

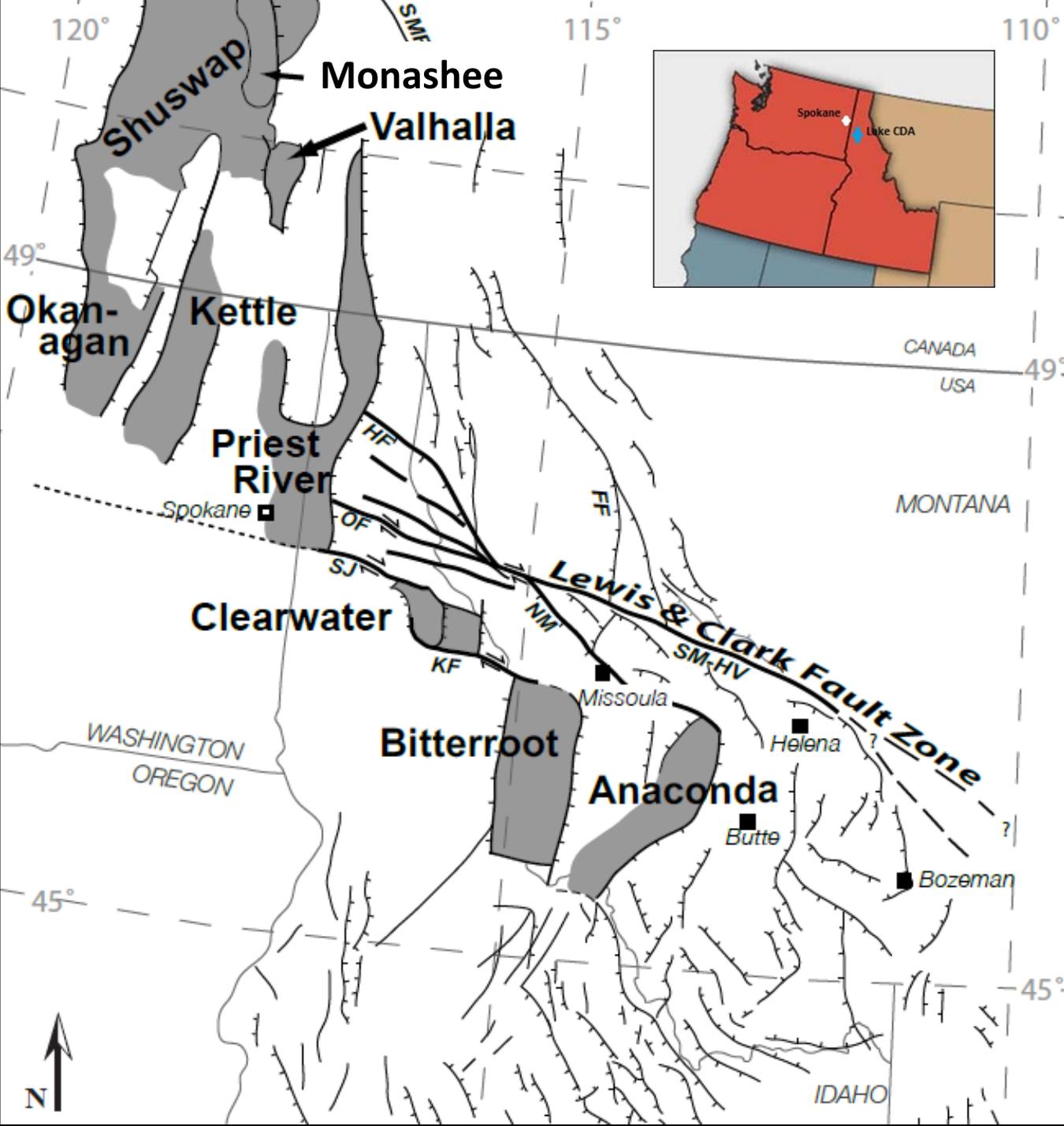
Amphibolite Inclusions Within the 2.65 Ga Pend Oreille Gneiss, Priest River Complex, Northern Idaho

Andy Buddington – Spokane Community College

Da Wang – Washington State University

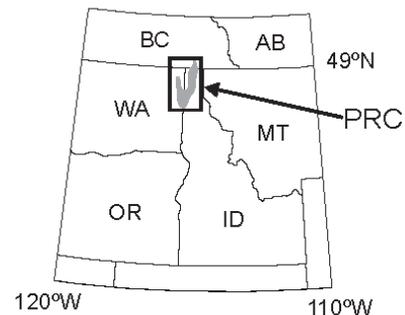
Chris Rogers – Carleton University





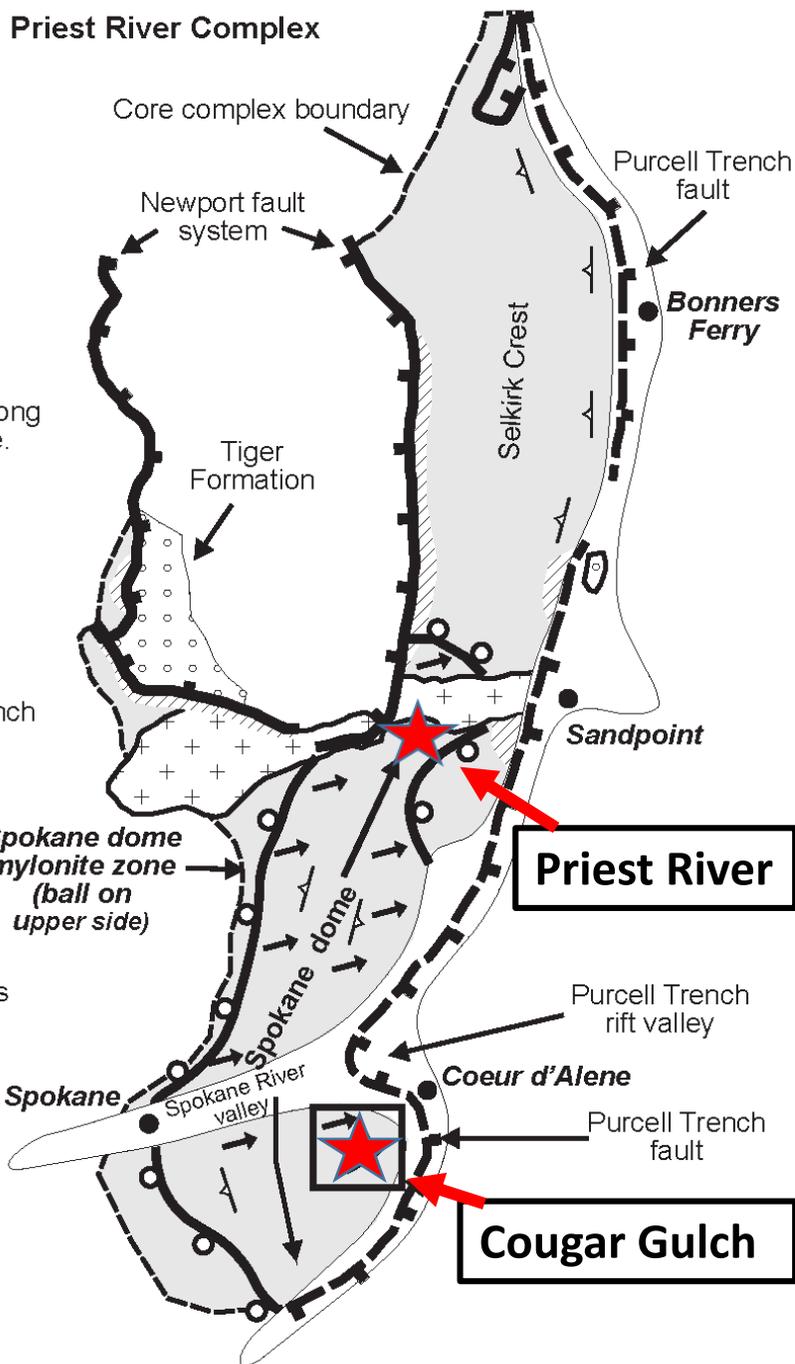
Inland Northwest MCC's

(Foster et al., 2007)



Priest River Complex

- Spokane dome mylonite lineation. Arrow indicates the sense of shear, or if a long arrow, the structural plunge.
- Fine-grained mylonites
- Foliation, mylonite zone (ball on upper plate), detachment fault (teeth on upper plate), respectively
- Valley fill in the Purcell Trench
- Eocene sedimentary rocks
- Eocene plutons
- Metamorphic rocks and Cretaceous igneous rocks
- Pre-Belt basement localities



