

# Ritakallio

**Alternative Names:** Ritakallionmaa

**Occurrence type:** prospect

Commodity	Rank	Total measure	Total production	Total resource	Importance
gold	1	NA	NA	NA	NA

Easting EUREF: 271183,676

Northing EUREF: 6782485,268

Easting YKJ: 3271261

Northing YKJ: 6785333

**Discovery year:** 2004

**Discovered by:** Geological Survey of Finland

**Province:** Pirkkala (Au)

**Comments:** The first indication was a low-grade Au anomaly in regional heavy mineral till survey. This was followed by the discovery of auriferous glacial erratics in the area in addition to gold nuggets in heavy mineral survey. This led to the discovery of gold in outcrop. Based on heavy mineral survey and ground geophysical surveys two diamond drilling profiles were drilled, which were further complemented by bedrock surface and till geochemical surveys.

**References:** 3, 6, 7

## Mineral deposit type

**Group:** Metallogenic deposit

**Main type:** Orogenic (metamorphic hydrothermal)

**Sub type 1:** Au

**Comments:** Mineralisation during a main, compressional, stage of deformation in brittle ductile domain: the gabbro was the competent unit within the softer mica gneiss environment; hence spece was formed within the gabbro and silica and gold were able to precipitate mostly in the gabbro.

**References:** 7

## Dimension

**Expression:** exposed

**Area (ha):** NA

**Form:** discordant

**Dip azim:** 45

**Shape:** NA

**Dip:** 70

**Length (m):** NA

**Plunge azim:** NA

**Width (m):** NA

**Plunge dip:** NA

**Thickness (m):** NA

**Orientation method:** NA

**Depth (m):** NA

## Holder history

**Previous holders:**

Company	Years	Holding type	Comments
Kultatie Oy	2018	Application for exploration permit	NA
Polar Mining Oy	2006-2012	Claim (old law)	NA
Geological Survey of Finland	2004-2006	NA	NA

## Figures



Sampling in the Ritakallio area: a) heavy mineral exploration in till and b) diamond drilling.  
From Vuori et al. (2005).

## EXPLORATION ACTIVITY

### Polar Mining Oy

Years	Activity type	Geologist	Exploration result	Ref
2007-2007	core drilling	NA	mineral occurrences	7
<i>Core drilling (reconnaissance drilling): seven diamond-drill holes, total 487 m.</i>				
2006-2006	excavation	NA	mineral occurrences	1, 2
2006-2006	core drilling	NA	mineral occurrences	1, 2

### Geological Survey of Finland

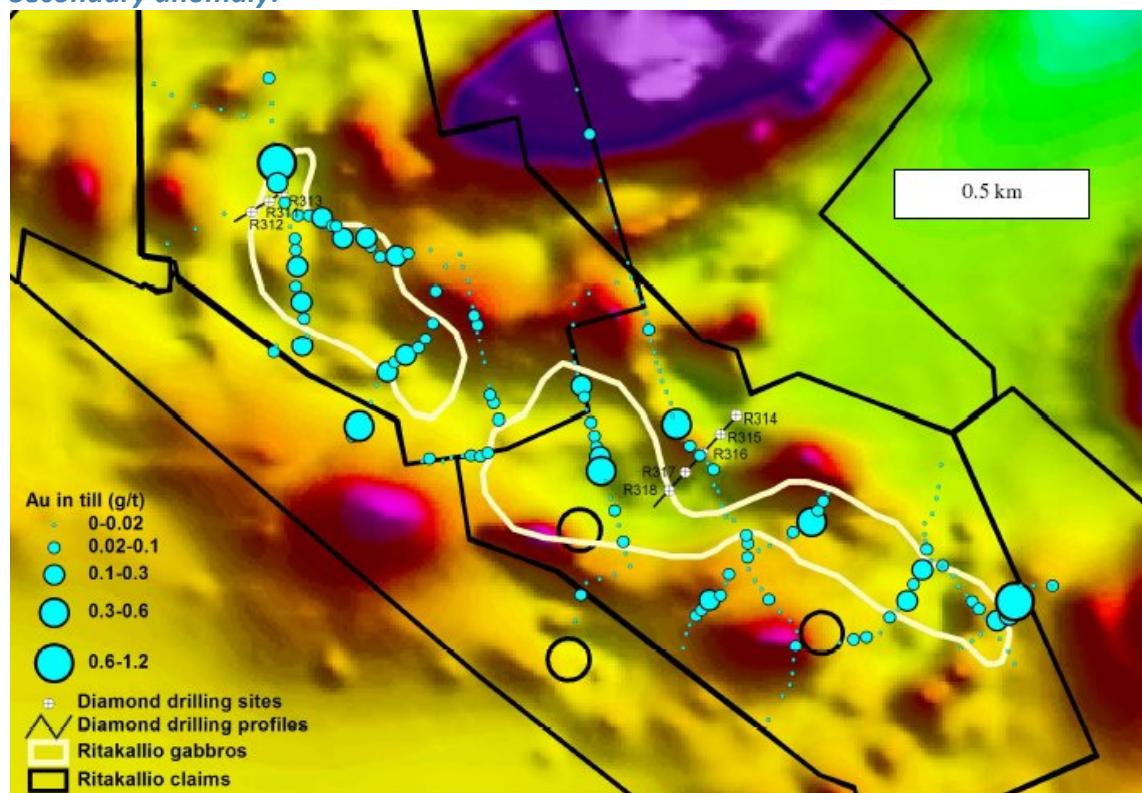
Years	Activity type	Geologist	Exploration result	Ref
2003-2006	detailed heavy mineral sampling	Saku Vuori	geochemical anomaly	4, 7
<i>Discovery of auriferous glacial erratics in the area in addition to gold nuggets in heavy mineral survey.</i>				
2003-2006	detailed geology	Saku Vuori, Hannu Lahtinen	key geological features	4, 6, 7
<i>Detailed bedrock mapping and a mineralogical and whole-rock lithogeochemical investigation.</i>				
2002-2003	regional heavy mineral sampling	Niilo Kärkkäinen	geochemical anomaly	4, 7
<i>Low-grade Au anomaly in regional heavy mineral till survey.</i>				
2002-2006	detailed geophysics	Saku Vuori	geophysical anomaly	7
<i>Ground IP and magnetic and electromagnetic surveys. IP anomalies seem to correlate with mineralised zones in the gabbro-diorite intrusion. The strongest positive magnetic anomaly seems to relate to the metacherts which are pyrrhotite bearing.</i>				
2002-2006	percussion drilling	Saku Vuori	NA	4, 7
2002-2006	regional geochemistry	Niilo Kärkkäinen	geochemical anomaly	4, 5, 7
<i>Gold and pathfinder element anomalies in till</i>				
2002-2006	detailed geochemistry	Saku Vuori	geochemical anomaly	4
<i>More than 2300 m long and 600 m wide geochemical and heavy mineral gold anomalies in till; the Au and As anomalies extend at least 5 km to the SE of the hosting granodiorite - in regional survey, this is part of a 30-35 km long, SE-trending As anomaly. Lithogeochemical investigations indicate enrichment of Au, As, Bi, Sb and Te related to gold mineralisation.</i>				
2002-2006	core drilling	Saku Vuori	mineral occurrences	7
<i>Eight diamond-drill holes in two profiles, total 610.4 m.</i>				
<b>Intersections</b>				
	HoleID	R311		
	From-To	31,4-36,1		
	Length	4,7m		

gold	1,7ppm
HoleID	R314
From-To	41-42
Length	1m
gold	3,85ppm

1990-1990	regional geophysics	NA	key geological features	4, 7
<i>Low-altitude airborne magnetic, electromagnetic and radiometric survey</i>				

