Pahtavaara

Occurence type: deposit

Commodity	Rank	Total measure	Total production	Total resource	Importance
gold	1	29,28 t	10,86 t	18,42 t	Medium sized deposit

Easting EUREF: 475137,65
Northing EUREF: 7501765,025
Easting YKJ: 3475300
Northing YKJ: 7504900

Discovery year: 1985
Discovered by: Geological Survey of Finland
Province: Kittilä (Au, Cu)
Comments: The discovery was preceded by detection of Cu and Mn anomalies in regional till survey and Au anomalies in detailed till survey, and the discovery of the extensive "skarn" zone in the bedrock during regional exploration. Gold mineralisation was localized by trenching in 1985.
References: 9, 13, 14, 15, 19, 20, 21, 30, 31, 32, 33, 34, 46, 54, 64

Mineral deposit type

Group: Metallogenic deposit
Main type: Orogenic (metamorphic hydrothermal)
Sub type 1: Au
Comments: Biotitisation-dominated, reducing alteration in a komatiitic sequence was the main mineralising stage during peak- to slightly post-peak deformation. This was followed by amphibole overgrowth with partial decarbonation of rocks altered during the first stage under oxidising conditions; this was another mineralising stage, possibly just remobilising gold. The coarse, visible gold was formed during the latter stage.
References: 1, 5, 8, 16, 27, 28

Group: Metallogenic deposit
Main type: VMS (mixed hydrothermal)
Sub type 1: Mafic-ultramafic
Comments: Number of features fit into the submarine hydrothermal origin whereas others are ok also for orogenic gold class

Dimension

Expression: exposed
Form: discordant
Shape: irregular
Length (m): 1500
Width (m): 300
Thickness (m): NA
Depth (m): 330
Area (ha): NA
Dip azim: 337
Dip: 75
Plunge azim: NA
Plunge dip: NA
Orientation method: NA
Dimension comments: Several ore bodies, each consisting from one to a few shoots. The deposit is open at depth, down plunge, along the entire mineralised domain, and open along strike to the west and ENE. T-Vein ore body extends >500 m from surface down easterly plunge.

Holder history

Current holder: Rupert Finland Oy
Years: 2016
Holding type: Mining concession (old law)

Previous holders:

Company	Years	Holding type	Comments
Lappland Goldminers Oy	2008-2014	Mining concession (old law)	Bankruptcy in 2014.
Scan Mining Oy	2002-2008	Mining concession (old law)	Bankruptcy in 2007.
Terra Mining Oy	1993-2002	Mining concession (old law)	Bankruptcy in 2000.
Terra Mining Oy	1991-1993	Claim (old law)	NA
Geological Survey of Finland	1984-1991	Claim (old law)	NA

EXPLORATION ACTIVITY

Rupert Resources Ltd

Years	Activity type	Geologist	Exploration result	Ref
2016-2017	detailed geochemistry	NA	NA	40
	chip sampling of open pits, trenches, and underground horizons, soil and till sampling. During 2017; ionic leach, convensional geochemical (till) and heavy mineral surveys to identify new areas of interest; Western Extension, North IP, South Ip and Arthur			

2016-2016	detailed geophysics	NA	NA	50
	The 27 km of IP; Several conductive anomalies show up as folds, corroborating the idea that there is a northern flank to a big fold.			