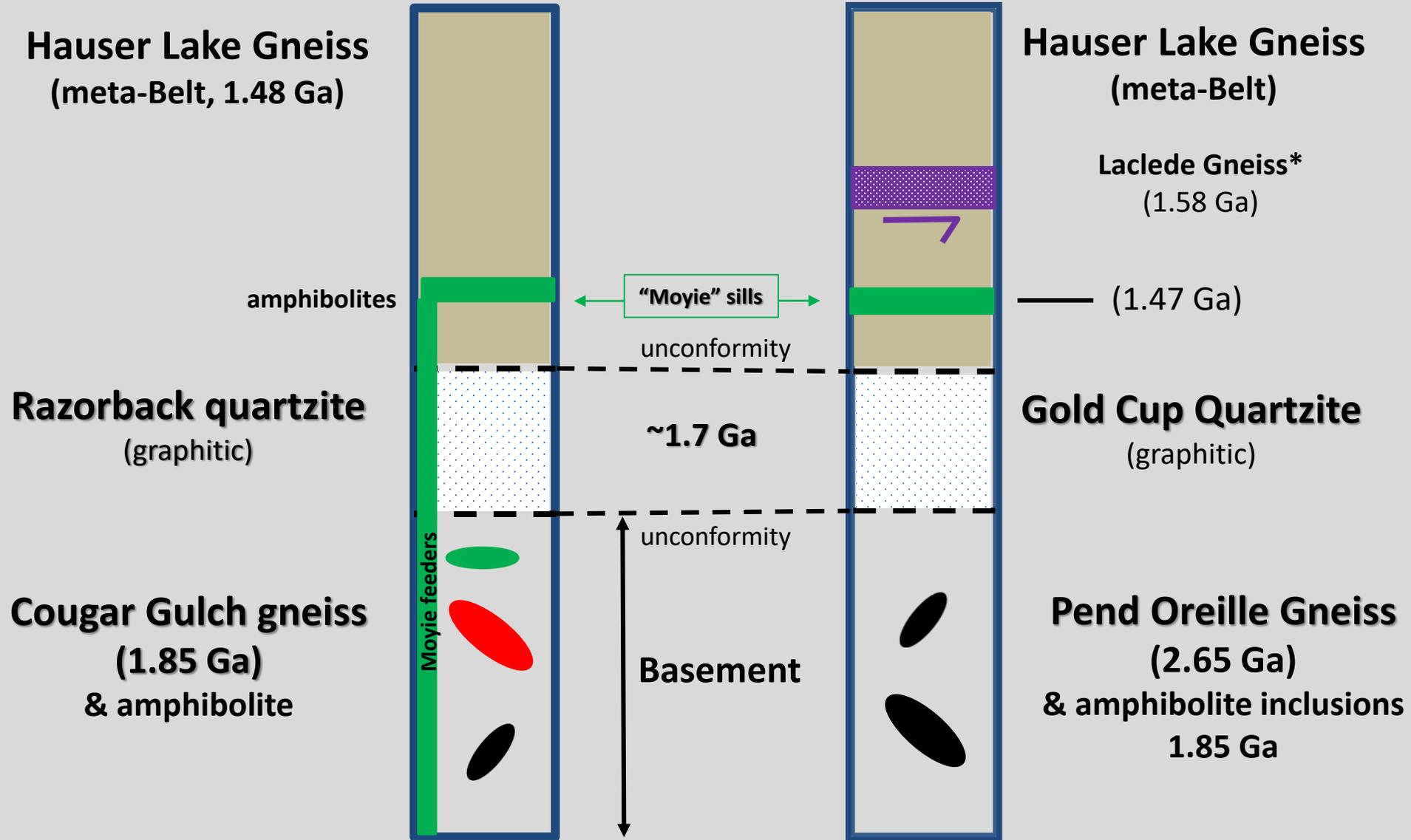
Modified after
Doughty et al., 2016

Cougar Gulch, ID

(Buddington, et al., 2017)

Priest River, ID

(Doughty, et al 1998)



Pend Oreille Gneiss

2.65 Ga

Doughty, et al., 1998



Pend Oreille Gneiss

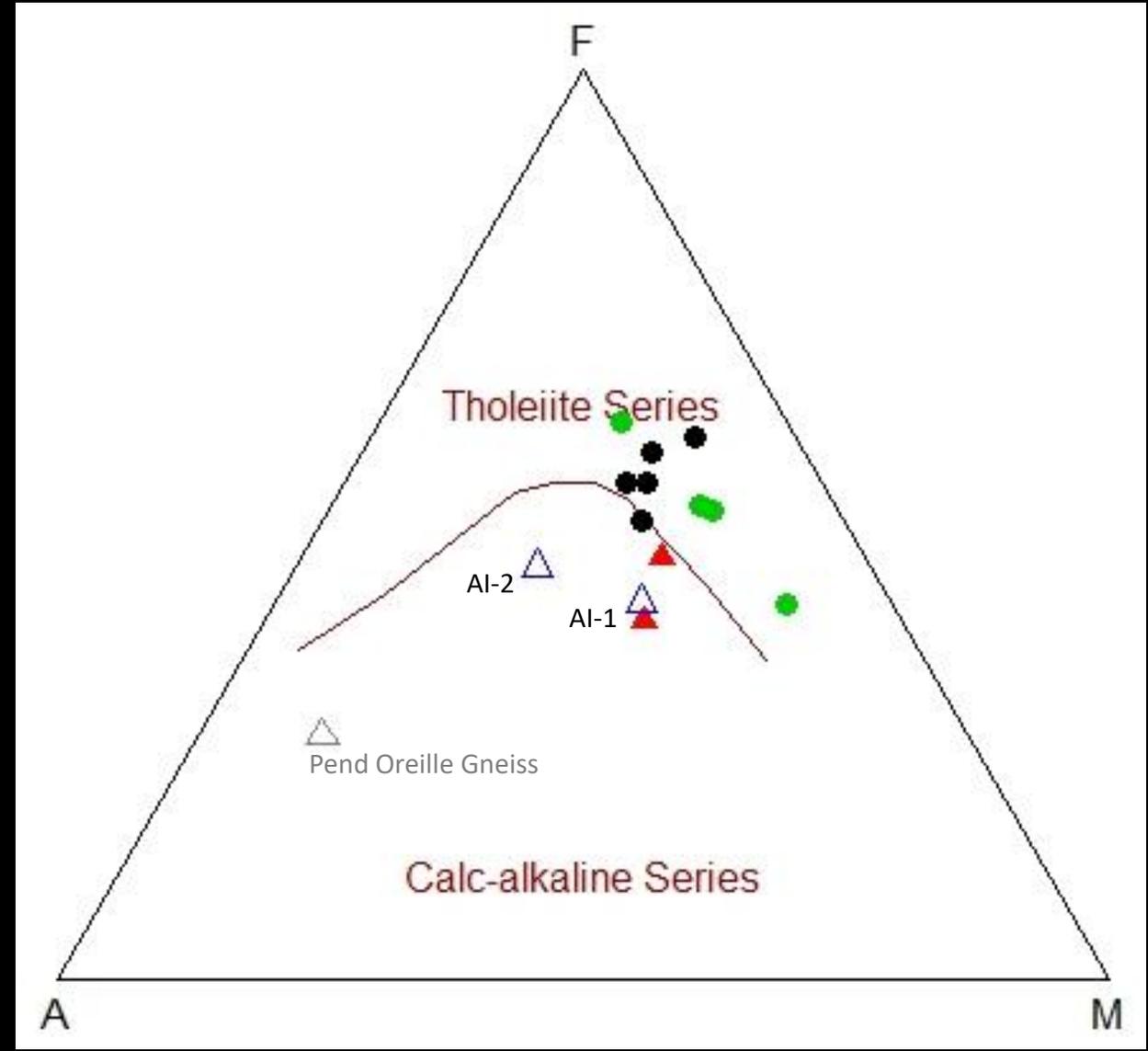
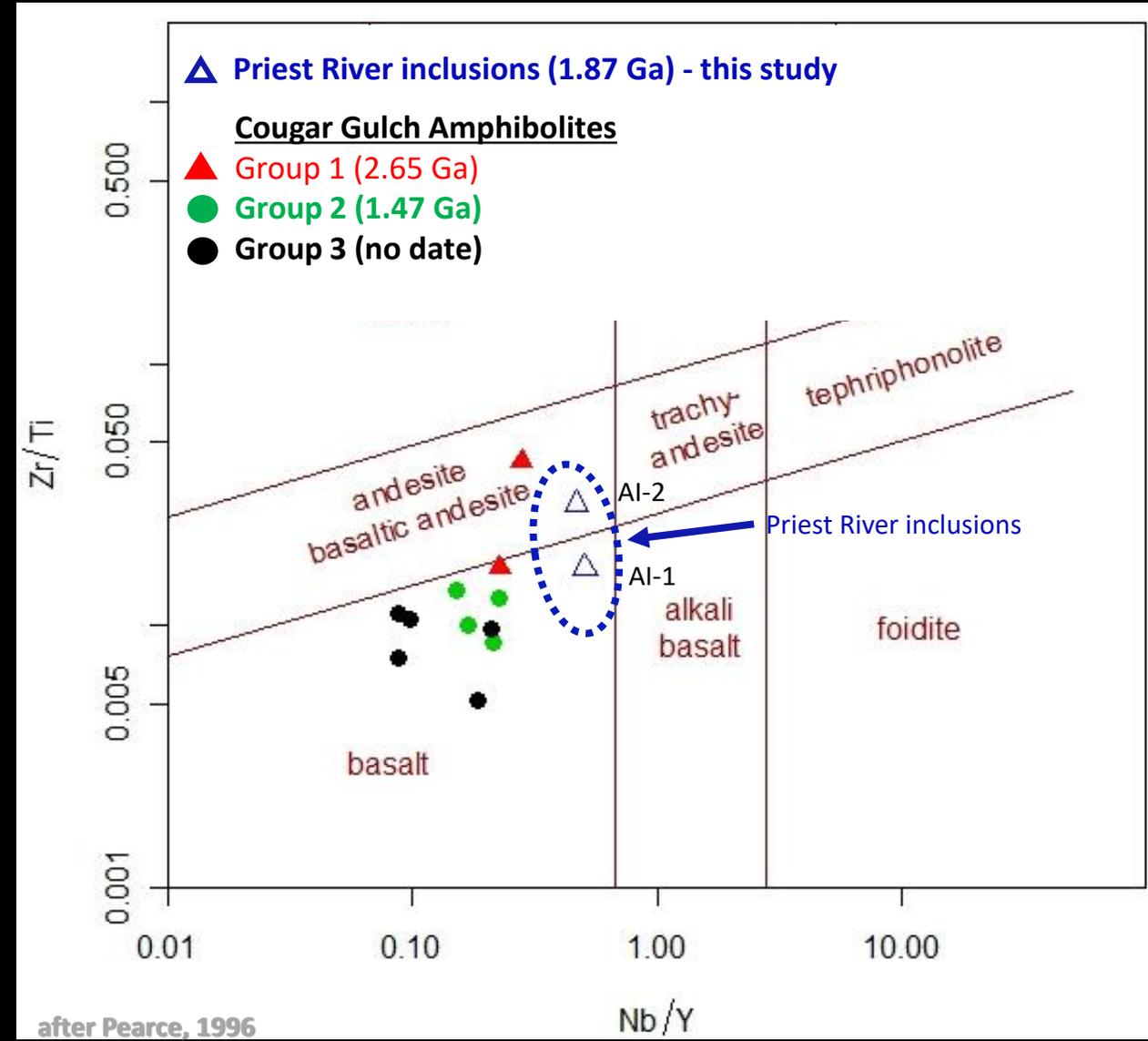


