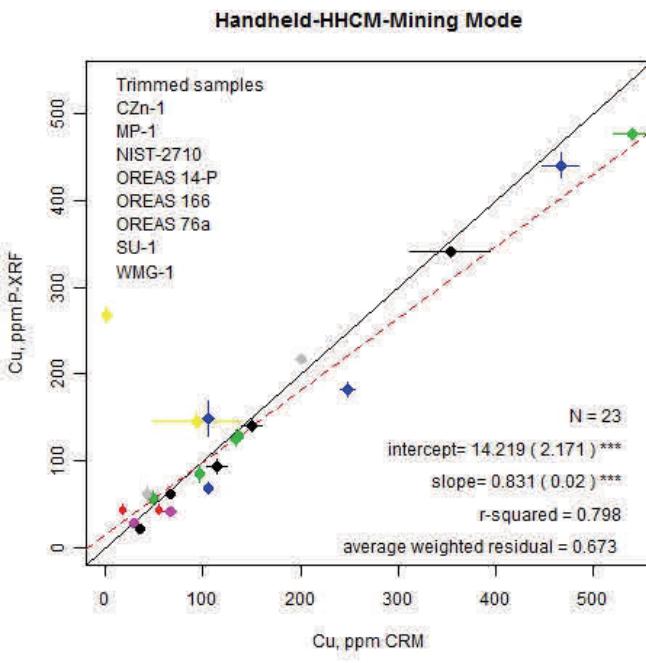
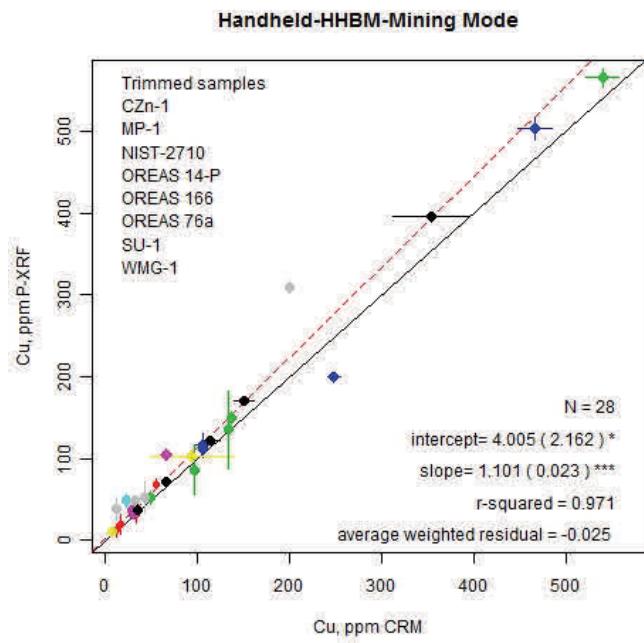
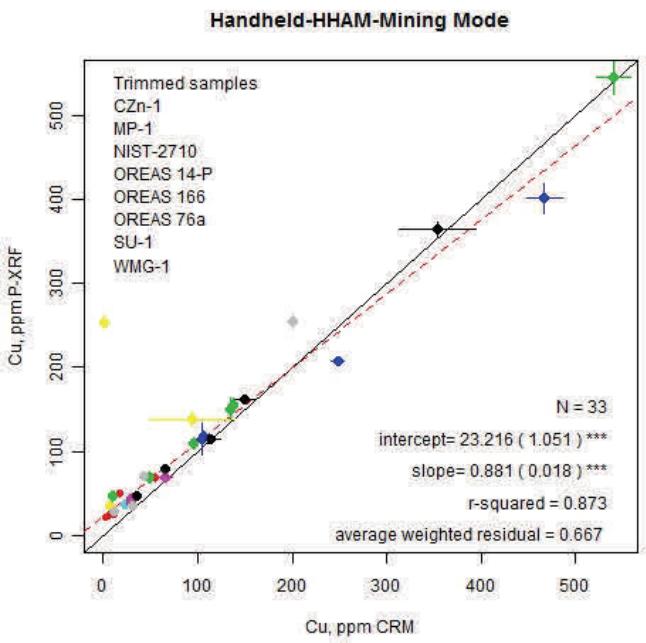
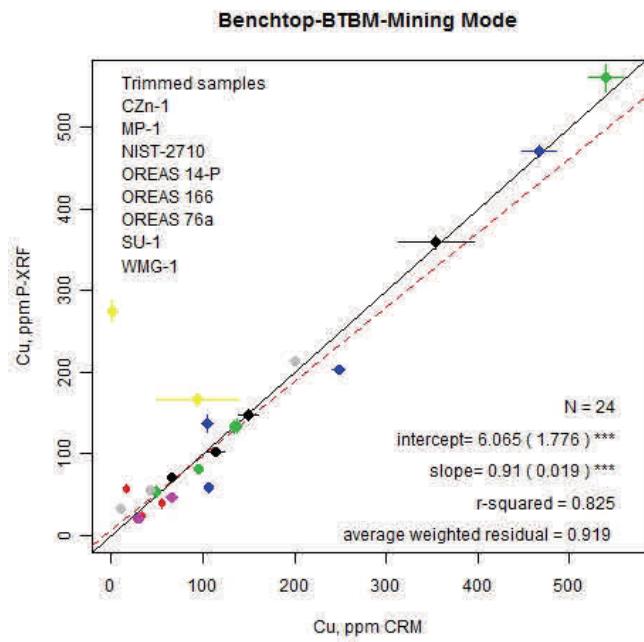
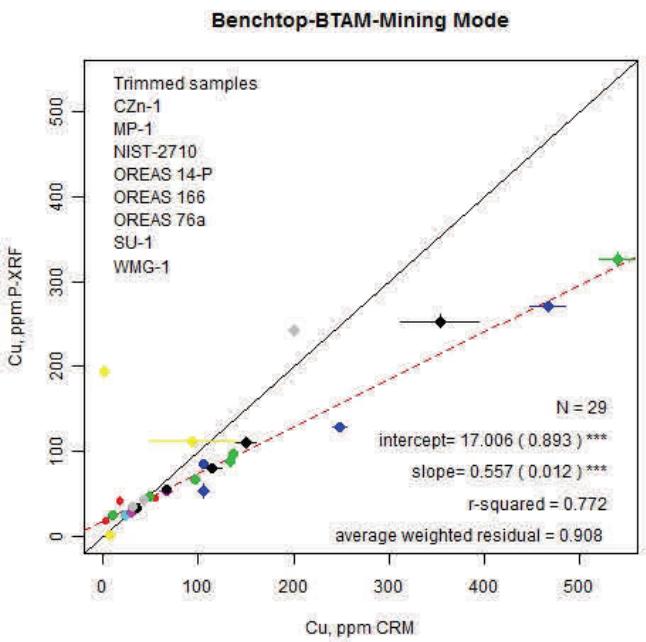




**Benchtop-BTAM-Mining Mode****Benchtop-BTBM-Mining Mode****Handheld-HHAM-Mining Mode****Handheld-HHBM-Mining Mode****Handheld-HHCM-Mining Mode**

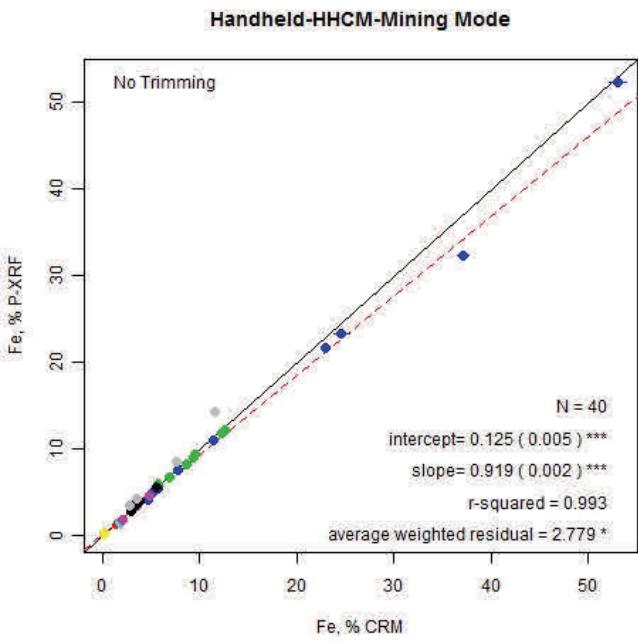
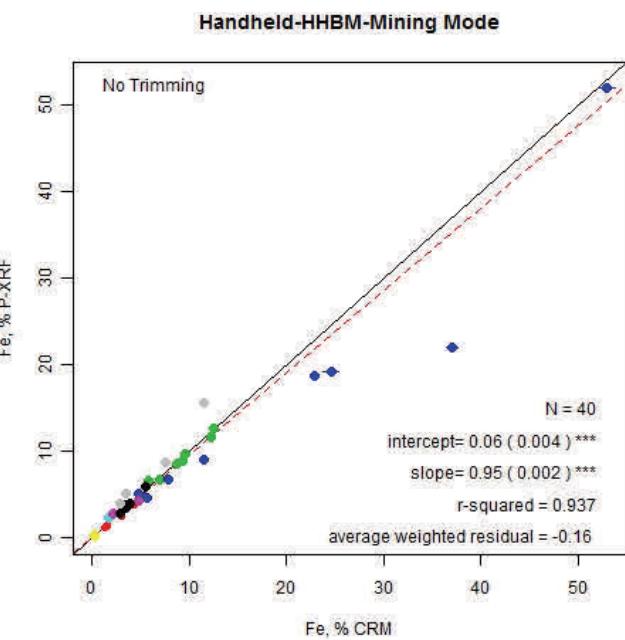
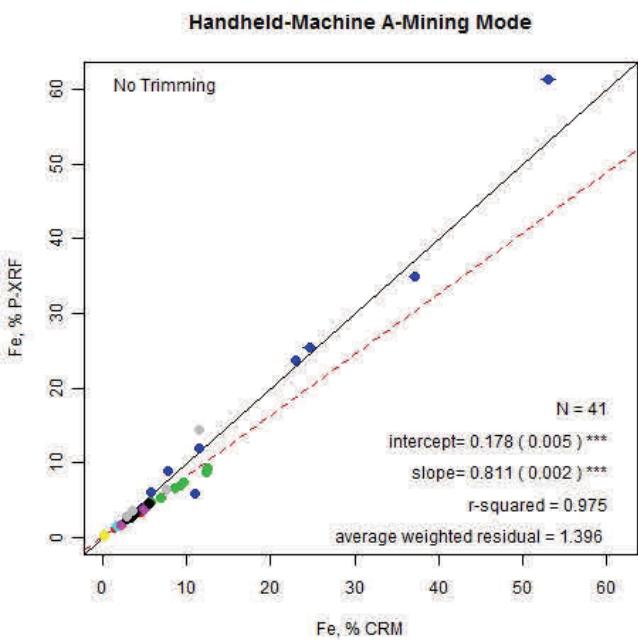
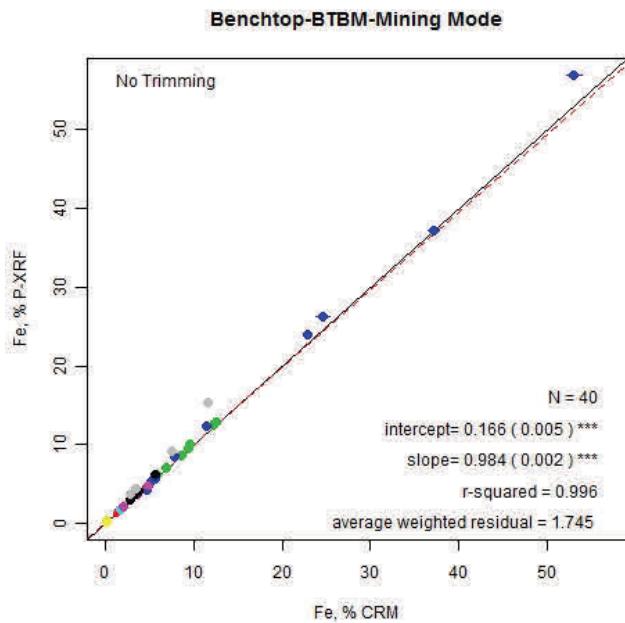
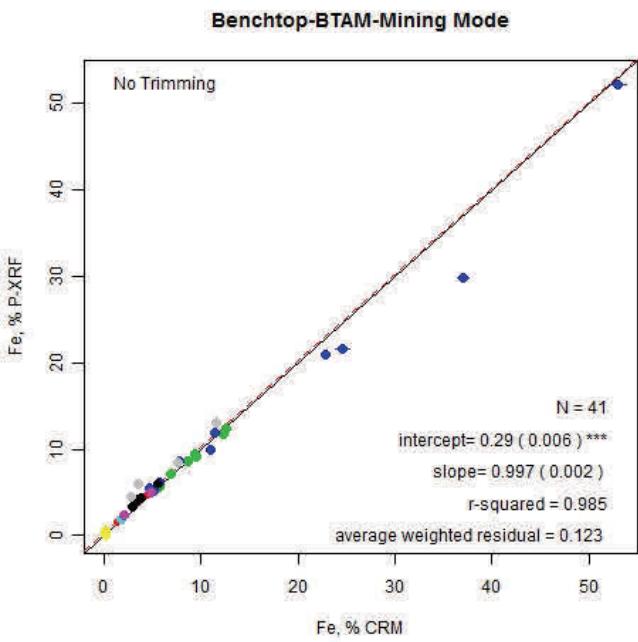
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Cu- Mining mode**



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

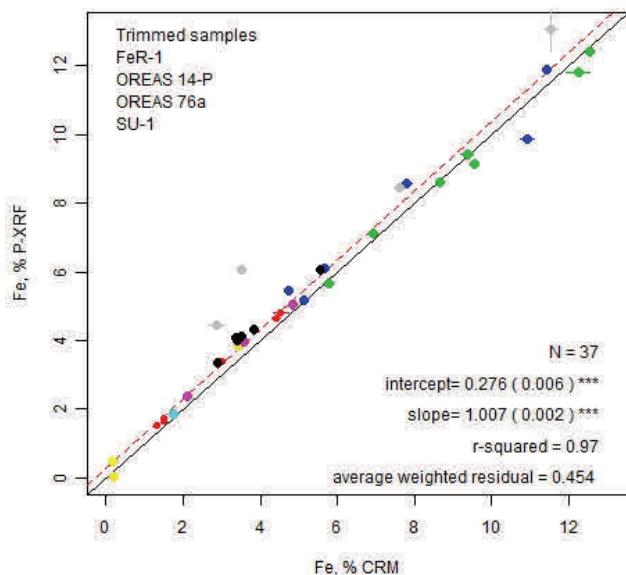
**Fig. Cu- Mining mode trimmed**



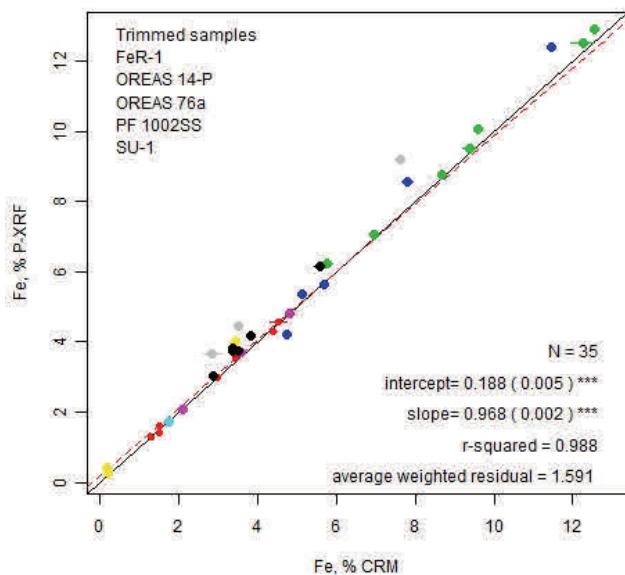
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	○

Fig. Fe- Mining mode

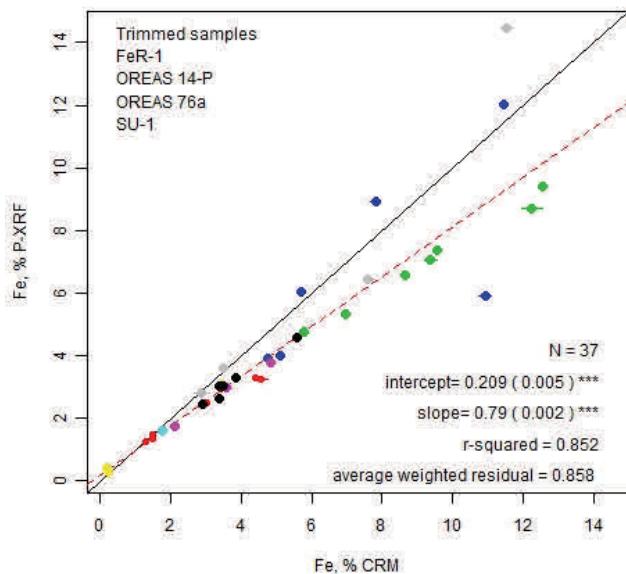
### Benchtop-BTAM-Mining Mode



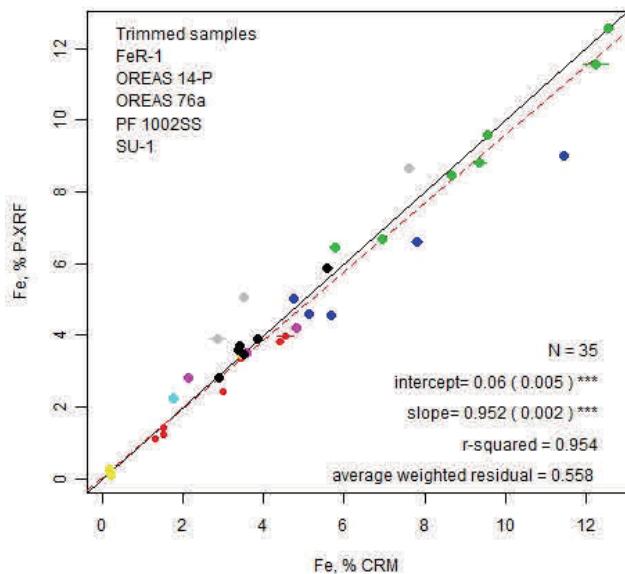
### Benchtop-BTBM-Mining Mode



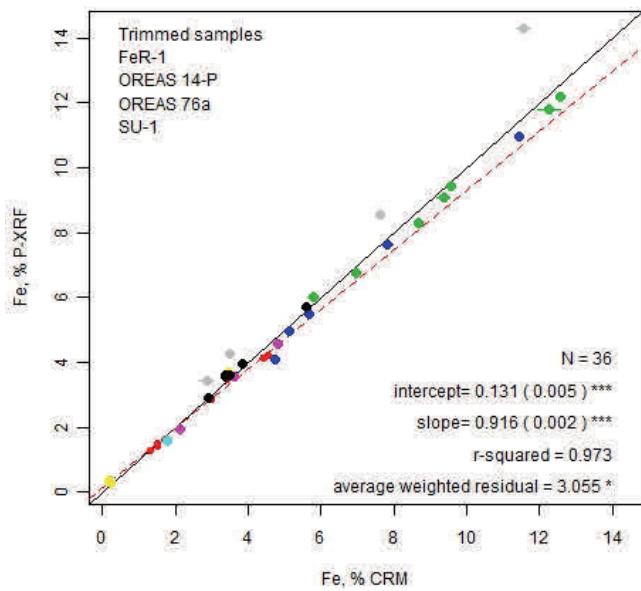
### Handheld-Machine A-Mining Mode



### Handheld-HHBM-Mining Mode

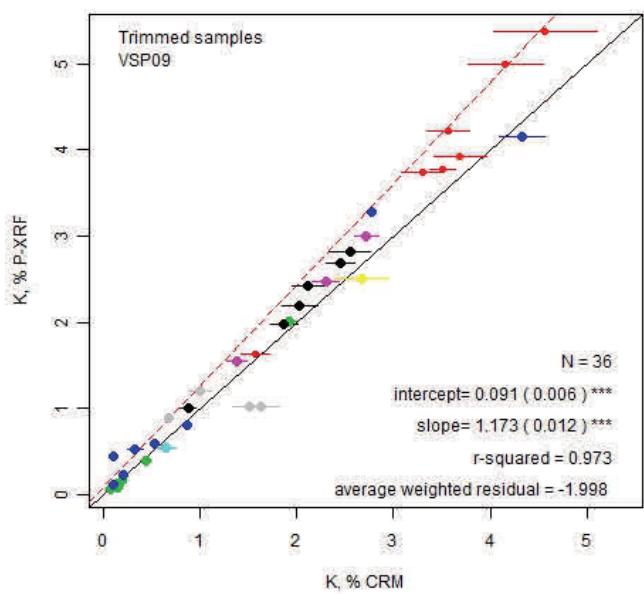
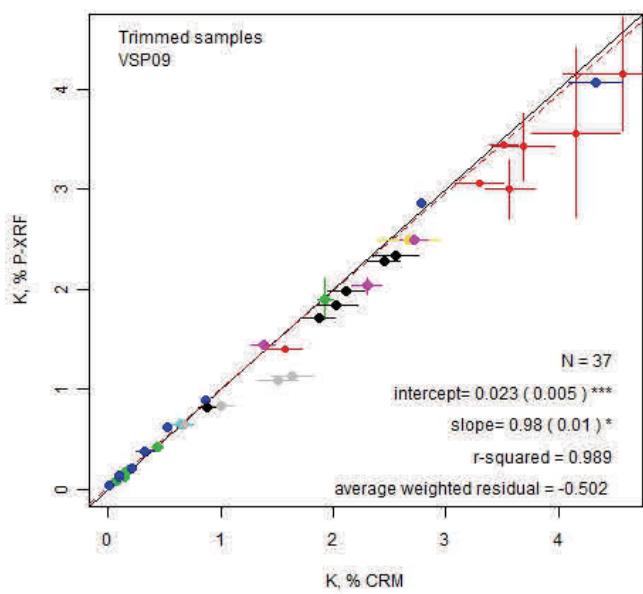
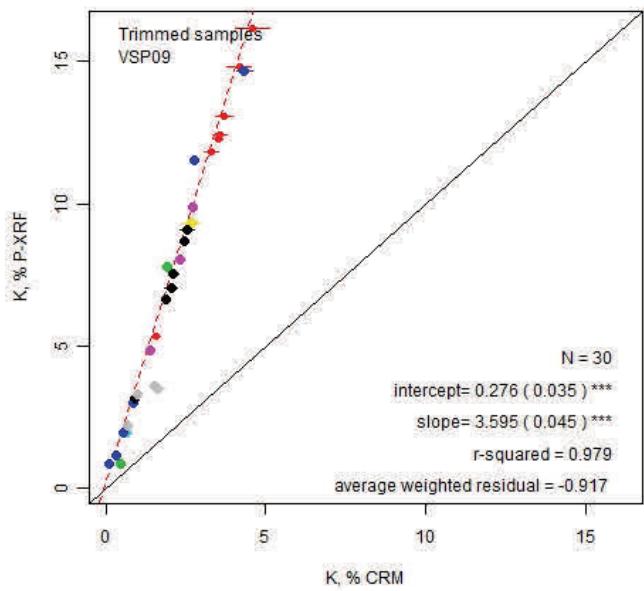
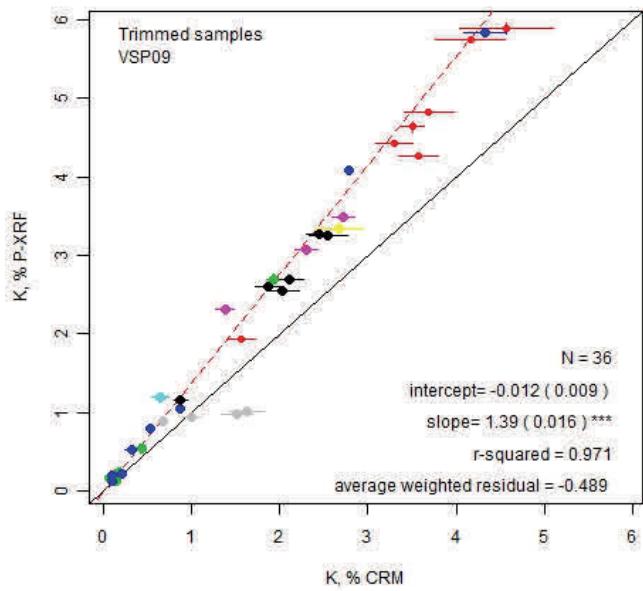
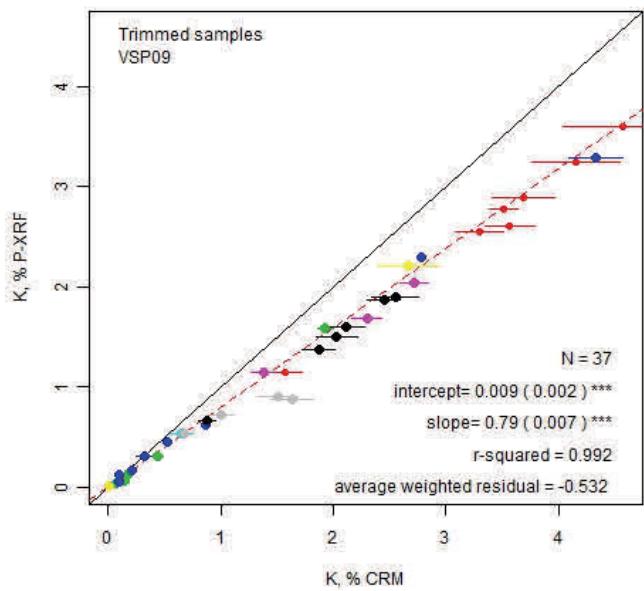


