MinExTarget
Workshop 14.12.2021

Rajapalot Au-Co deposit as an example of atypical orogenic gold

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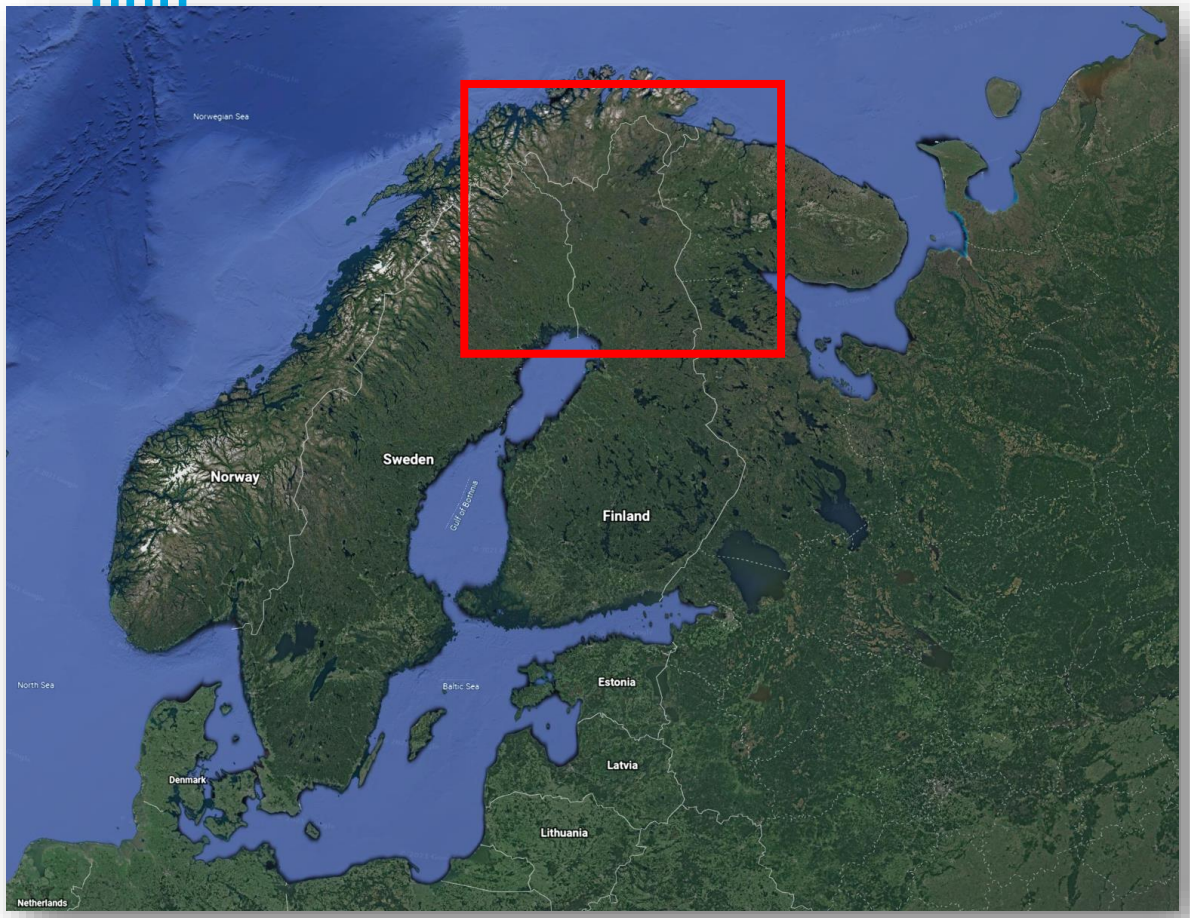
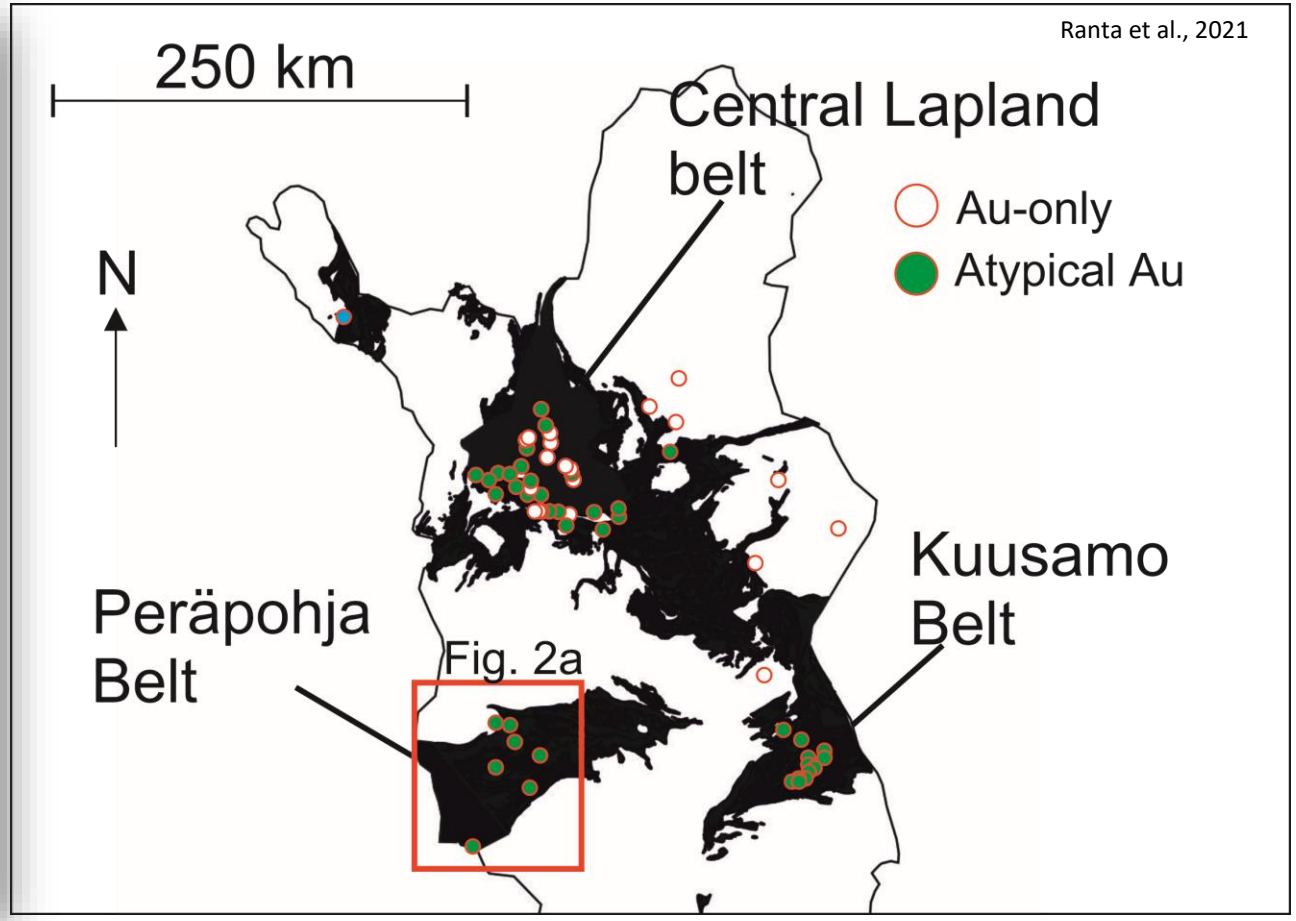
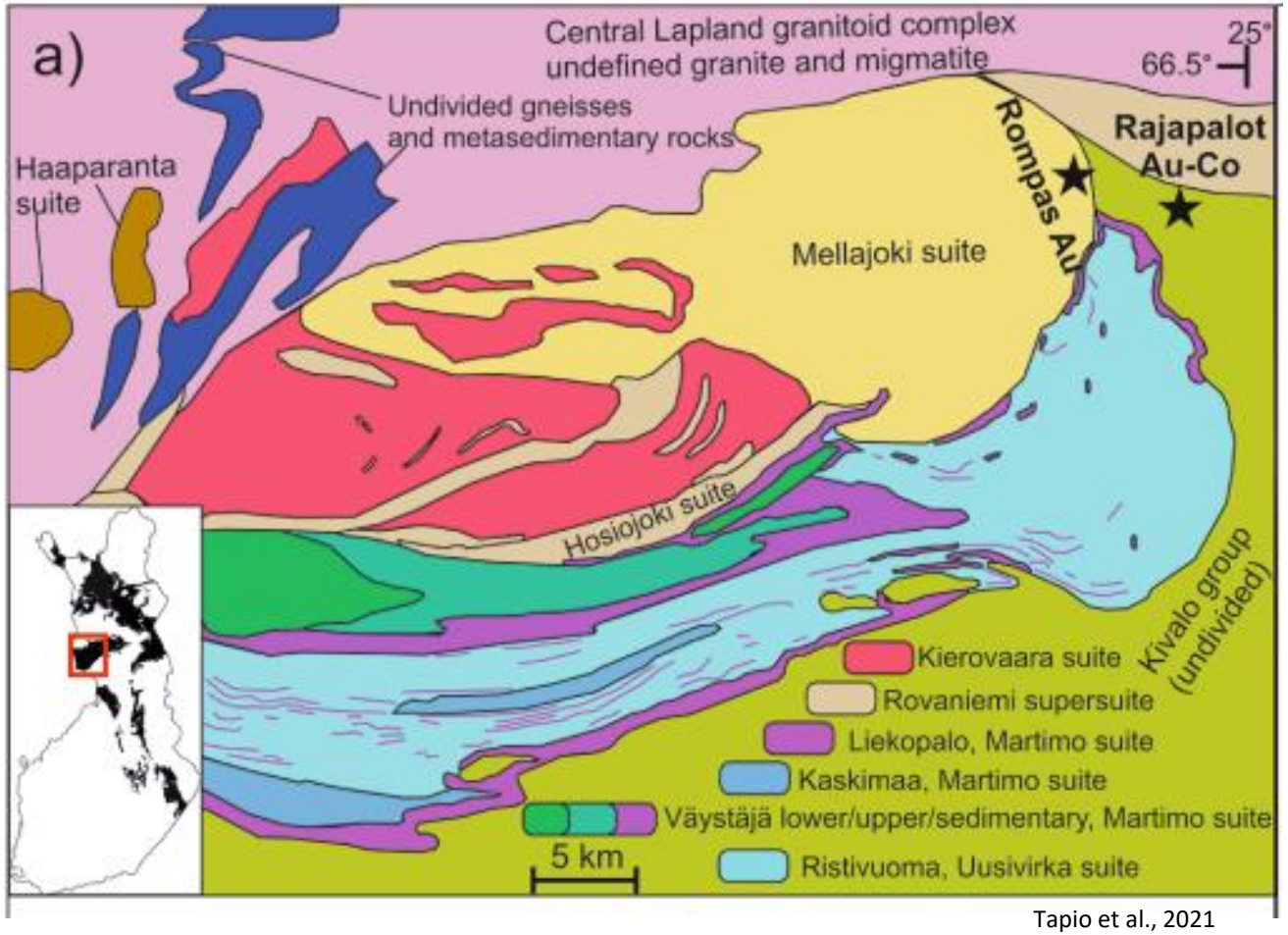




