



RESEARCH & INNOVATION PROGRAMME
ON RAW MATERIALS
TO FOSTER CIRCULAR ECONOMY

EGU21-12390 -Unravelling the relationship between mafic magmatism and Sb mineralization through dolerite geochemistry (Central Iberian Zone, Spain)

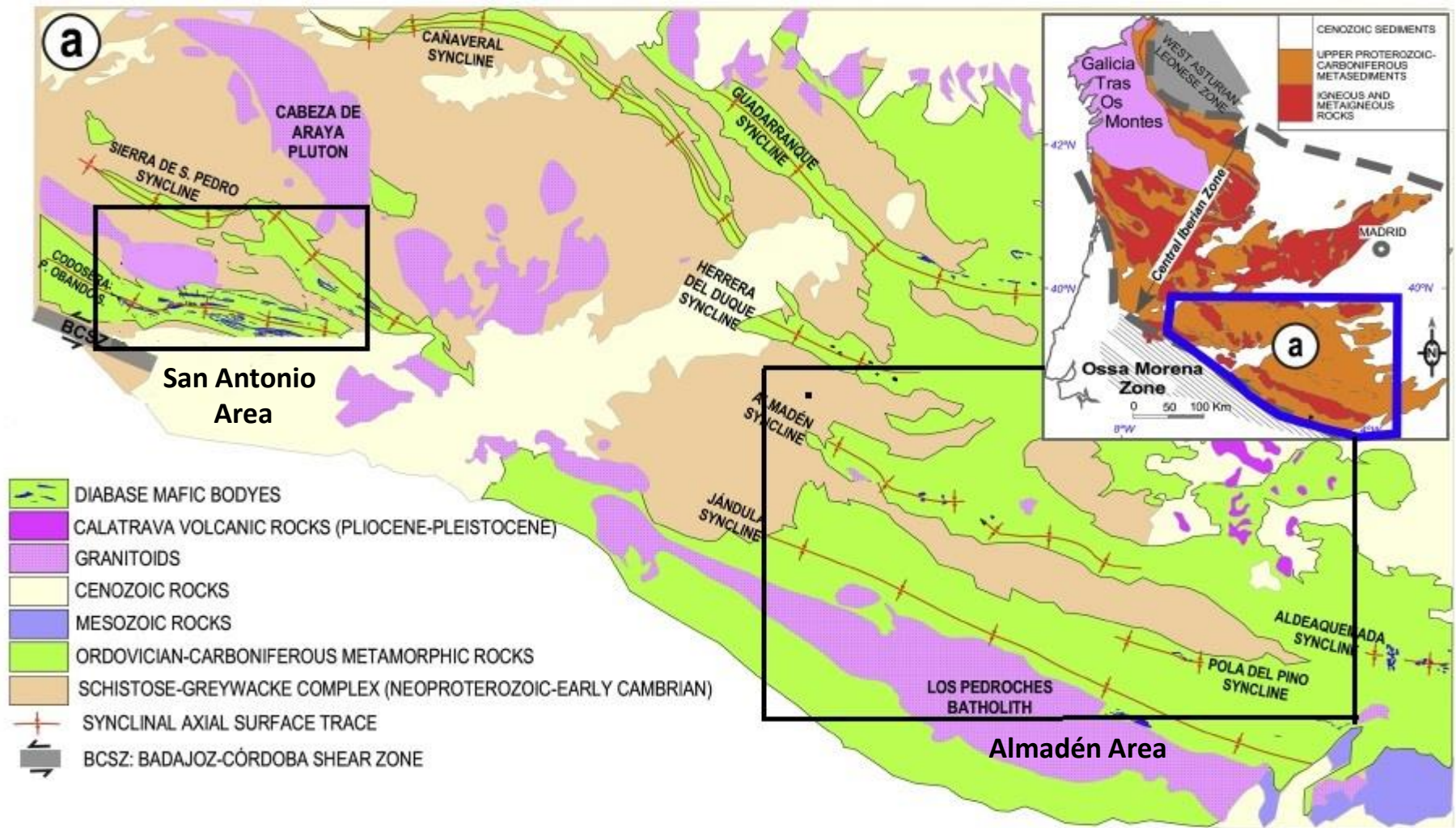
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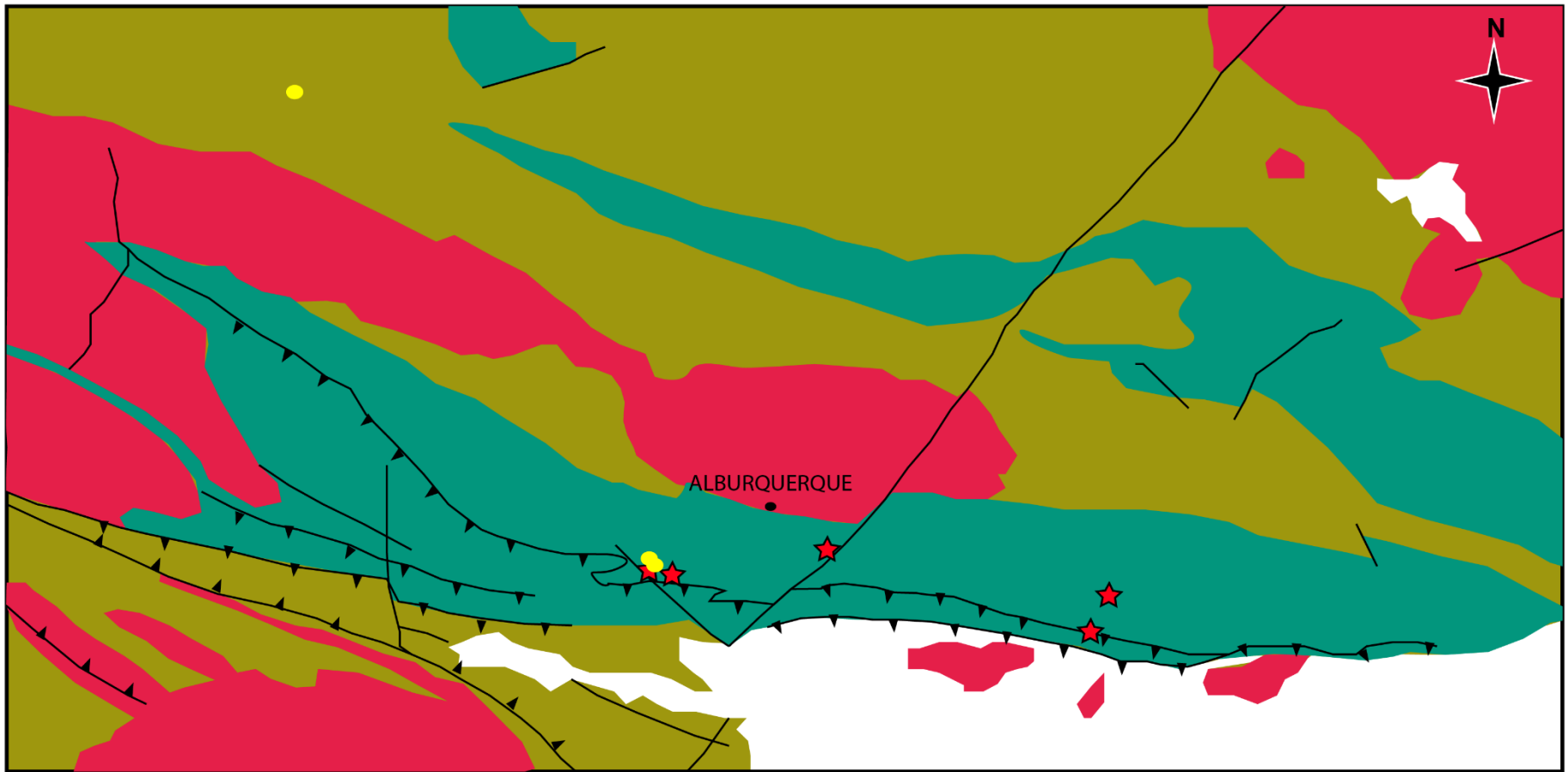