2016	core drilling	Mike Sutton, Charlotte Seabrook	mineralized zone identified	37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 51, 52, 64
	In total 12,293 m from surface and 3,209 m from underground drilled in 2016. 2018 drilling focussed on definition of new resources in proximity to underground mine infra and at surface within 1 km of the Pahtavaara mill. Late 2018 to early 2019: 3128 m of diamond drilling. In total 53 km diamond drilling during 2016-2018. Winter 2019-2020 drilling in total 10515 m, winter 2020-2021: 93 holes for a total of 6561.5 m.			
	Intersections			
	HoleID	116005		
	From-To	125-130		
	Length	5m		
	gold	32,7ppm		
	Comments	*South Flank; Karoliina orebody*		
	HoleID	116005		
	From-To	144-153		
	Length	9m		
	gold	2,4ppm		
	Comments	*South Flank; Karoliina orebody*		
	HoleID	116011		
	From-To	136-137		
	Length	1m		
	gold	432ppm		
	Comments	*North Flank; East*		
	HoleID	116011		
	From-To	140-141		
	Length	1m		
	gold	432ppm		
	HoleID	116016		
	From-To	123-127,1		
	Length	4,1m		
	gold	14,6ppm		
	Comments	*South Flank; Karoliina orebody*		
	HoleID	116047		
	From-To	85-86		
	Length	1m		
	gold	18,7ppm		
	HoleID	116051		
	From-To	140-141		

	Length	1m
	gold	245ppm
	HoleID	116234
	From-To	90-101,6
	Length	11,6m
	gold	4,8ppm
	Comments	*North Flank; West* *inc. 5.03 m / 9.0 ppm*
	HoleID	117305
	From-To	135-139
	Length	4m
	Comments	*North Flank; East*
	HoleID	117315
	From-To	6-15
	Length	9m
	gold	22,8ppm
	Comments	*South Flank; Karoliina orebody, inc. 3.0 m (from 7.00 m to 10.00 m) 54.5 ppm Au*
	HoleID	119503
	From-To	69-75
	Length	6m
	gold	5,6ppm
	Comments	*Harpoon zone*
	HoleID	119503
	From-To	169,6-181,5
	Length	11,9m
	gold	62,7ppm
	Comments	
	HoleID	119507
	From-To	150-155
	Length	5m
	gold	220,3ppm
	Comments	*In the NFE zone*
	HoleID	119519
	From-To	165,3-167
	Length	1,7m
	gold	181,1ppm
	HoleID	120342
	From-To	NA
	Length	3,9m
	gold	27ppm
	HoleID	120501
	From-To	55-56,7
	Length	1,7m
	gold	15ppm
	HoleID	120505
	From-To	151-167
	Length	16m
	gold	5,5ppm
	HoleID	120518
	From-To	44-46,6
	Length	2,6m
	gold	46,8ppm
	Comments	*Karoliina East ore body*
	HoleID	120525
	From-To	51-56
	Length	5m
	gold	11,6ppm
	Comments	*T-Vein ore body*
	HoleID	121406
	From-To	NA
	Length	12,4m

	gold	3,7ppm
	Comments	*T-Vein ore body*

Lappland Goldminers Oy

Years	Activity type	Geologist	Exploration result	Ref
2009-2014	core drilling	Risto Virkkunen	mineral reserve defined	64
	1232 Diamond and 78 RC-drill holes, 154,573 and 1,135 m, respectively			

Scan Mining Oy

Years	Activity type	Geologist	Exploration result	Ref
2004-2008	core drilling	NA	mineral resource defined	64
	815 Diamond and 21 RC-drill holes, 94,663 and 1116 m, respectively.			
2002-2008	percussion drilling	NA	NA	54, 55, 56, 57, 58, 59
2002-2008	core drilling	NA	NA	54, 55, 56, 57, 58, 59
	(2002-2003): 7665 m			
2002-2003	feasibility study	NA	NA	55

Terra Mining Oy

Years	Activity type	Geologist	Exploration result	Ref
1992-2000	core drilling	M. Kilpelä.	mineral reserve defined	14, 62, 63, 64
	152 Diamond and 84 RC-drill holes, 14853 and 9976 m, respectively			
	Intersections			
	HoleID	197501		
	From-To	157-164		
	Length	7m		
	gold	6,6ppm		
	HoleID	197501		
	From-To	210-220		
	Length	10m		
	gold	11,7ppm		
	HoleID	197502		
	From-To	202-208		
	Length	6m		
	gold	10,7ppm		
1991-1996	feasibility study	M. Kilpelä.	NA	14, 63
1991-2001	percussion drilling	M. Kilpelä.	NA	13, 14, 62, 63

Geological Survey of Finland

Years	Activity type	Geologist	Exploration result	Ref

1984-1991	detailed geophysics	E. Pulkkinen, E. Korkiakoski	NA	8, 12, 14, 16, 17, 18, 35
	No response or a weak negative anomaly by electromagnetic methods for the mineralisation. Good response for unaltered metakomatiite and weak response for altered metakomatiite in magnetic survey.			