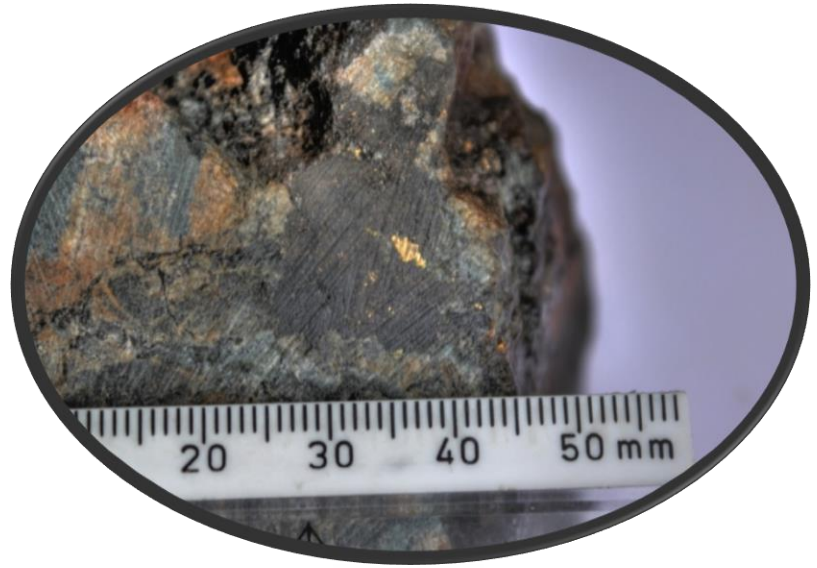
Ca. 2.50 – 1.90 Ga Paleoproterozoic volcano-sedimentary belts

Rajapalot Au-Co deposit

- > 1 million oz Au-Co deposit located in Arctic circle in northern Finland
- Discovered initially 2008 as Au-U rich rocks were found from the area with best hand sample containing over 30 000 g/t of gold **(Rompas)**



