Osikonmäki

Occurence type: deposit

Commodity	Rank	Total measure	Total production	Total resource	Importance
gold	1	8,72 t	NA	8,72 t	Small deposit
arsenic	5	NA	NA	NA	NA

Easting EUREF: 563603,567
Northing EUREF: 6880215,272
Easting YKJ: 3563800
Northing YKJ: 6883100

Discovery year: 1986
Discovered by: Geological Survey of Finland
Province: Rantasalmi (Au)
Comments: Investigation of the 20 km boulder train led to the discovery of a gold-bearing shear zone in outcrop in the Osikonmäki Tonalite
References: 6, 10, 15, 19, 28

Mineral deposit type

Group: Metallogenic deposit
Main type: Orogenic (metamorphic hydrothermal)
Comments: Transport of gold was facilitated by thio- and thioarsenide complexes in fluids of either magmatic and/or metamorphic origin.
References: 5, 7, 13, 14, 15, 16, 17, 18

Dimension

Expression: exposed
Form: discordant
Shape: irregular
Length (m): 3000
Width (m): 10
Thickness (m): NA
Depth (m): NA
Area (ha): NA
Dip azim: 180
Dip: 45
Plunge azim: 112
Plunge dip: 20
Orientation method: NA
Dimension comments: Open at depth. May contain additional ore bodies or extensions of the known ore bodies along strike and at depth, as the ore is open at several directions.

Holder history

Current holder: Gemdale Limited
Years: 2023-2025
Holding type: Reservation

Previous holders:

Company	Years	Holding type	Comments
Pallagen Oy	2021	Application for reservation	NA

BR Gold Mining Oy	2012-2019	Application for exploration permit	BR Gold is a wholly owned subsidiary of Northern Aspect Resources Ltd which is in turn owned by Rupert Resources Ltd
Belvedere Resources Ltd	2004-2010	Claim (old law)	NA
Endomines Oy	1997-2004	Claim (old law)	NA
Ashton Mining	1995-1997	NA	NA
Outokumpu Oy	1993-1995	NA	NA
Geological Survey of Finland	1986-1993	NA	NA

EXPLORATION ACTIVITY

Belvedere Resources Ltd

Years	Activity type	Geologist	Exploration result	Ref
2012-2012	detailed geophysics	NA	geophysical anomaly	28
	IP and resistivity surveys: The high resistivity and elevated chargeability clearly correlate with the known Osikonmäki mineralisation. A structure with higher resistivity compared to the background continues in the direction of the known mineralisation. This structure also shows elevated chargeability and is a target for further drilling in the area			

BR Gold Mining Oy

Years	Activity type	Geologist	Exploration result	Ref
2012-2013	core drilling	NA	key geological features	28
	Belvedere and BR Gold together during 2005-2012: 101 diamond-drill holes, in total 10,036.26 m.			

Belvedere Resources Ltd

Years	Activity type	Geologist	Exploration result	Ref
2006-2006	detailed geochemistry	NA	geochemical anomaly	28
	MMI surface till sampling indicated Au and Cu anomalies			

2005-2011	core drilling	NA	key geological features	1, 2, 28
	7 diamond-drill holes, total 775 m; 2006: 18 diamond-drill holes, total 913 m; 2011: 54 holes with 6122 m.			
	Intersections			
	HoleID	NA		
	From-To	NA		
	Length	15,5m		
	gold	1,56ppm		
	HoleID	NA		
	From-To	NA		
	Length	14,7m		
	gold	2,95ppm		
	HoleID	NA		
	From-To	NA		
	Length	22,3m		
	gold	2,64ppm		
	HoleID	NA		
	From-To	NA		
	Length	23,6m		
	gold	3,01ppm		

2005-2005	geological interpretation	NA	NA	1, 2, 3

Endomines Oy

Years	Activity type	Geologist	Exploration result	Ref
1999-2000	resource assessment	NA	mineral resource defined	28
	Mineral resource estimated in 1999 and 2000			

Outokumpu Oy

Years	Activity type	Geologist	Exploration result	Ref
1993-1995	ore beneficiation tests	NA	NA	11
	metallurgical studies with the aim of producing concentrate suitable for processing through the Outokumpu or Vammala concentrate plants. The area was relinquished when it was determined that a suitable concentrate could not be produced.			

Geological Survey of Finland

Years	Activity type	Geologist	Exploration result	Ref
1986-1991	core drilling	Olavi Kontoniemi	mineral occurrences	10, 11, 15, 23
	120 diamond-drill holes, total of 16462 m. Drilling is concentrated on the eastern and western portions of the known part of the shear zone, in profiles 25-100 m, mostly 50 m, apart.			
	Intersections			
	HoleID	NA		
	From-To	NA		
	Length	27m		
	gold	7,1ppm		
	HoleID	NA		
	From-To	NA		
	Length	1m		
	gold	68,8ppm		
	HoleID	NA		
	From-To	NA		
	Length	19m		
	gold	2,3ppm		
	HoleID	NA		
	From-To	NA		
	Length	25m		
	gold	9,5ppm		

1985-1993	detailed geochemistry	Olavi Kontoniemi	geochemical anomaly	22, 23
	In till, the Au-As-Te association forms an anomaly that is related to gold mineralisation in the area; in addition, the location of the Osikonmäki mineralisation is indicated by a strong point anomaly. Other elements or element combinations do not show anomalies related to gold mineralisation in the area. A total of 1,737 samples from 1,650 sampling points were collected. A till geochemical survey was conducted over the Osikonmäki region covering 100 km² with sample density of 16 samples/km2.			

1985-1993	percussion drilling	Olavi Kontoniemi	NA	5, 9, 11, 12, 14, 15, 16, 17, 18, 21, 22, 23, 24, 26, 27

1985-1993	ore beneficiation tests	Olavi Kontoniemi	NA	5, 9, 11, 12, 14, 15, 16, 17, 18, 21, 22, 23, 24, 26, 27

1985-1993	regional geochemistry	Olavi Kontoniemi	NA	5, 9, 11, 12, 14, 15, 16, 17, 18, 21, 22, 23, 24, 26, 27

1985-1993	excavation	Olavi Kontoniemi	NA	5, 9, 11, 12, 14, 15, 16, 17, 18, 21, 22, 23, 24, 26, 27

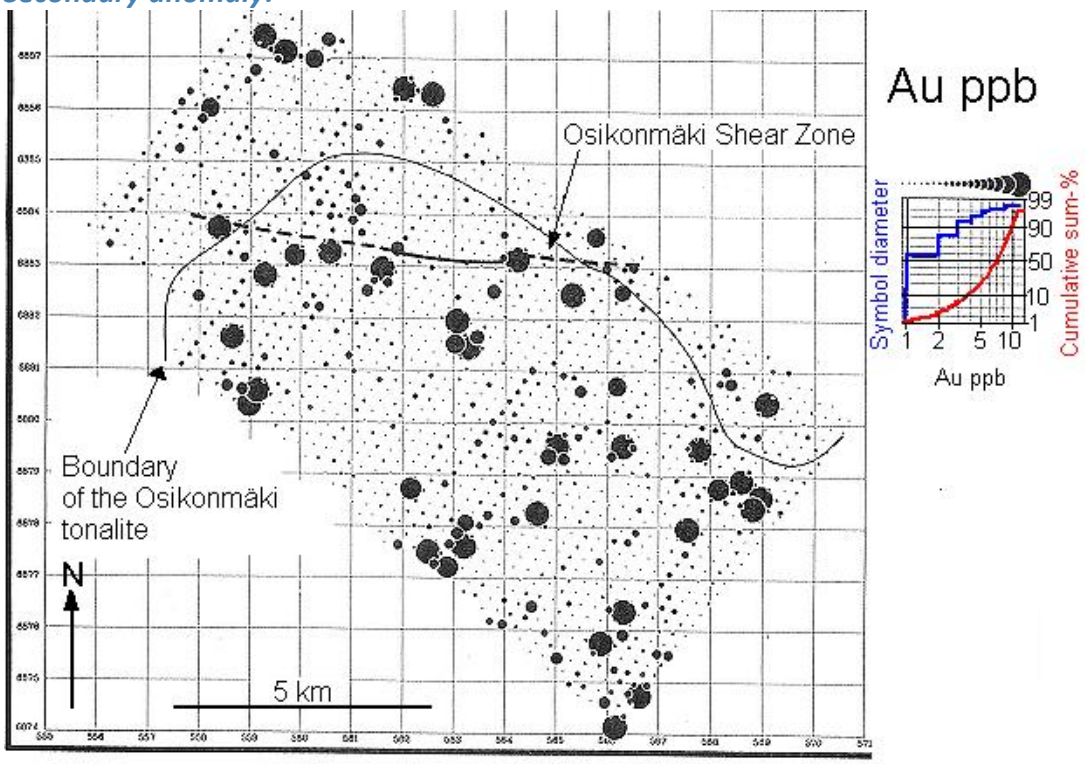
1985-1993	detailed geophysics	Olavi Kontoniemi	NA	8, 10, 12, 14
	Good response by IP, no response on radiometric, slingram, gravity or magnetic methods.			