1-Study area



(Modified after Lopez-Moro et al., 2020)

SAN ANTONIO AREA



INTRUSIVE ROCKS

CENOZOIC ROCKS

ORDOVICIAN-CARBONIFEROUS ROCKS

NEOPROTEROZOIC-CAMBRIAN ROCKS

THRUST

EXTENSIONAL FAULT

FAULT

DOLERITES

Sb-MINERALIZATION

10km

ALMADÉN AREA



GRANITIDS

CENOZOIC ROCKS

ORDOVICIAN-CARBONIFEROUS ROCKS

NEOPROTEROZOIC-CAMBRIAN ROCKS

THRUST

EXTENSIONAL FAULT

FAULT

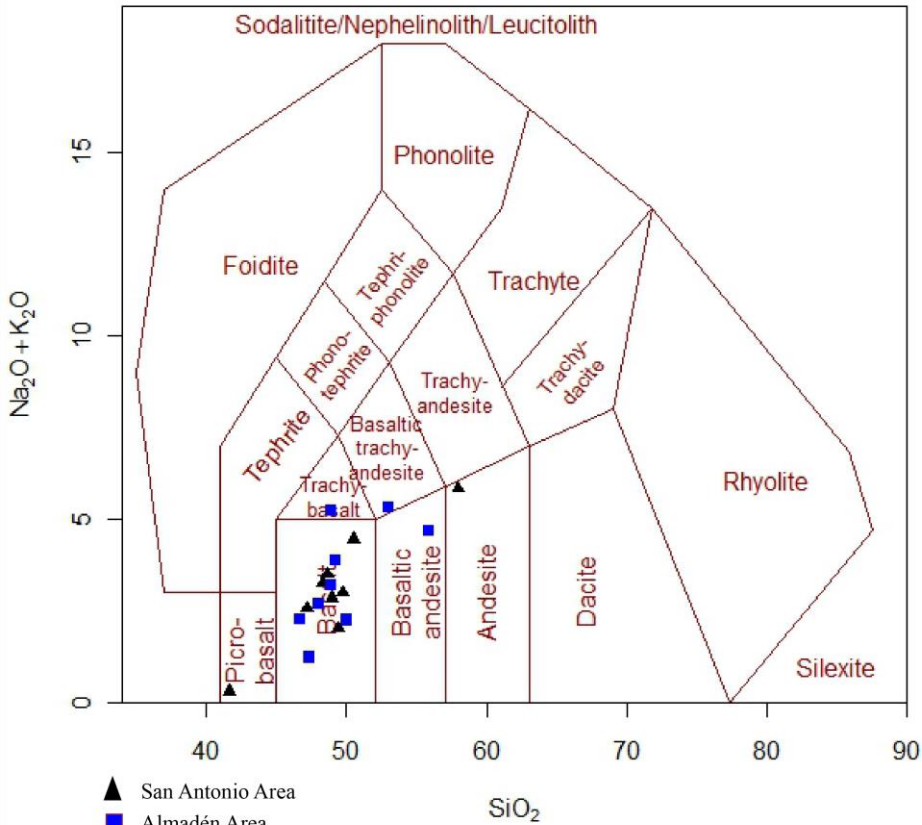
DOLERITES

Sb-MINERALIZATION

20km

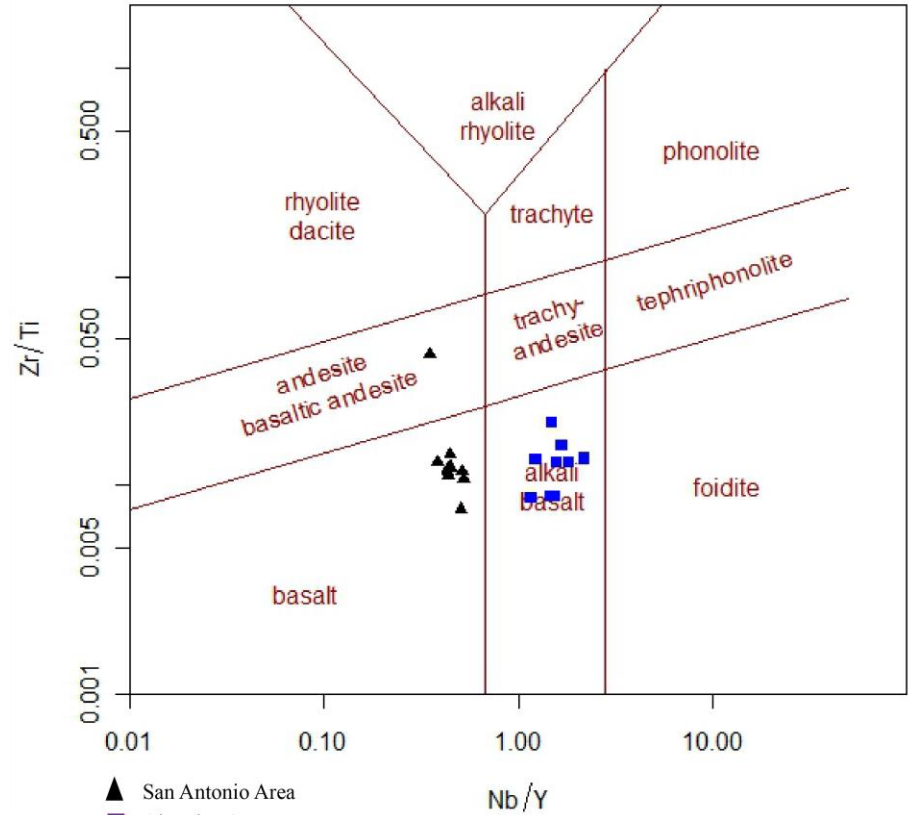
3-Whole Rock Geochemistry

MAFIC ROCKS SAN ANTONIO AND ALMADÉN AREAS



▲ San Antonio Area
 ■ Almadén Area
 TAS Diagram- Middlemost (1994)