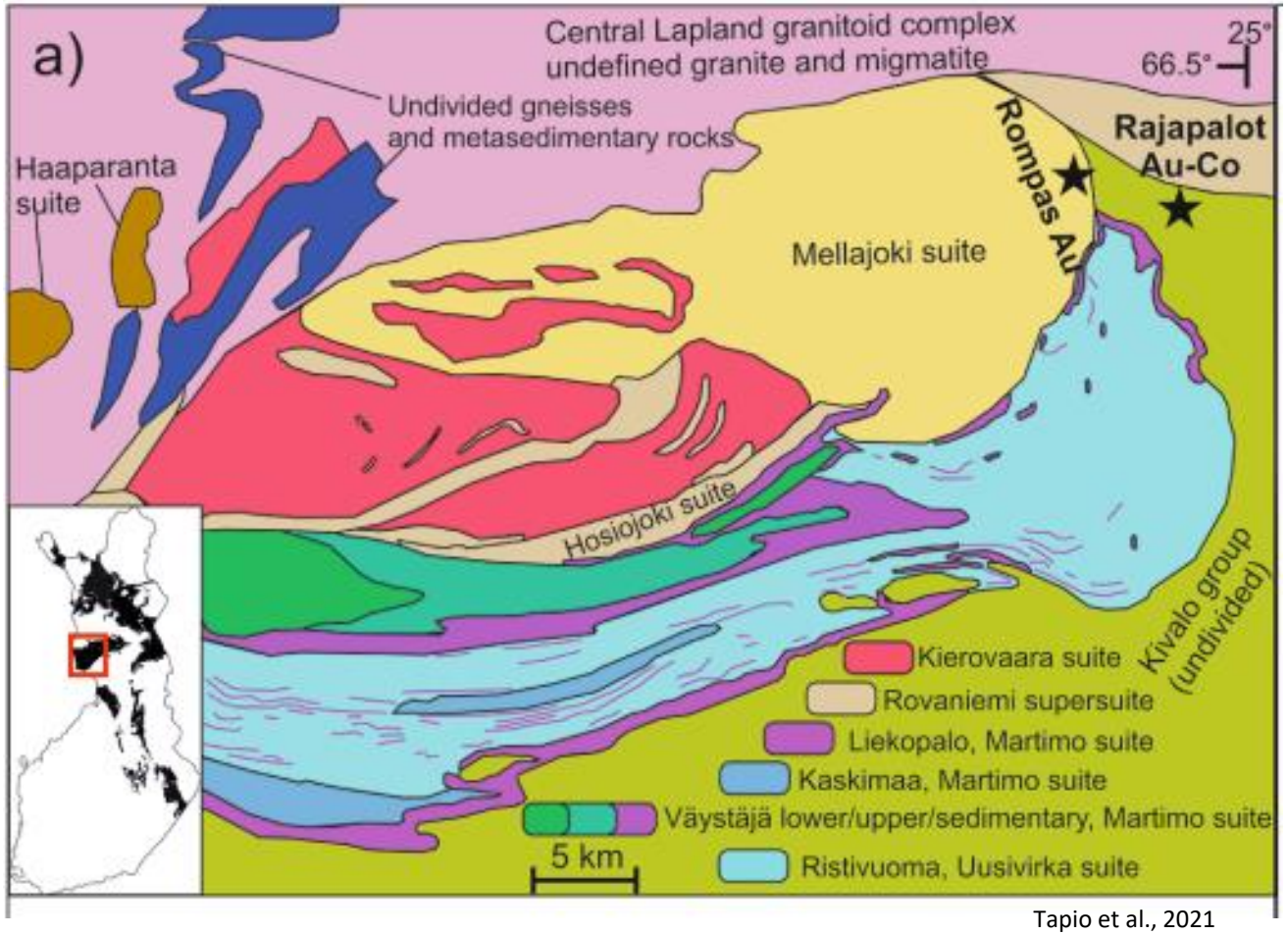
Tapio et al., 2021



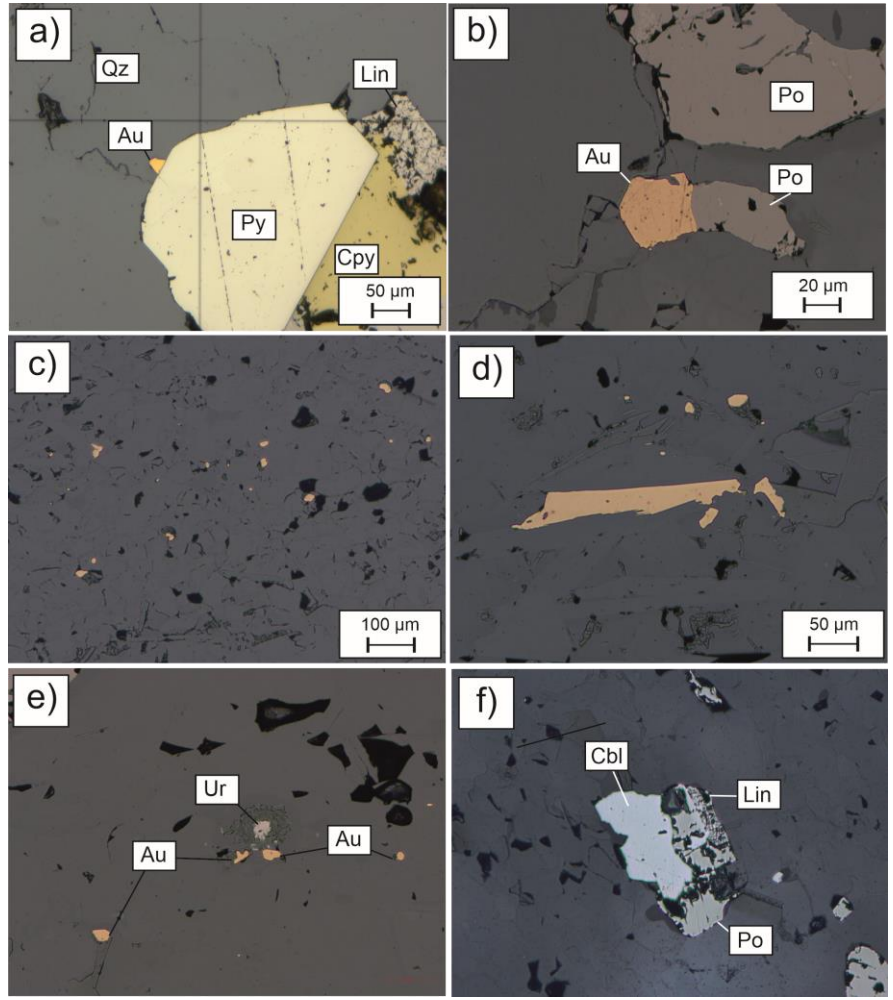
Photos: Courtesy of Mawson Oy

Rajapalot Au-Co deposit

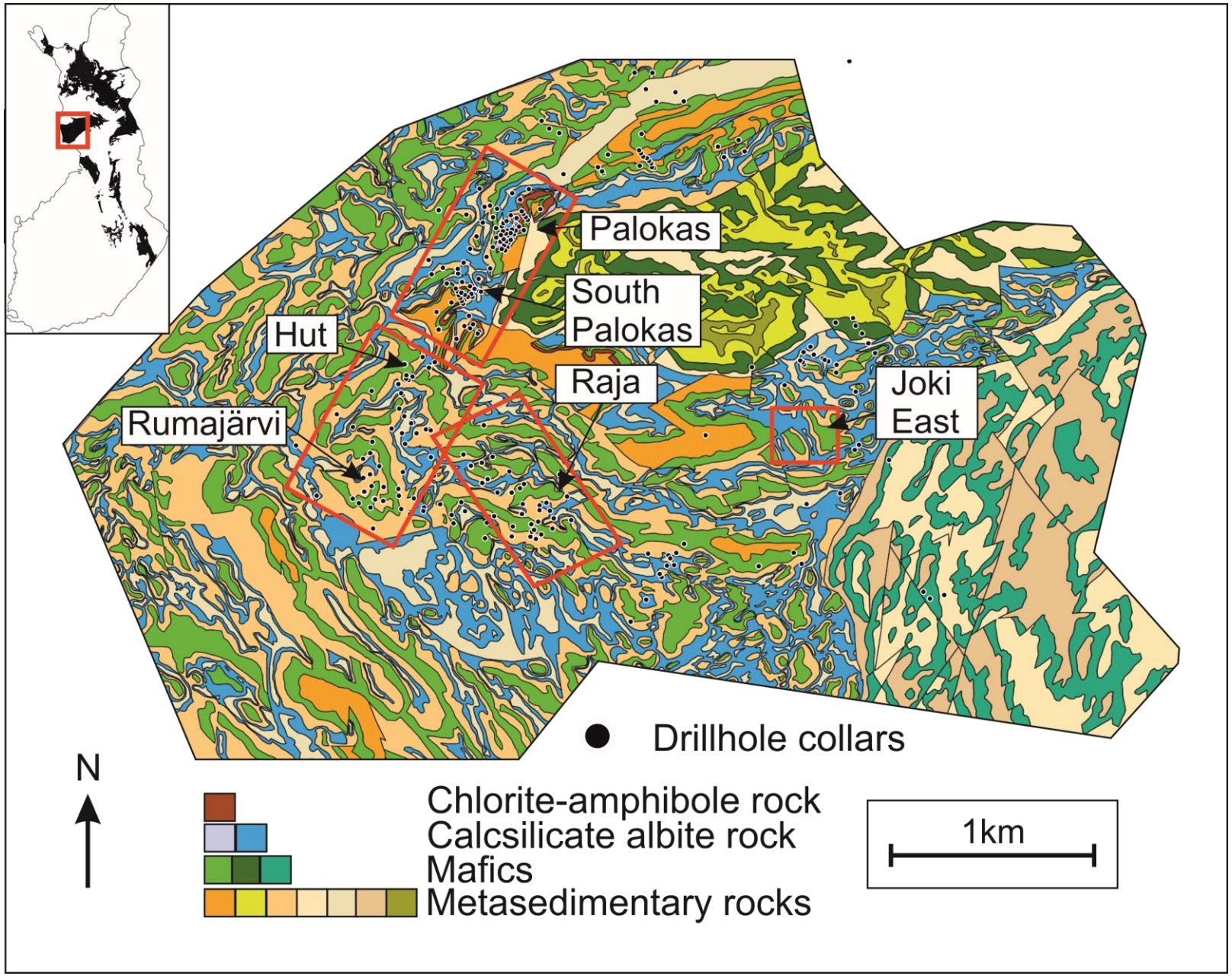
- In 2012 discovery of the **Rajapalot** area with Au-Co 8 km east from the initial Au-U discoveries