1985-1993	detailed geology	Olavi Kontoniemi	key geological features	5, 9, 11, 12, 14, 15, 16, 17, 18, 21, 22, 23, 24, 26, 27
	Outcrop mapping, trenching through the overburden into bedrock surface			

1979-1979	regional geophysics	NA	key geological features	
	Low-altitude airborne magnetic, electromagnetic and radiometric survey			

Figures

Secondary anomaly:



Au anomaly in till around Osinkonmäki and its surroundings
(Lestinen 1991).
Edited by P.Eilu (1999)

RESOURCES AND RESERVES

Most recent

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Rupert Resources Ltd	2018	9.11.2018	NI 43-101	28
	Category:	**Inferred mineral resource**			
	Tonnage:	**3230000 t**			
	gold	2,7 ppm			
	Cutoff:	**gold 1,5 ppm**			

Previous calculations

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Belvedere Resources Ltd	2011	NA	NI 43-101	4
	Category:	**Indicated mineral resource**			
	Tonnage:	**1,296 Mt**			
	gold	1,7 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**3,542 Mt**			
	gold	2,09 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Indicated and inferred mineral resource**			
	Tonnage:	**4,838 Mt**			
	gold	1,986 ppm			
	Cutoff:	**gold 0,5 ppm**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Belvedere Resources Ltd	2006	NA	JORC code	3
	Category:	**Inferred mineral resource**			
	Tonnage:	**2,3 Mt**			
	gold	1,89 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Endomines Oy	2001	NA	NA	26
	Category:	**Indicated mineral resource**			
	Tonnage:	**0,3 Mt**			
	gold	5,5 ppm			
	Cutoff:	**gold 2 ppm**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**0,1 Mt**			
	gold	5 ppm			
	Cutoff:	**gold 2 ppm**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Geological Survey of Finland	1990	NA	NA	7, 10, 15

	Category:	**NA**
	Tonnage:	**2,2 Mt**
	gold	3,1 ppm
	Cutoff:	**gold 1 ppm**
	Category:	**NA**
	Tonnage:	**0,09 Mt**
	gold	4,9 ppm
	arsenic	0,77 %
	Cutoff:	**gold 1 ppm**

GEOLOGY

Host rock: Tonalite

Tonalite (Host rock)

Rock type: Host rock
Proportion: major
Grain size: NA
Color: NA
References: 7, 8, 10, 14, 15, 16, 17, 18, 20, 25, 28
Comments: The hosting structure is indicated by intense shearing can be more than 30 m in true thickness and areas of minor shearing more than 100 m in true thickness.

Ore minerals:

Mineral	Proportion	Mineral texture
Antimony	minor	
Arsenopyrite	major	
Bismuth	minor	
Chalcopyrite	major	
Covellite	minor	
Cubanite	minor	
Dyscrasite	minor	
Electrum	minor	
Galena	minor	
Gold	minor	
	Native Au and electrum, with a set of Bi-Se-Te minerals, occur as inclusions and at grain boundaries within and between arsenopyrite, quartz and plagioclase. native Au is more abundant towards the centres of early crystallised loellingite-arsenopyrite grains. Fineness 98-39% Au, 0.1-60.5% Ag, 0.0-0.6% Bi.	
Hedleyite	minor	
Ikunolite	minor	
Ilmenite	minor	
Kawazulite	minor	
Löllingite	major	
Maldonite	minor	
Marcasite	minor	
Molybdenite	minor	
Pilsenite	minor	
Pyrrhotite	major	
Rutile	minor	
Sphalerite	minor	
Stannite	minor	
Tetrahedrite	minor	

Other minerals:

Mineral	Proportion	Mineral texture
Biotite	present	Alteration product
K-Feldspar	present	Alteration product
Powellite	present	
Quartz	present	
	Concordant, narrow quartz veins along the OSZ	
Scheelite	present	
Titanite	present	Alteration product

Tourmaline	present	Alteration product

Structures
Blastomylonite

Textures
Cataclastic
Granoblastic
Porphyroclastic

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	Post	-3,4	-645
Comments: Plagioclase - quartz - biotite - hornblende ± K feldspar, hornblende, diopside, with a retrograde overprint.					

Geological age:

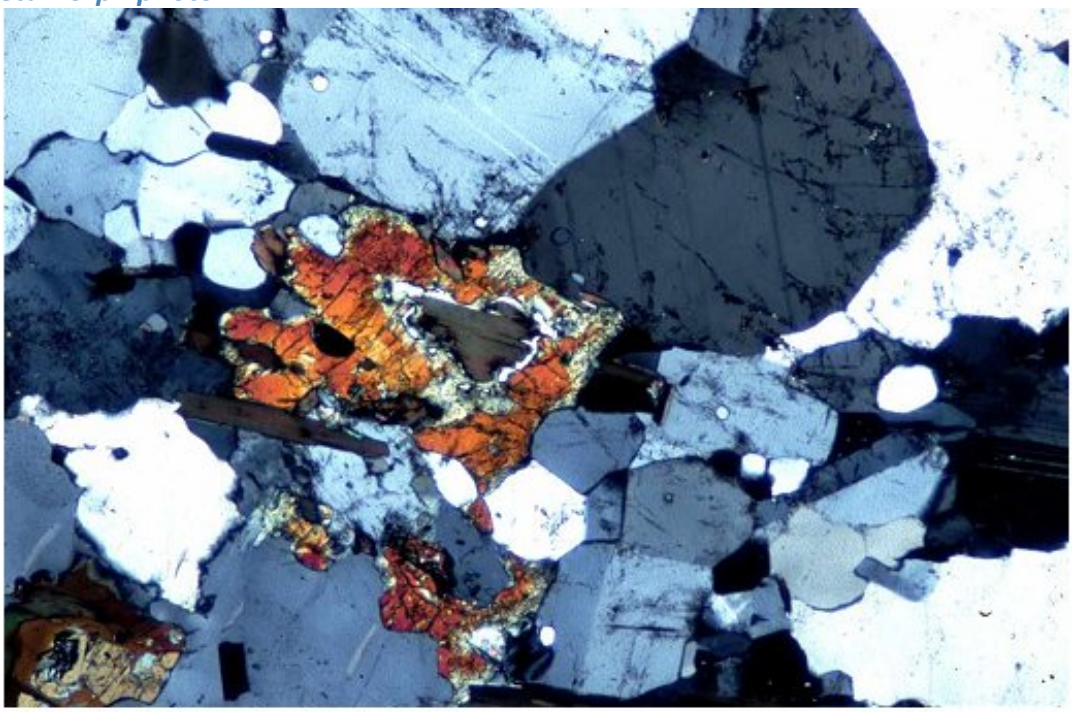
Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:		
Paleoproterozoic (2500-1600 Ma)	1815-1887		Y		
Comments: Mineralization age is later than the intrusion of synorogenic granitoids, i.e. <1887 Ma, but earlier than the peak regional metamorphism and the post-orogenic Pirilä-type granites, i.e. >1815 Ma.					
Paleoproterozoic (2500-1600 Ma)	1801-1887	1844	N		
Radiometric age:	**Method:**	**Age:**	**Error (Ma):**	**Mineral:**	**Reference:**
	Pb-Pb	1801	31		9, 15
	U-Pb	1887	5	Zircon	9, 15