1984-1991	excavation	E. Pulkkinen, E. Korkiakoski	NA	8, 12, 14, 16, 17, 18, 35

1984-1991	core drilling	E. Pulkkinen, E. Korkiakoski	NA	8, 12, 14, 16, 17, 18, 35
	Core drilling (reconnaissance drilling): 114 diamond-drill holes, total 3639 m, target drilling at Pahtavaara in 1987 and 1989; 44 diamond drill holes, total 4356,60 m			
	Intersections			
	HoleID	R538		
	From-To	NA		
	Length	6,5m		
	gold	32,6ppm		

1984-1991	detailed geology	E. Pulkkinen, E. Korkiakoski	NA	8, 12, 14, 16, 17, 18, 35
	High gold grade and visible gold in outcrop; The discovery was preceded by detection of Au anomalies in till and the discovery of the extensive "skarn" zone in the bedrock during regional exploration.			

1984-1991	detailed geochemistry	E. Pulkkinen, E. Korkiakoski	geochemical anomaly	8, 12, 14, 16, 17, 18, 35
	A combined Au-Cu-Co-Ni anomaly in till: arcuate, E-W trending, 15 km long.This includes an inner anomaly formed by the combination Au-Ba-Sr-Mn, which envelopes the Au deposit and the most altered rocks. The original Pahtavaara mine site surface anomaly was 400 m x 100 m with grades >0.2 ppm Au. In vegetation, Au is enriched in juniper and crowber			

1984-1991	percussion drilling	E. Pulkkinen, E. Korkiakoski	NA	8, 12, 14, 16, 17, 18, 35

1977-1977	regional geophysics	NA	key geological features	8, 12, 14, 16, 17, 18, 35
	Low-altitude airborne magnetic, electromagnetic and radiometric survey			

1971-1976	regional geochemistry	NA	NA	8, 12, 14, 16, 17, 18, 35
	Regional geochemical till survey; Cu and Mn anomalies			

RESOURCES AND RESERVES

Most recent

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Rupert Resources Ltd	2022	28.11.2022	NI 43-101	49
	Comments: Mineral resources remain the same 28.11.2023				
	Category:	**Indicated mineral resource**			
	Tonnage:	**0,9 Mt**			
	gold	2,2 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Indicated mineral resource**			
	Tonnage:	**1 Mt**			
	gold	3,7 ppm			
	Cutoff:	**gold 1,5 ppm**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**3,7 Mt**			
	gold	1,6 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**2,2 Mt**			
	gold	3,1 ppm			
	Cutoff:	**gold 1,5 ppm**			
	Category:	**Indicated and inferred mineral resource**			
	Tonnage:	**7,8 Mt**			
	gold	2,362 ppm			
	Cutoff:	**NA**			

Previous calculations

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Rupert Resources Ltd	2018	16.4.2018	NI 43-101	36
	Category:	**Inferred mineral resource**			
	Tonnage:	**4640000 t**			
	gold	3,2 ppm			
	Cutoff:	**gold 1,5 ppm**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Lappland Goldminers Oy	2013	NA	NI 43-101	22
	Comments: As of January 1, 2013.				
	Category:	**Measured mineral resource**			
	Tonnage:	**0,618 Mt**			
	gold	1,97 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Indicated mineral resource**			
	Tonnage:	**0,656 Mt**			
	gold	2,16 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**1,482 Mt**			

	gold	1,77 ppm			
	Cutoff:	**gold 0,5 ppm**			
	Category:	**Measured, indicated and inferred mineral resource**			
	Tonnage:	**2,756 Mt**			
	gold	1,9 ppm			
	Cutoff:	**NA**			