### Handheld-HHCM-Mining Mode



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

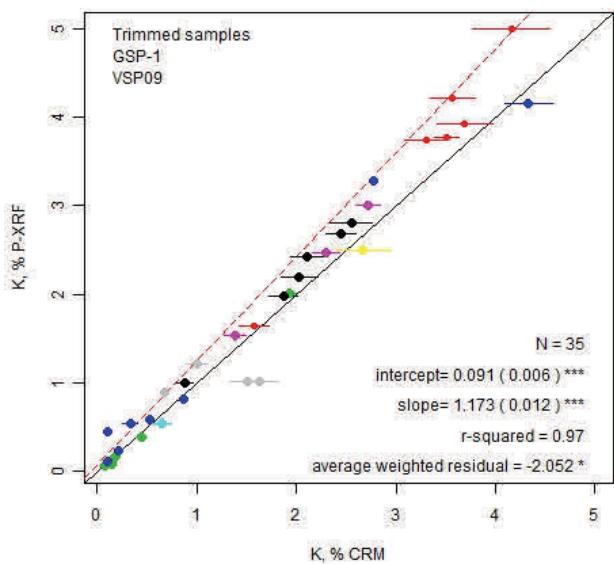
**Fig. Fe- Mining mode  
trimmed**

**Benchtop-BTAM-Mining Mode****Benchtop-BTBM-Mining Mode****Handheld-Machine A-Mining Mode****Handheld-HHBM-Mining Mode****Handheld-HHCM-Mining Mode**

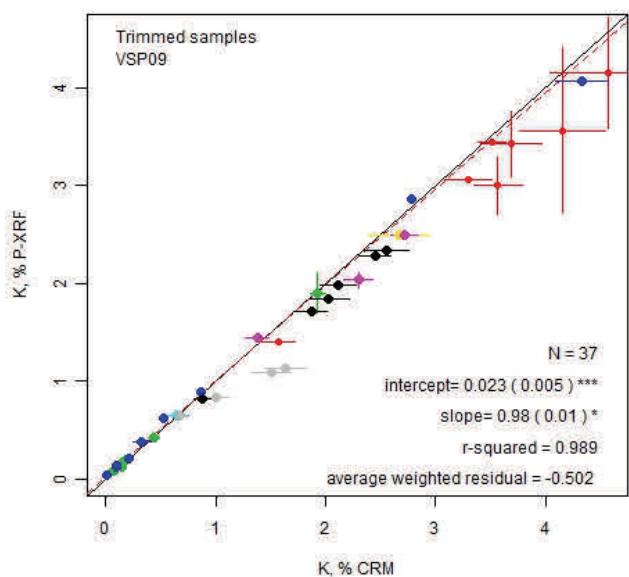
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. K- Mining mode partial trim**

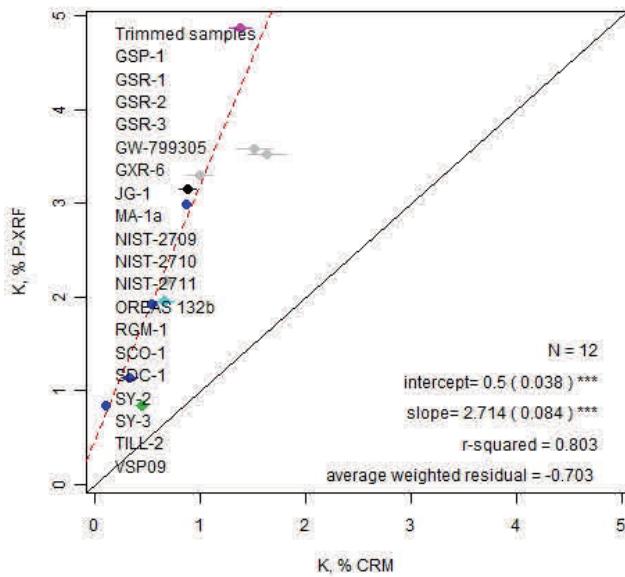
**Benchtop-BTAM-Mining Mode**



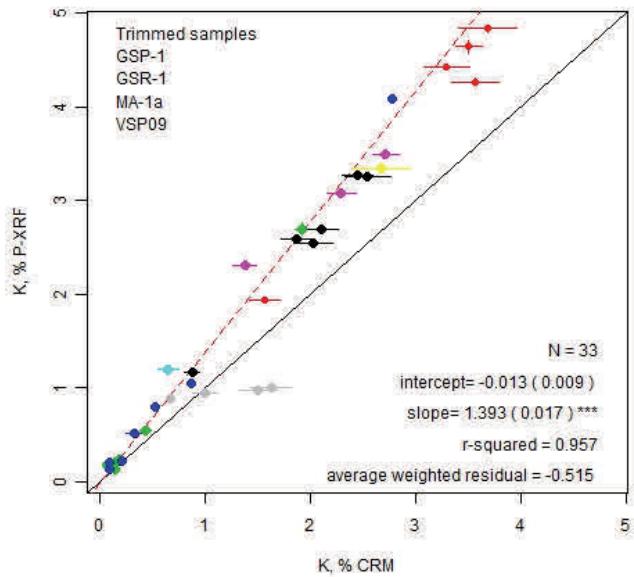
**Benchtop-BTBM-Mining Mode**



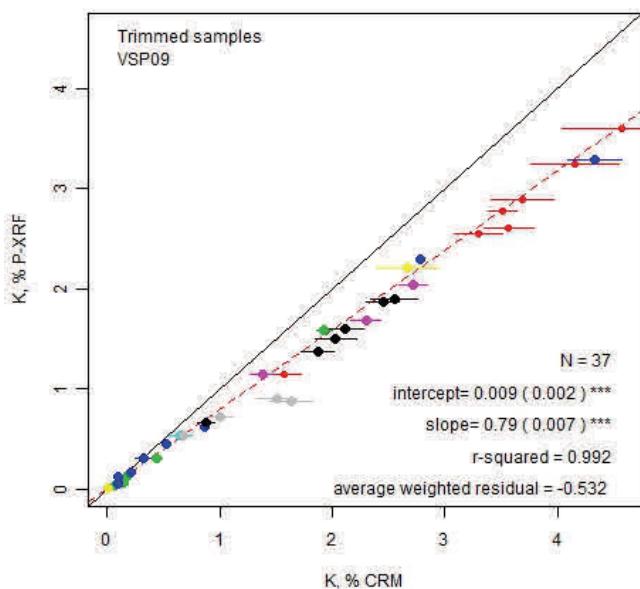
**Handheld-HHAM-Mining Mode**



**Handheld-HHBM-Mining Mode**



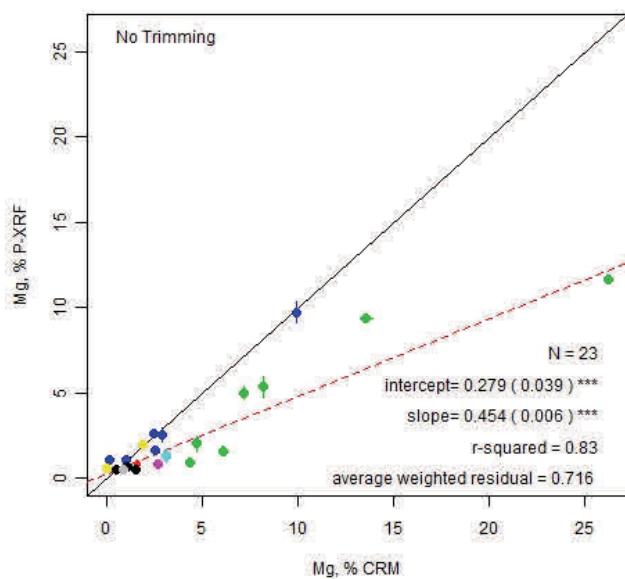
**Handheld-HHCM-Mining Mode**



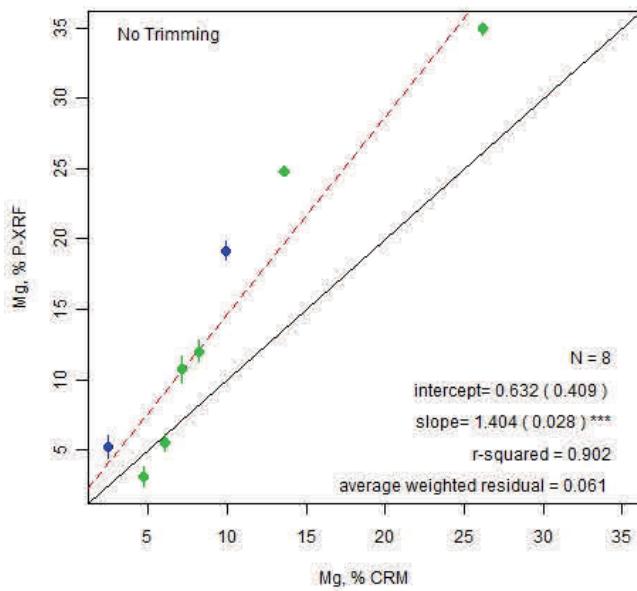
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. K- Mining mode trimmed**

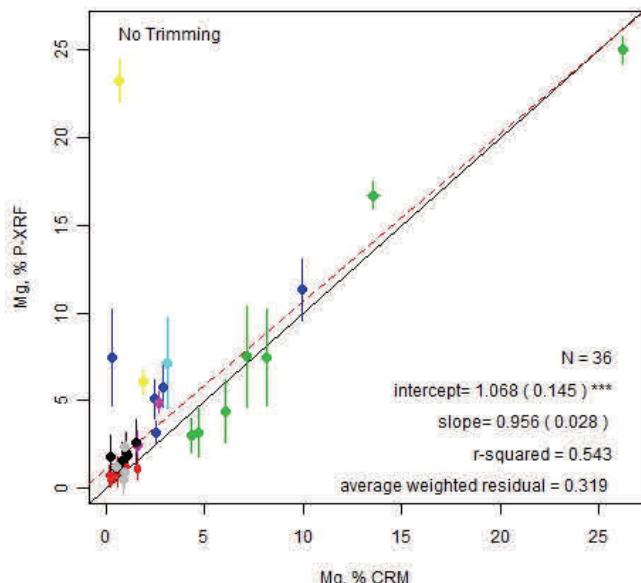
### Benchtop-BTBM-Mining Mode



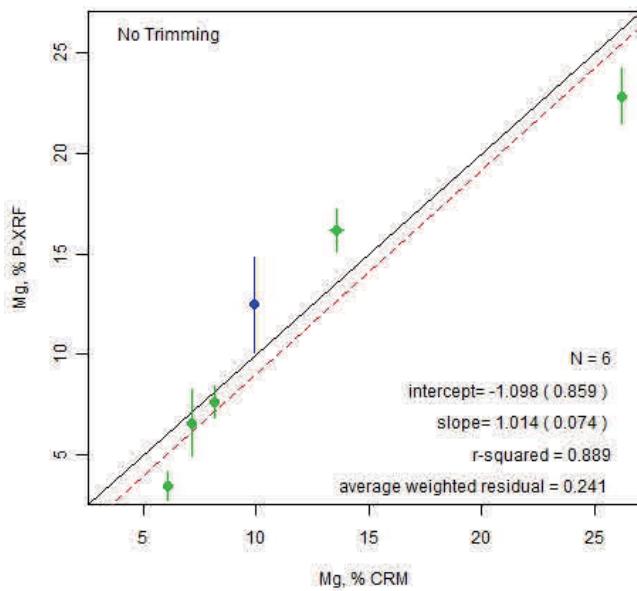
### Handheld-Machine A-Mining Mode



### Handheld-HHBM-Mining Mode



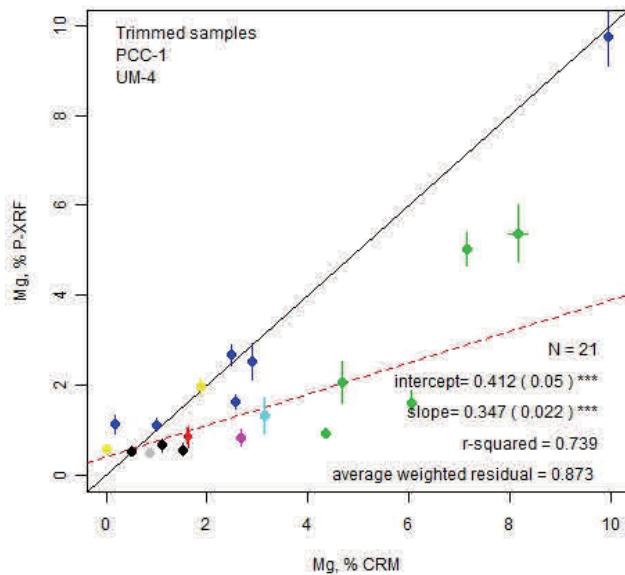
### Handheld-HHCM-Mining Mode



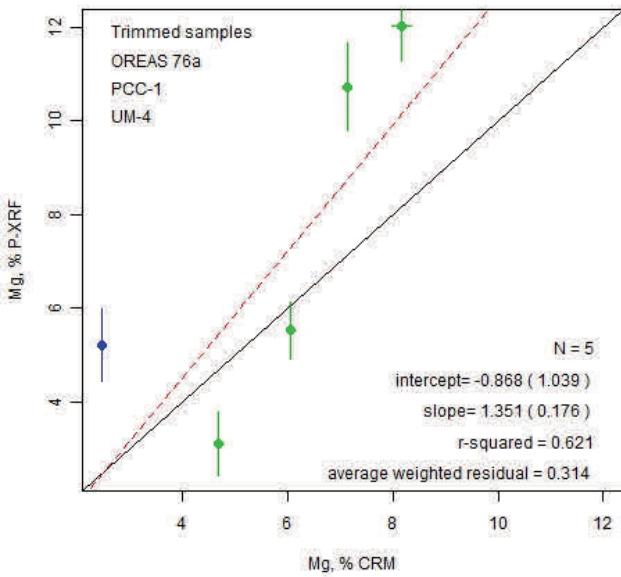
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Mg- Mining mode**