Tapio et al., 2021

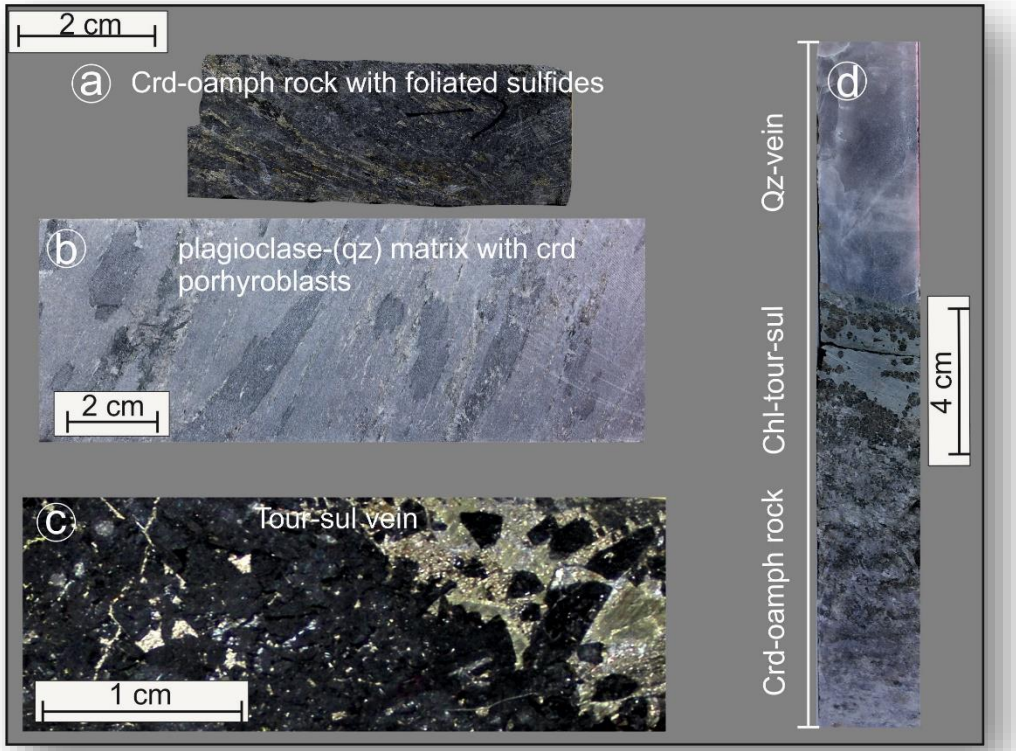


Ranta et al., 2021



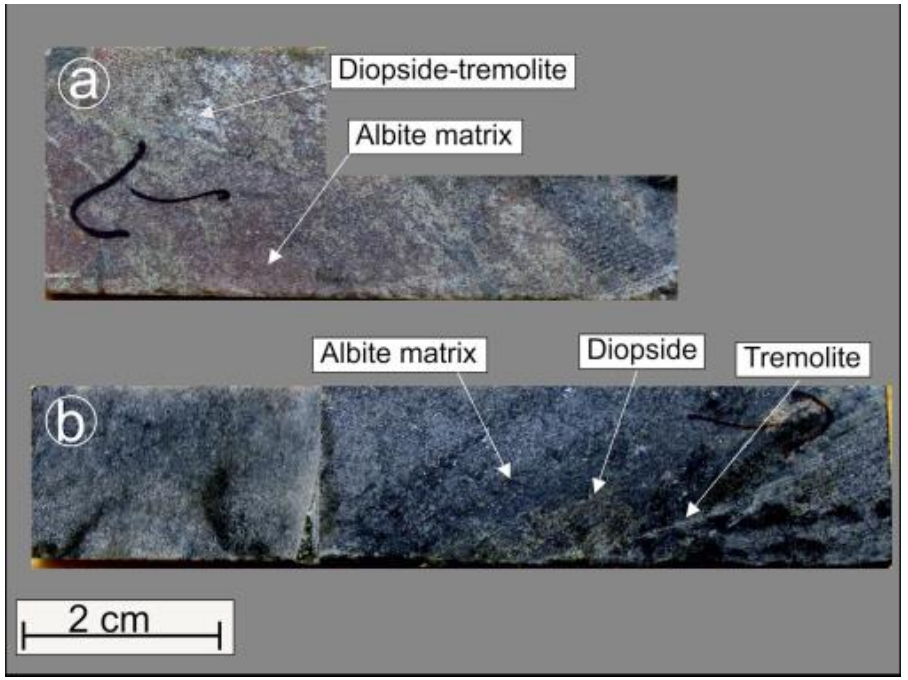
Ranta et al., 2021

Palokas Au-Co



Ranta et al. (2018)

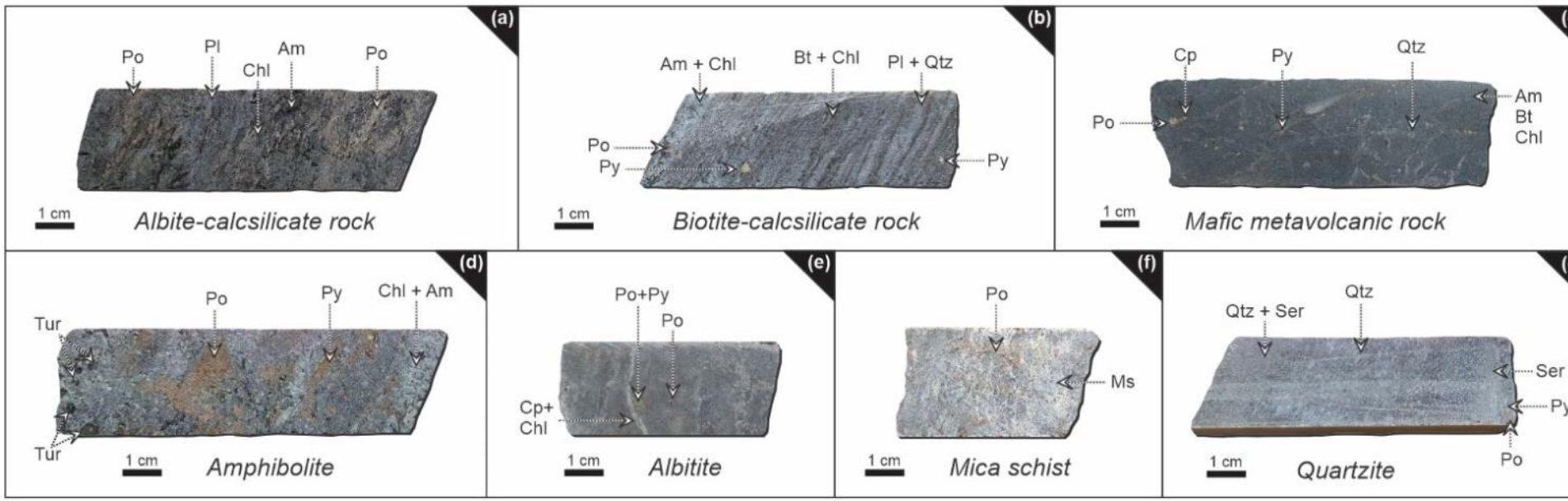
Palokas Au-Co



Ranta et al. (2018)

