

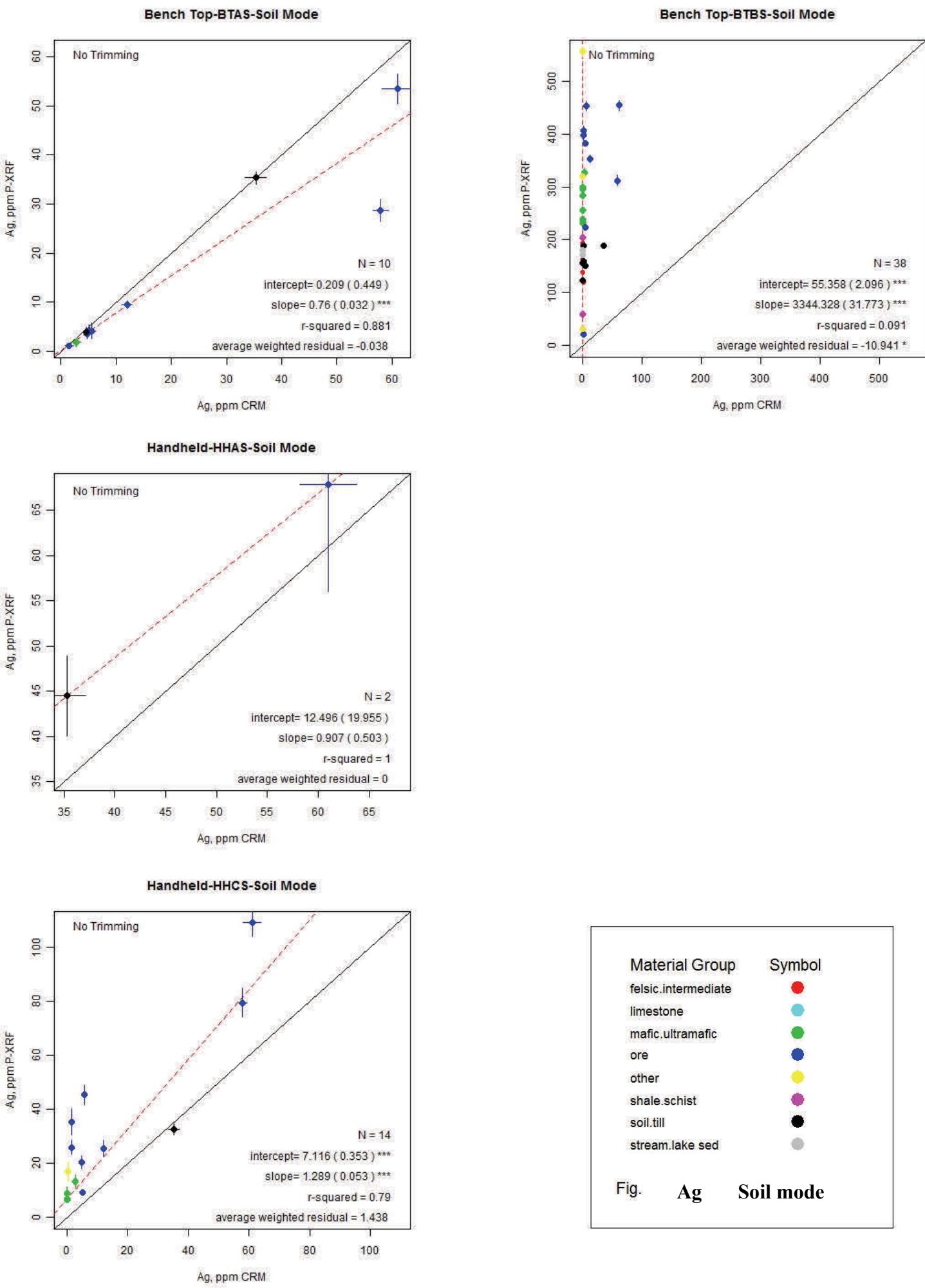
**CANADIAN MINING INDUSTRY RESEARCH
ORGANIZATION (CAMIRO) EXPLORATION DIVISION**

CAMIRO PROJECT 10E01

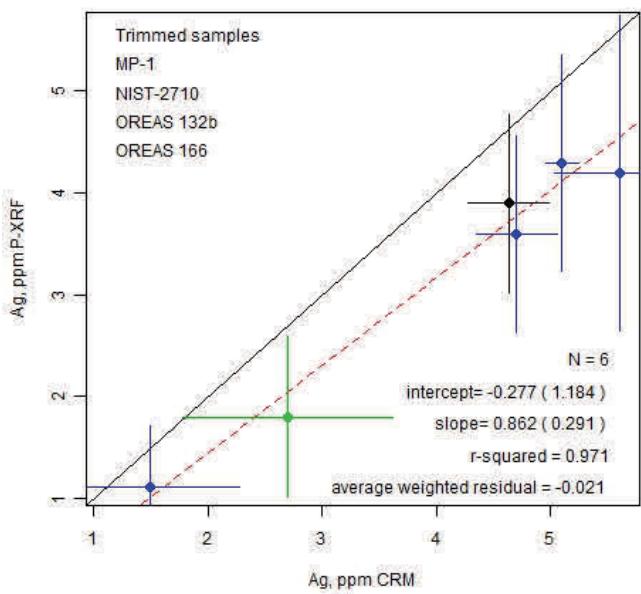
**Quality Control Assessment of Portable XRF Analysers:
Development of Standard Operating Procedures,
Performance on Variable Media and Recommended Uses**

APPENDIX 4a

X-Y Graphs for Soil Mode

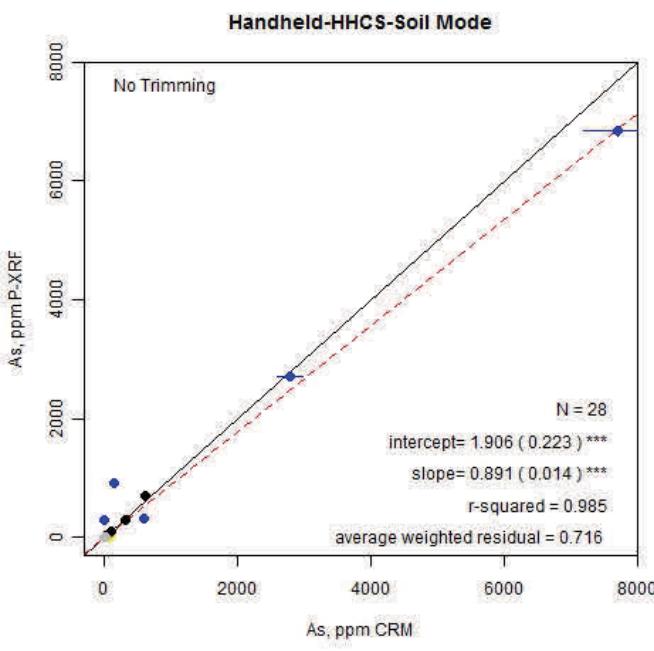
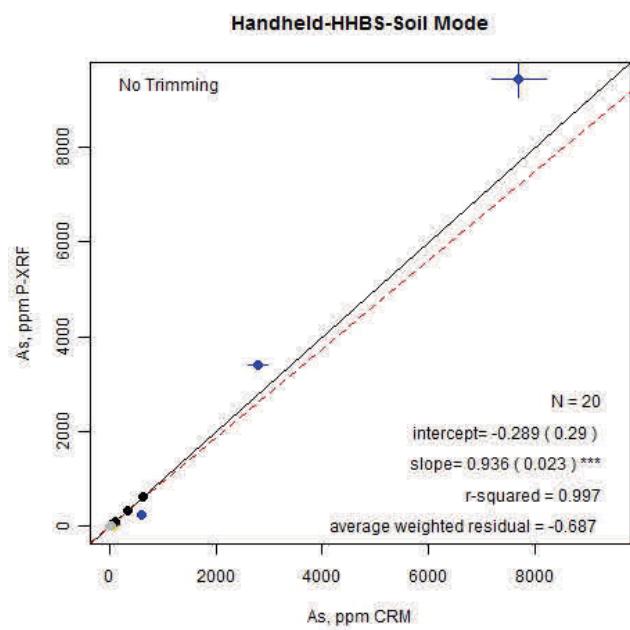
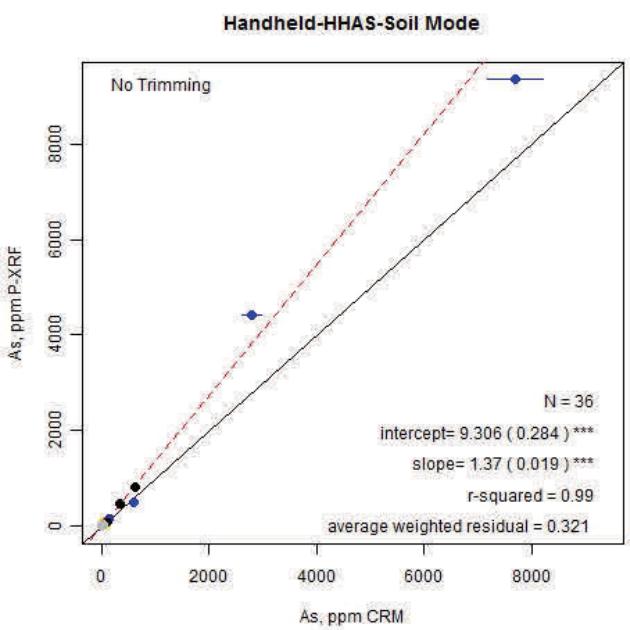
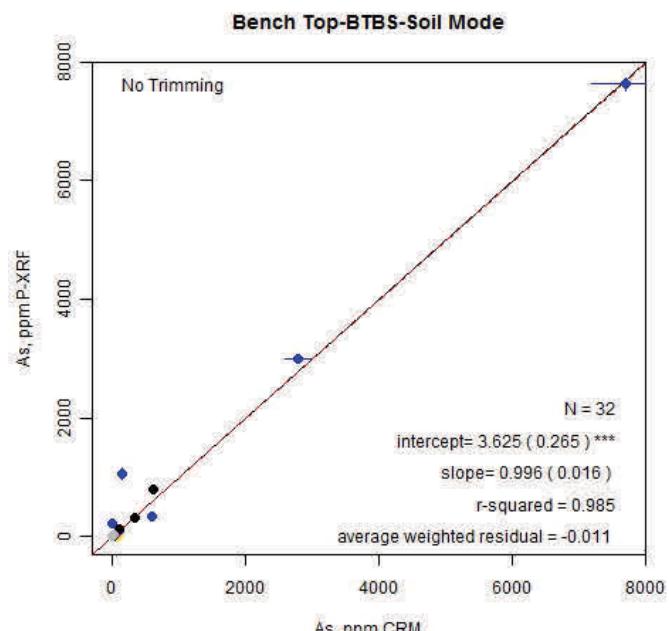
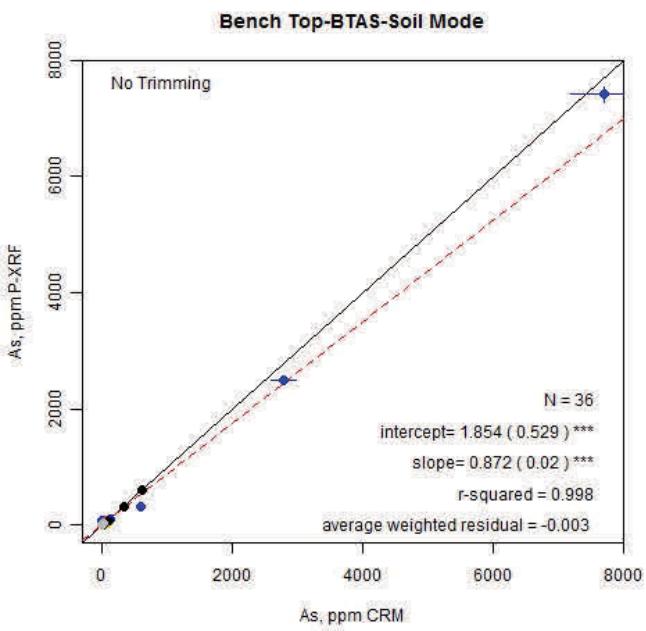


Bench Top-Machine A-Soil Mode



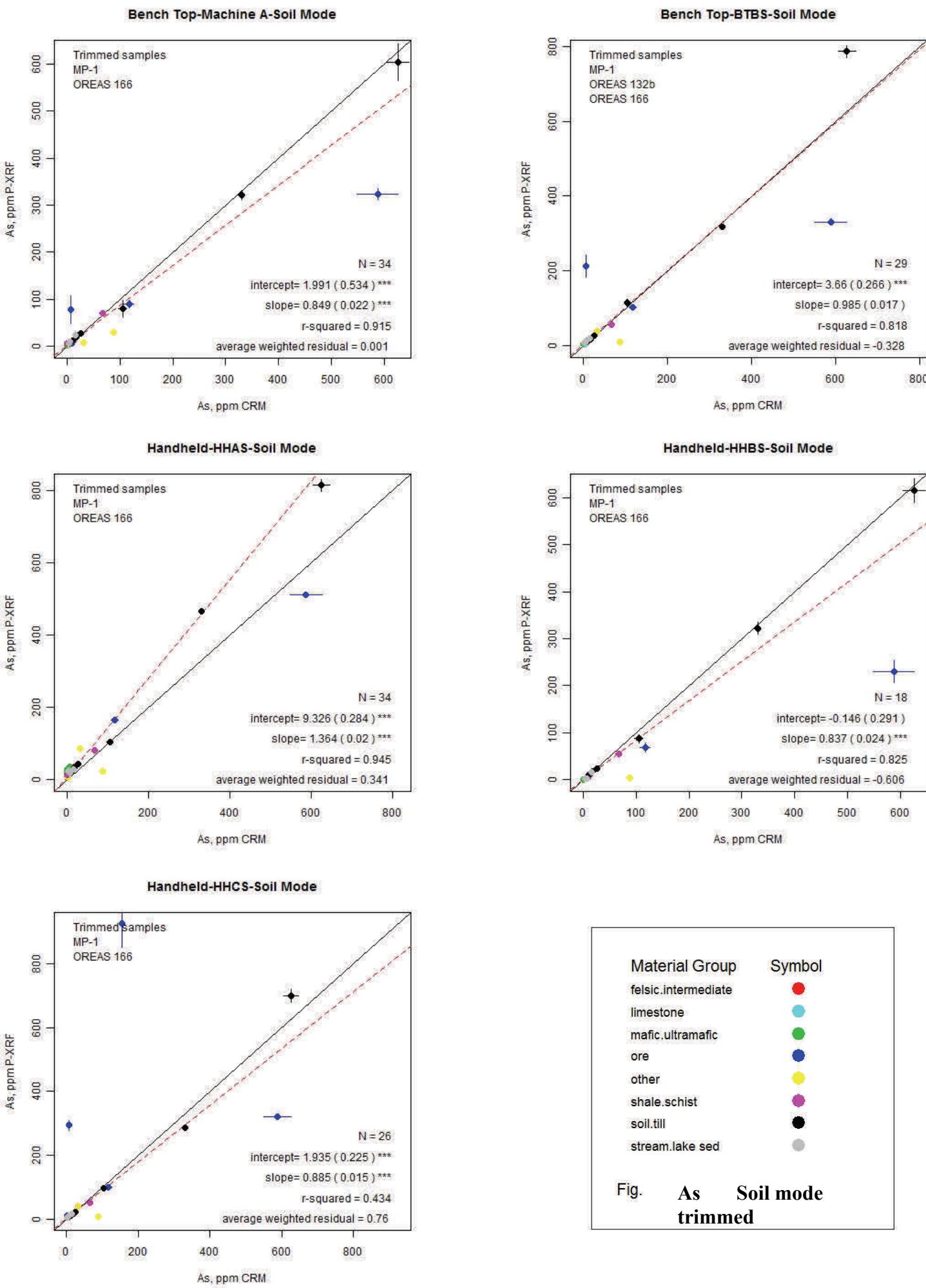
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

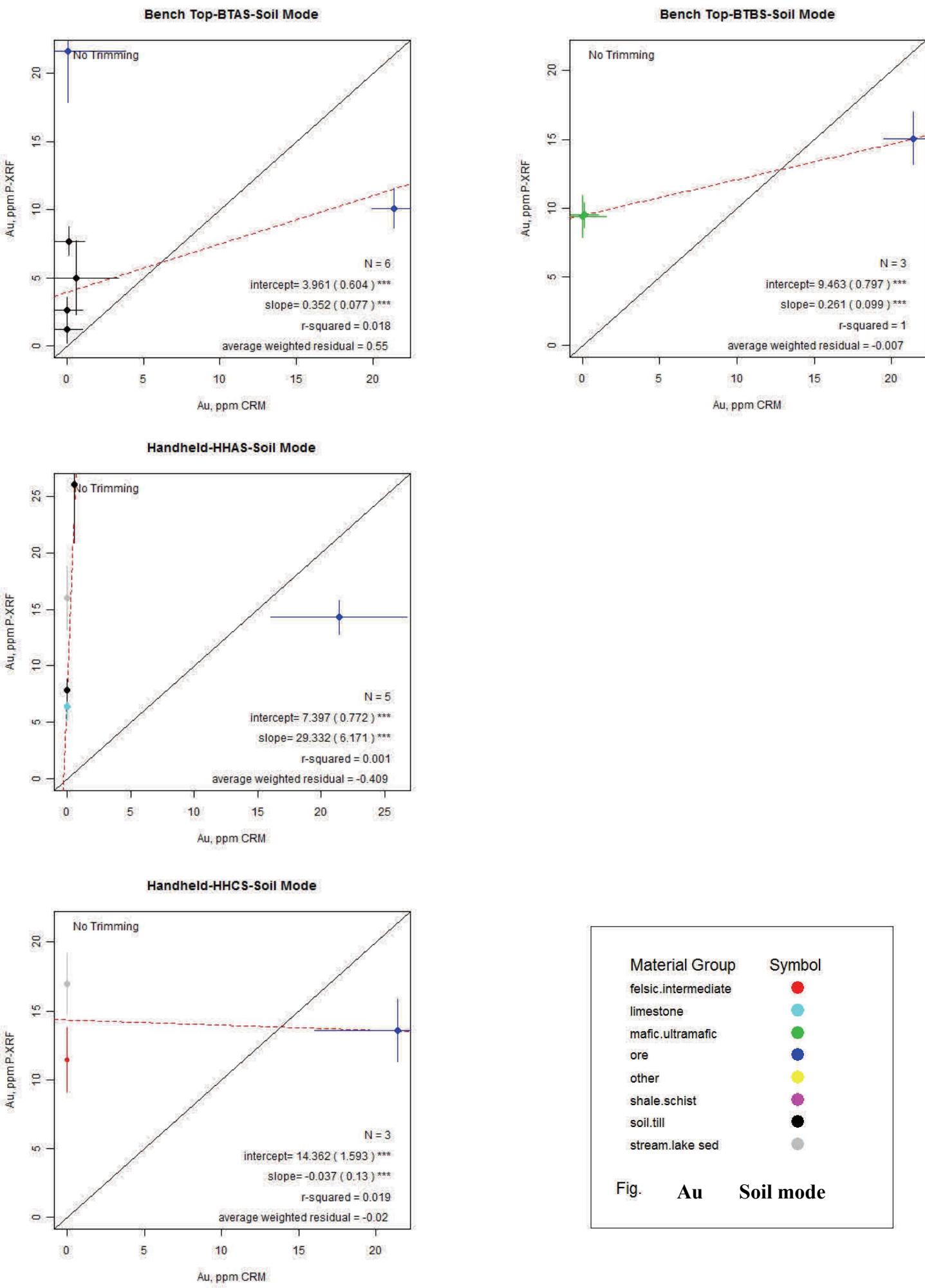
Fig. Ag Soil mode
trimmed

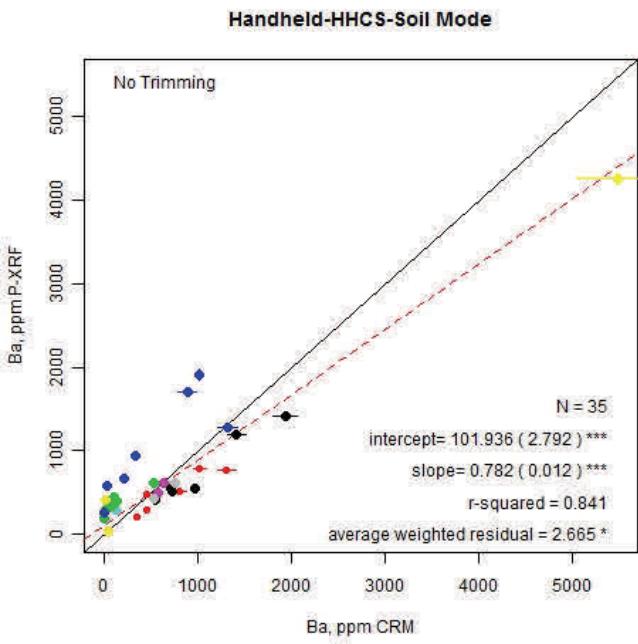
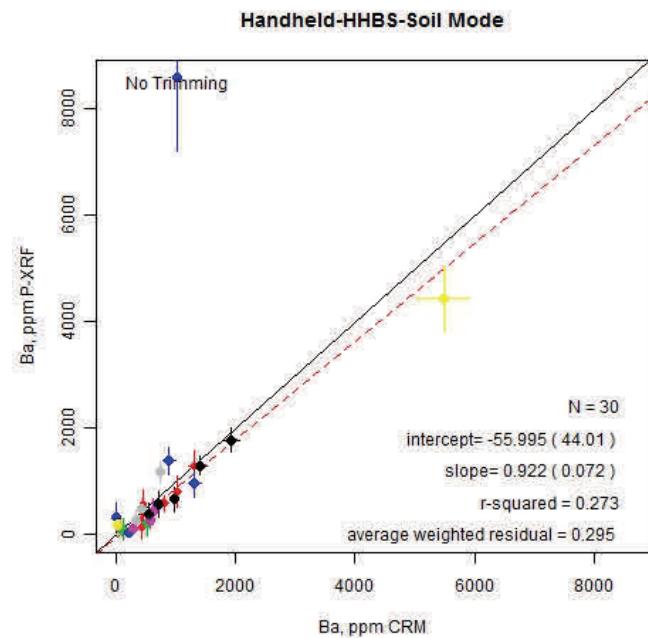
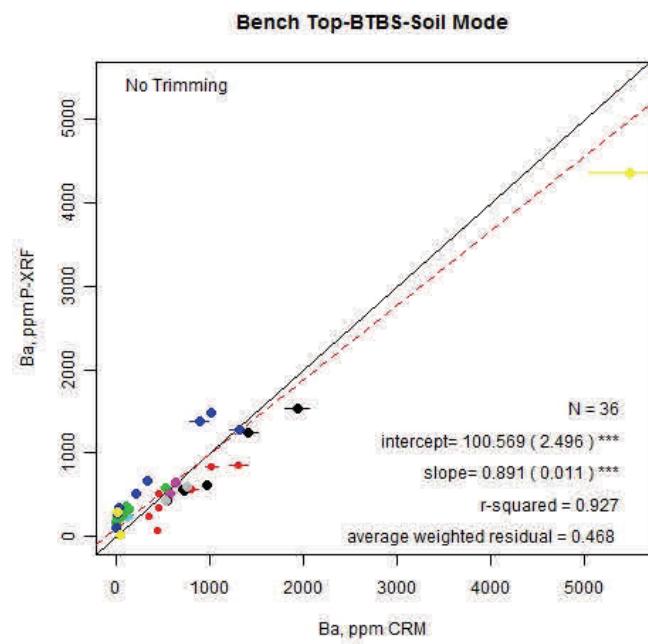
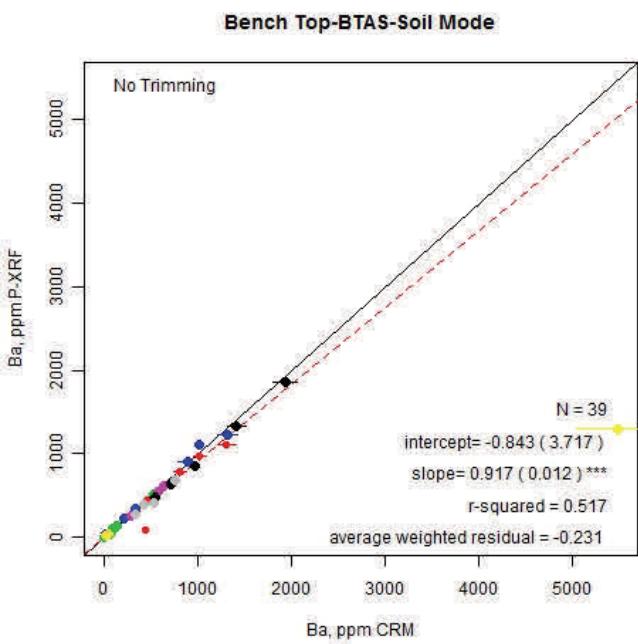


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. As Soil mode



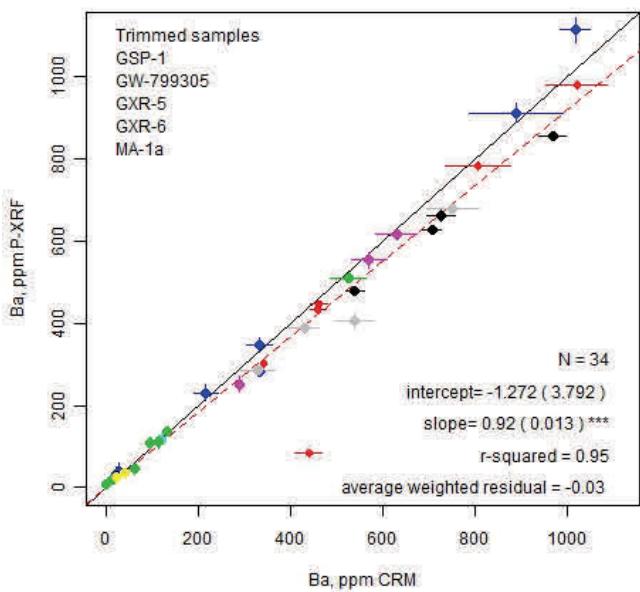




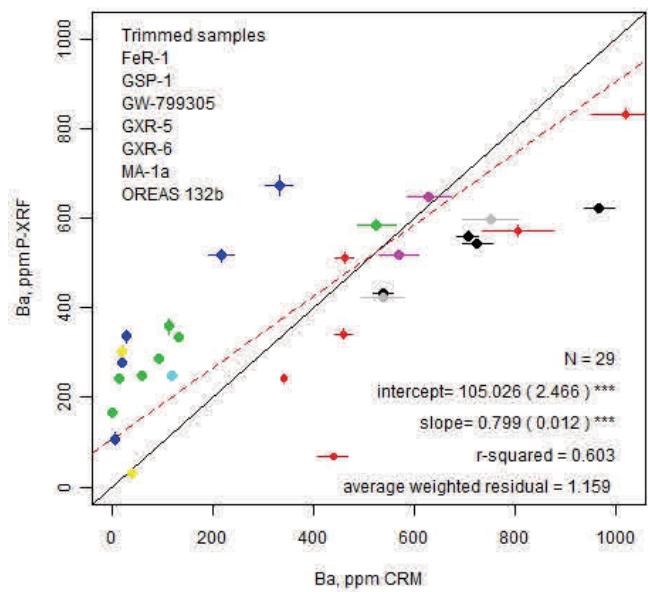
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ba Soil mode

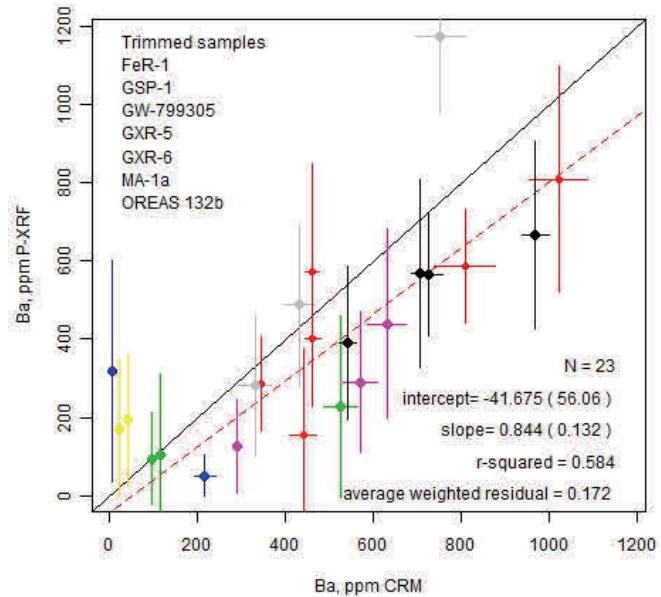
Bench Top-Machine A-Soil Mode



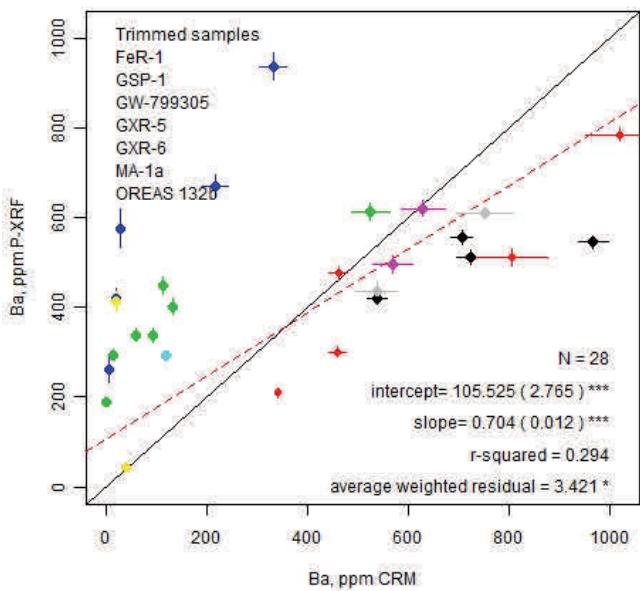
Bench Top-BTBS-Soil Mode



Handheld-HHBS-Soil Mode



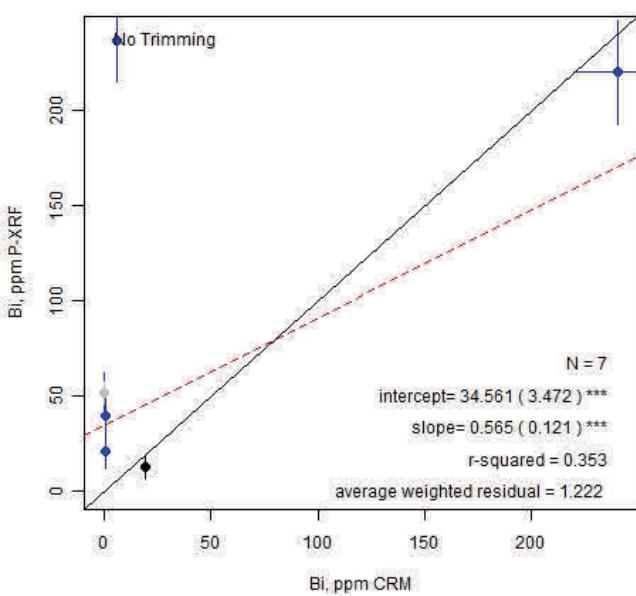
Handheld-HHCS-Soil Mode



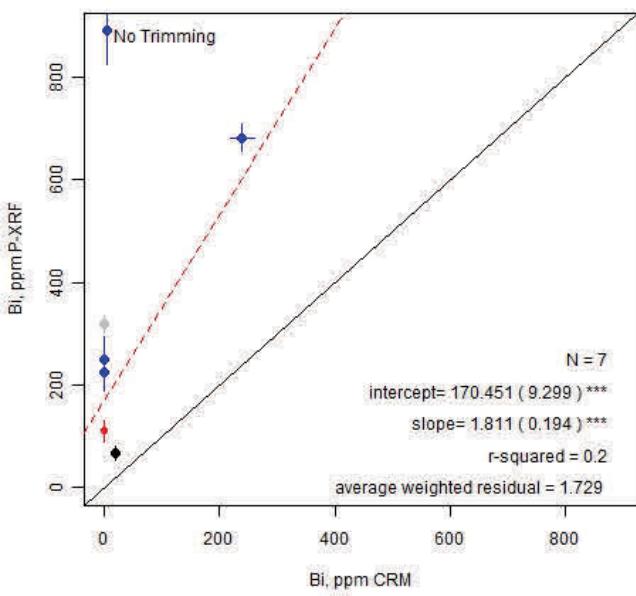
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ba Soil mode trimmed

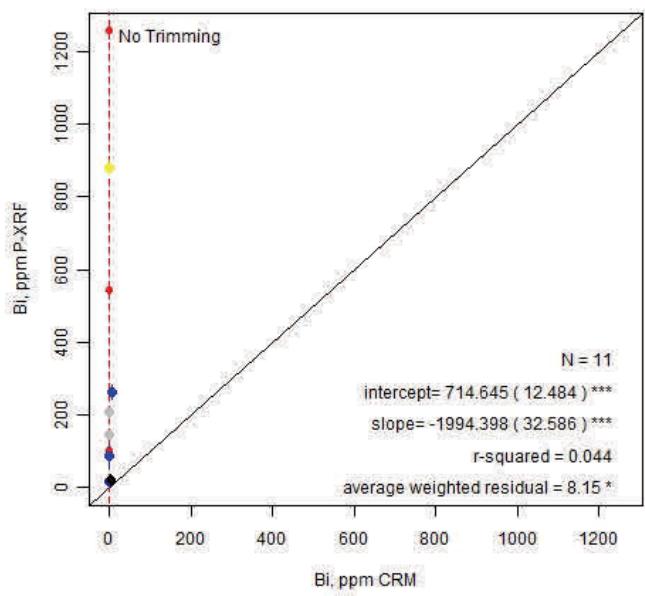
Bench Top-BTAS-Soil Mode



Handheld-HHAS-Soil Mode

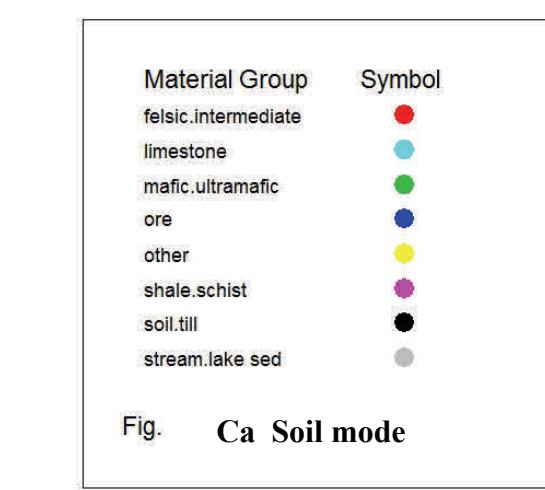
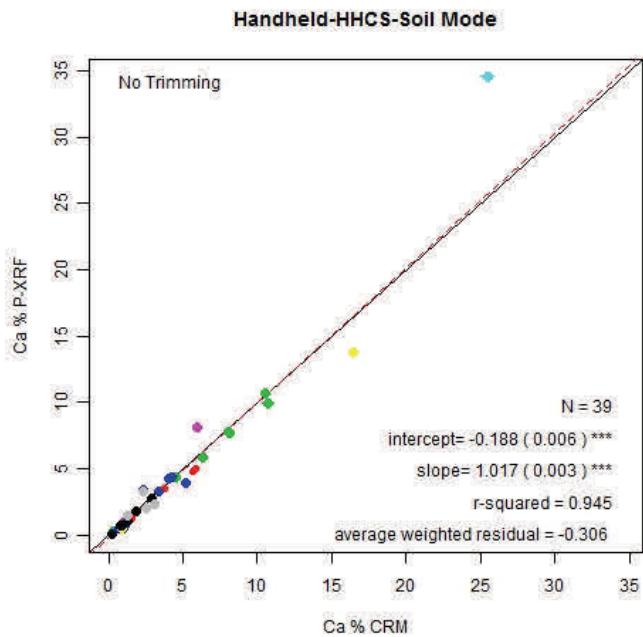
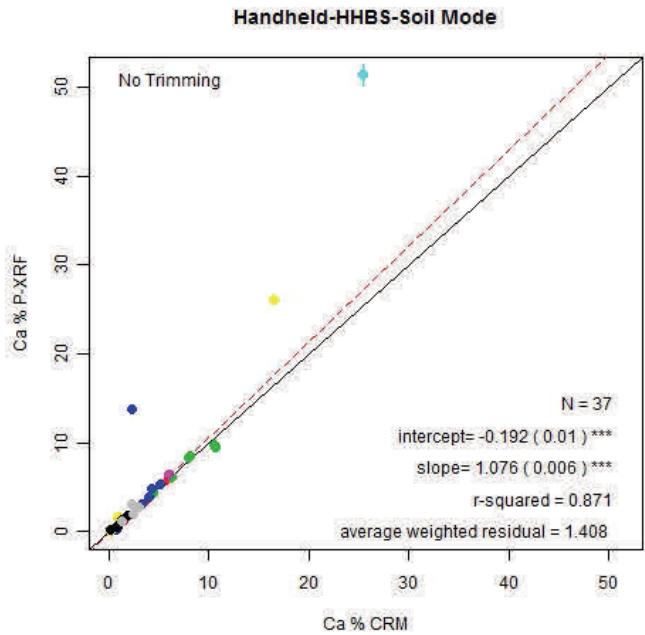
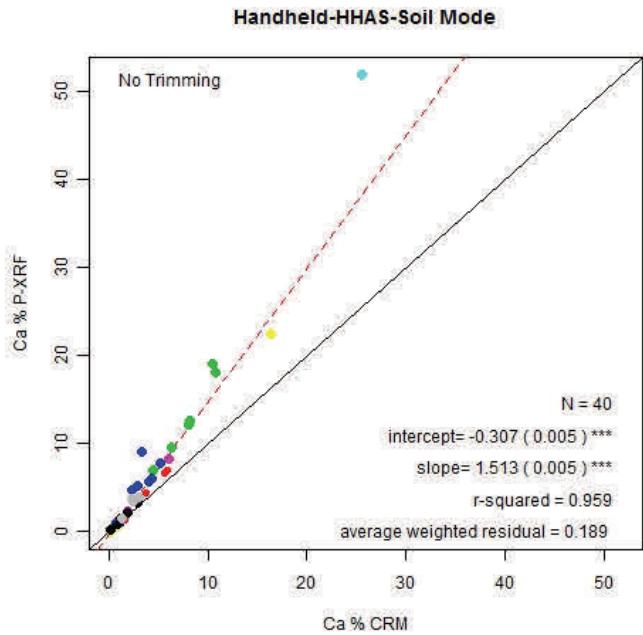
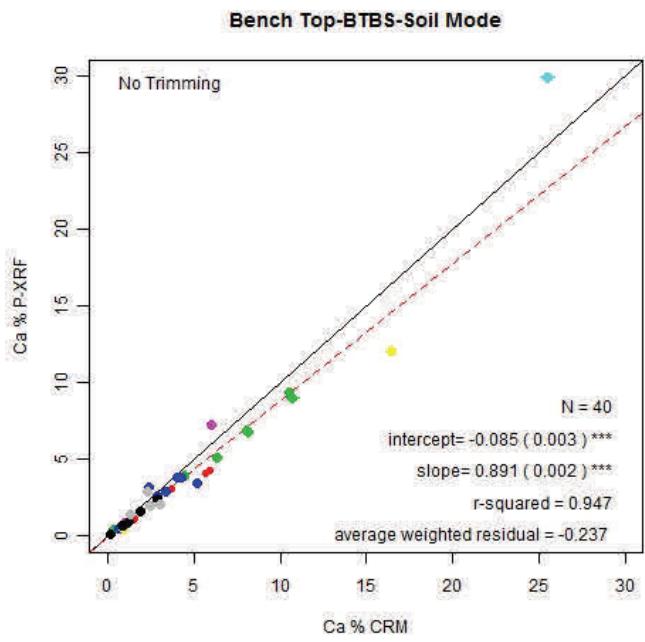
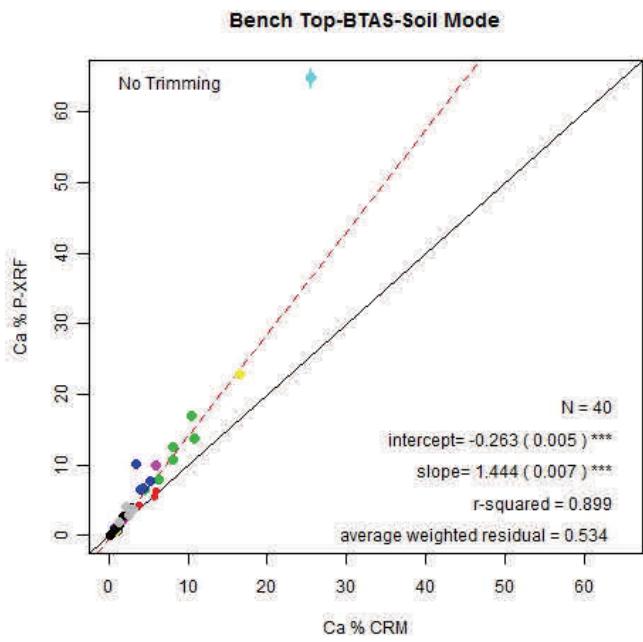