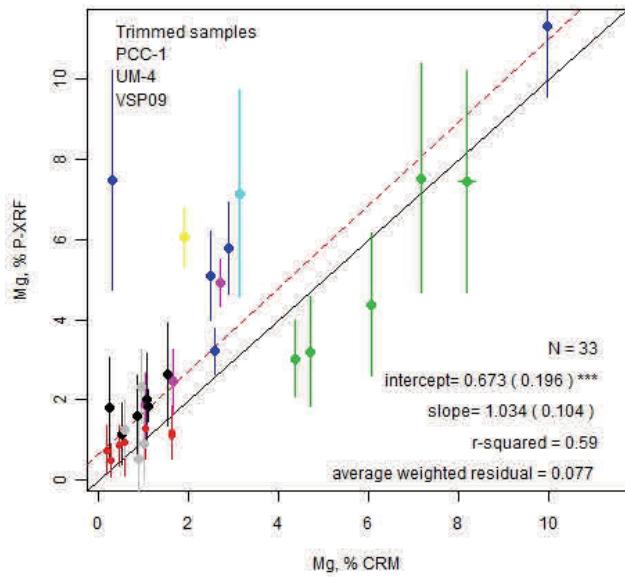
### Benchtop-BTBM-Mining Mode



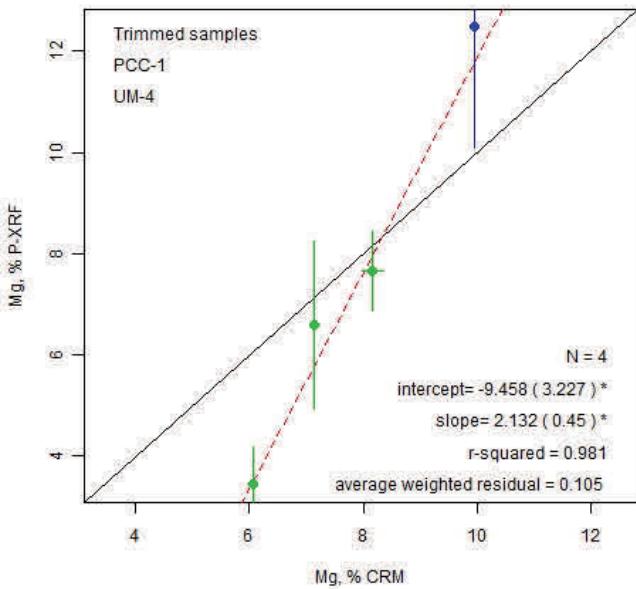
### Handheld-HHAM-Mining Mode



### Handheld-HHBM-Mining Mode



### Handheld-HHCM-Mining Mode



#### Material Group      Symbol

felsic.intermediate



limestone



mafic.ultramafic



ore



other



shale.schist



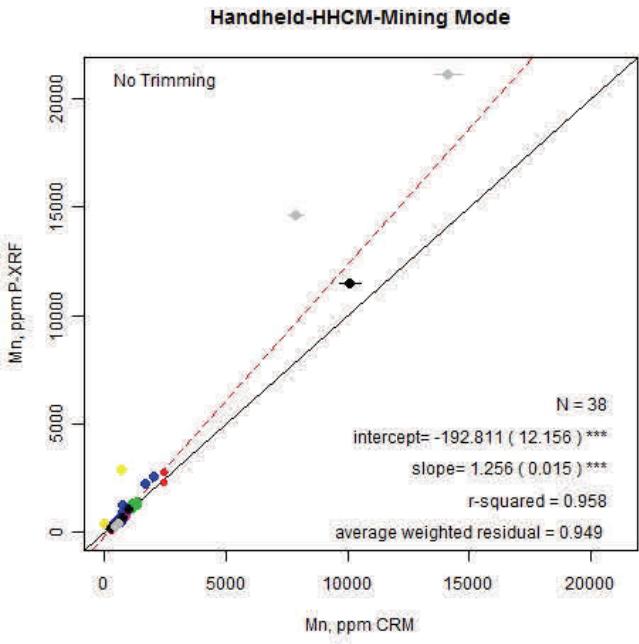
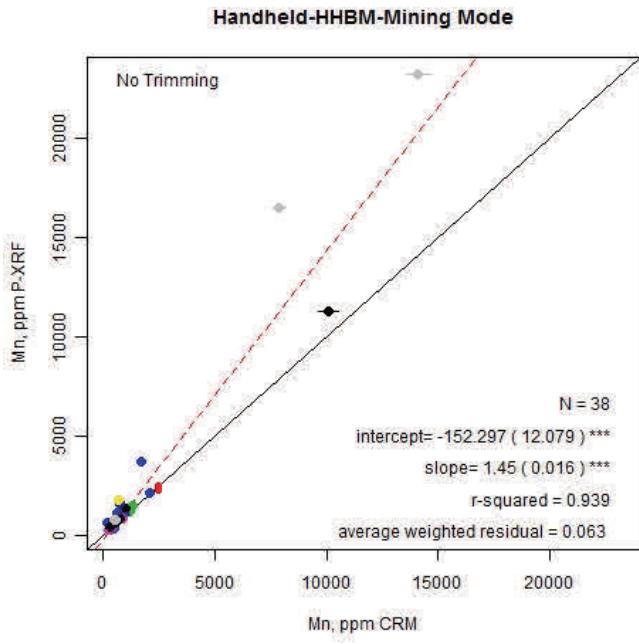
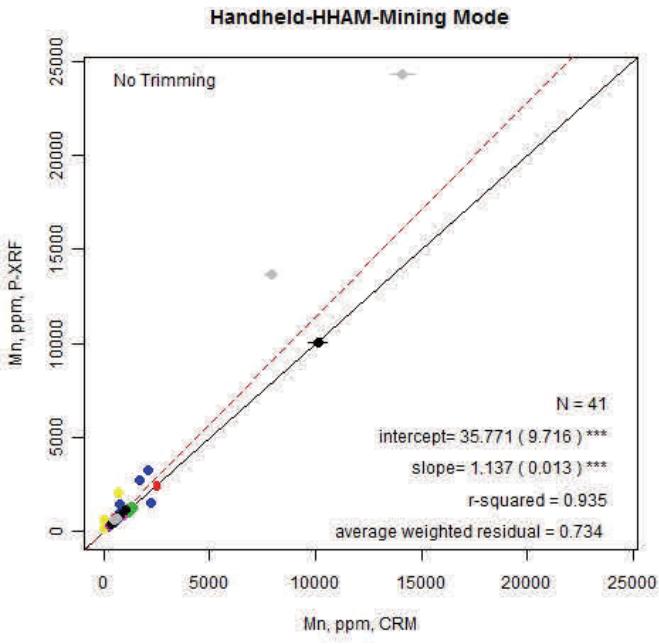
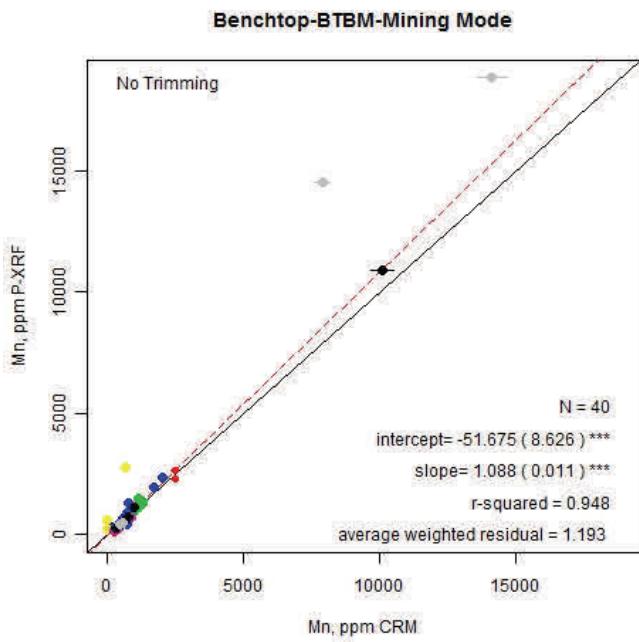
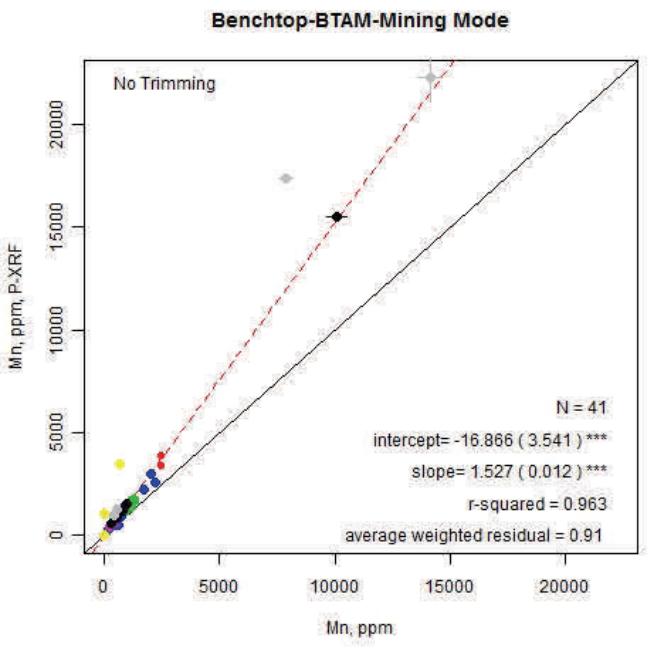
soil.till



stream.lake sed

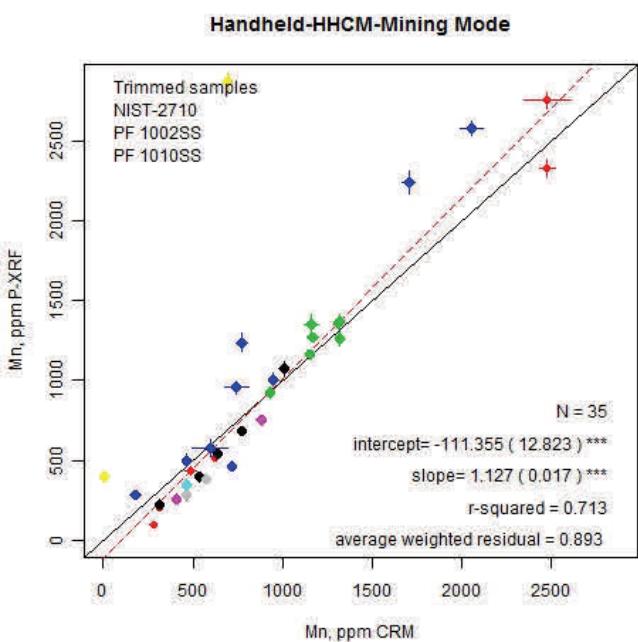
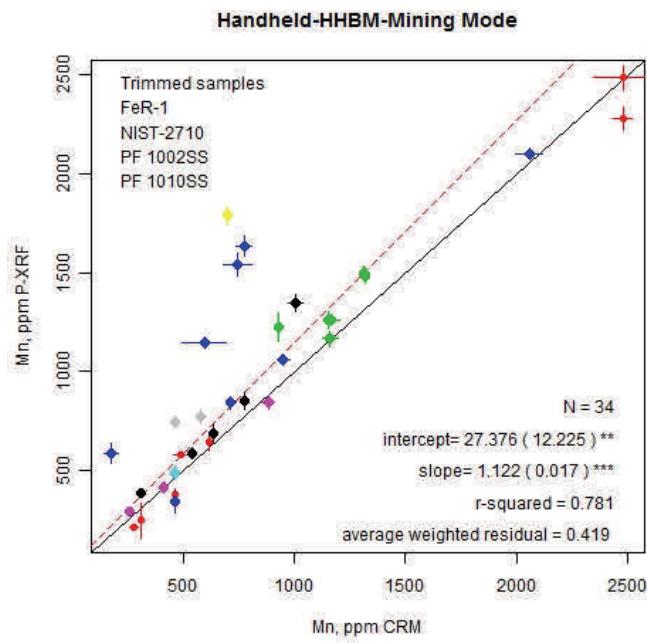
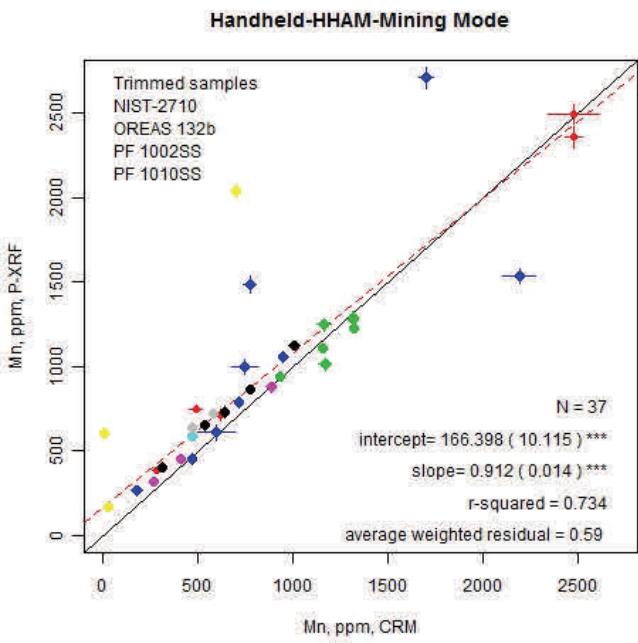
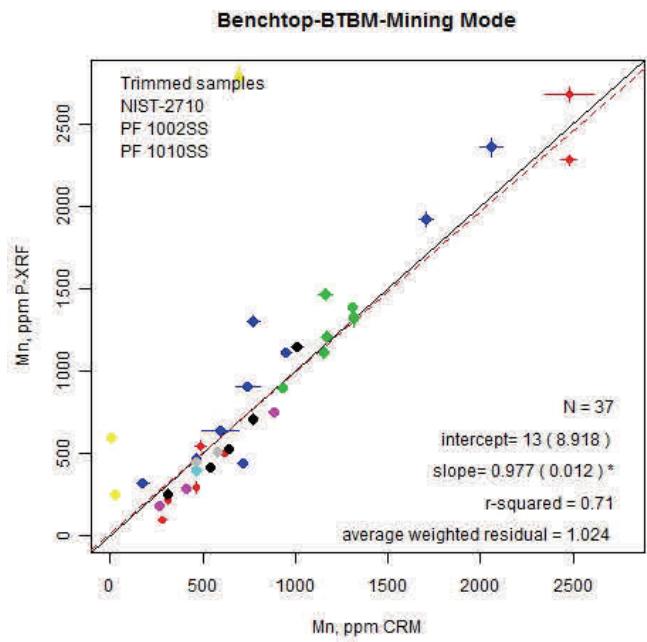
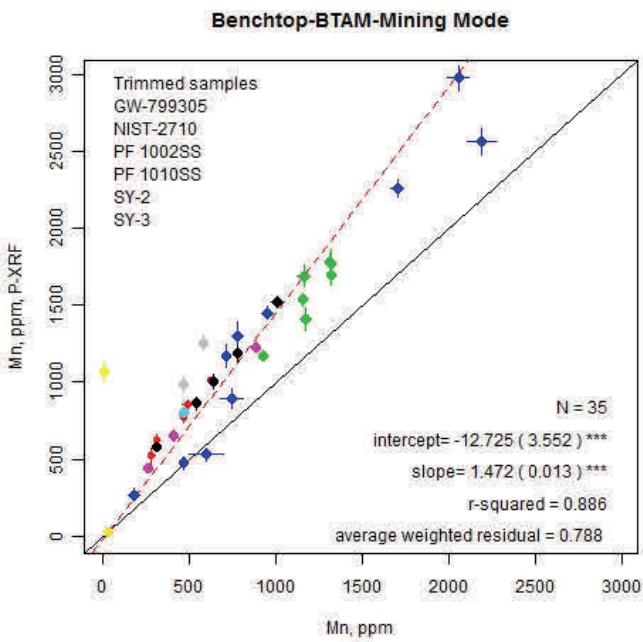


**Fig. Mg- Mining mode trimmed**



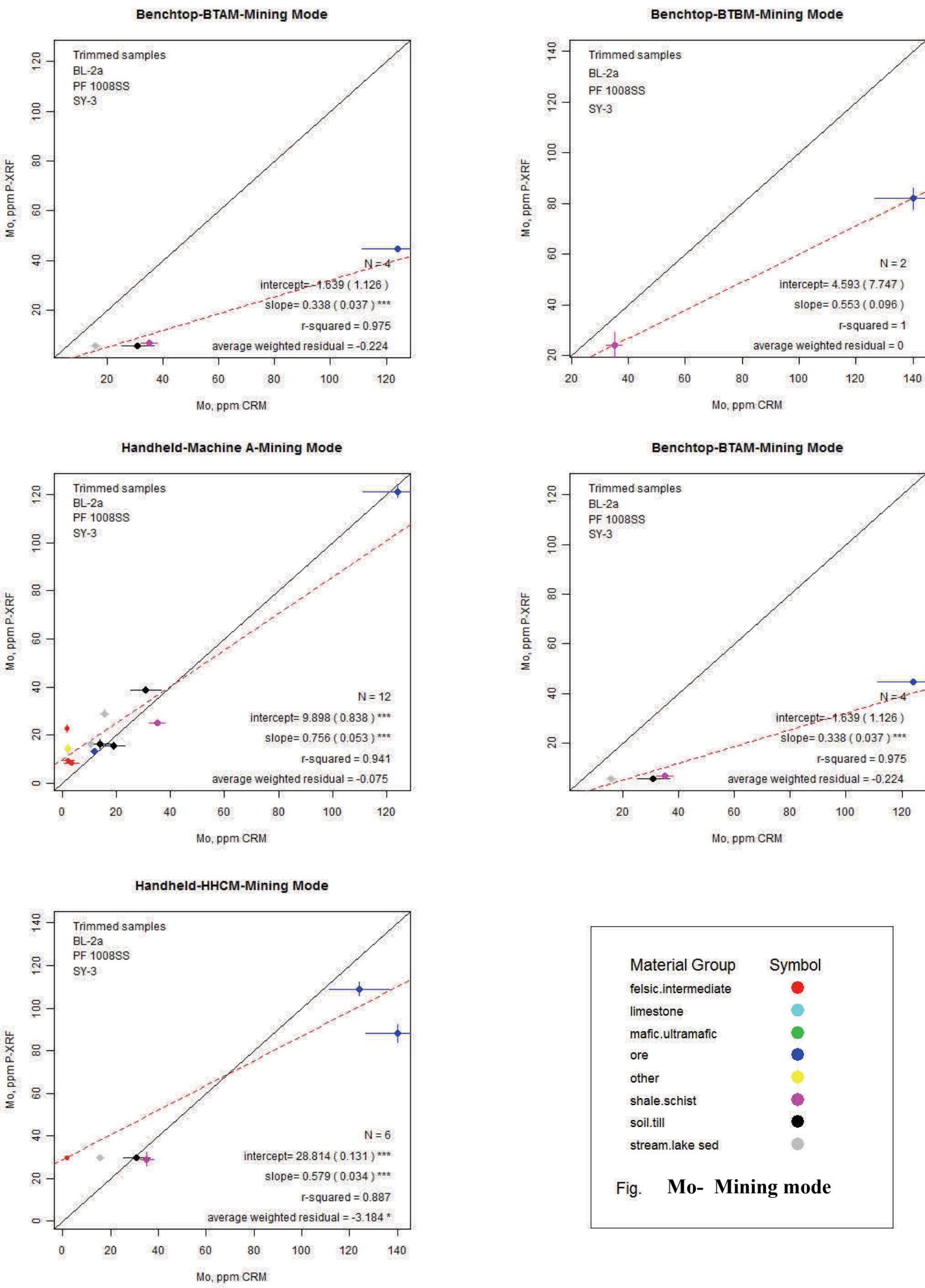
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Mn- Mining mode**

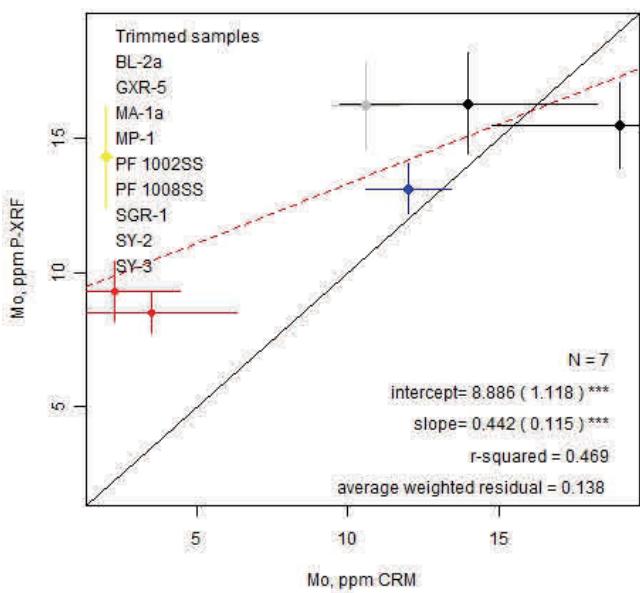


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Mn- Mining mode trimmed**



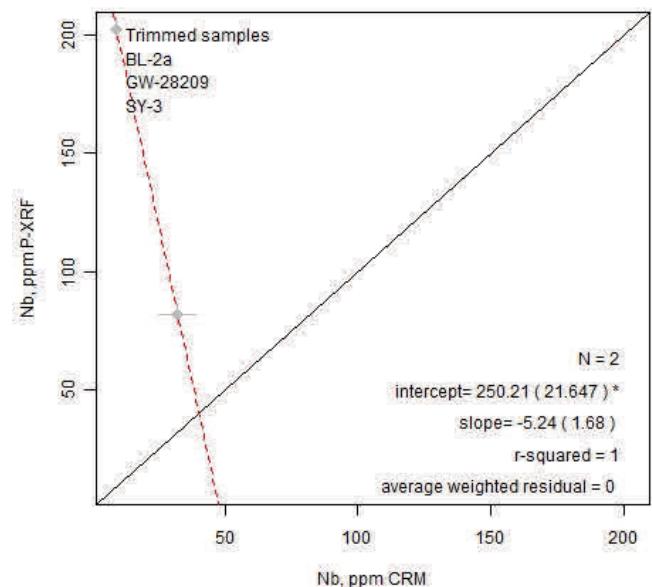
### Handheld-HHAM-Mining Mode



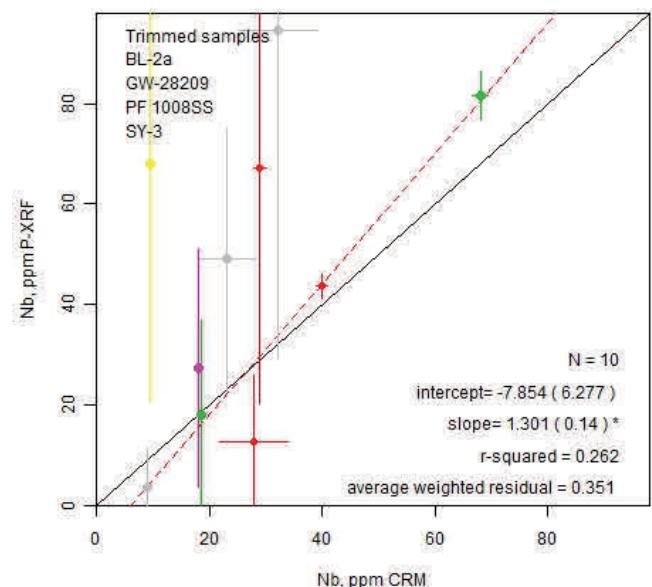
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Mo- Mining mode  
trimmed