Figures

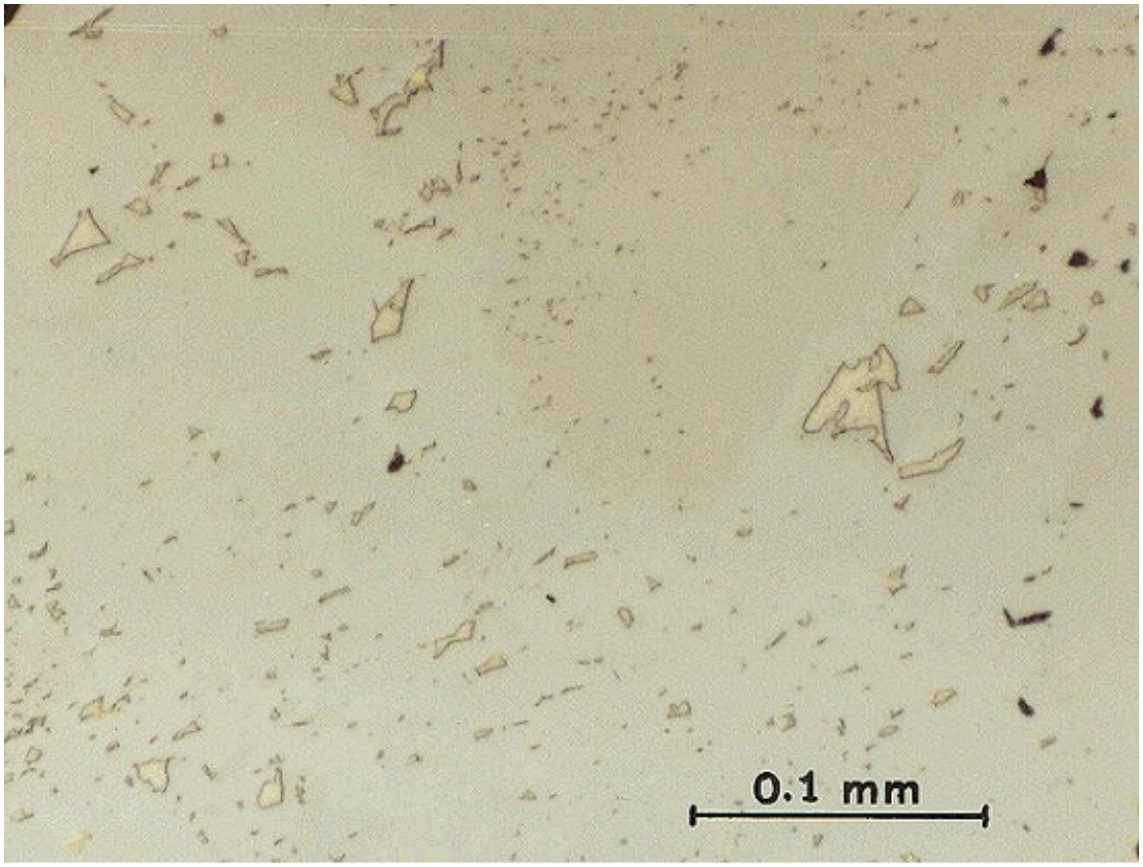
Structure:

A close-up on the main, gold-mineralised shear zone at Osikonmäki, Rantasalmi, Savo. Photo Pasi Eilu 7/10/1997.

Metamorph photo:



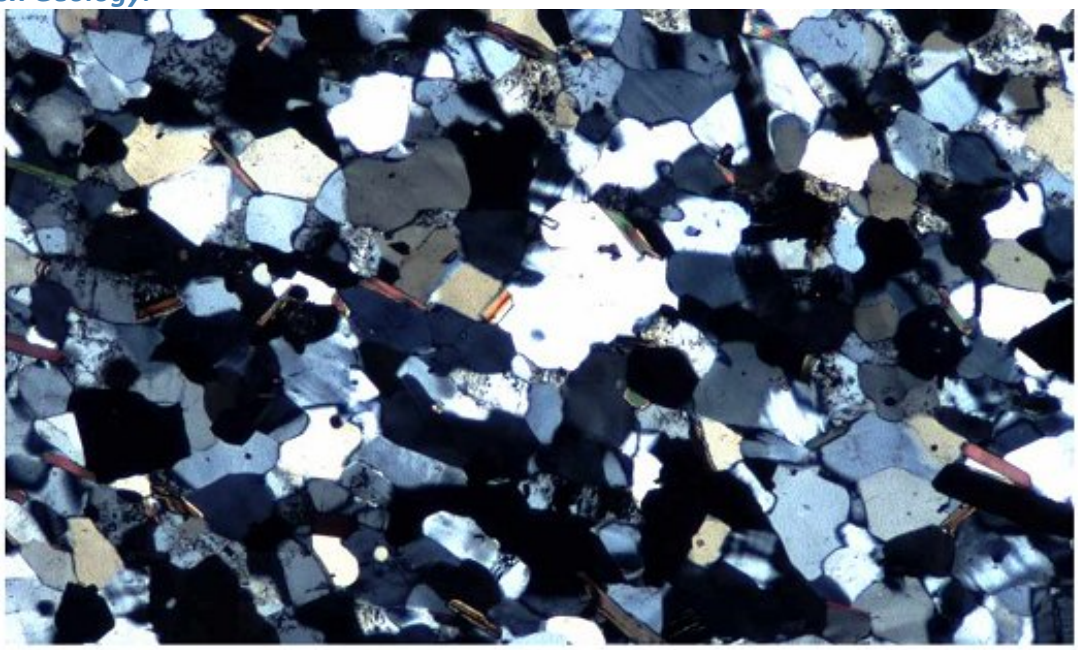
Unaltered tonalite at Osikonmäki. Mineral assemblage: plagioclase - quartz - biotite - hornblende - diopside ± K feldspar. Field of view 3.2 mm. Photo Pasi Eilu 1997.



Inclusions of native gold and Bi-Te-Se minerals in arsenopyrite at Osikonmäki (Kontoniemi 1998).

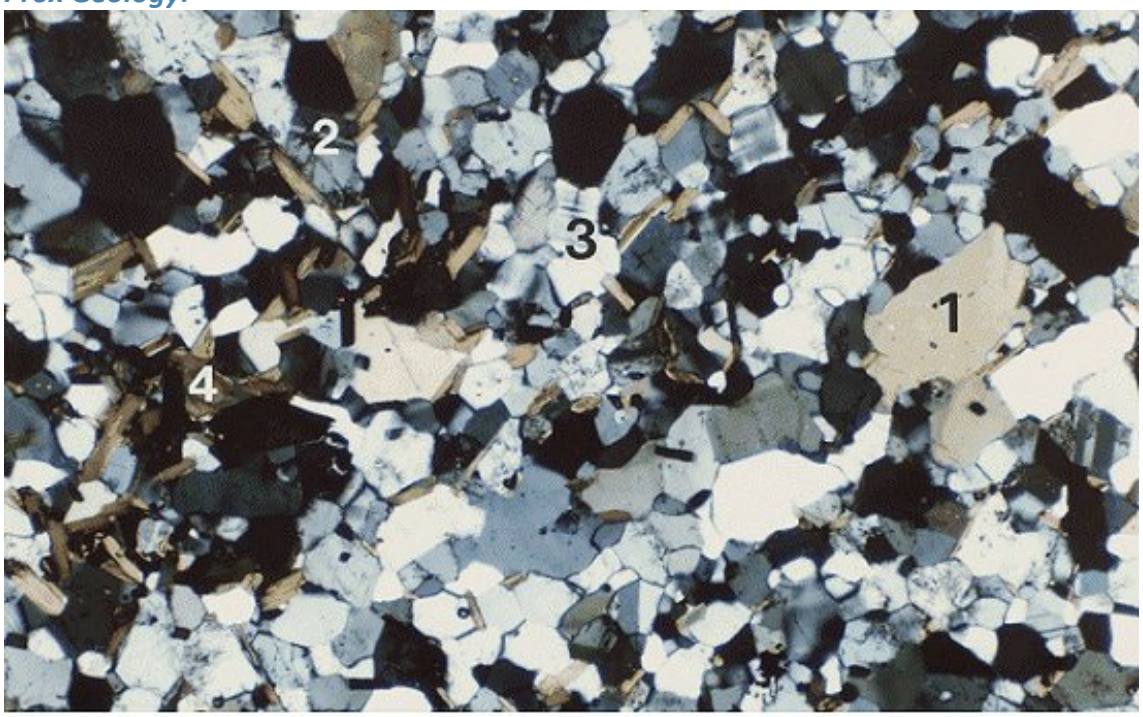
Osikonmäki, Savo: Altered and sheared, banded and granoblastic tonalite from the gold mineralisation. Pervasive, fine-grained arsenopyrite dissemination. Mineral assemblage: quartz - plagioclase - microcline - biotite - arsenopyrite.
Field of view 10 cm. Photo Jari Väätäinen.