Handheld-HHBS-Soil Mode

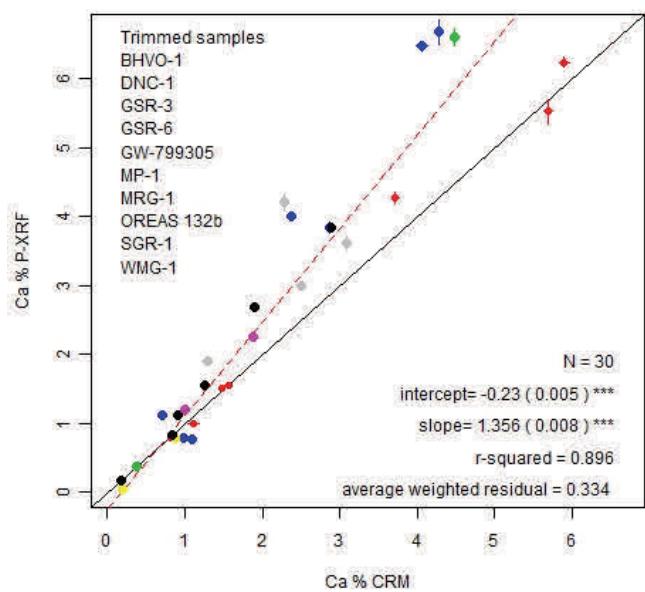


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

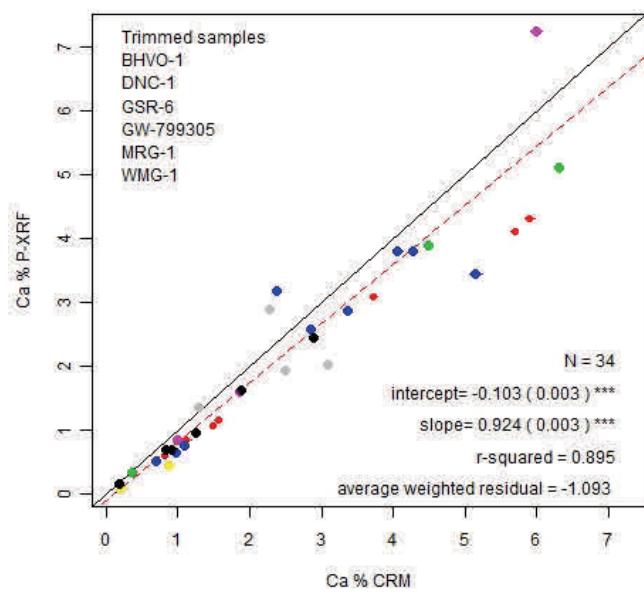
Fig. Bi Soil mode



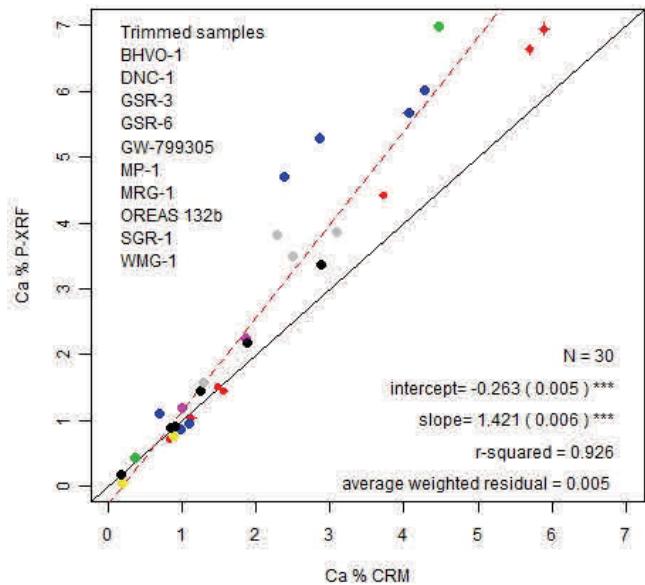
Bench Top-Machine A-Soil Mode



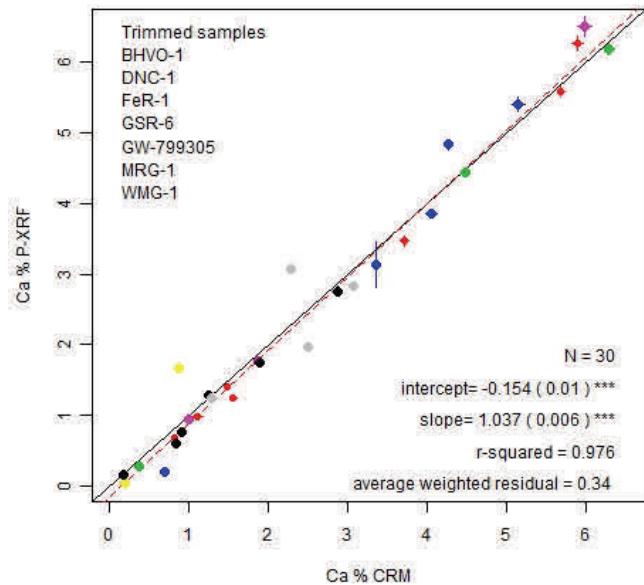
Bench Top-BTBS-Soil Mode



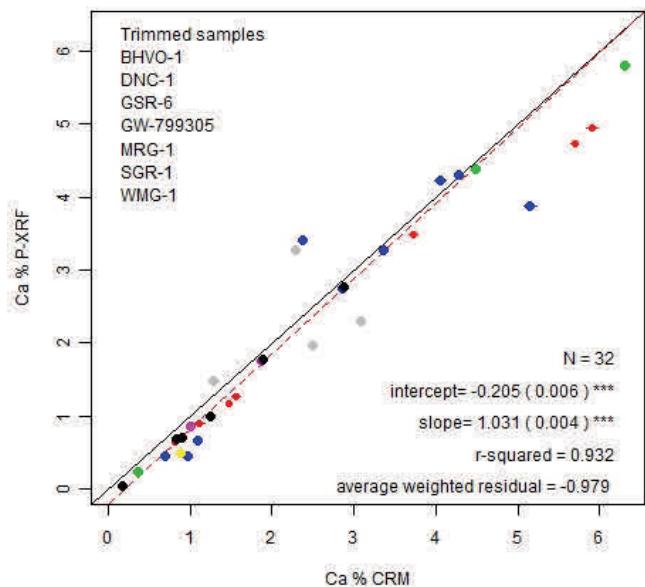
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode

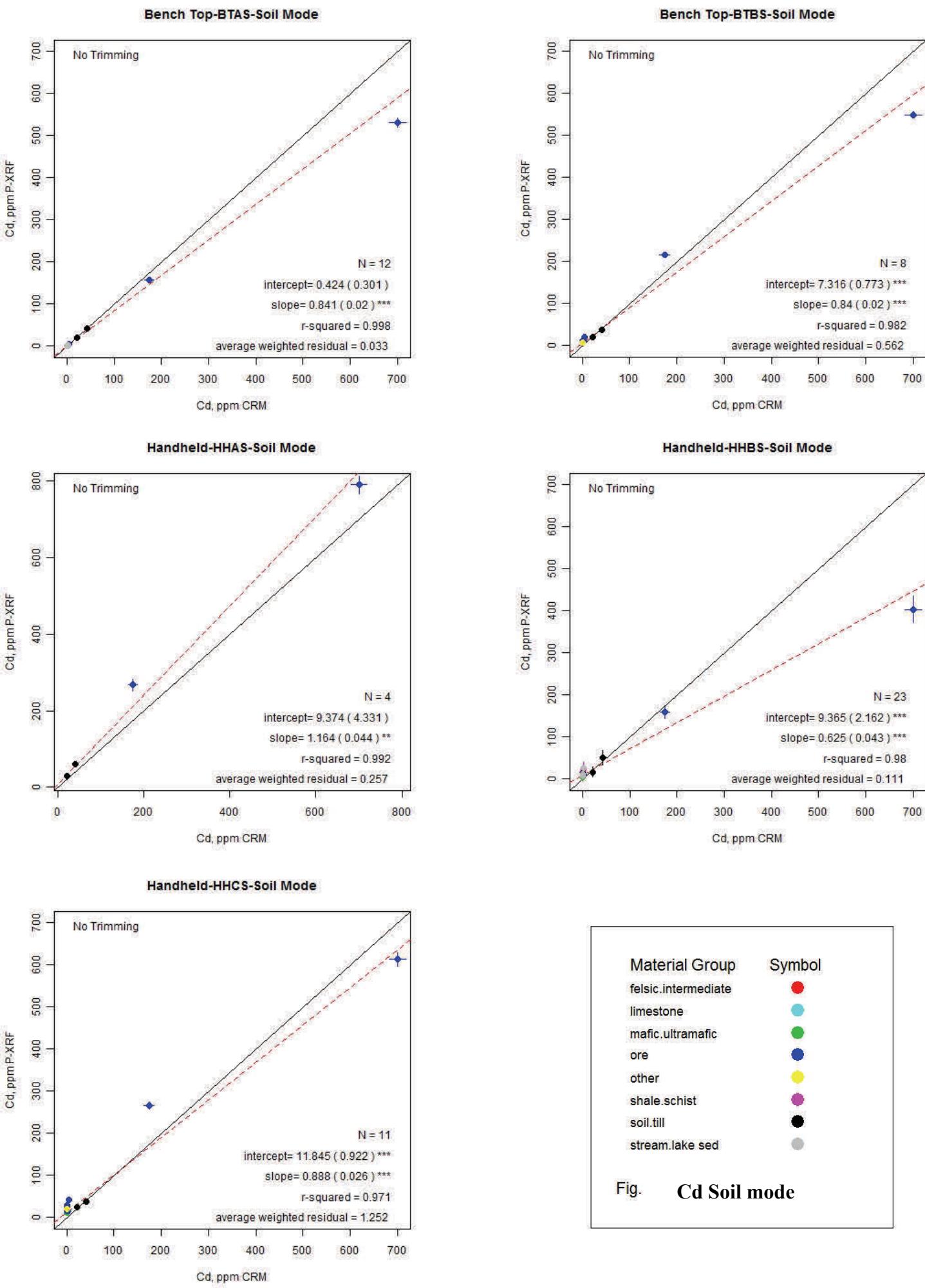


Handheld-HHCS-Soil Mode

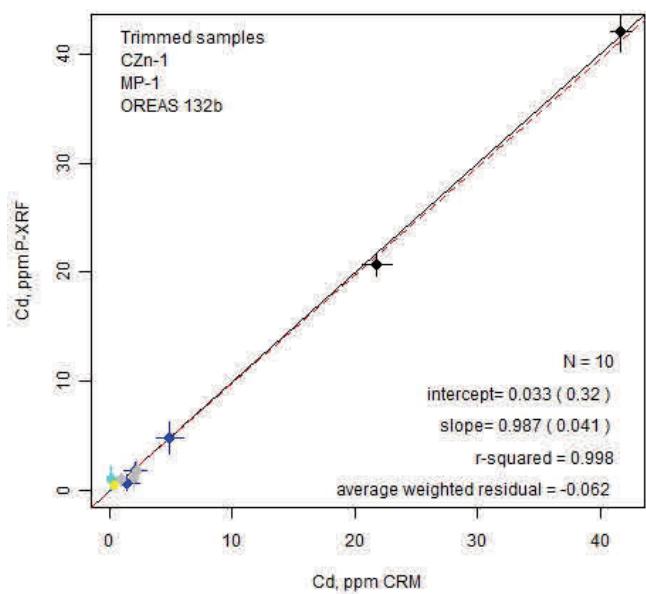


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

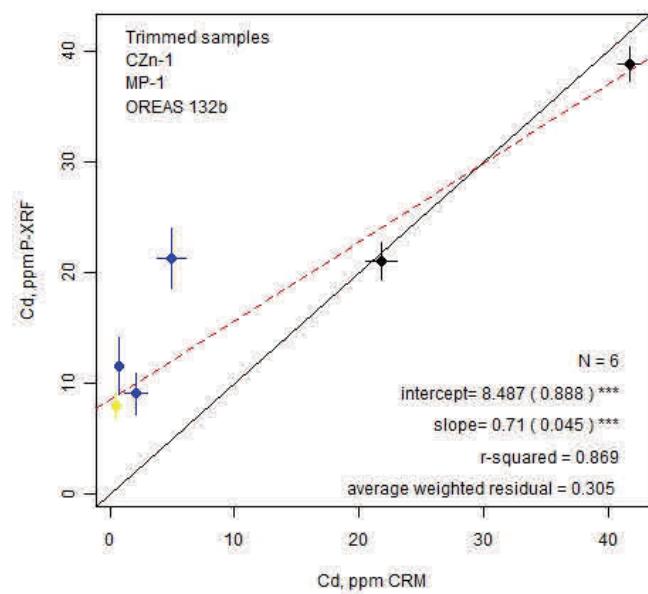
Fig. Ca Soil mode
trimmed



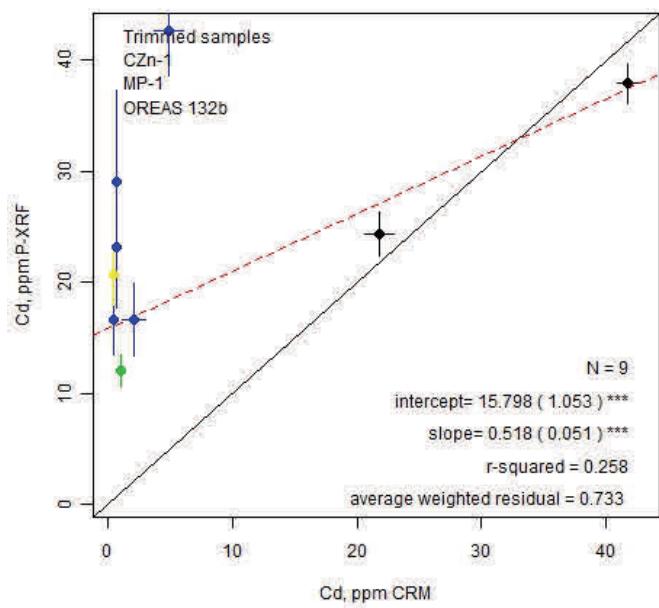
Bench Top-Machine A-Soil Mode



Bench Top-BTBS-Soil Mode



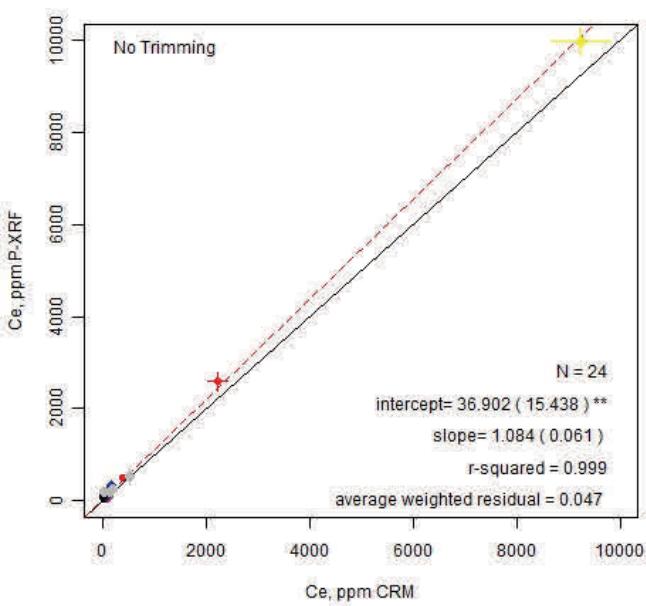
Handheld-HHCS-Soil Mode



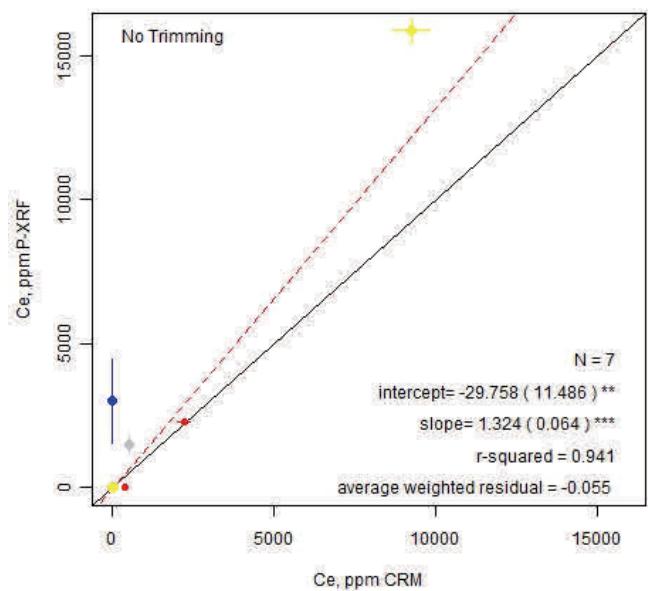
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Cd Soil mode
trimmed

Bench Top-BTAS-Soil Mode



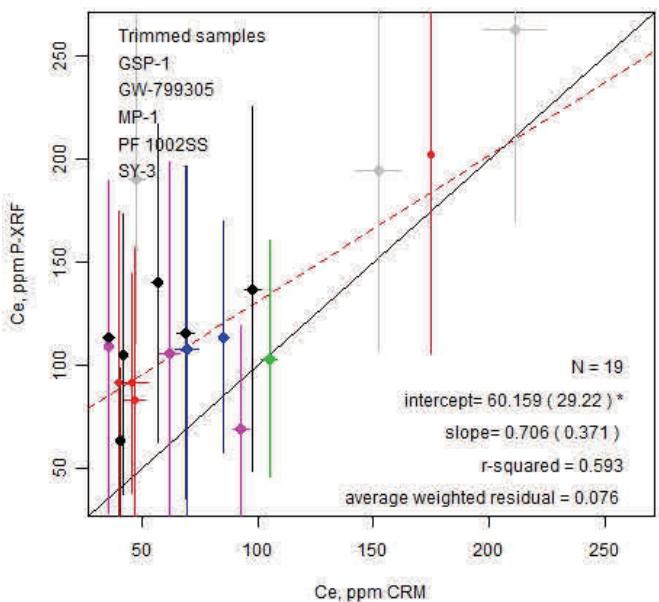
Handheld-HHBS-Soil Mode



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

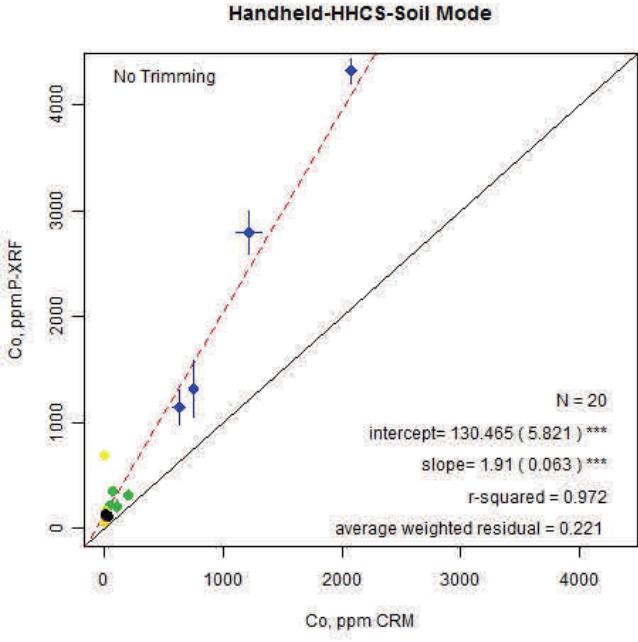
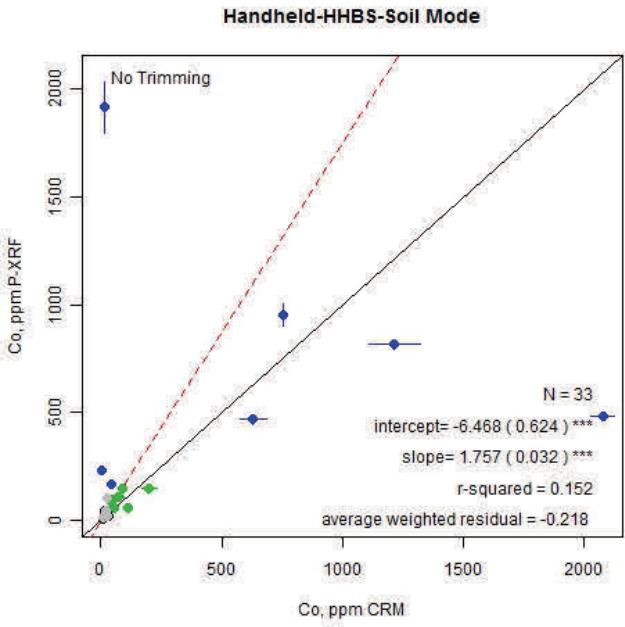
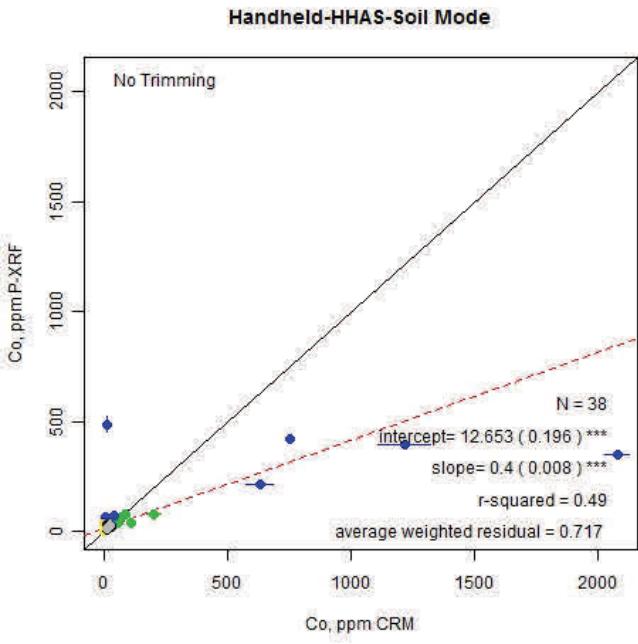
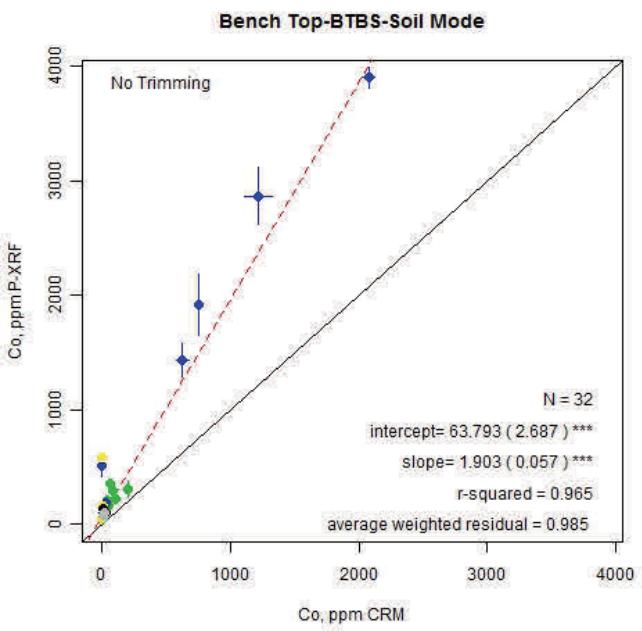
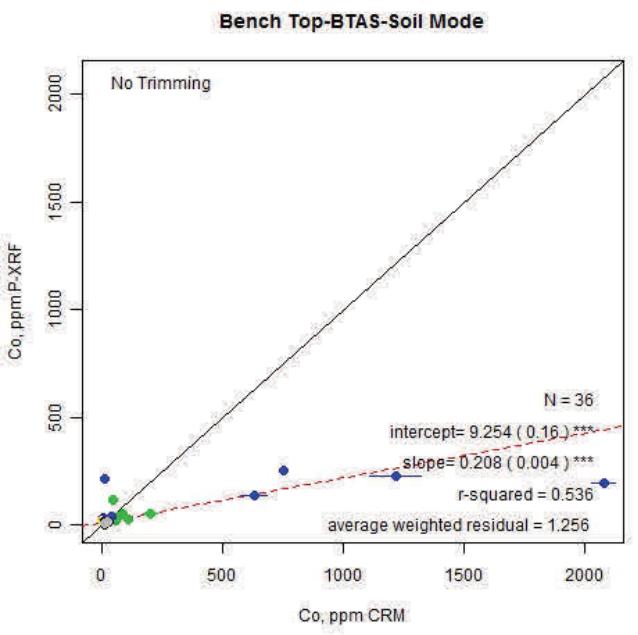
Fig. Ce Soil mode

Bench Top-Machine A-Soil Mode



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

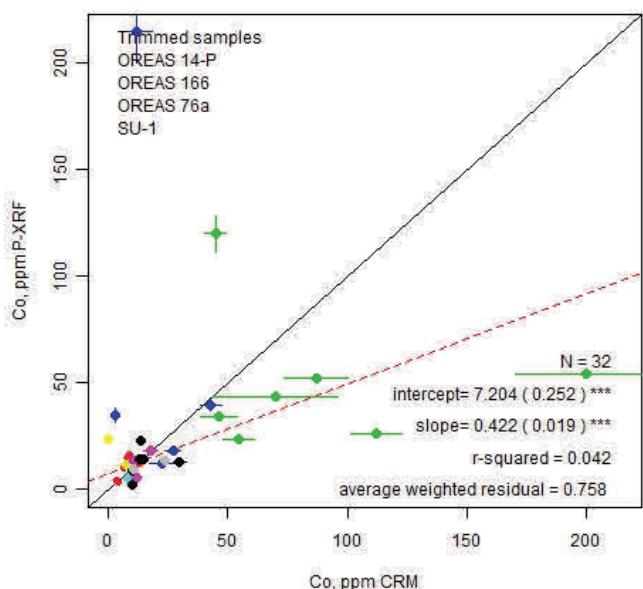
Fig. Ce Soil mode
trimmed



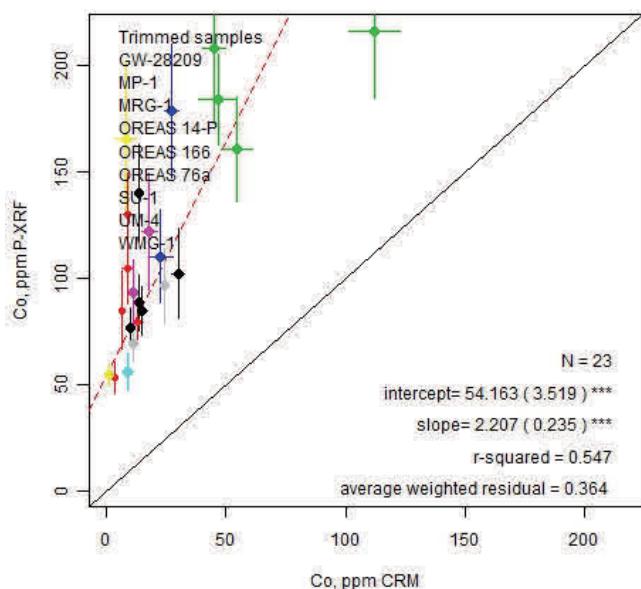
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. **Co** Soil mode

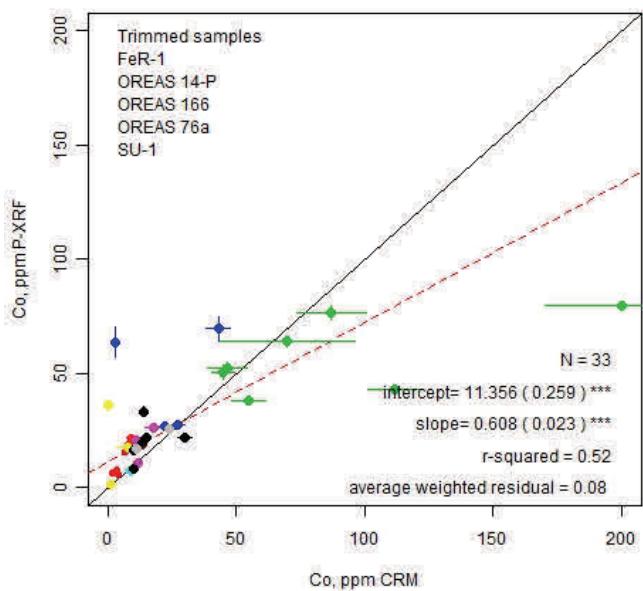
Bench Top-Machine A-Soil Mode



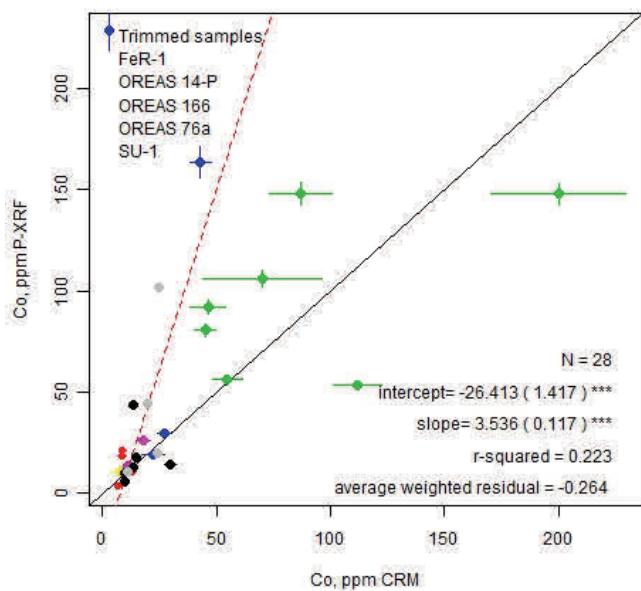
Bench Top-BTBS-Soil Mode



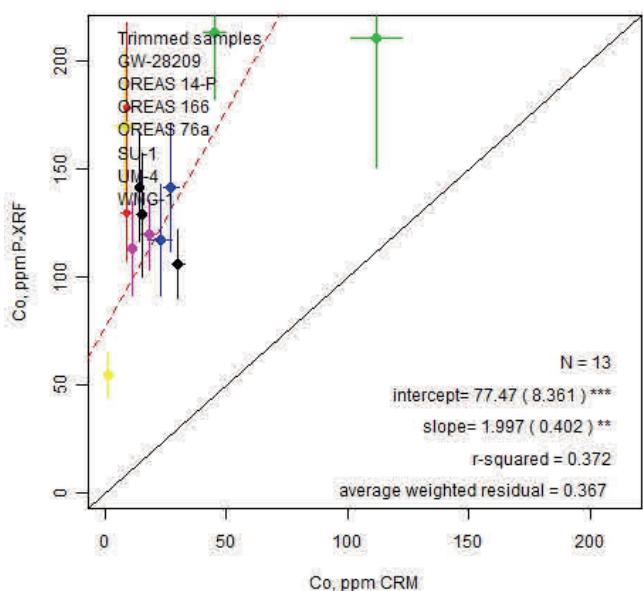
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode

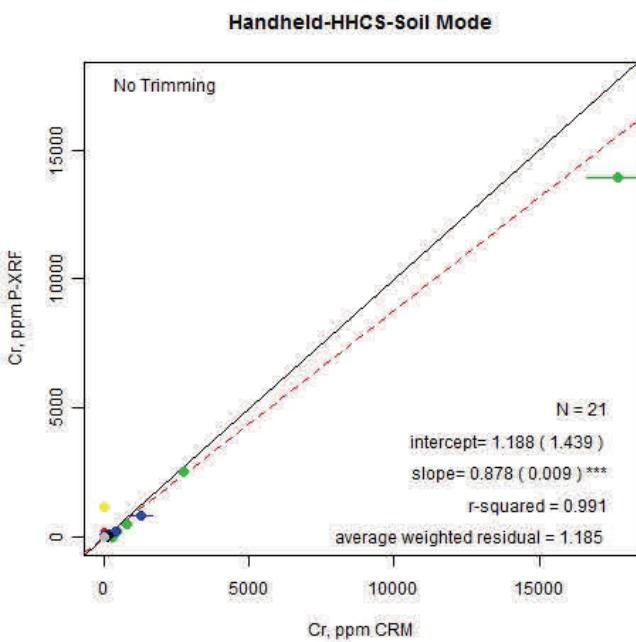
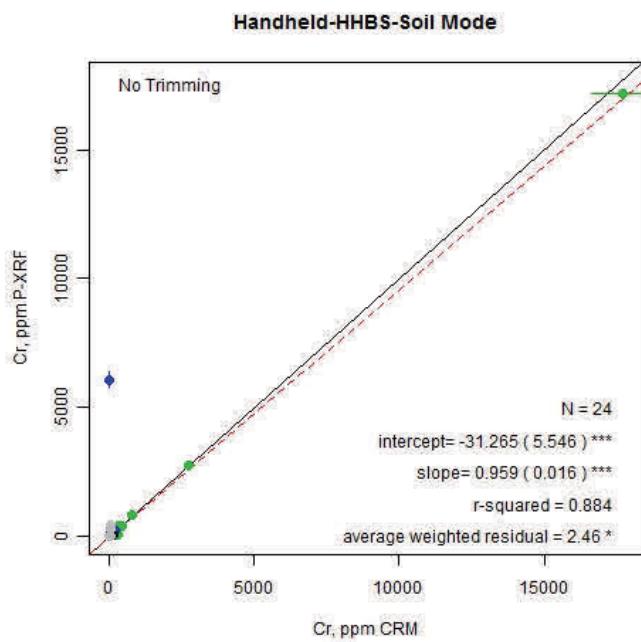
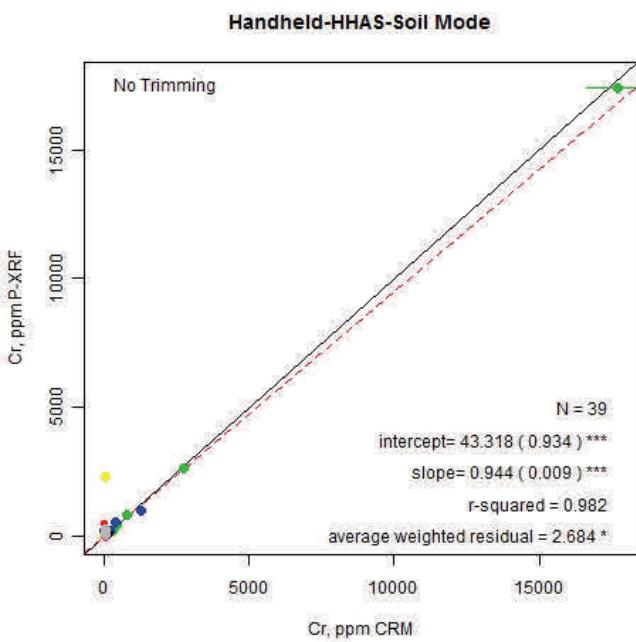
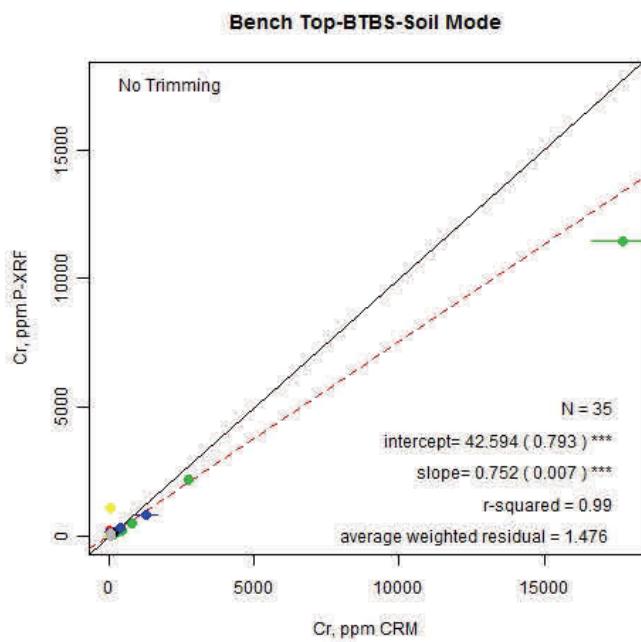
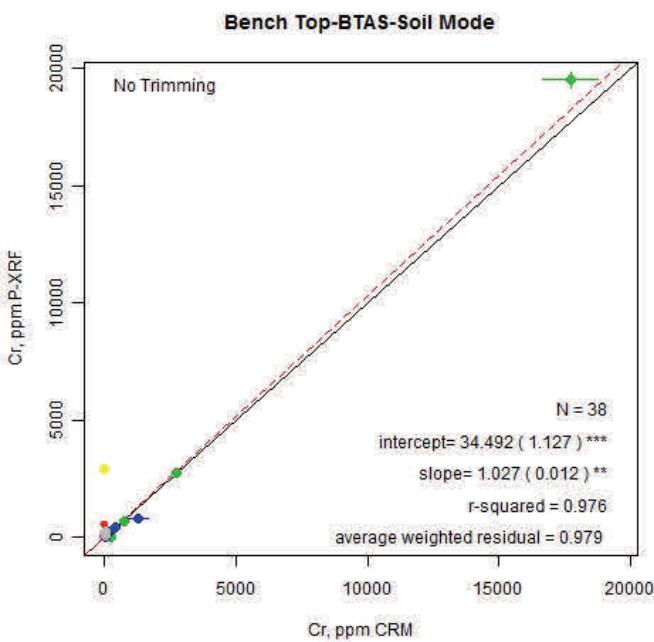