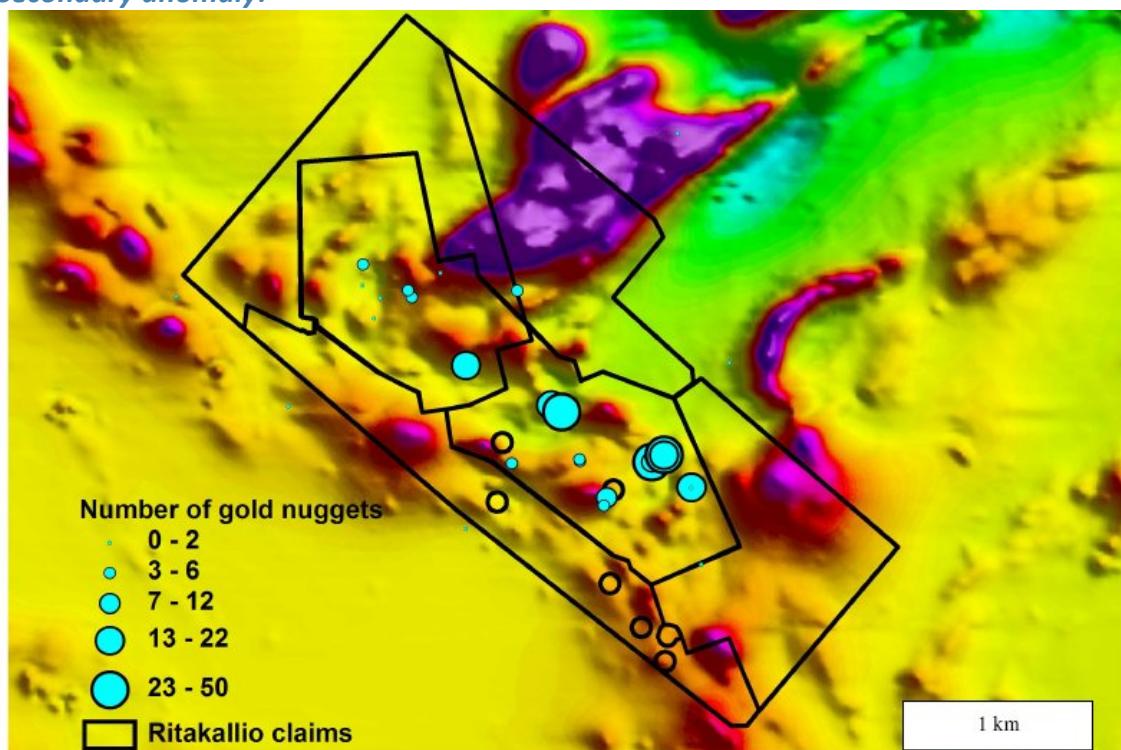
## Figures

### Secondary anomaly:



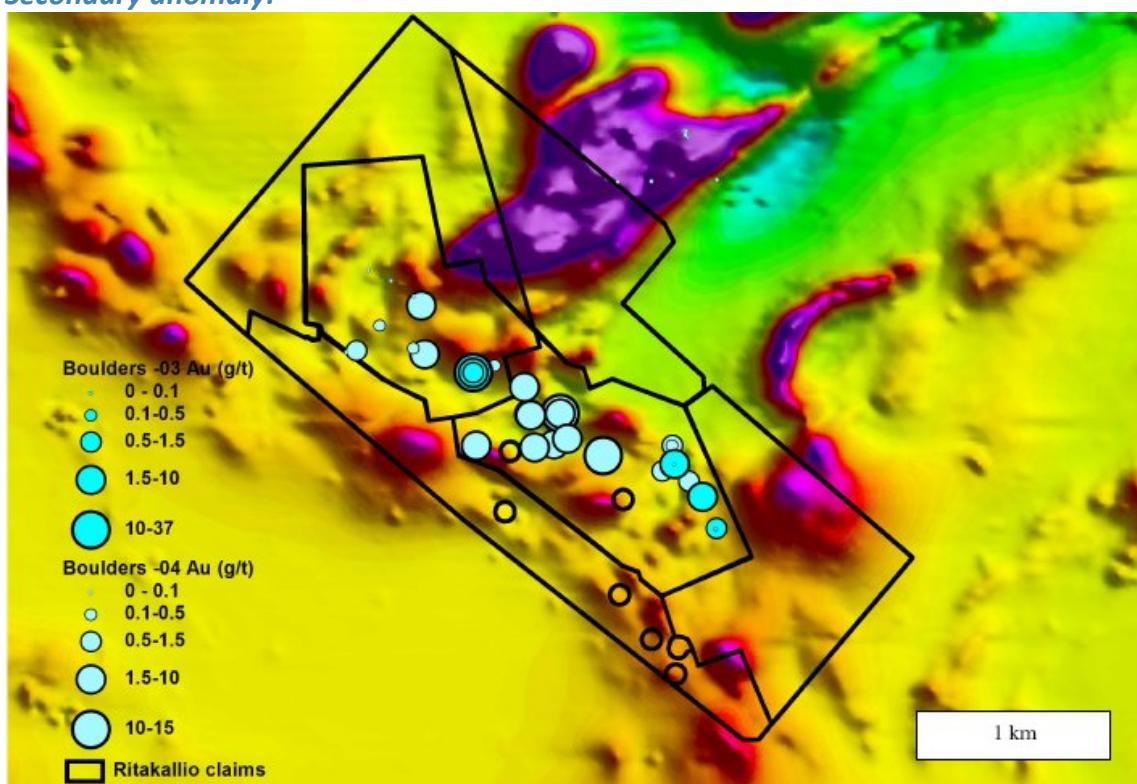
Gold concentrations in till samples (< 2 mm fraction) at Ritakallio. Base map is a low-altitude high-resolution aeromagnetic map (purple= high values, green= low values; g/t=ppm). North up. From Vuori et al. (2006).

*Secondary anomaly:*



The location of heavy mineral excavation sites and the number of gold grains in 20 kg till samples at Ritakallio (Modified after Huhta 2005). Base map is low-altitude high-resolution aeromagnetic map (purple = high values, green = low values). Note that the unfilled black circles are not sampling sites, but are areas excluded from the claims.  
North up. From Vuori et al. (2006).

*Secondary anomaly:*

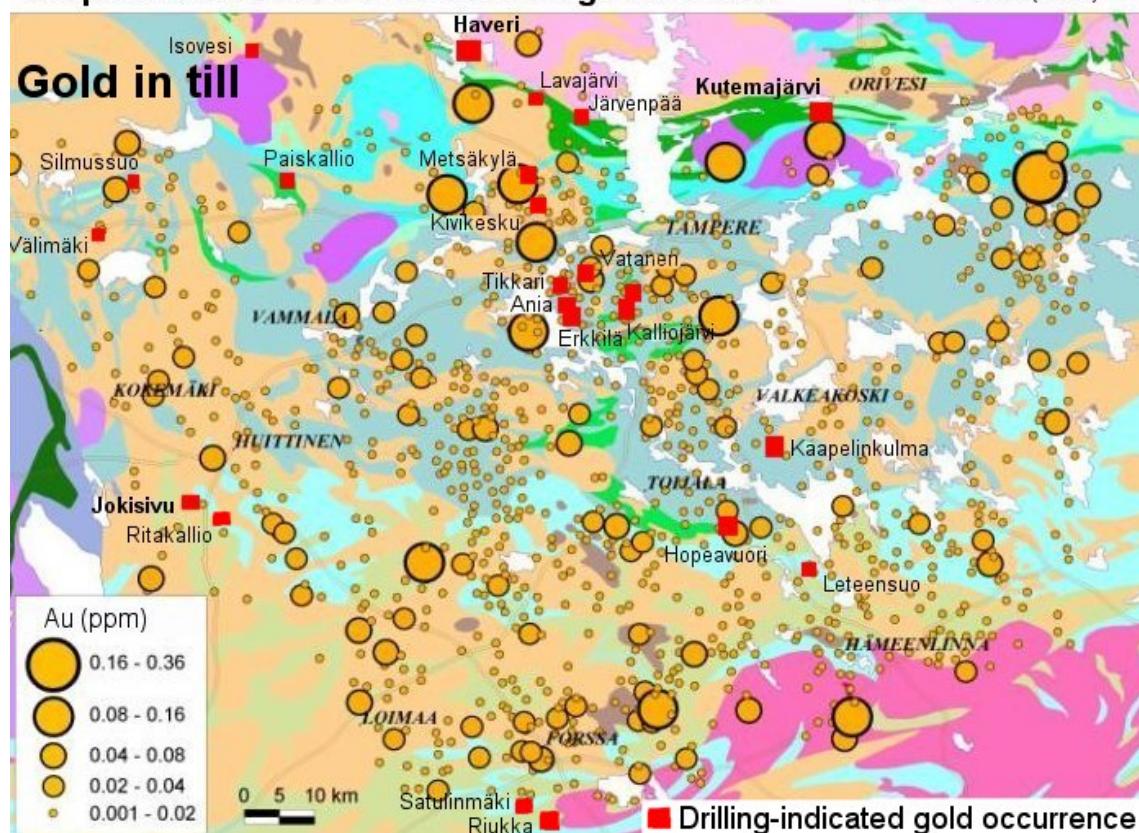


The locations and gold concentrations of boulders collected in years 2003 and 2004 at Ritakallio. Base map is low-altitude high-resolution aeromagnetic map (purple = high values, green = low values; g/t = ppm). North up. From Vuori et al. (2006).