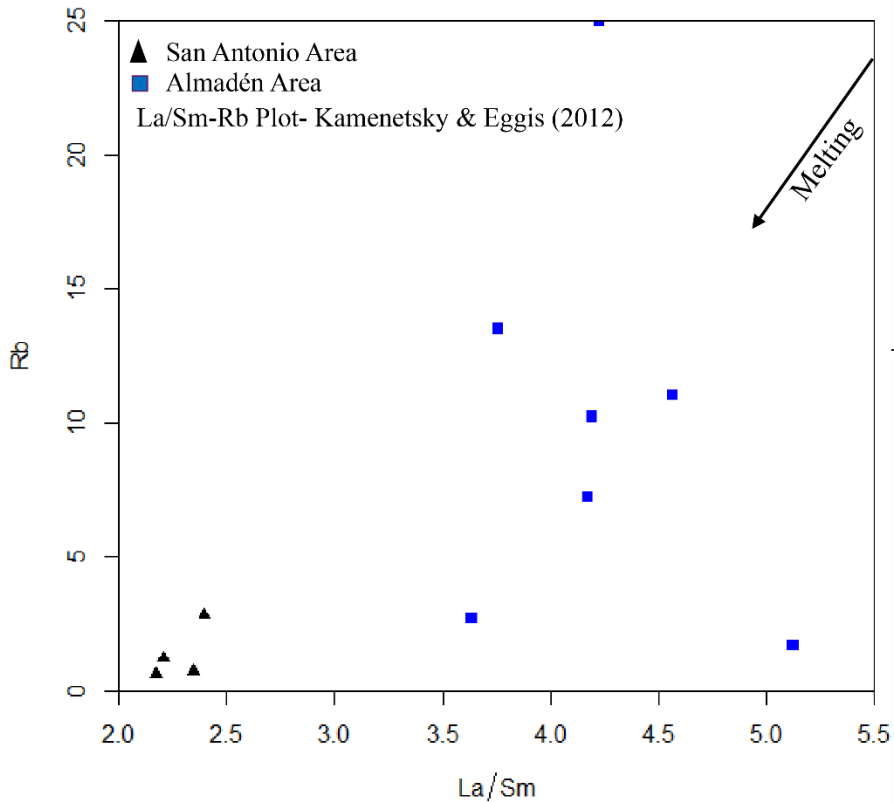
MAFIC ROCKS SAN ANTONIO AND ALMADÉN AREAS



▲ San Antonio Area
 ■ Almadén Area
 Nb/Y-Zr/Ti Plot- Pearce (1996)