Handheld-HHCS-Soil Mode



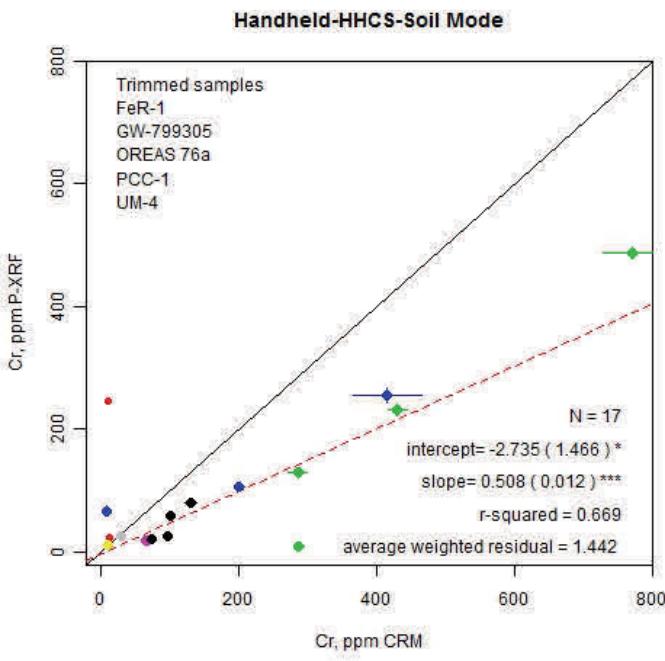
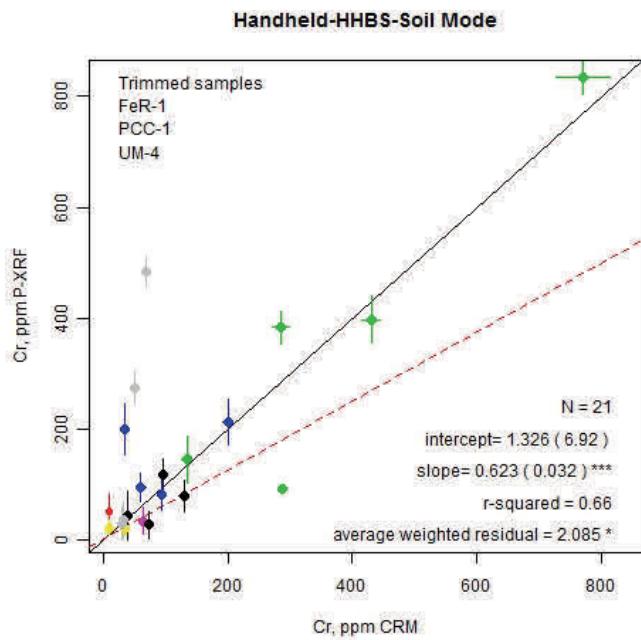
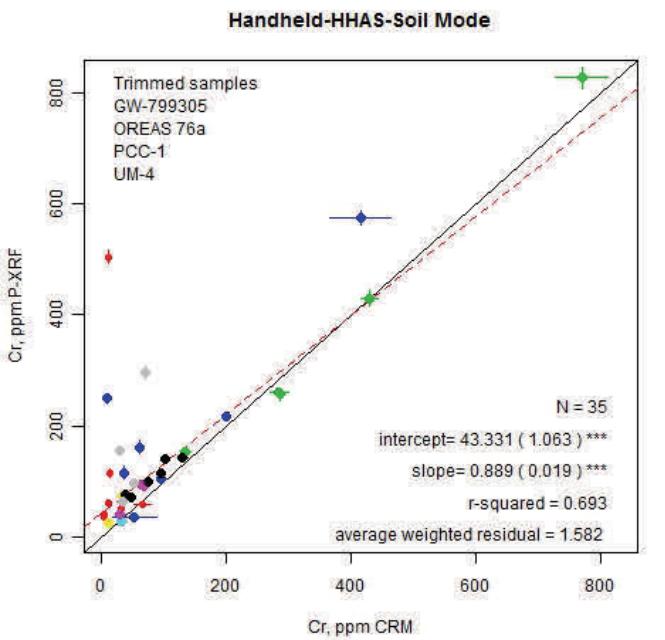
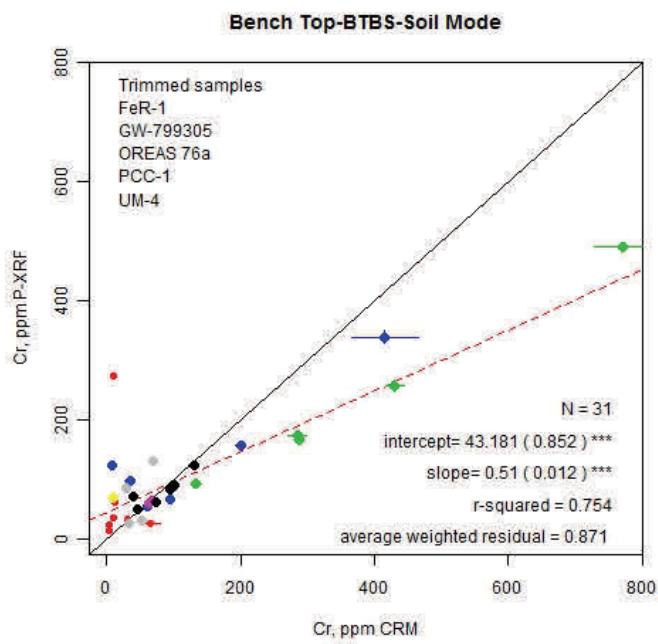
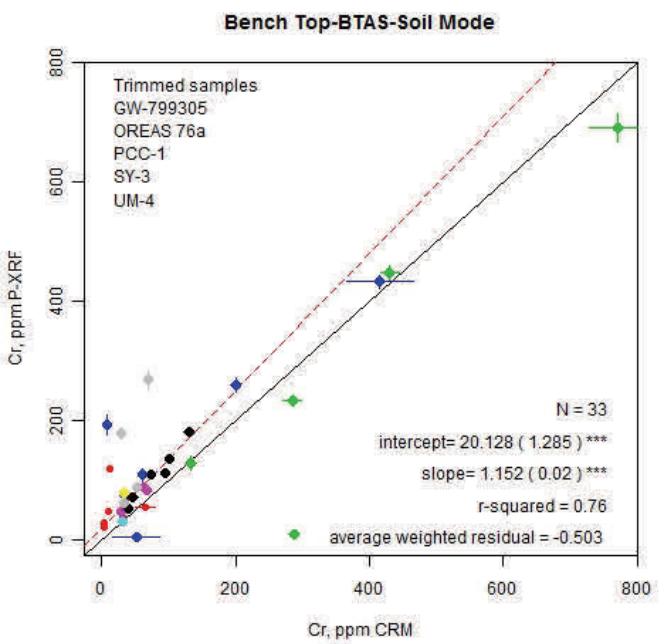
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Co Soil mode
trimmed



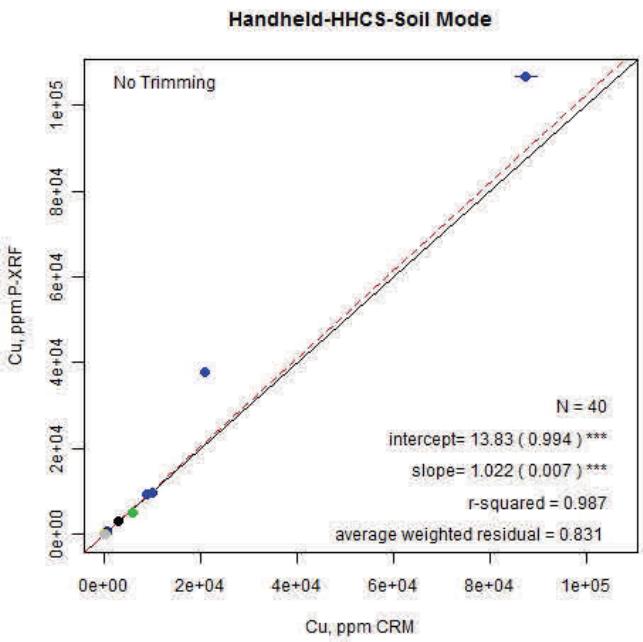
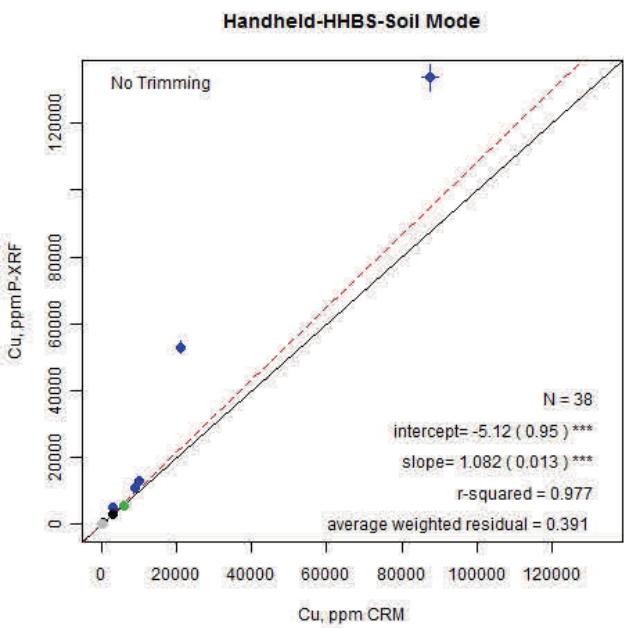
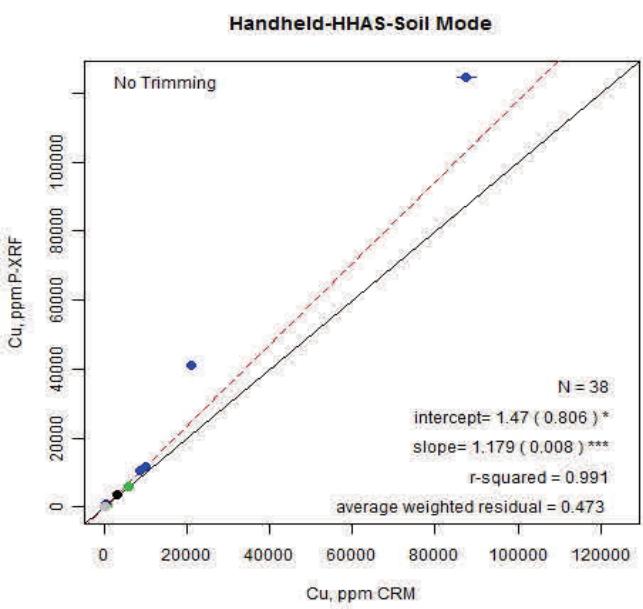
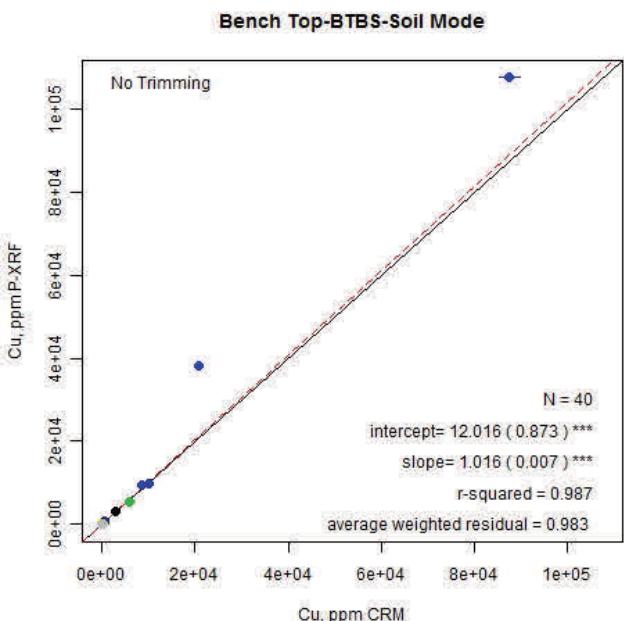
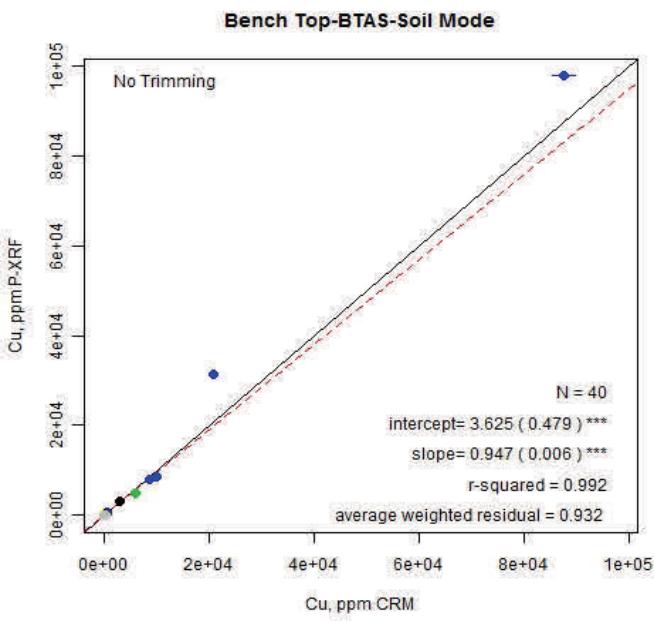
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Cr Soil mode



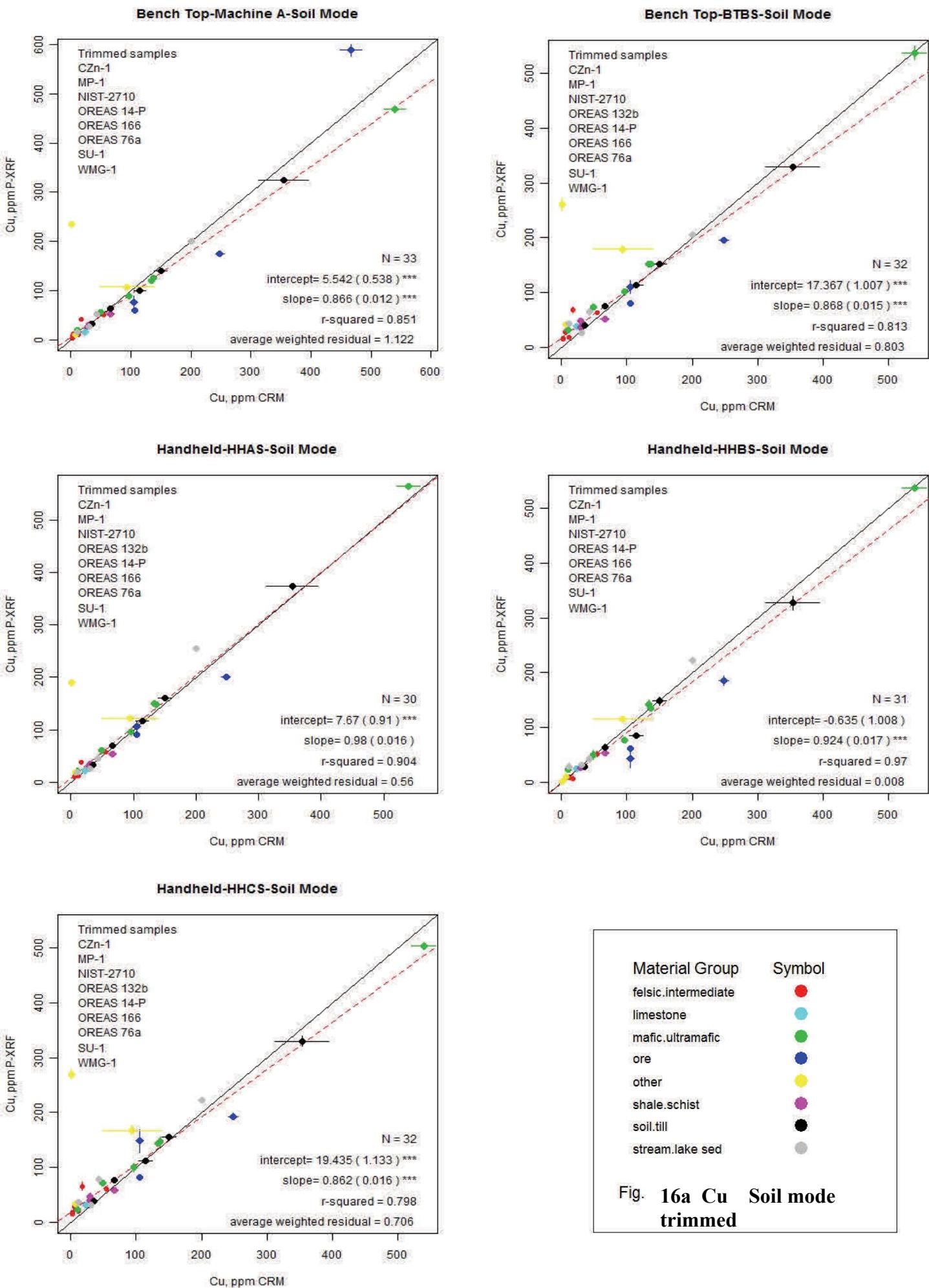
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

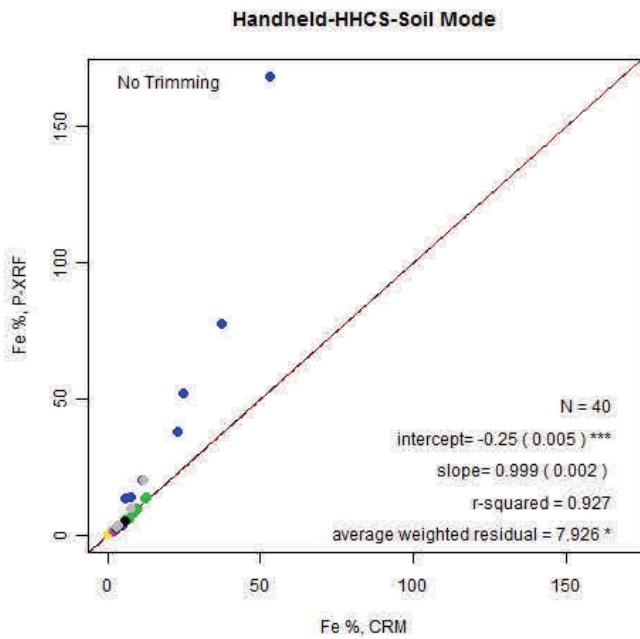
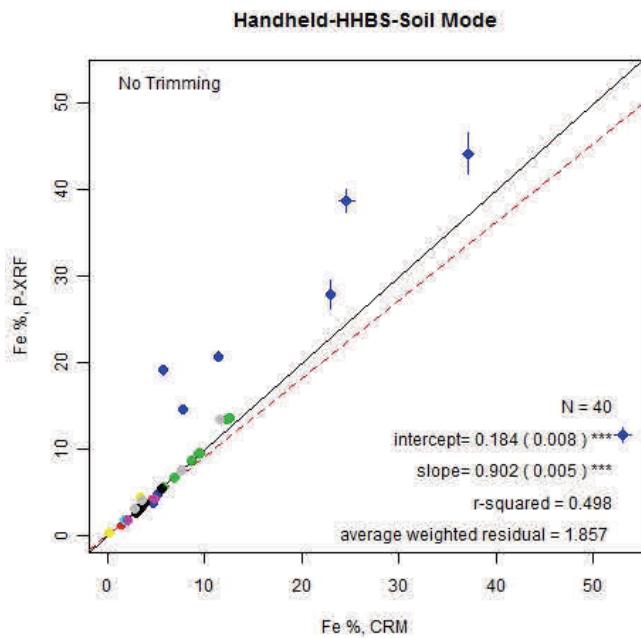
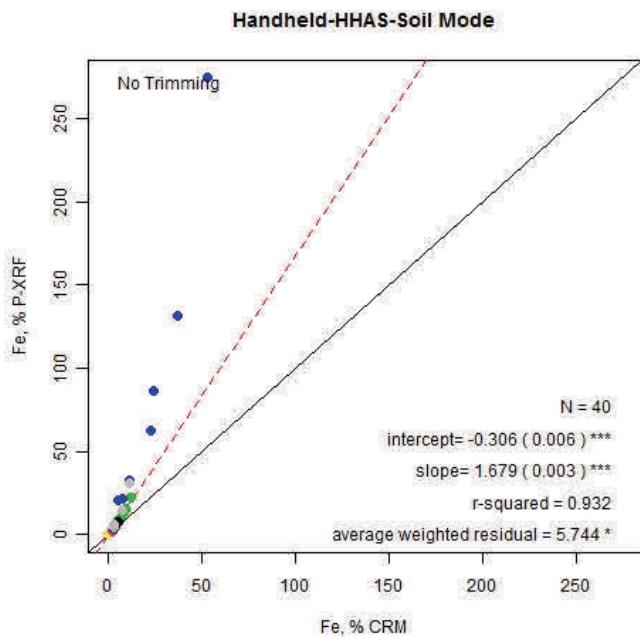
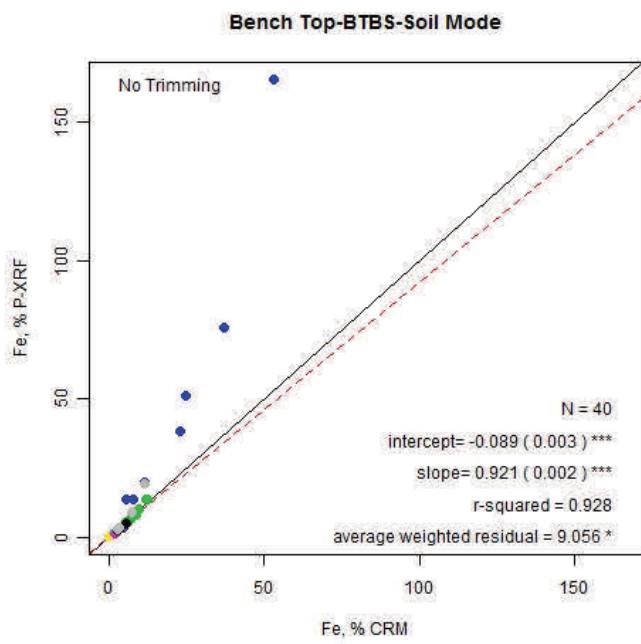
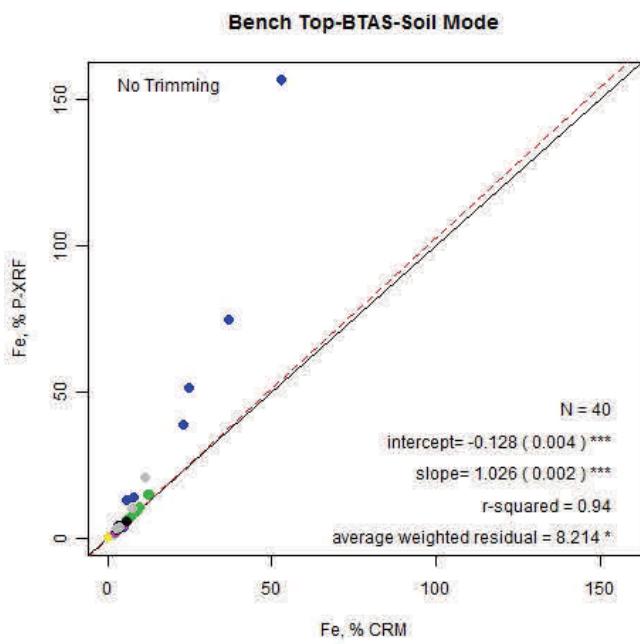
Fig. Cr Soil mode trimmed



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

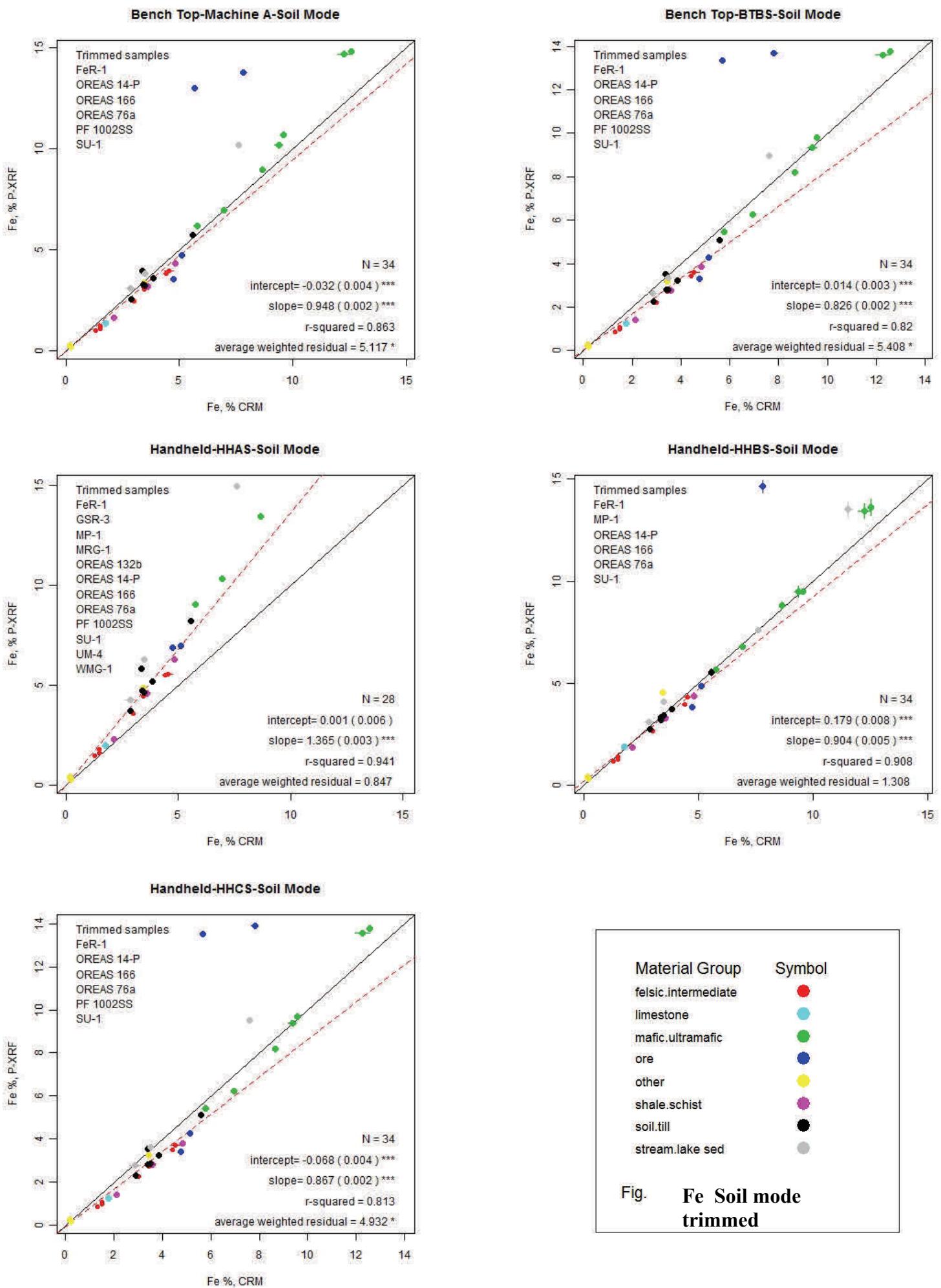
Fig. Cu Soil mode

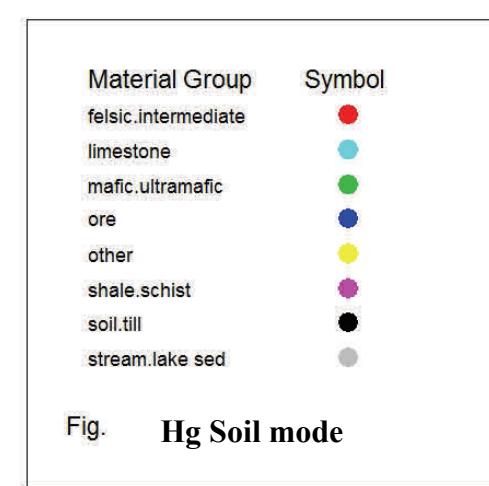
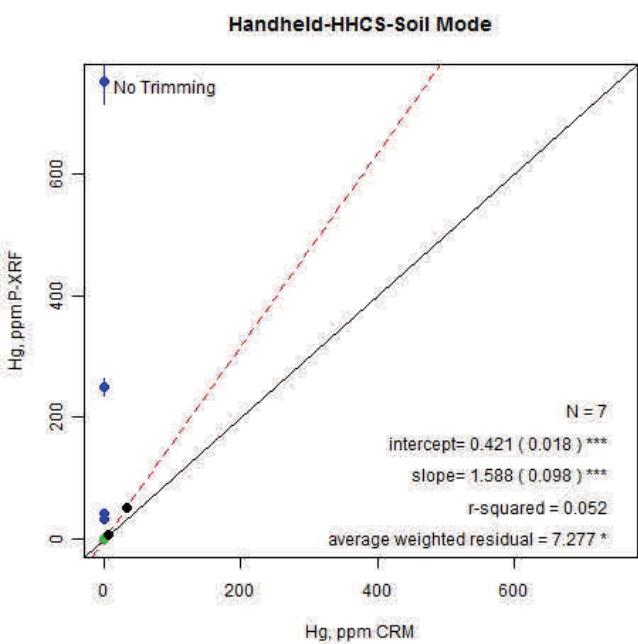
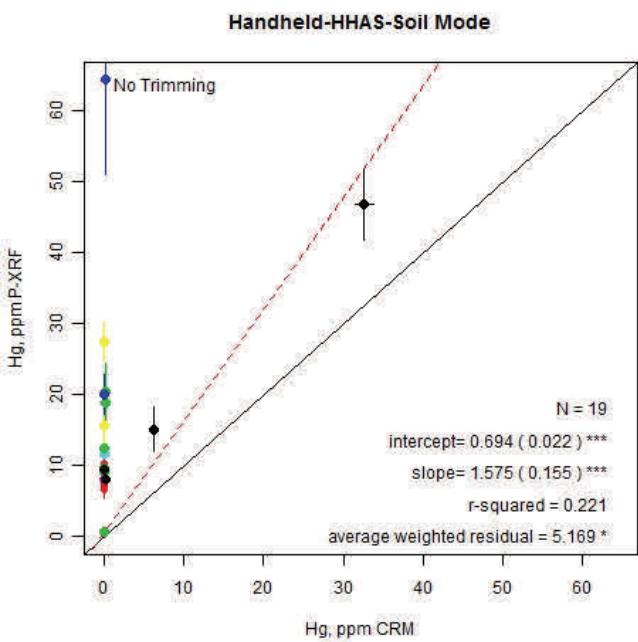
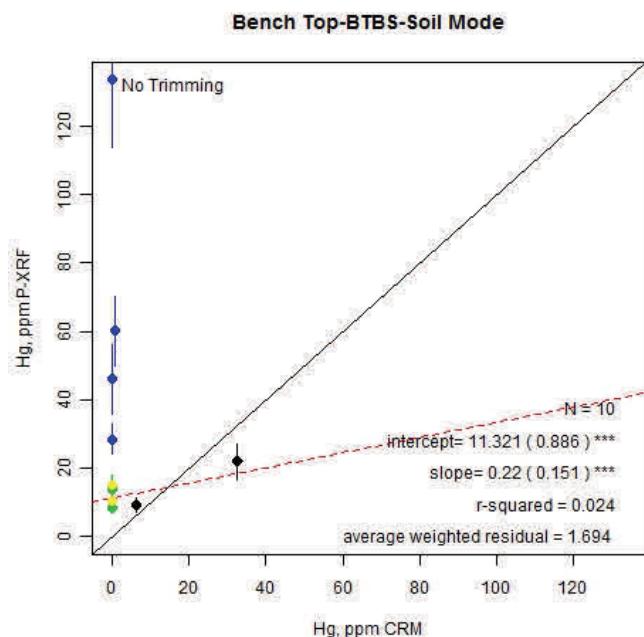
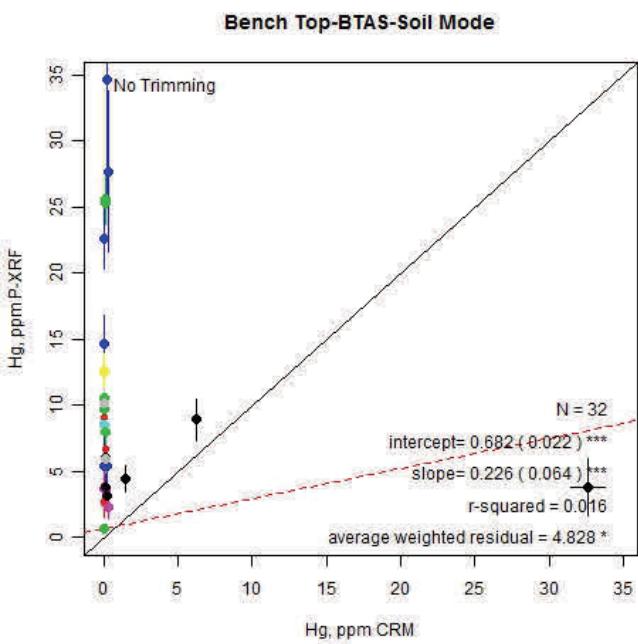