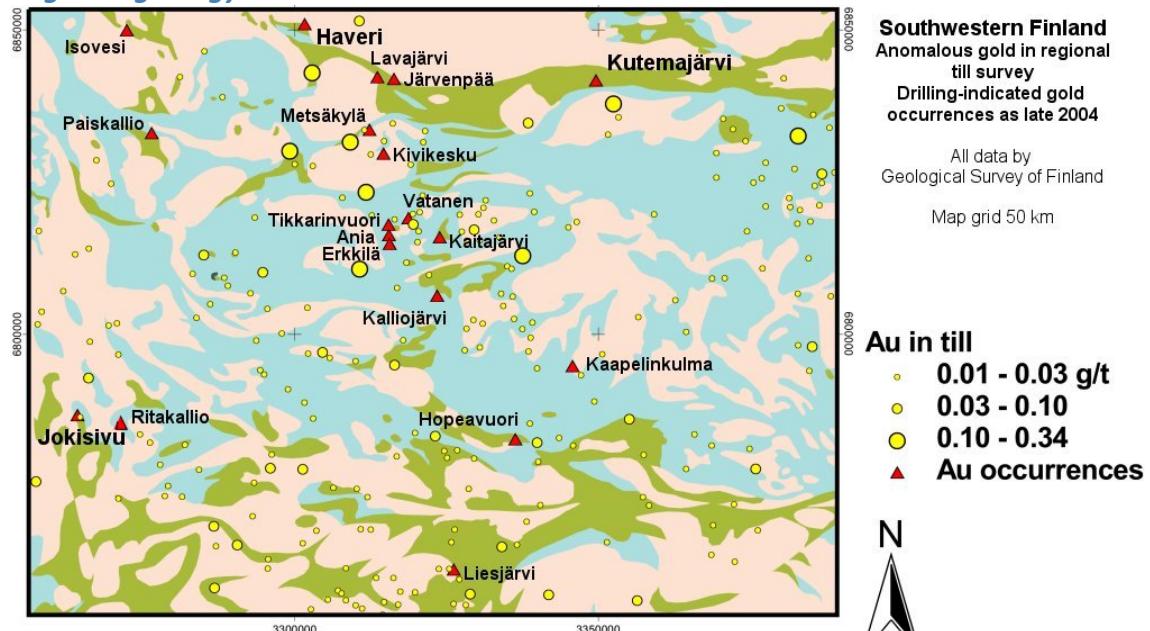
**Secondary anomaly:**

**Tampere Schist Belt and Vammala Migmatite Zone**

Kärkkäinen et al. (2003)



**Regional geology:**



## GEOLOGY

**Host rock:** Diorite, Gabbro, Garnet Paraschist

**Wall rock:** Skarn, Basaltic rock, Chert, Garnet Greywacke

### Diorite (Host rock)

**Rock type:** Host rock

**Proportion:** major

**Grain size:** NA

**Color:** NA

**References:** 2, 6, 7

**Comments:** The occurrence is in a layered gabbro intrusion surrounded by mica gneiss. The geotectonic environment is arc-accretionary, with volcanism and sedimentation mainly at ca. 1.9 Ga, and form the Vammala (or Pirkkala) Migmatite Belt.

#### Ore minerals:

Mineral	Proportion	Mineral texture
Arsenopyrite	minor	
Aurostibite	trace	
Bismuth	trace	
Bismuthinite	trace	
Galena	rare	
Glaucodot	rare	
Gold	present	<i>Free native gold between silicate grains and as inclusions in sulphides, and as intergrown with Bi-, Sb- and Te-minerals. Dominantly detected in quartz veins. In arsenopyrite-lölligite grains, gold inclusions occur as exsolved from löllingite near the apy-löll contact.</i>
Hedleyite	rare	
Ilmenite	minor	
Löllingite	minor	<i>Closely related occurrence with arsenopyrite, dominantly as inclusions in the latter</i>
Maldonite	trace	
Pentlandite	present	
Pyrite	present	
Pyrrhotite	present	
Rutile	present	
Scheelite	minor	
Sphalerite	rare	
Telluride	present	<i>Bi Telluride</i>
Titanomagnetite	minor	
Zavaritskite	trace	
<i>The first recorded occurrence of zavaritskite in Finland</i>		

#### Other minerals:

Mineral	Proportion	Mineral texture
Biotite	major	Alteration product
Quartz	major	

#### Structures

Sheared
Layered

**Textures****Porphyritic**

Comments: Diorite: plagioclase-hornblende ( porphyritic with hornblende "spots" & equigranular ) [1].

Mica gneiss: quartz-plagioclase-biotite-K feldspar-hornblende-garnet [2].

**Equigranular**

Alteration:	Distribution:	Degree:	Relation to mineralization:
silicification	Veins		
Comments: Auriferous quartz veins 1-30 cm wide [1,2,3]. Formation of sulphides, biotite and quartz within a few mm to cm's beyond the quartz veins [2].			

**Metamorphic description:**

Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	Min T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA	-6,4	570-645
Comments: Regional migmatisation at ca. 1880 Ma. Temperature after the biotite-garnet geothermometer					

**Composition category**

silicate chemistry

**Geological age:**

Geological era:	Max age - Min age (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1780-1880		Y
Comments: Mineralisation inferred to be post-peak regional metamorphism, i.e. after 1880 Ma			

**Gabbro (Host rock)****Rock type:** Host rock**Proportion:** major**Grain size:** NA**Color:** NA**References:** 6, 7

**Comments:** The occurrence is in a layered gabbro intrusion surrounded by mica gneiss, and is characterised by auriferous quartz veins 1-30 cm wide

**Ore minerals:**

Mineral	Proportion	Mineral texture
Gold	variable	

**Other minerals:**

Mineral	Proportion	Mineral texture
Hornblende	major	
Plagioclase	major	

**Structures**

Layered
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Alteration:	Distribution:	Degree:	Relation to mineralization:
silicification	Veins		
<i>Comments: Auriferous quartz veins 1-30 cm wide [1,2,3]. Formation of sulphides, biotite and quartz within a few mm to cm's beyond the quartz veins [2].</i>			
sericitic alteration	Shearing		

**Metamorphic description:**

Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	Min T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA	-6,4	570-645
<i>Comments: Regional migmatisation at ca. 1880 Ma; Plagioclase-hornblende.</i>					

**Composition category**

silicate chemistry
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**Geological age:**

Geological era:	Max age - Min age (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1600-2500	1900	N

**Garnet Paraschist (Host rock)****Rock type:** Host rock**Proportion:** minor**Grain size:** NA**Color:** NA**References:** 6, 7**Comments:** The occurrence is in a layered gabbro intrusion surrounded by mica gneiss of probably sedimentary origin**Ore minerals:**

Mineral	Proportion	Mineral texture
Gold	variable	

**Other minerals:**

Mineral	Proportion	Mineral texture
Biotite	major	
Garnet	minor	
Hornblende	minor	
Microcline	major	
Plagioclase	major	
Pyrite	present	

Quartz	major
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#### Structures

Gneiss

Veined

Alteration:	Distribution:	Degree:	Relation to mineralization:
silicification	Veins		
<i>Comments: Auriferous quartz veins 1-30 cm wide [1,2,3]. Formation of sulphides, biotite and quartz within a few mm to cm's beyond the quartz veins [2].</i>			
sericitic alteration	Shearing	NA	

#### Metamorphic description:

Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	Min T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA	-6,4	570-645
<i>Comments: Regional migmatisation at ca. 1880 Ma; Quartz-plagioclase-biotite-K feldspar-hornblende-garnet.</i>					

#### Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1600-2500	1900	N

## Skarn (Wall rock)

**Rock type:** Wall rock

**Proportion:** minor

**Comments:** Apparently, these are metamorphic skarns, and they are part of the local metavolcanic sequence.

#### Ore minerals:

Mineral	Proportion	Mineral texture
Epidote	major	

#### Other minerals:

Mineral	Proportion	Mineral texture
Calcite	minor	
Diopside	major	
Grossular	major	
Plagioclase	major	
Pyrrhotite	minor	
Quartz	minor	
Titanite	minor	

## Basaltic rock (Wall rock)

**Rock type:** Wall rock

**Proportion:** minor

**Grain size:** Fine grained 0.2 - 1 mm**References:** 6**Other minerals:**

Mineral	Proportion	Mineral texture
Amphibole	major	
Biotite	minor	
Epidote	present	
Plagioclase	major	
Pyrite	present	
Pyrrhotite	present	
Quartz	minor	
Titanite	present	