Type:	**Company:**	**Year:**	**Date:**	**Calc Method:**	**Reference:**
Reserve	Lappland Goldminers Oy	2013	NA	NI 43-101	22
	Comments: As of January 1, 2013.				
	Category:	**Proved ore reserves**			
	Tonnage:	**0,676 Mt**			
	gold	1,62 ppm			
	Cutoff:	**gold 1 ppm**			
	Category:	**Probable ore reserves**			
	Tonnage:	**0,721 Mt**			
	gold	1,77 ppm			
	Cutoff:	**gold 1 ppm**			
	Category:	**Proved and probable ore reserves**			
	Tonnage:	**1,397 Mt**			
	gold	1,697 ppm			
	Cutoff:	**NA**			

Type:	**Company:**	**Year:**	**Date:**	**Calc Method:**	**Reference:**
Resource	Lappland Goldminers Oy	2010	NA	NI 43-101	24
	Category:	**Inferred mineral resource**			
	Tonnage:	**88000 t**			
	gold	7,14 ppm			
	Cutoff:	**NA**			
	Comments: Cut-off grade 1.5 - 2.0 g/t Au.				
	Category:	**Measured and indicated mineral resource**			
	Tonnage:	**574000 t**			
	gold	3,3 ppm			
	Cutoff:	**NA**			
	Comments: Cut-off grade 1.5 - 2.0 g/t Au.				
	Category:	**Measured, indicated and inferred mineral resource**			
	Tonnage:	**662000 t**			
	gold	3,81 ppm			
	Cutoff:	**NA**			
	Comments: Cut-off grade 1.5 - 2.0 g/t Au.				

Type:	**Company:**	**Year:**	**Date:**	**Calc Method:**	**Reference:**
Reserve	Lappland Goldminers Oy	2010	NA	NI 43-101	24
	Category:	**NA**			
	Tonnage:	**577000 t**			
	gold	2,64 ppm			
	Cutoff:	**NA**			
	Comments: Cut-off grade 1.5 - 2.0 g/t Au.				

Type:	**Company:**	**Year:**	**Date:**	**Calc Method:**	**Reference:**
Reserve	Lappland Goldminers Oy	2010	NA	NI 43-101	25
	Category:	**Proved and probable ore reserves**			
	Tonnage:	**678000 t**			
	gold	2,79 ppm			
	Cutoff:	**NA**			
	Comments: Cut-off grade 1.5 - 2.0 g/t Au.				

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Scan Mining Oy	2006	NA	NA	59
	Category:	**NA**			
	Tonnage:	**2,44 Mt**			
	gold	2,9 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Scan Mining Oy	2005	NA	NA	57
	Category:	**NA**			
	Tonnage:	**2,975 Mt**			
	gold	3,2 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Scan Mining Oy	2003	NA	NA	54, 55
	Category:	**NA**			
	Tonnage:	**1,007 Mt**			
	gold	4,82 ppm			
	Cutoff:	**NA**			
	Category:	**NA**			
	Tonnage:	**0,256 Mt**			
	gold	2,33 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Scan Mining Oy	2002	NA	NA	53
	Category:	**NA**			
	Tonnage:	**0,73 Mt**			
	gold	2,3 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Terra Mining Oy	1999	NA	NA	2, 3, 13
	Category:	**NA**			
	Tonnage:	**2 Mt**			
	gold	2,5 ppm			
	Cutoff:	**NA**			

MINING

Pahtavaara

Easting EUREF: 475137,65
Northing EUREF: 7501765,025
Status: Care and maintenance
Previous status: Operating
Operating years: 1995-2014
Years in production: 18
Total ore mined: 5820321 t
References: 2, 3, 58, 59, 60, 61

Total production:

Product	Product measure
gold	10,86 t

Other materials:

Material type	Material measure
Waste rock	8944352 t

Mining activity:

Year	Ore mined	Ore processed	Activity type	Production	Other material
2014	167072 t	167072 t	underground mining		
				gold 180 kg	Waste rock 61306 t
2013	328908 t	366604 t	underground mining		
				gold 344 kg	Waste rock 137643 t
2012	529886 t	515514 t	NA		
				gold 575 kg	Waste rock 179567 t
2011	487744 t	482587 t	NA		
				gold 621 kg	Waste rock 188599 t
2010	464317 t	476121 t	NA		
				gold 739,57 kg	Waste rock 195683 t
2009	307009 t	415368 t	NA		
				gold 586 kg	Waste rock 237776 t
2008	10732 t	239586 t	NA		
				gold 65 kg	Waste rock 5528 t
2007	465439 t	465439 t	NA		
				gold 818 kg	Waste rock 134603 t
2006	497400 t	497400 t	NA		
				gold 1057 kg	Waste rock 112900 t
2005	436502 t	436502 t	NA		
				gold 996 kg	Waste rock 0 t
2004	418300 t	418300 t	NA		
				gold 1060 kg	Waste rock 573500 t
2003	10032 t	10032 t	NA		
					Waste rock 339519 t
2000	135000 t	135000 t	NA		
				gold 243 kg	Waste rock 576000 t
1999	339536 t	447737 t	NA		
				gold 890,99 kg	Waste rock 102153 t
1998	430561 t	493983 t	NA		
				gold 1067 kg	Waste rock 1929576 t
1997	474373 t	539658 t	NA		

				gold 1149,47 kg	Waste rock 2904962 t
1996	317510 t	302721 t	NA		
				gold 463,16 kg	Waste rock 1167977 t
1995	0 t	0 t	NA		
					Waste rock 97060 t

Figures

Pahtavaara open pits in 2004:

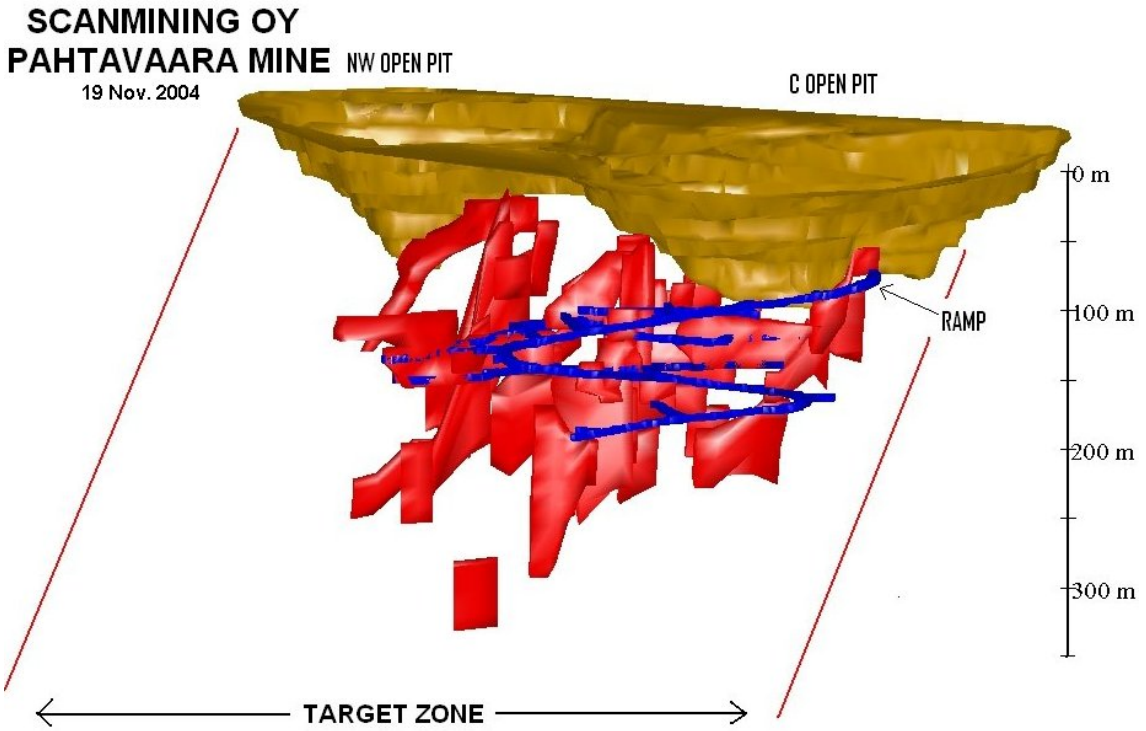
The Pahtavaara open pit:

Pahtavaara mine, Sodankylä. Photo courtesy by Terra Mining Oy.

The Pahtavaara open pit in 1996:

Pahtavaara, Sodankylä. Main pit area just after the removal of the overburden, 1996. (Photo by P. Eilu)

Pahtavaara: main, vertical ore zone at the centre of the photo. Main pit, 70 m below surface. Mine geologist Kari Niiranen as a scale. Photo Pasi Eilu 18/8/1998.


SCANMINING OY
PAHTAVAARA MINE
19 Nov. 2004
NW OPEN PIT
C OPEN PIT
0 m
100 m
200 m
300 m
RAMP
TARGET ZONE

GEOLOGY

Host rock: Komatiite

Komatiite (Host rock)

Rock type: Host rock
Proportion: major
Grain size: NA
Color: NA
References: 4, 5, 6, 7, 8, 10, 11, 12, 14, 16, 17, 18, 26, 29, 31
Comments: The lodes are 5-10 m wide. Two lodes beyond the established ore of 2004, one to the west and another to the east of the mine, within the alteration halo of the ore. Sulfides occur as small veinlets except in the Karoliina orebody in which sulfides occur as massive lenses or bodies. Distal and intermediate talc-carbonate ± pyrite alteration; proximal quartz-baryte ± carbonate, tourmaline, gold assemblages which look like veins but could be replacement or chemical sediment

Ore minerals:

Mineral	Proportion	Mineral texture
Allanite	present	
	in the Karoliina orebody	
Bornite	present	
	in the Karoliina orebody	
Bravoite	present	
	in the Karoliina orebody	
Chalcopyrite	minor	
	major in the Karoliina orebody	
Chromite	minor	
Clausthalite	minor	
Cubanite	minor	
Electrum	present	
	in the Karoliina orebody	
Frohbergite	present	
	in the Karoliina orebody	
Galena	present	
	in the Karoliina orebody	
Gold	minor	
	Nearly all is free native gold, chiefly between silicate, carbonate and baryte grains, but locally also as inclusions in magnetite; minor gold as inclusions in pyrite and chalcopyrite. In the Karoliina orebody gold is commonly associated with sulphides and within carbonate and the average Ag content in gold is 15 w-%.	
Hematite	minor	
Hessite	trace	
	in the Karoliina orebody	
Magnetite	major	
	minor in the Karoliina orebody	
Melonite	present	
	in the Karoliina orebody	
Merenskyite	minor	
Millerite	minor	
Molybdenite	minor	
	in the Karoliina orebody	
Monazite	present	
	in the Karoliina orebody	

Pentlandite	minor
Pyrite	major
Pyrrhotite	minor
Rutile	minor
Sphalerite	minor
	in the Karoliina orebody
Stannite	present
	in the Karoliina orebody
Tennantite	present
	in the Karoliina orebody
Tetrahedrite	trace
	in the Karoliina orebody
Ullmannite	major
	in the Karoliina orebody
Violarite	minor
Xenotime-(Y)	trace
	in the Karoliina orebody

Other minerals:

Mineral	Proportion	Mineral texture
Actinolite	present	Alteration product
Albite	present	Alteration product
Ankerite	present	Alteration product
Baryte	present	
Baryte	present	Alteration product
Biotite	present	Alteration product
Calcite	present	Alteration product
Chlorite	present	Alteration product
Dolomite	present	
Quartz	present	
Richterite	present	Alteration product
Scheelite	present	
Talc	present	Alteration product
Tourmaline	present	Alteration product
Tremolite	present	

Textures
Massive
Granoblastic
Nematoblastic

Alteration:	Distribution:	Degree:	Relation to mineralization:
biotite alteration	NA	Strong	Pre
chloritic alteration	NA	NA	Pre
pyritic alteration	Disseminated	Weak	Syn
Comments: Pervasive pyrite dissemination in biotite-altered domains			
tourmalinisation	NA	Strong	Syn
carbonate alteration	NA	NA	Syn
Comments: The extent of the alteration envelope is 100x500 m; The extent of the alteration halo is 30 -120 m x 600 m; Formation of overprinting tremolite porphyroblasts took place after gold mineralisation.			

Metamorphic description:

Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	MIn T- Max T (°C)
Regional	greenschist metamorphic facies	low metamorphic grade	NA		

Comments: Progressive regional metamorphism peaked during the crystallisation of tremolite and recrystallisation of minerals produced by the early alterations, like carbonate(s) and talc. Metamorphic peak during D2, thrusting during D3 was at least partly post-peak, late metamorphic.

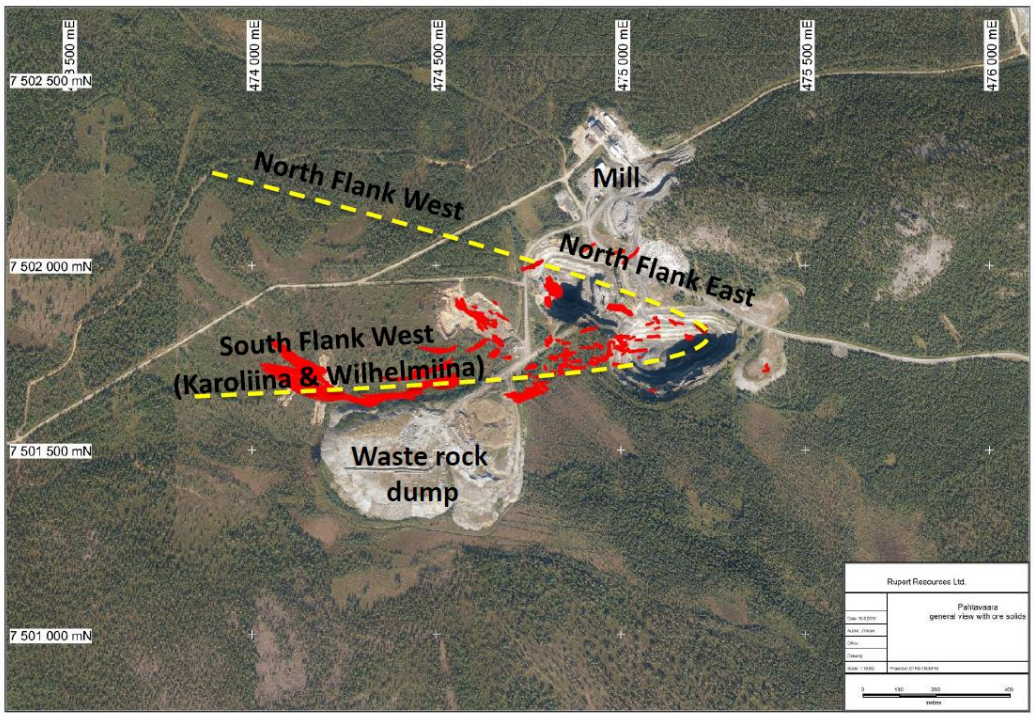
Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:		
Paleoproterozoic (2500-1600 Ma)	2050-2060		Y		
Comments: If the mineralisation relates to synvolcanic submarine hydrothermal system, the age is roughly the same as the age of the host rocks, 2060-2050 Ma.					
Radiometric age:	**Method:**	**Age:**	**Error (Ma):**	**Mineral:**	**Reference:**
	Pb-Pb	1811	87	Pyrite	28
	Pb-Pb	1814	32		28