Prox Geology:



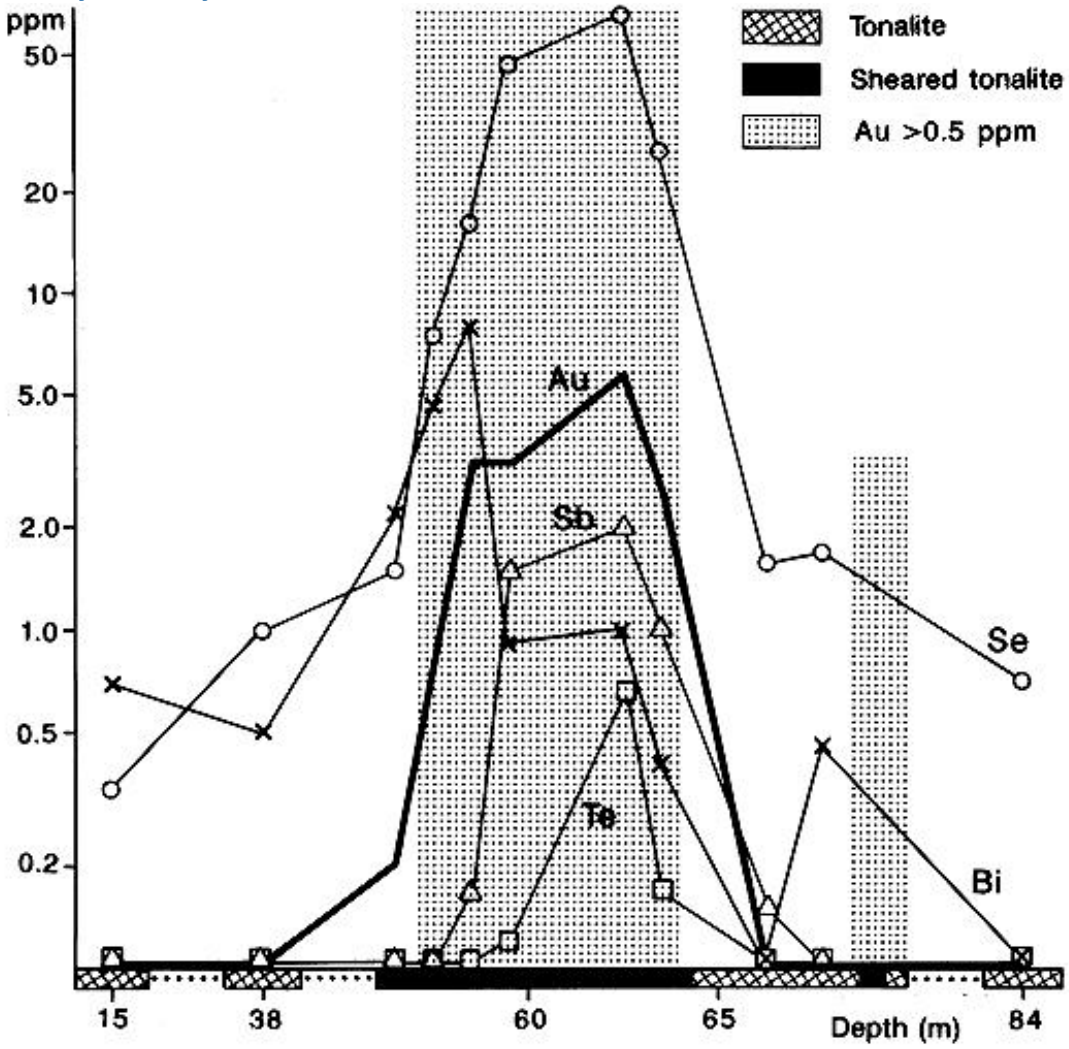
Altered, sheared and mineralised tonalite at Osikonmäki. Mineral assemblage: plagioclase - quartz - biotite - K feldspar - actinolite - diopside - sulphides.
Field of view 3.2 mm. Photo Pasi Eilu 1997.

Prox Geology:

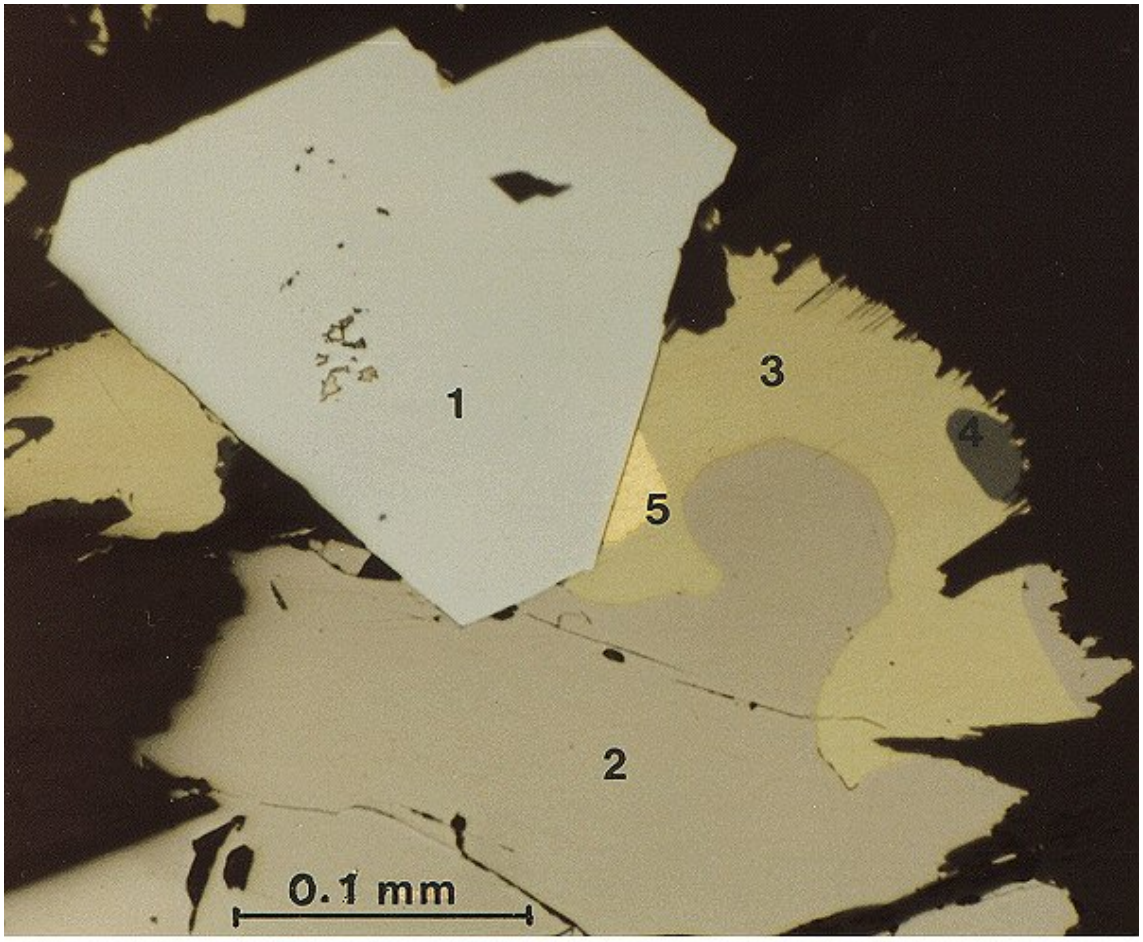


Altered tonalite at Osikonmäki. 1: quartz, 2: plagioclase, 3: K feldspar, 4: biotite (Kontoniemi 1998). Field of view 6 mm.