**Chert (Wall rock)****Rock type:** Wall rock**Proportion:** present**Grain size:** Fine grained 0.2 - 1 mm**Color:** Grey**References:** 6**Comments:** Metachert units in the local volcanic sequence**Other minerals:**

Mineral	Proportion	Mineral texture
Diopside	minor	
Epidote	present	
Graphite	present	
Hematite	present	
Pyrrhotite	present	
Quartz	major	

**Textures****Granoblastic****Garnet Greywacke (Wall rock)****Rock type:** Wall rock**Proportion:** minor**Grain size:** NA**Color:** NA**References:** 6, 7**Other minerals:**

Mineral	Proportion	Mineral texture
Biotite	major	
Garnet	major	
Ilmenite	minor	
Plagioclase	major	
Pyrite	present	
Quartz	major	

**Structures**

Concretion

Layered

**Metamorphic description:**

Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	Min T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA	-6,4	570-645

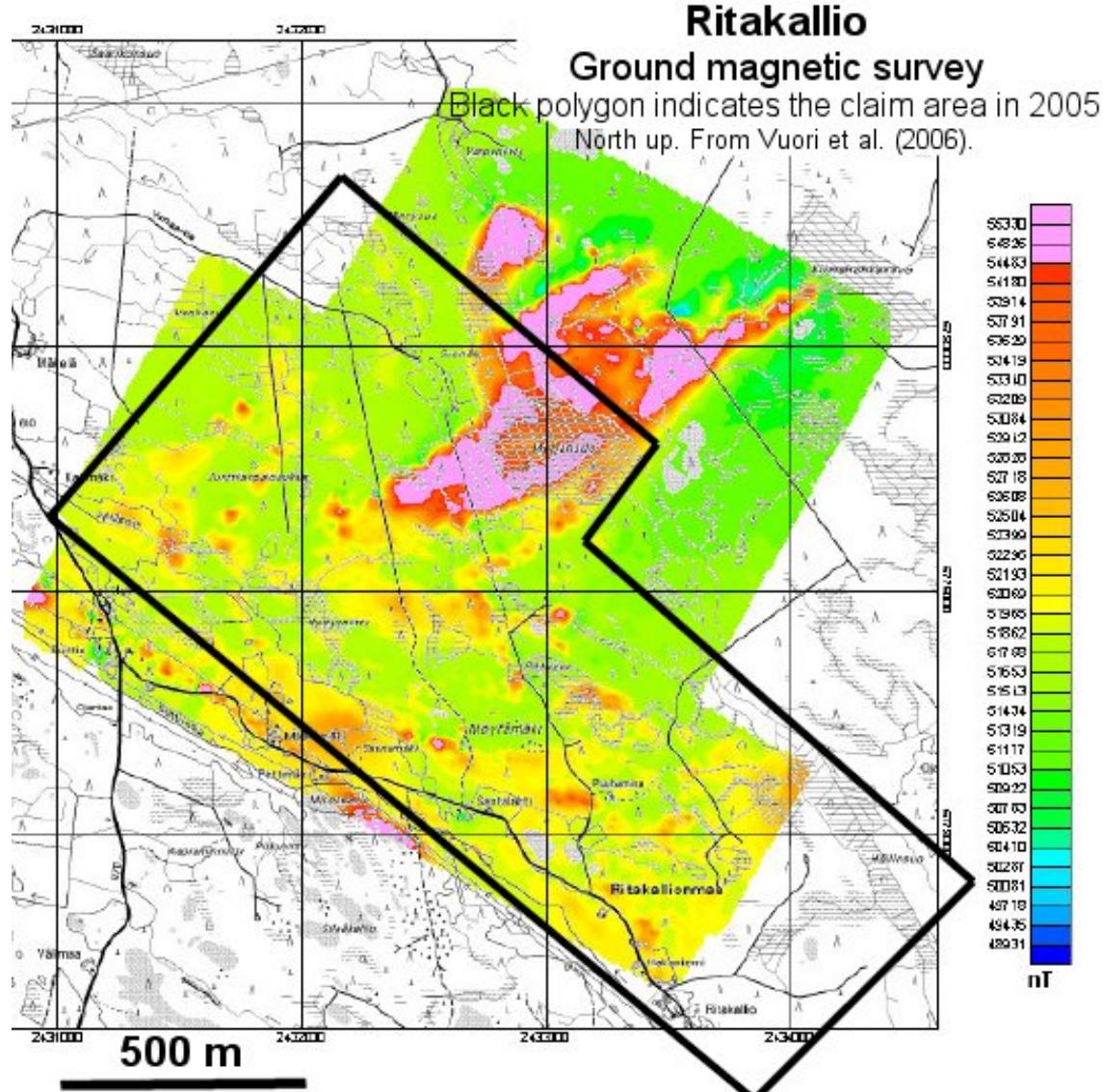
*Comments: Regional migmatisation at ca. 1880 Ma.*

**Geological age:**

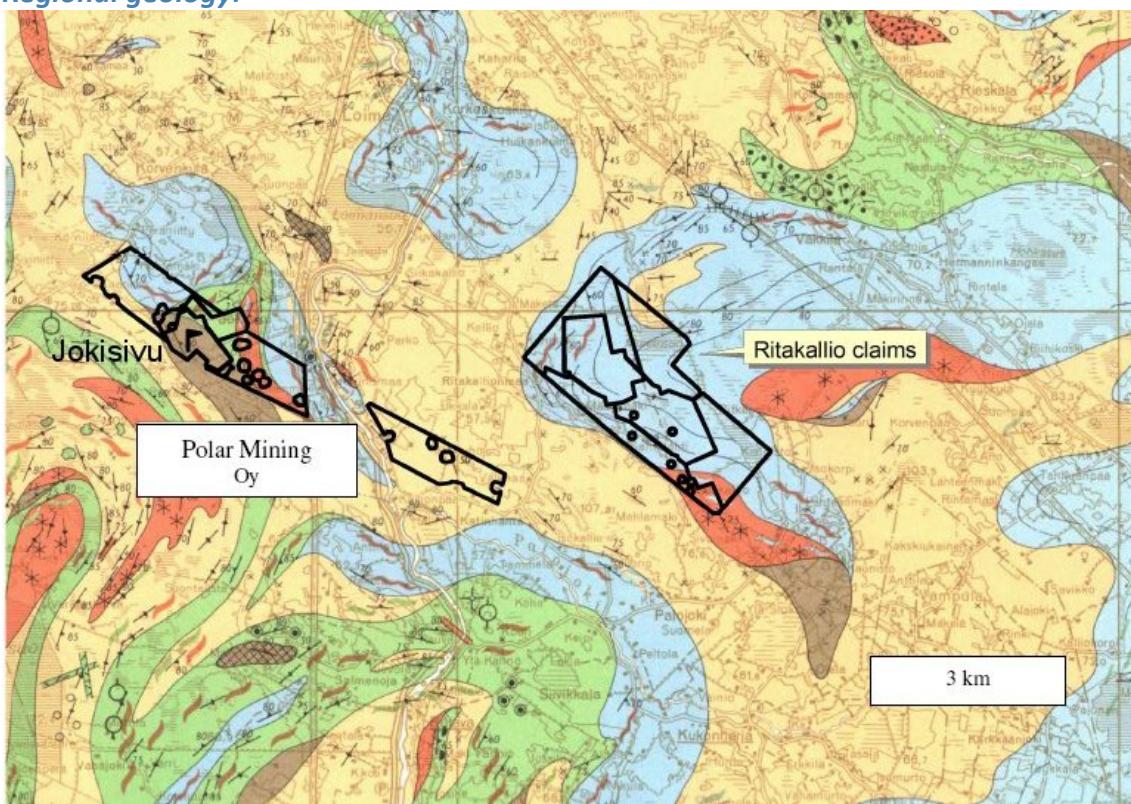
Geological era:	Max age - Min age (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1600-2500	N	