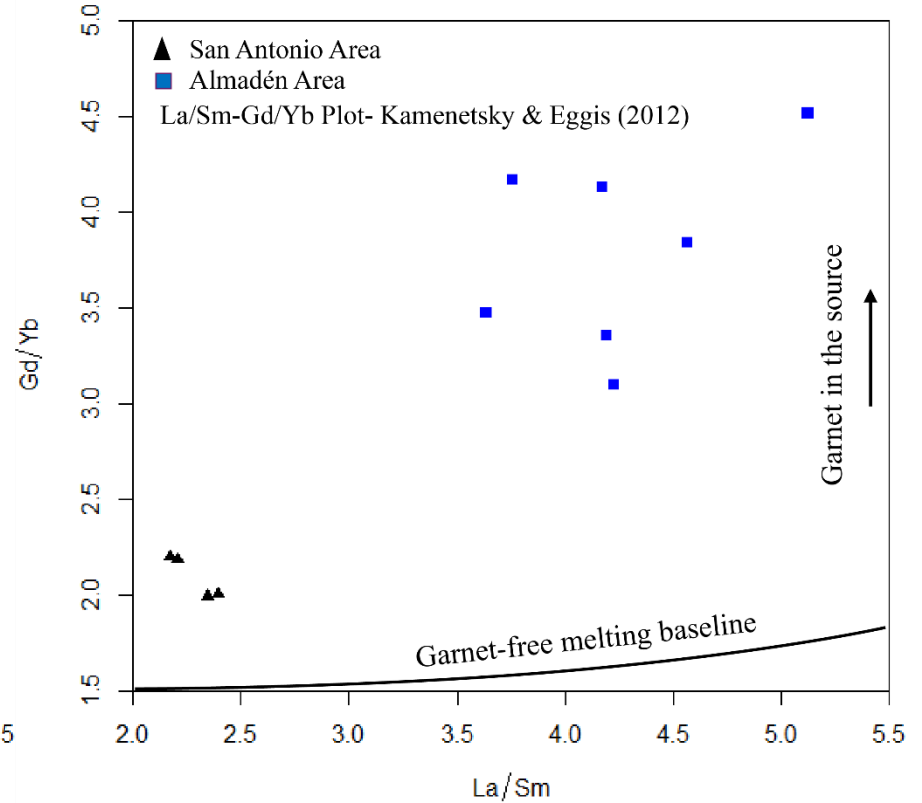
3-Whole Rock Geochemistry

La/Sm vs Rb



Low degree of partial melting

La/Sm vs Gd/Yb

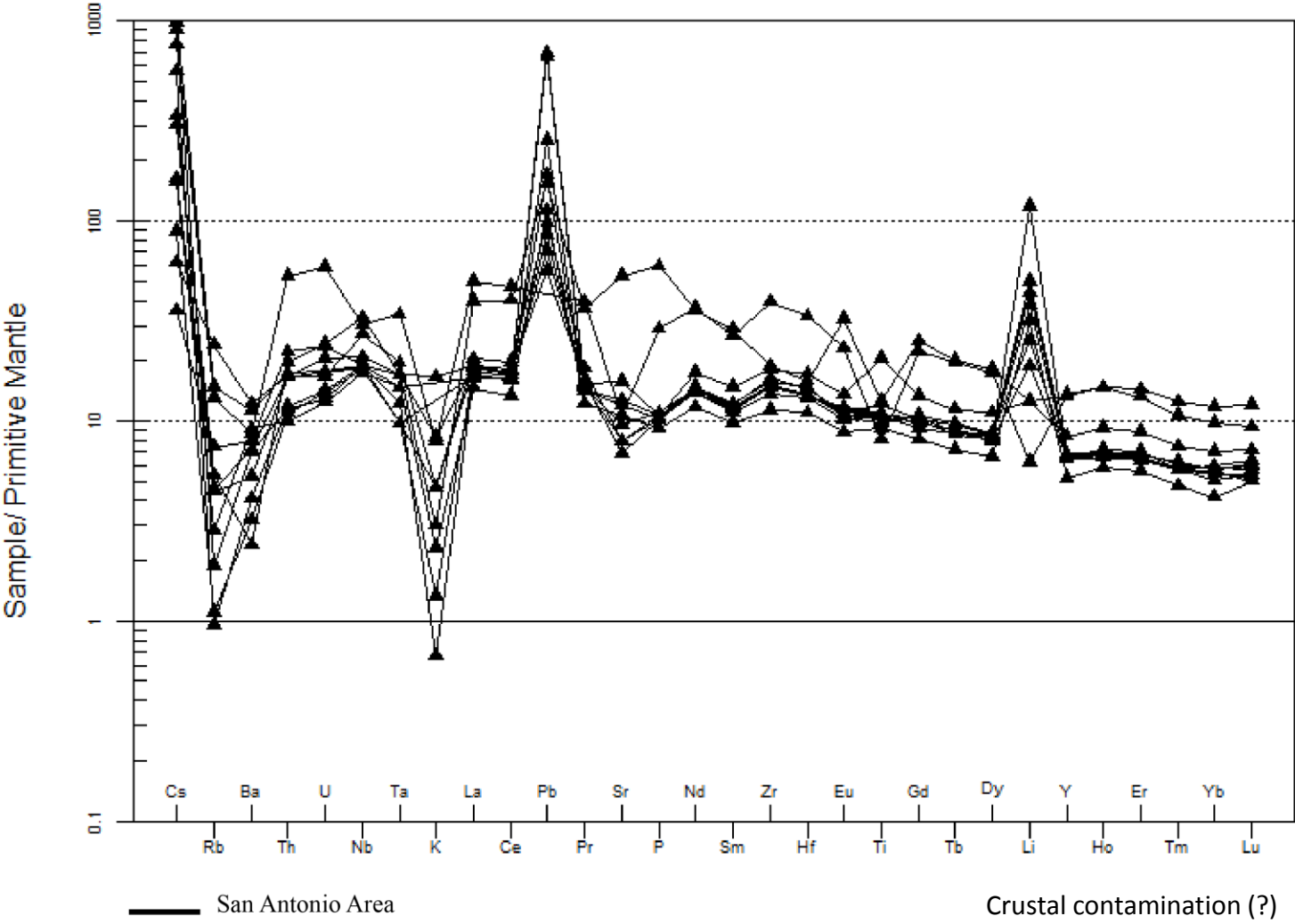


Garnet in the source

Th/La (0.10 for SA), (0.09 for Al); Zr/Y (5.46 for SA), (8.53 for Al)- comparable to those of an enriched mantle source (Fitton et al., 1988; Wilson, 1993)