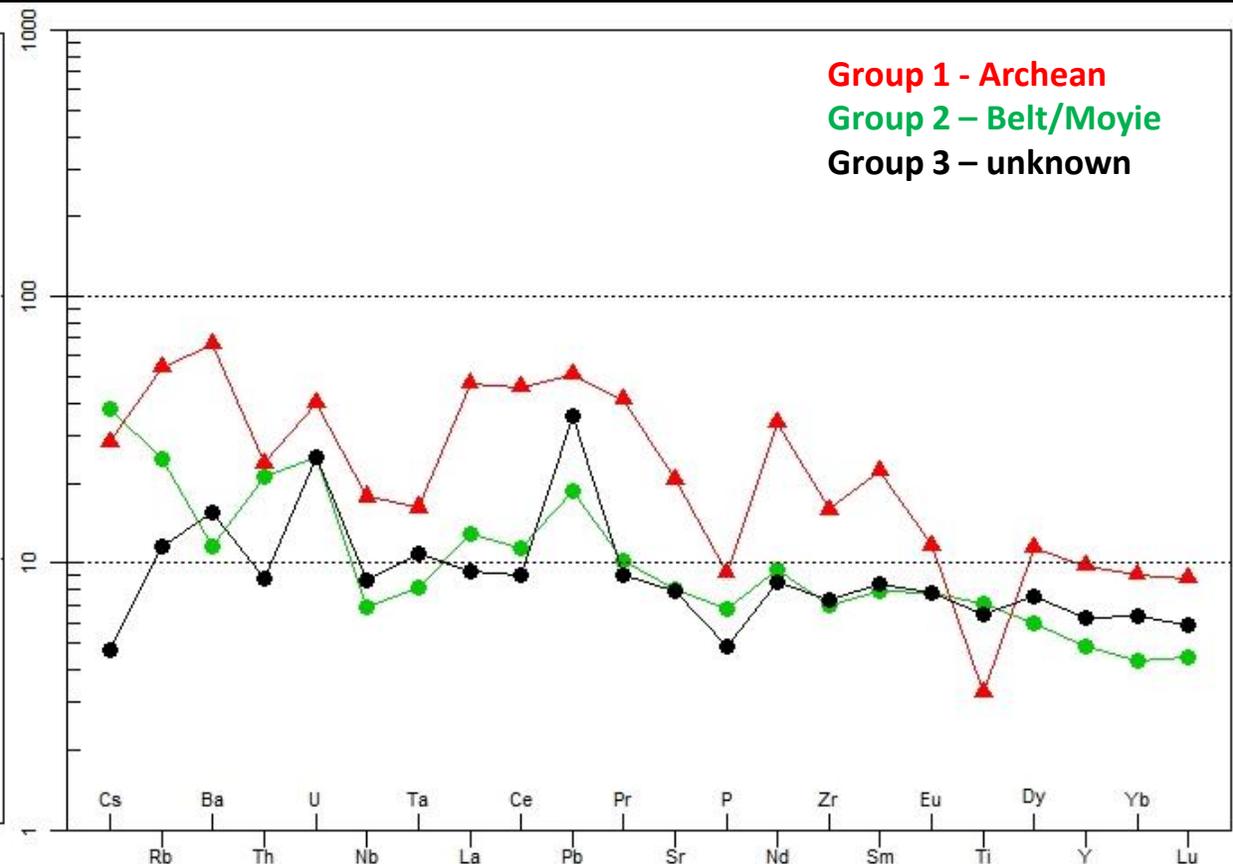
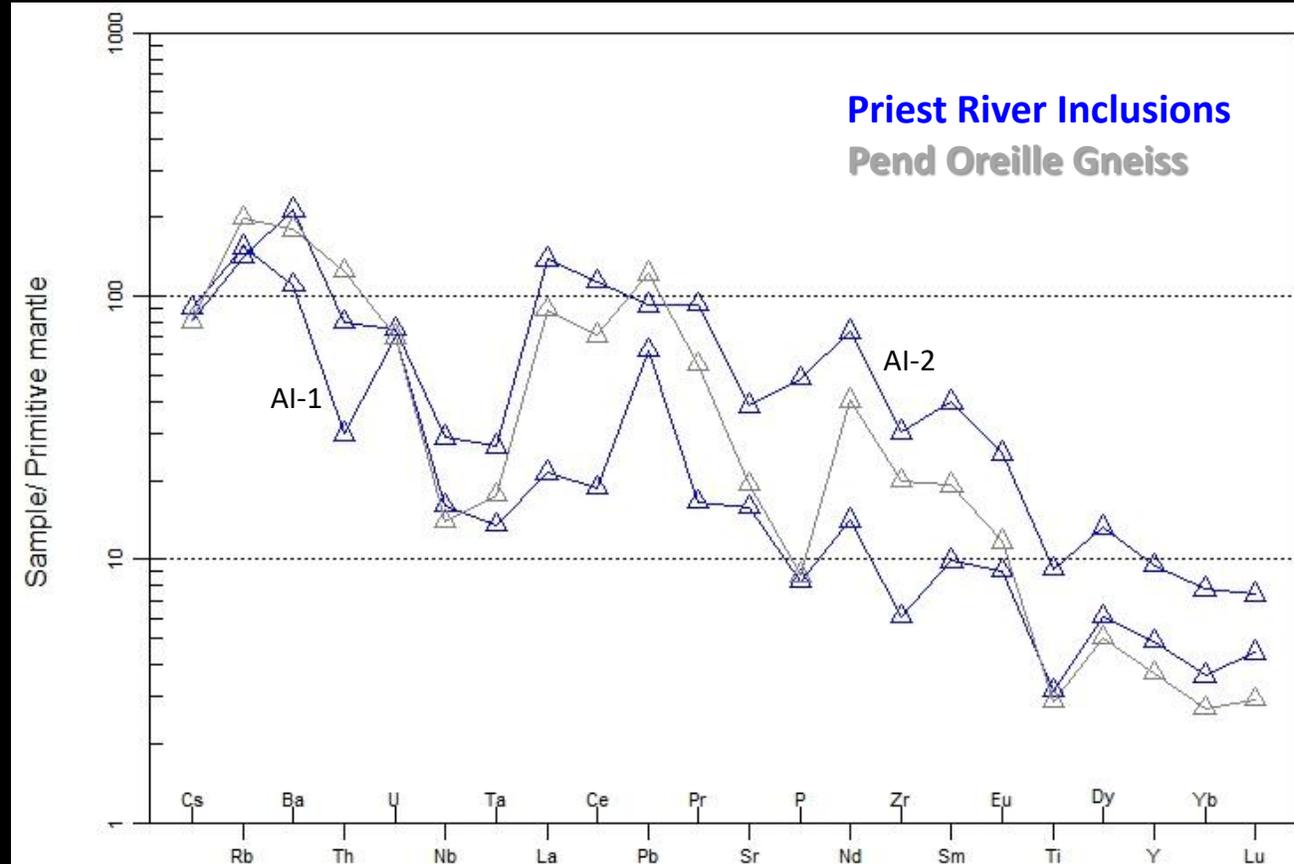