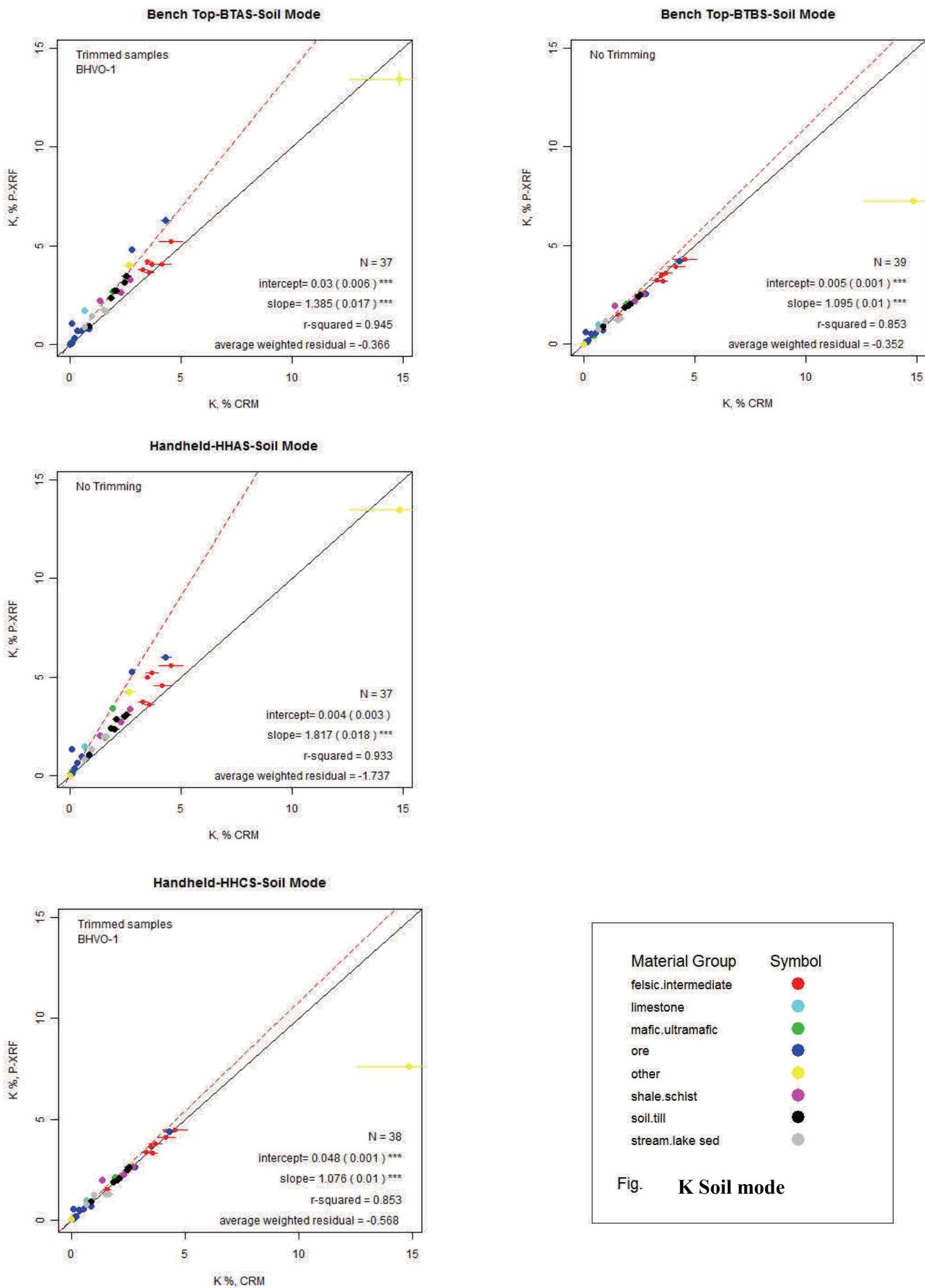


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

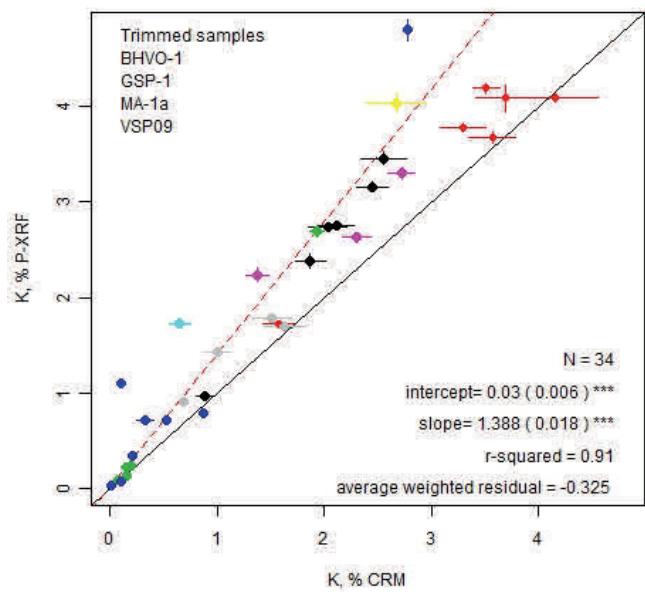
Fig. Fe Soil mode



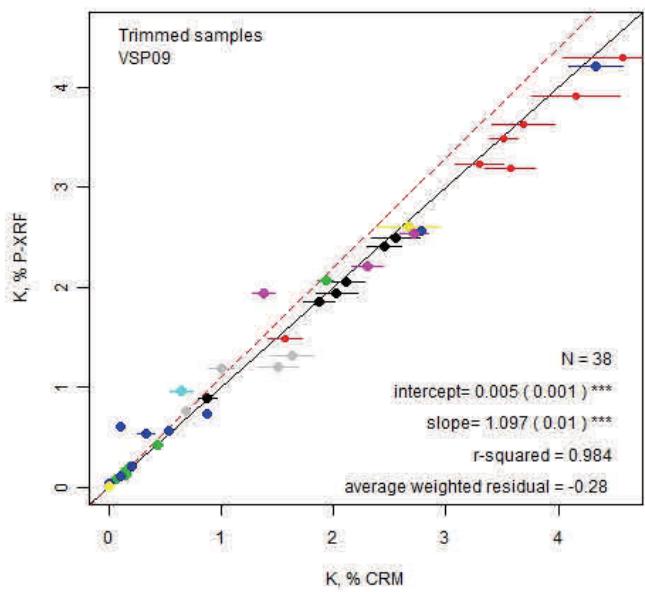




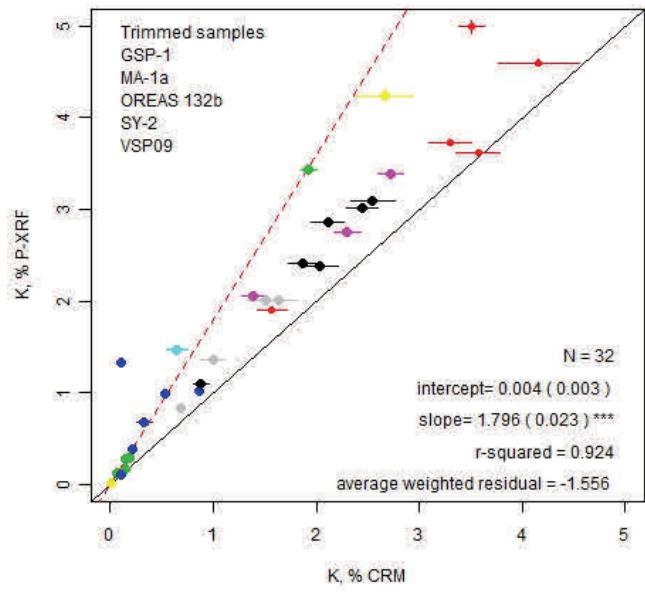
Bench Top-Machine A-Soil Mode



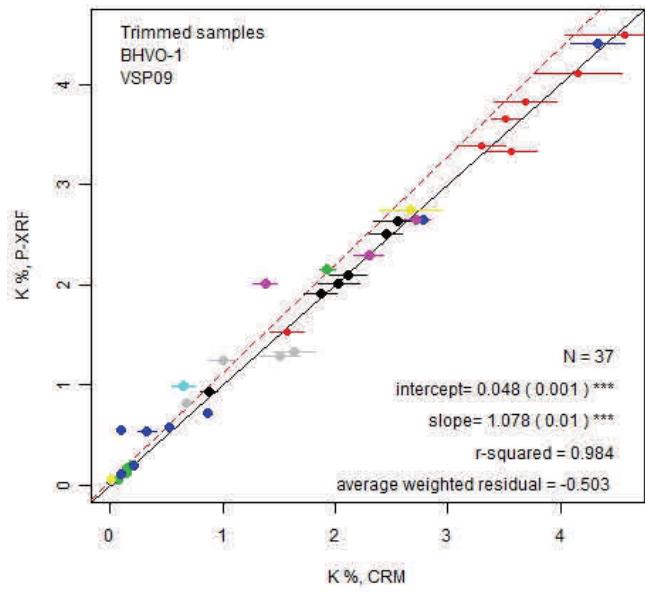
Bench Top-BTBS-Soil Mode



Handheld-HHAS-Soil Mode



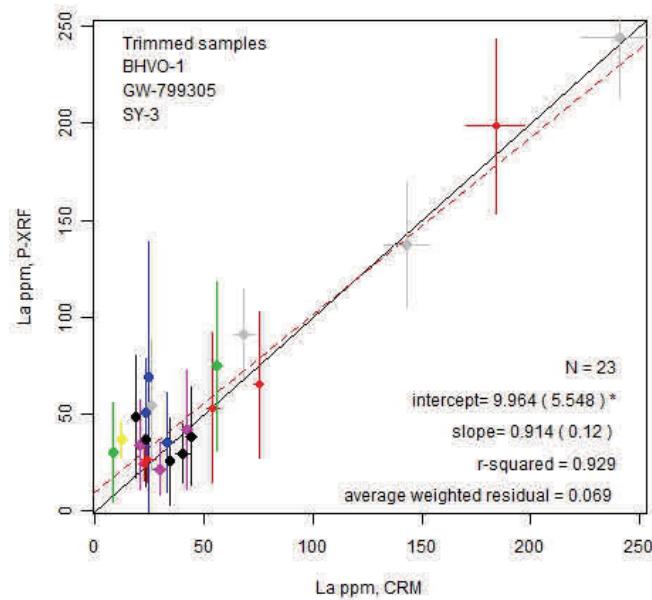
Handheld-HHCS-Soil Mode



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

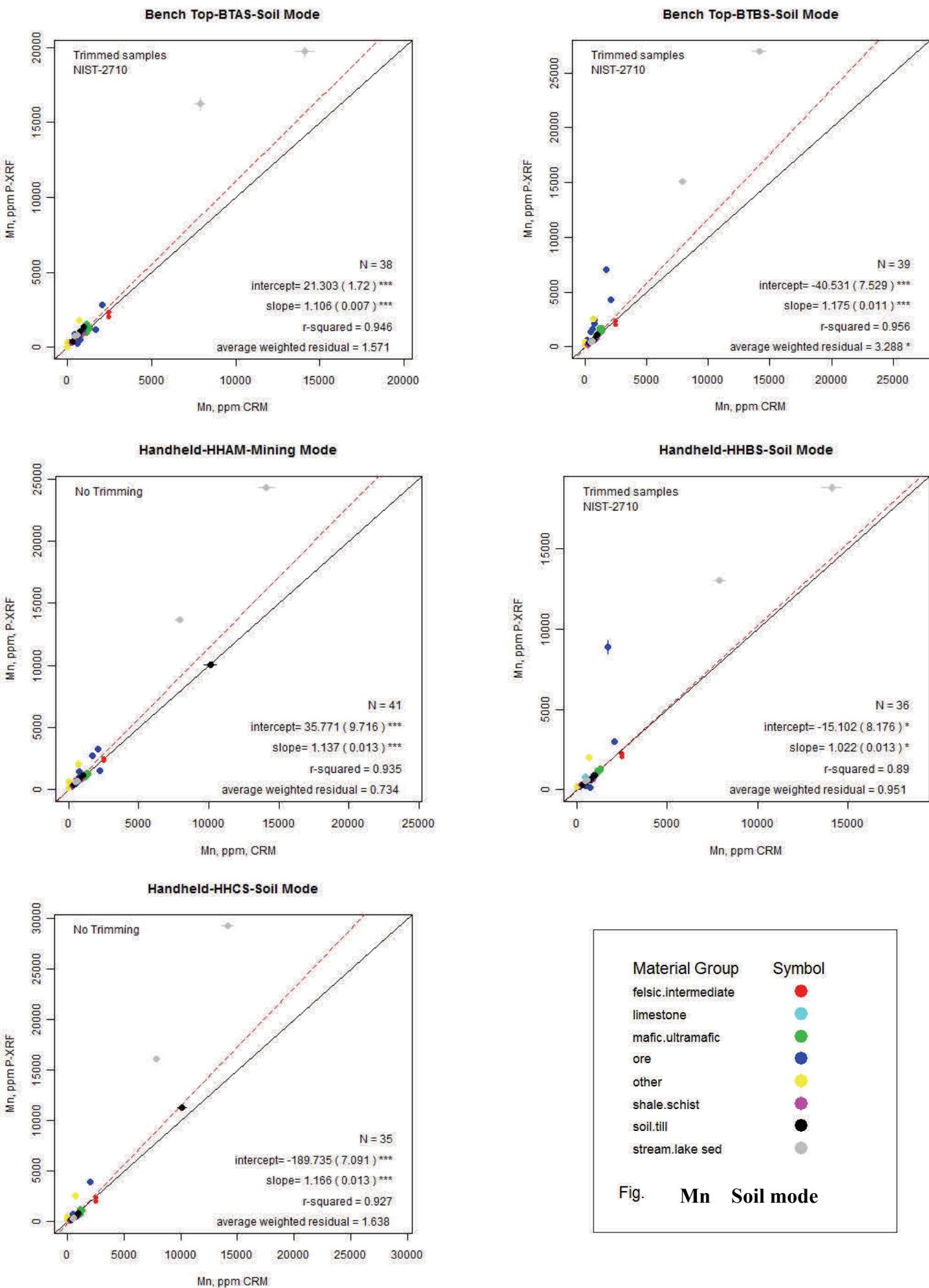
Fig. K Soil mode
trimmed

Bench Top-Machine A-Soil Mode

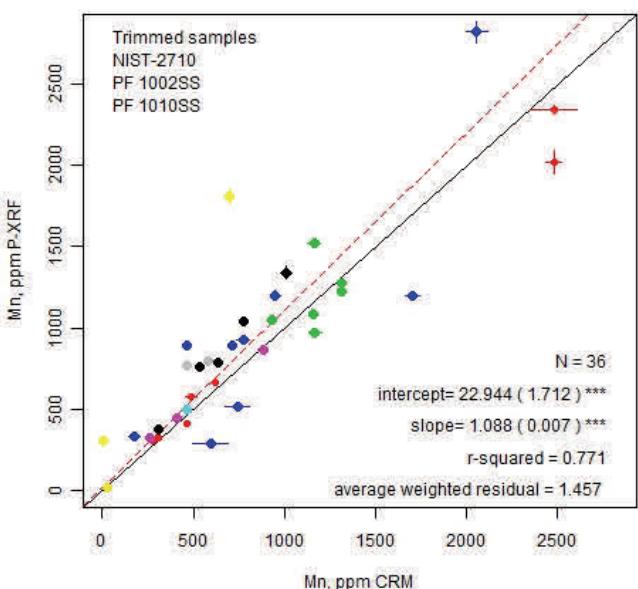


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

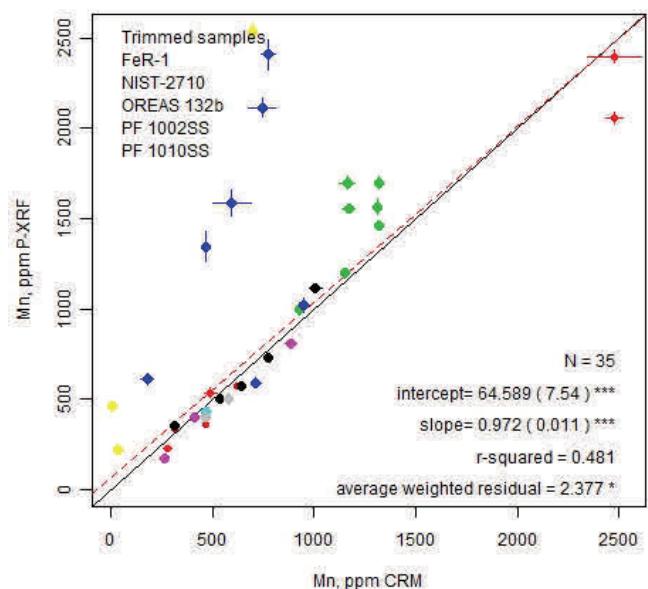
Fig. La Soil mode
trimmed



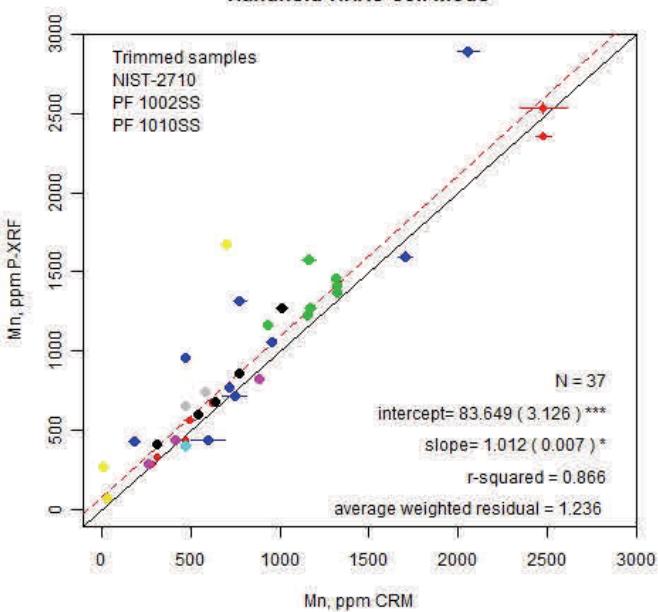
Bench Top-Machine A-Soil Mode



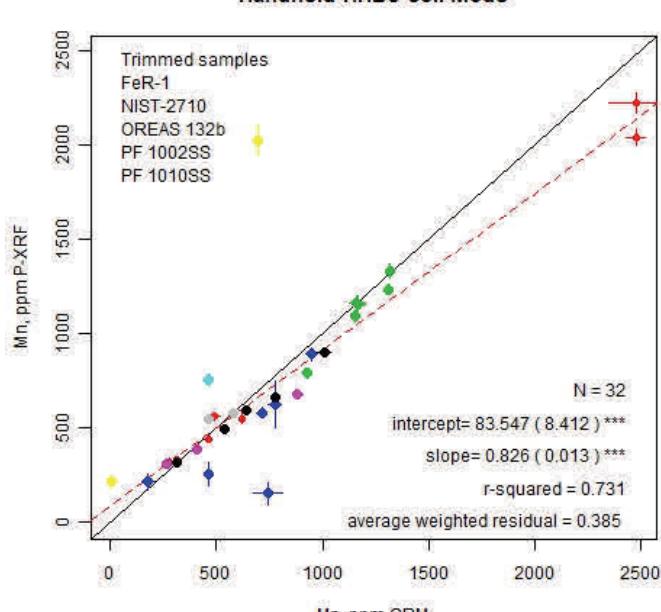
Bench Top-BTBS-Soil Mode



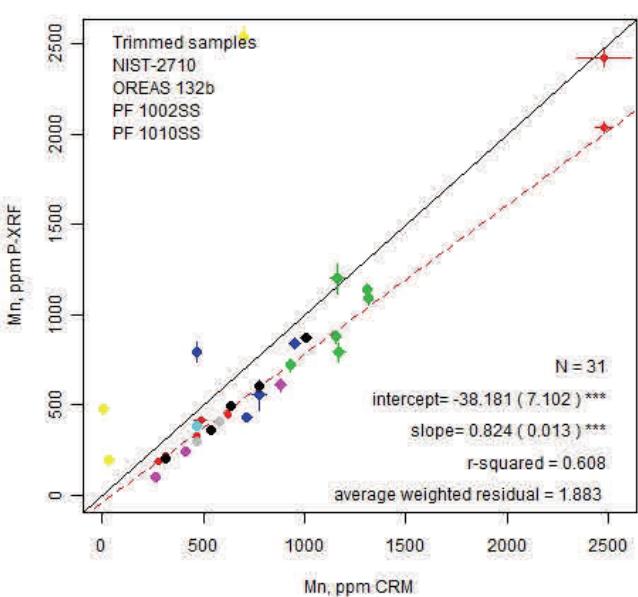
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode

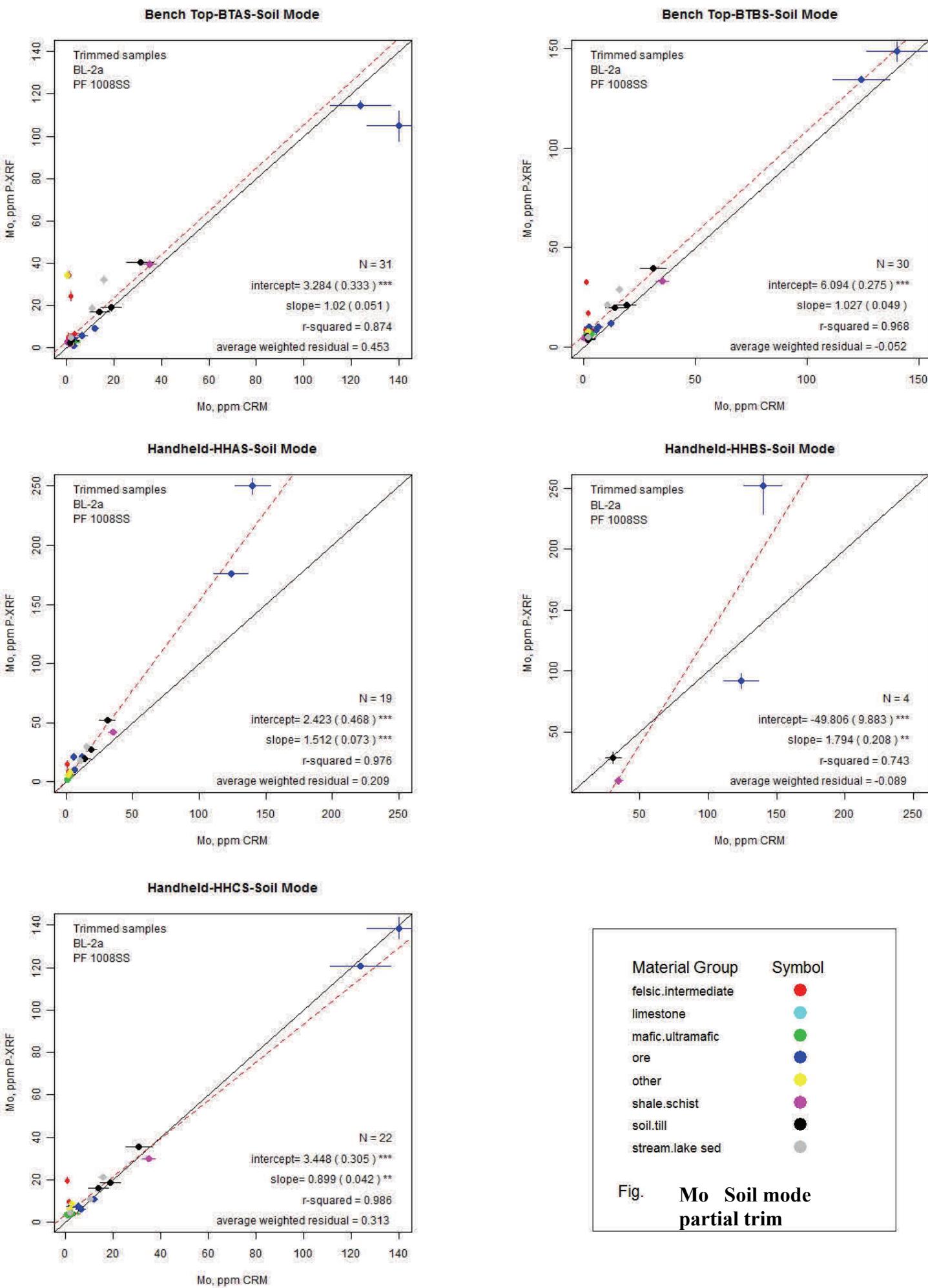


Handheld-HHCS-Soil Mode

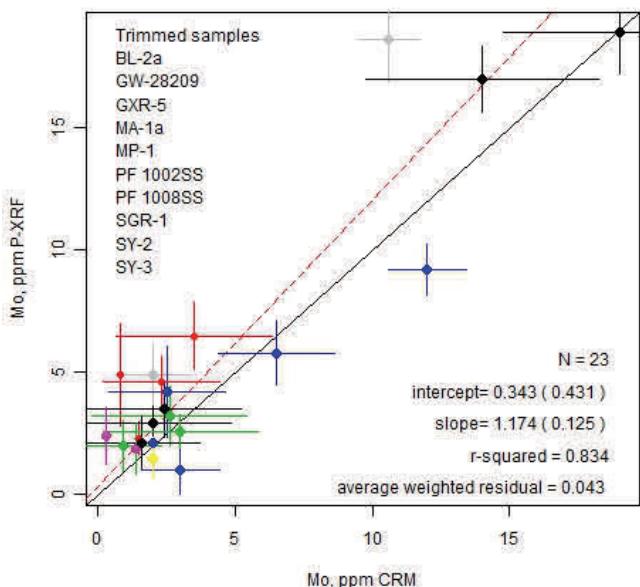


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

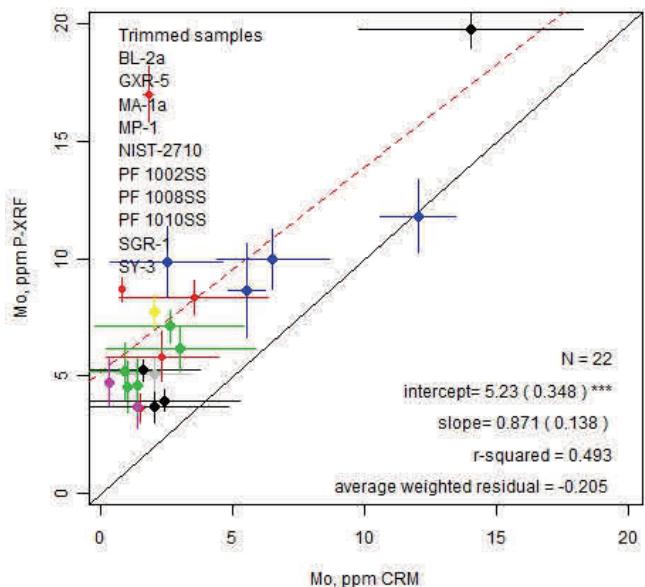
Fig. Mn Soil mode
trimmed



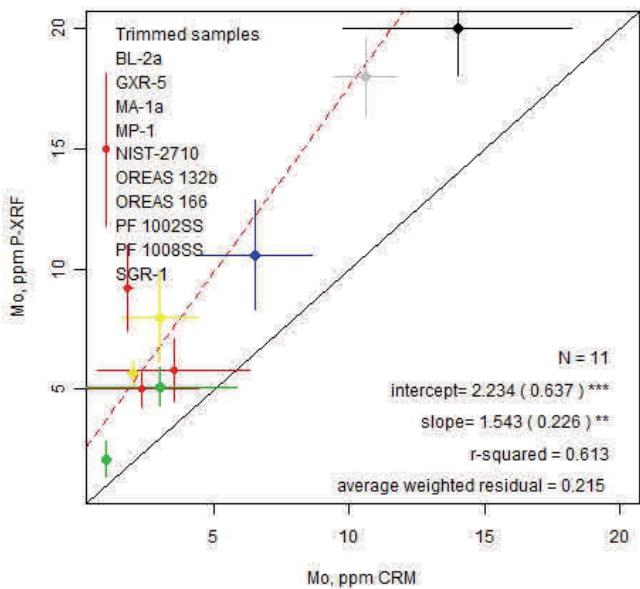
Bench Top-Machine A-Soil Mode



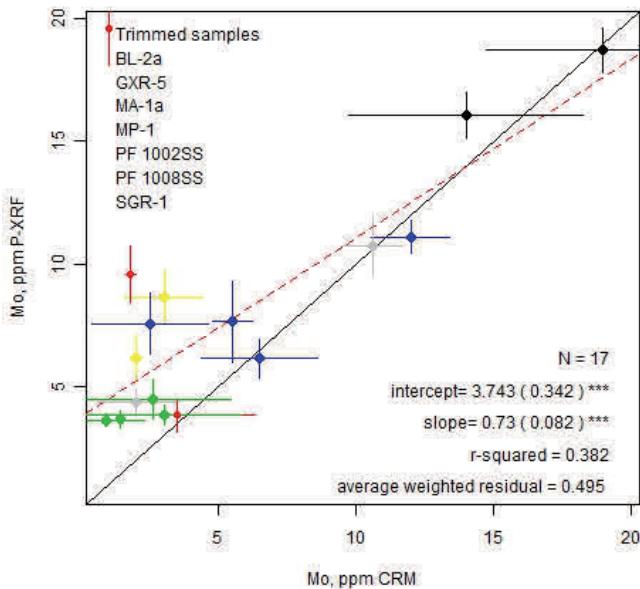
Bench Top-BTBS-Soil Mode



Handheld-HHAS-Soil Mode



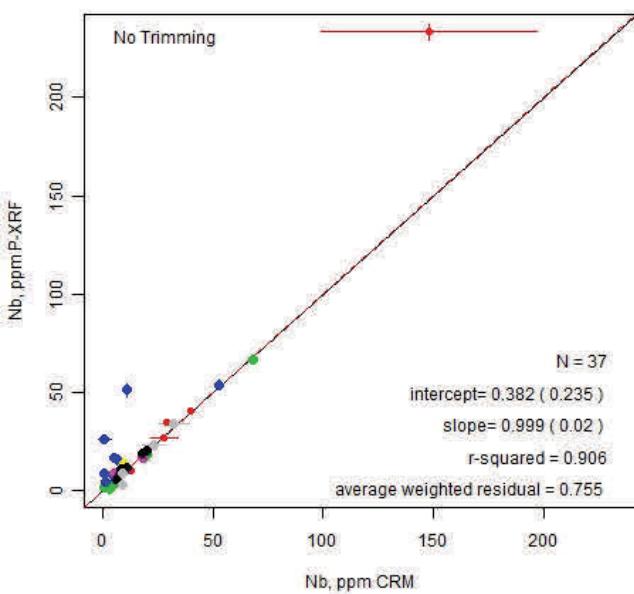
Handheld-HCFS-Soil Mode



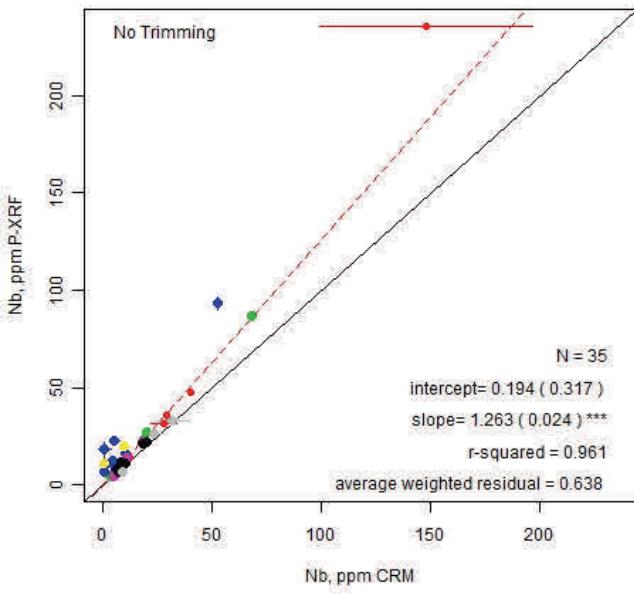
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Mo Soil mode trimmed

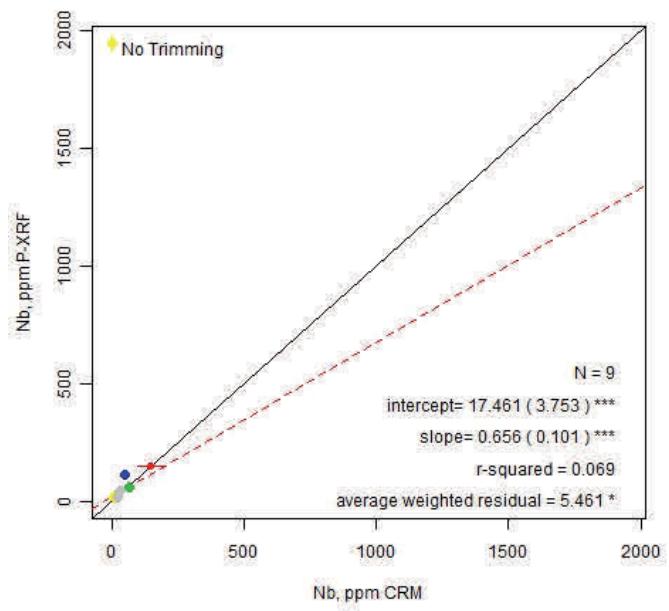
Bench Top-BTAS-Soil Mode



Handheld-HHAS-Soil Mode



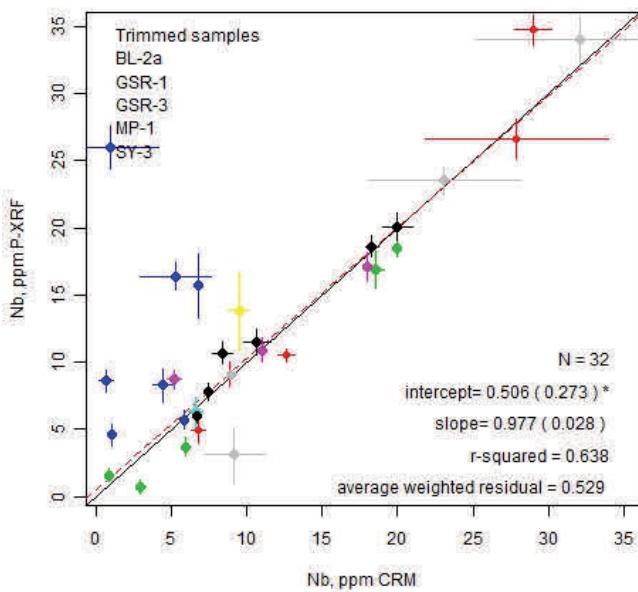
Handheld-HHBS-Soil Mode



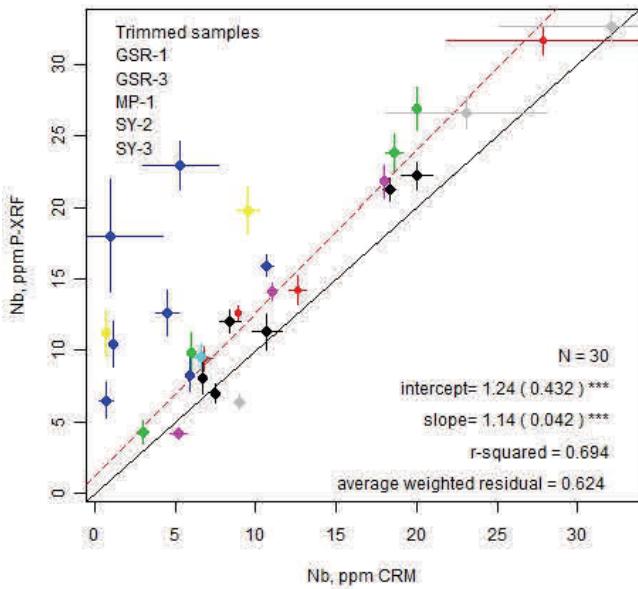
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Nb Soil mode

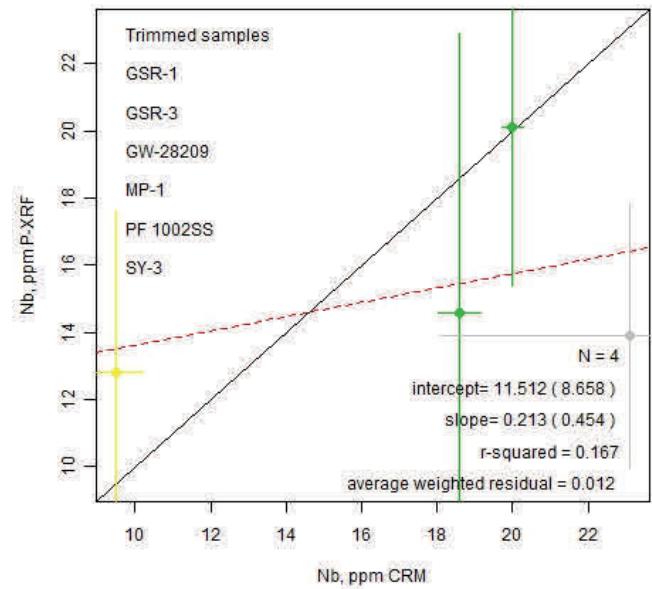
Bench Top-Machine A-Soil Mode



Handheld-HHAS-Soil Mode



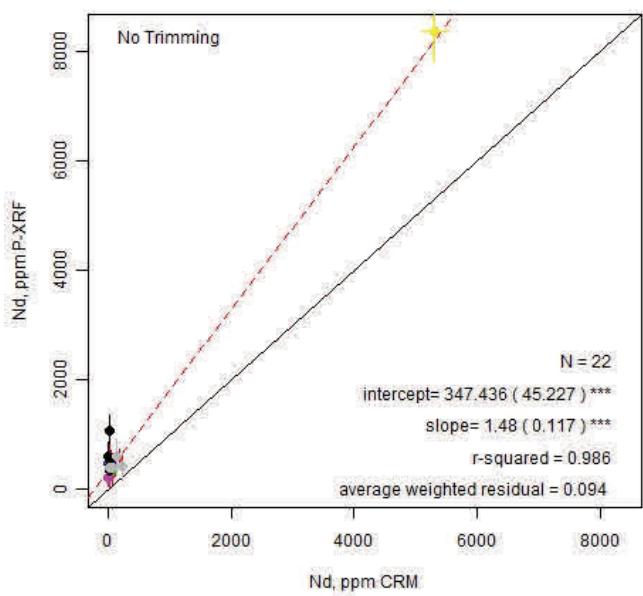
Handheld-HHBS-Soil Mode



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

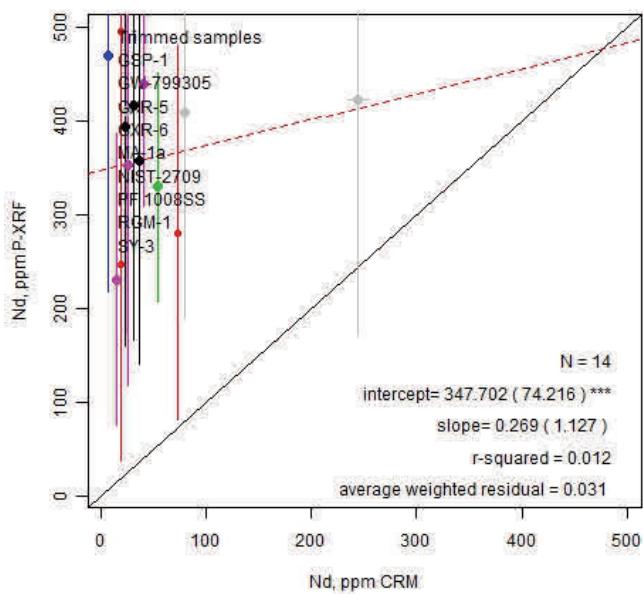
Fig. Nb Soil mode
trimmed

Bench Top-BTAS-Soil Mode

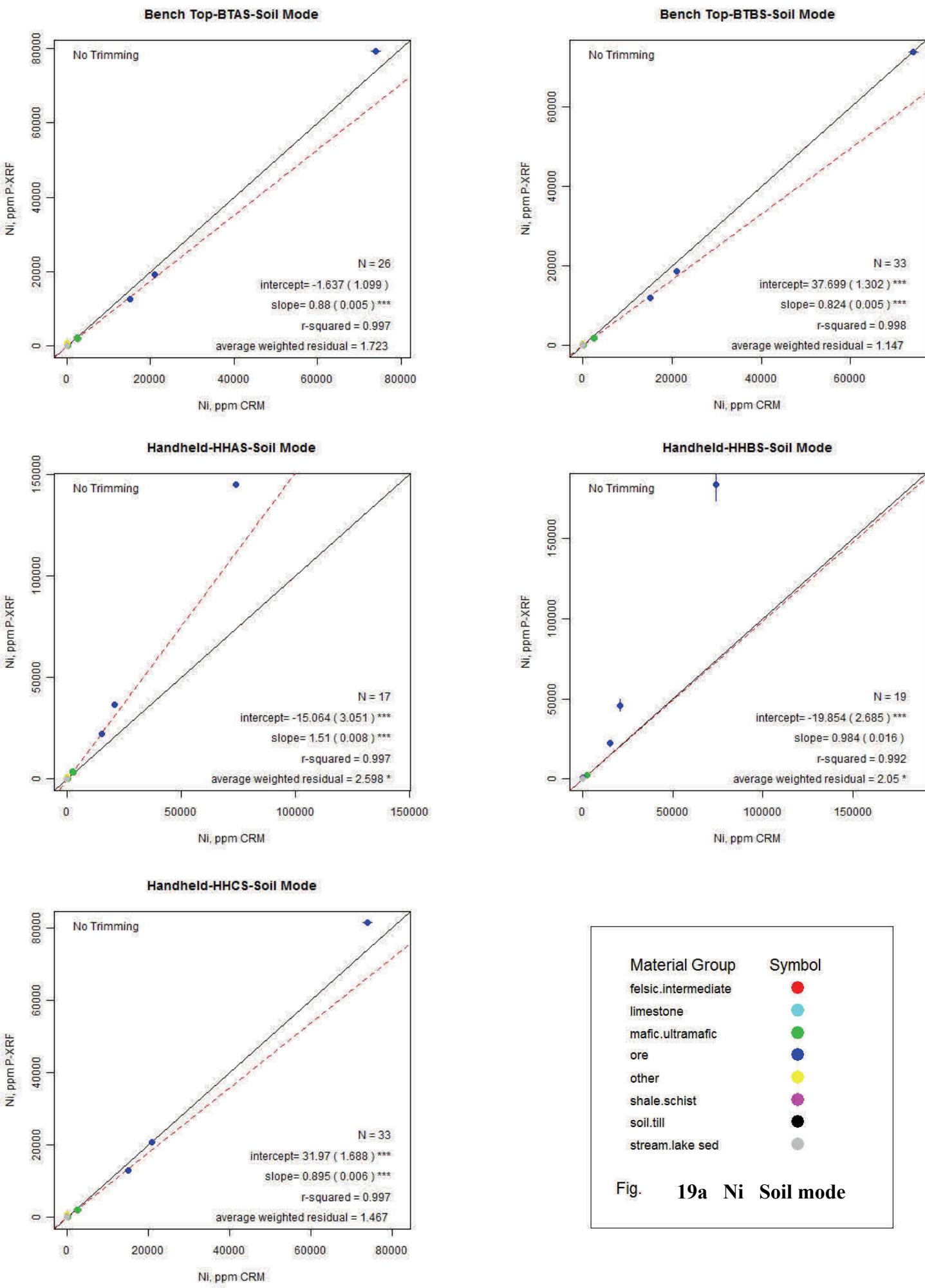


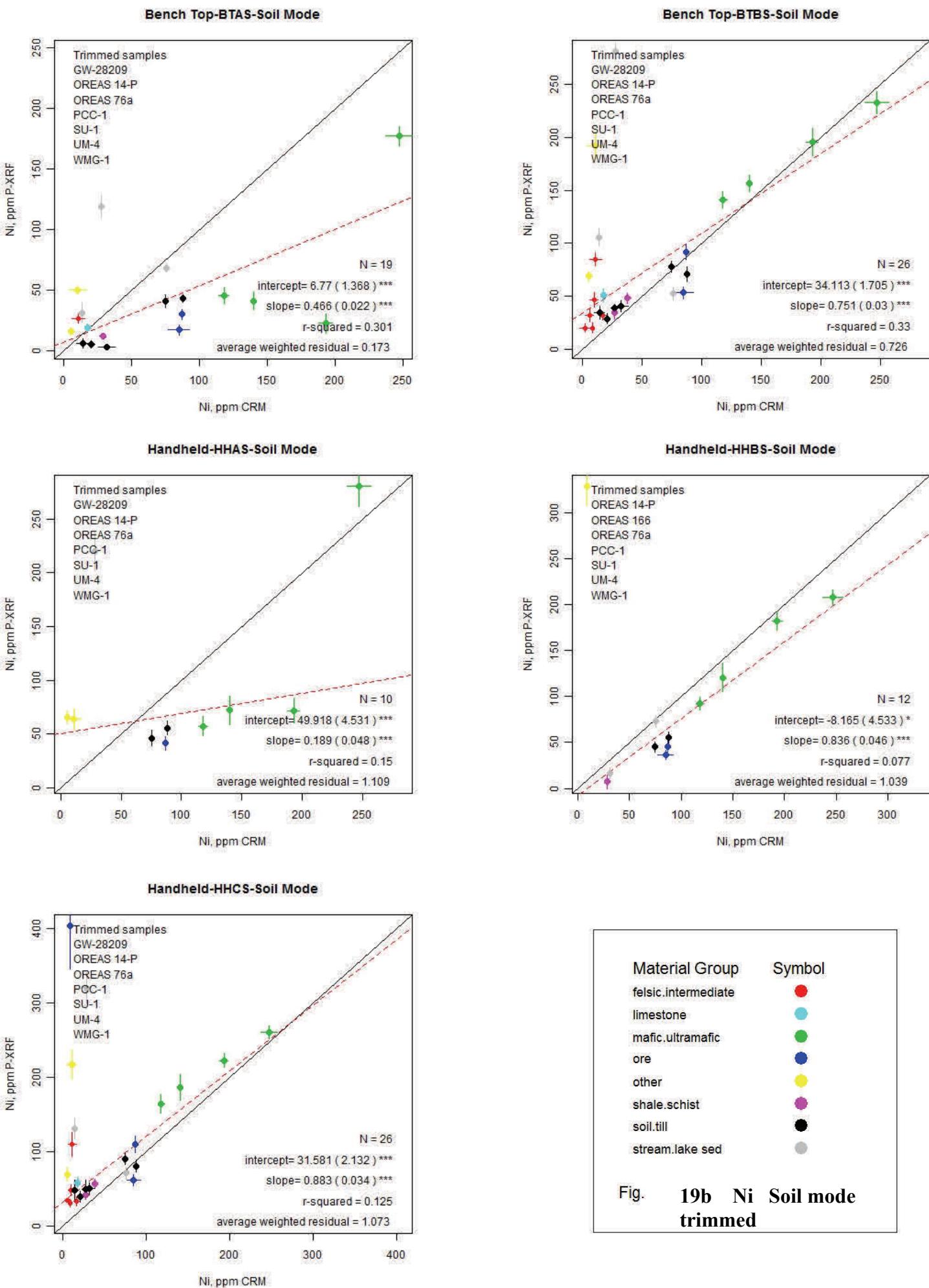
Nd Soil mode

Bench Top-Machine A-Soil Mode

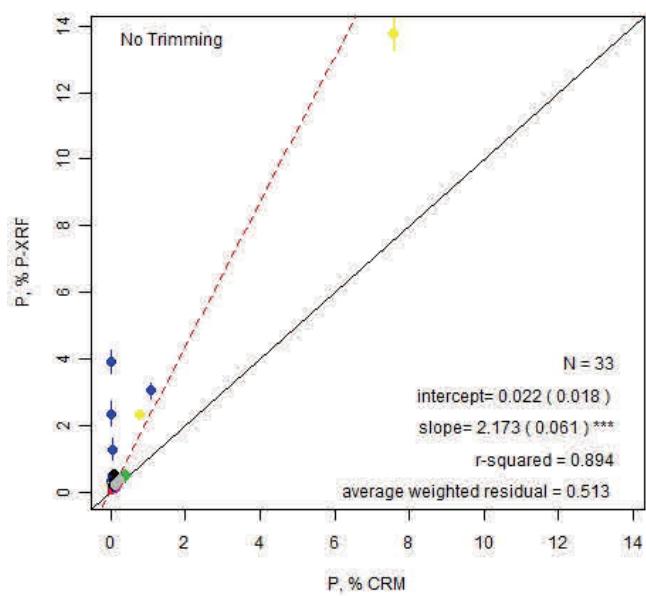


**Nd Soil mode
trimmed**

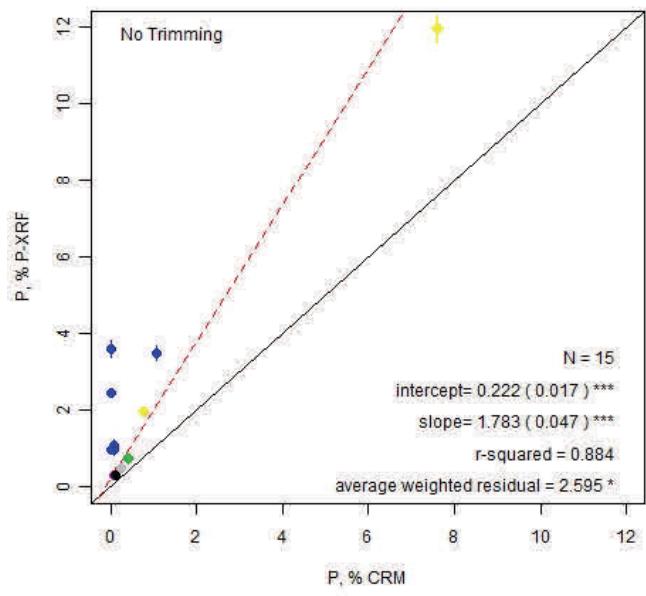




Bench Top-BTAS-Soil Mode



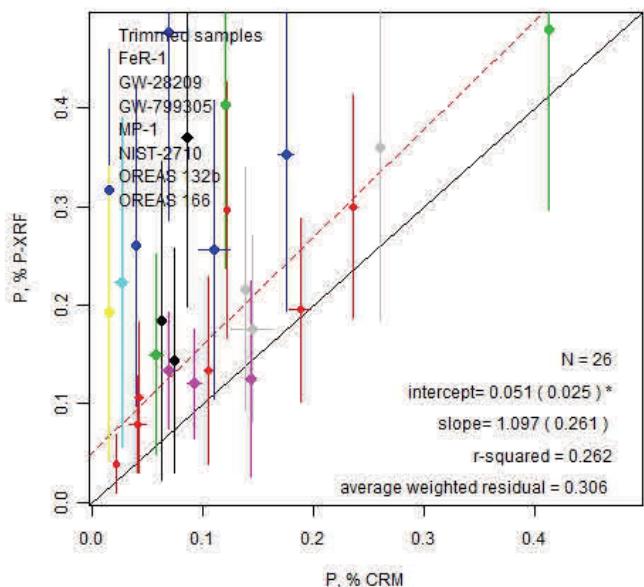
Handheld-HHAS-Soil Mode



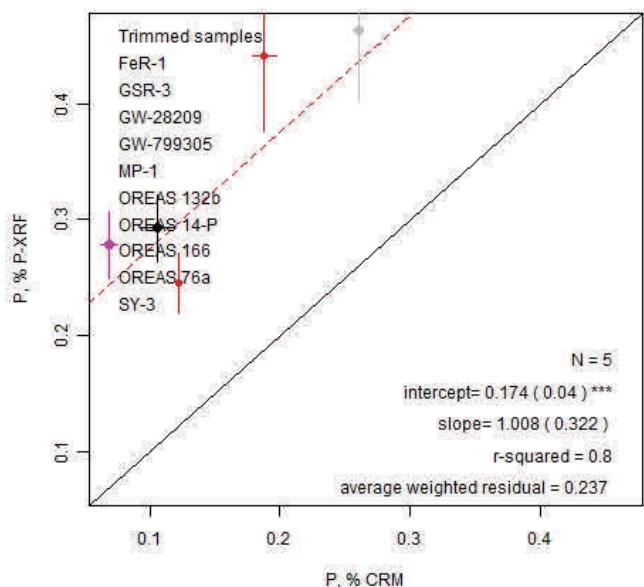
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. P Soil mode