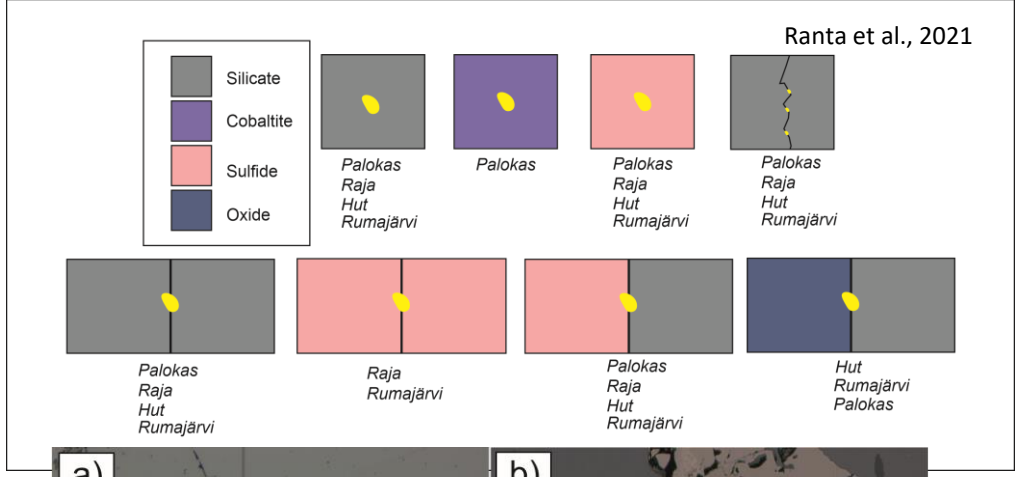
Raja Au-Co

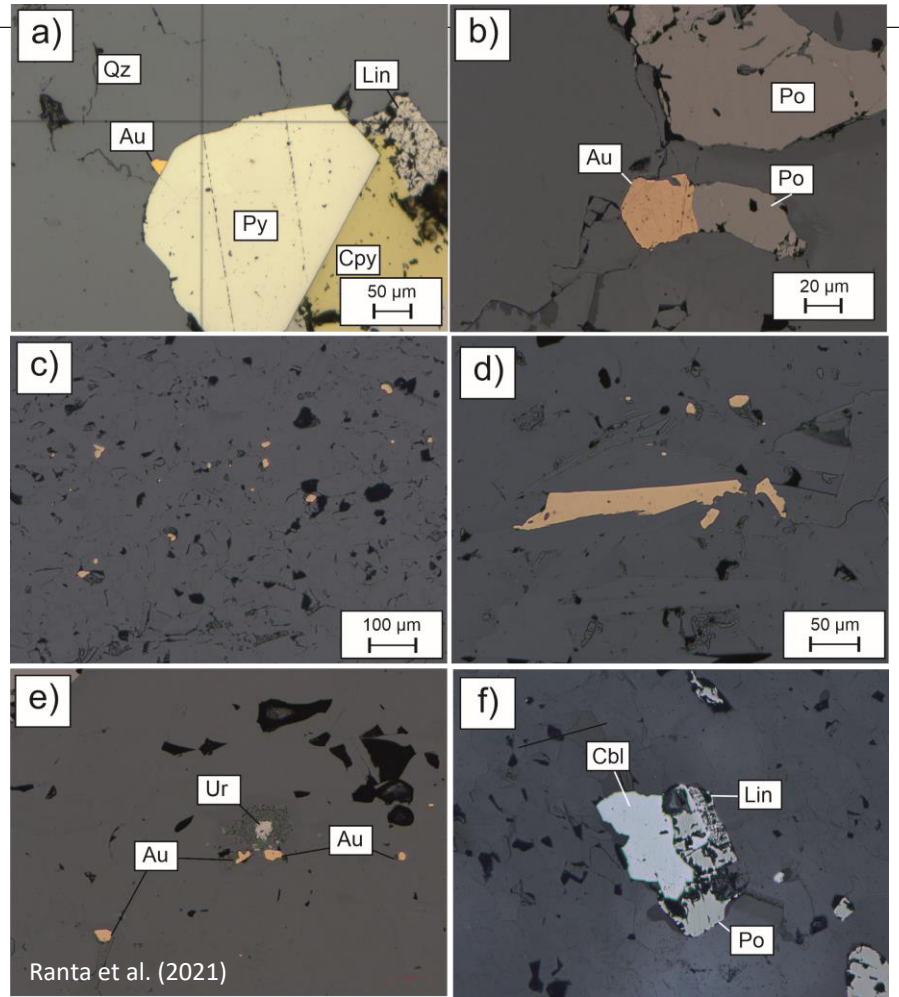
Raič et al. (pre-print)



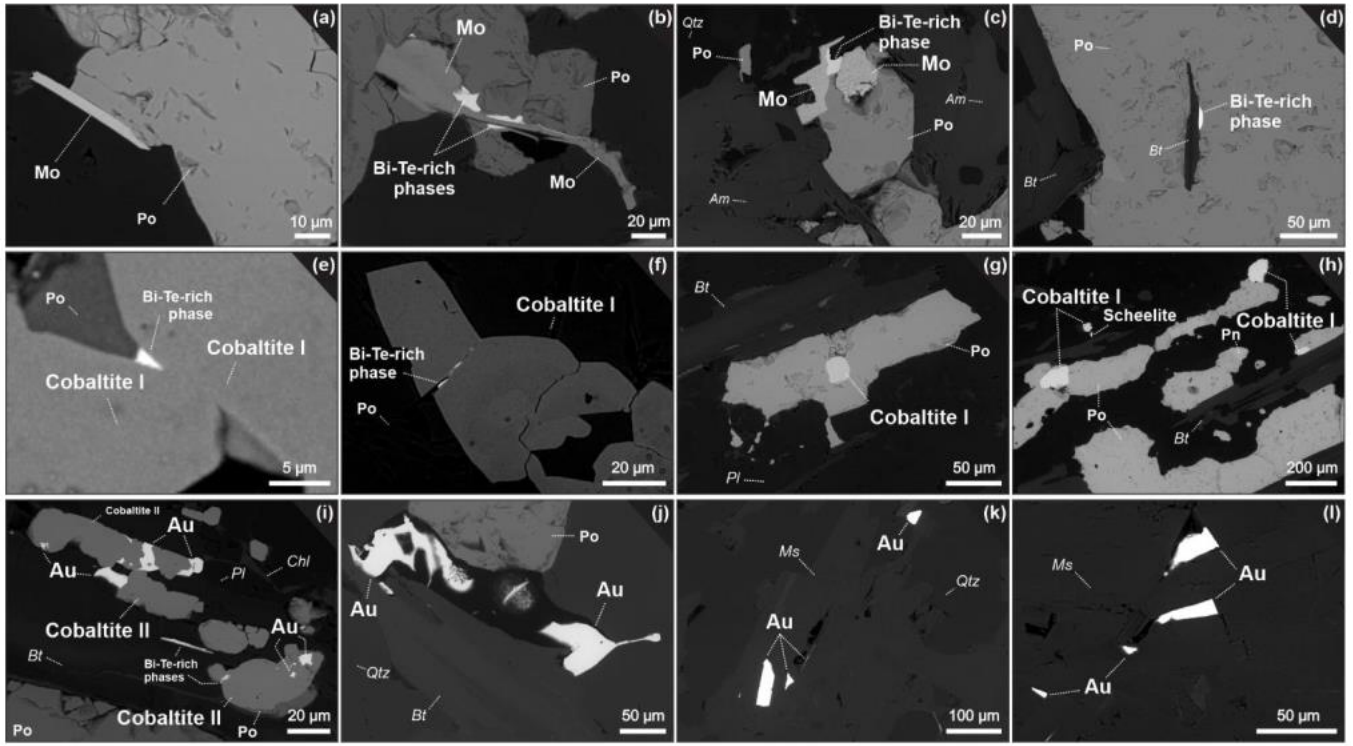
Rajapalot area is comprised of sedimentary and volcanic rocks displaying of wide range of metamorphic and hydrothermal alterations (pre-, syn-, late/post-orogenic)