4-PM normalized diagram-San Antonio Area

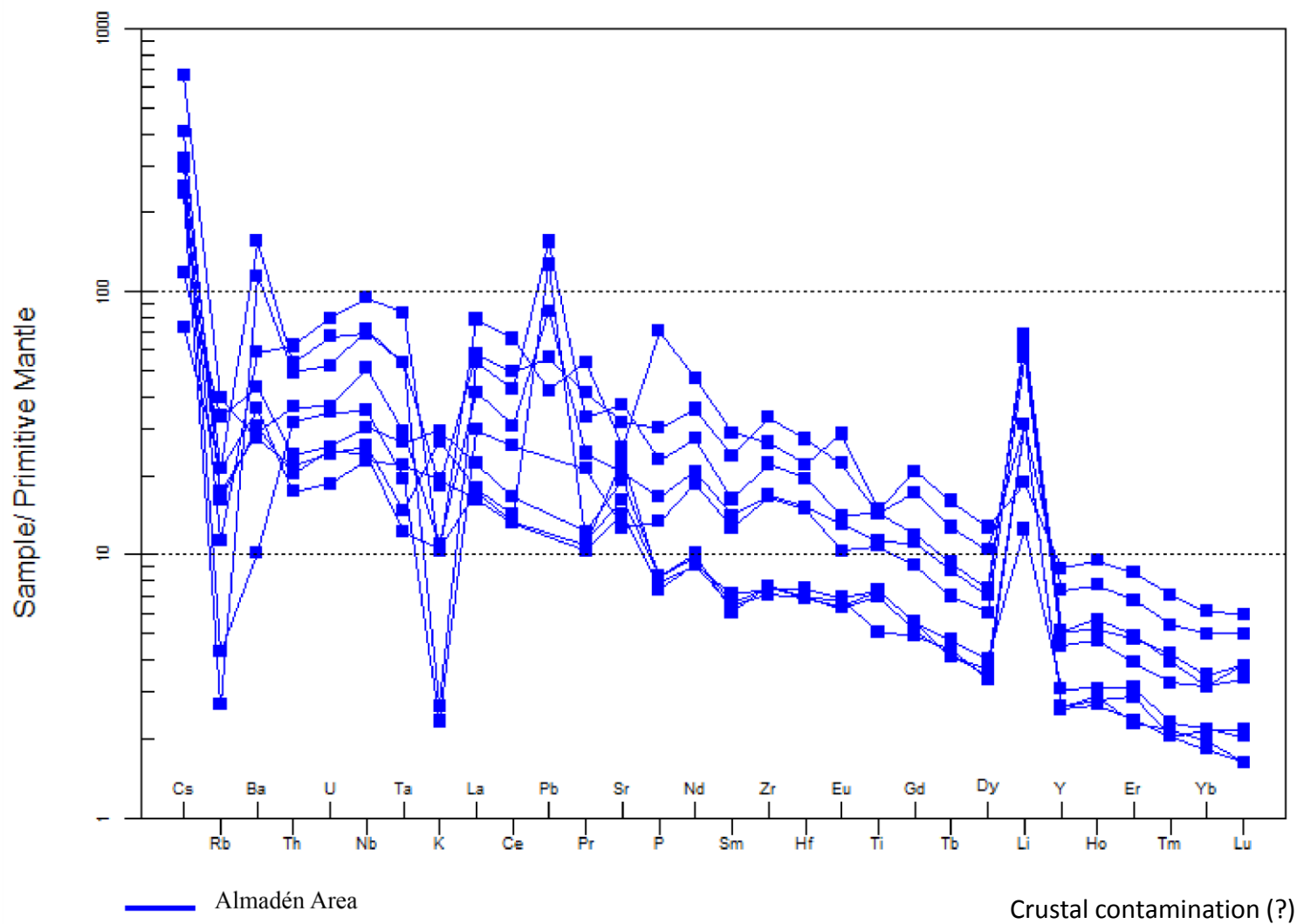
MAFIC ROCKS SAN ANTONIO AREA



Primitive Mantle - Sun & McDonough (1989)