Bench Top-Machine A-Soil Mode

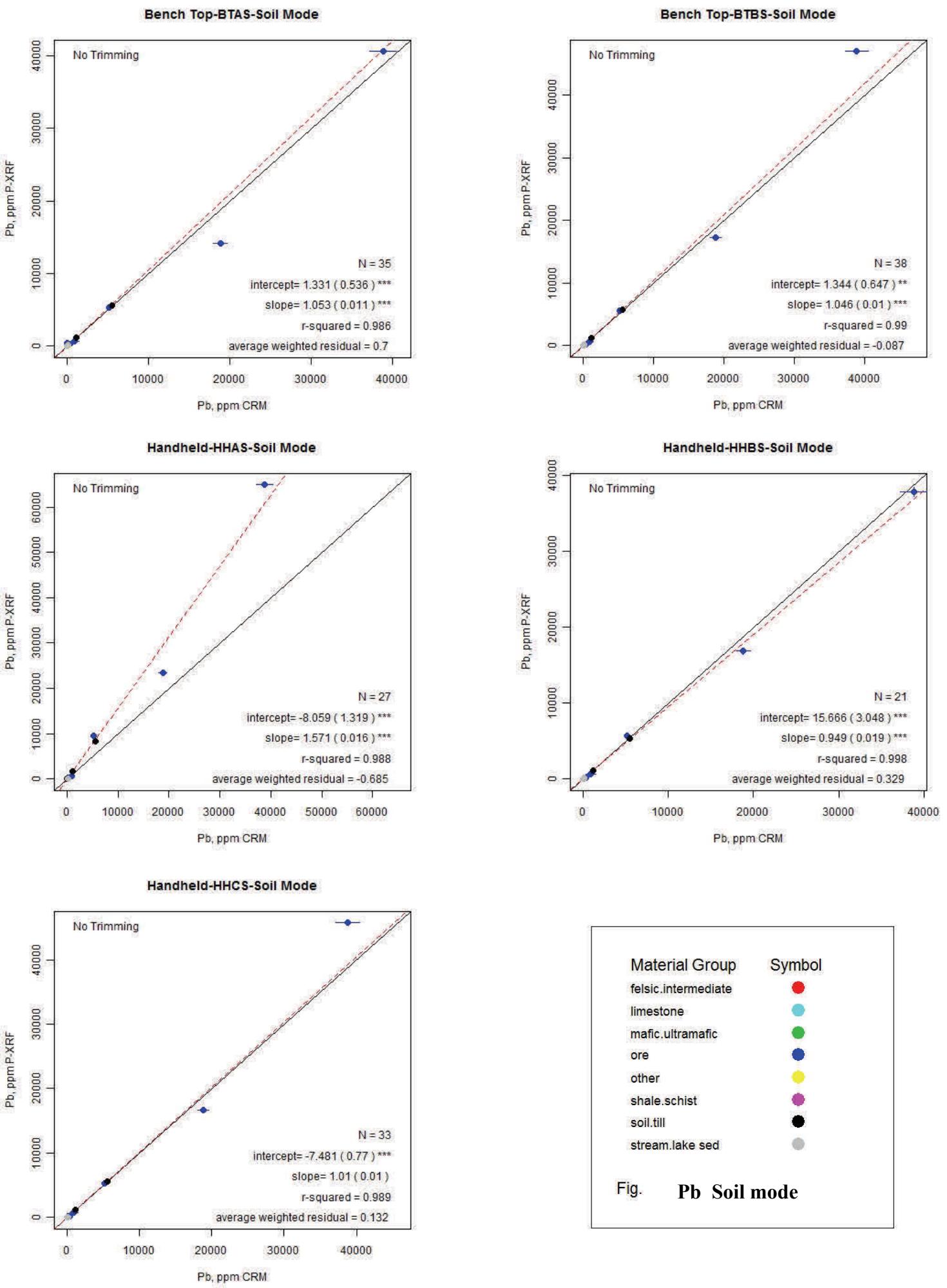


Handheld-HHAS-Soil Mode

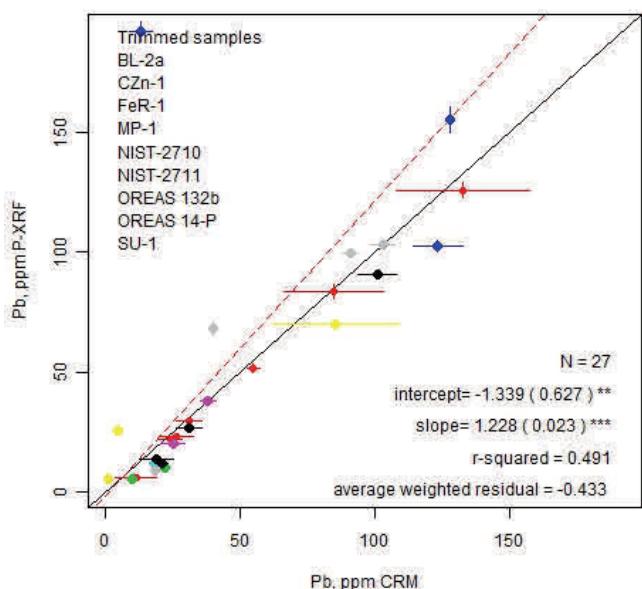


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

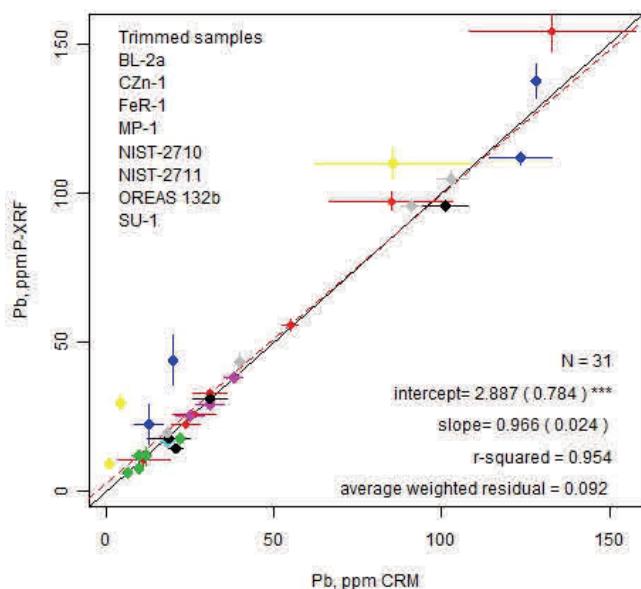
Fig. P Soil mode
trimmed



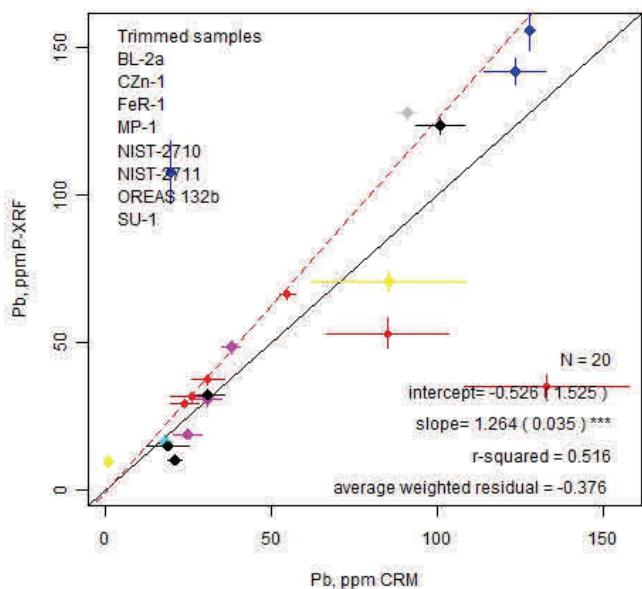
Bench Top-Machine A-Soil Mode



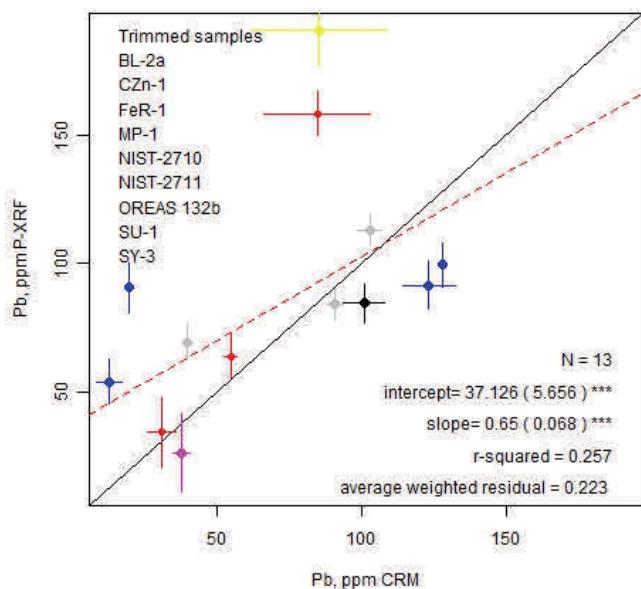
Bench Top-BTBS-Soil Mode



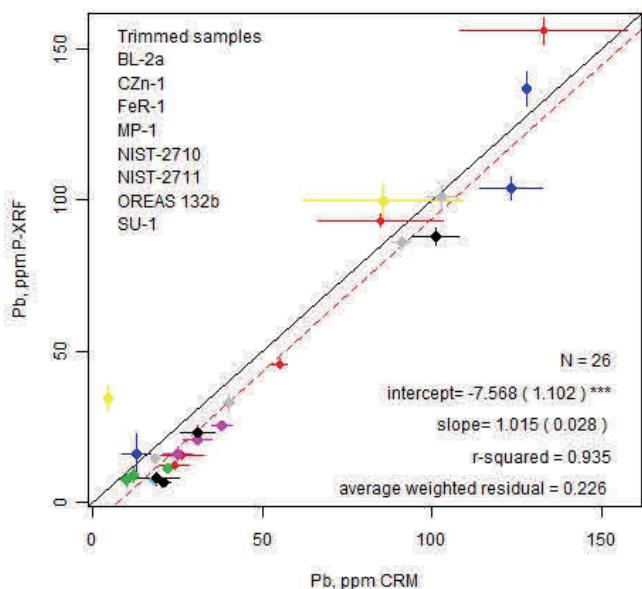
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode

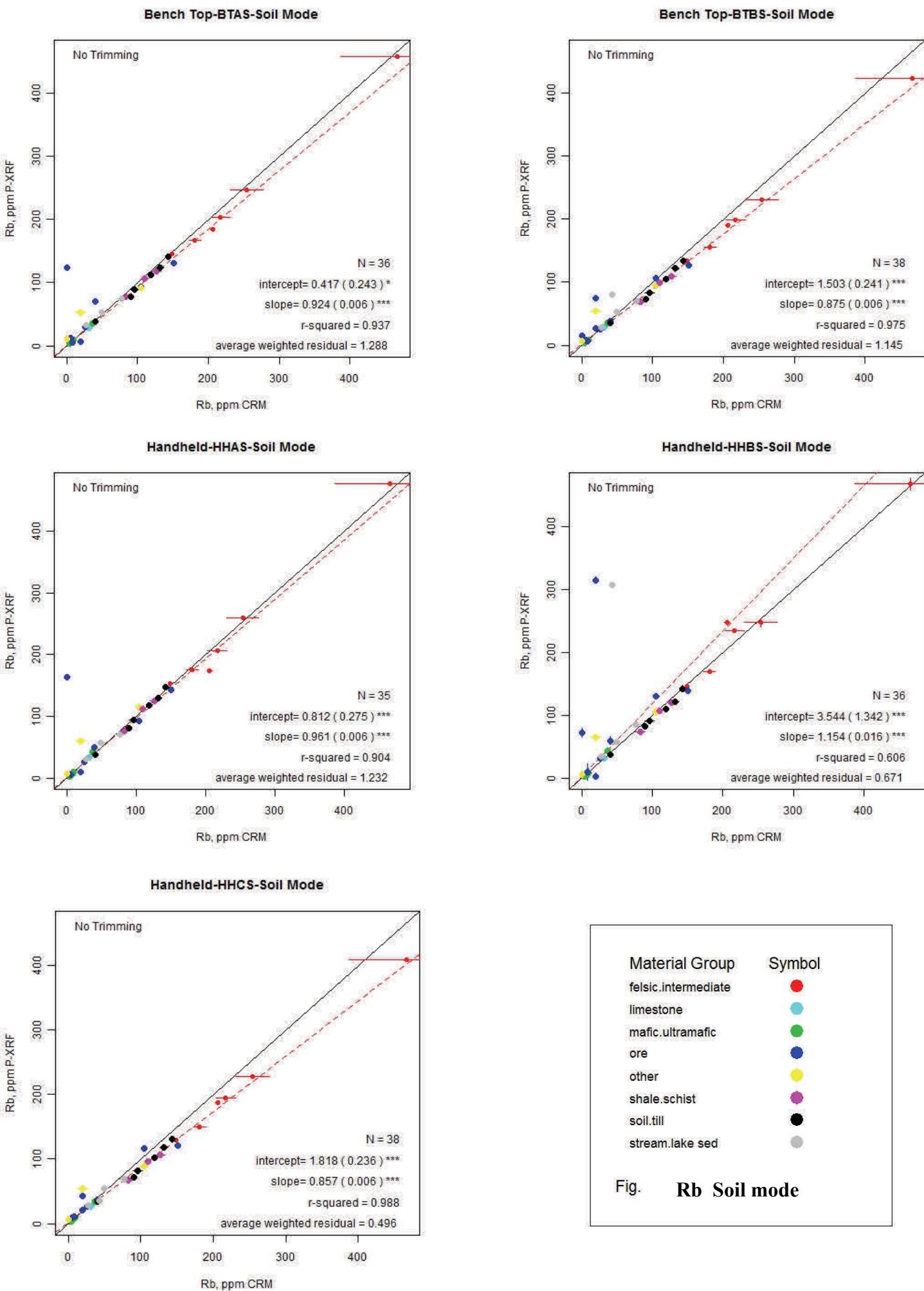


Handheld-HHCS-Soil Mode

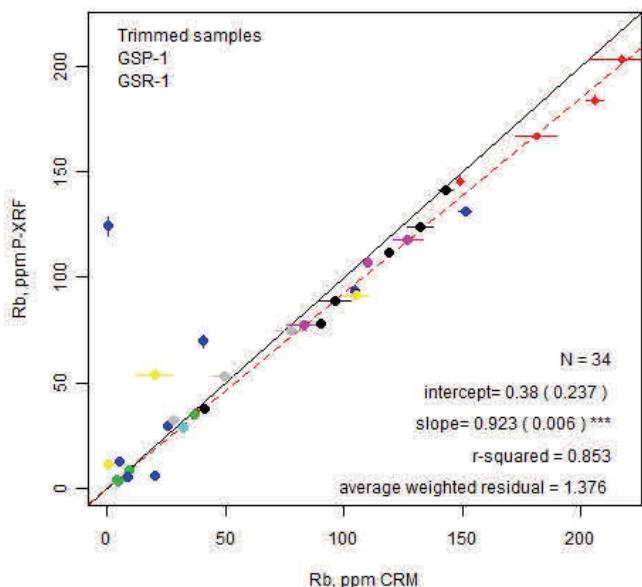


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

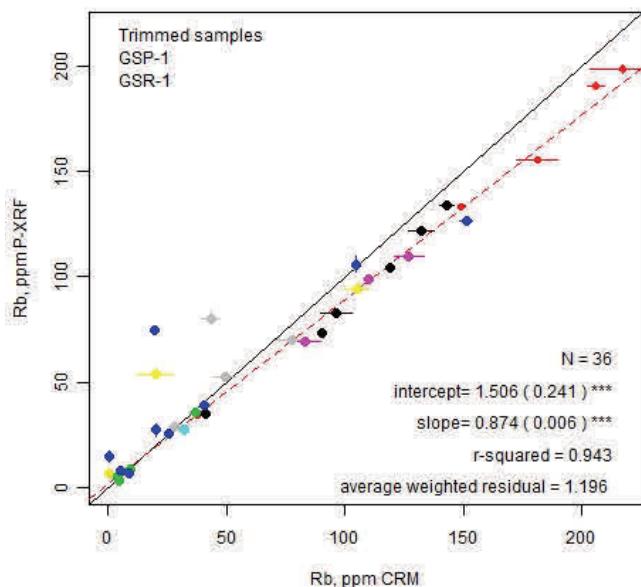
Fig. Pb Soil mode
trimmed



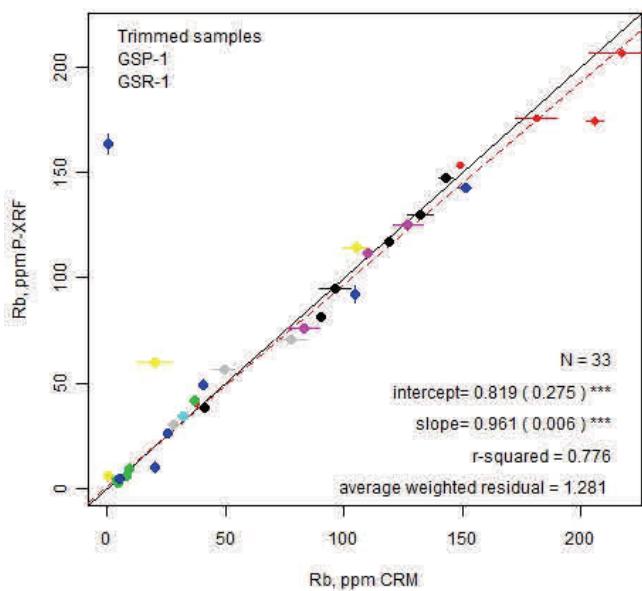
Bench Top-Machine A-Soil Mode



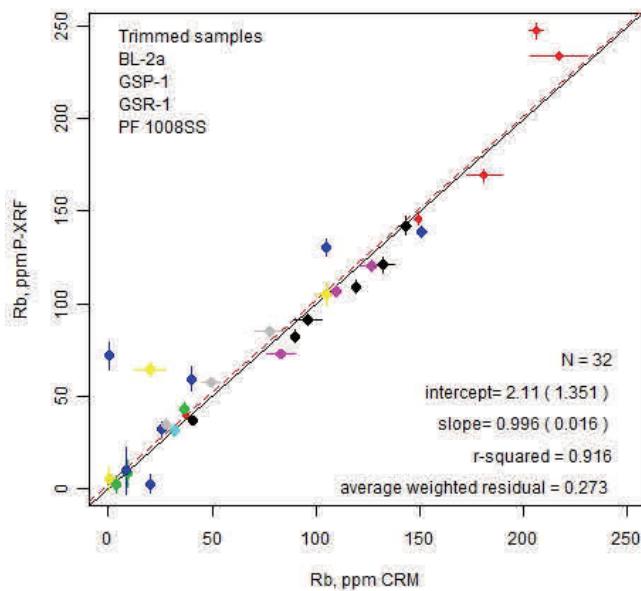
Bench Top-BTBS-Soil Mode



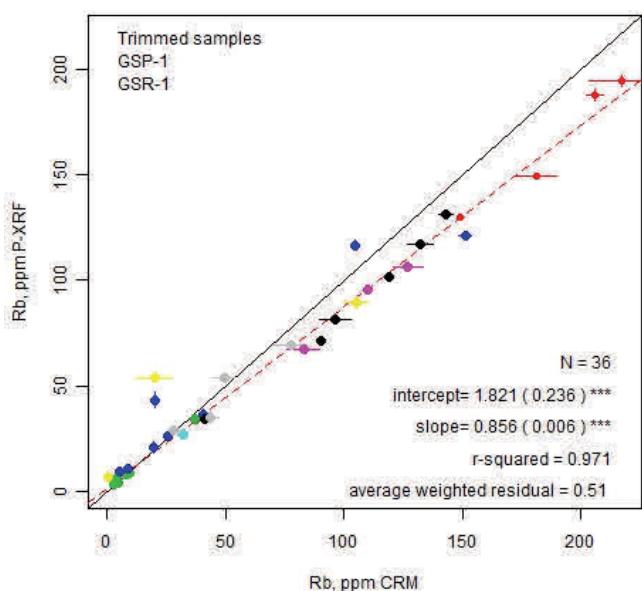
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode

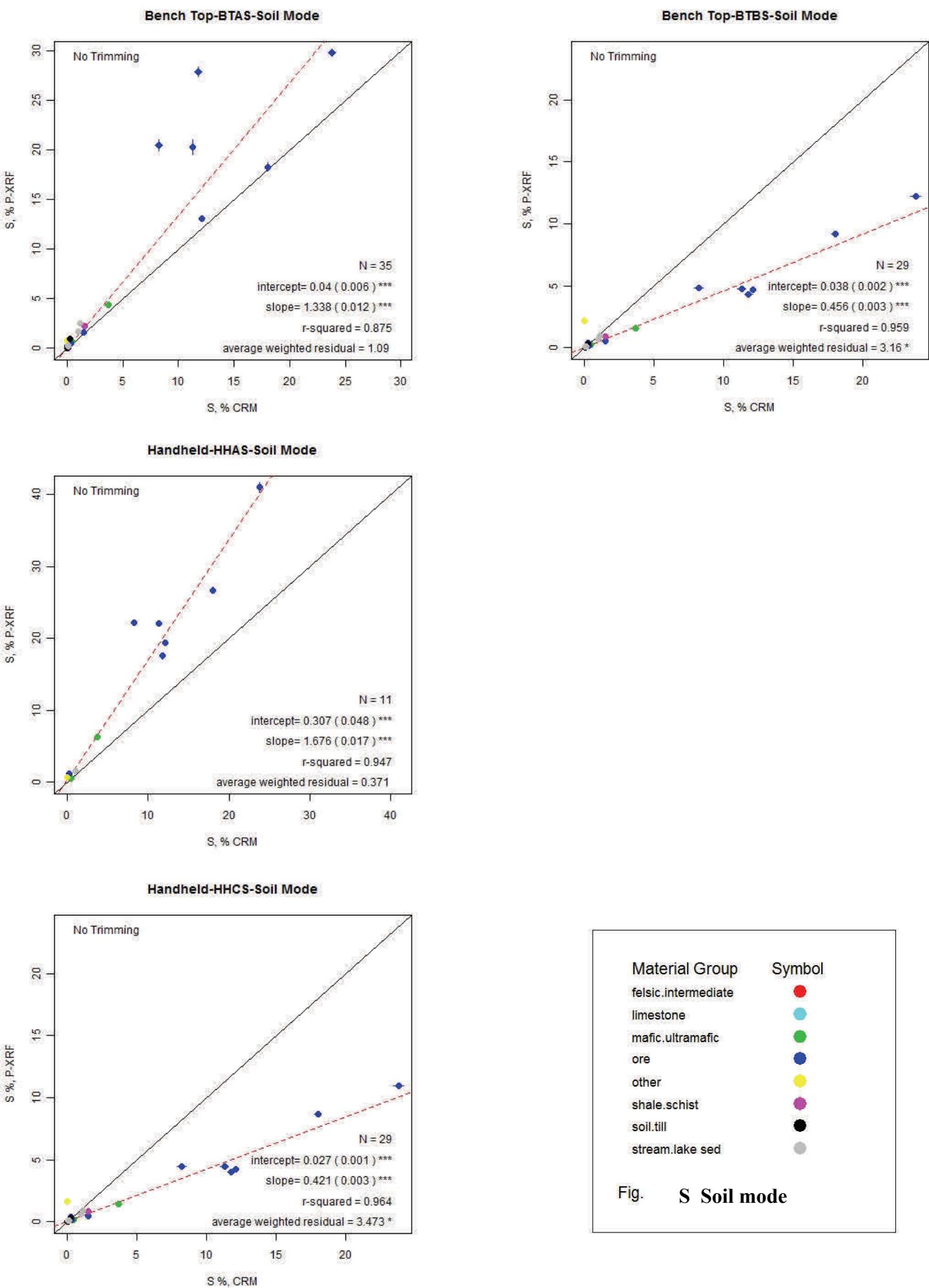


Handheld-HHCS-Soil Mode

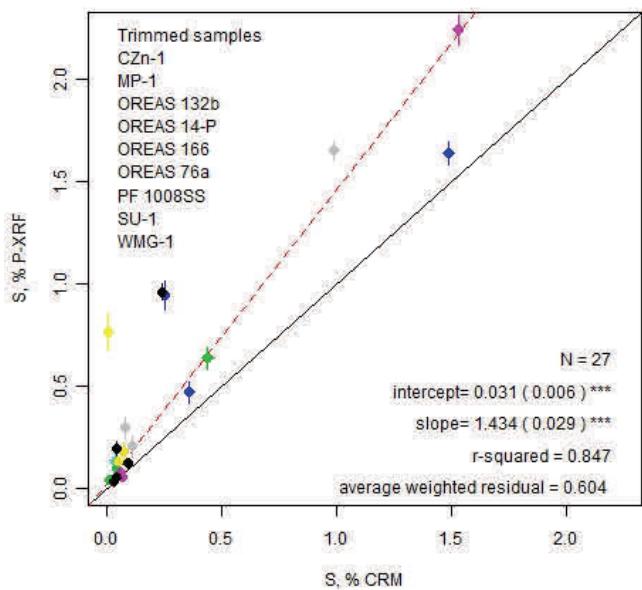


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

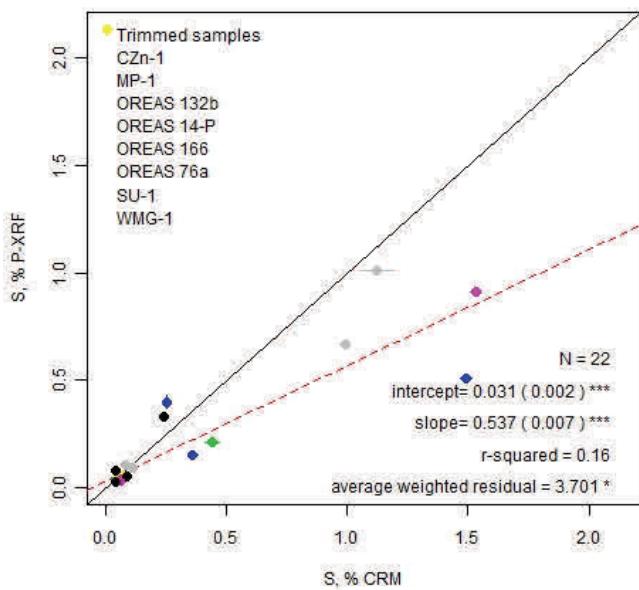
Fig. Rb Soil mode
trimmed



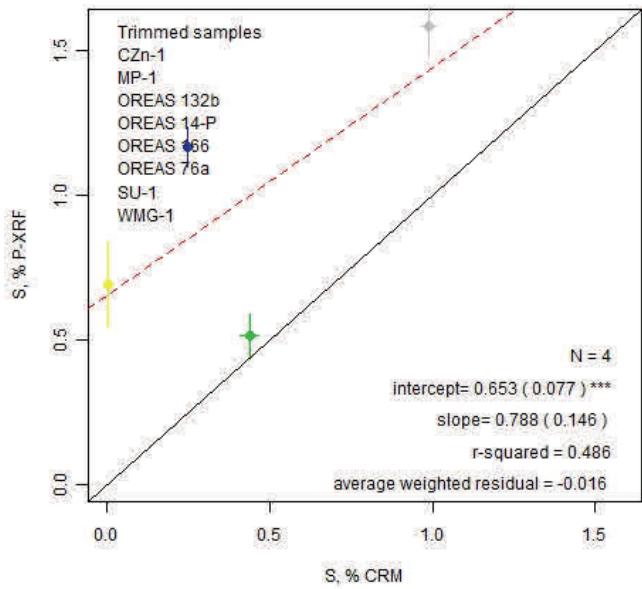
Bench Top-Machine A-Soil Mode



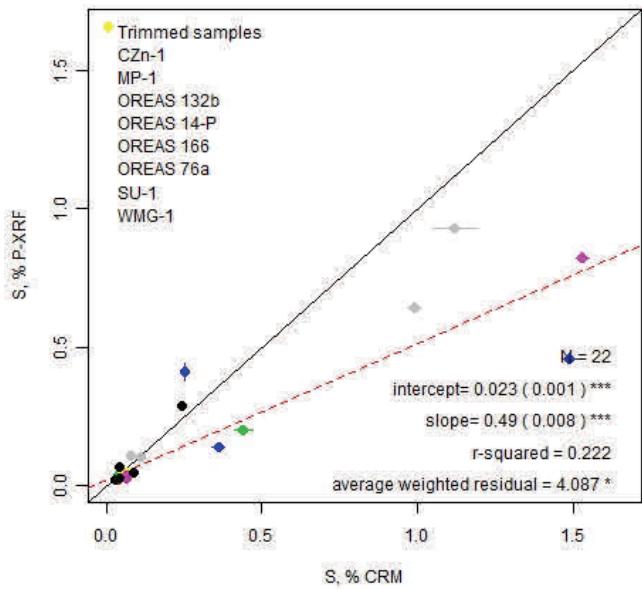
Bench Top-BTBS-Soil Mode



Handheld-HHAS-Soil Mode

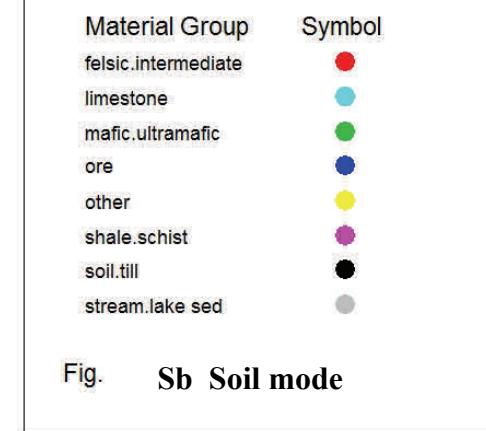
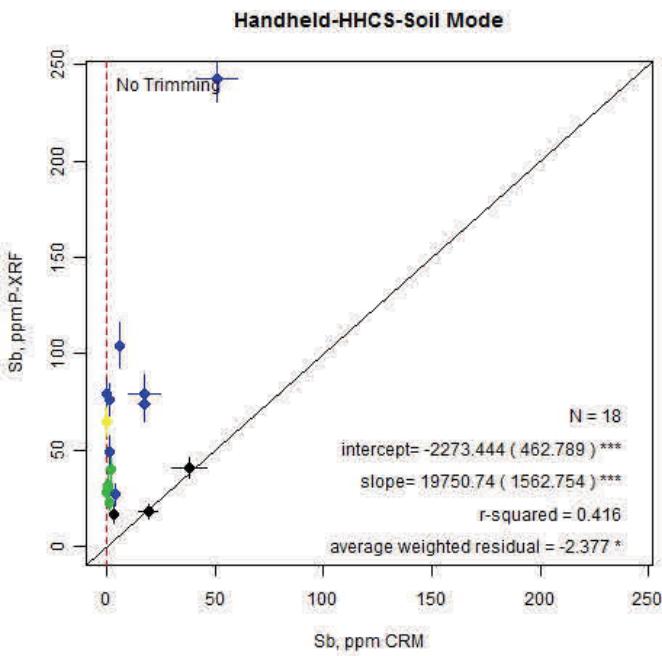
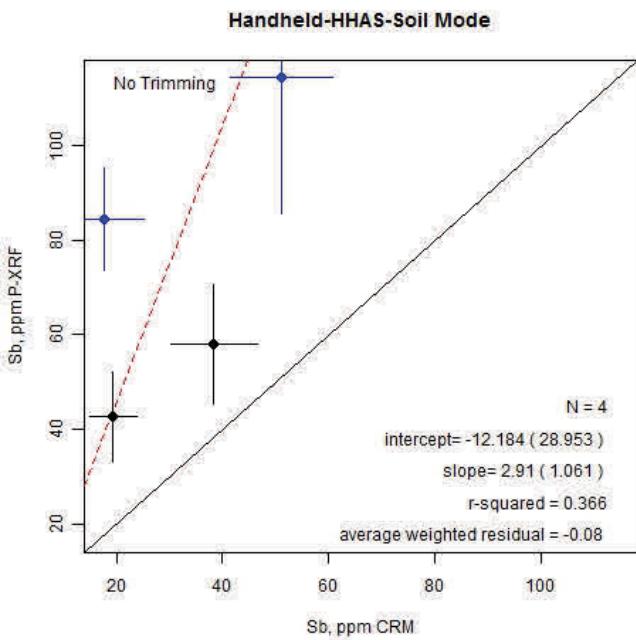
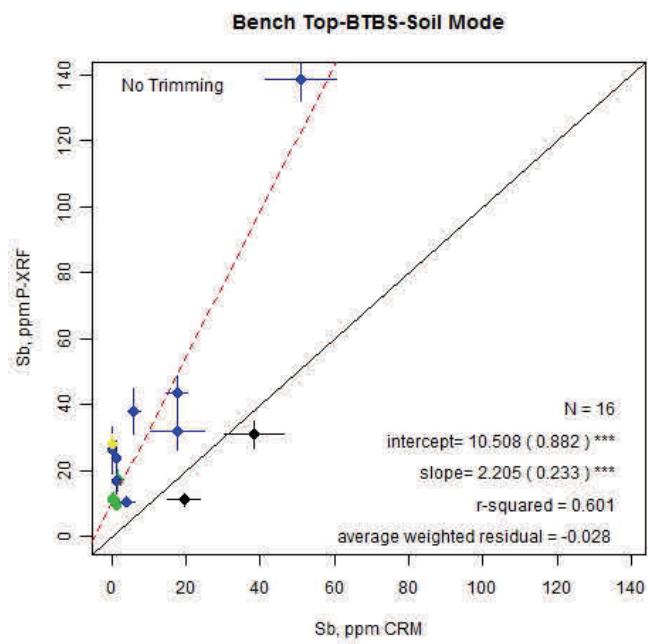
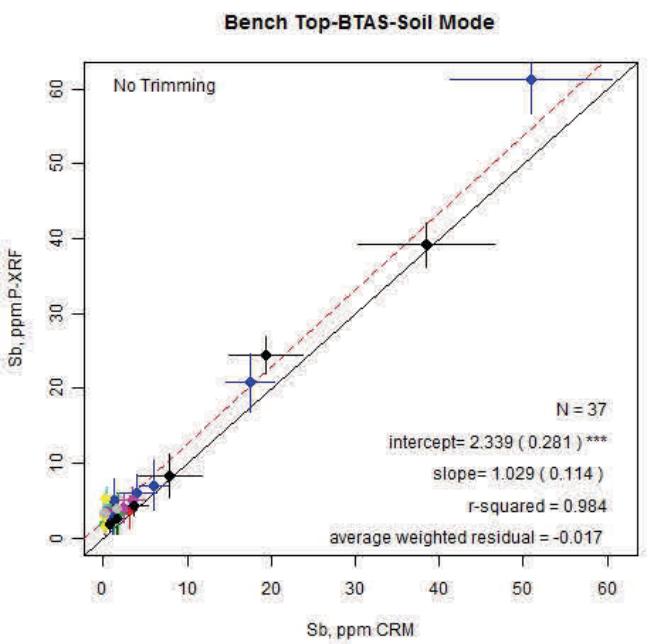