Amphibolite inclusions

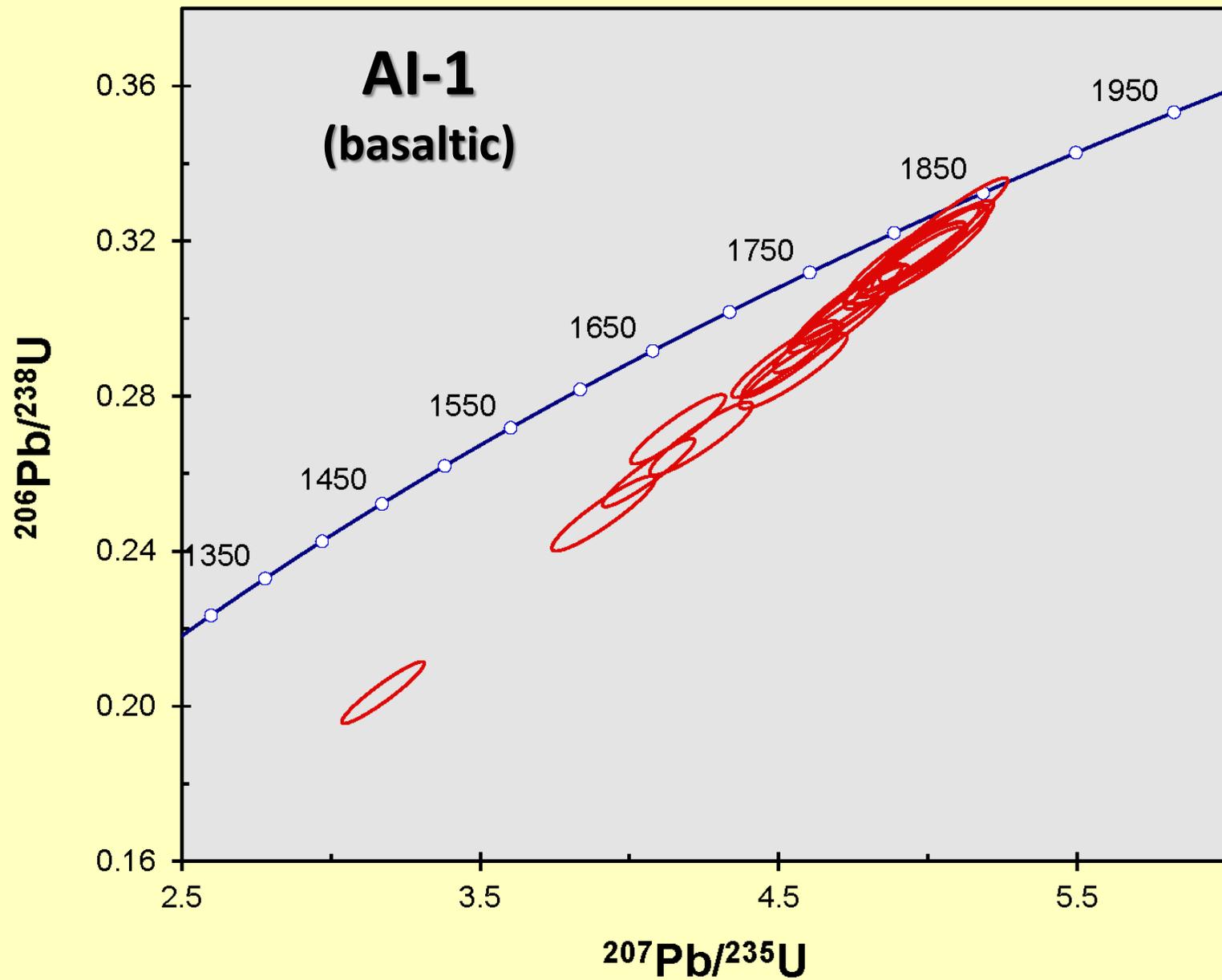


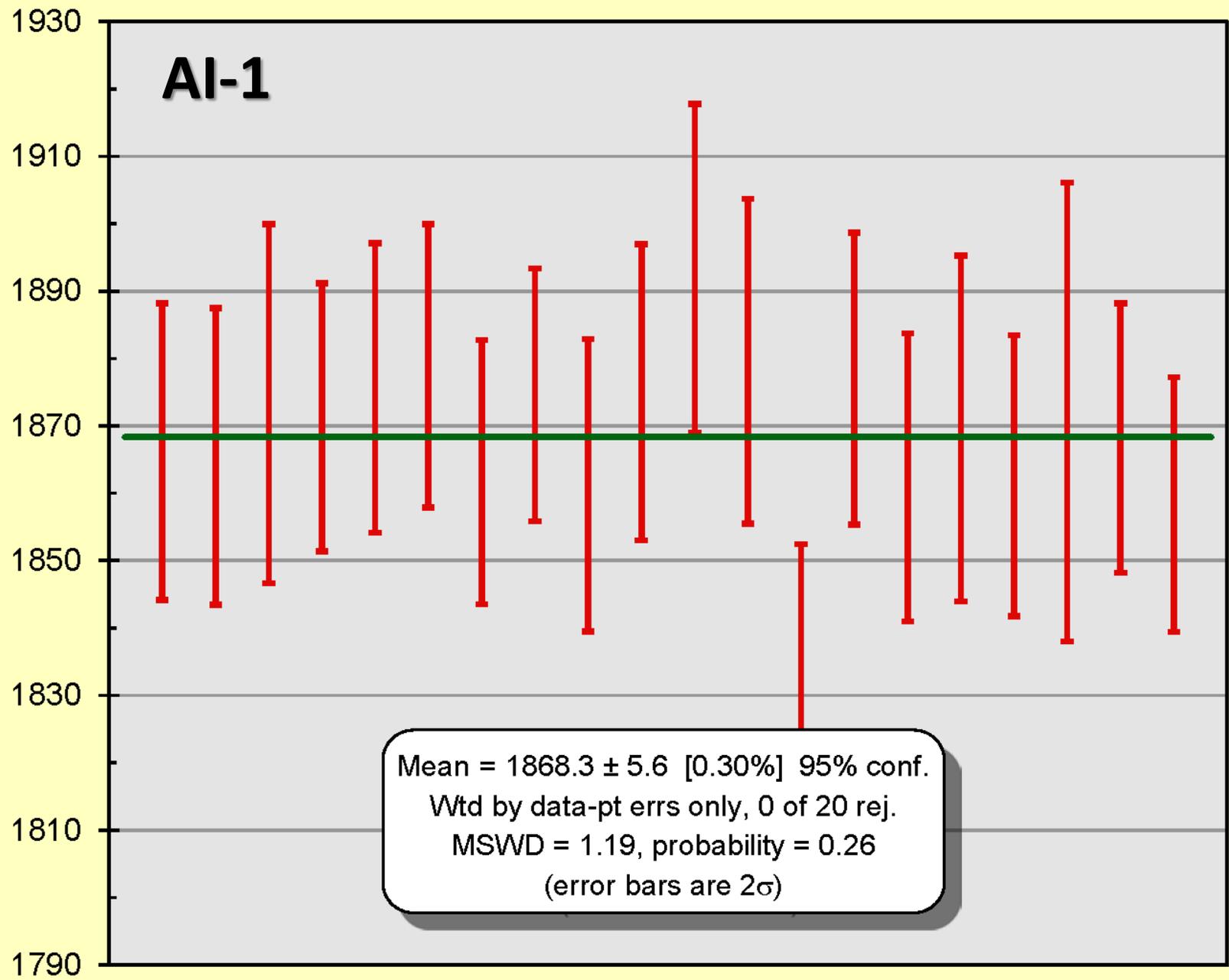
Amphibolite inclusions

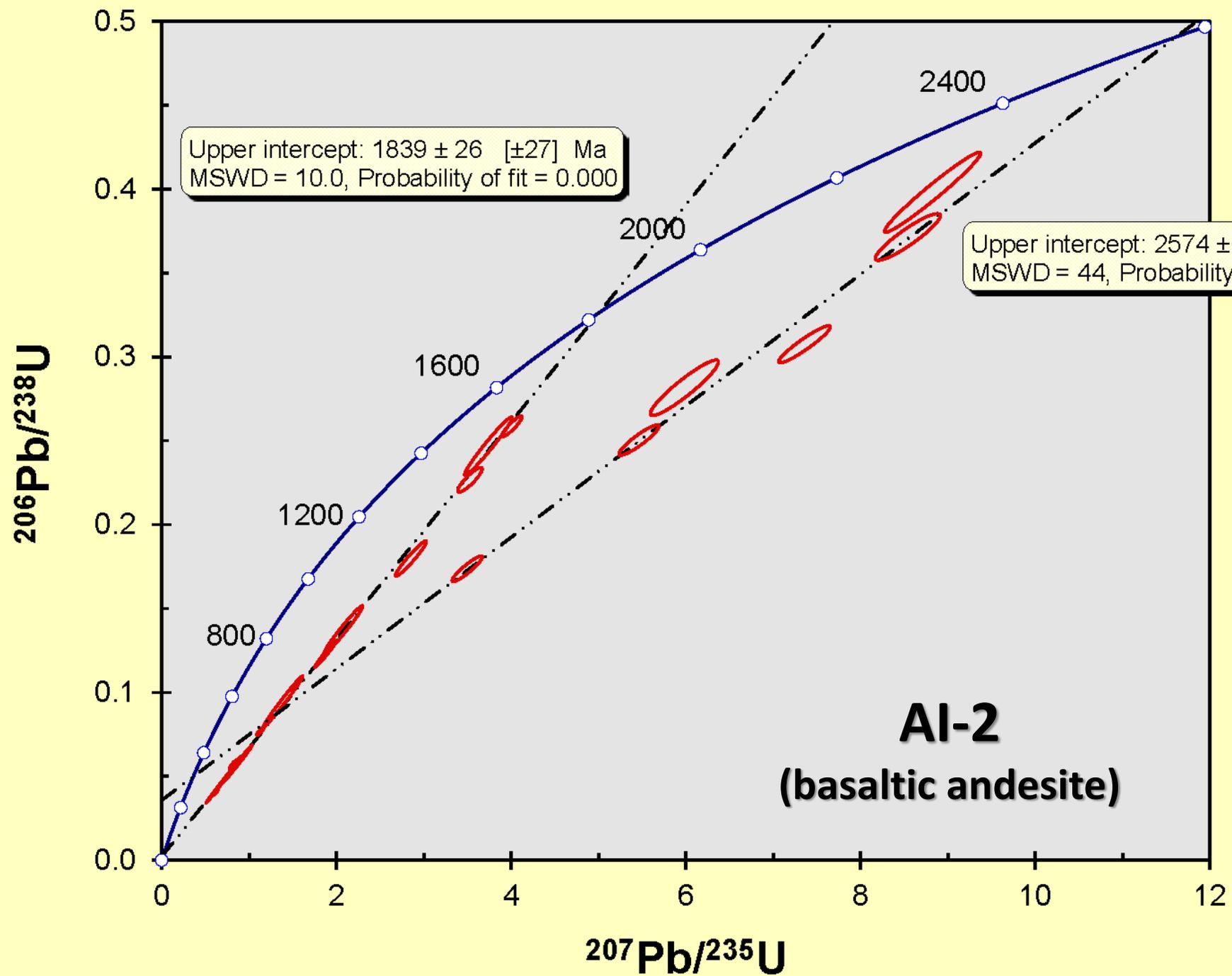


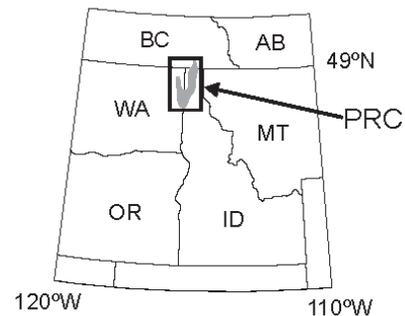


McDonough & Sun, 1995



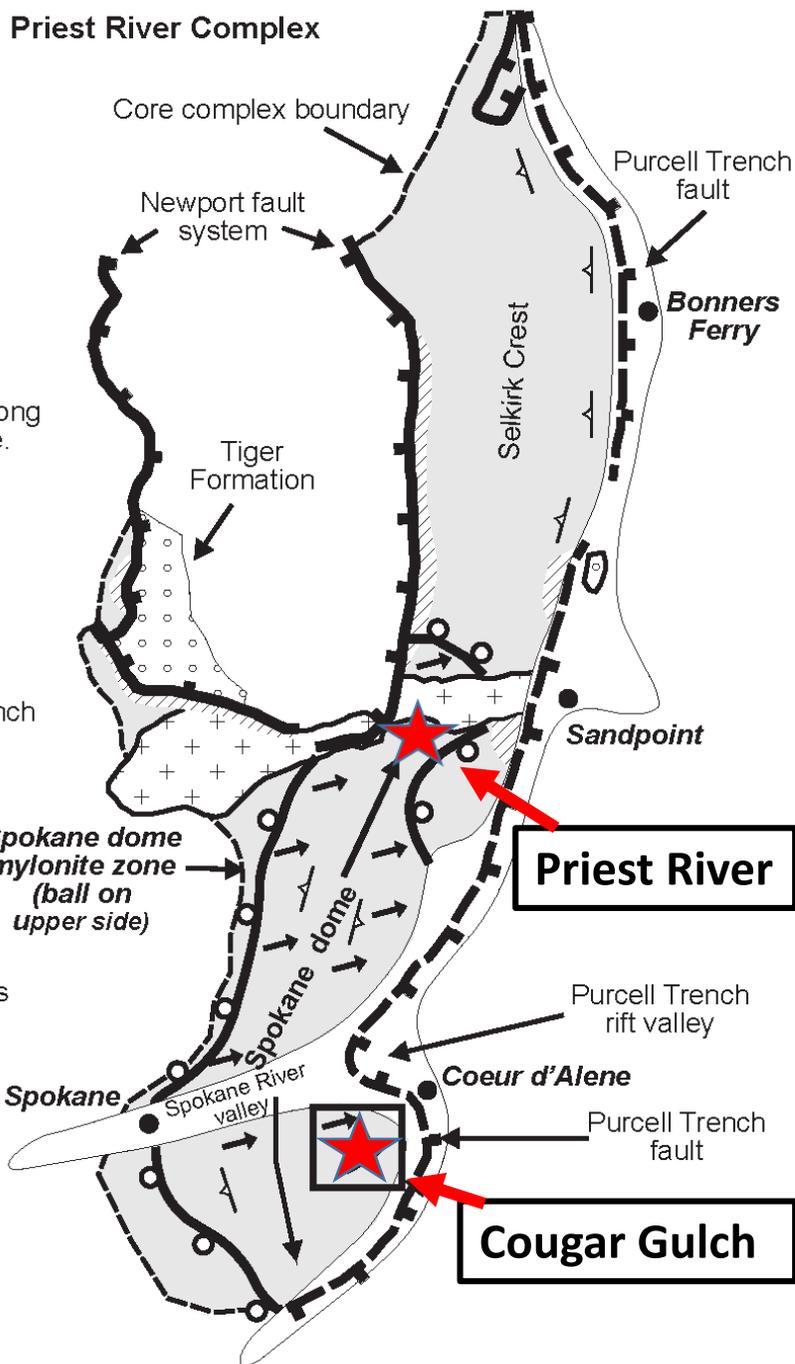






Priest River Complex

- Spokane dome mylonite lineation. Arrow indicates the sense of shear, or if a long arrow, the structural plunge.
- Fine-grained mylonites
- Foliation, mylonite zone (ball on upper plate), detachment fault (teeth on upper plate), respectively
- Valley fill in the Purcell Trench
- Eocene sedimentary rocks
- Eocene plutons
- Metamorphic rocks and Cretaceous igneous rocks
- Pre-Belt basement localities