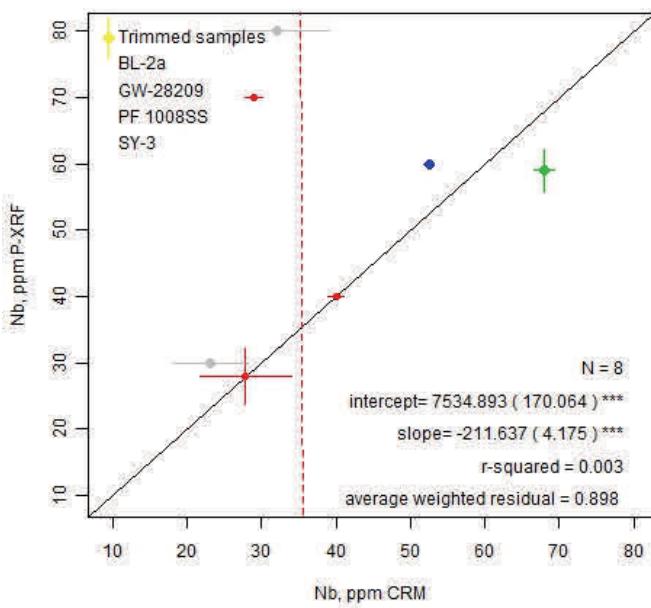
### Benchtop-BTBM-Mining Mode



### Handheld-HHBM-Mining Mode

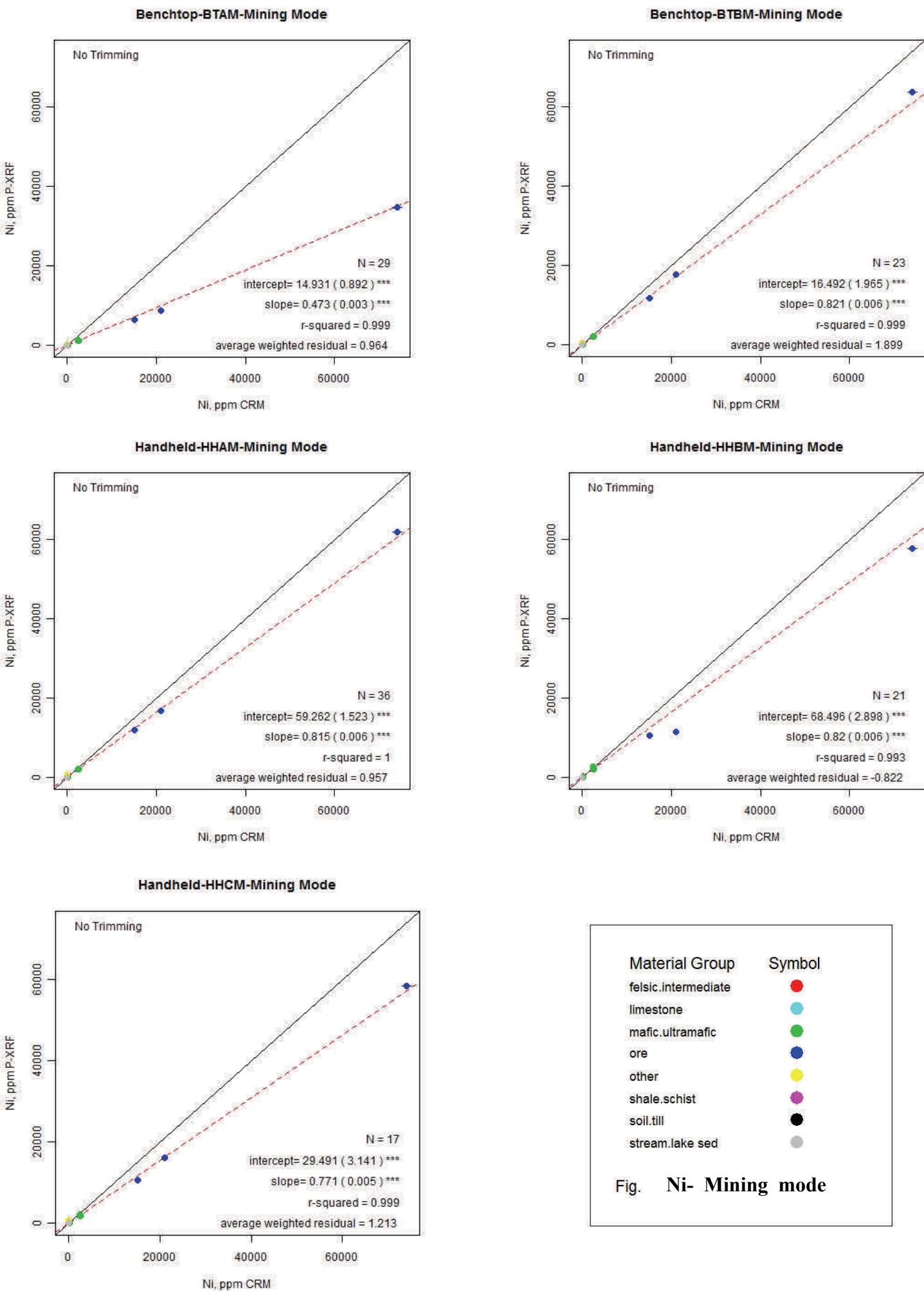


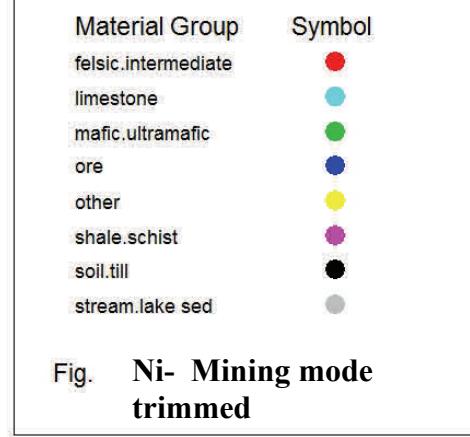
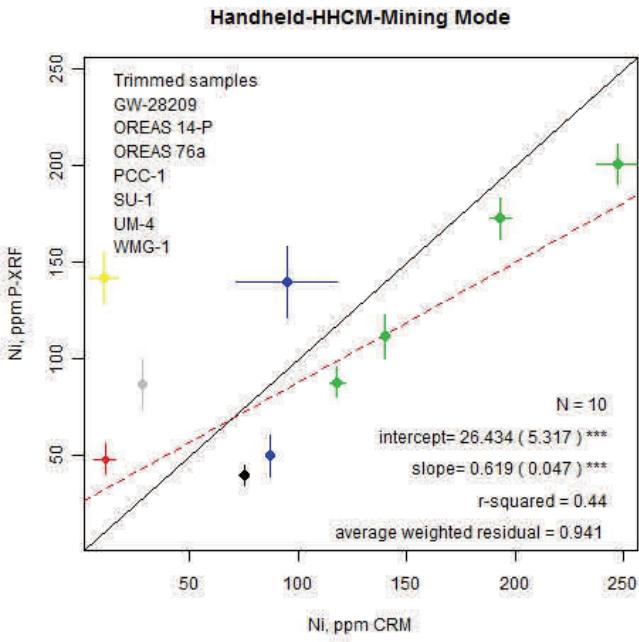
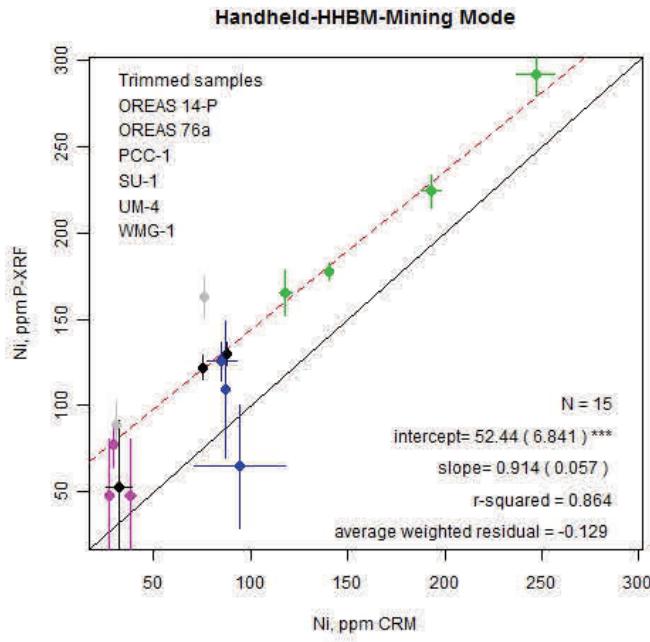
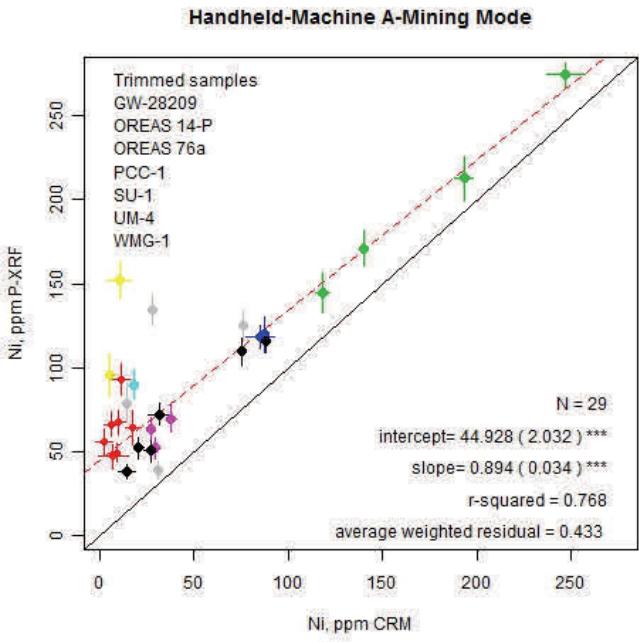
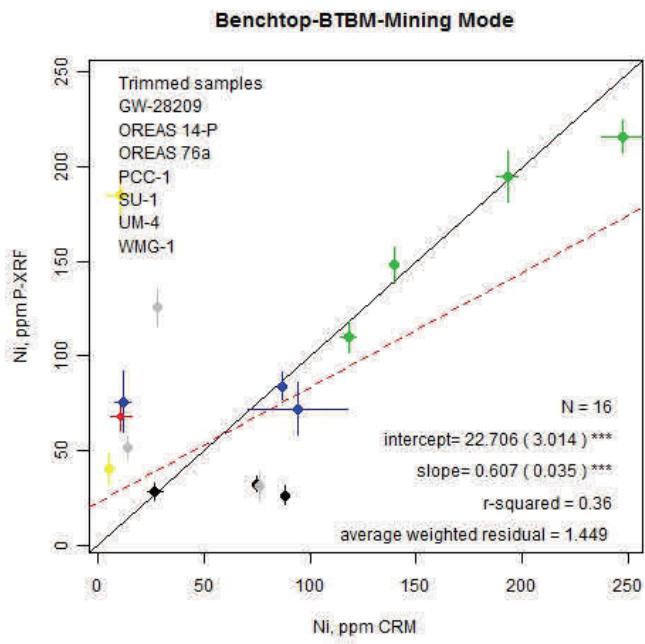
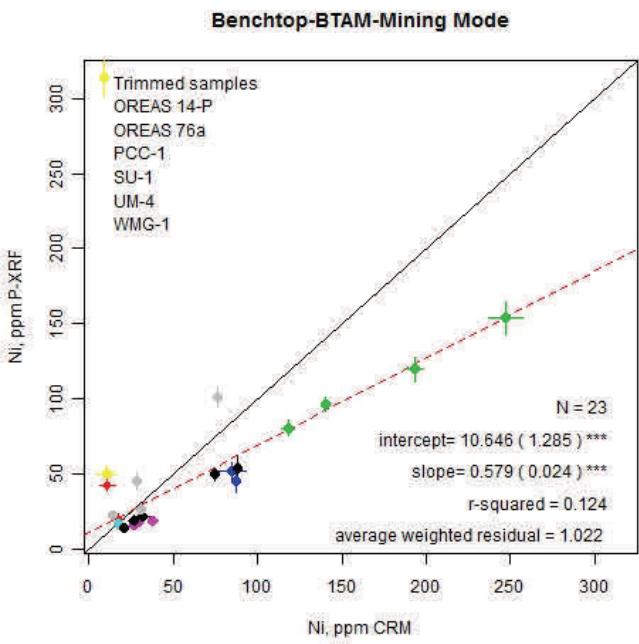
### Handheld-HHCM-Mining Mode

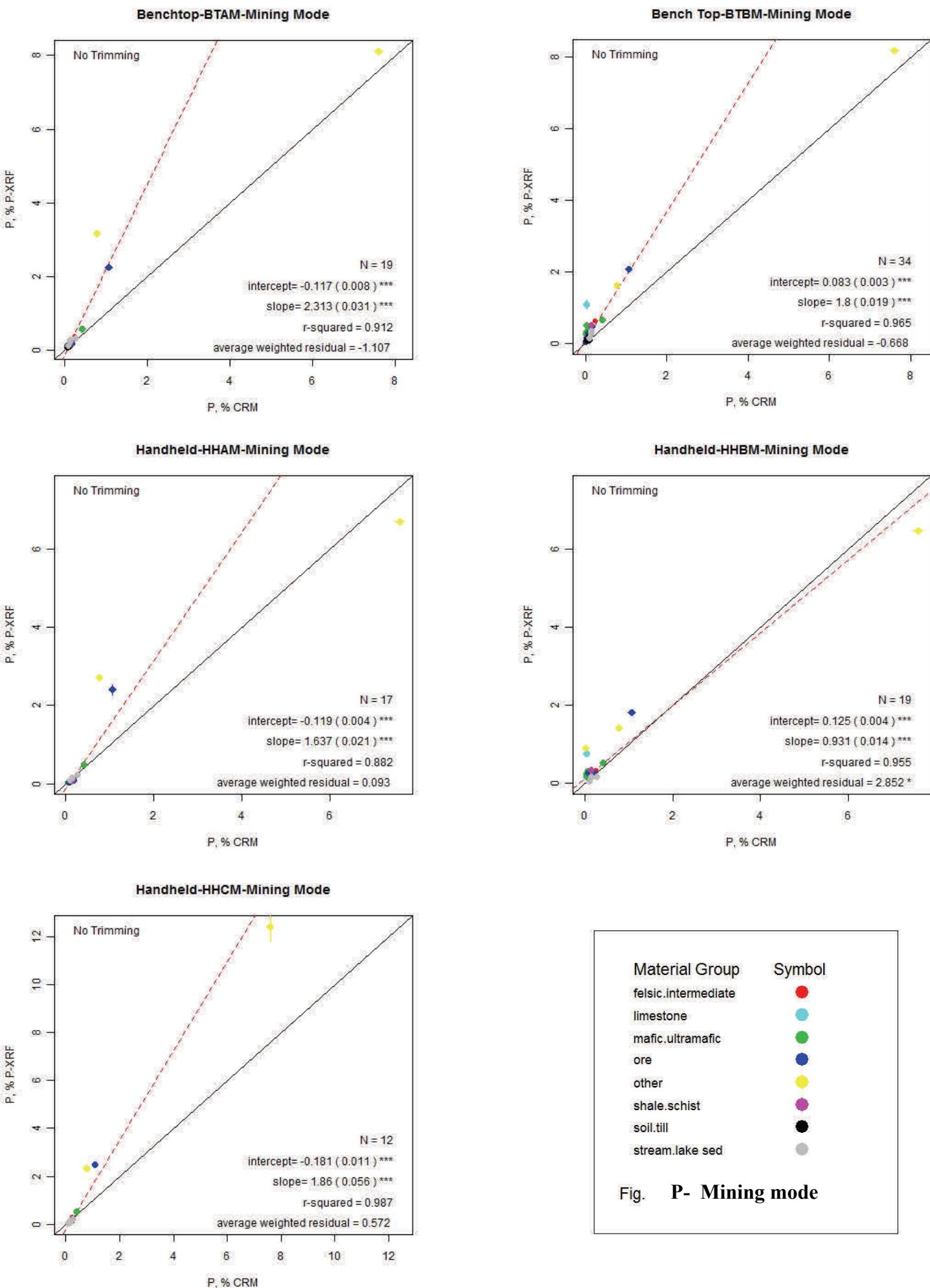


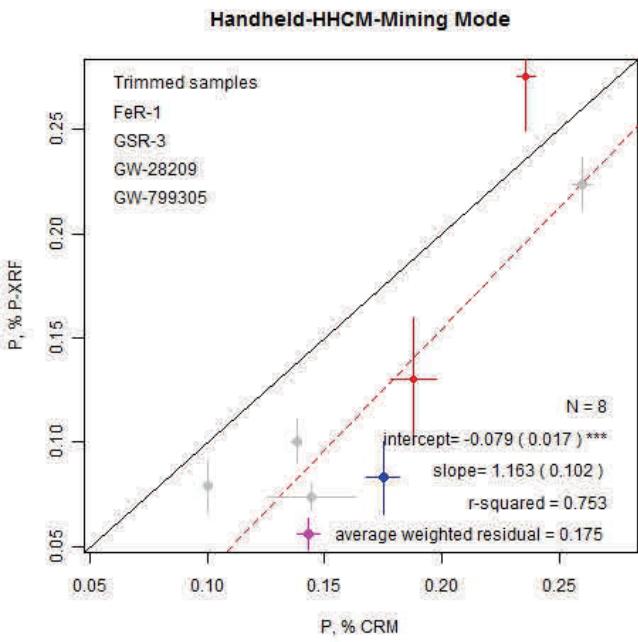
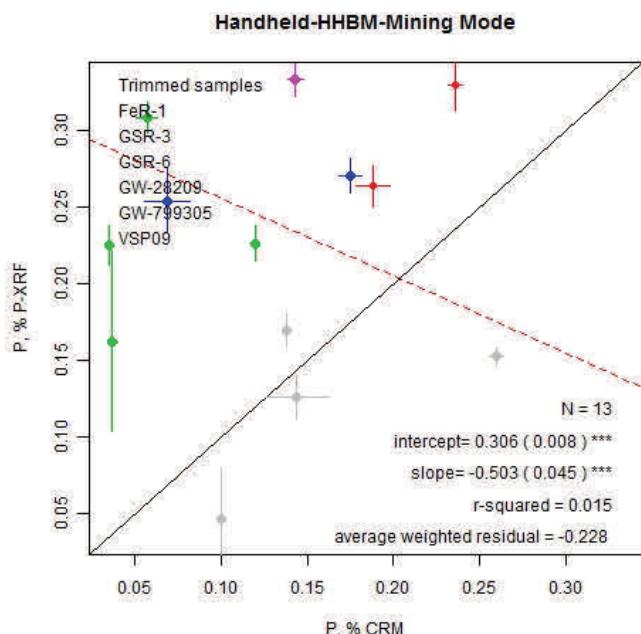
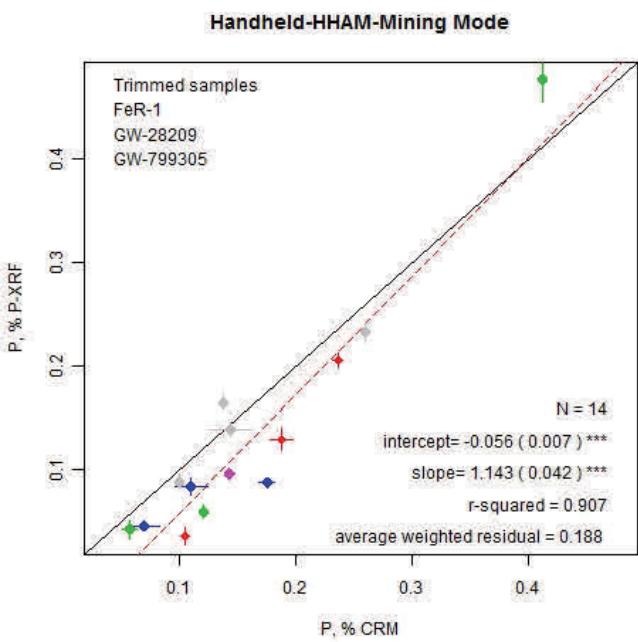
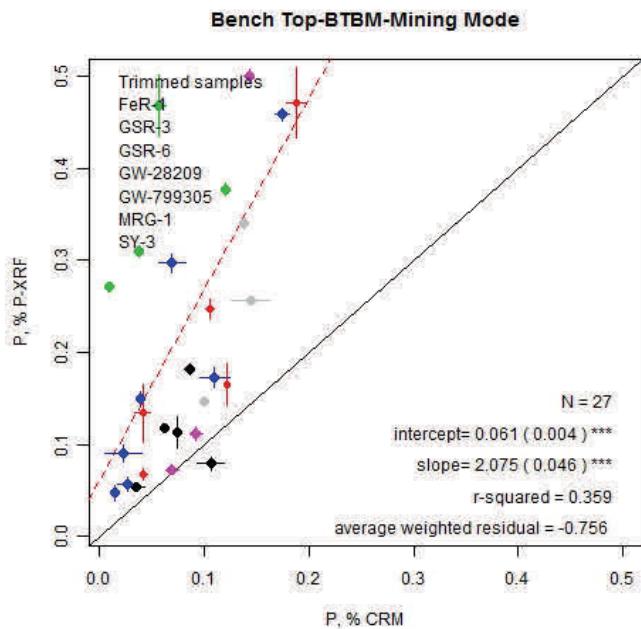
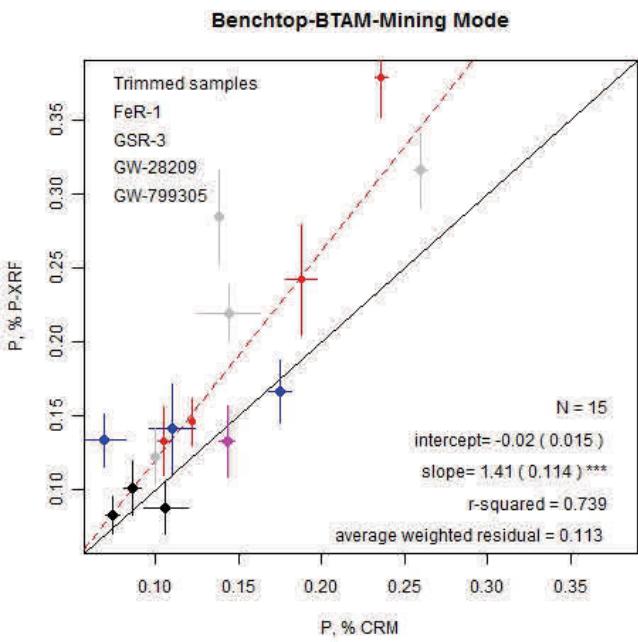
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Nb- Mining mode





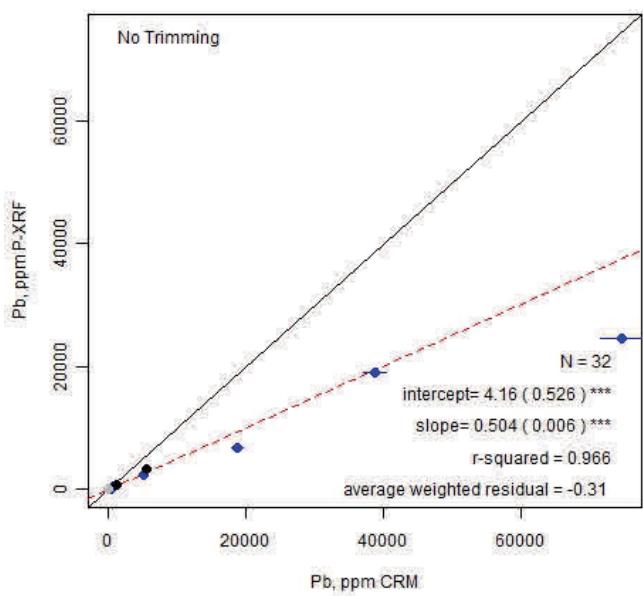




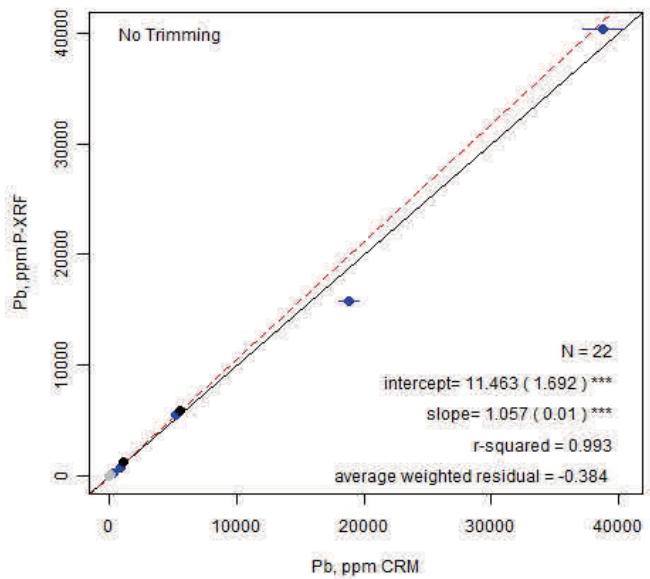
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. P- Mining mode trimmed**