Handheld-HHCS-Soil Mode

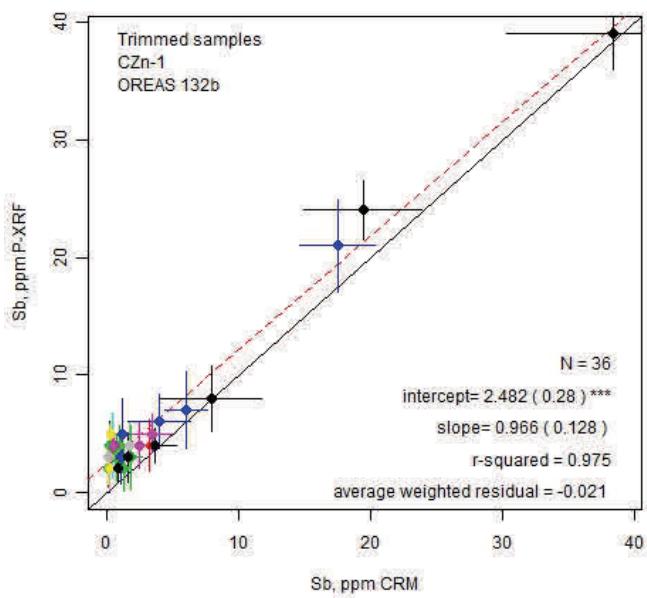


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

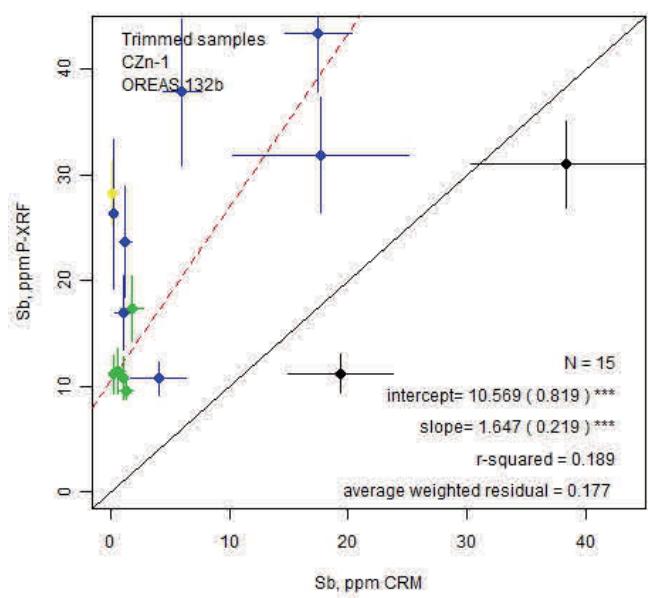
Fig. S Soil mode
trimmed



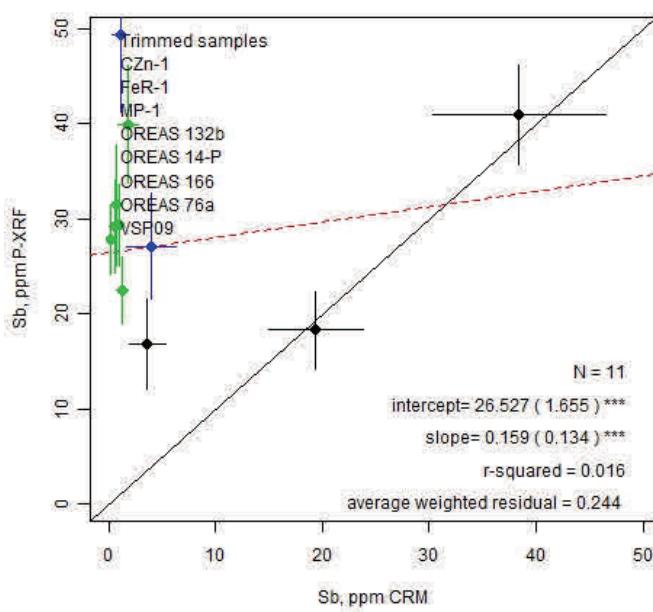
Bench Top-Machine A-Soil Mode



Bench Top-BTBS-Soil Mode



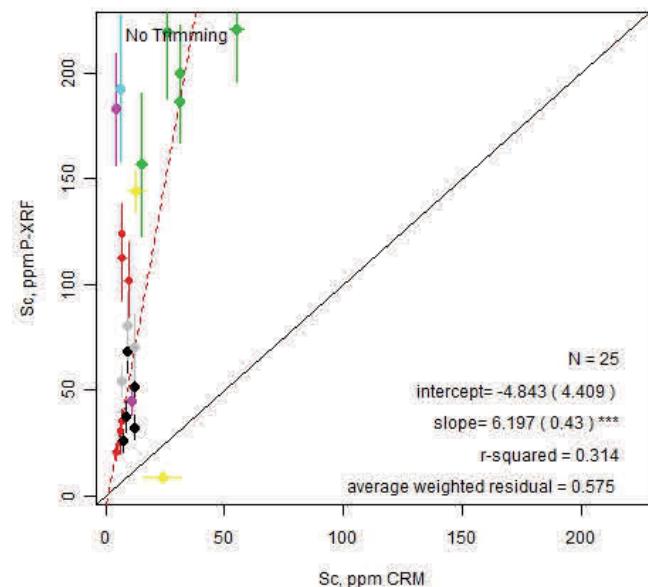
Handheld-HHCS-Soil Mode



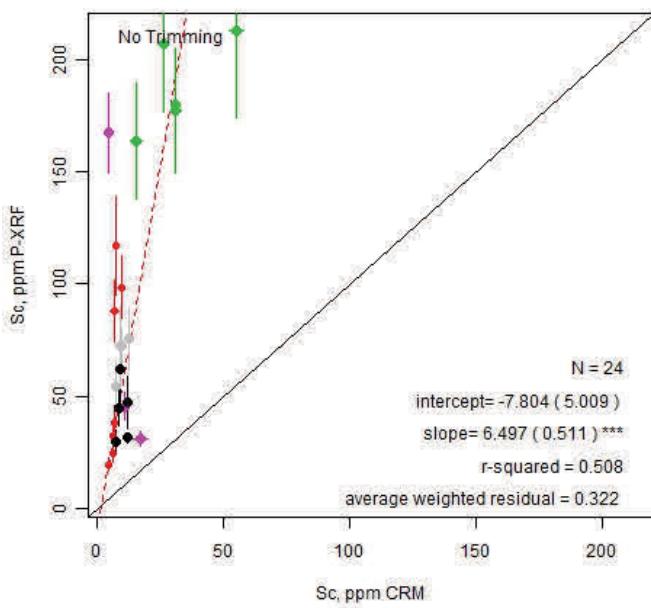
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Sb Soil mode
trimmed

Bench Top-BTBS-Soil Mode

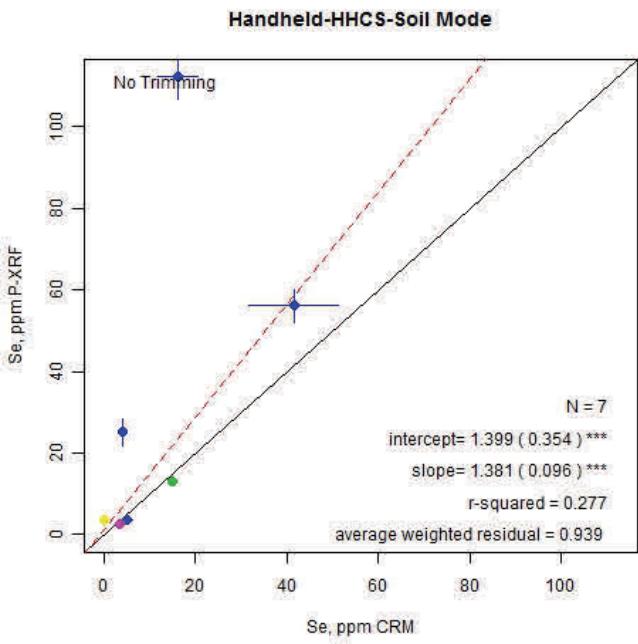
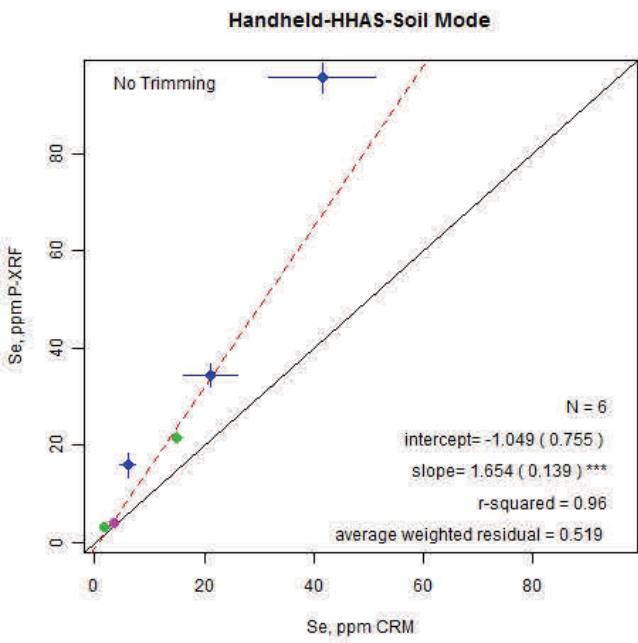
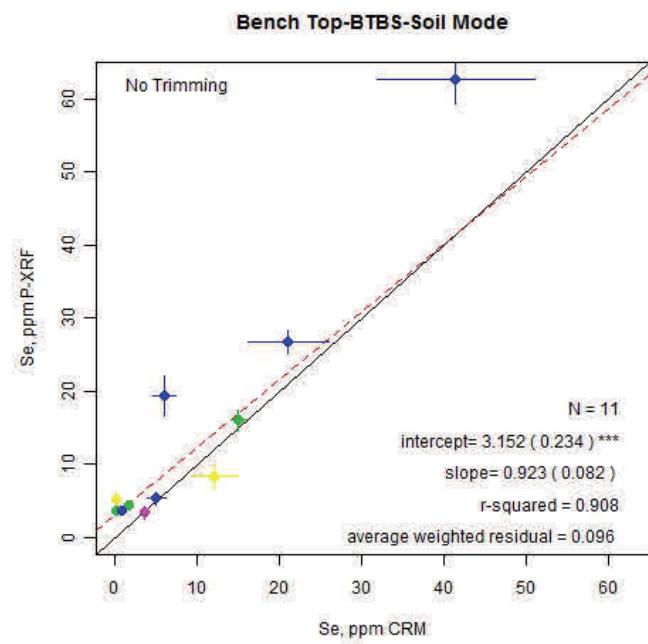
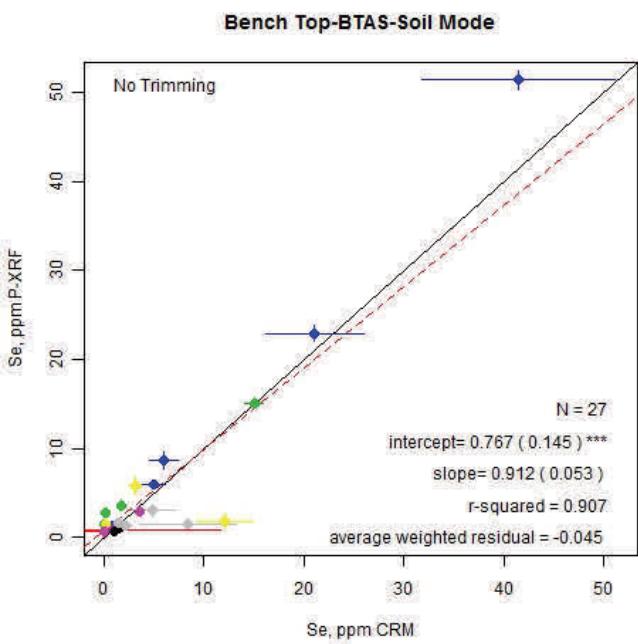


Handheld-HHCS-Soil Mode



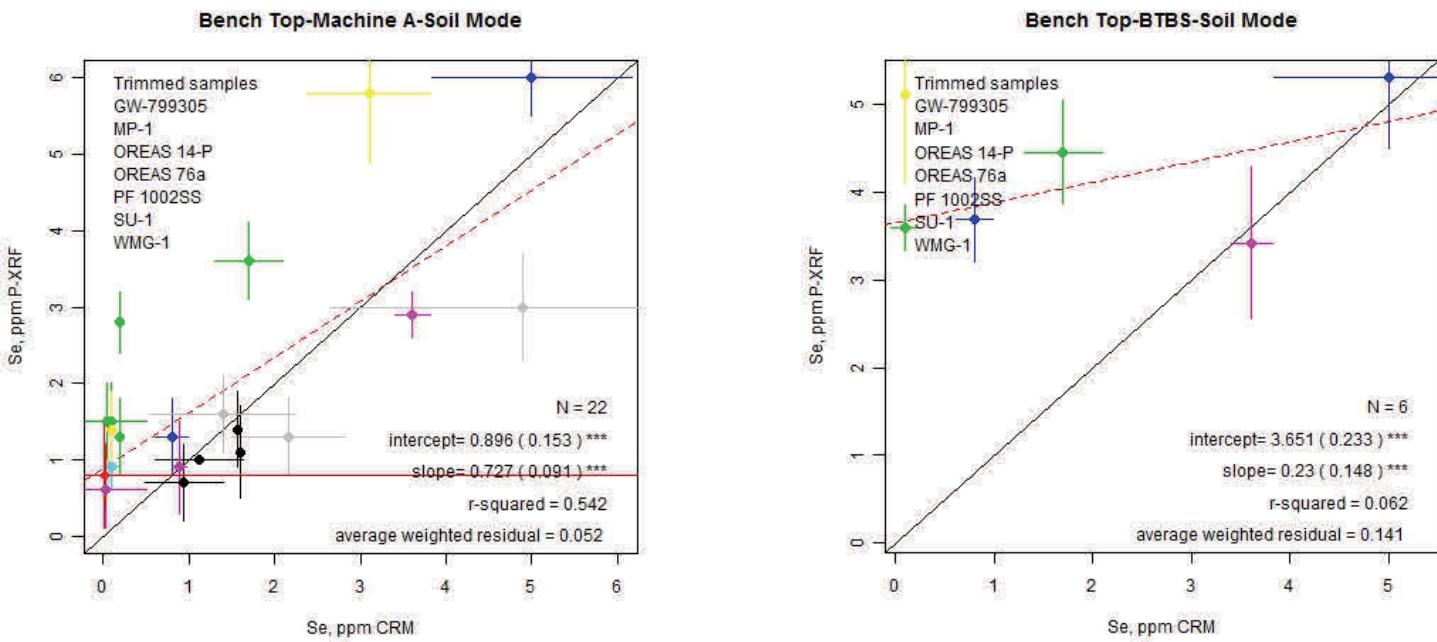
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Sc Soil mode



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

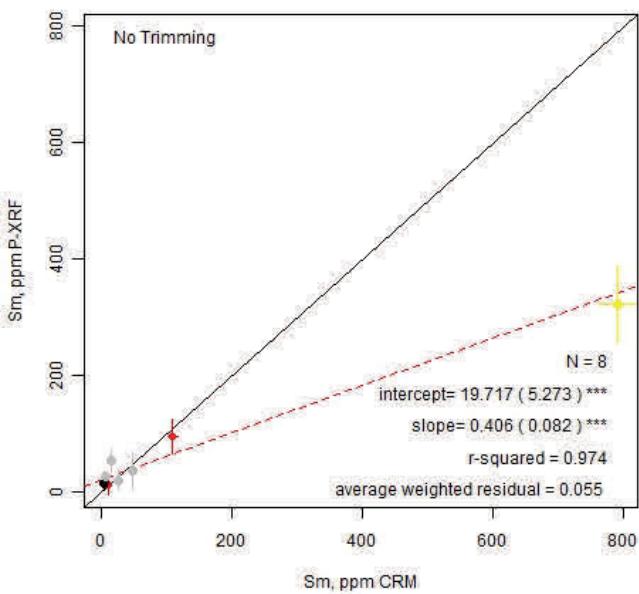
Fig. Se Soil mode



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

Fig. Se Soil mode trimmed

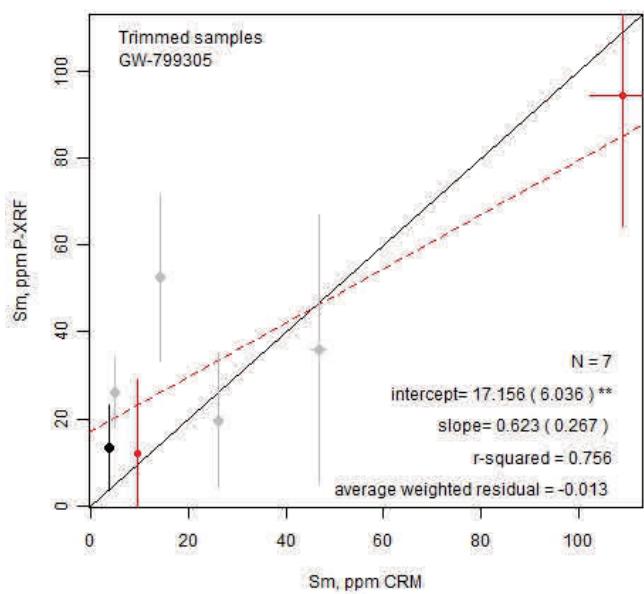
Bench Top-BTAS-Soil Mode



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

Fig. Sm Soil mode

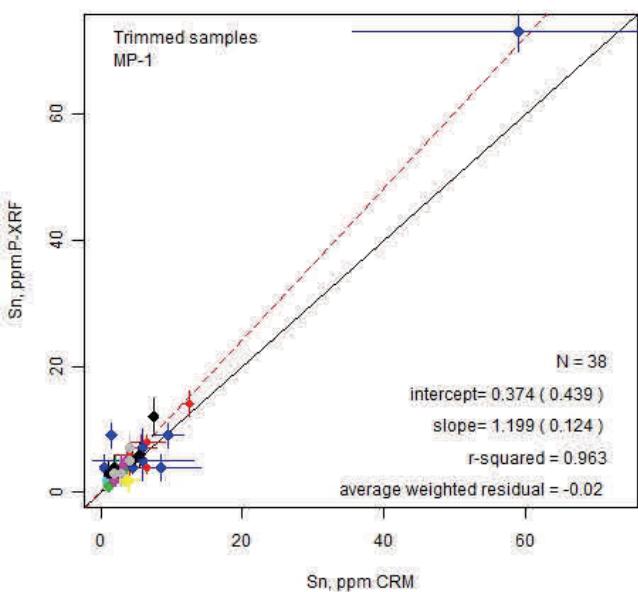
Bench Top-Machine A-Soil Mode



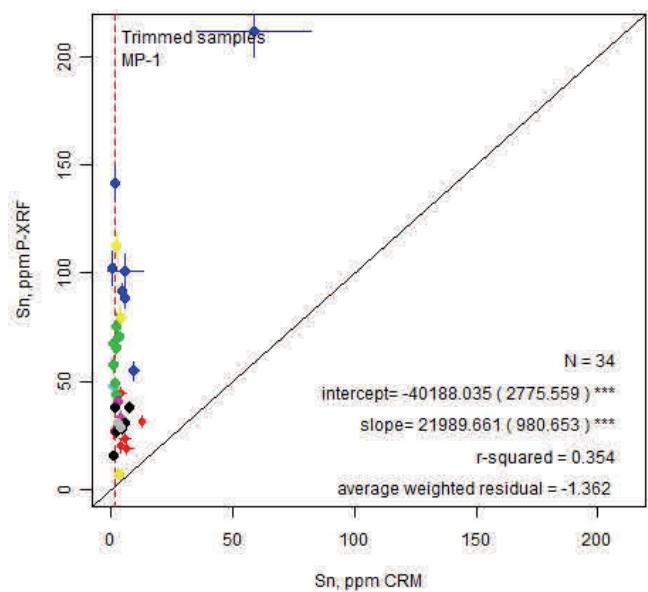
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Sm Soil mode
trimmed

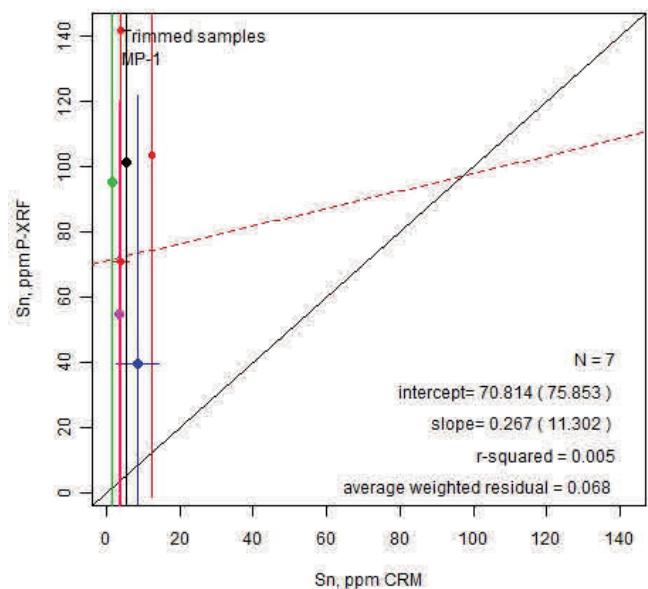
Bench Top-BTAS-Soil Mode



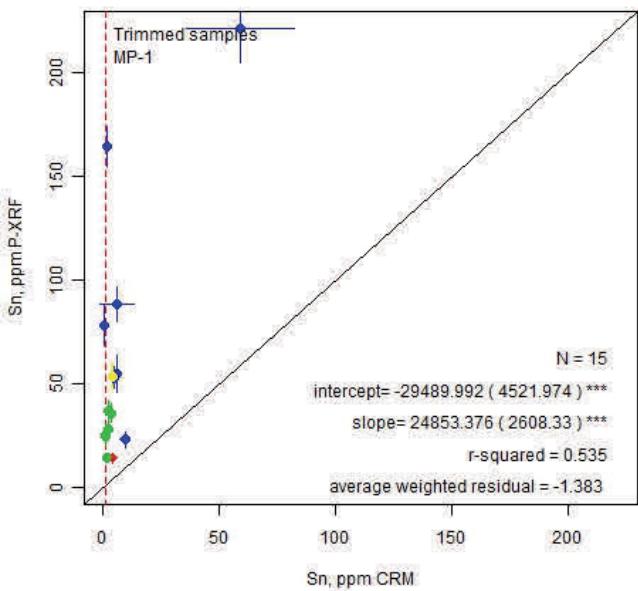
Bench Top-BTBS-Soil Mode



Handheld-HHBS-Soil Mode

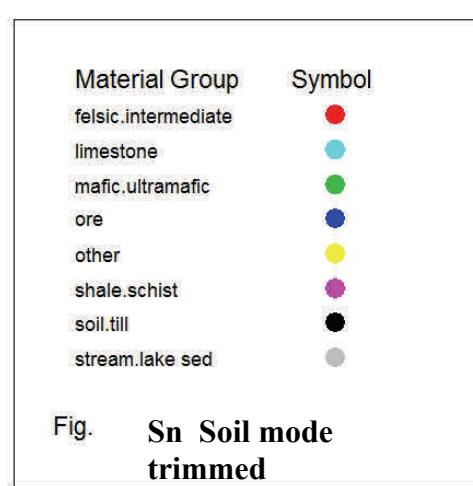
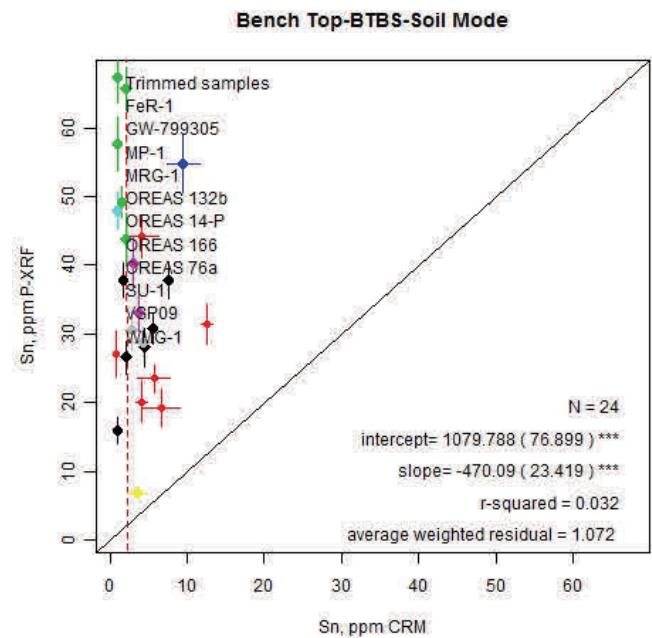
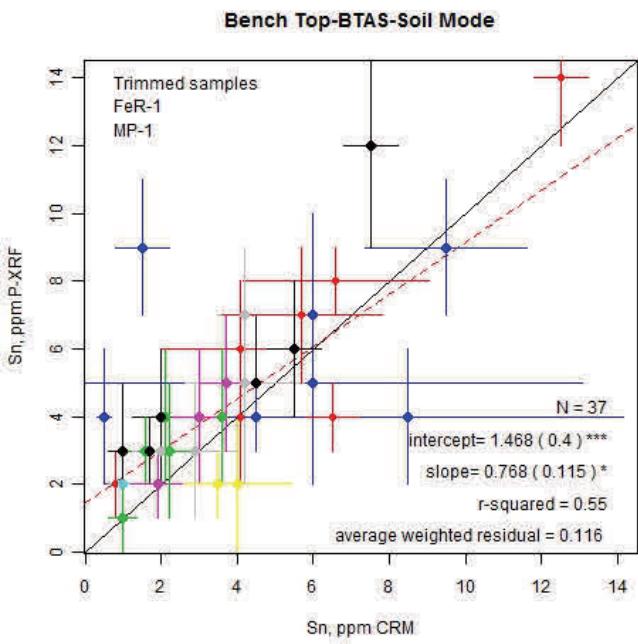


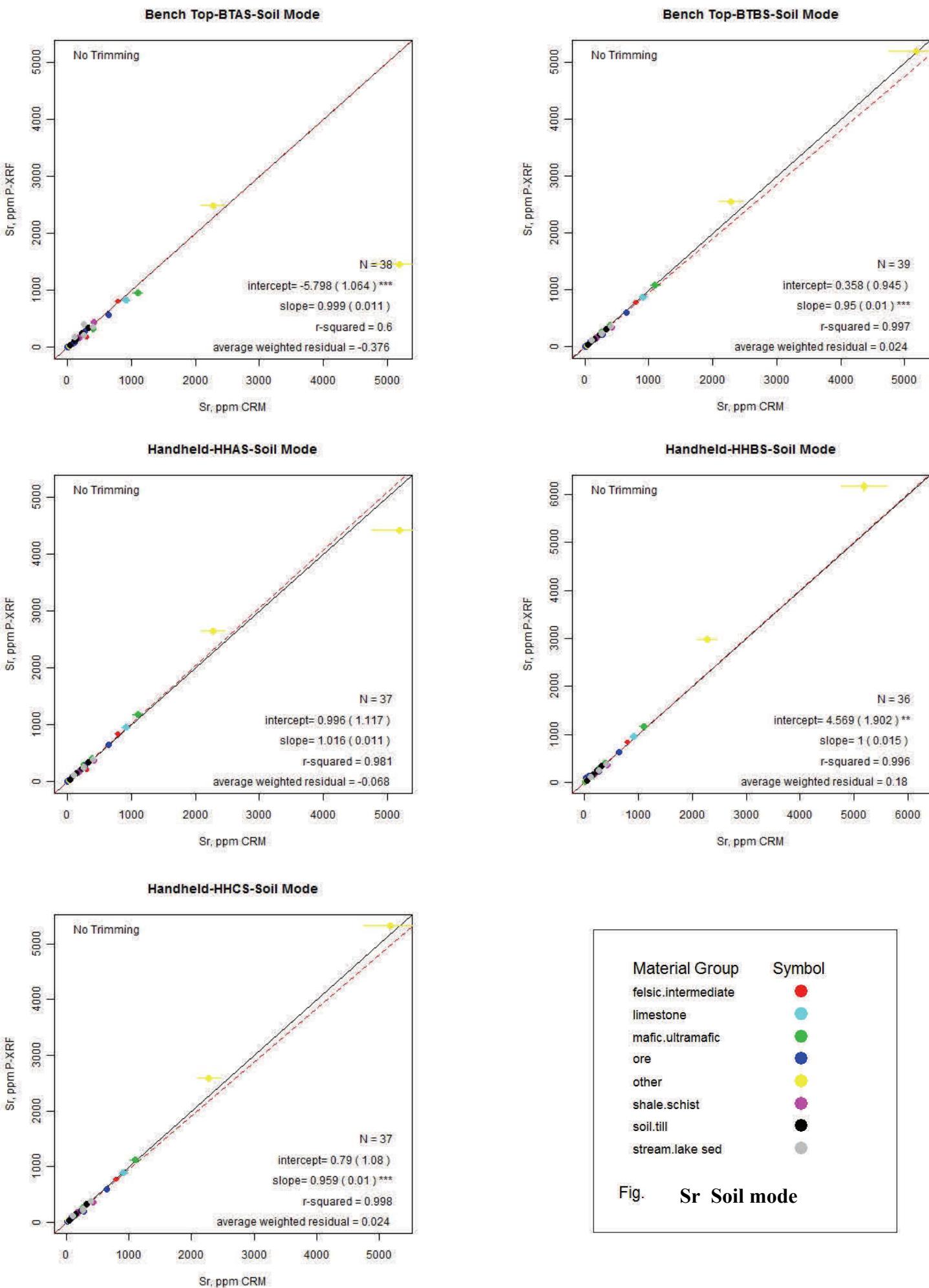
Handheld-HHCS-Soil Mode

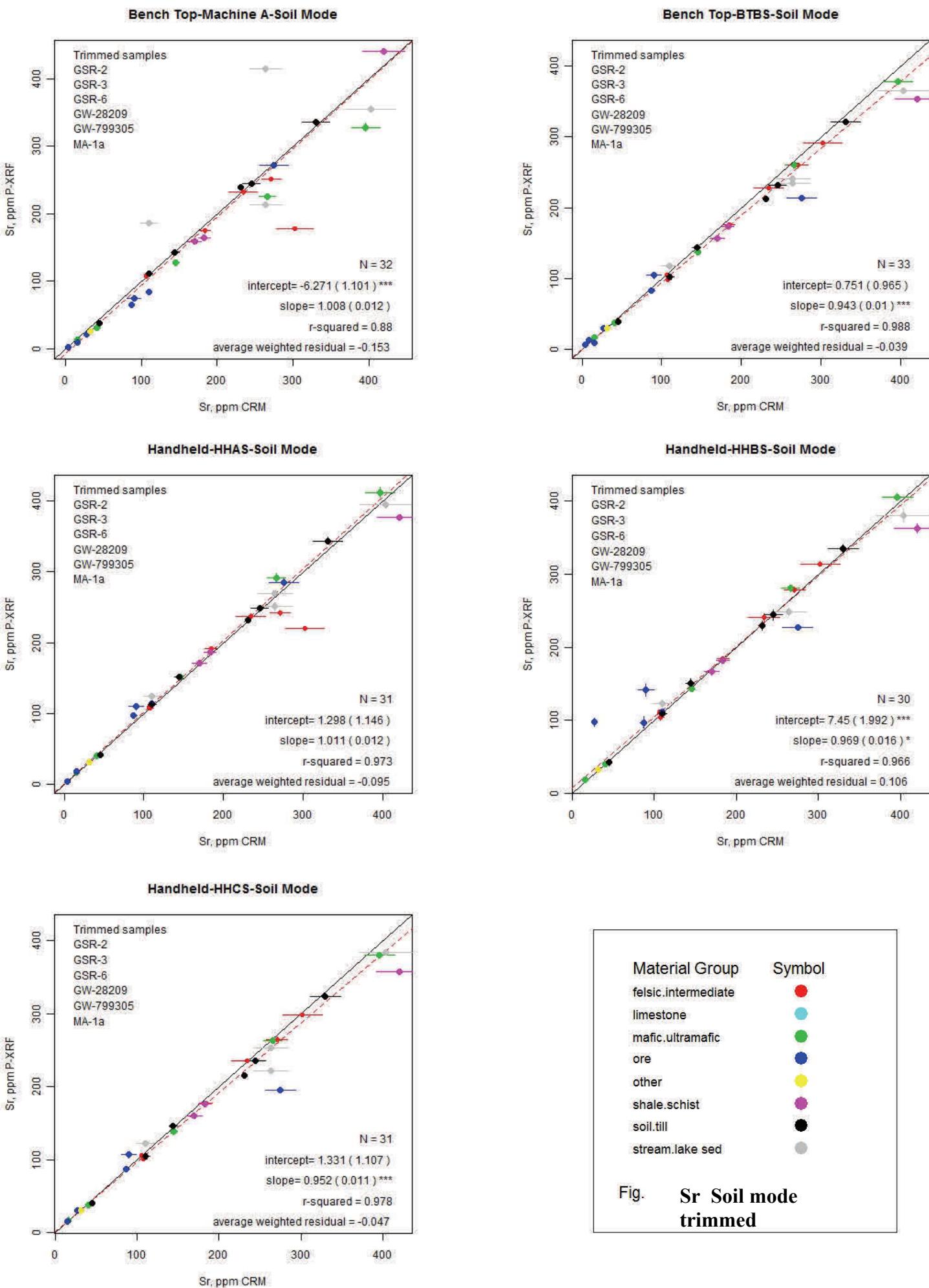


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

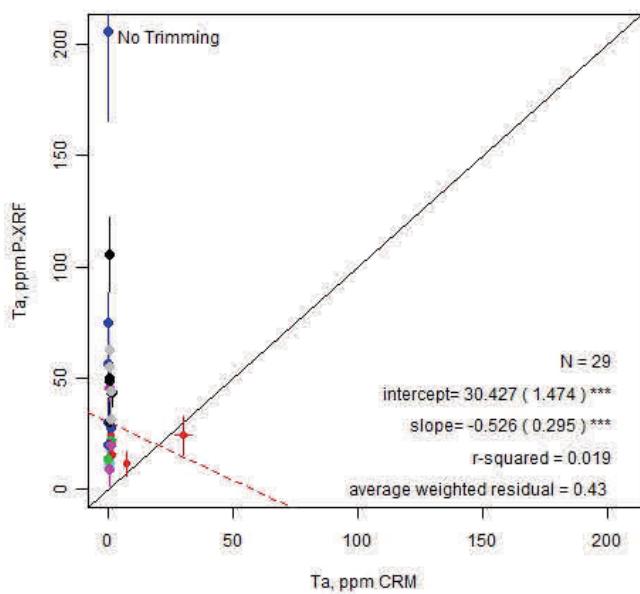
Fig. Sn Soil mode



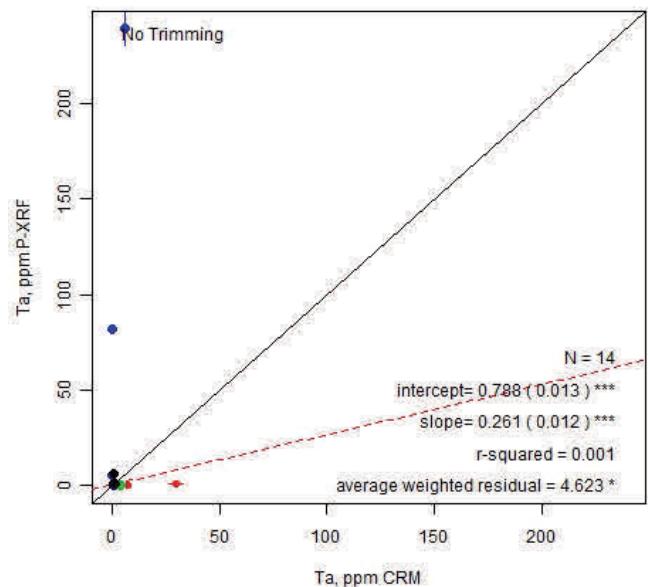




Bench Top-BTAS-Soil Mode

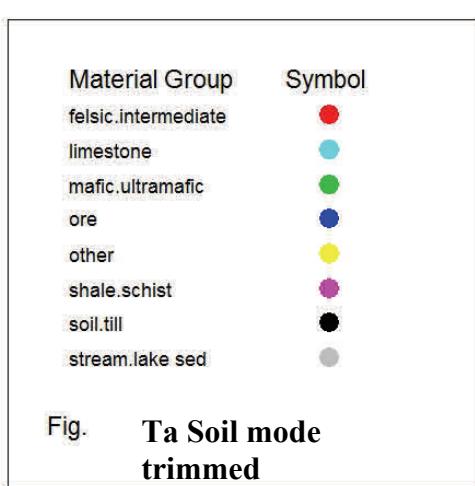
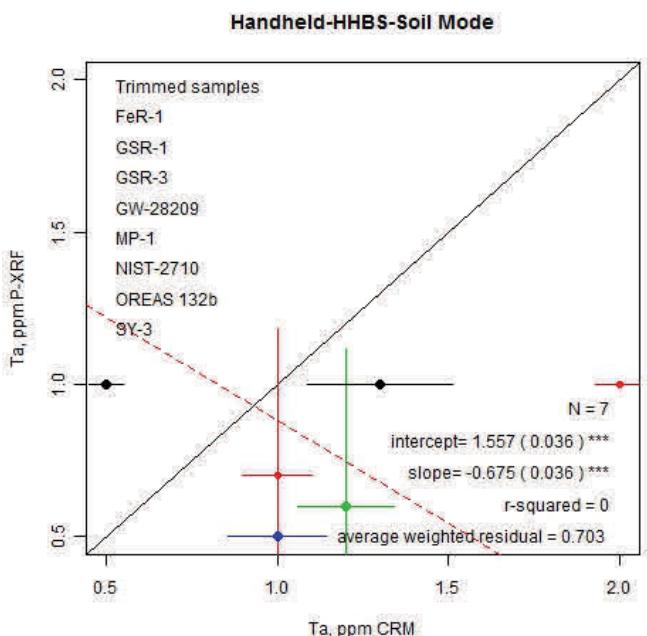