4-PM normalized diagram-Almadén Area

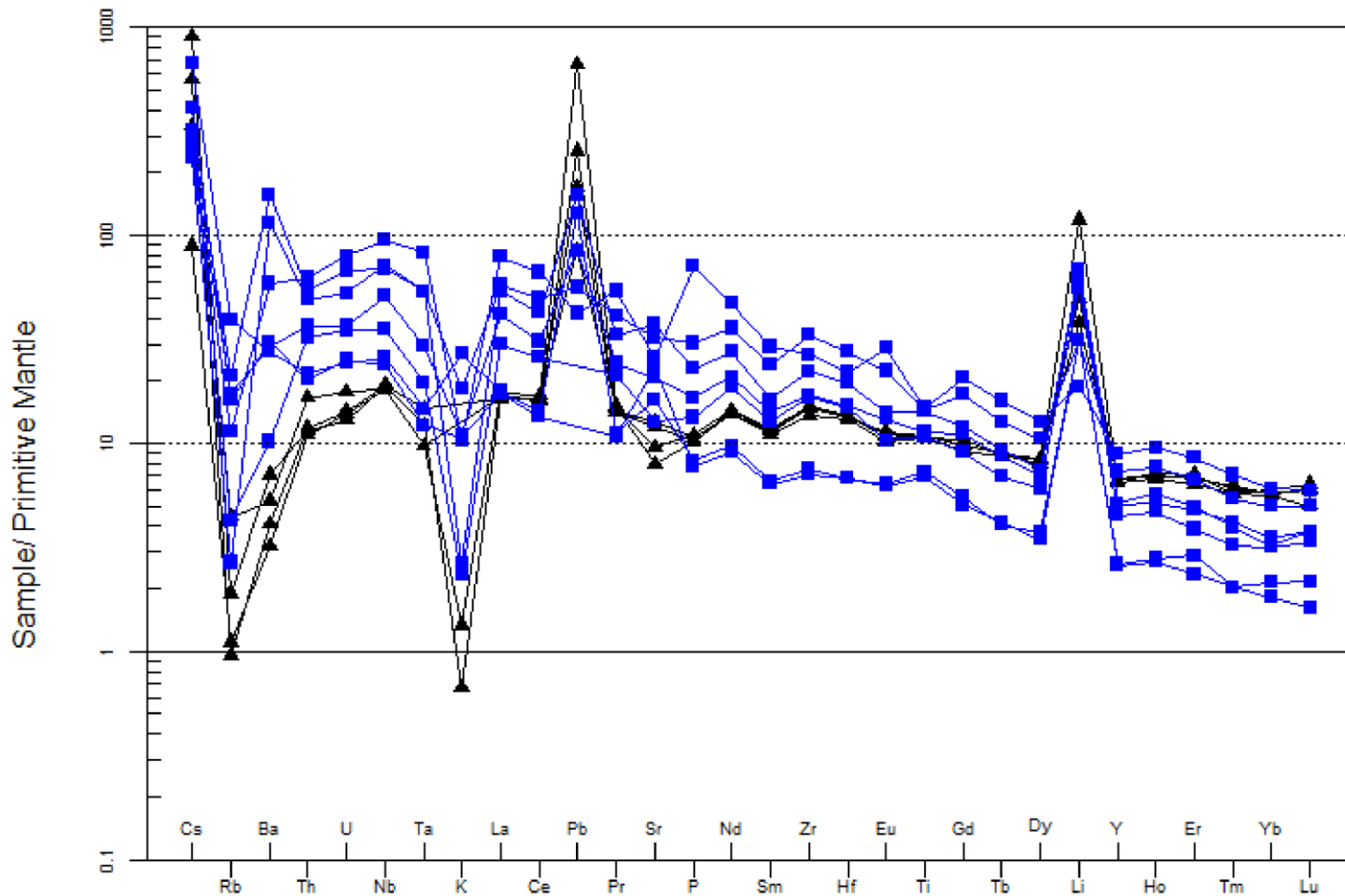
MAFIC ROCKS ALMADÉN AREA



Primitive Mantle - Sun & McDonough (1989)