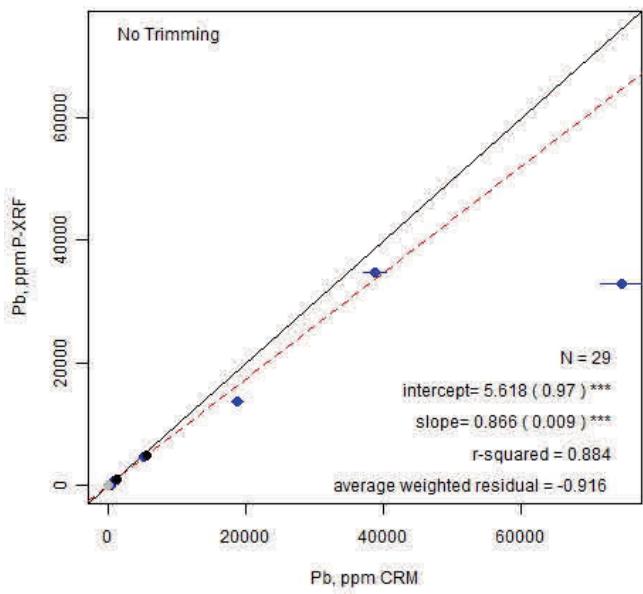
### Benchtop-BTAM-Mining Mode



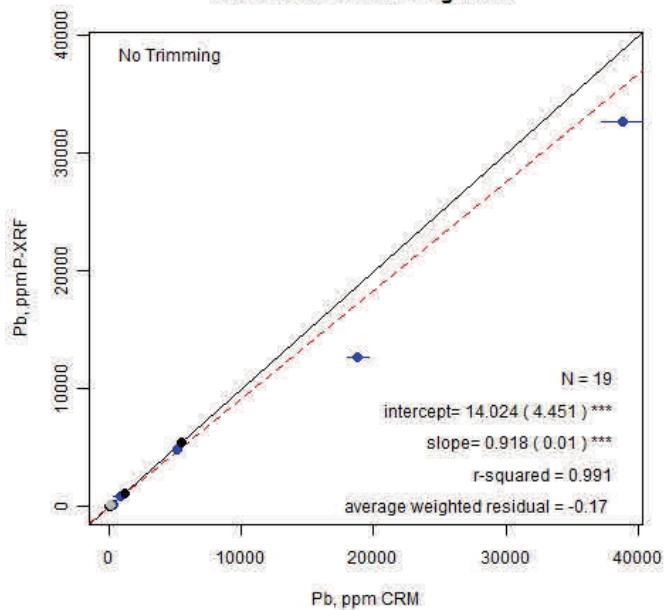
### Bench Top-BTBM-Mining Mode



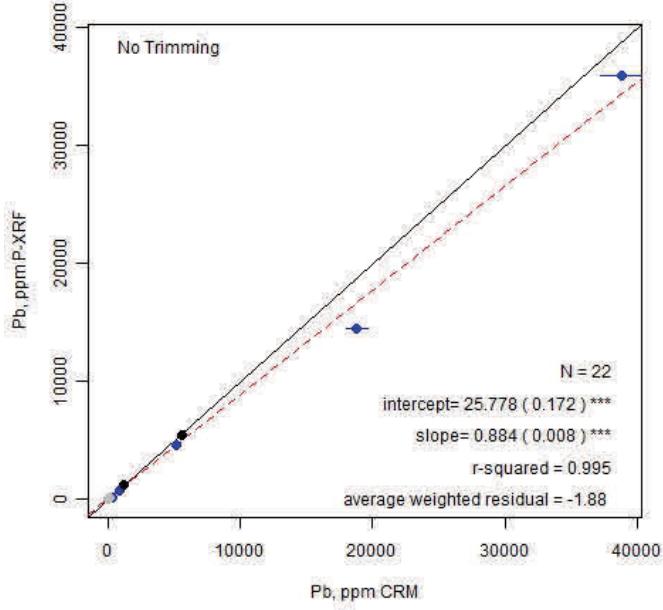
### Handheld-HHAM-Mining Mode



### Handheld-HHBM-Mining Mode

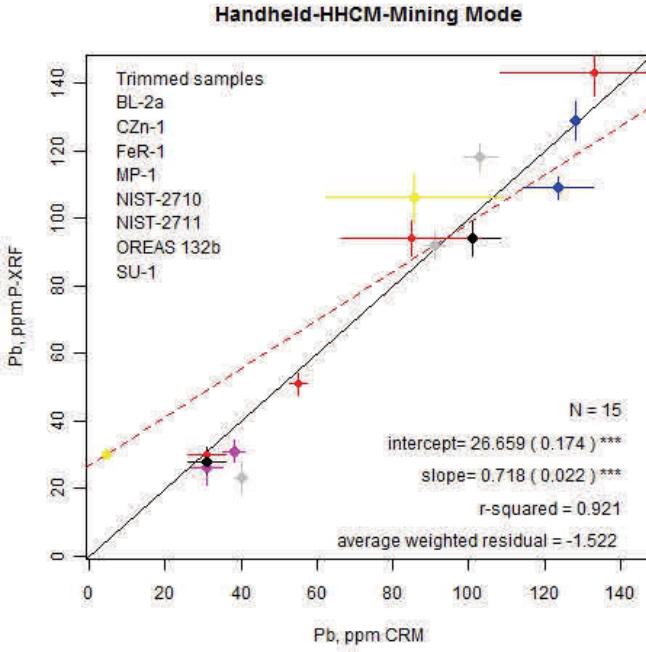
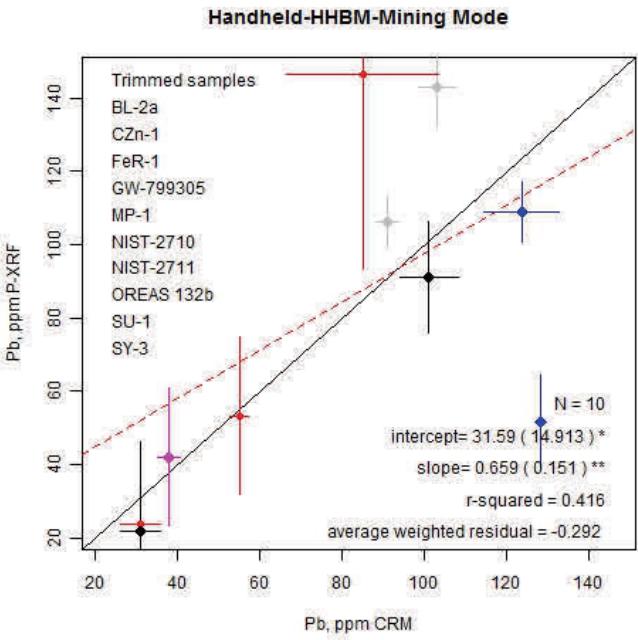
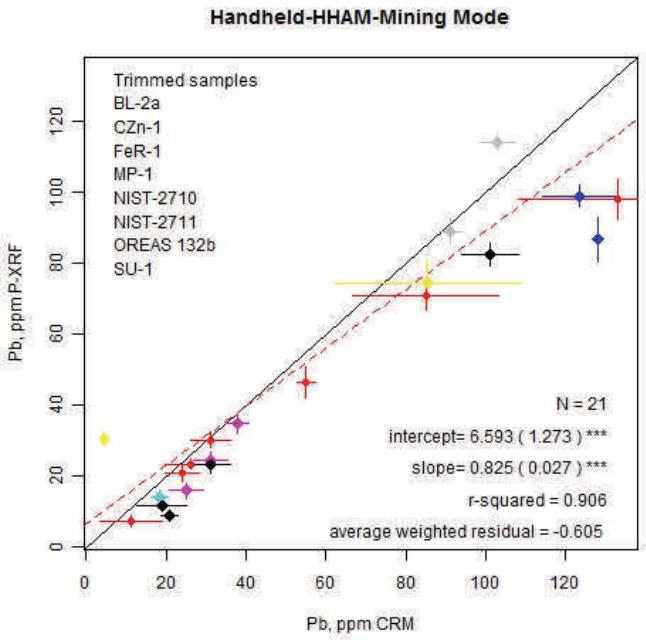
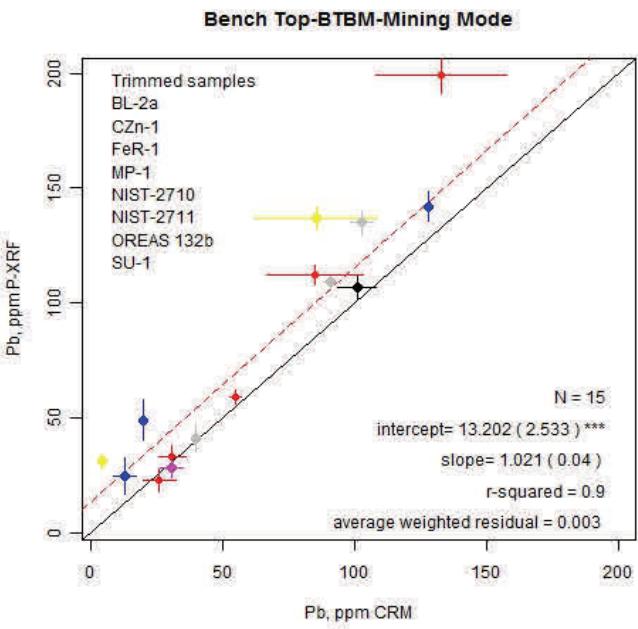
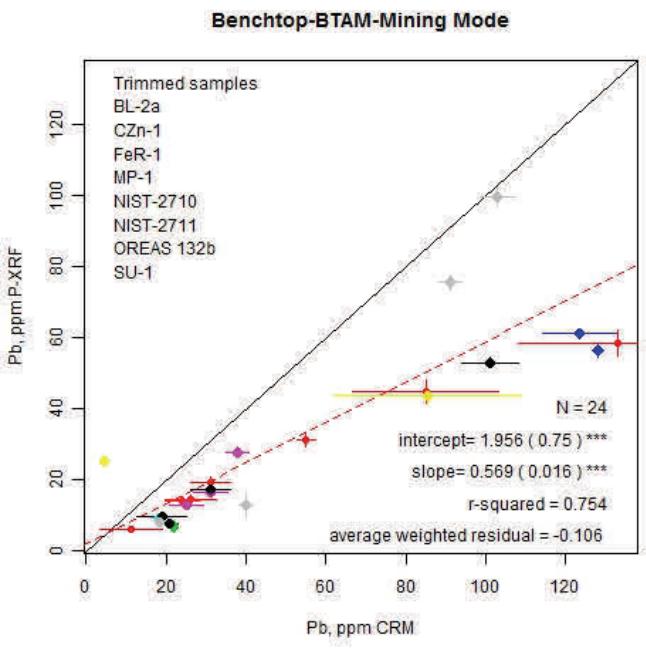


### Handheld-HHCM-Mining Mode



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

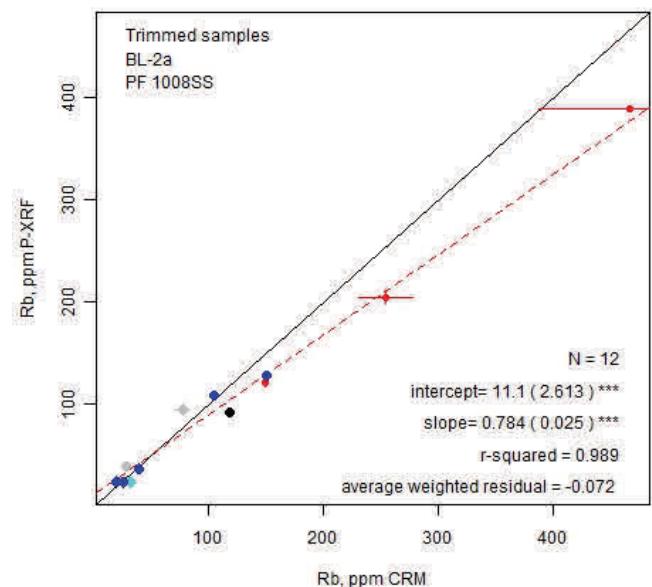
Fig. Pb- Mining mode



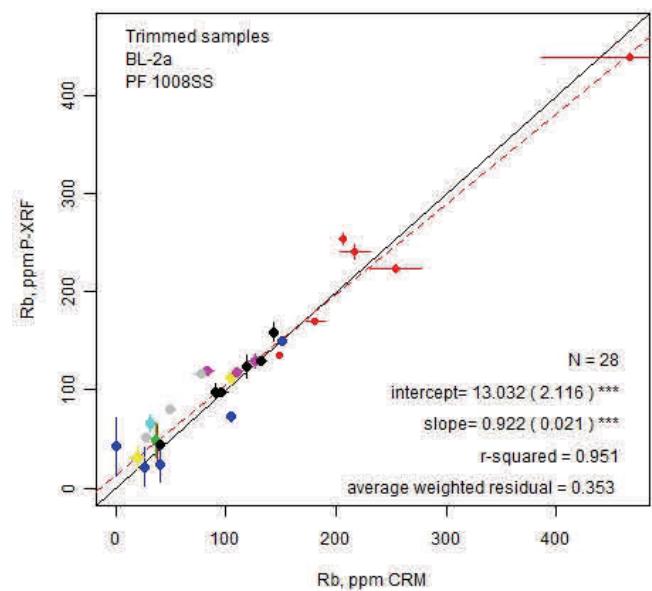
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Pb- Mining mode trimmed**

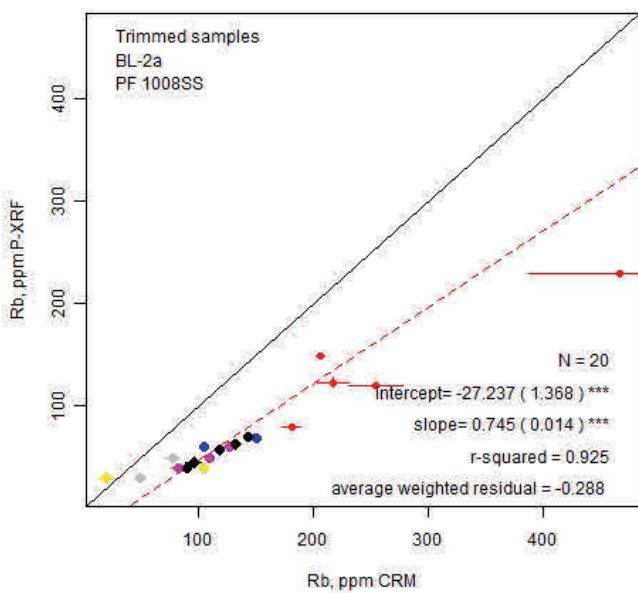
### Bench Top-BTBM-Mining Mode



### Handheld-HHBM-Mining Mode



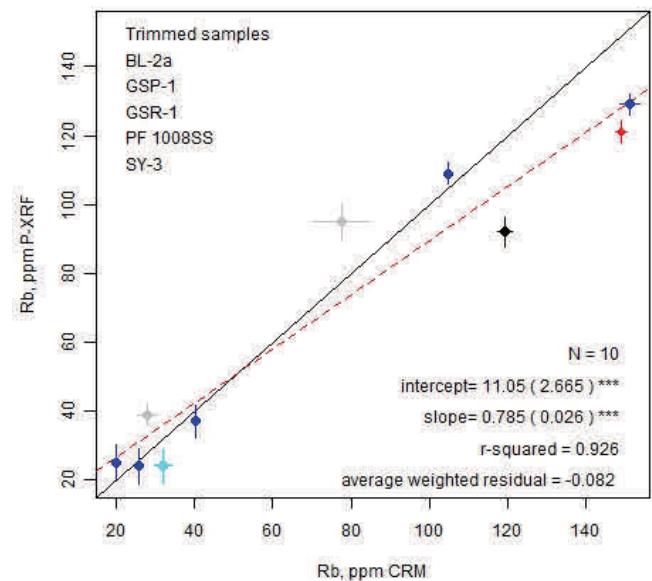
### Handheld-HHCM-Mining Mode



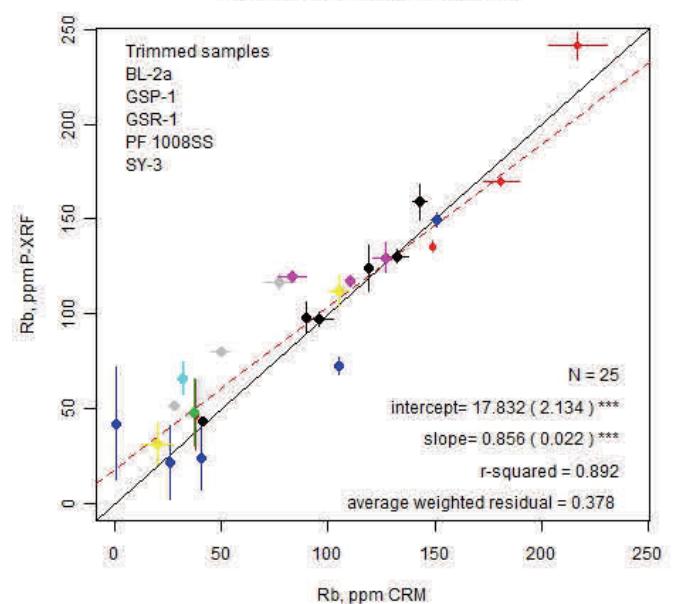
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Rb- Mining mode  
Partial trim