Handheld-HHBS-Soil Mode

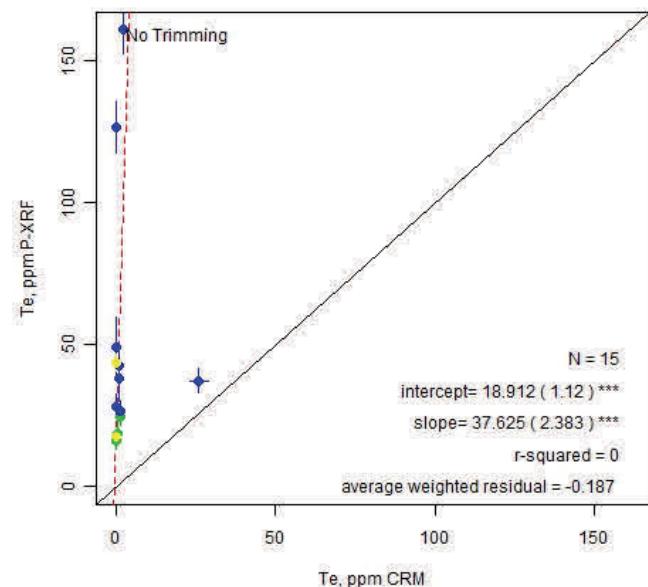


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

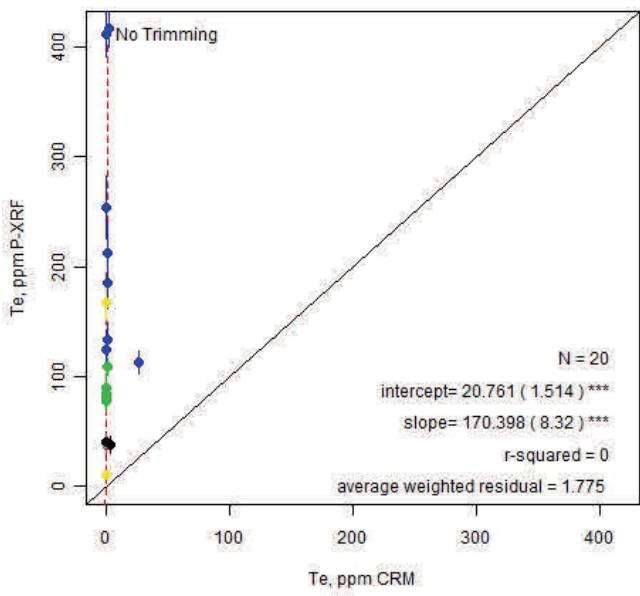
Fig. Ta Soil mode



Bench Top-BTBS-Soil Mode

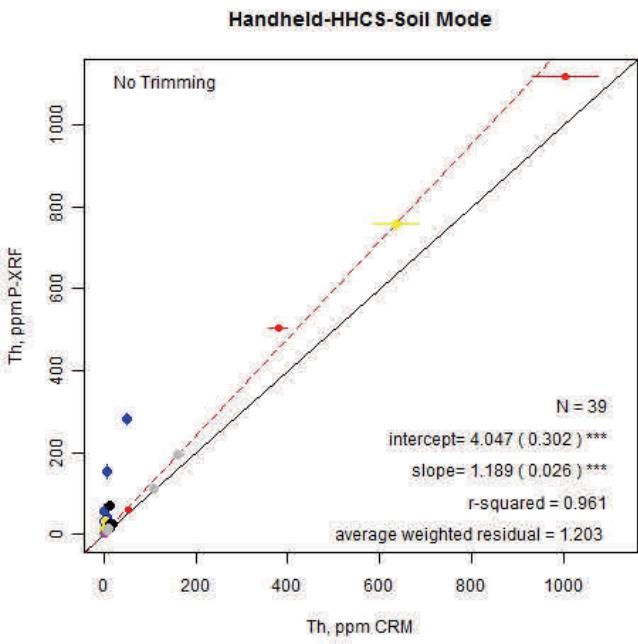
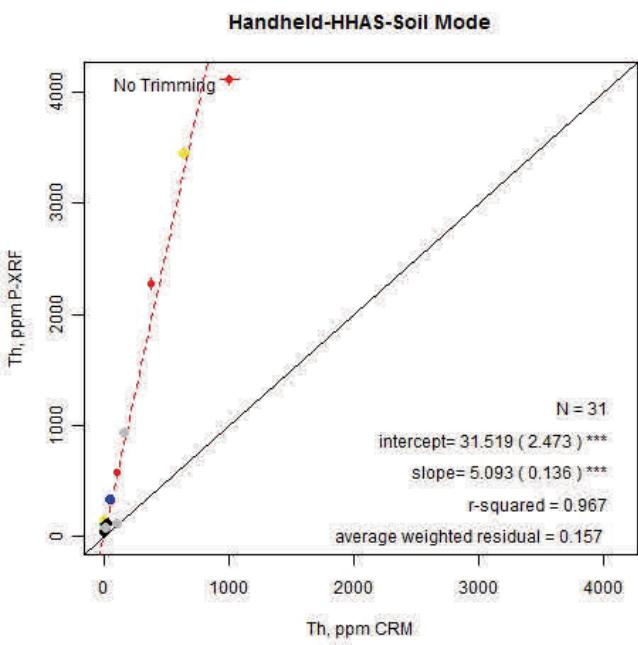
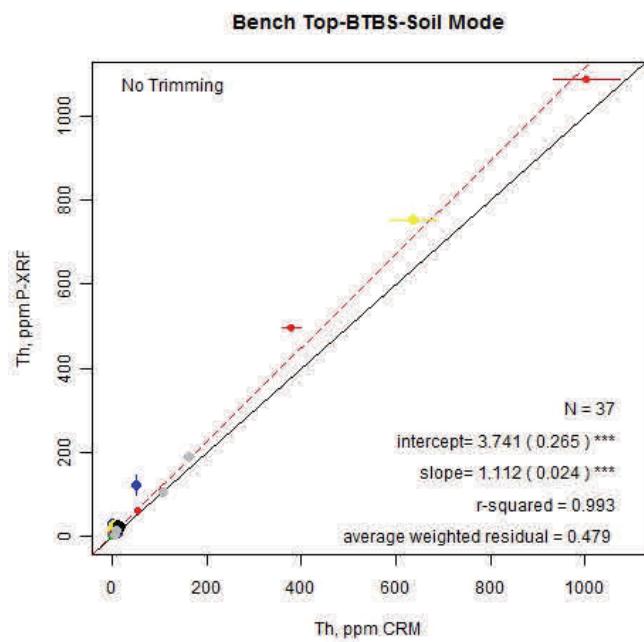
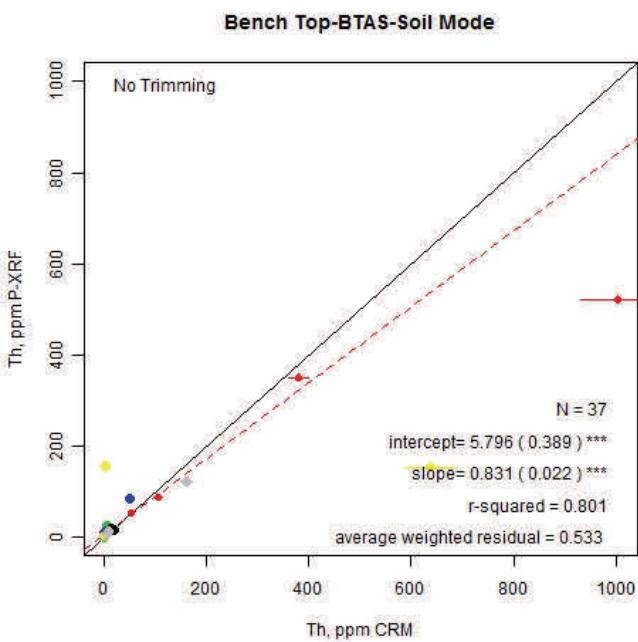


Handheld-HHCS-Soil Mode



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

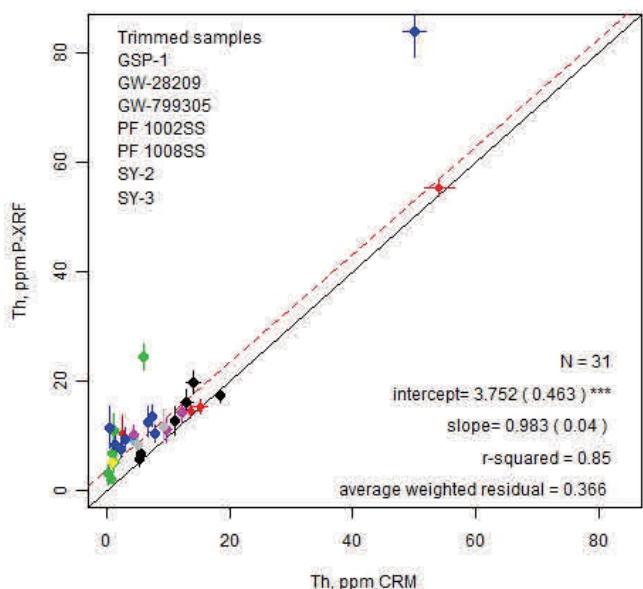
Fig. Te Soil mode



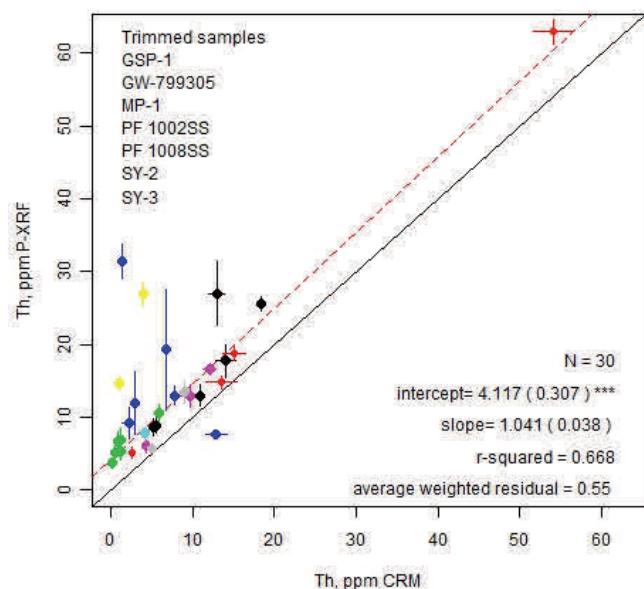
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Th Soil mode

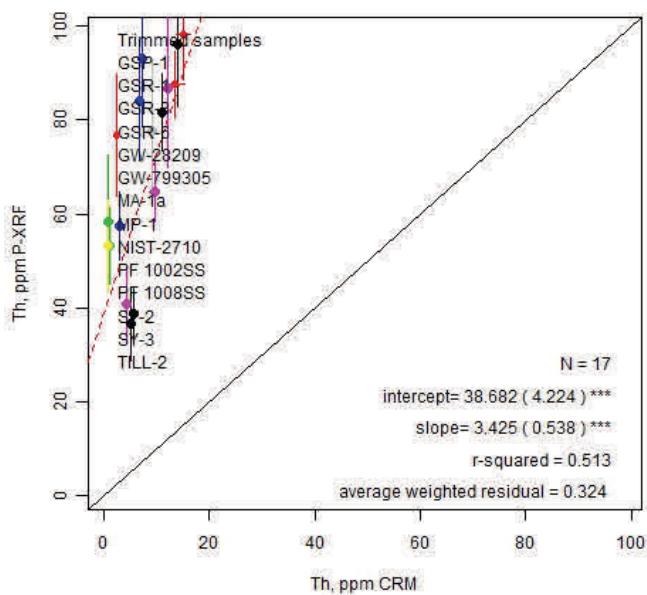
Bench Top-Machine A-Soil Mode



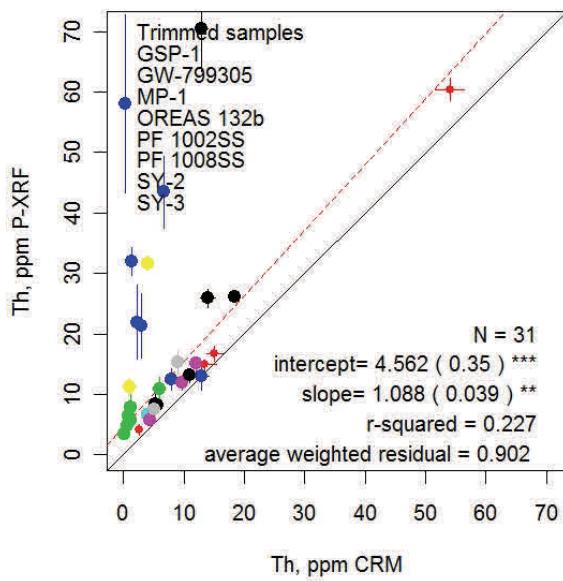
Bench Top-BTBS-Soil Mode



Handheld-HHAS-Soil Mode



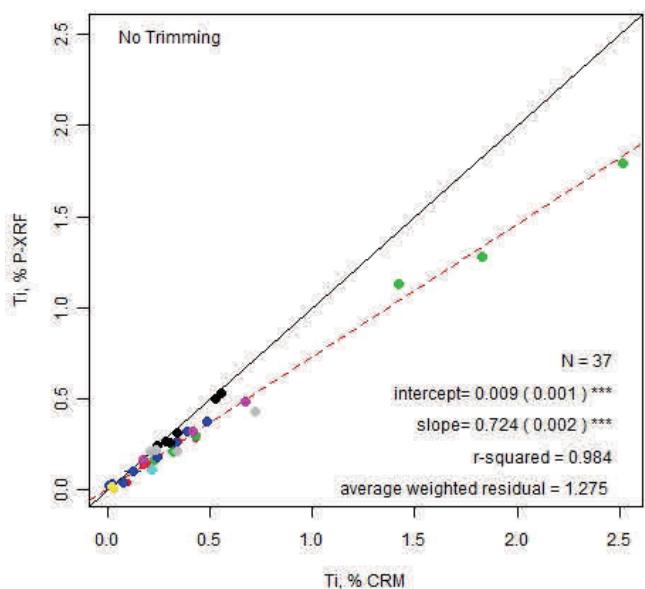
Handheld-HHCS-Soil Mode



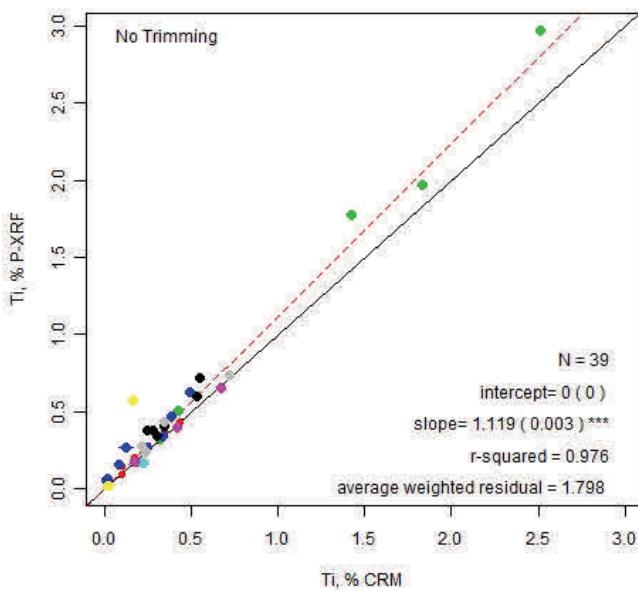
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	○

Fig. Th Soil mode
trimmed

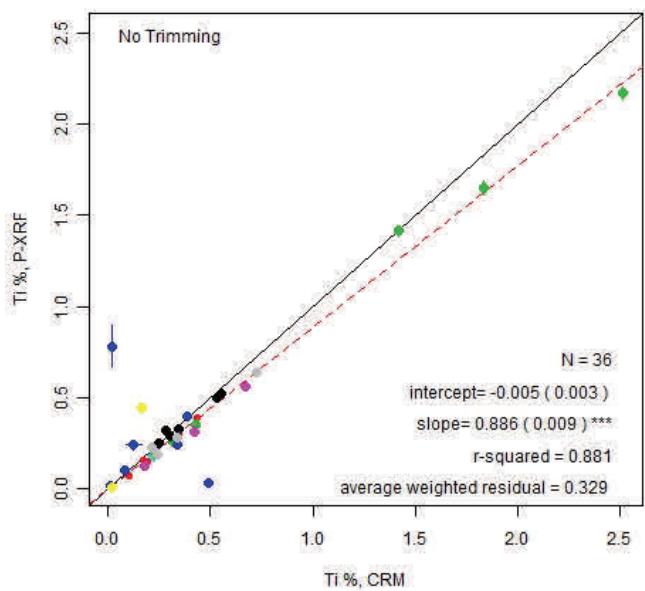
Bench Top-BTBS-Soil Mode



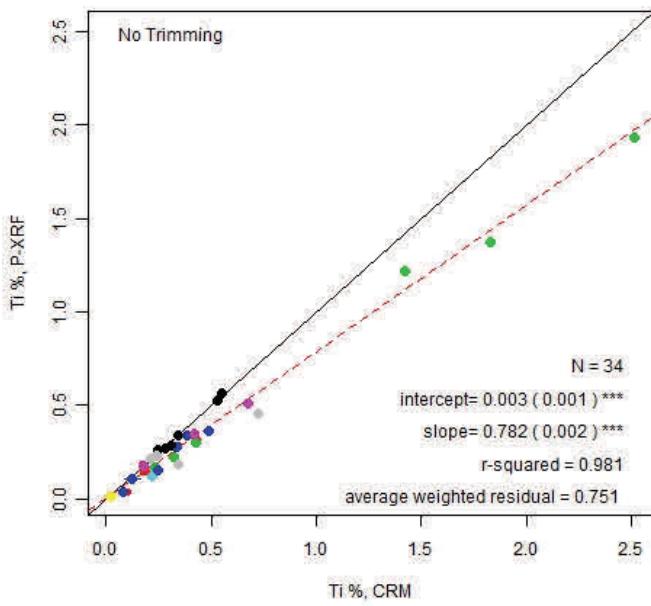
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode



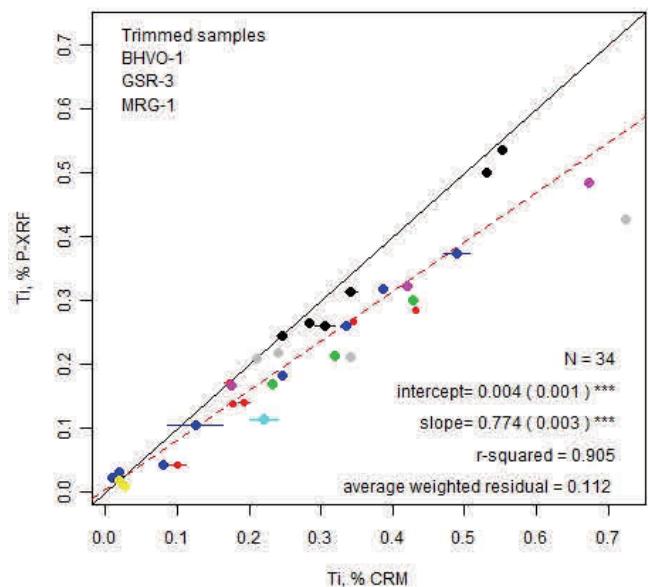
Handheld-HHCS-Soil Mode



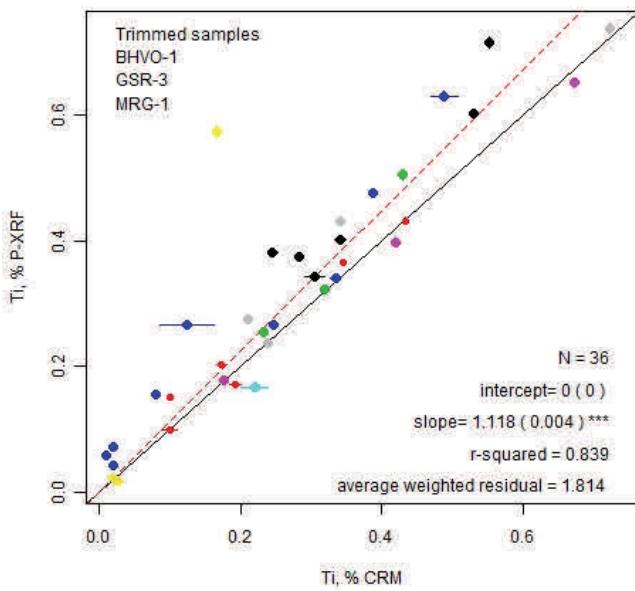
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ti Soil mode

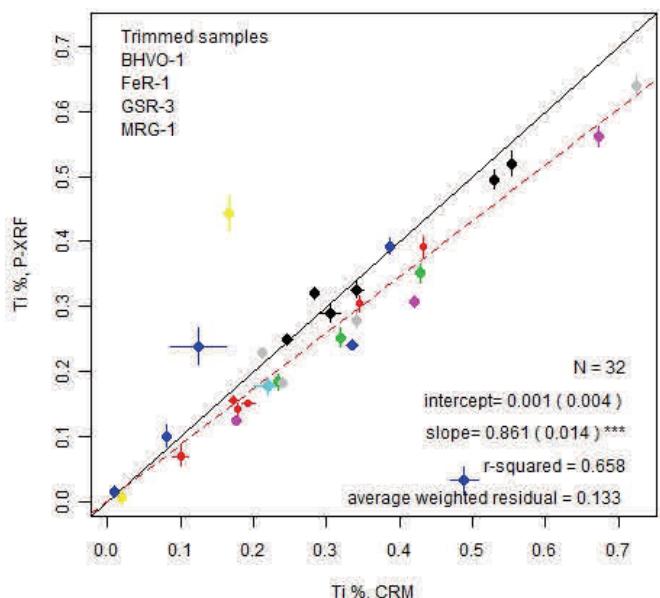
Bench Top-BTBS-Soil Mode



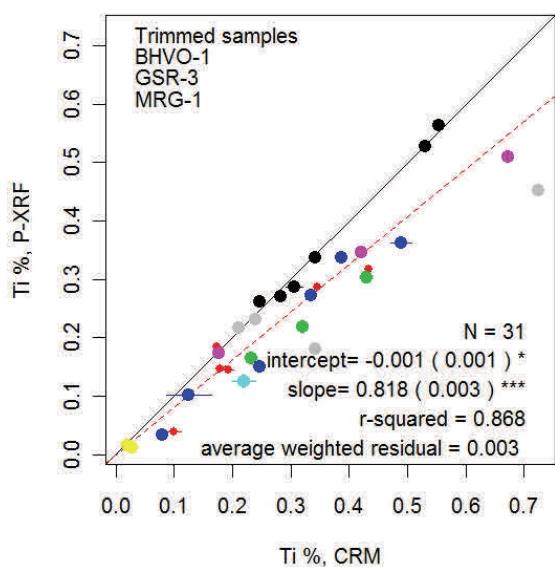
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode

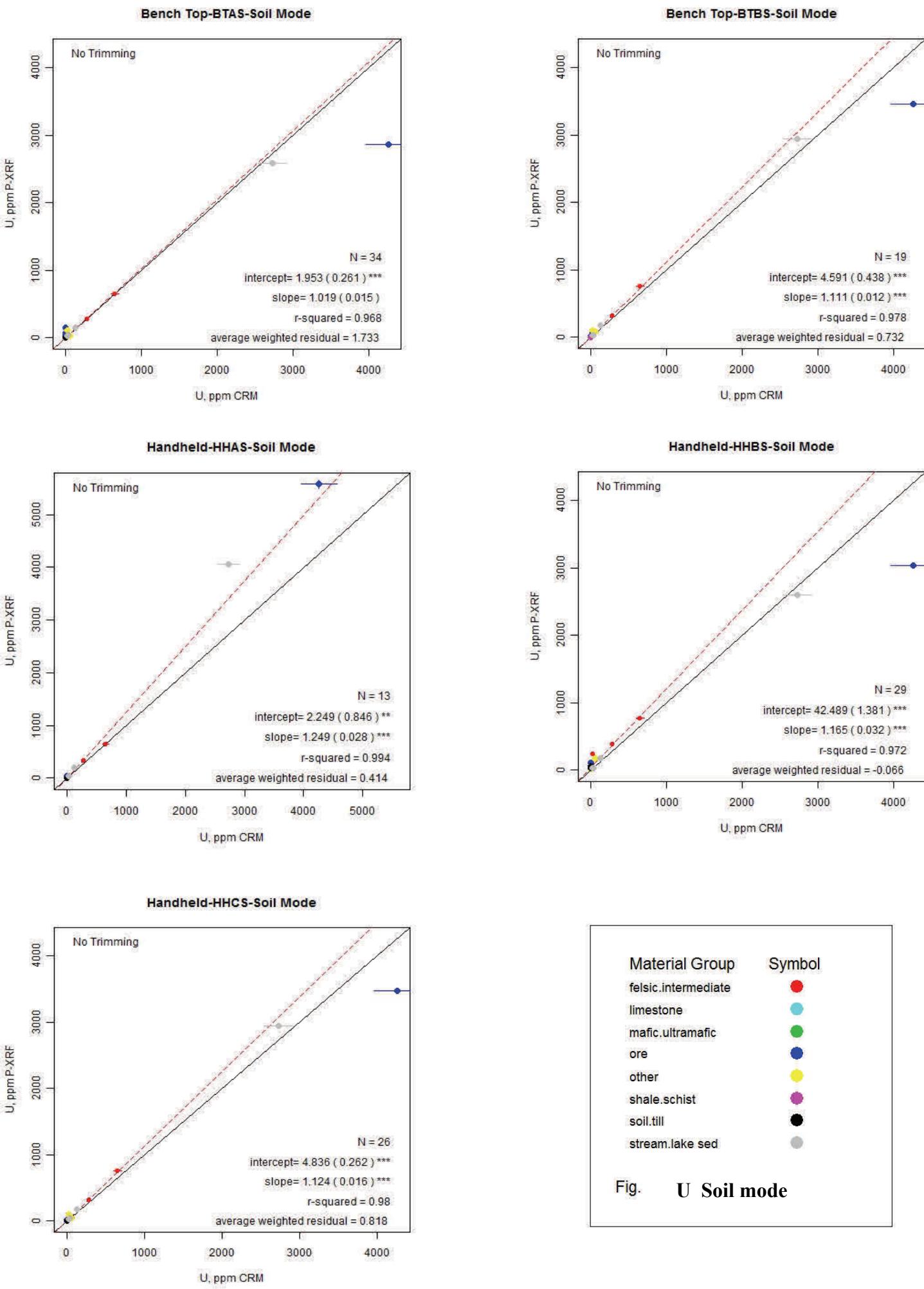


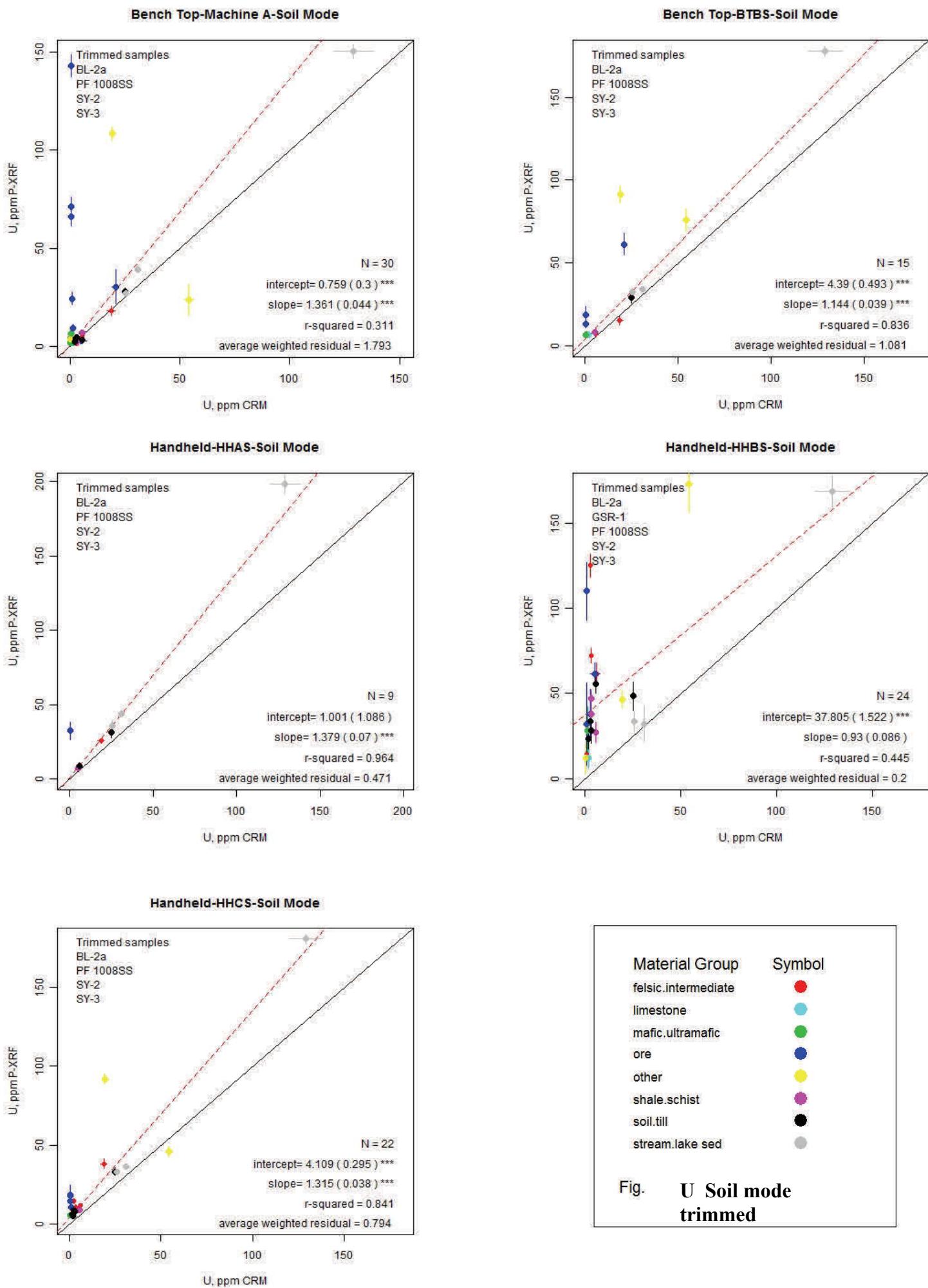
Handheld-HHCS-Soil Mode

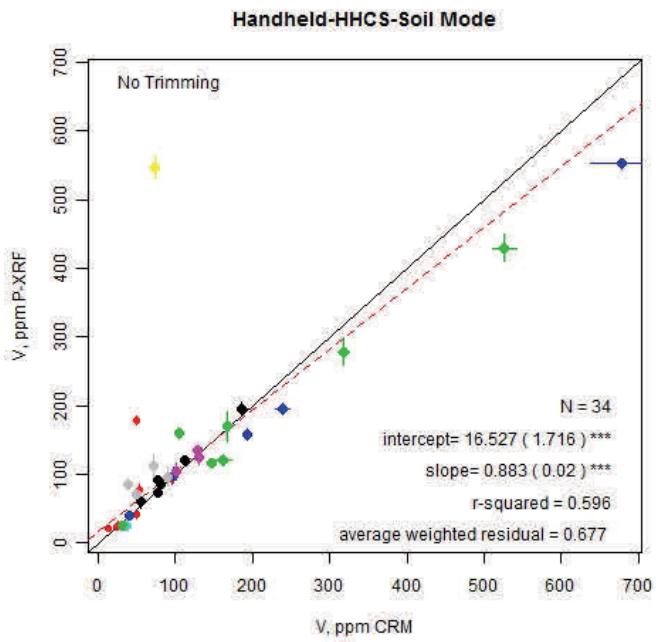
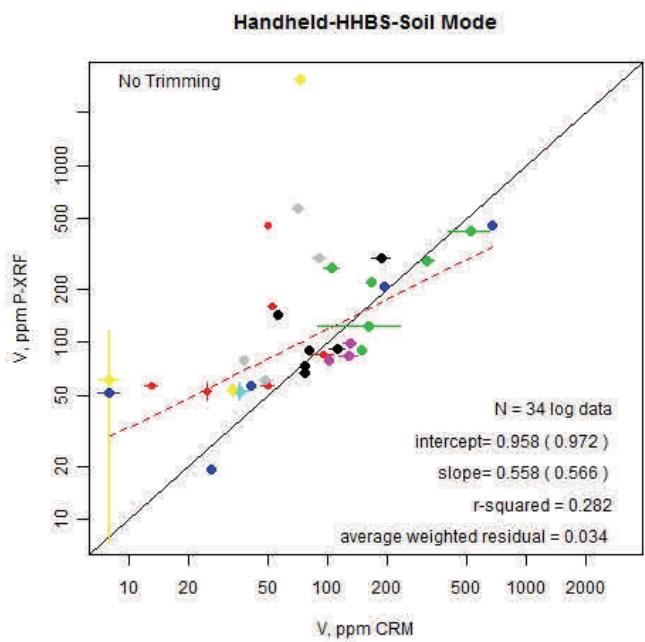
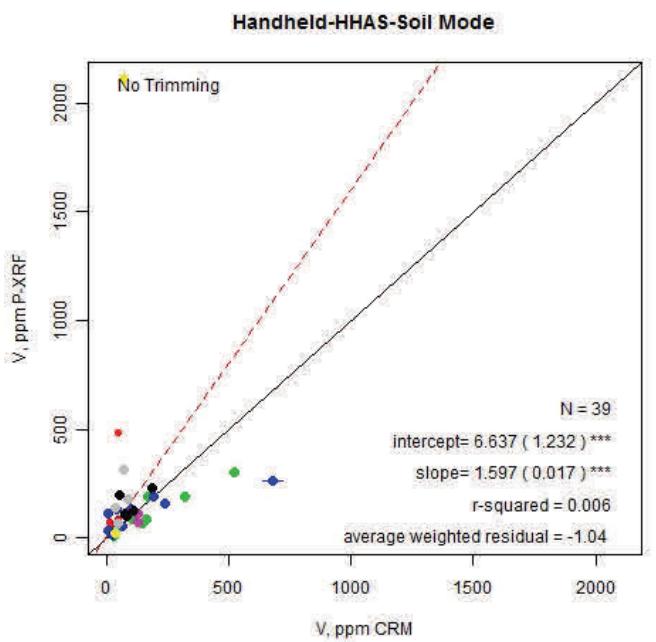
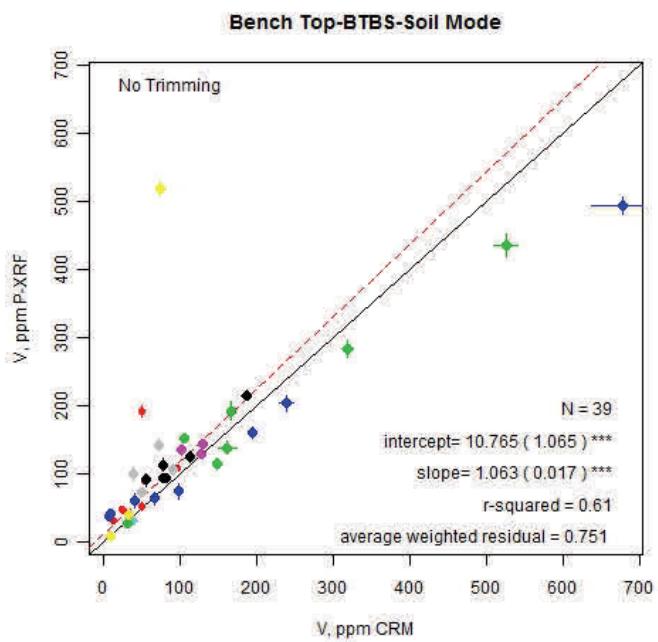
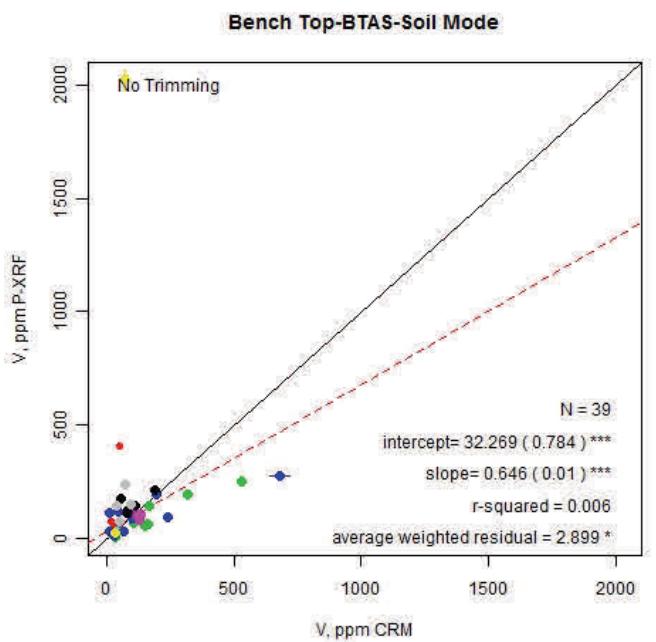


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Ti Soil mode
trimmed

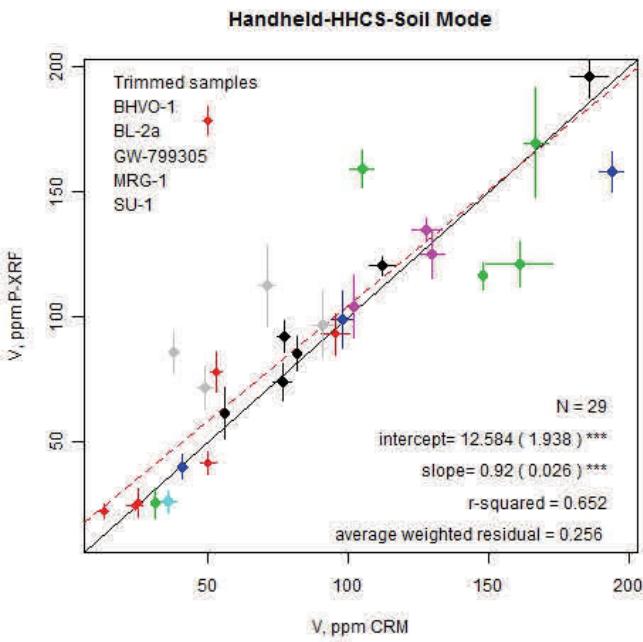
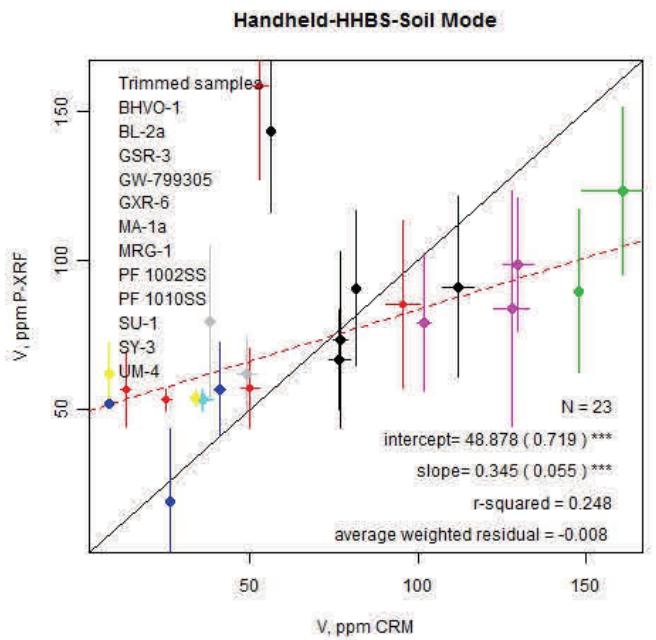
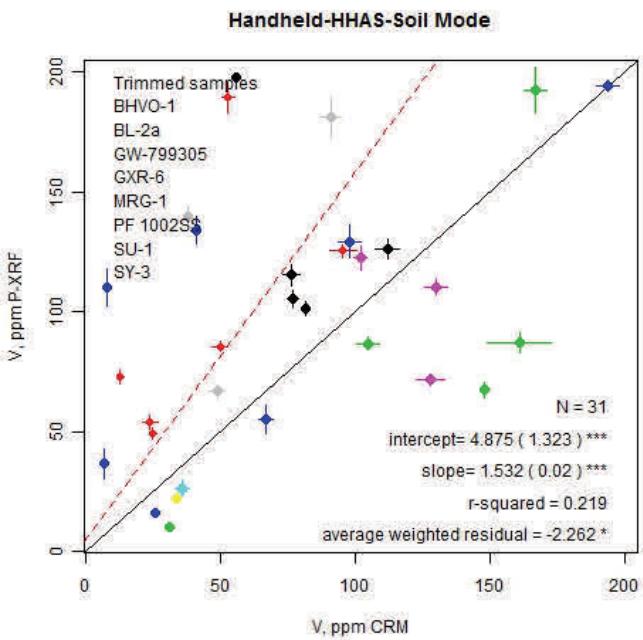
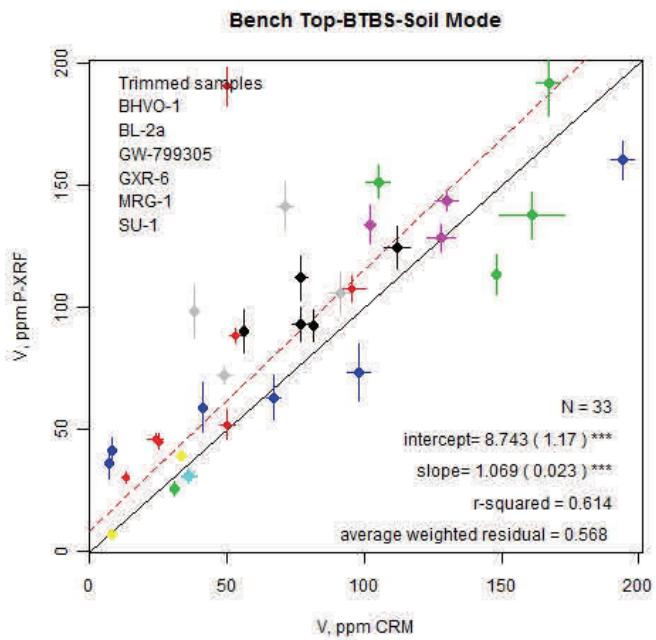
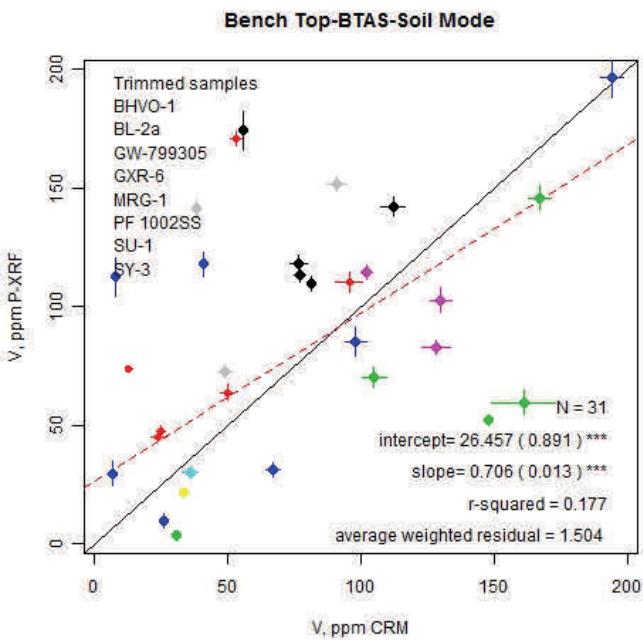