Ranta et al., 2021





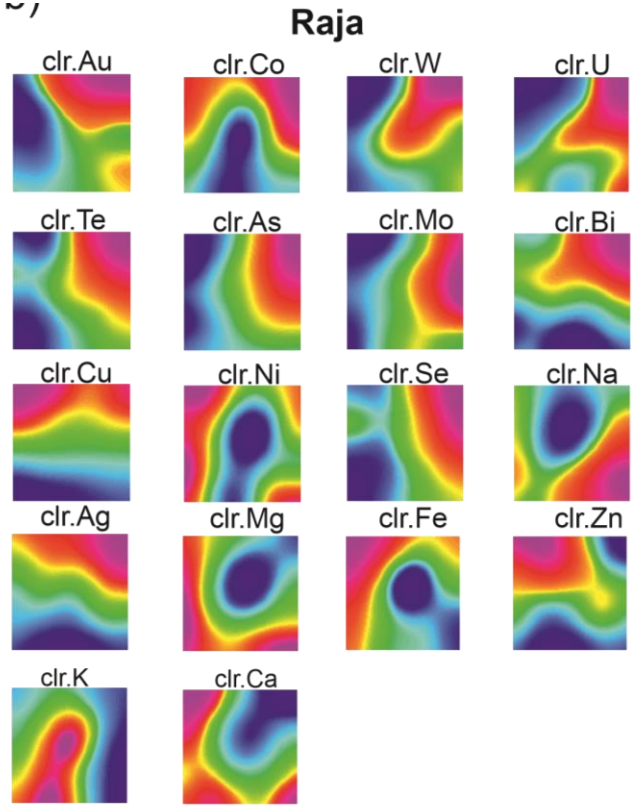
Ranta et al. (2021)



Raič et al. (pre-print)

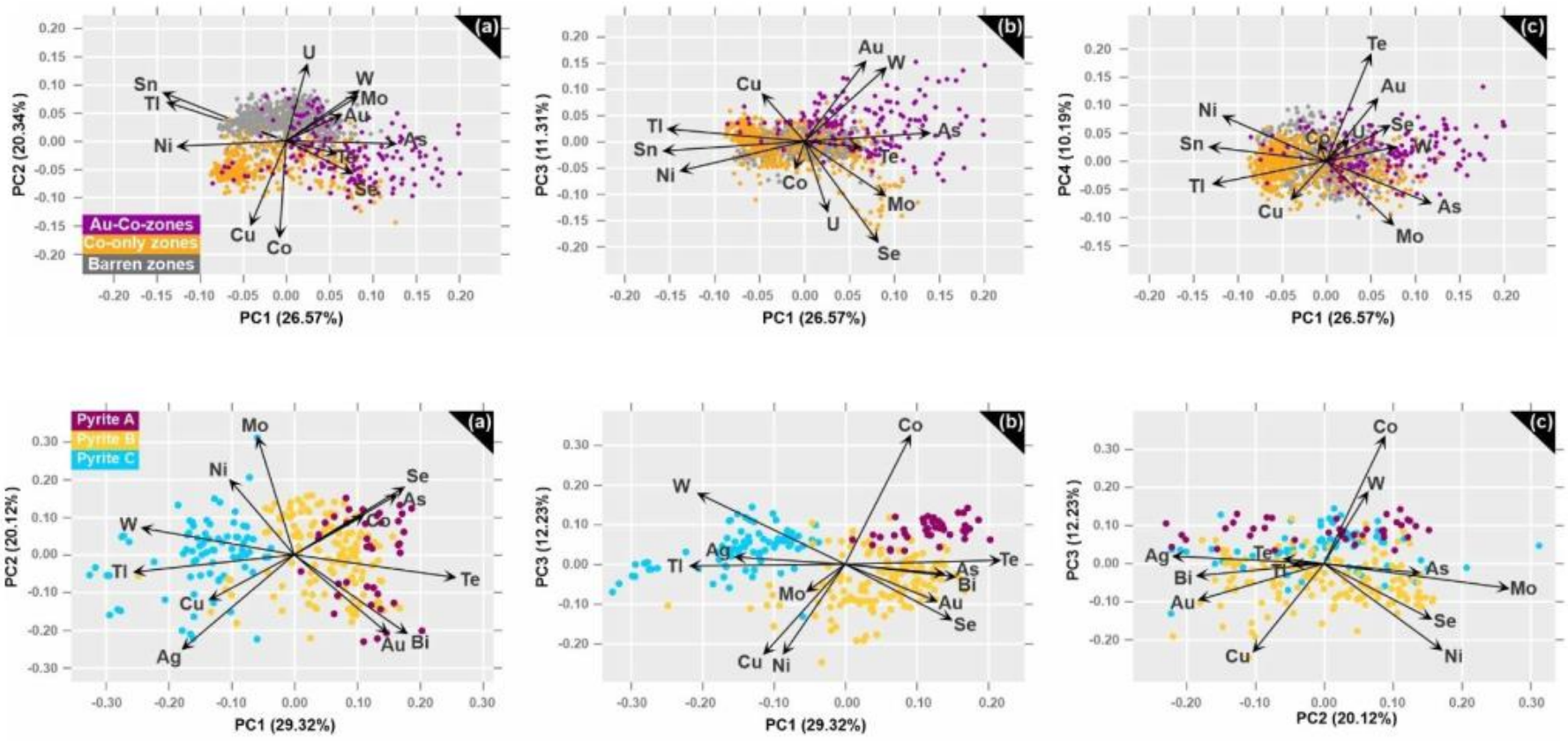
Gold is texturally late and located in highly variable textural settings in all the occurrences within Rajapalot in contrast to cobalt which seems to be earlier phase.

SOM



Modified after Ranta et al. (2021)

PCA



Modified Raič et al. (pre-print)