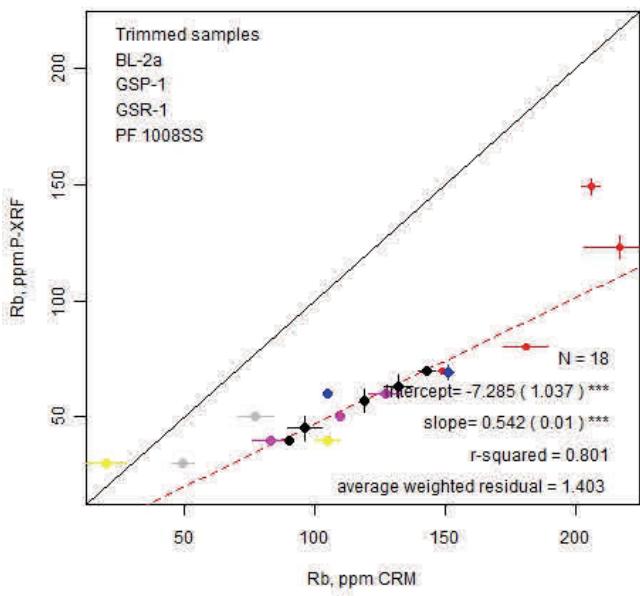
### Bench Top-BTBM-Mining Mode



### Handheld-HHBM-Mining Mode

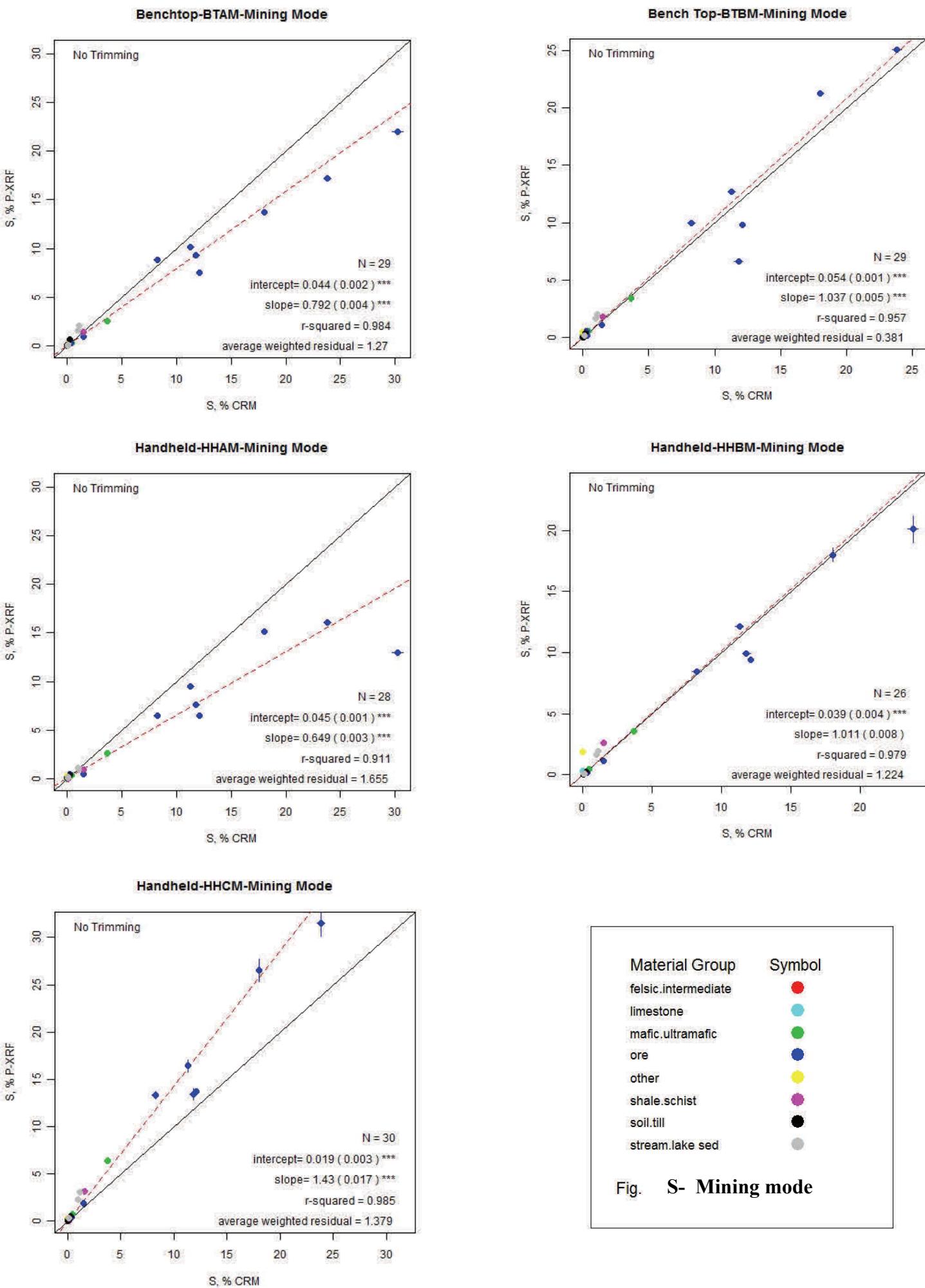


### Handheld-HHCM-Mining Mode

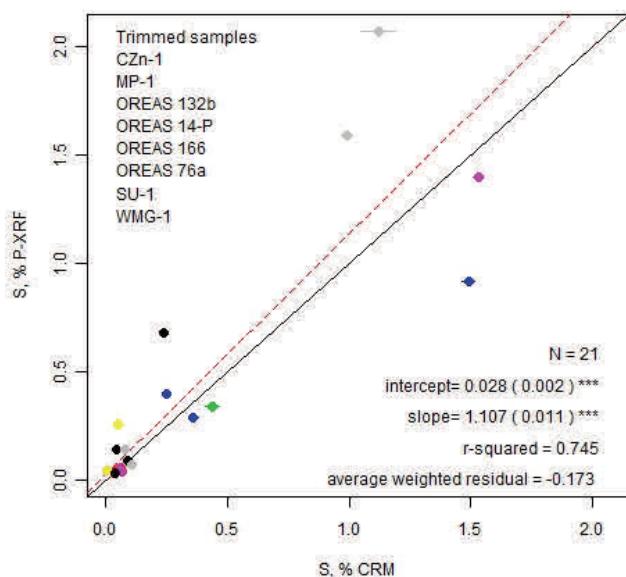


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

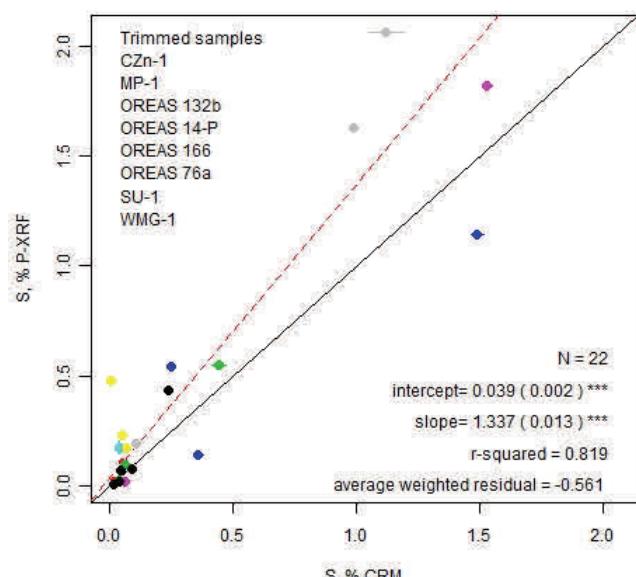
Fig. Rb- Mining mode  
trimmed



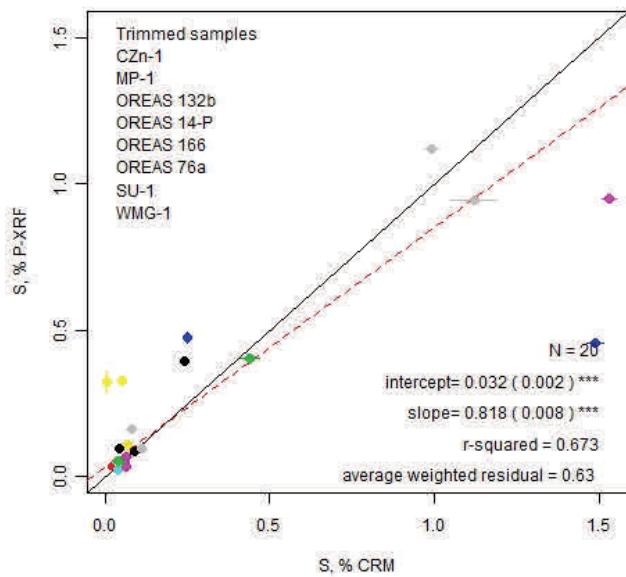
### Benchtop-BTAM-Mining Mode



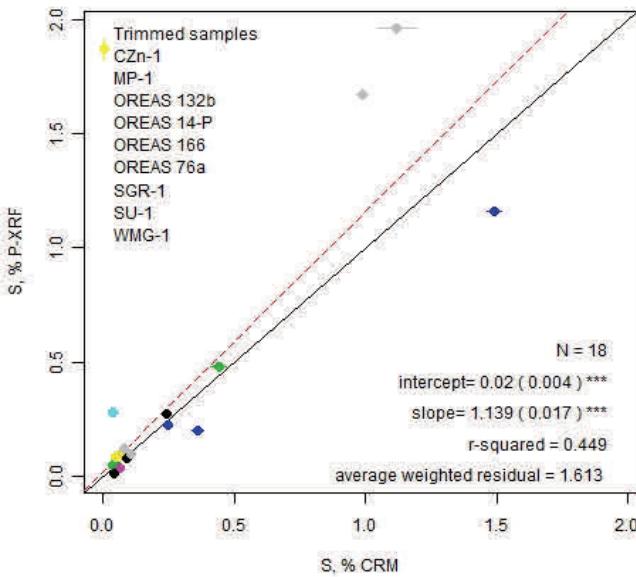
### Bench Top-BTBM-Mining Mode



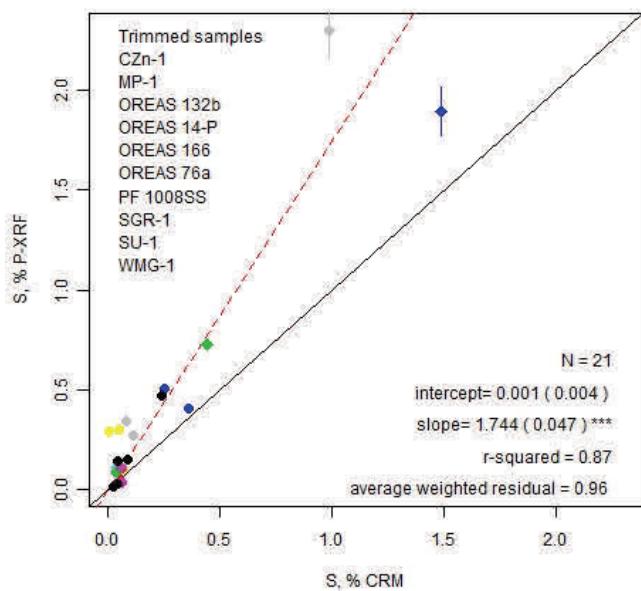
### Handheld-HHAM-Mining Mode



### Handheld-HHBM-Mining Mode



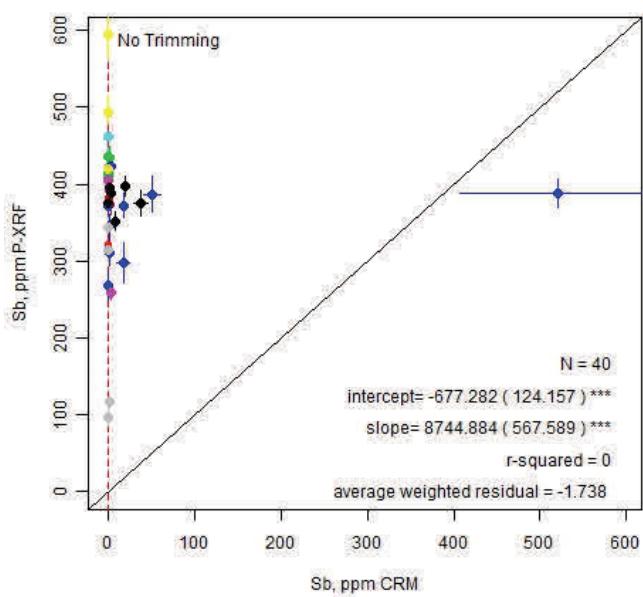
### Handheld-HHCM-Mining Mode



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

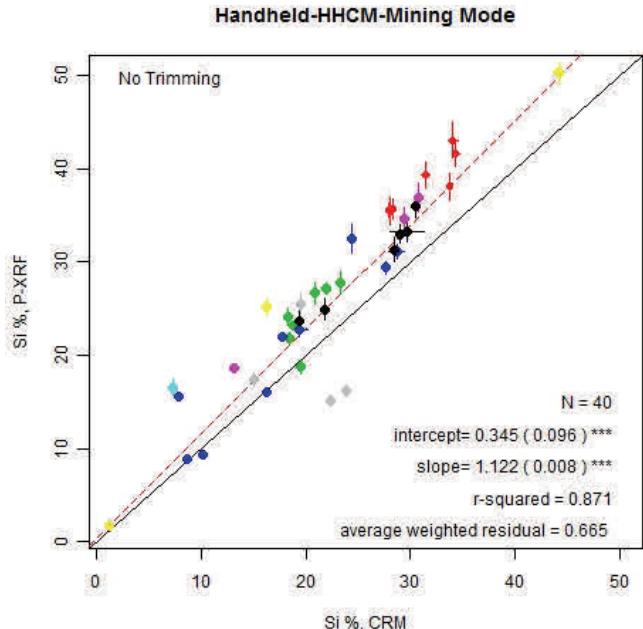
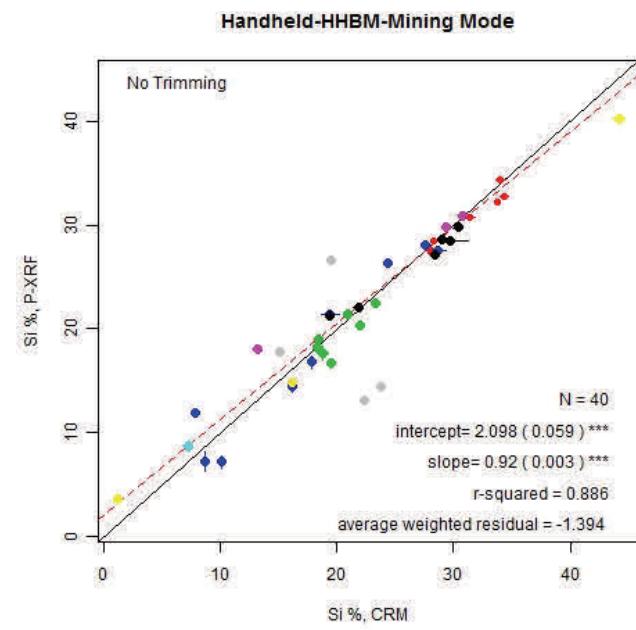
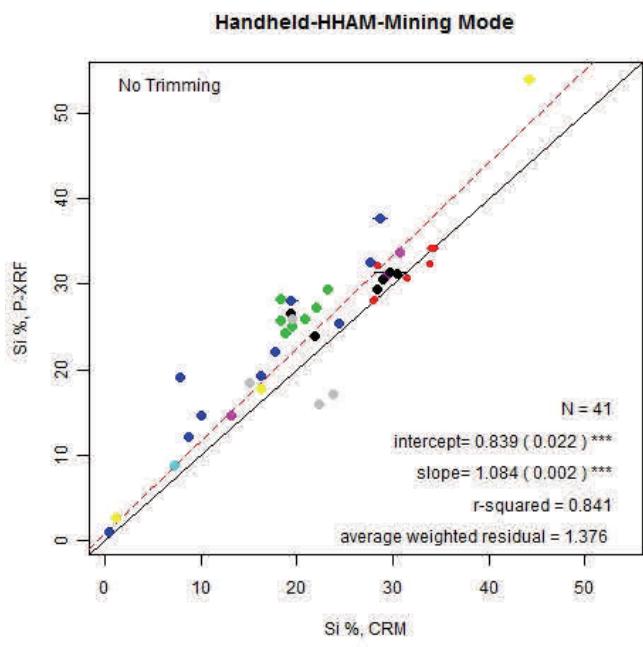
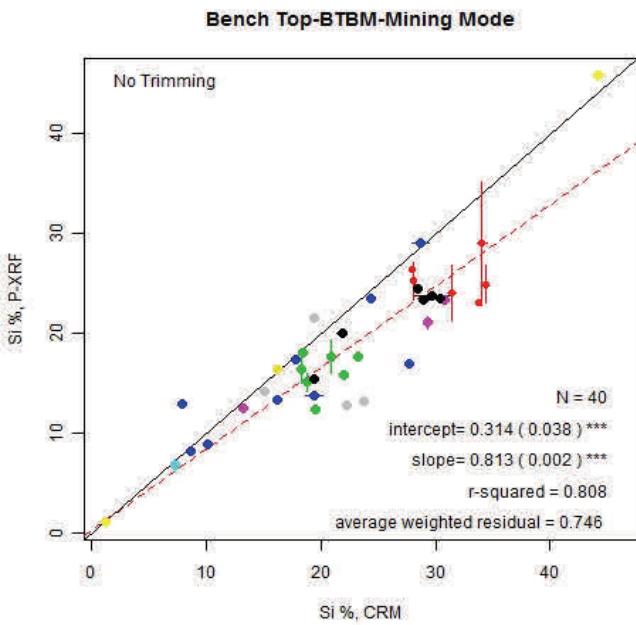
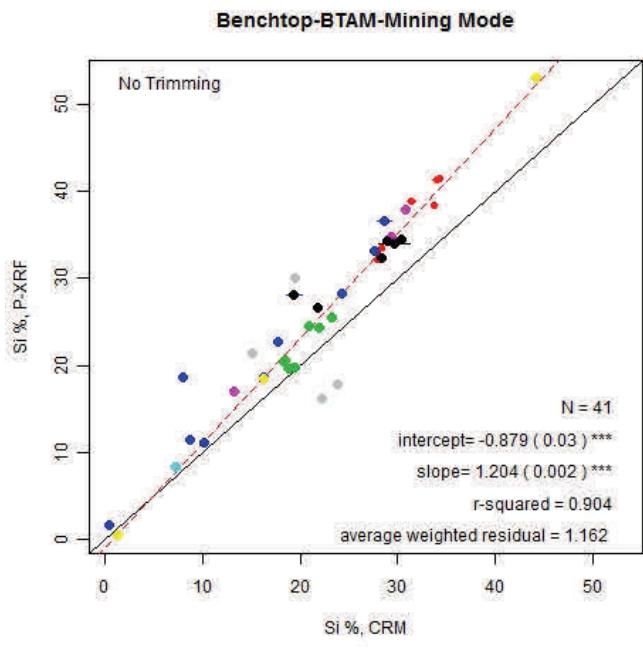
**Fig. S- Mining mode trimmed**

**Handheld-HHAM-Mining Mode**



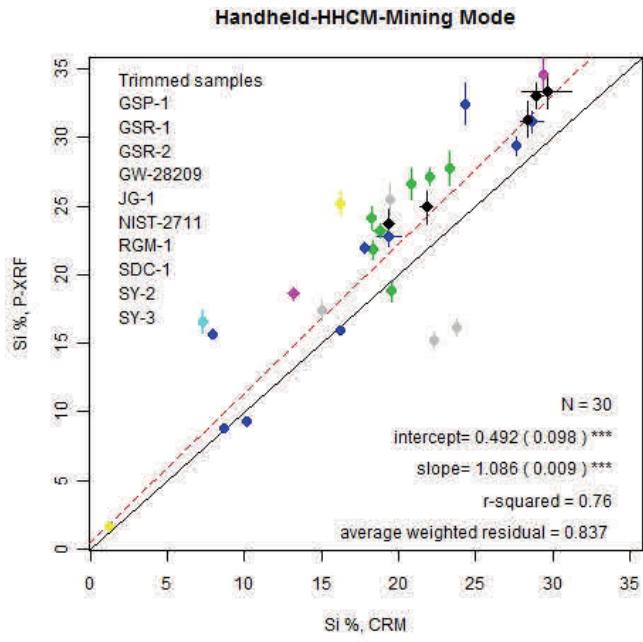
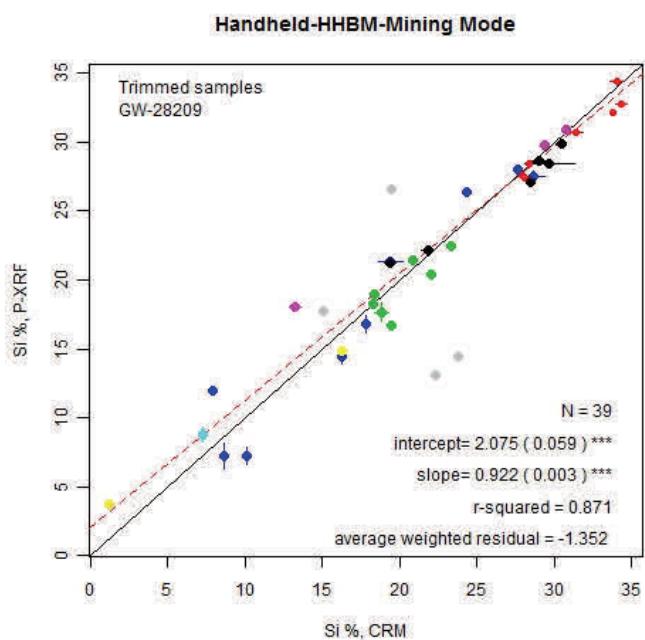
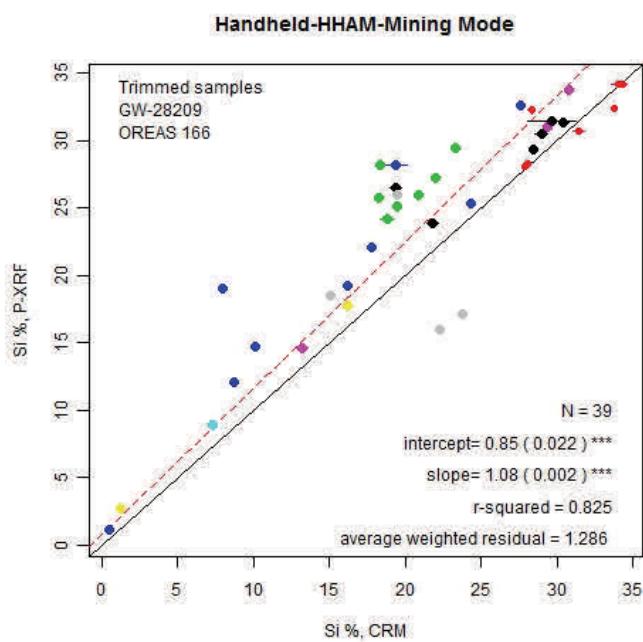
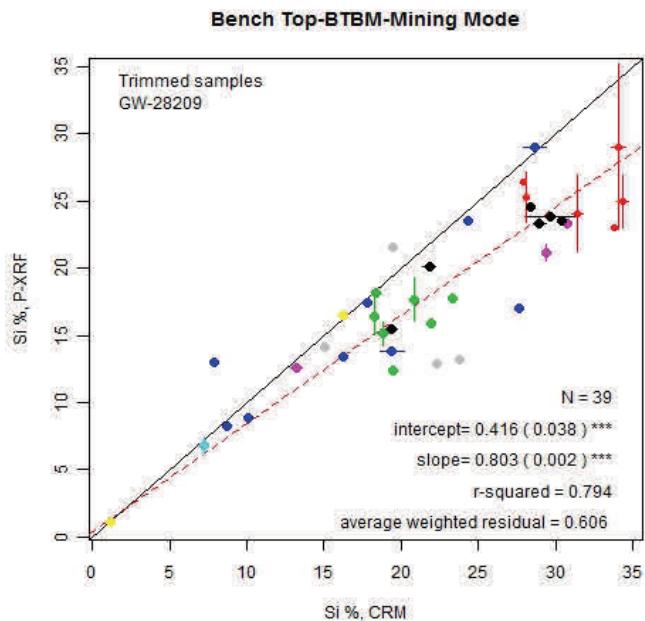
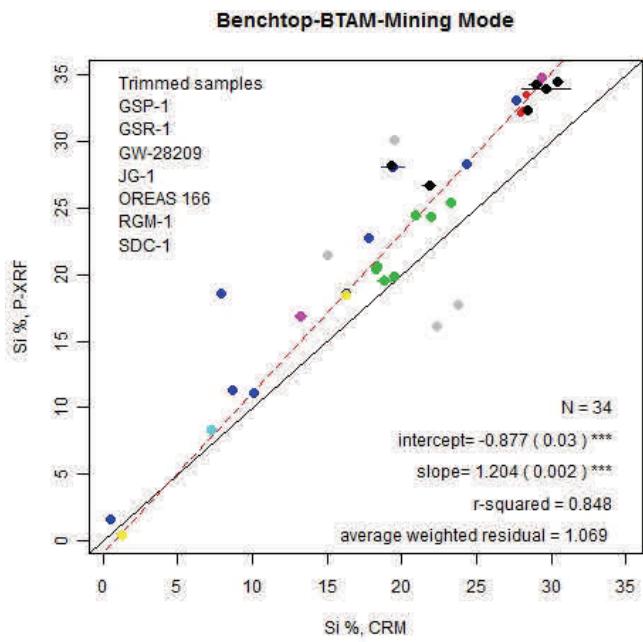
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Sb- Mining mode**



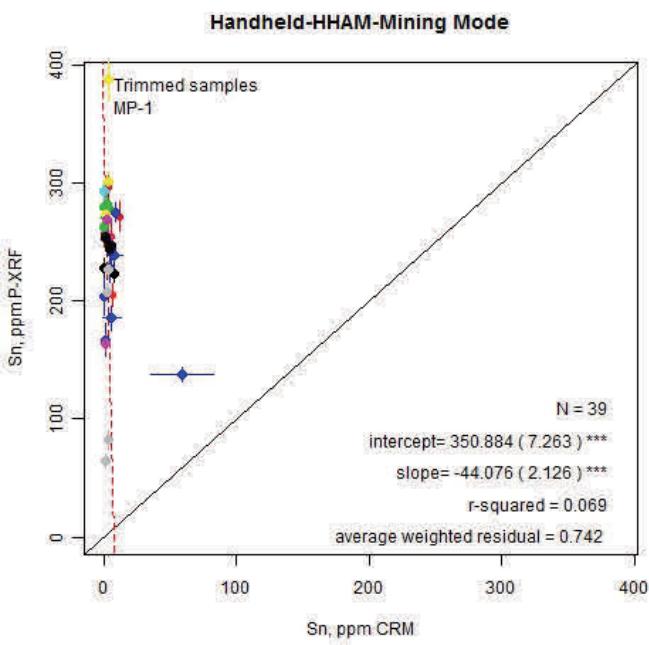
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Si- Mining mode



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

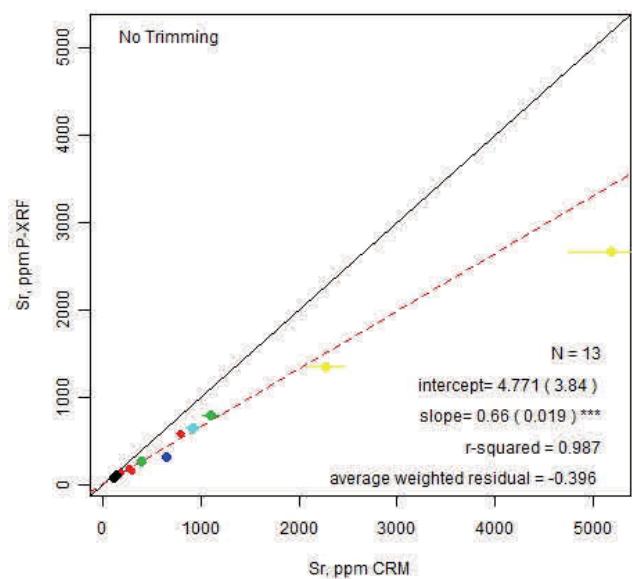
**Fig. Si- Mining mode trimmed**



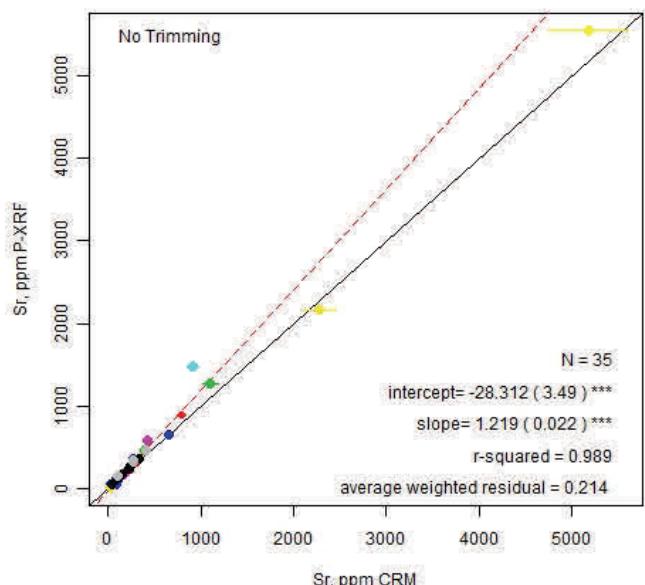
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Sn- Mining mode