**Figures**

*Primary anomaly:*

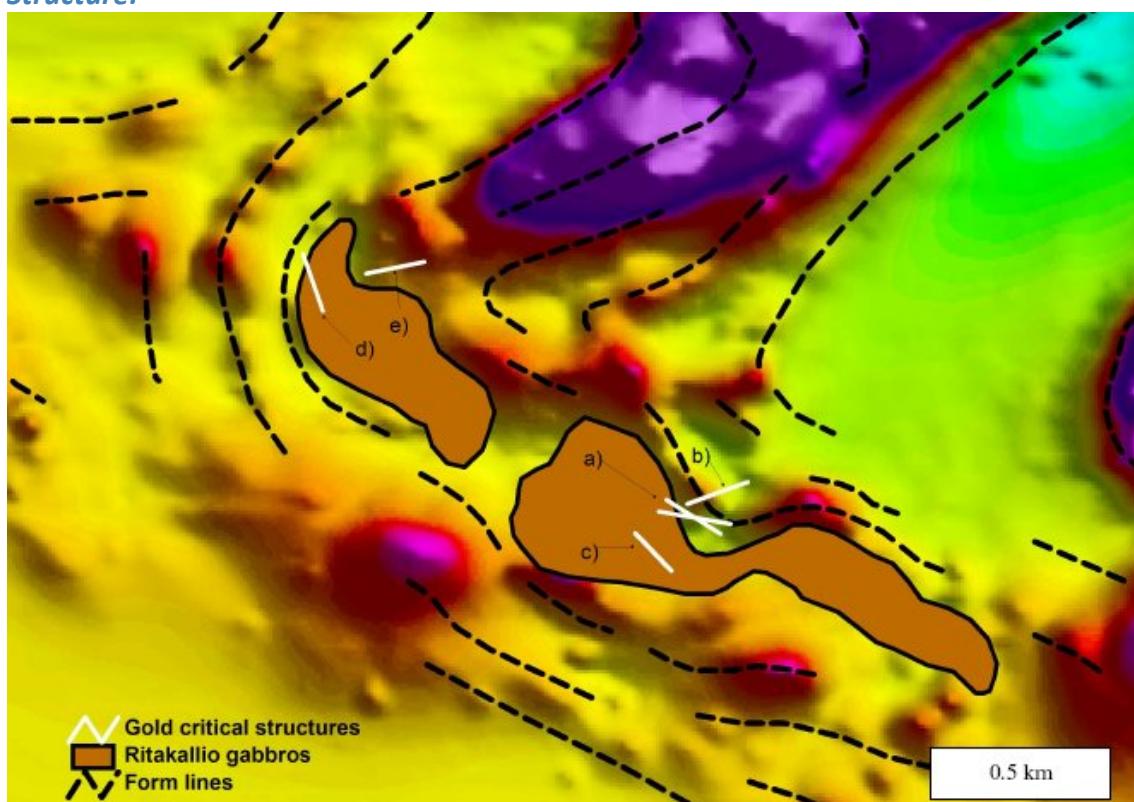


*Regional geology:*



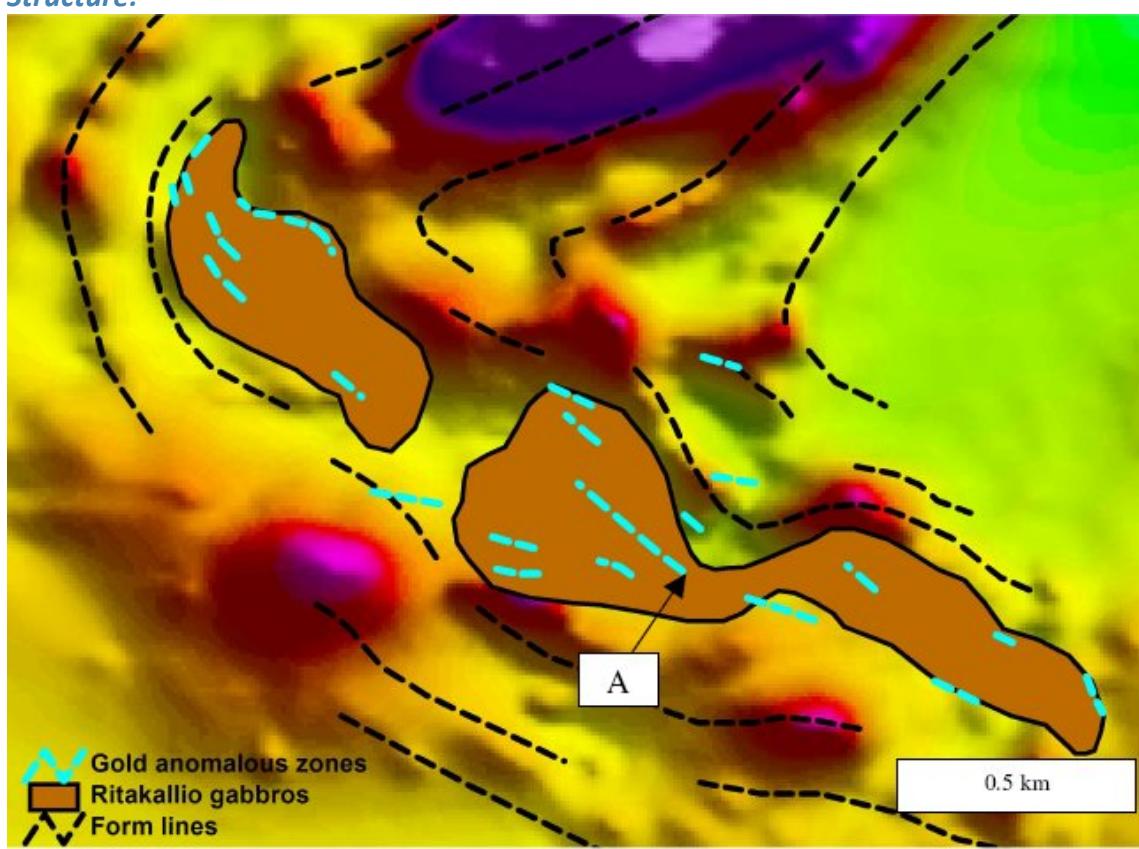
Regional bedrock map and claims: Jokisivu-Ritakallio area and surroundings.  
orange = granodiorite, blue = mica gneiss, green = mafic metavolcanites, red = granite  
brown = gabbro). Geology from Matisto (1976). From Vuori et al. (2005)

**Structure:**



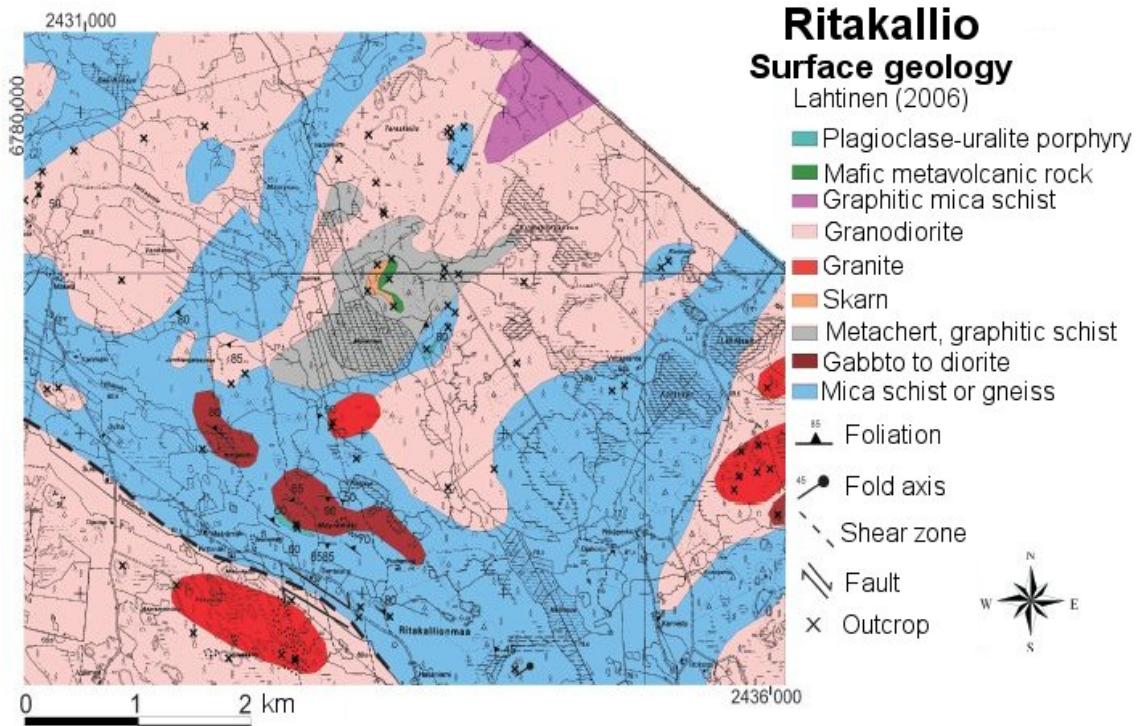
Observed gold-critical structure orientations and overall structural patterns at Ritakallio. Form lines delineate the Ritakallio fold discussed in the text. For explanation for 'a', 'b', 'c', 'd' and 'e', see text. North up. From Vuori et al. (2006).