Modified after
Doughty et al., 2016

Cougar Gulch, ID

(Buddington, et al., 2017)

Priest River, ID

(Doughty, et al 1998)

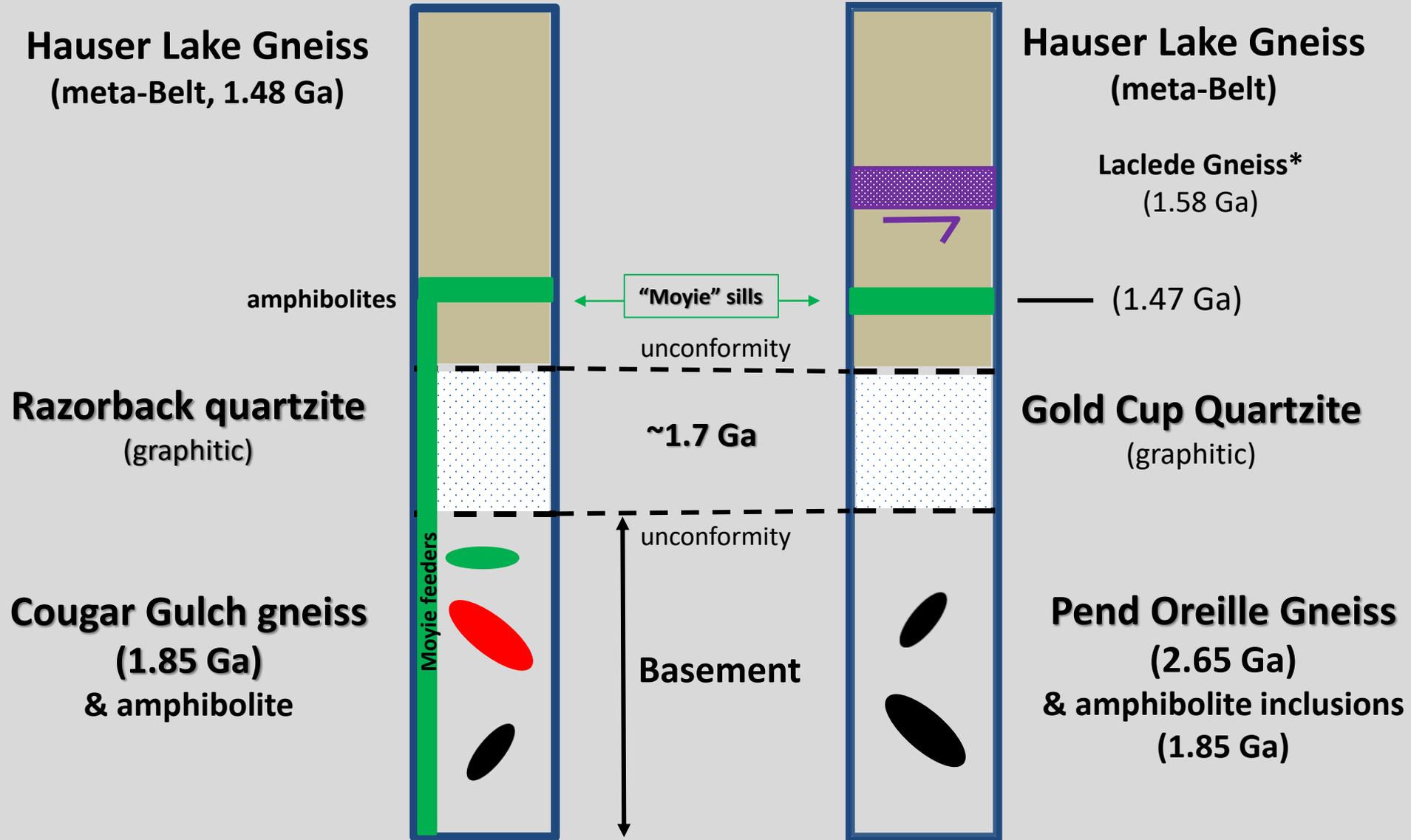


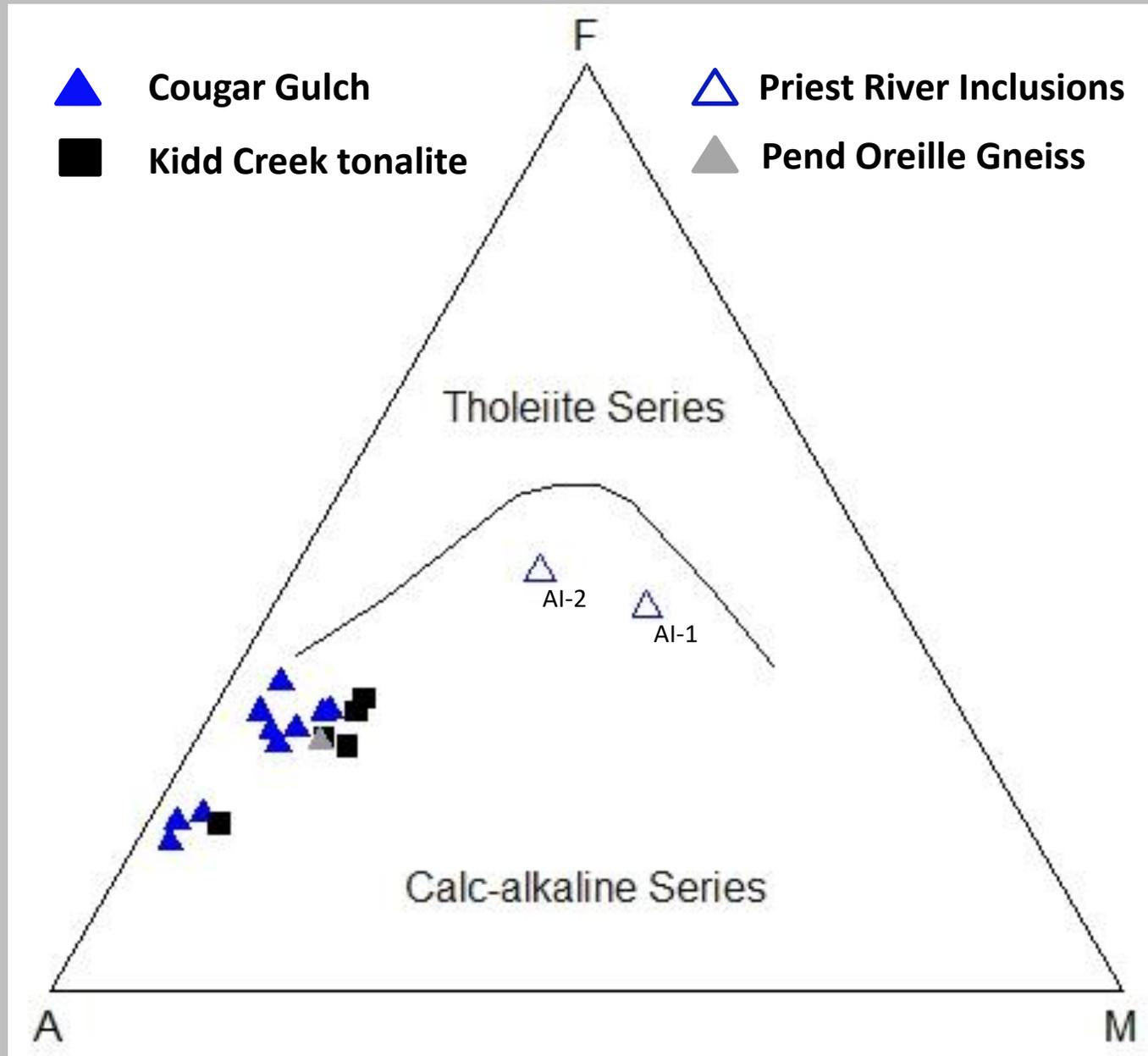
Table 1. Zircon U-Pb Summary

Sample	Number of analyzed grains		$^{207}\text{Pb}/^{206}\text{Pb}$ age (Ma)		
	Total	<10% discordance	Oldest	Youngest	Mean
<i>Metaigneous</i>					
<i>Neoarchean</i>					
13DW02	28	-	2686	2577	2650±10
<i>Paleoproterozoic</i>					
13DW01	28	-	1873	1848	1859±5
13DW03	31	-	1833	1900	1870±11
13DW05	36	-	1850	1895	1871±5
13DW06	32	-	2691 ⁺	1859	1872±5
13DW07	32	-	2665 ⁺	1854	1869±6
14DW12	18	-	1891	1832	1859±7
14DW13	26	-	1856	1904	1876±5
15DW17	16	-	2619 ⁺	1830	1855±10
<i>Metasediment</i>					
13DW04	125	110	3355	1727	-
15DW16	97	95	2484	1458	-
15DW18	106	99	3294	1768	-