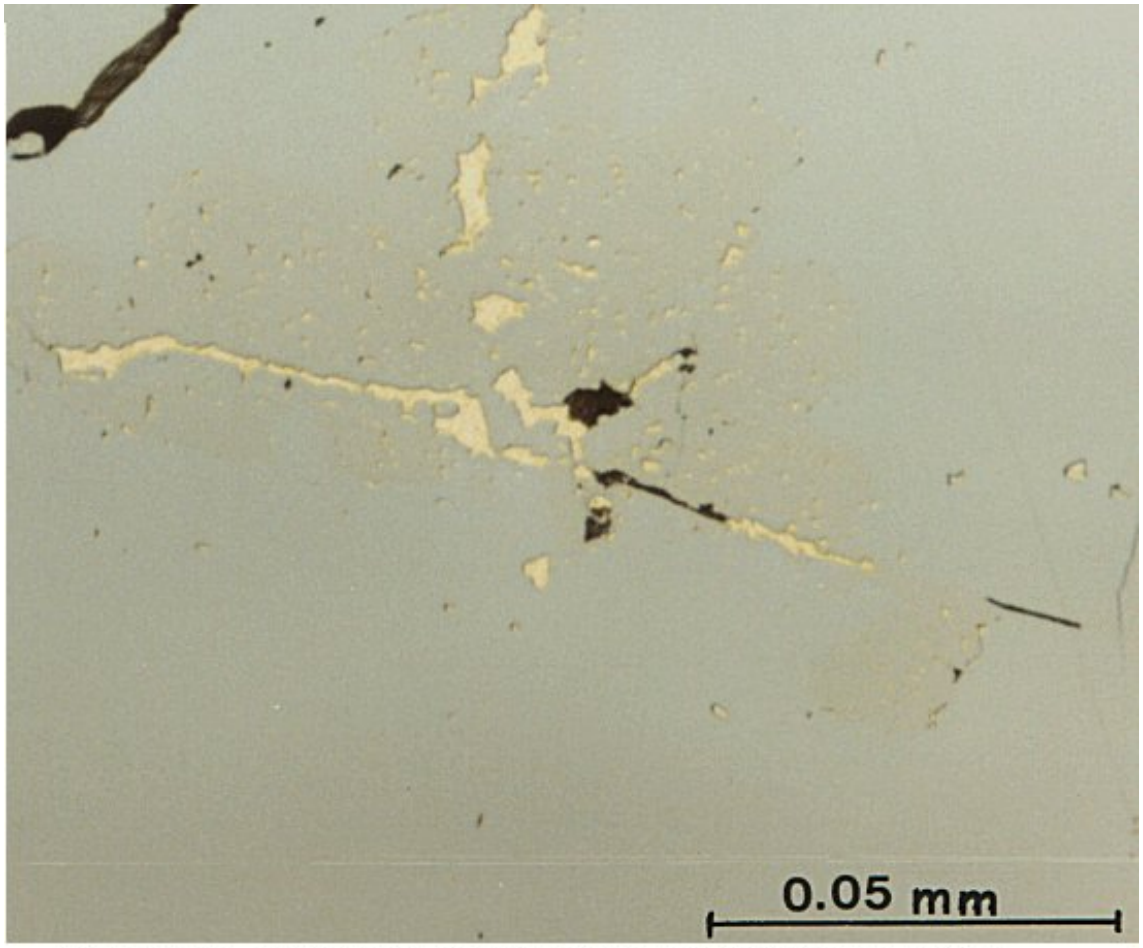
Primary anomaly:



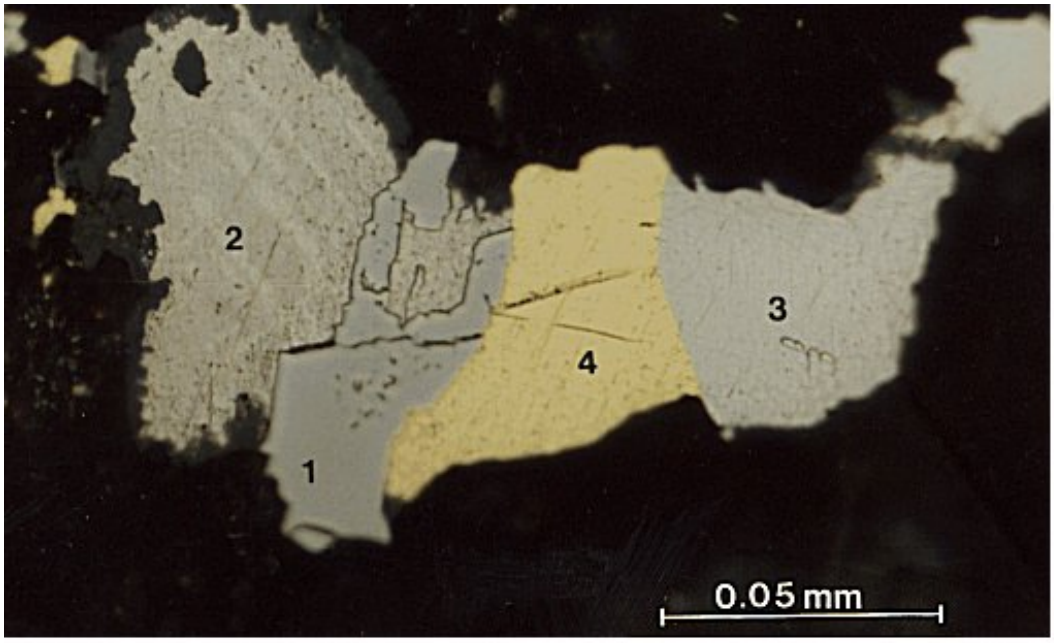
Geochemical section in drill hole BH 478 at Osikonmäki (Kontoniemi 1998).



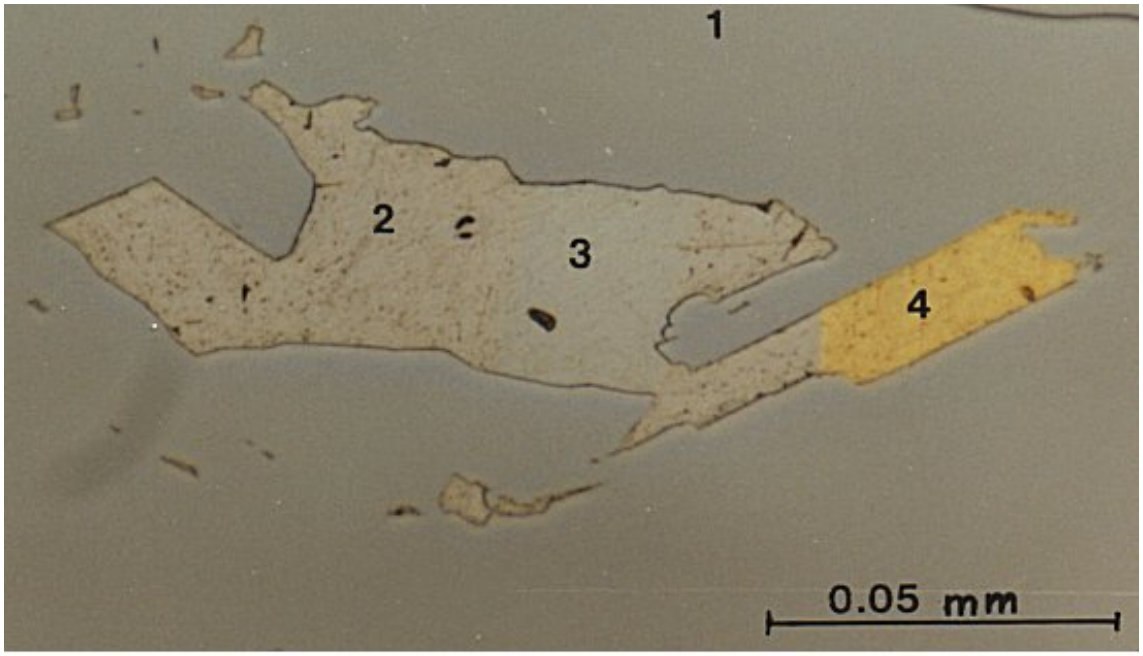
Typical assemblage in disseminated ore at Osikonmäki (Kontoniemi 1998). 1 = arsenopyrite, 2 = pyrrhotite, 3 = chalcopyrite, 4 = sphalerite, 5 = gold.