4-PM normalized diagram-SA-AL-Sb Mineralization

MAFIC ROCKS SPATIALLY RELATED TO Sb MINERALIZATION



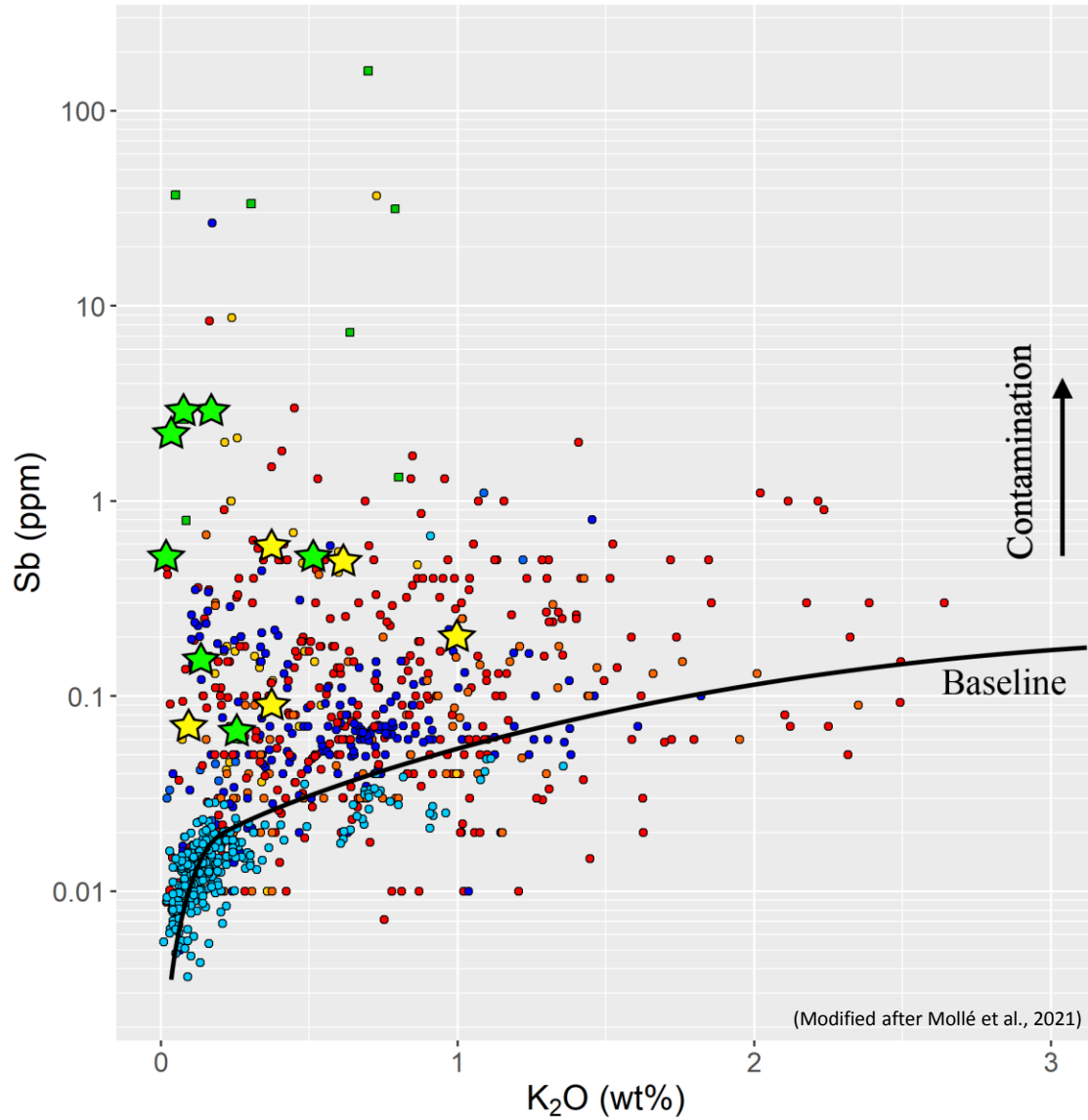
— San Antonio Area

— Almadén Area

Primitive Mantle - Sun & McDonough (1989)

Highest anomalies in K, Rb, Pb et Li- SA-Hydrothermalism

5-Sb vs K₂O (wt%)



(Modified after Mollé et al., 2021)

Geodynamic context

- Mid-oceanic ridge
- Oceanic plateau
- Oceanic island
- Trap
- Rift
- Convergent margins

Ore deposit

- Semnon
- Almadén
- San Antonio

Crustal contamination (?)

6-Conclusions

- A spatial link between Sb mineralization and mafic magmatism is proposed for these areas of the CIZ.
- SA fall into the classical basalt field whereas Al fall into the alkali basalt field according to the Zr/TiO₂ vs Nb/Y diagram.
- La/Sm vs Gd/Yb and La/Sm vs Rb suggest the presence of garnet in the source and low degree of partial melting.
- Negative anomalies in K and Rb could be associated with presence of phlogopite in the source.
- Anomalies in K, Rb, Pb et Li could be an effect of hydrothermalism.
- Trace element ratios such as Th/La (0,10 for SA) and (0,09 for Al), for both areas suggest an enriched mantle source.
- Sb vs K₂O (wt%) and anomalies in Li suggest crustal contamination, this is coherent regarding positive anomalies in Cs, Pb that may be related to sediment addition and subduction processes.

References

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