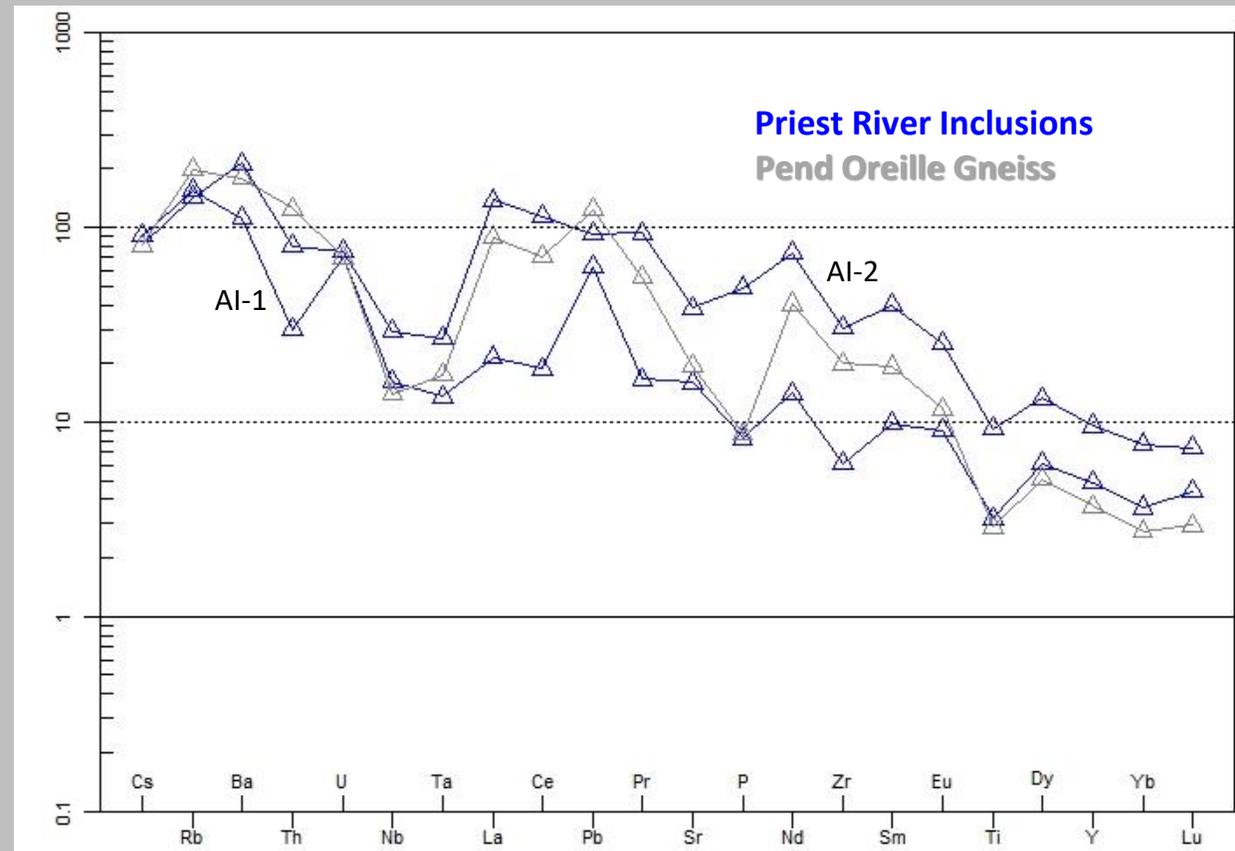
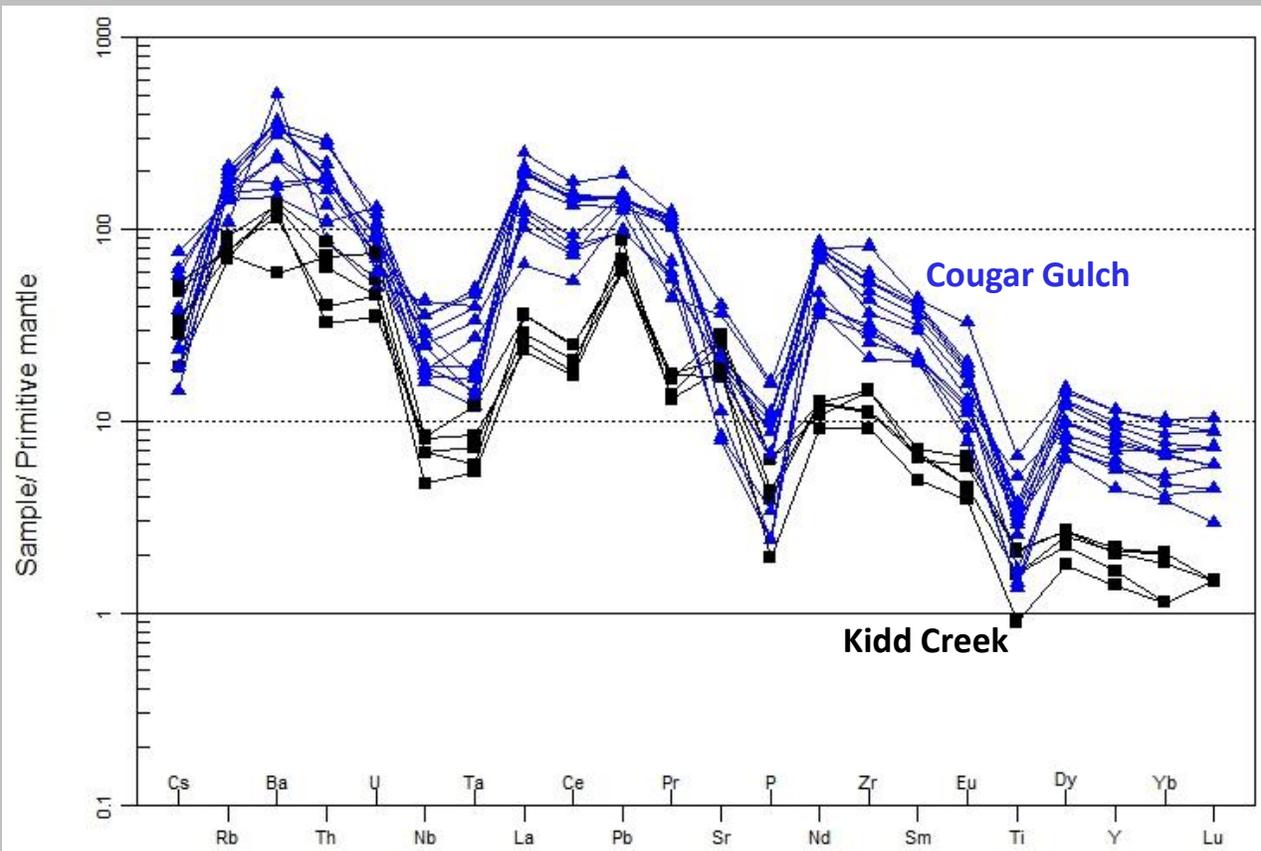
Ages labeled with ⁺ indicate analyses of inheritance

(from Wang, 2015)

Cougar Gulch & Priest River

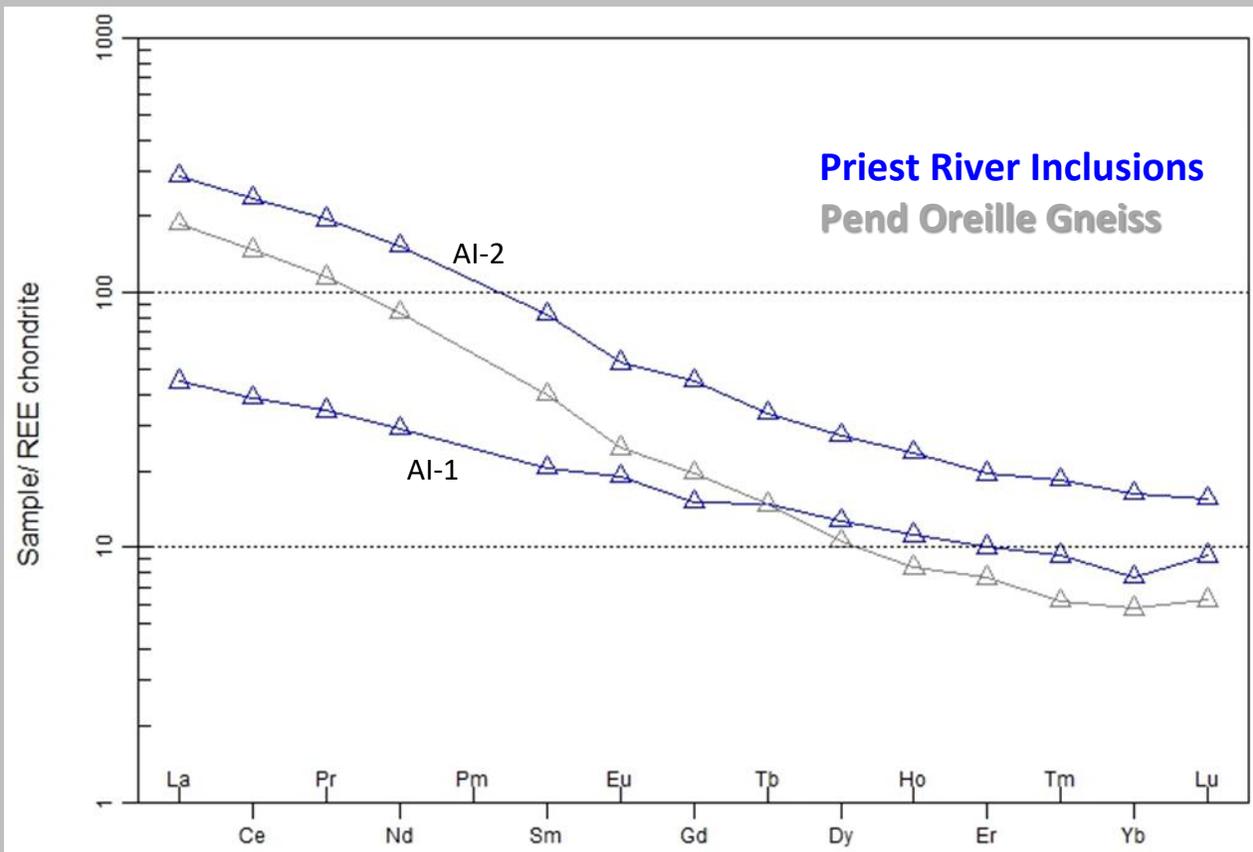
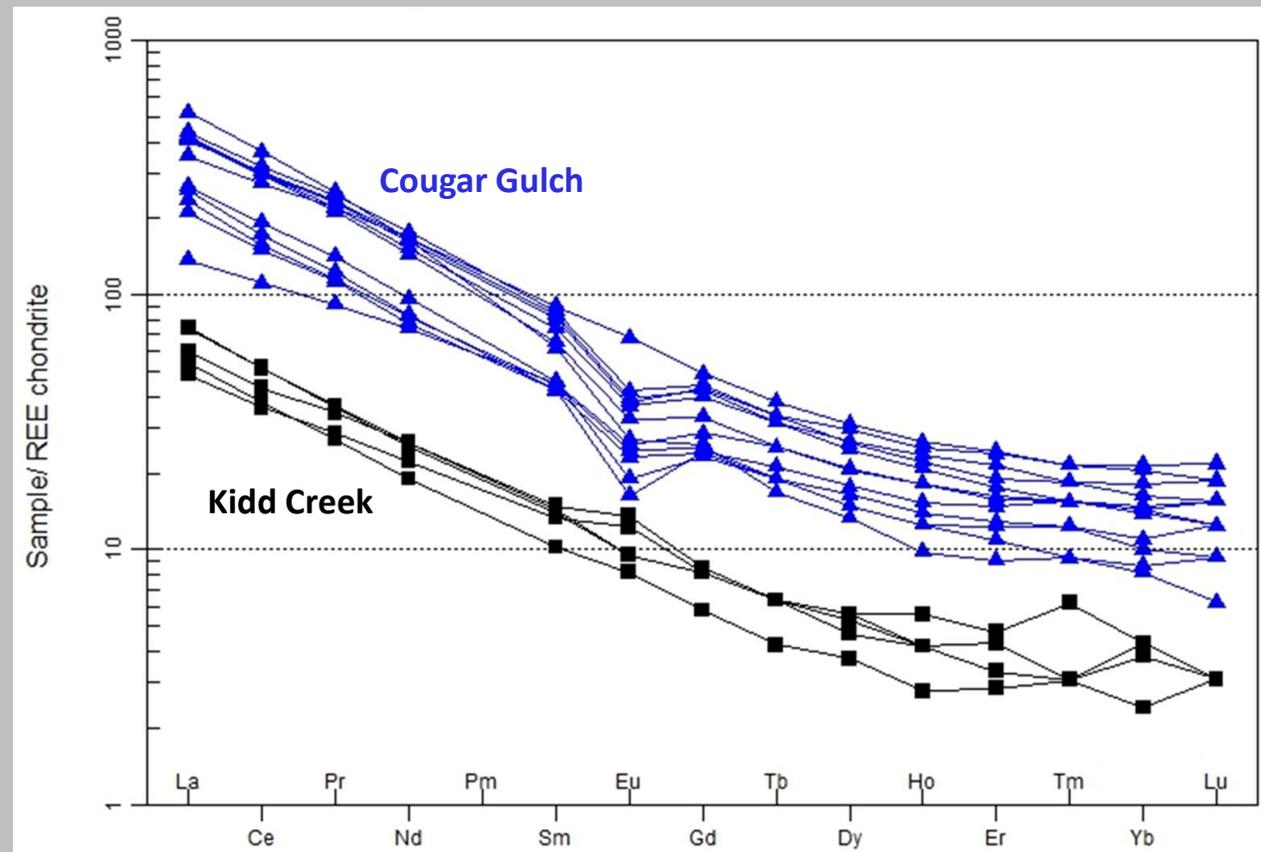