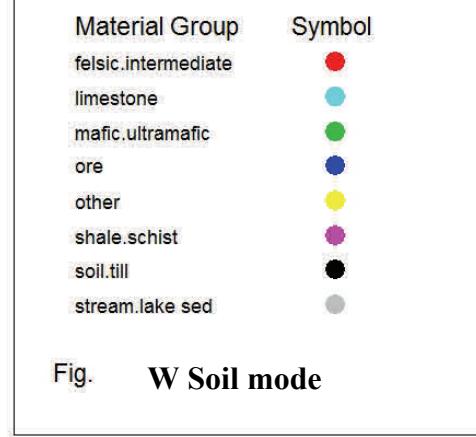
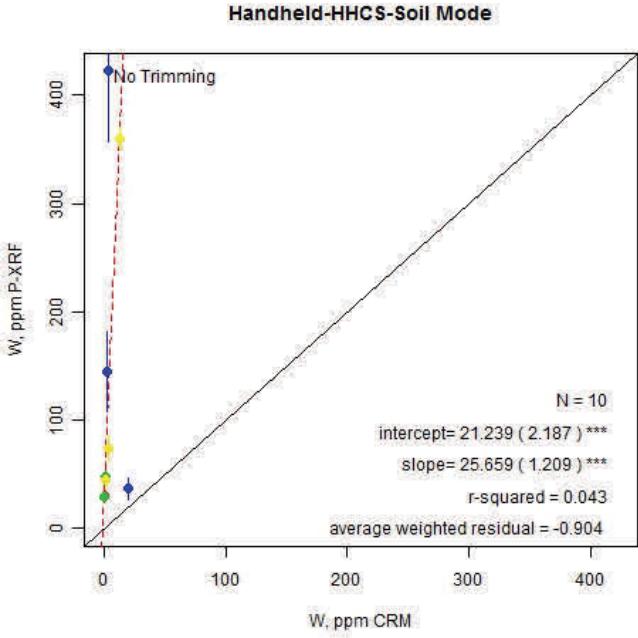
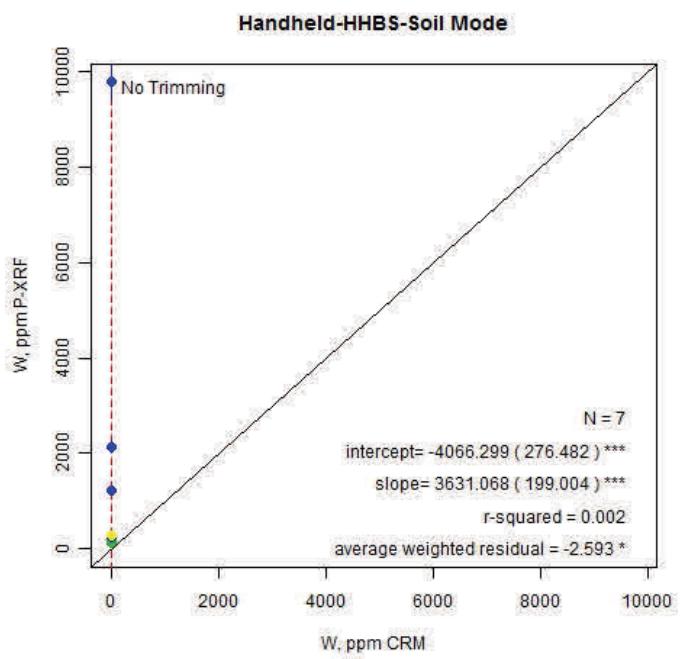
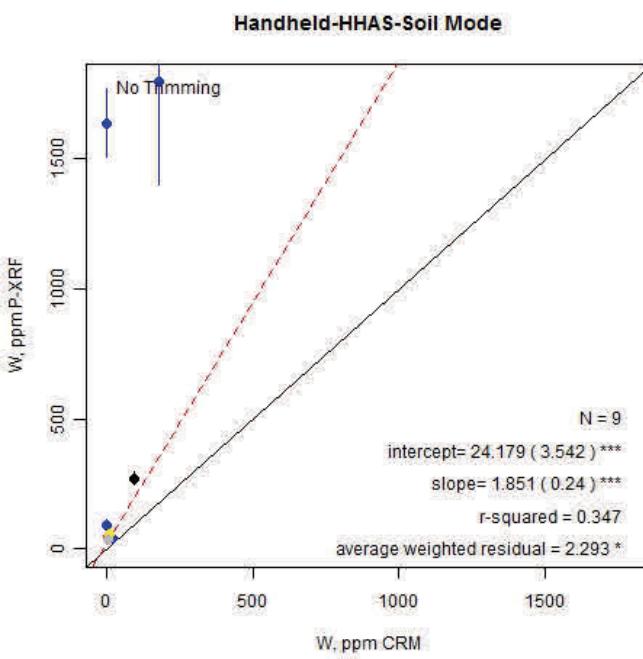
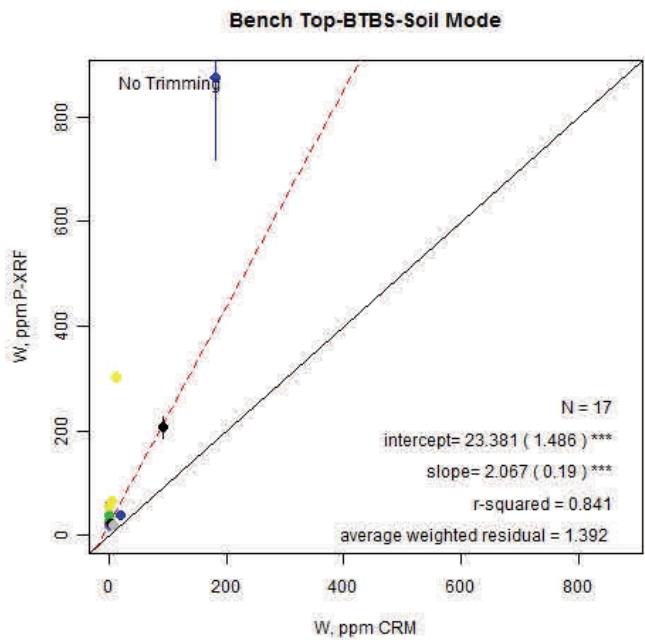
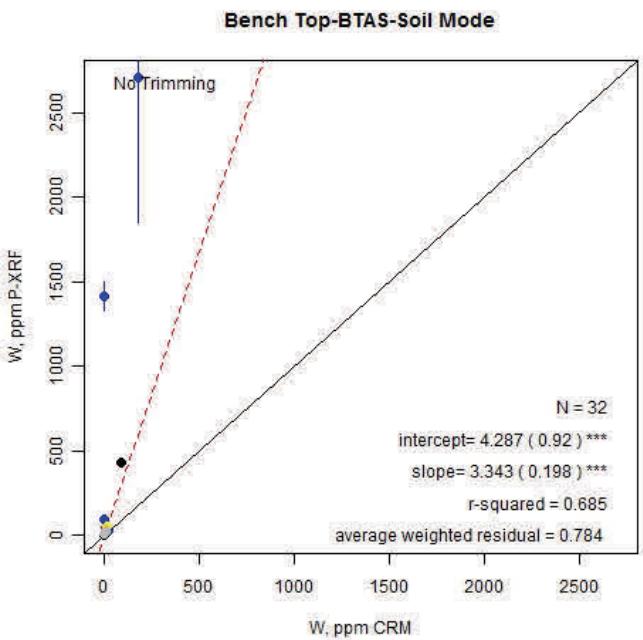
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. V Soil mode

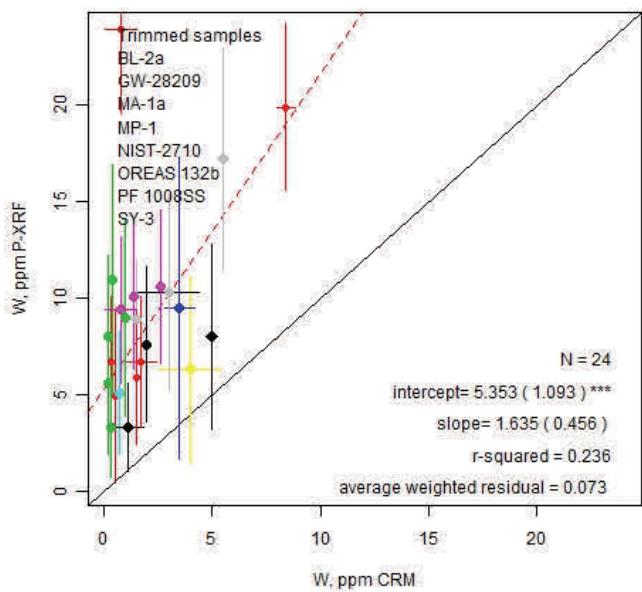


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	○
shale.schist	●
soil.till	●
stream.lake sed	●

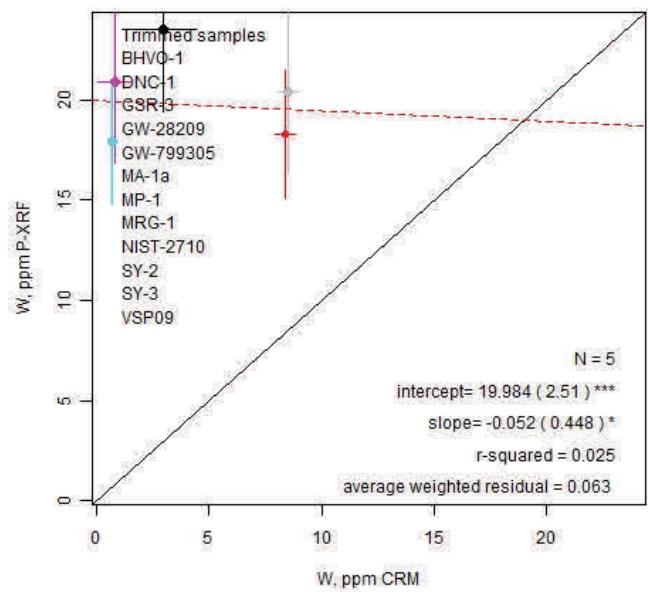
Fig. V Soil mode
trimmed



Bench Top-Machine A-Soil Mode

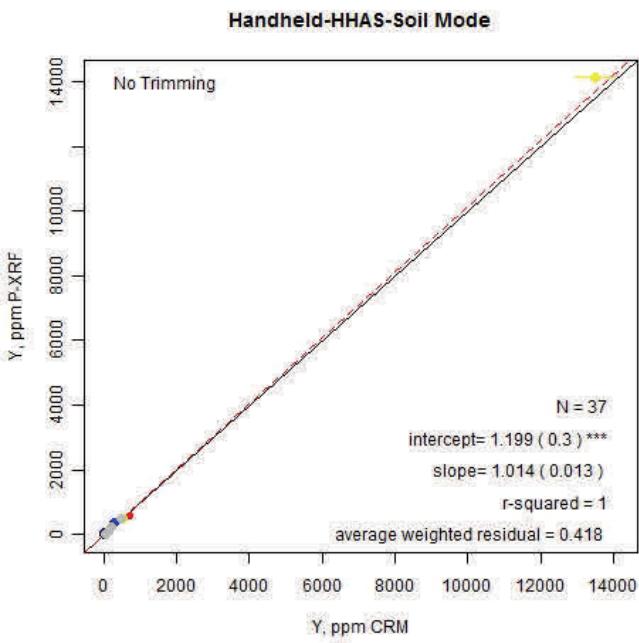
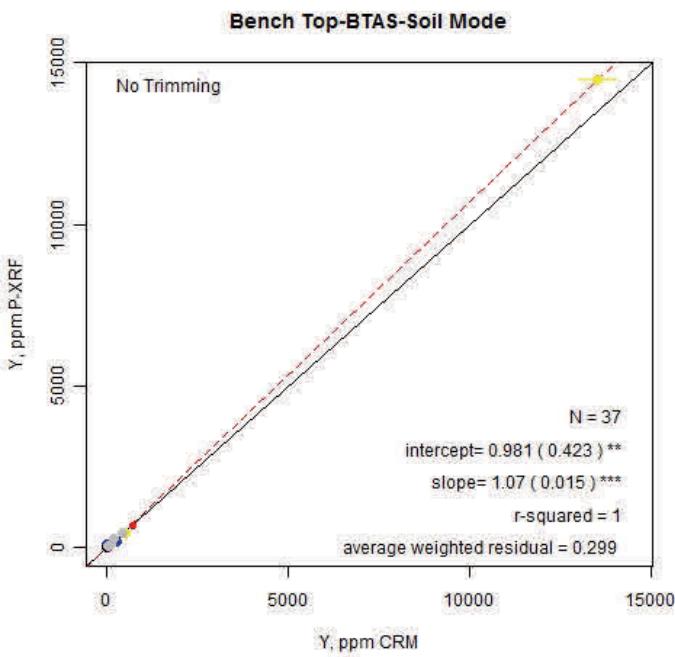


Bench Top-BTBS-Soil Mode



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

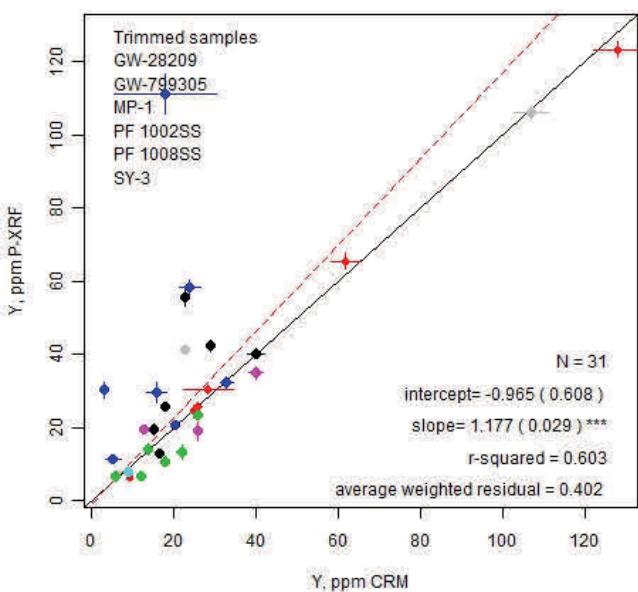
Fig. W Soil mode
trimmed



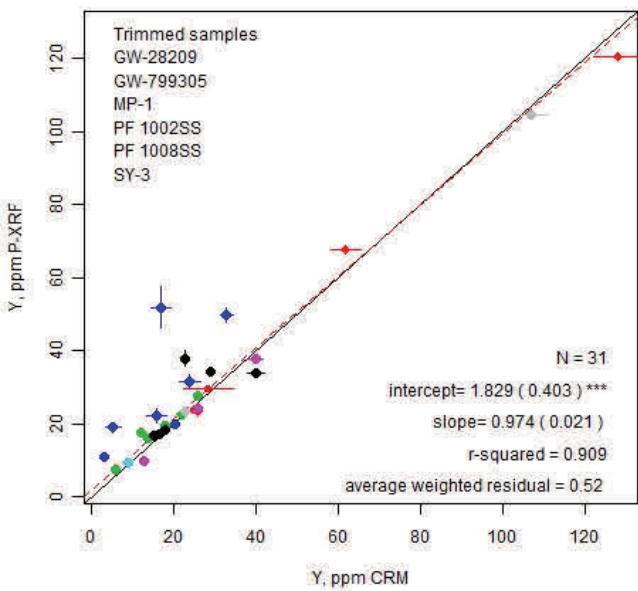
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Y Soil mode

Bench Top-BTAS-Soil Mode

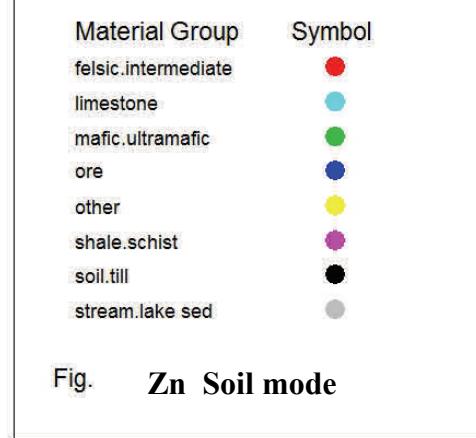
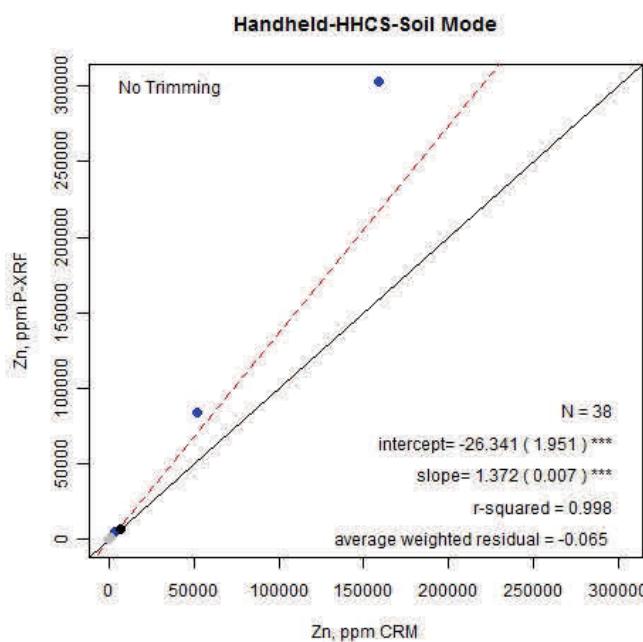
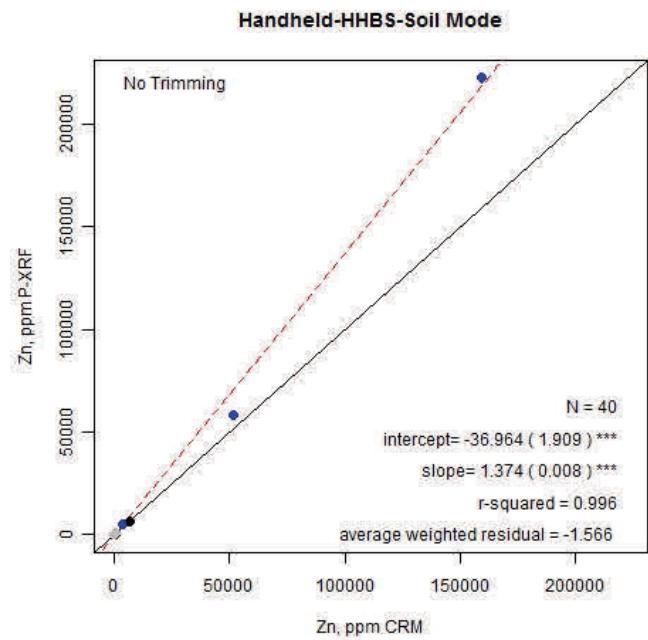
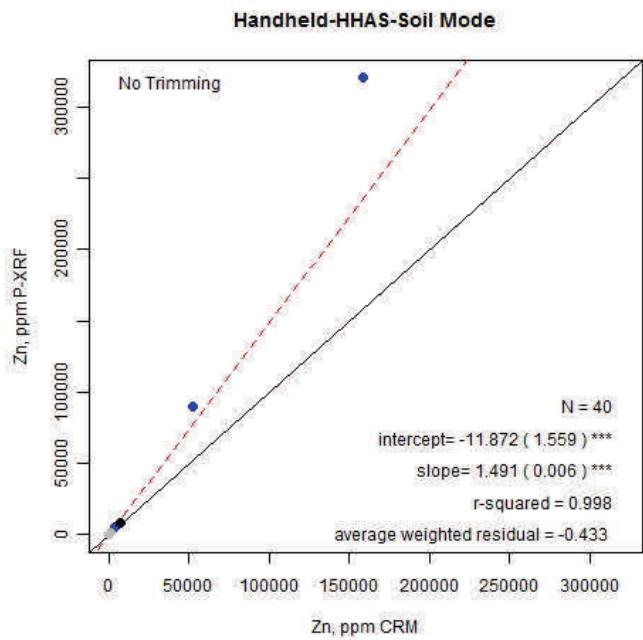
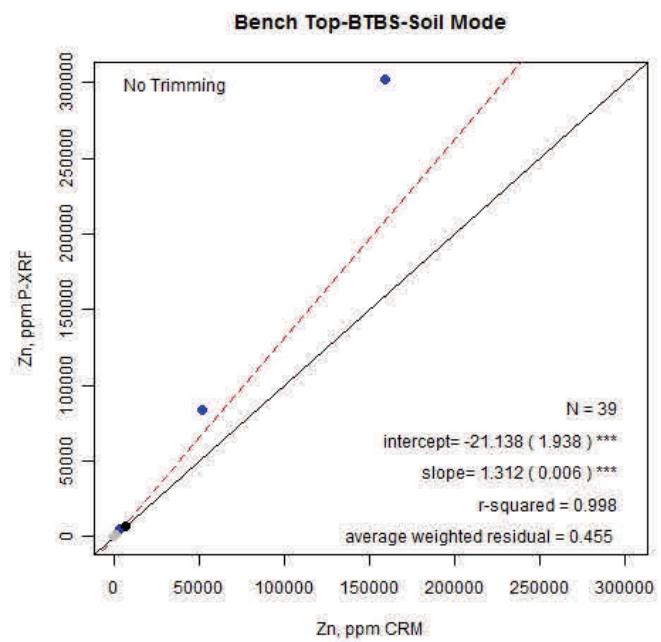
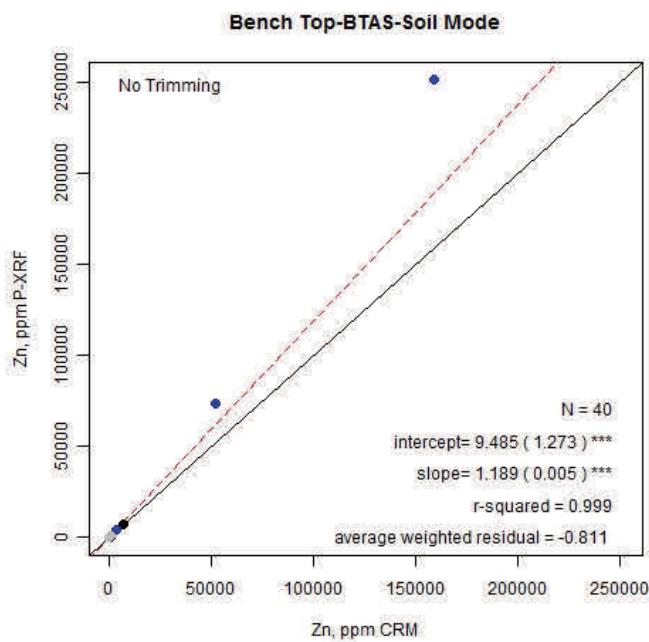


Handheld-HHAS-Soil Mode

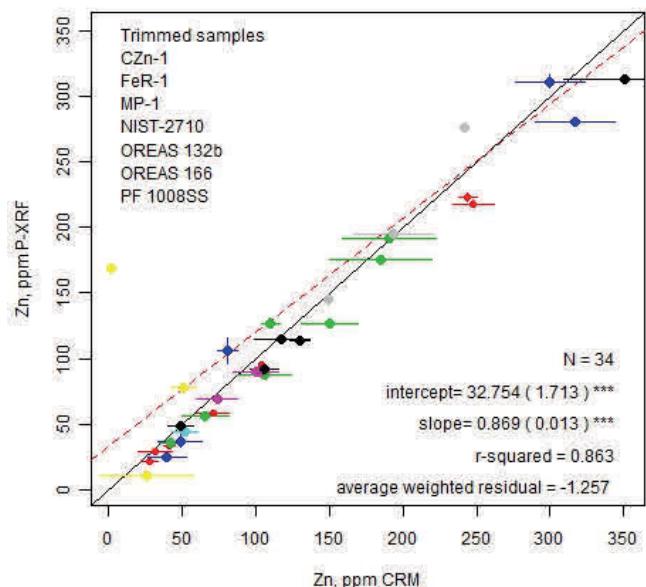


Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

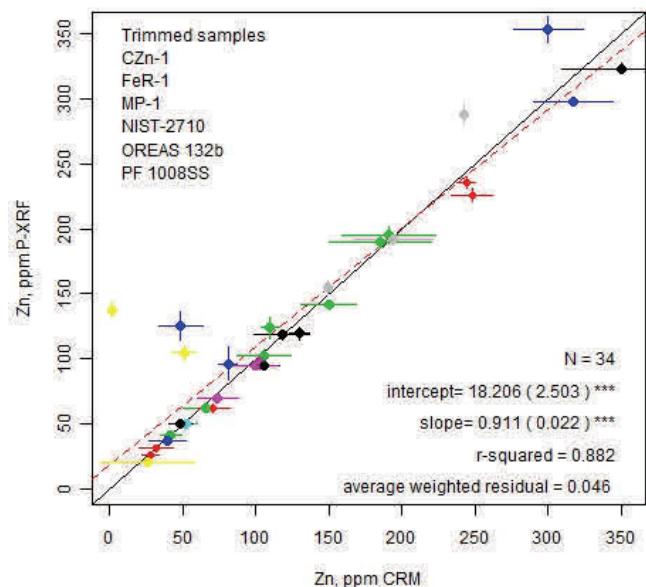
Fig. Y Soil mode
trimmed



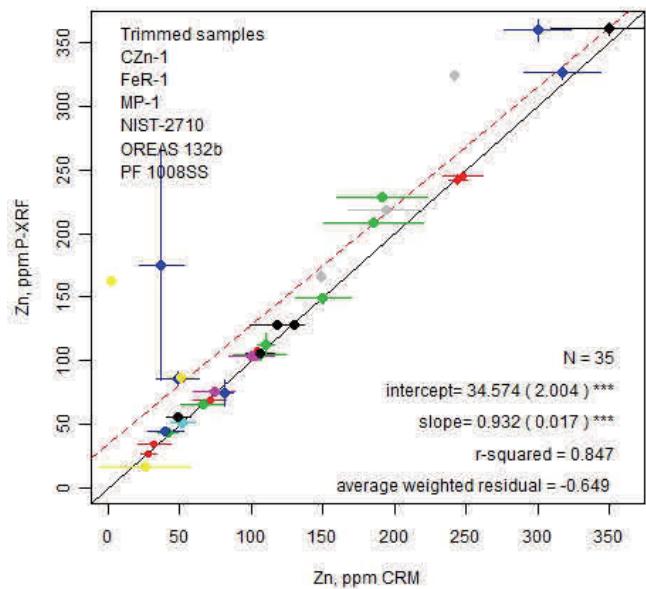
Bench Top-Machine A-Soil Mode



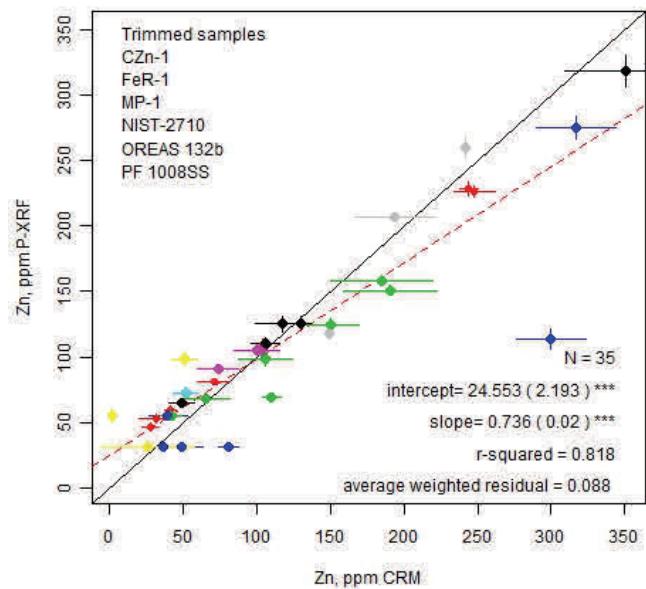
Bench Top-BTBS-Soil Mode



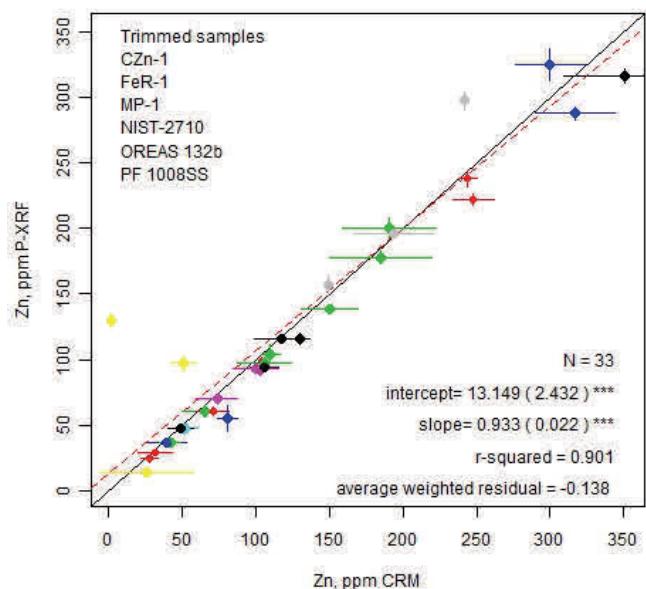
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode



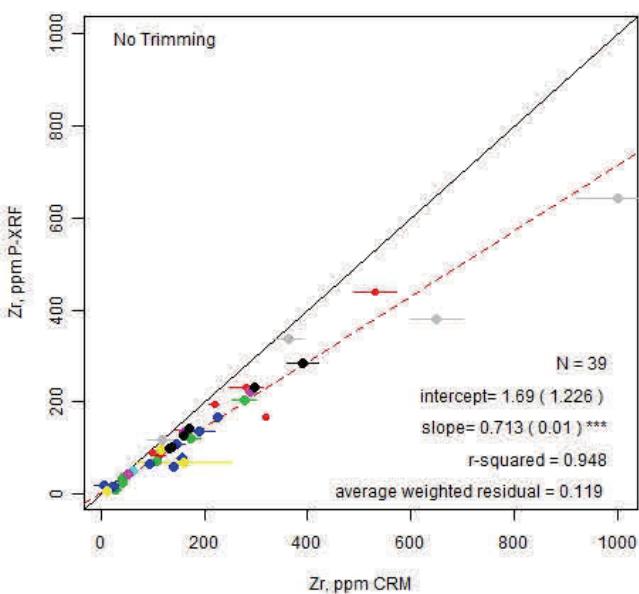
Handheld-HHCS-Soil Mode



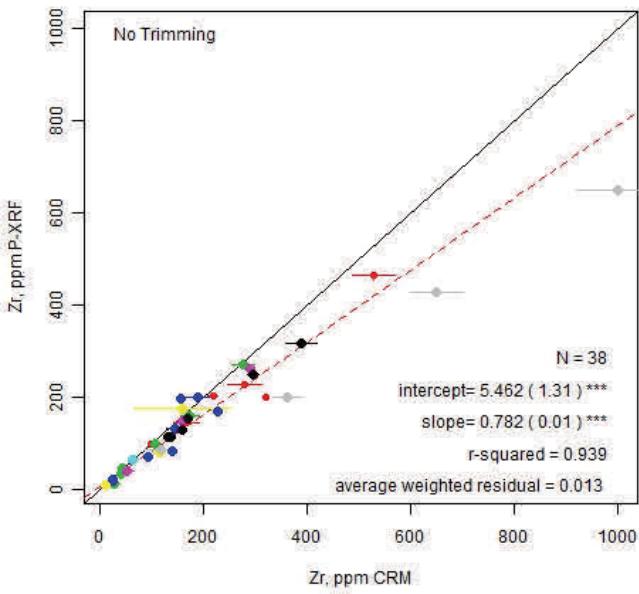
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. **Zn Soil mode trimmed**

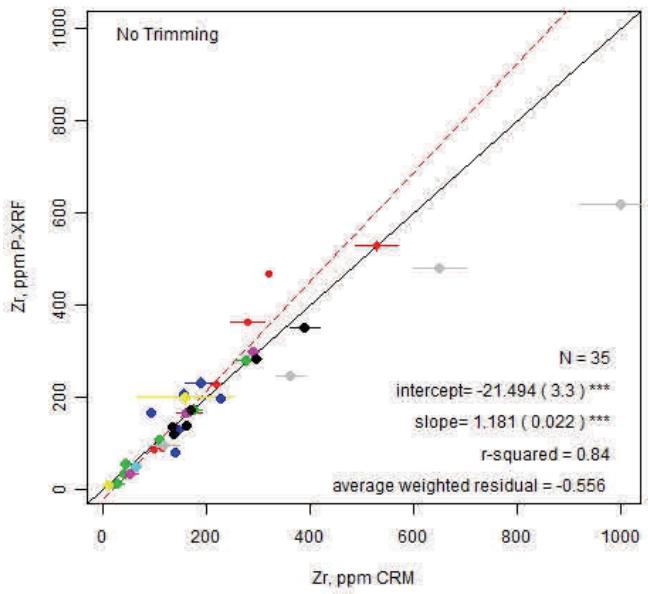
Bench Top-BTAS-Soil Mode



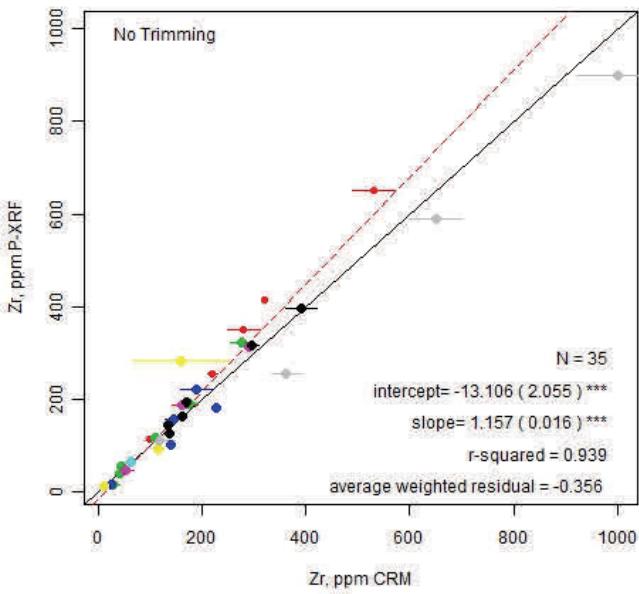
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode



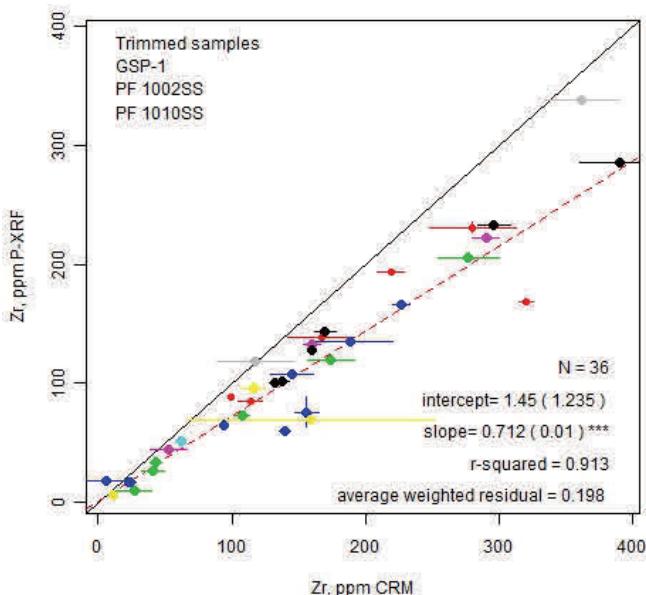
Handheld-HHCS-Soil Mode



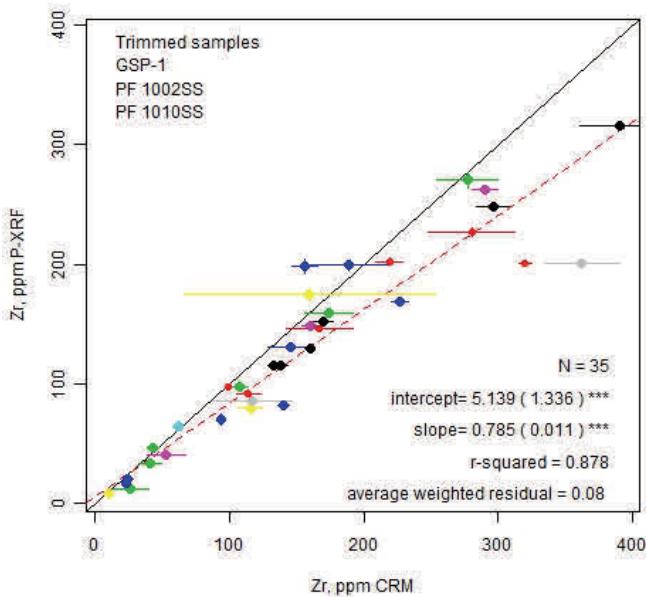
Material Group	Symbol
felsic.intermediate	●
limestone	○
mafic.ultramafic	●
ore	●
other	●
shale.schist	●
soil.till	●
stream.lake sed	●

Fig. Zr Soil mode

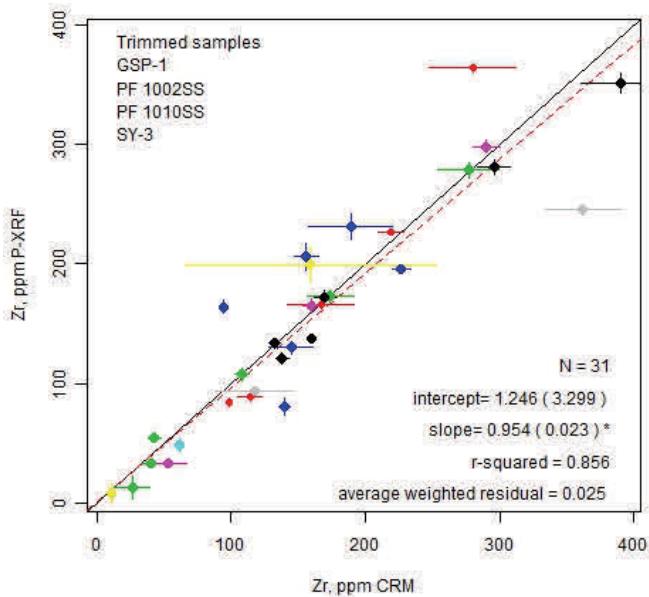
Bench Top-Machine A-Soil Mode



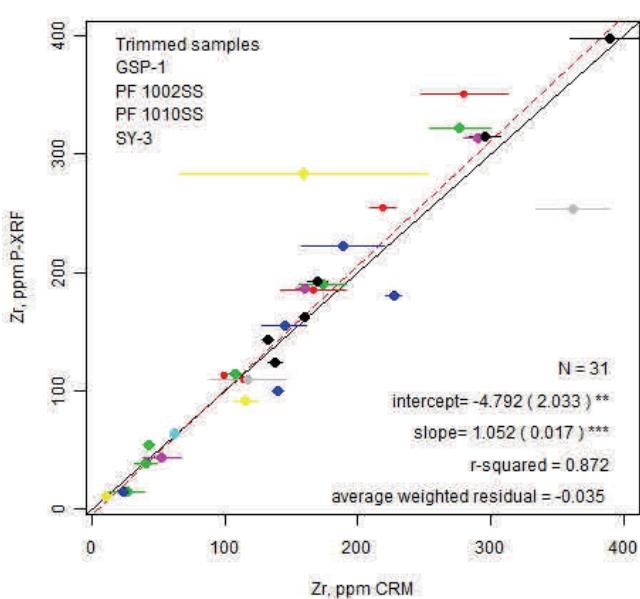
Handheld-HHAS-Soil Mode



Handheld-HHBS-Soil Mode



Handheld-HHCS-Soil Mode



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

Fig. Zr Soil mode
trimmed