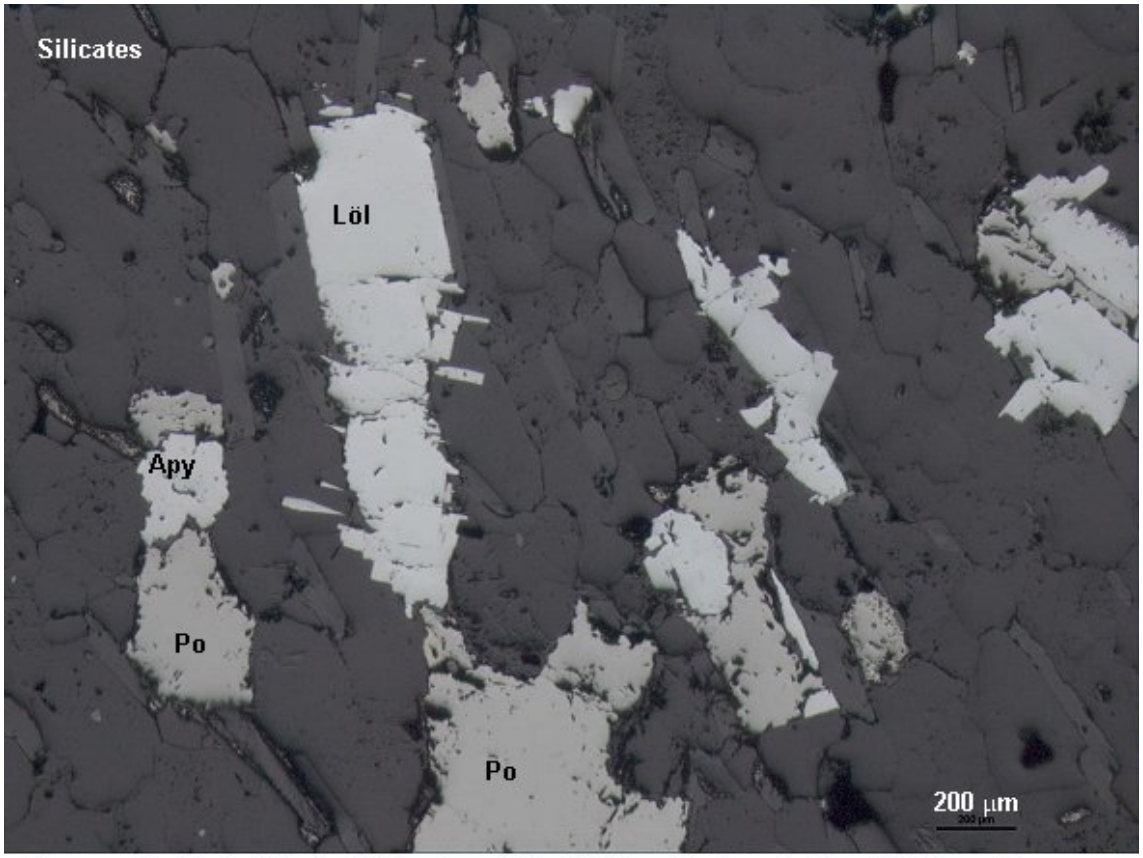
Exolutions of native gold in arsenopyrite at Osikonmäki (Kontoniemi 1998).



Ore minerals in a quartz vein at Osikonmäki (Kontoniemi 1998).
1 = arsenopyrite, 2 = native bismuth, 3 = hedleyite, 4 = gold.

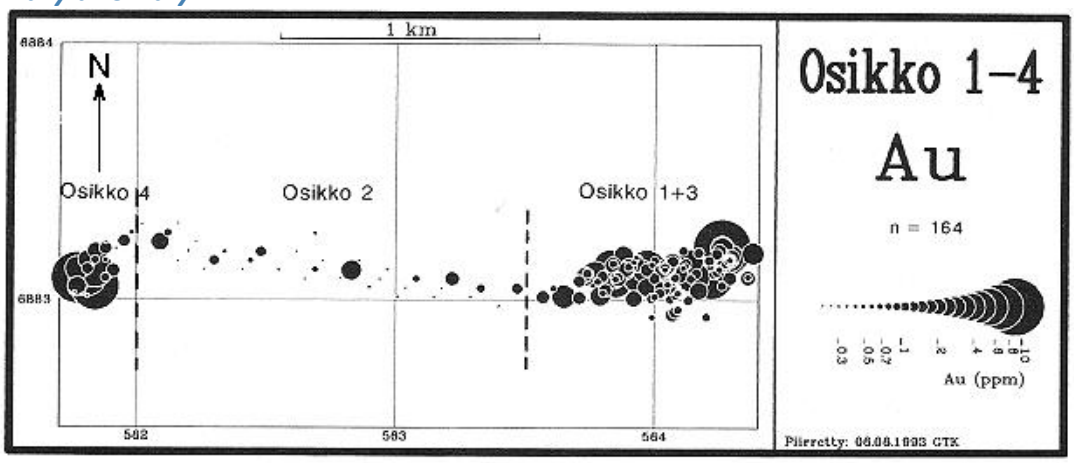


Ore minerals in arsenopyrite at Osikonmäki (Kontoniemi 1998).
1 = arsenopyrite, 2 = native bismuth, 3 = hedleyite, 4 = gold.



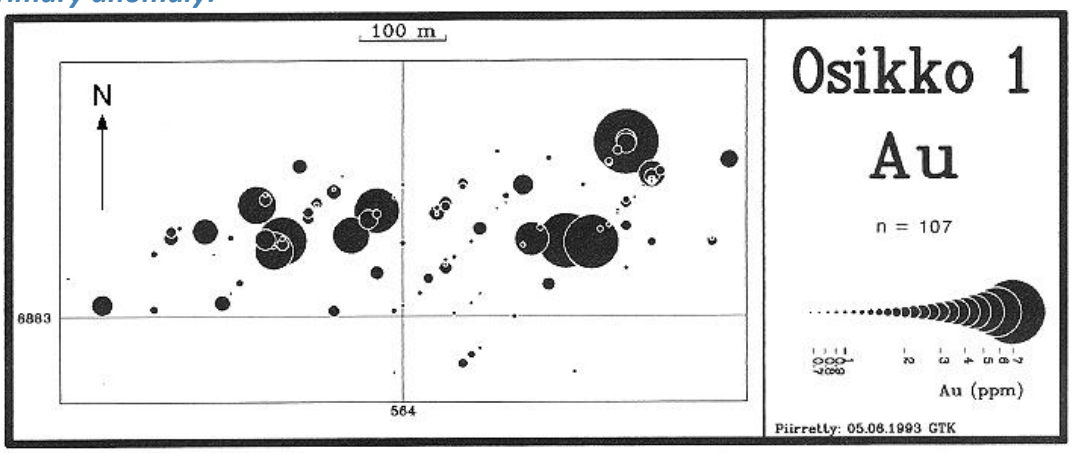
Arsenopyrite (Apy), löllingite (Löl) and pyrrhotite (Po) in gold mineralisation at Osikonmäki. Image Markku Lehtinen.

Primary anomaly:



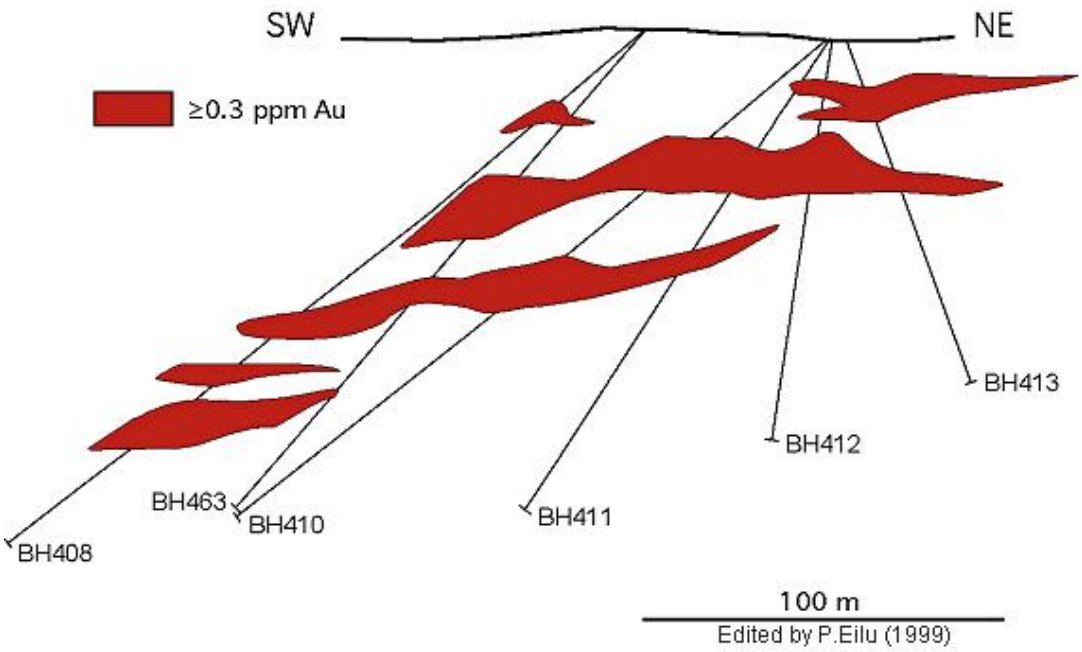
Variation in gold content in bedrock projected to surface at Osikonmäki, along the Osikonmäki Shear Zone. From Kontoniemi (1998).
Edited by P.Eilu (1999)