Cougar Gulch & Priest River Trace Elements



Primitive mantle, McDonough & Sun, 1995

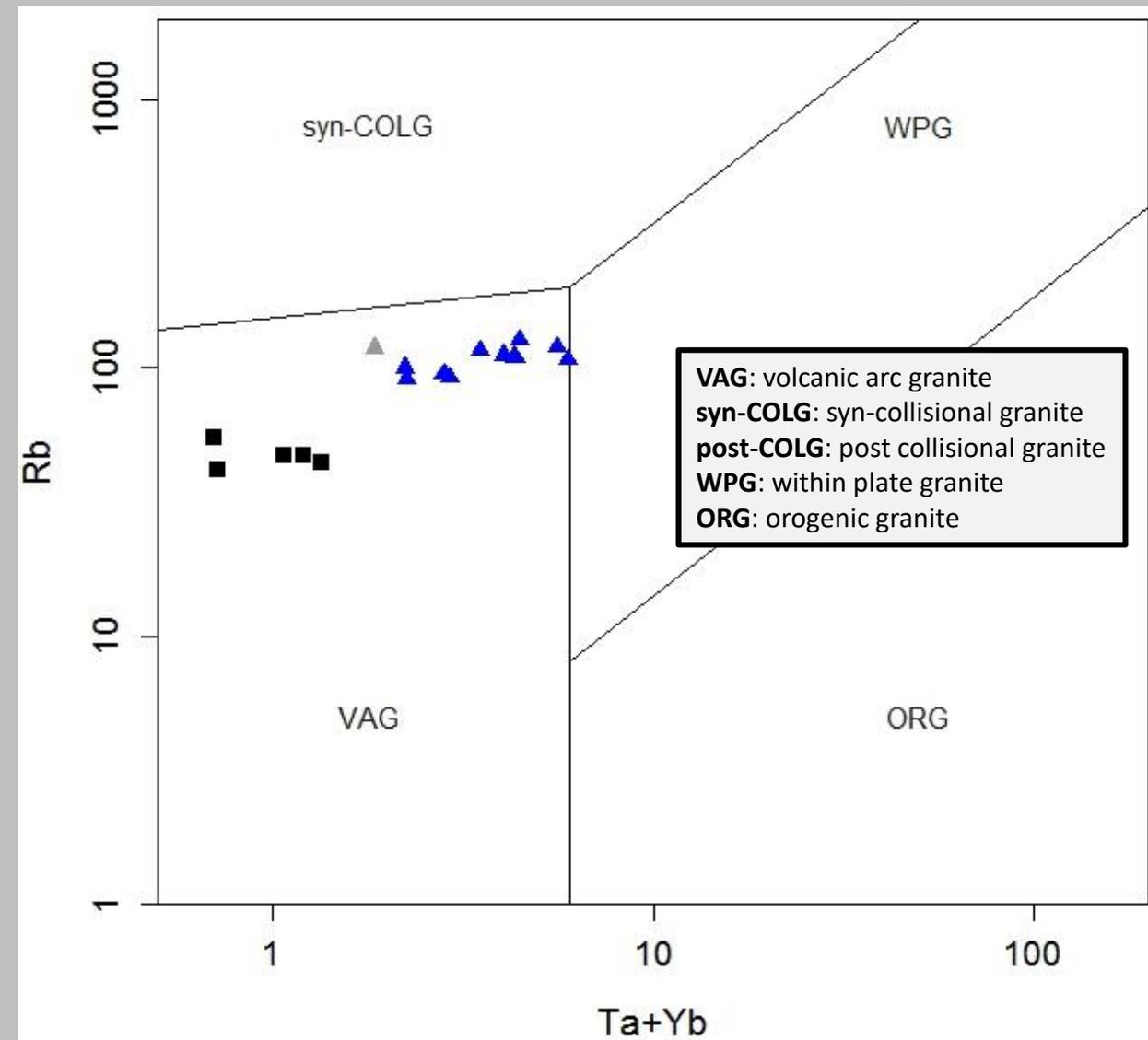
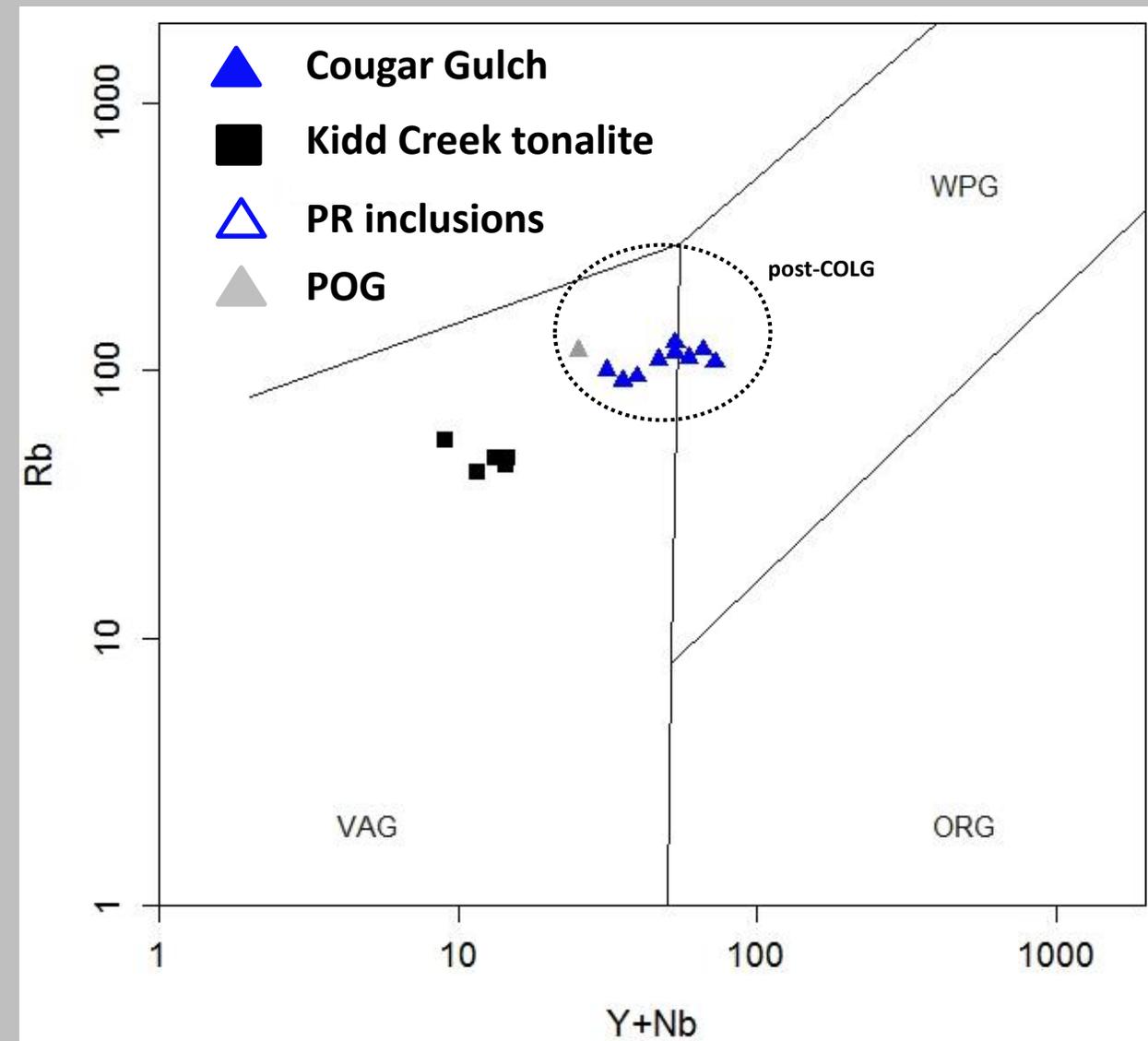
Cougar Gulch & Priest River REEs