**Structure:**



Main interpreted gold anomalous zones and structural patterns of Ritakallio area. Blue dashed line A is an interpreted continuation at the bedrock surface of the gold-enriched zone observed in drill core. North up. From Vuori et al. (2006).

**Local geology:**

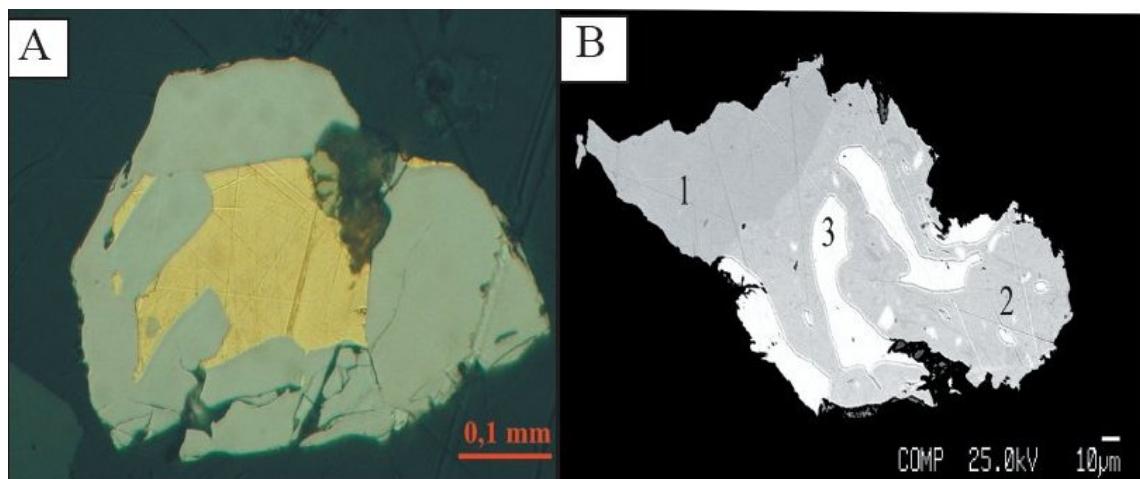


**Outcrop photo:**



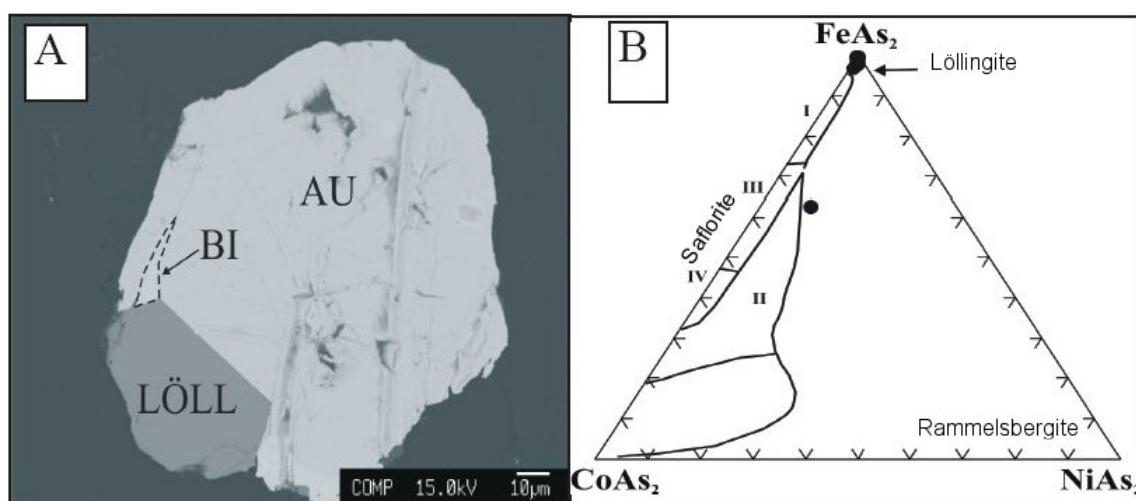
Gold-rich gabbro (1.2 g/t) of Ritakallio typified by quartz veins and shearing (observation 71.4-HML-04). The hammer handle is 60 cm long.

From Vuori et al. (2005).