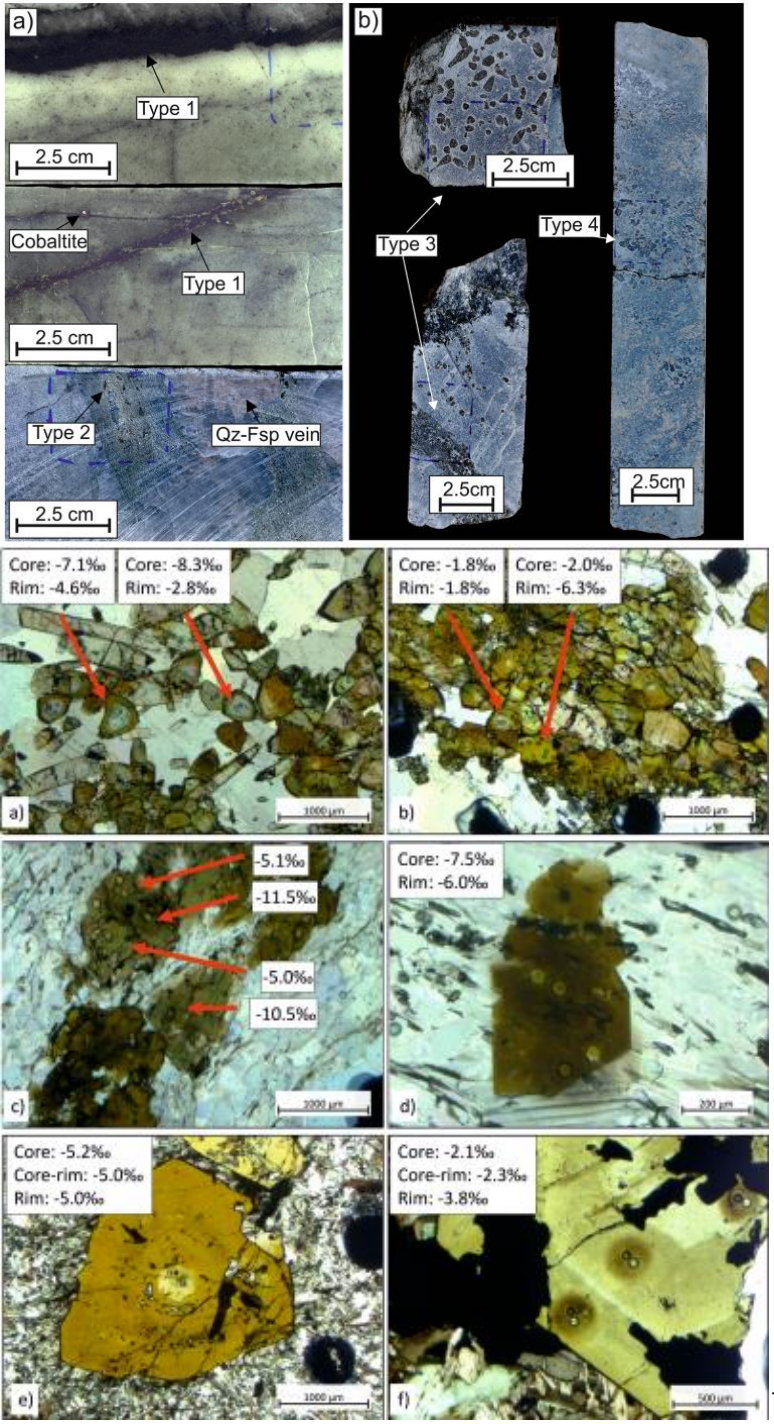
Multivariate statistical evaluation of the geohemical data indicates different formation histories for Au and Co

Tourmaline studies

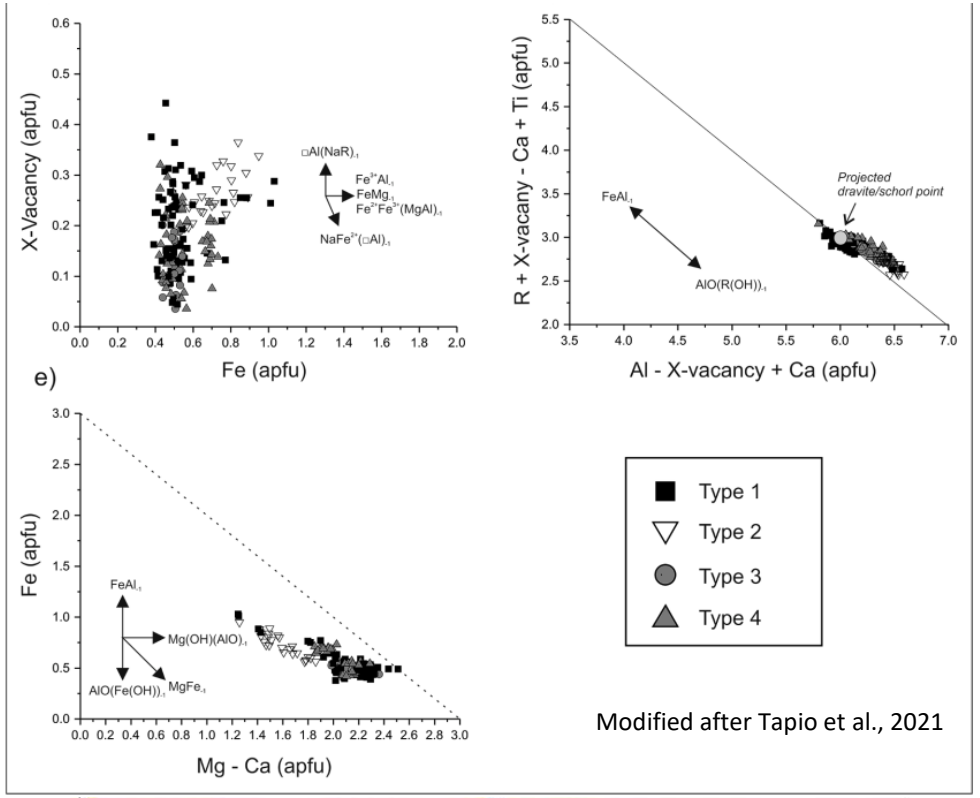
Tourmaline geochemistry indicates reduced low-salinity fluids (confirmed by fluid inclusion studies)

Boron isotope indicates genetic association of tourmaline and late-/post-orogenic granitoids.

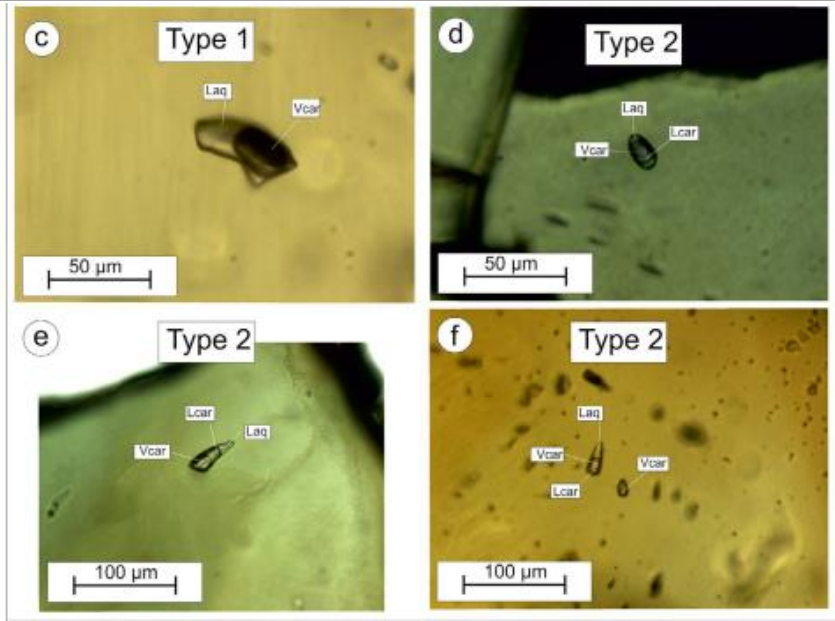
Fractionation modelling indicates at least two fluids with different initial B-isotope composition