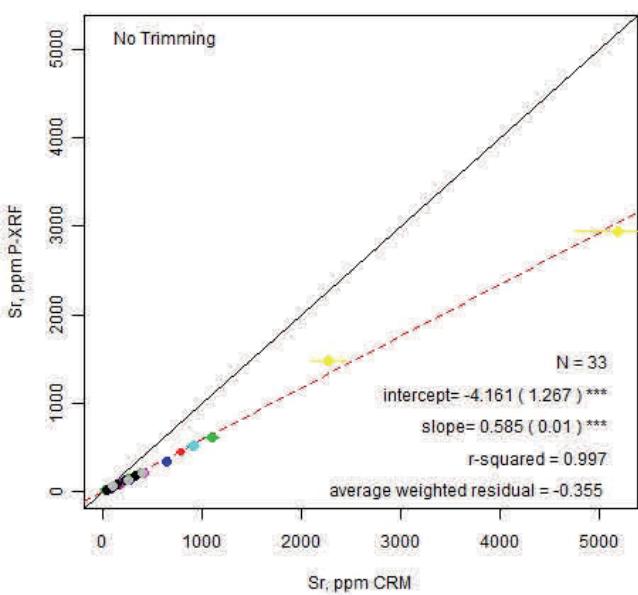
### Bench Top-BTBM-Mining Mode



### Handheld-HHBM-Mining Mode



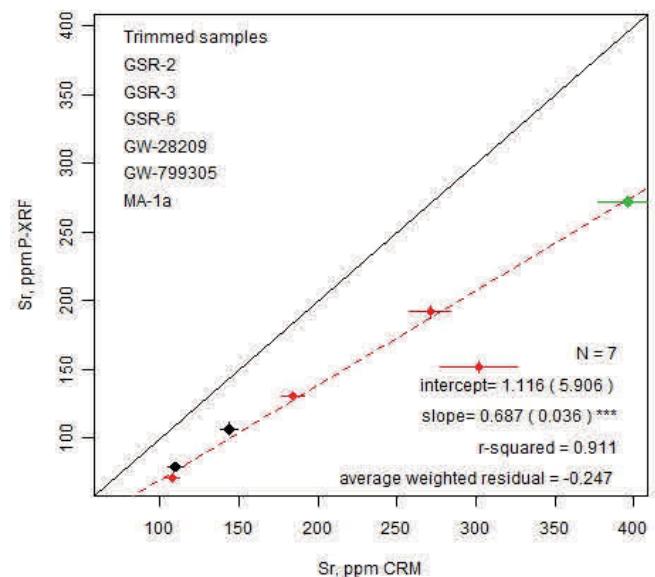
### Handheld-HHCM-Mining Mode



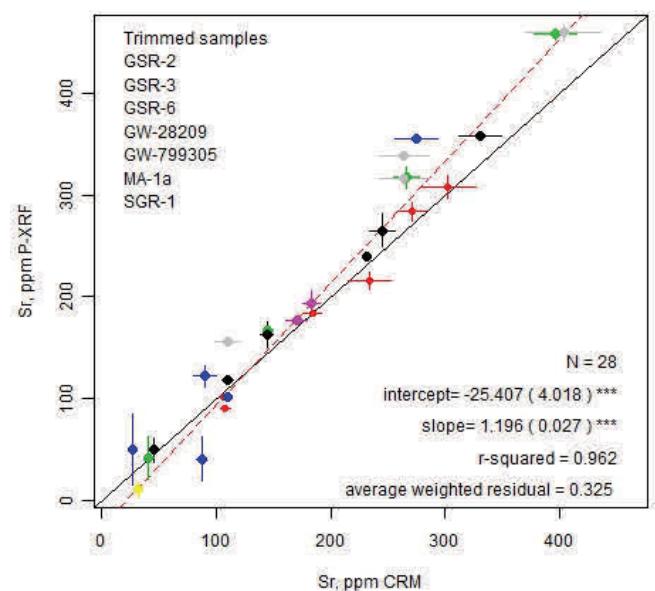
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Sr- Mining mode

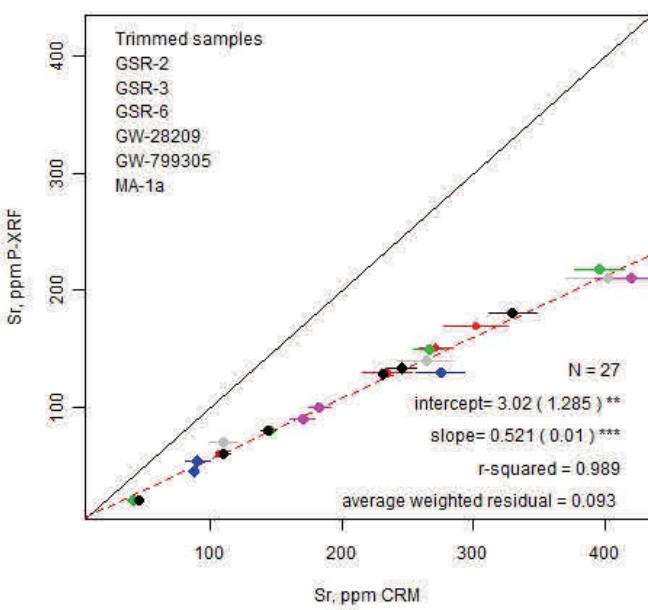
### Bench Top-BTBM-Mining Mode



### Handheld-HHBM-Mining Mode

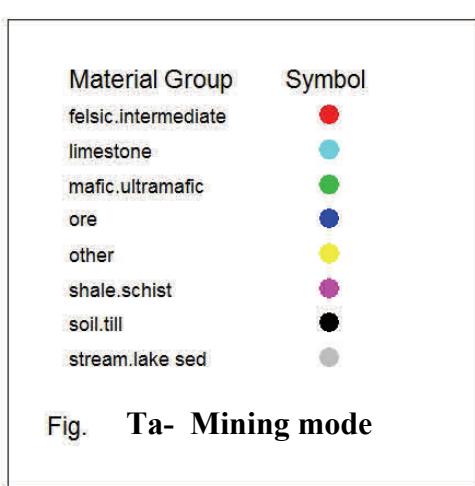
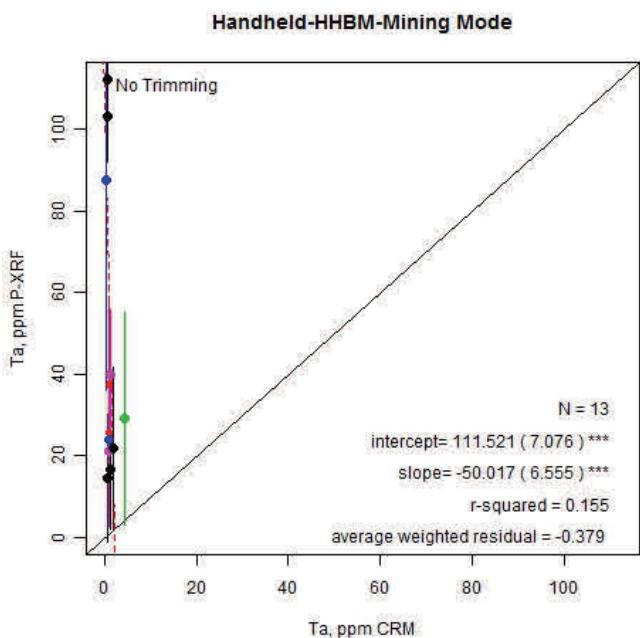


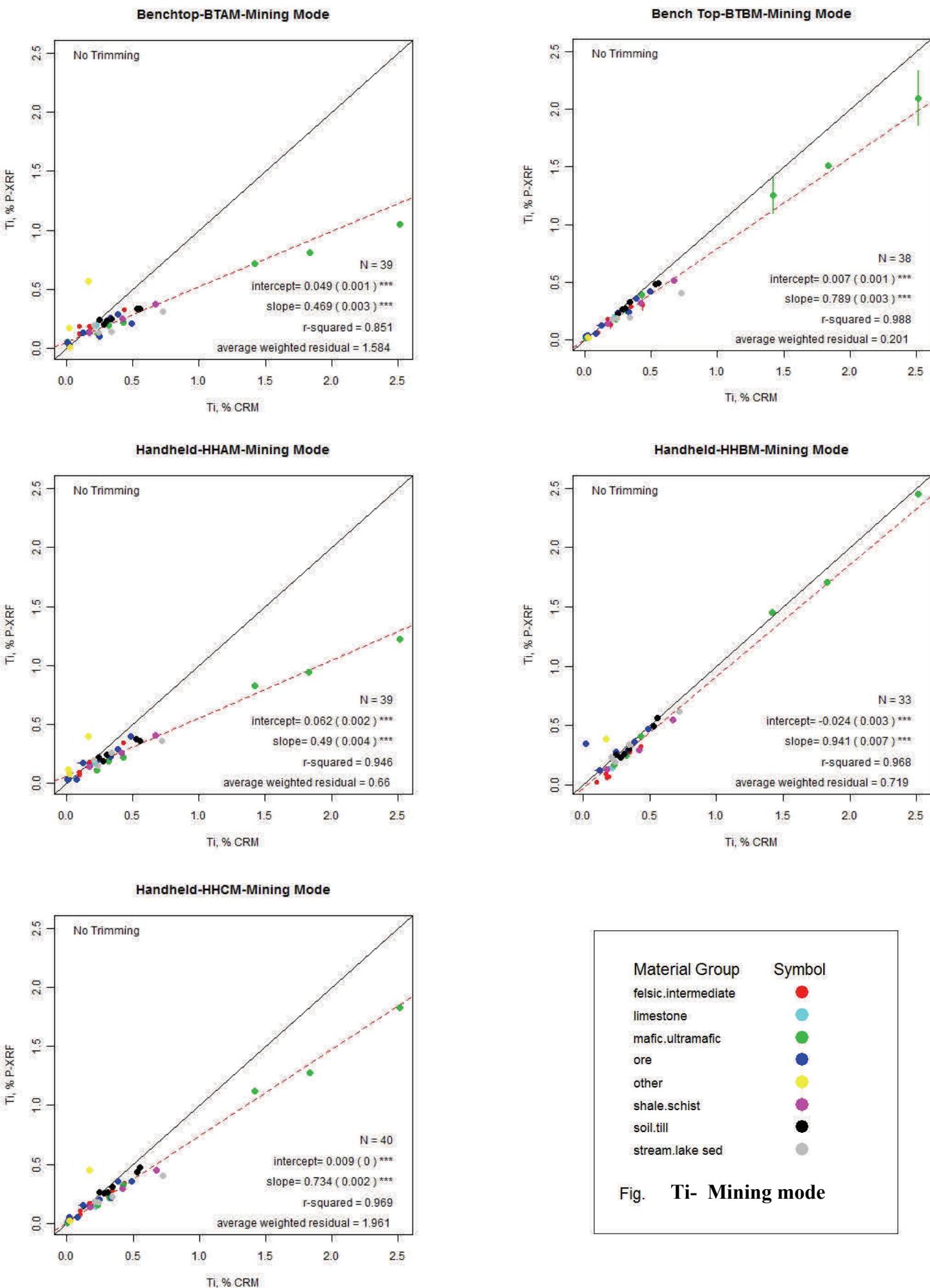
### Handheld-HHCM-Mining Mode

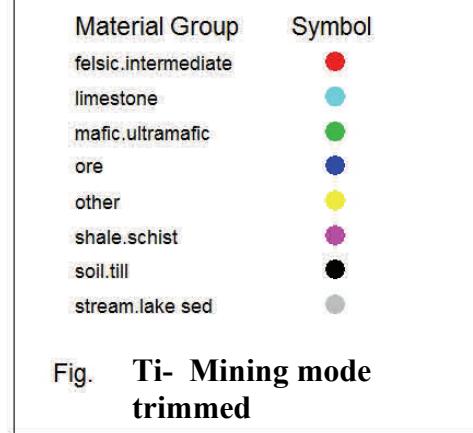
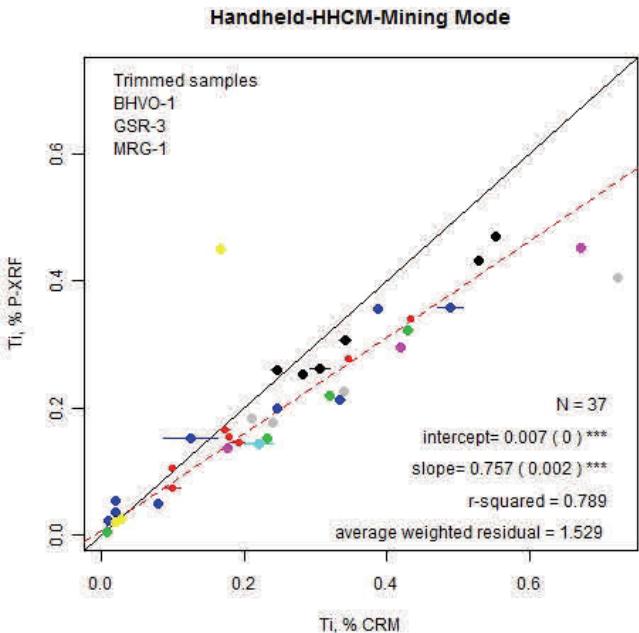
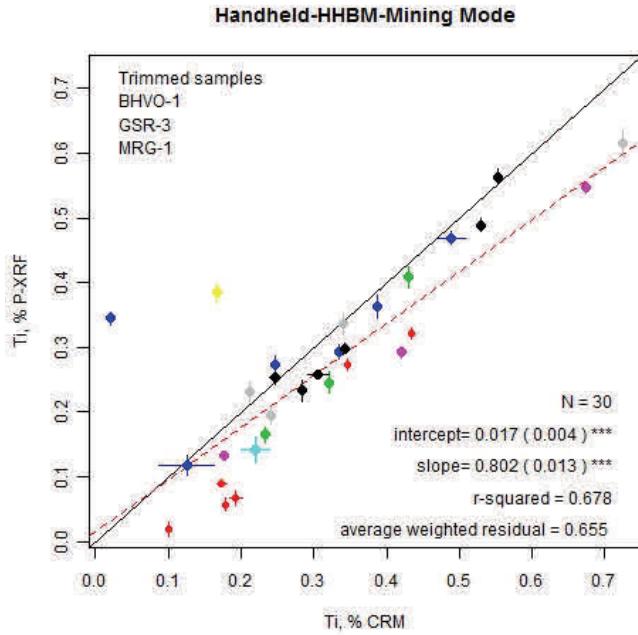
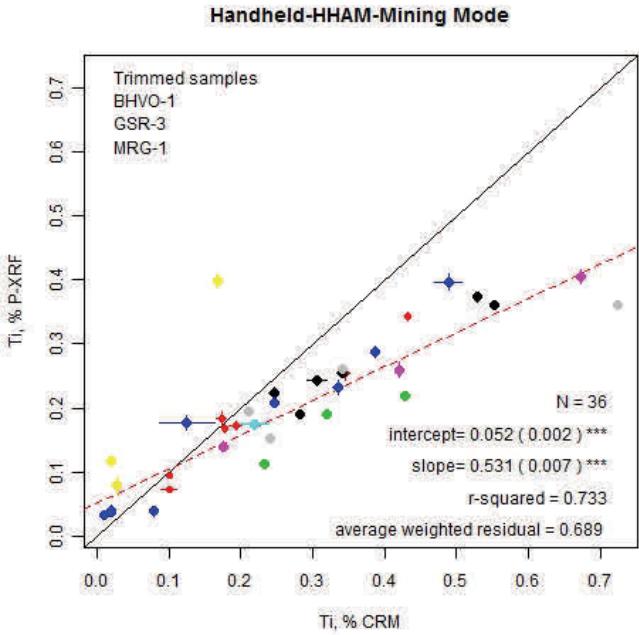
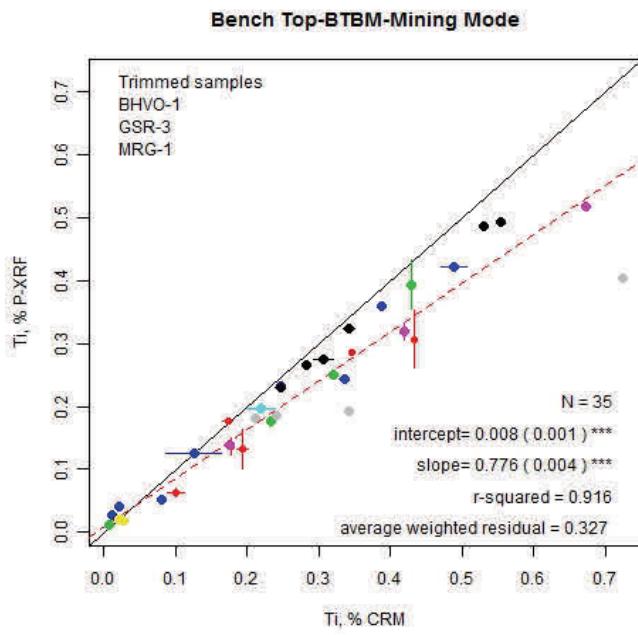
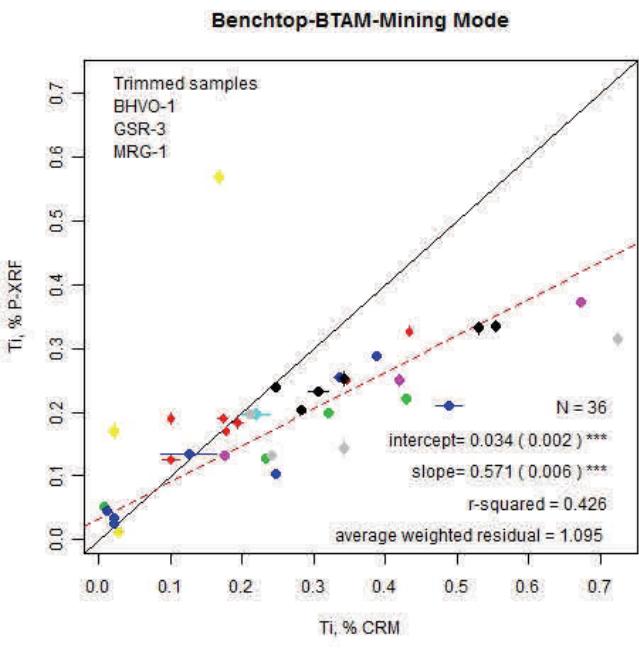