Chondrite values from Boynton, 1984

Tectonic Discrimination

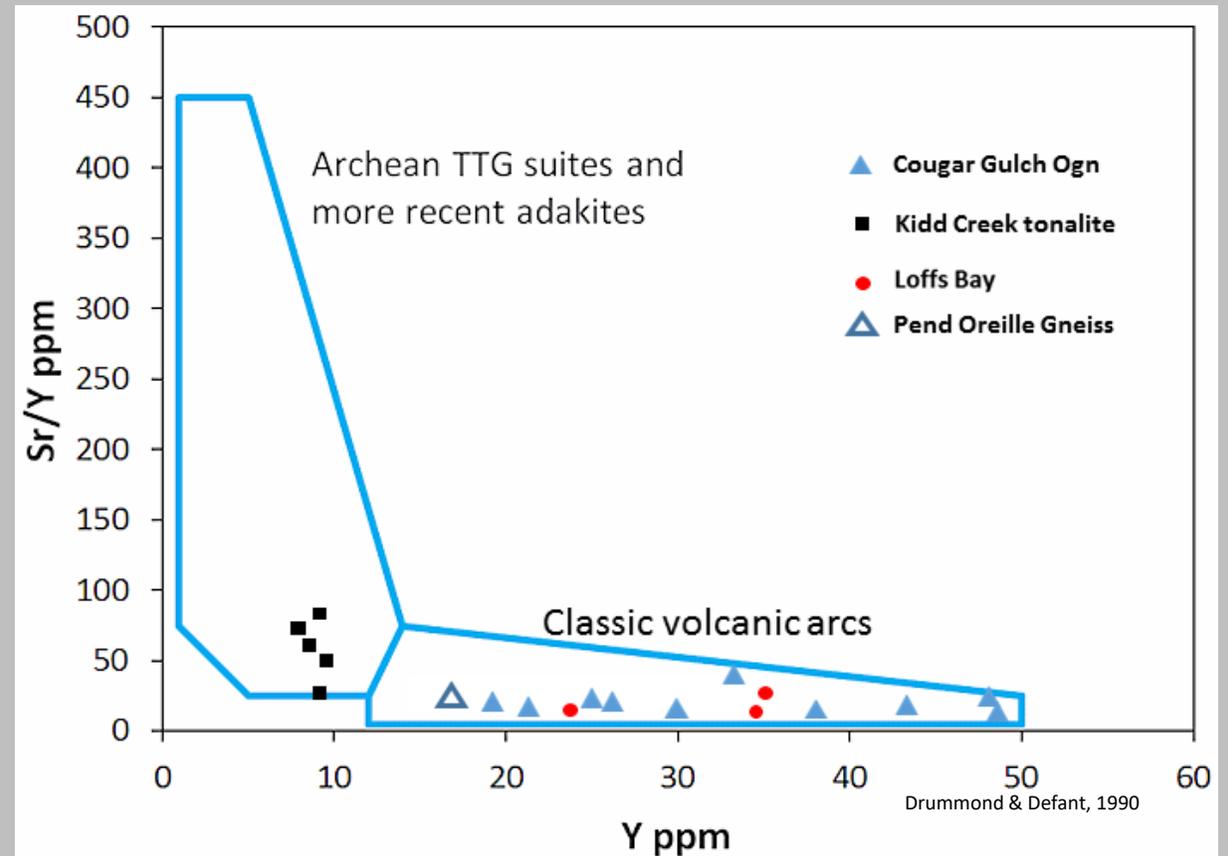
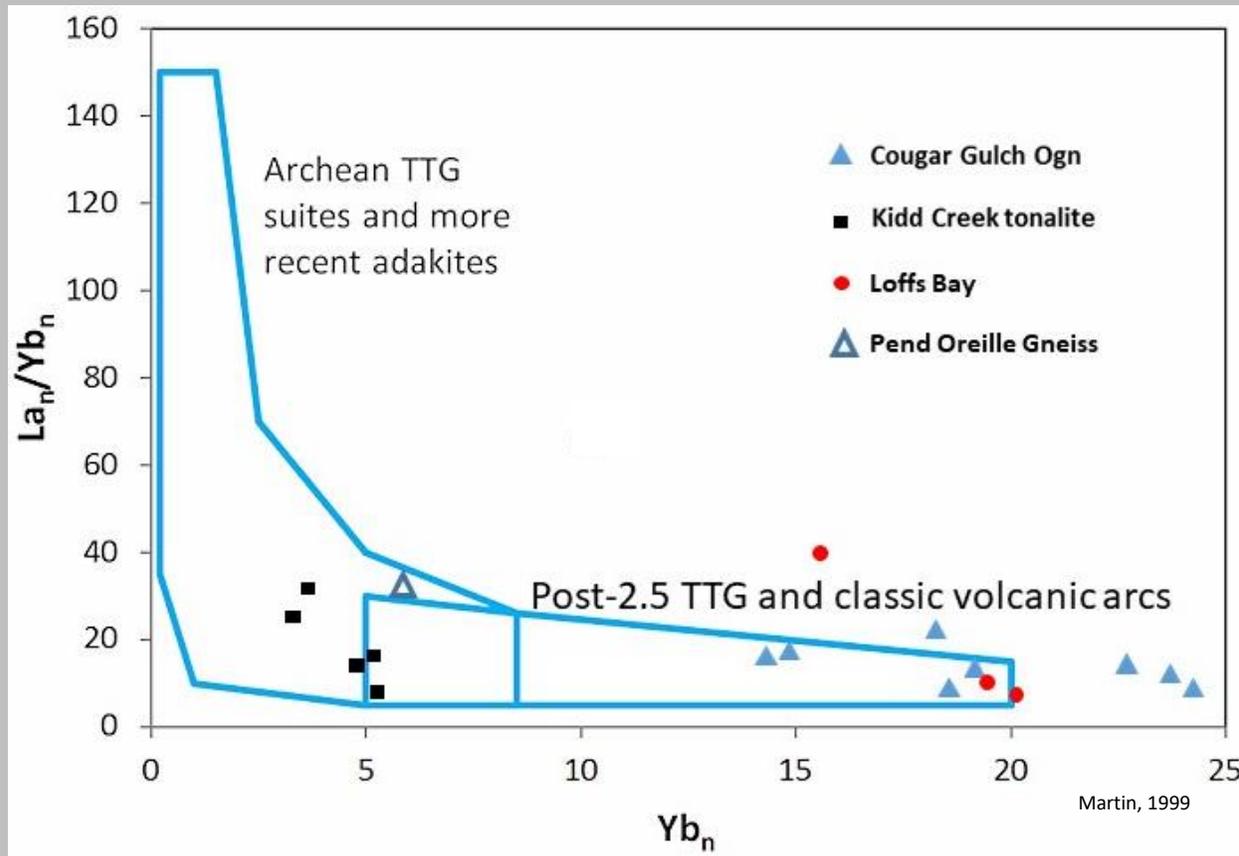
after Pearce, et al., 1984

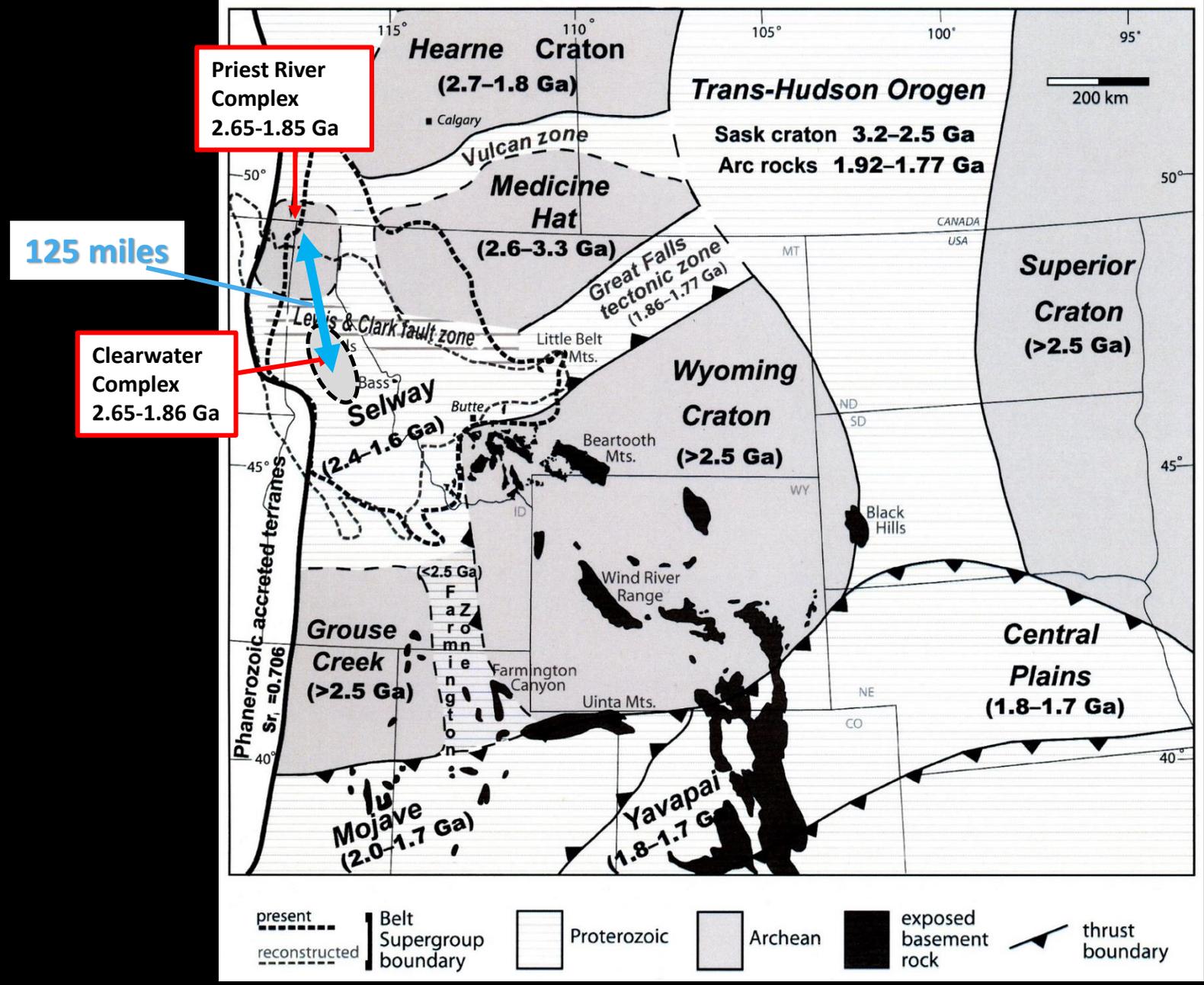


Tectonic Discrimination

TTG Affinity

Tonalite-Trondhjemite-Granodiorite





Basement rocks of western North America (Foster et al., 2006)

Summary

- **1.85 Ga amphibolite inclusions** in 2.65 Ga Pend Oreille Gneiss
- **mafic dikes** dismembered during Eocene (?) or Cretaceous (?)
- **1.85 Ga magmatic signatures** correlate → PRC & CC
- bimodal 1.85 - 2.65 Ga basement → **125 mile extent**

Questions/Implications

- **1.85 Ga subduction signature** real or inherited?
- significant **Paleoproterozoic arc**?
- assembly component of **supercontinent Columbia**?



Thank You!