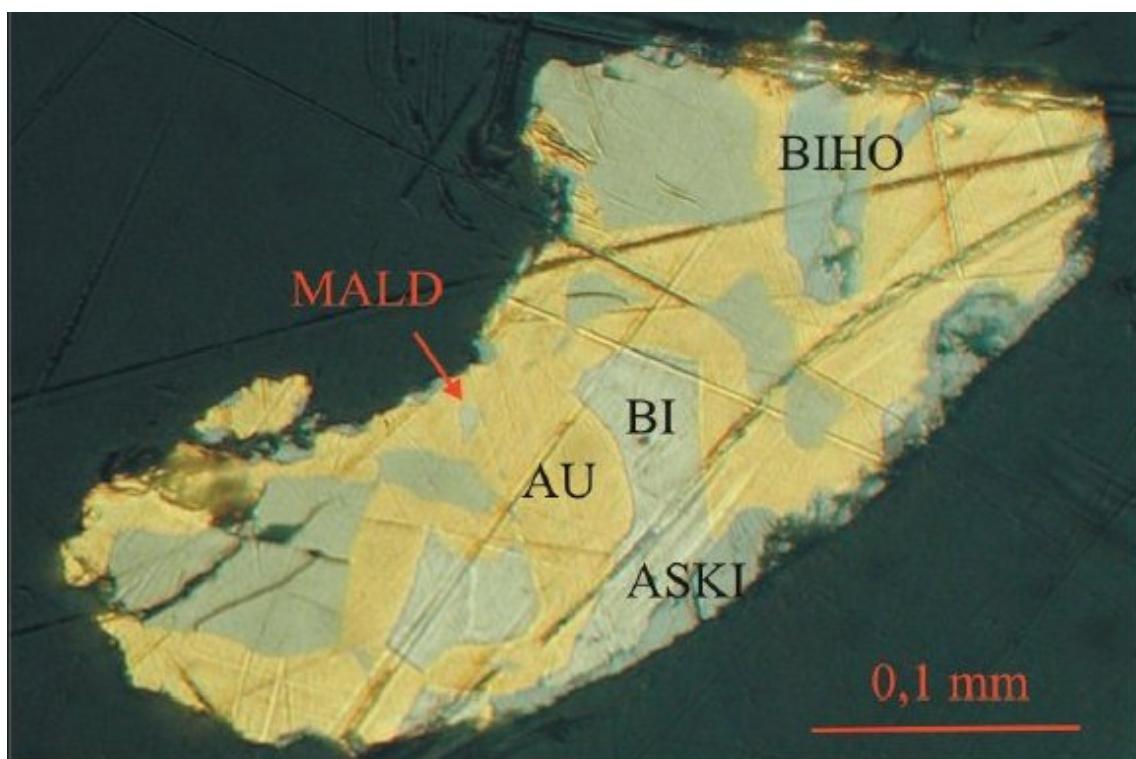


A. Gold (yellow) with arsenopyrite (grey).

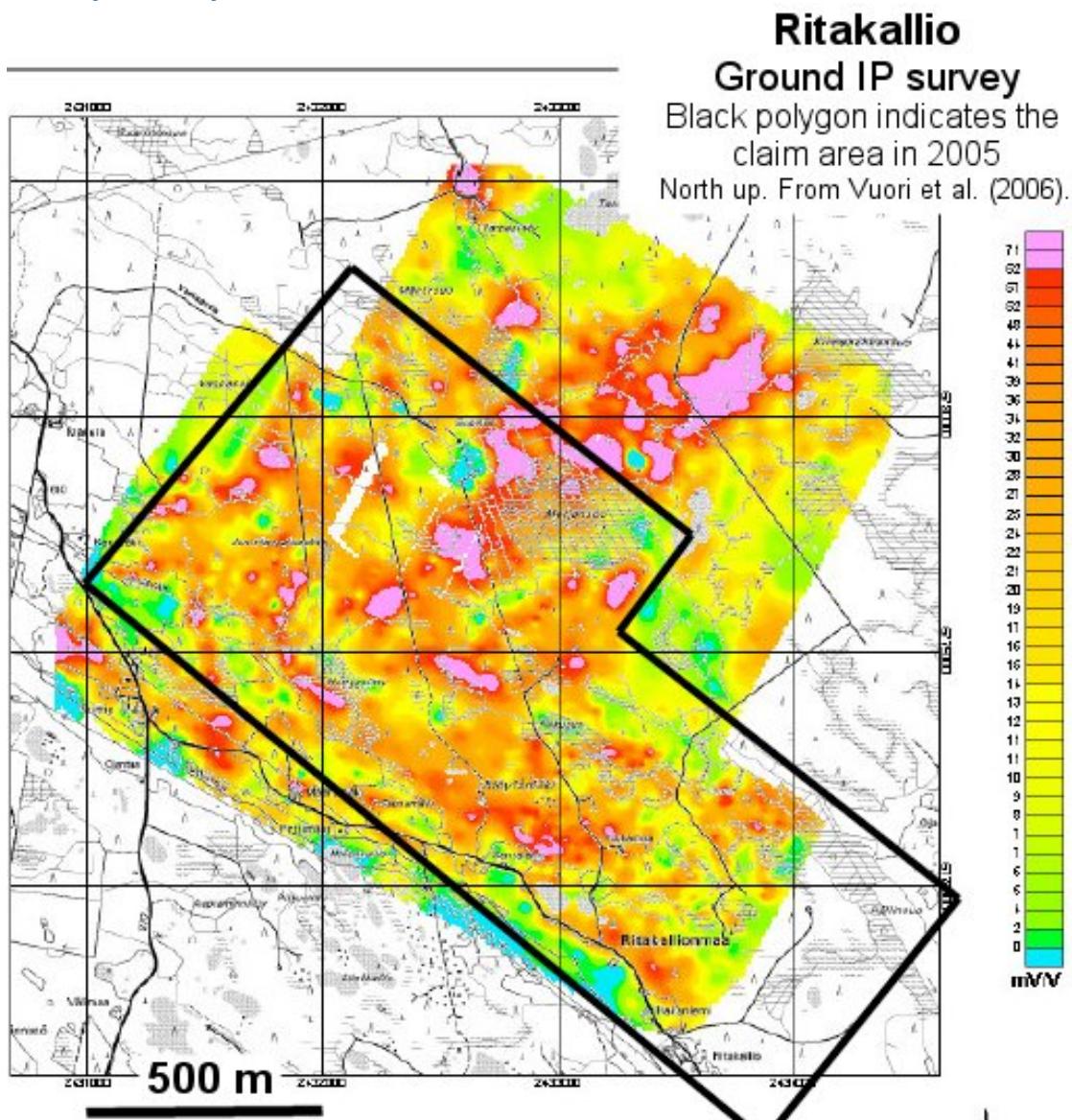
B. Disintegrated maldonite grain: 1 = Ag-bearing gold, 2 = pure gold,  
3 = native bismuth. BSE images (Lahtinen 2006).



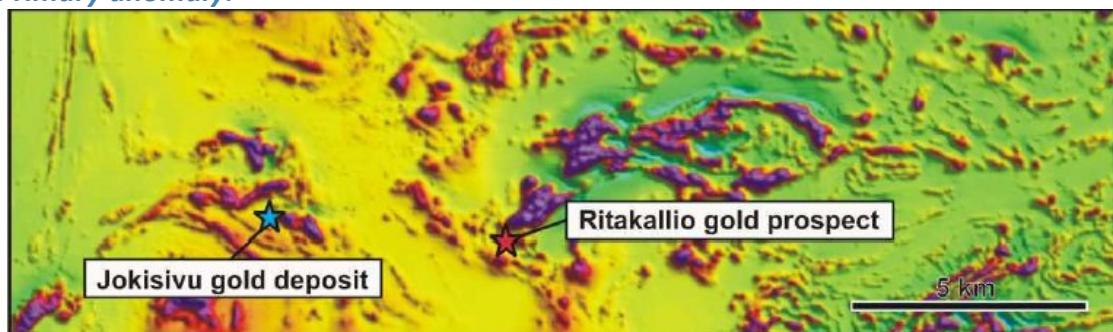
Idiomorphic grain of löllingite with native gold and bismuth at Ritakallio.  
On right, all arsenides analysed from Ritakallio. From Lahtinen (2006).