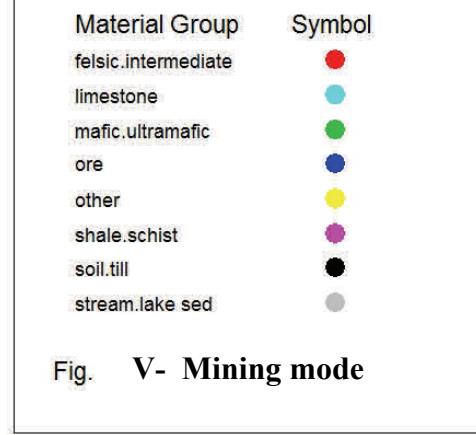
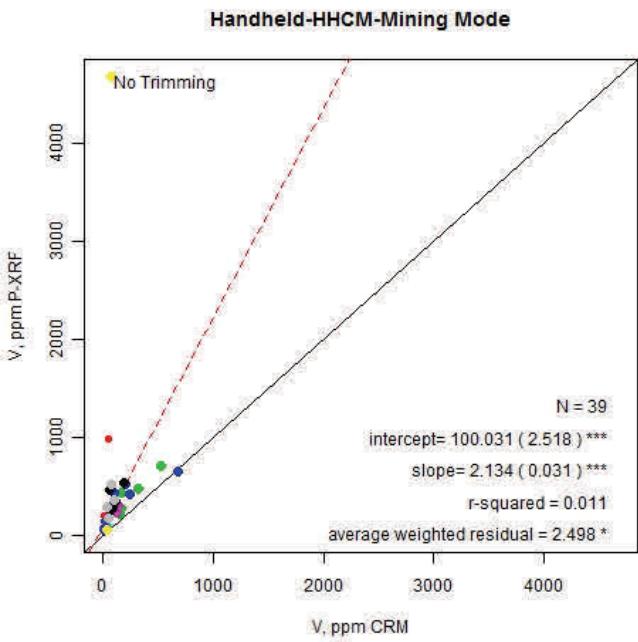
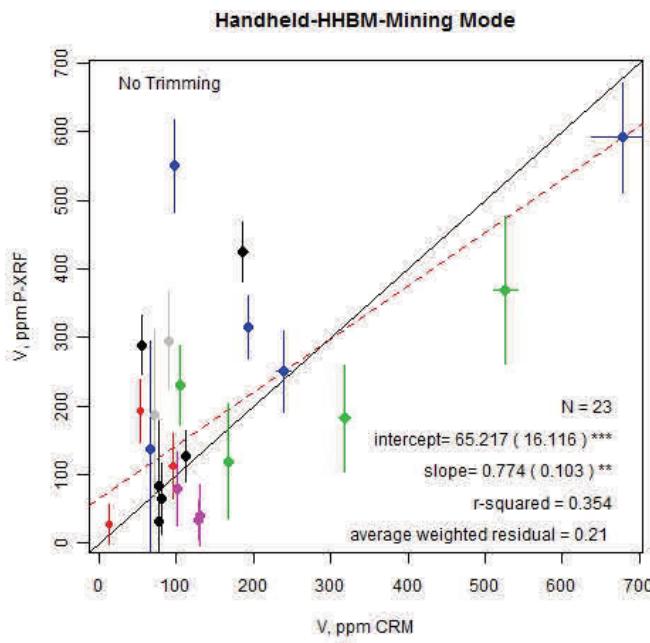
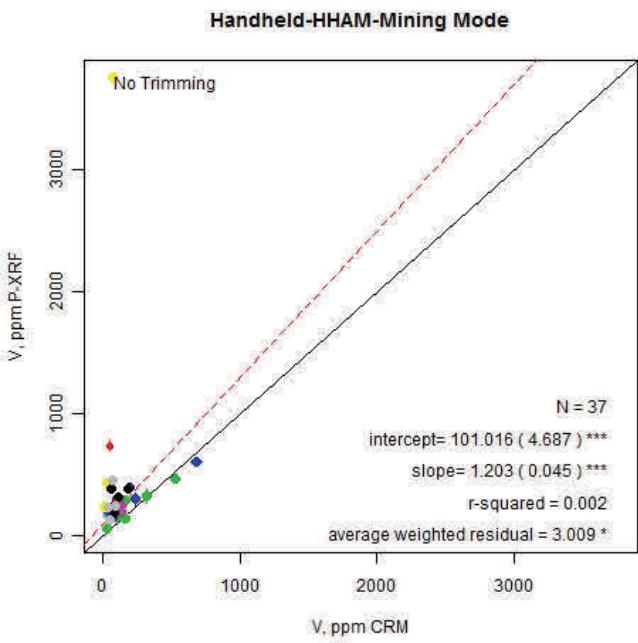
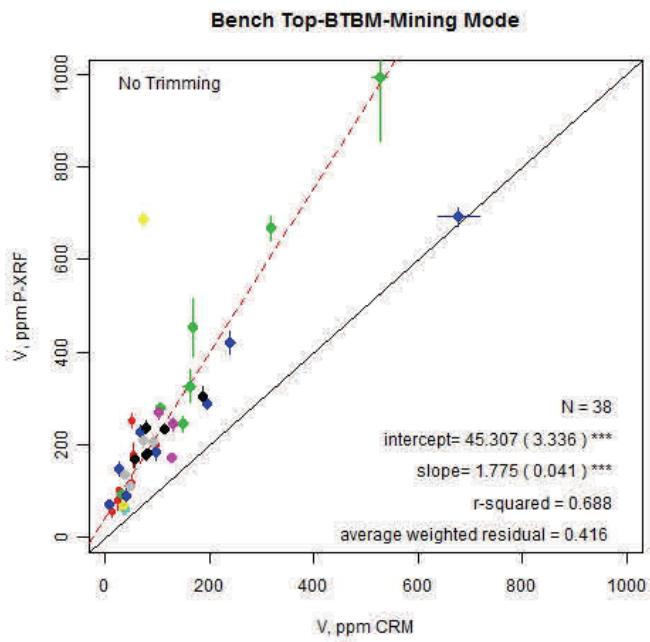
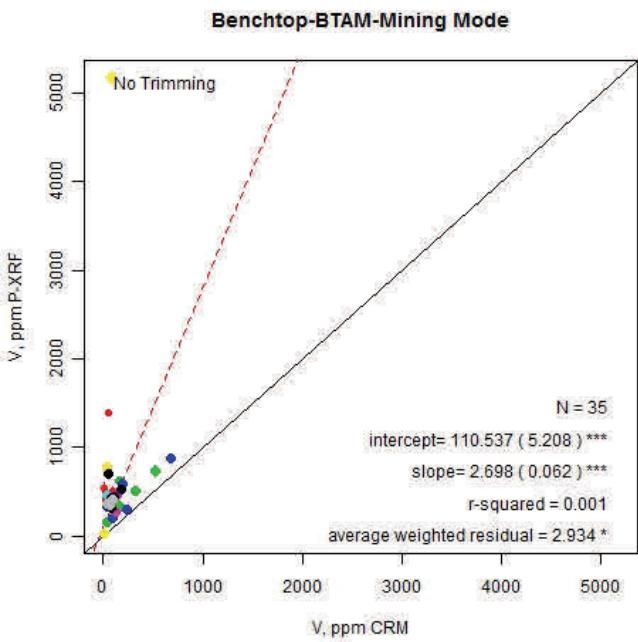
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	○

Fig. Sr- Mining mode  
trimmed

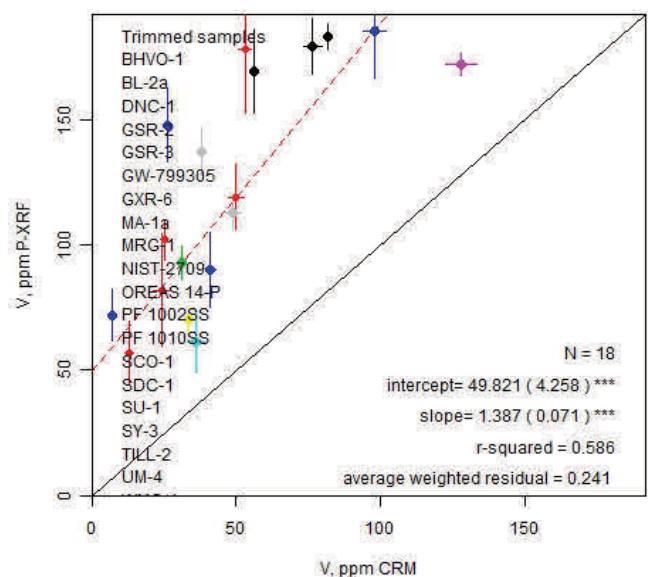




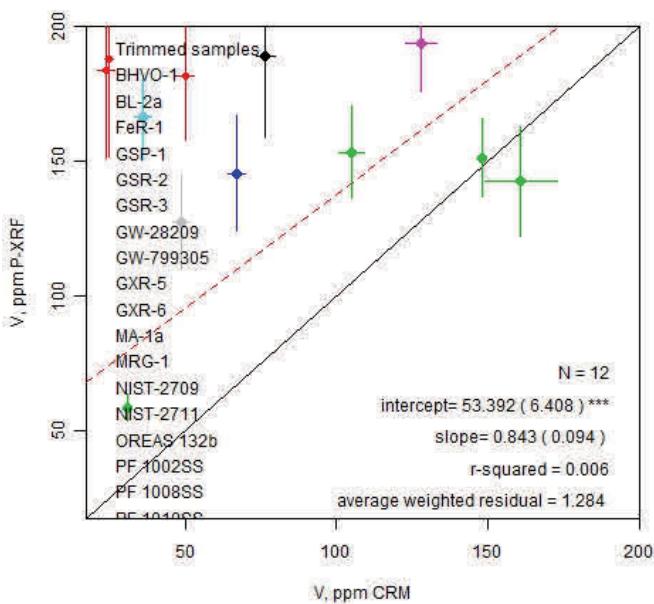




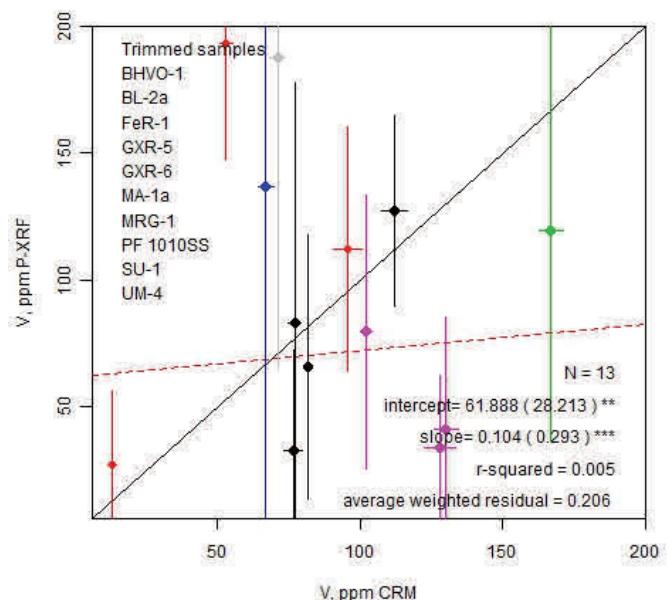
### Bench Top-BTBM-Mining Mode



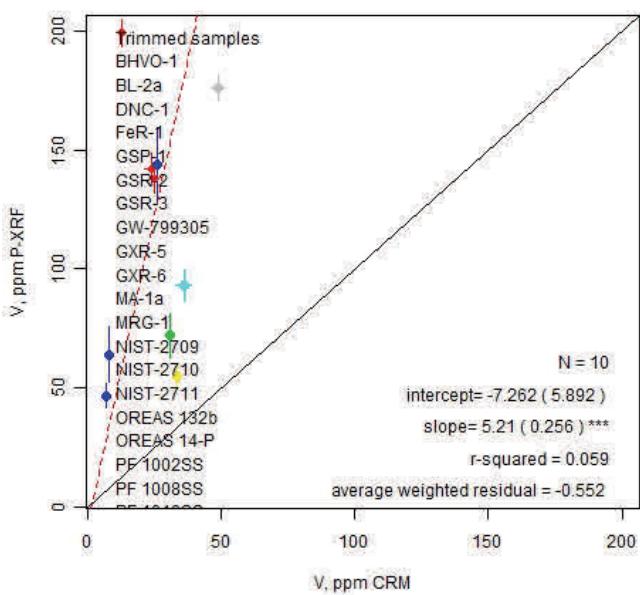
### Handheld-HHAM-Mining Mode



### Handheld-HHBM-Mining Mode



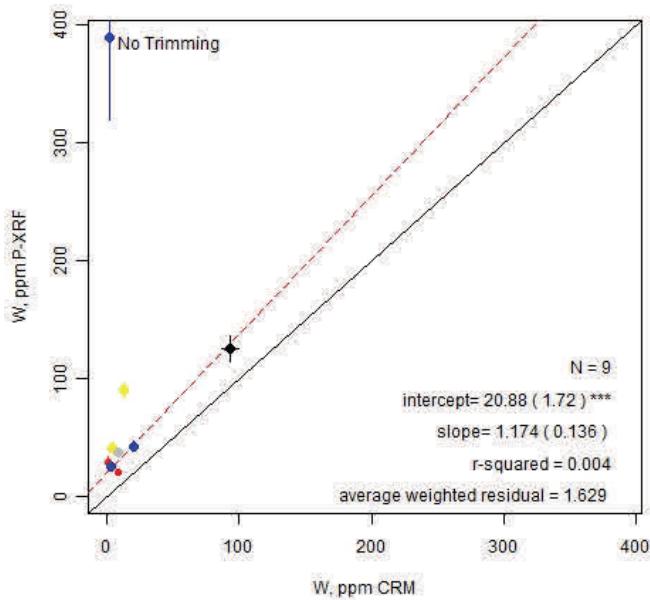
### Handheld-HHCM-Mining Mode



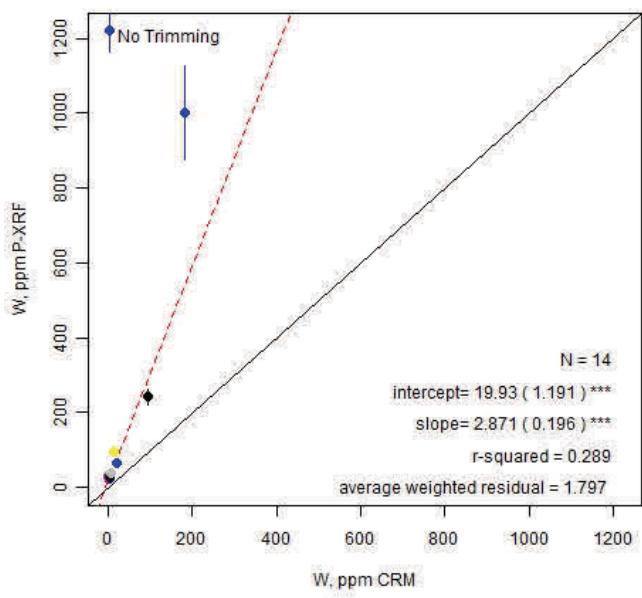
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. V- Mining mode  
trimmed

### Benchtop-BTAM-Mining Mode

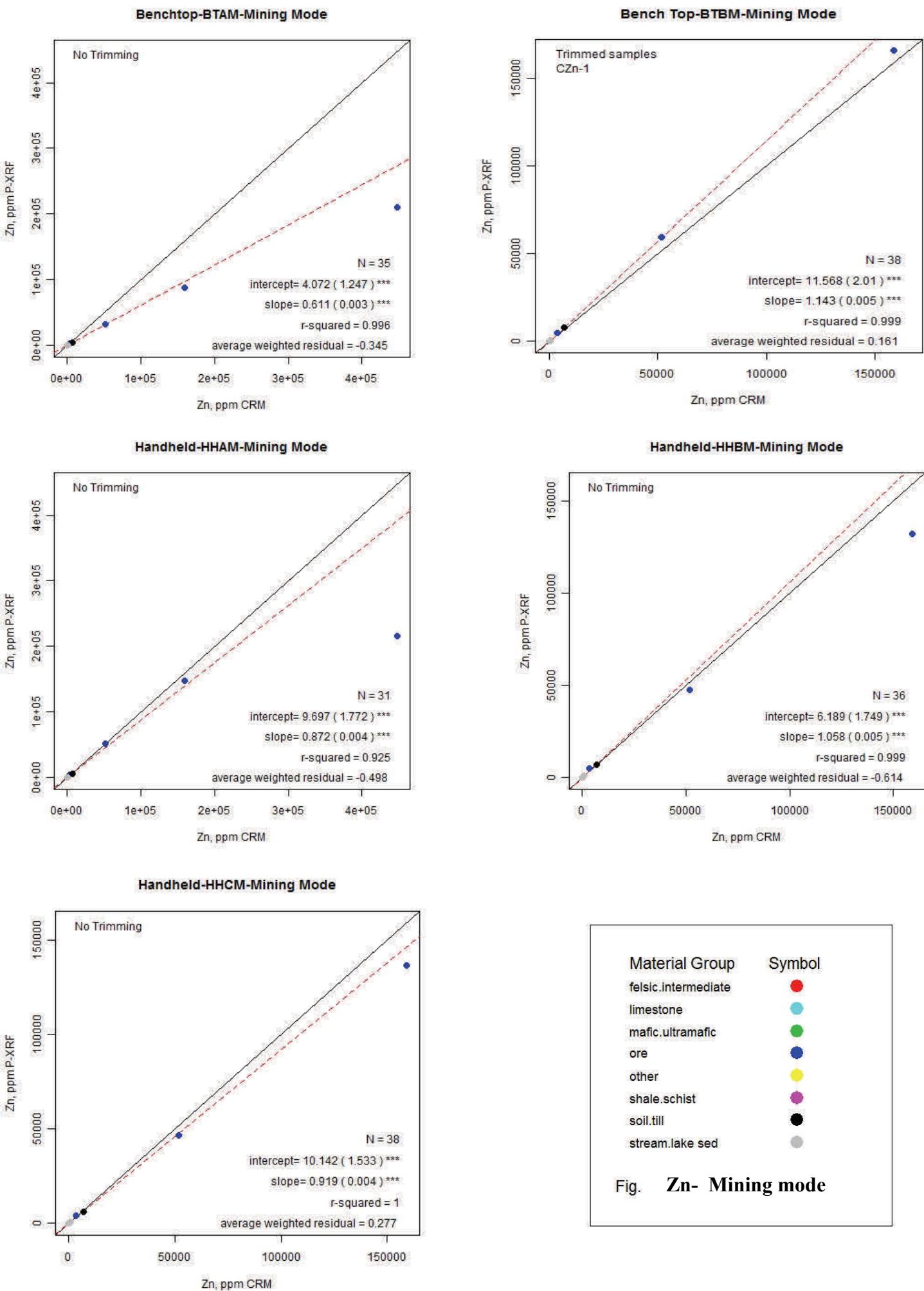


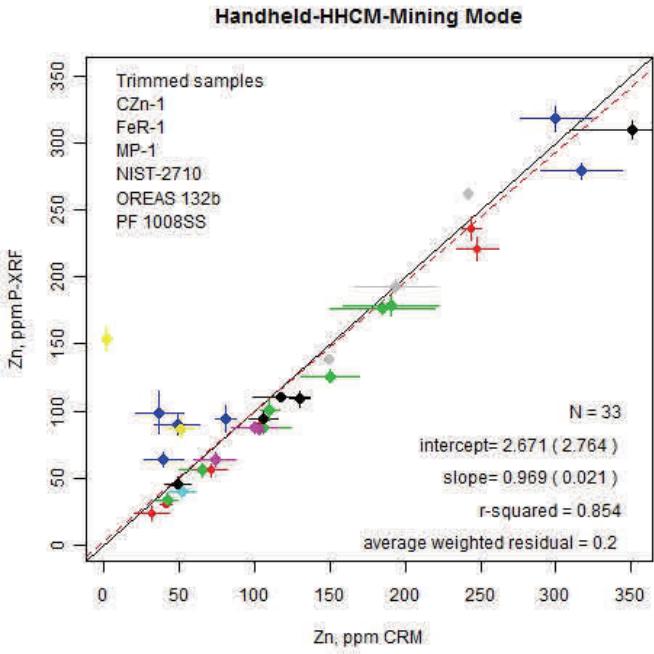
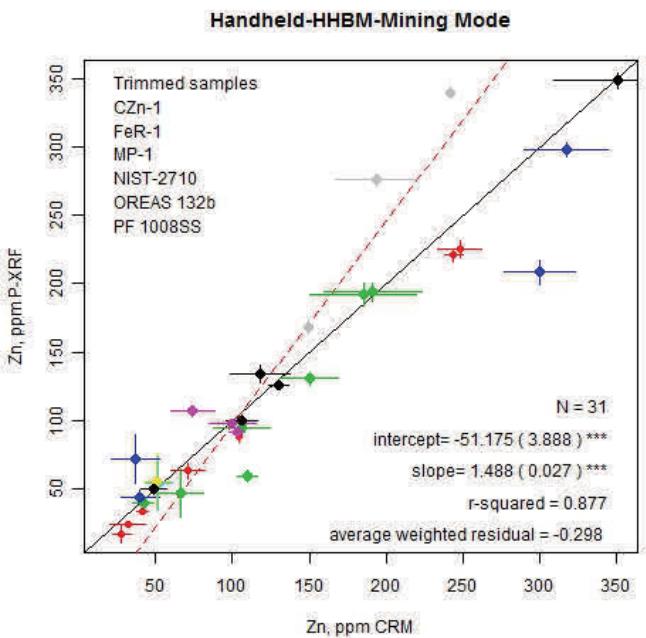
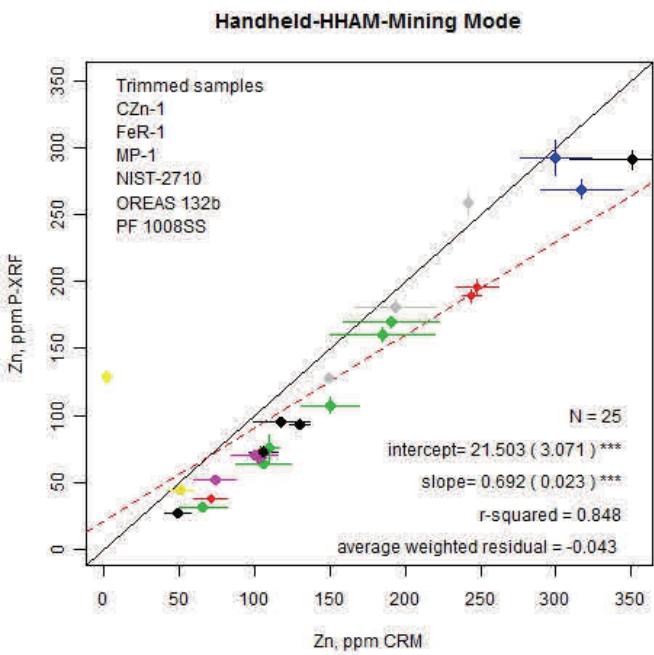
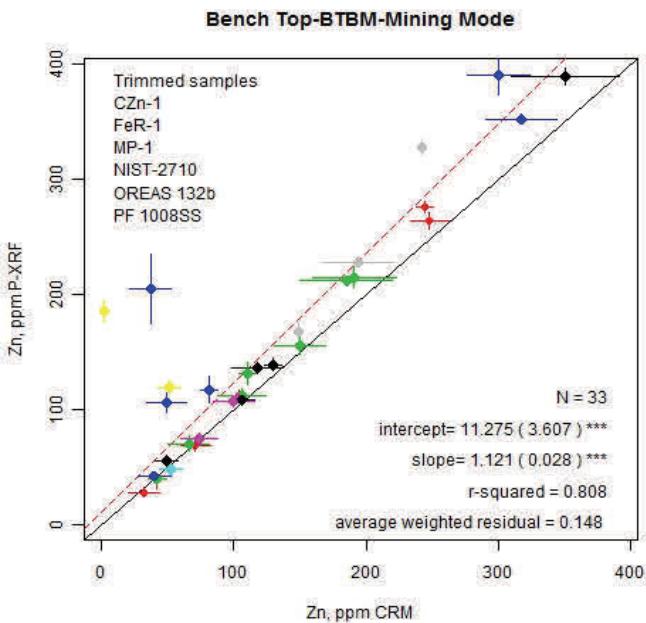
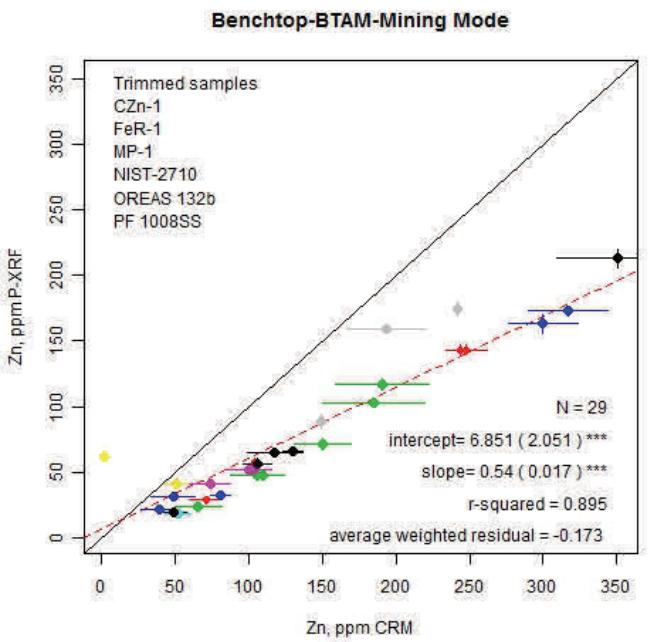
### Handheld-HHAM-Mining Mode



Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. W- Mining mode





Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

**Fig. Zn- Mining mode trimmed**