Tapio et al., 2021

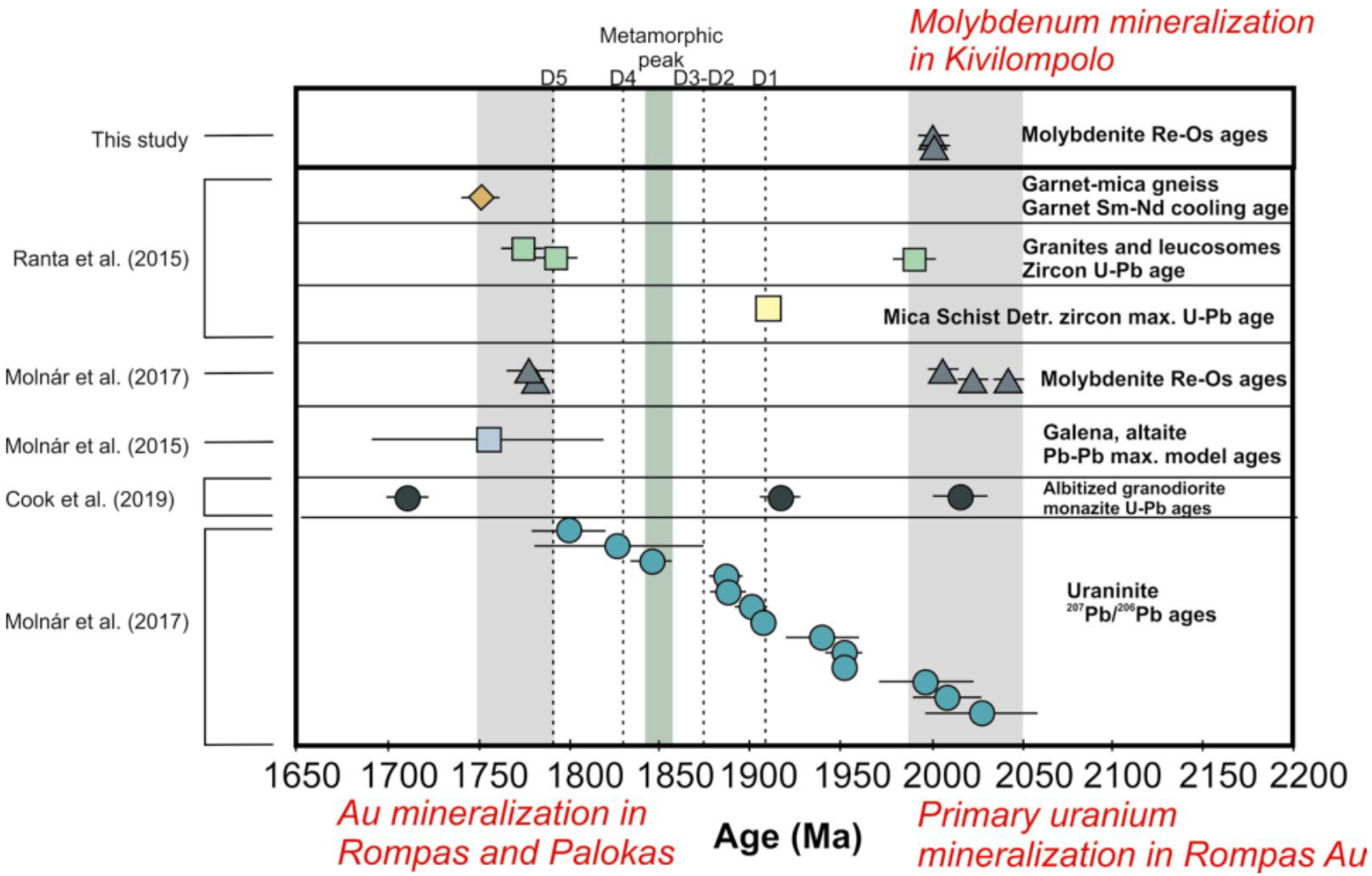


Modified after Tapio et al., 2021



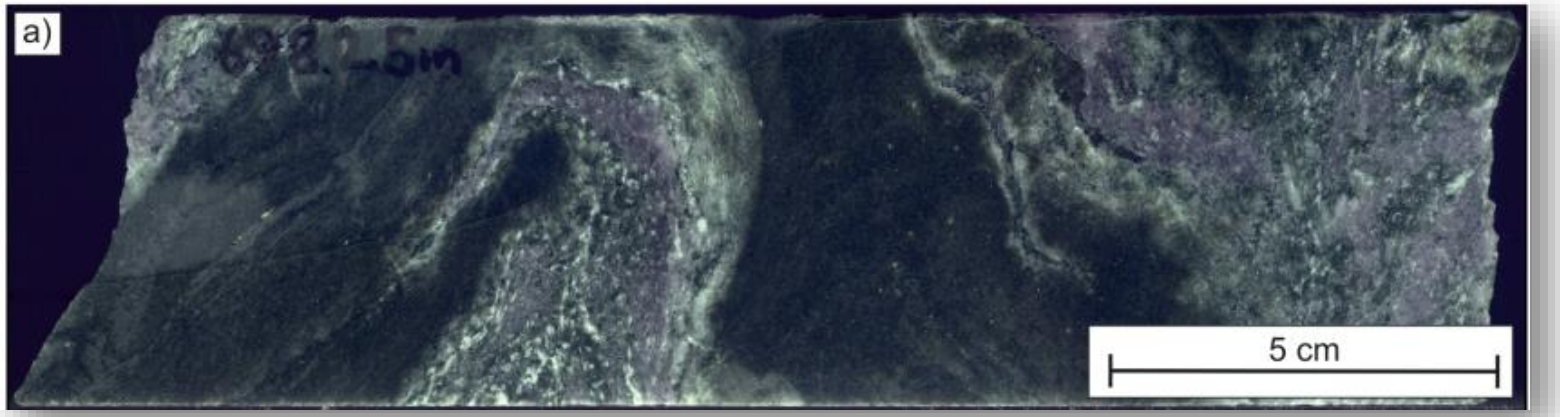
Ranta et al., 2017

Geochronology of the mineralized area

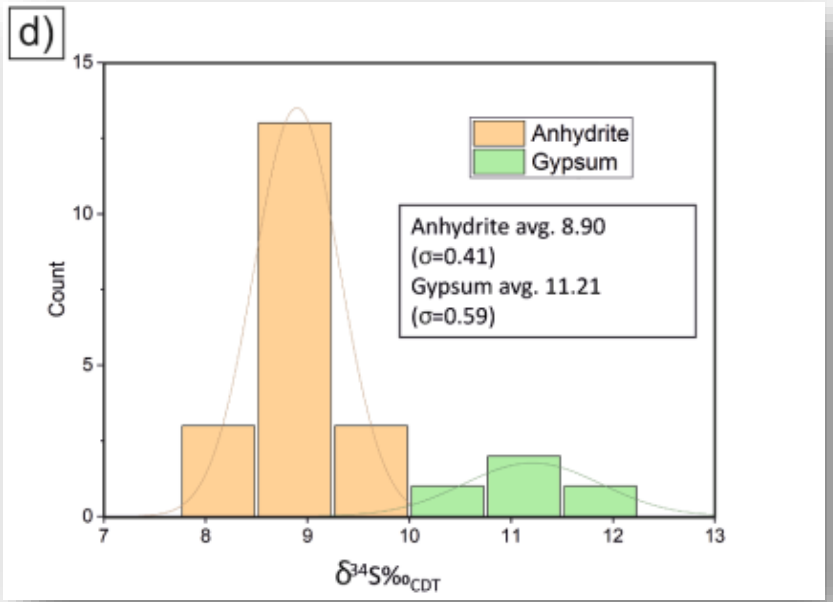


Ranta et al., 2020

Indications of Paleoproterozoic evaporites



Tapio et al., 2021



Tapio et al., 2021

S-isotope results from sulfates correlate with the well preserved Paleoproterozoic evaporitic Tulomozero fm, Onega basin

Summary

- Rajapalot Au-Co represents one of the atypical orogenic gold deposits in northern Finland with multimineralized history
- Gold and Cobalt seem to have different formational histories with main stage of gold formed during late- to post orogenic stages (1.78 Ga) and related to fluids with reduced, low-salinity nature with association of 1.78 Ga granites
- Cobalt is earlier and can potentially have:
  - Pre-orogenic initial enrichment during basin evolution related to the evaporitic fluids (+ U, Mo, (Au) enrichment)
  - Remobilization and enrichment during orogeny


THANK YOU!
Sometimes all that glitters is gold