*Primary anomaly:*

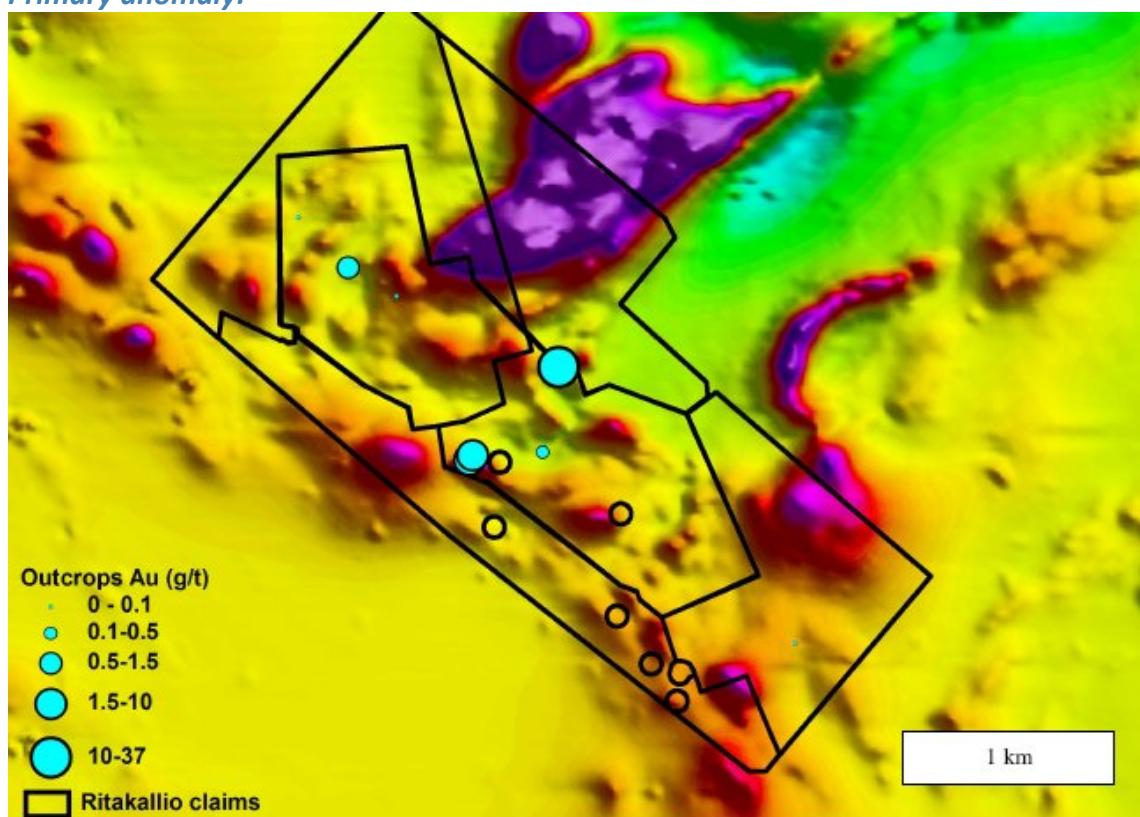


*Primary anomaly:*



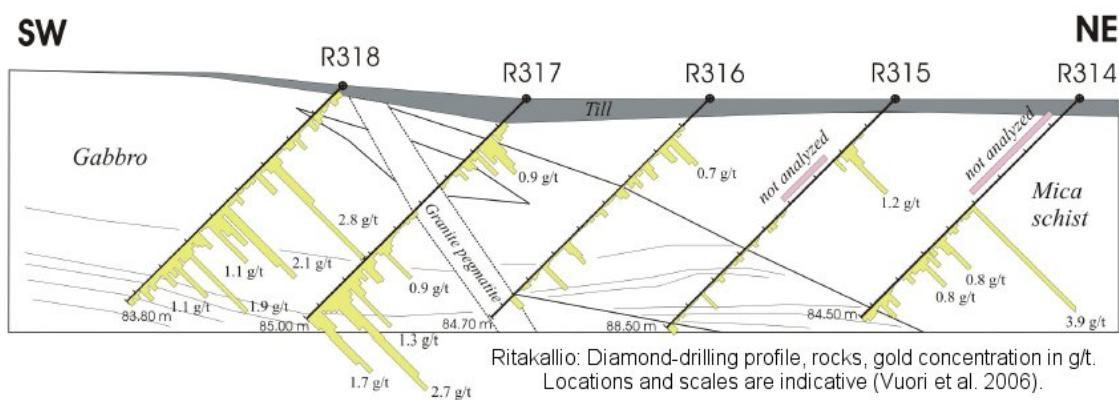
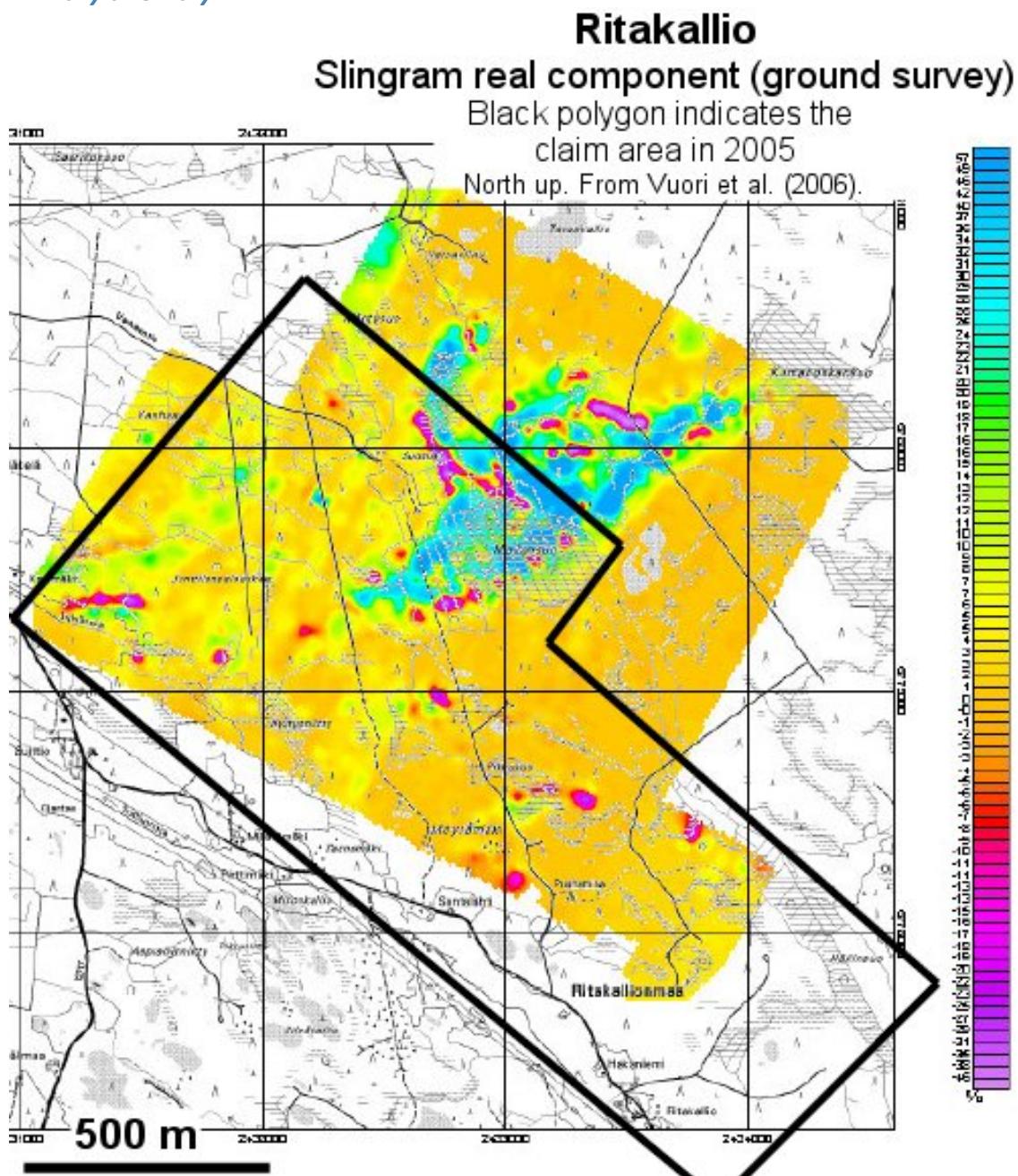
High-resolution aerogeophysical data, flight altitude 30 m, line-spacing 50 m, fixed-wings. Note the location of Ritakallio in a prominent NW-SE-oriented structure.  
North up. From Vuori et al. (2006).

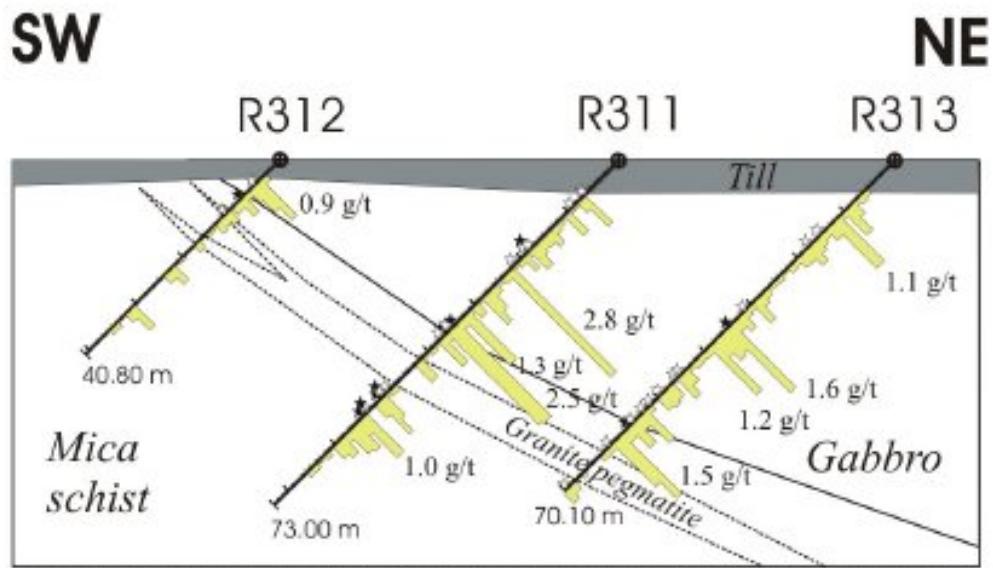
*Primary anomaly:*



Gold in outcrops, sampled with hammer and saw at Ritakallio. Base map is low-altitude high-resolution aeromagnetic map (purple = high values, green = low values; g/t=ppm). North up. From Vuori et al. (2006).

**Primary anomaly:**





Ritakallio: Diamond-drilling profile, rocks, gold concentration in g/t.  
Locations and scales are indicative (Vuori et al. 2006).

*Outcrop photo:*



**Outcrop photo:**



Ritakallio, gold-mineralised, sheared gabbro with thin quartz veins.  
Northing = 6785.270; Easting = 3270.902. Photo Pasi Eilu, 7 June 2005.

## REFERENCES

1. Dragon Mining NL 2007. Quarterly activities report for the quarter ended 30 June 2007. Released 27 July 2007.[http://tupa GTK.fi/karttasovellus/mdae/references/329\\_Kaapelinkulma/2007\\_june.pdf](http://tupa GTK.fi/karttasovellus/mdae/references/329_Kaapelinkulma/2007_june.pdf)
2. Dragon Mining NL 2007. Quarterly activities report for the quarter ended 31st December 2006. Released 29 January 2007.<http://www.dragon-mining.com.au/reports/2006>
3. Dragon Mining NL 2008. Quarterly activities report for the quarter ended 31 March 2008. Released 30 April 2008.  
[http://tupa GTK.fi/karttasovellus/mdae/references/329\\_Kaapelinkulma/2008\\_march\\_quarterly\\_report.pdf](http://tupa GTK.fi/karttasovellus/mdae/references/329_Kaapelinkulma/2008_march_quarterly_report.pdf)
4. Hölttä, P. 2007. Moreenigeokemia ja kultapotentiaaliset rakenteet. Vuorimiesyhdistys. Sarja B 86, 101–103. (in Finnish)
5. Kärkkäinen, N.; Lehto, T.; Tiainen, M.; Jokinen, T.; Nironen, M.; Peltonen, P.; Valli, T. 2003. Etelä- ja Länsi-Suomen kaarikompleksi, kullan ja nikkelin etsintä vuosina 1998-2002. Hanke 2108000-Vaihe I loppuraportti. 118 s., 28 liites. Geologian tutkimuskeskus, arkistoraportti, M 19/21, 12/2003/1/10.  
[http://tupa GTK.fi/raportti/arkisto/m19\\_21\\_12\\_2003\\_1\\_10.pdf](http://tupa GTK.fi/raportti/arkisto/m19_21_12_2003_1_10.pdf)
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7. Vuori, S., Kärkkäinen, N., Huhta, P. & Valjus, T. 2005. Ritakallio gold prospect, Huittinen, SW Finland. Geological Survey of Finland, Report CM06/2112/2005/1/10. 53 p.  
[http://tupa GTK.fi/raportti/valtaus/cm06\\_2112\\_2005.pdf](http://tupa GTK.fi/raportti/valtaus/cm06_2112_2005.pdf)