Primary anomaly:



Variation in gold content in bedrock projected to surface at Osikonmäki, along the Osikonmäki Shear Zone at claim Osikko1. From Kontoniemi (1998).
Edited by P.Eilu (1999)

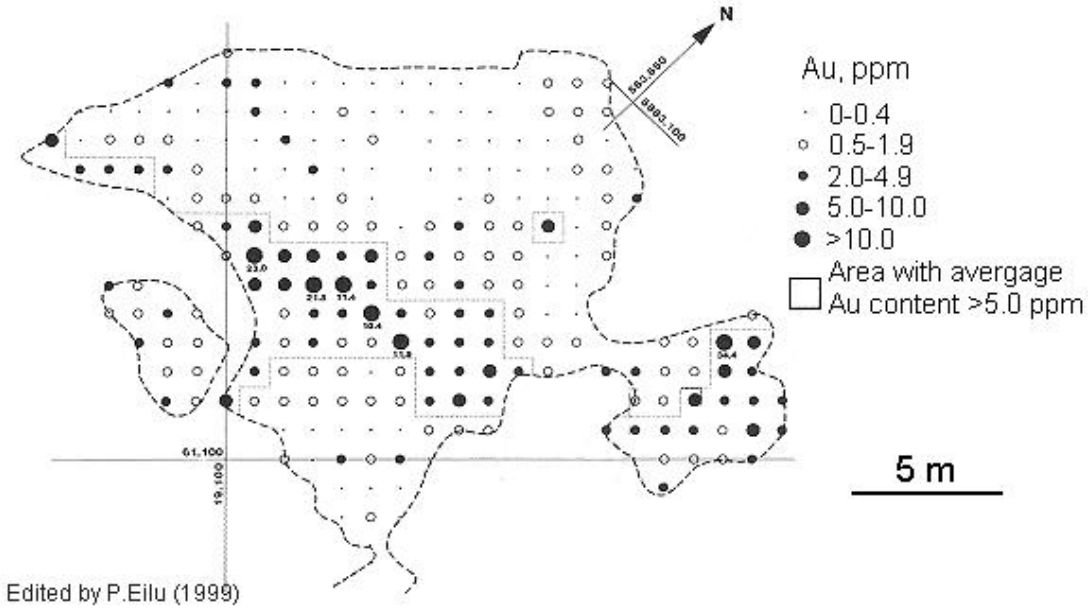
Plan view:



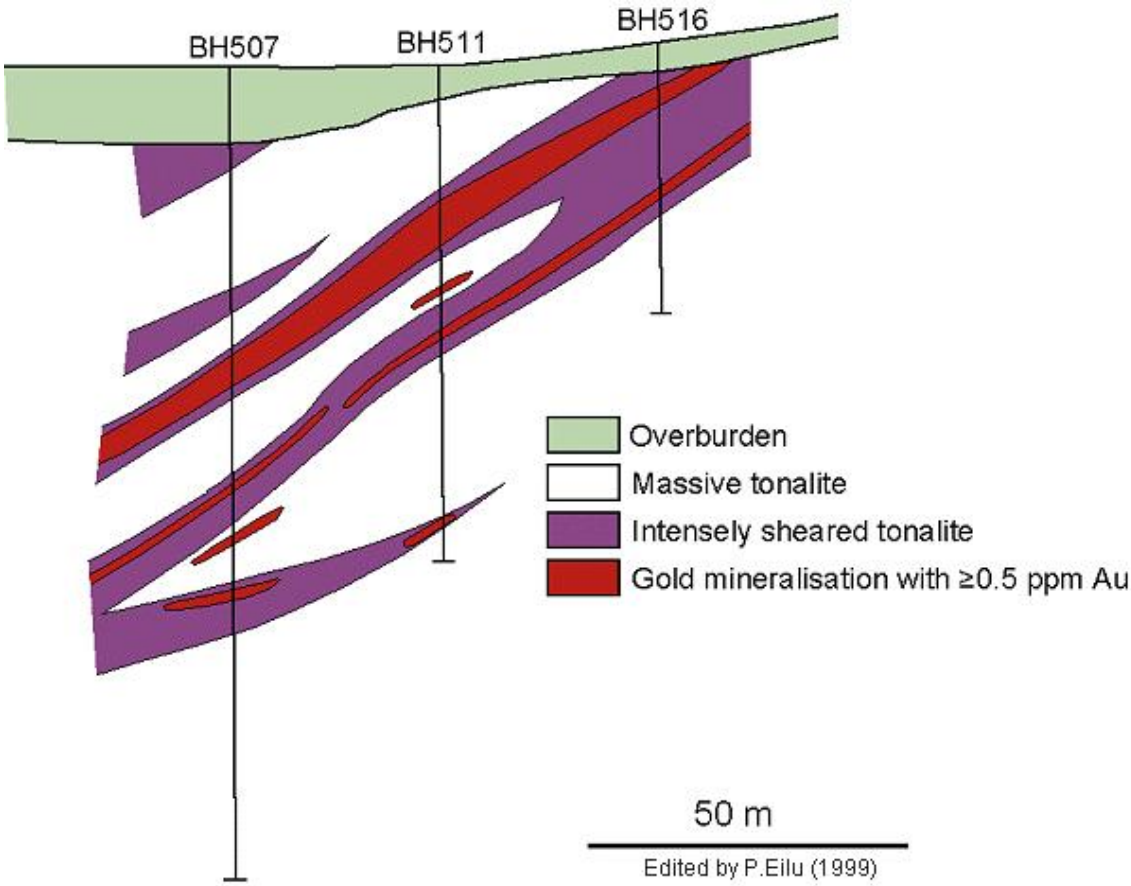
Edited by P.Eilu (1999)

Alternative block model for section across the Osinkonmäki Shear Zone and gold mineralisation (Kontoniemi 1998). Section 60.950 at Osikko 1.

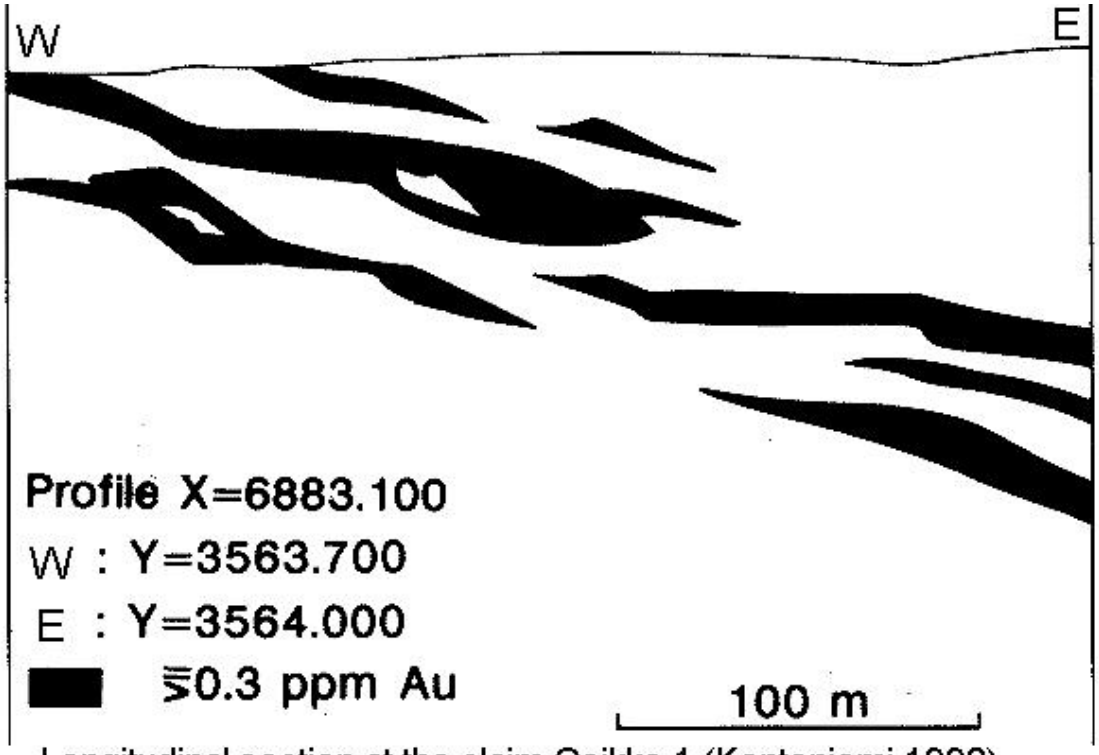
Primary anomaly:



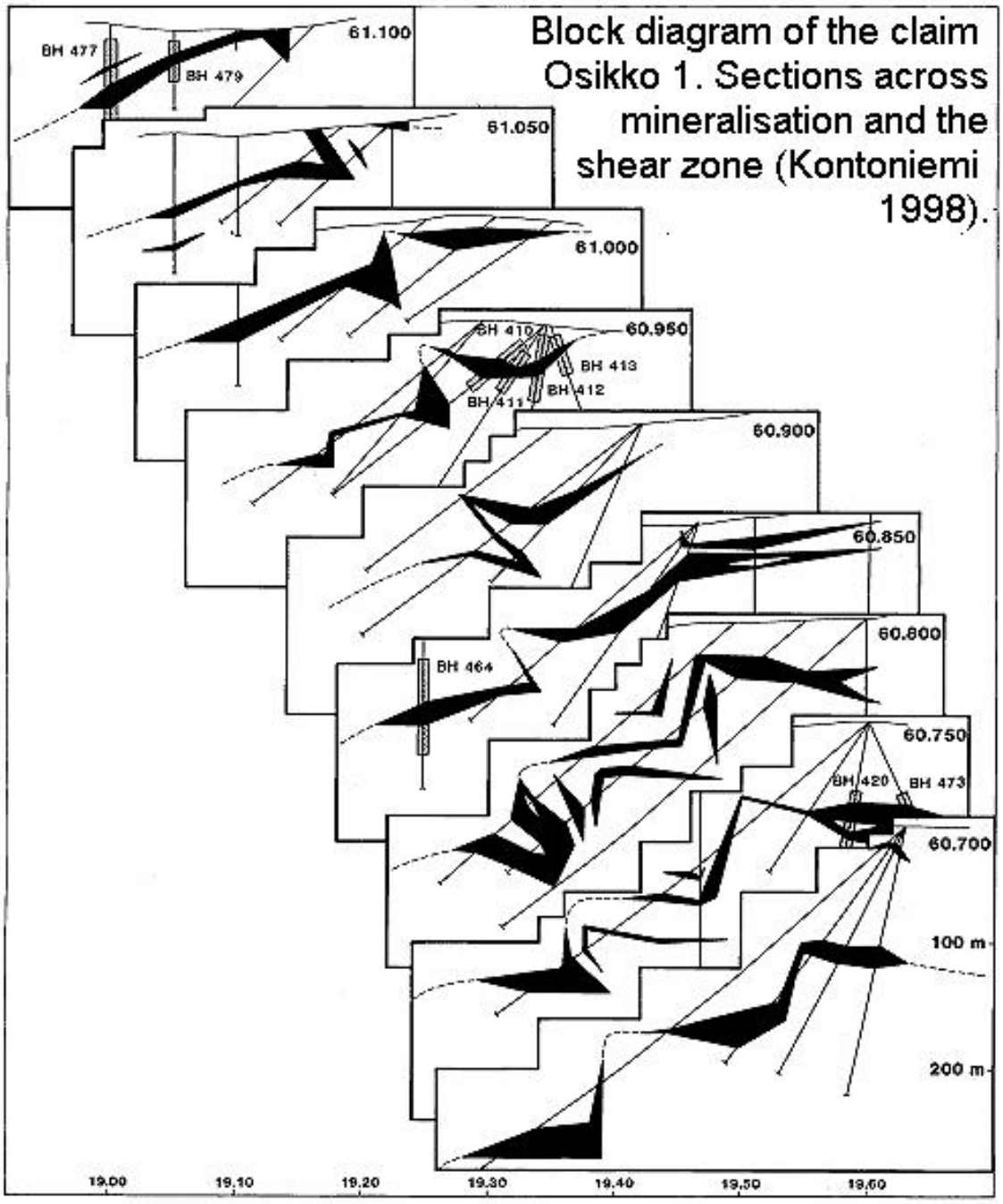
Gold content in the uppermost 20 cm of bedrock in an exploration trench at Osikonmäki (Kontoniemi 1998).



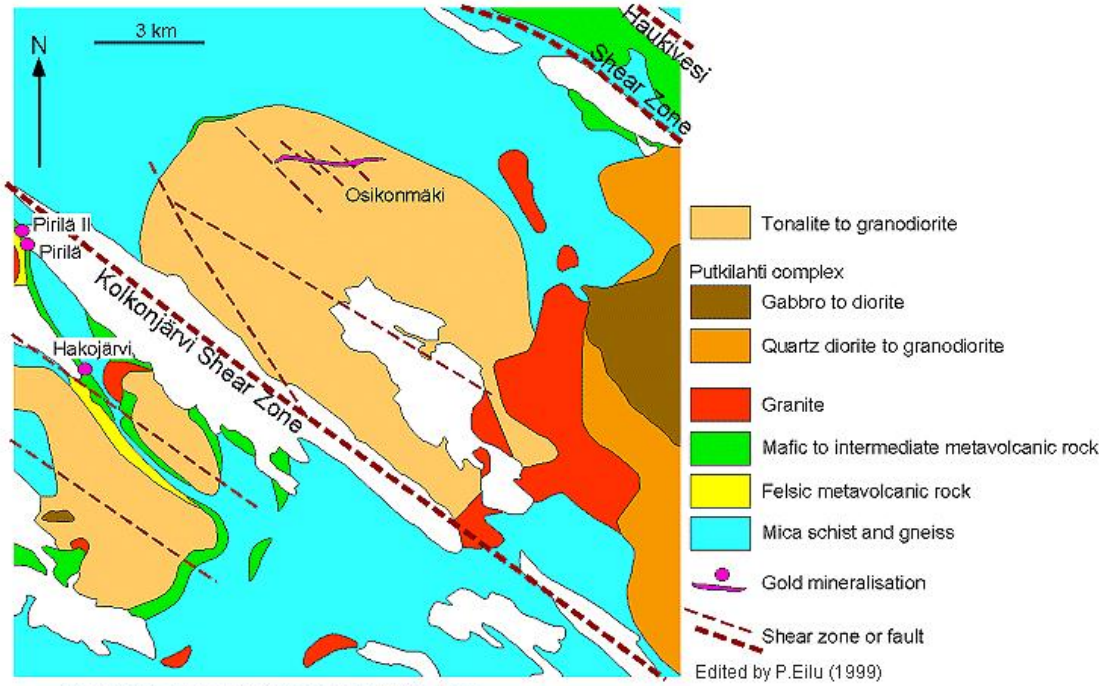
A N-S section across mineralisation in the western part of the Osikonmäki Shear Zone at y = 3561.780 (Kontoniemi 1998).



Longitudinal section at the claim Osikko 1 (Kontoniemi 1998).


Block diagram of the claim Osikko 1. Sections across mineralisation and the shear zone (Kontoniemi 1998).
BH 477
BH 479
61.100
61.050
61.000
BH 410
60.950
BH 413
BH 412
BH 411
60.900
60.850
60.800
BH 464
60.750
BH 420
BH 473
60.700
100 m
200 m
19.00
19.10
19.20
19.30
19.40
19.50
19.60

Regional geology:



Geology of the Osikonmäki-Pirilä area.
White areas are lakes. After Kontoniemi (1998).

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http://tupa.gtk.fi/karttasovellus/mdae/references/362_Iso-Rehvi/362_BelvedereResources_PressRelease_07092005.pdf

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6. Endomines Oy. 1999. www.endomines.fi on 09/12/99.

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9. Kontoniemi, O. & Vaasjoki, M. 1991. Isotopic studies from the Protereozoic Osikonmäki gold prospect at Rantasalmi, southeastern Finland. Geological Survey of Finland, Special Paper 12, 53-57.
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