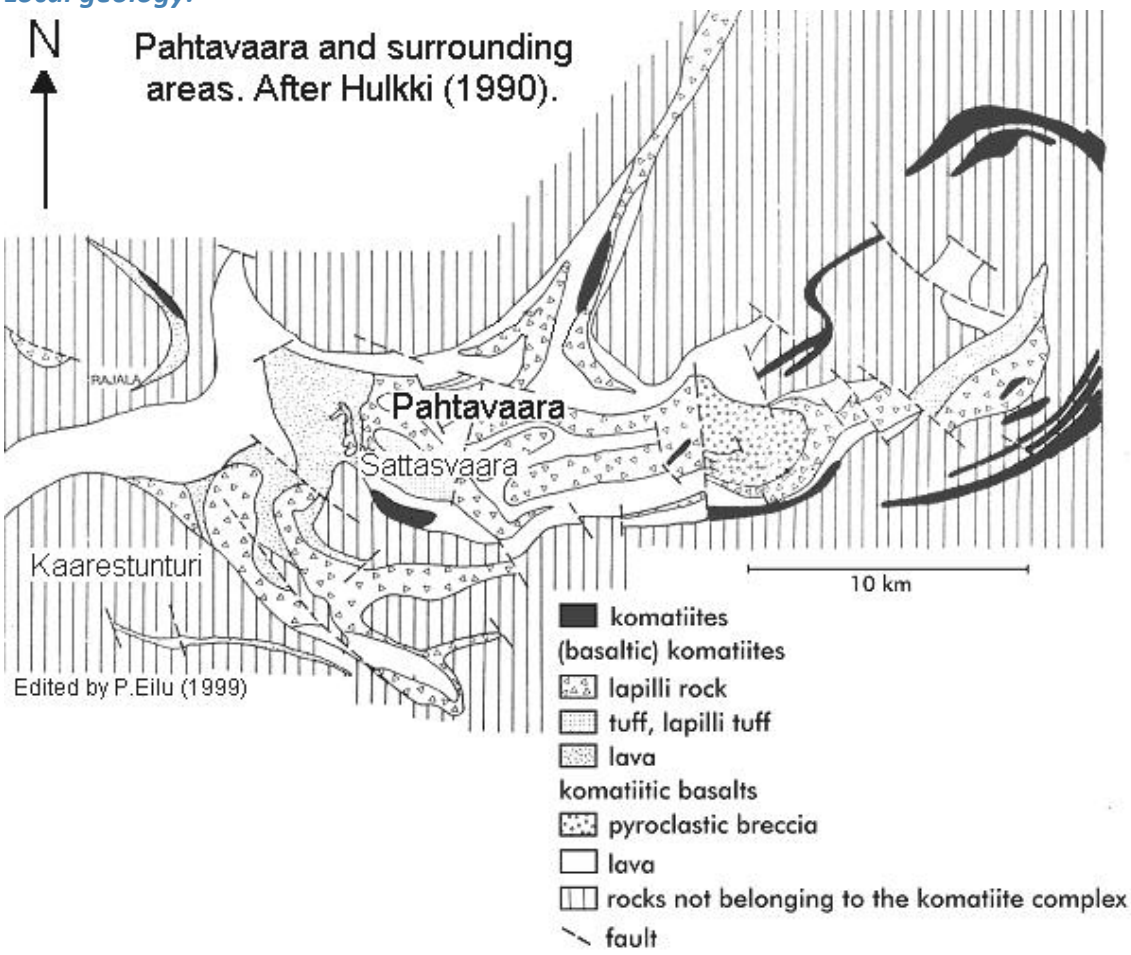
Figures

North and South Flank zones forming a fold structure (Rupert Resources Ltd, Website):

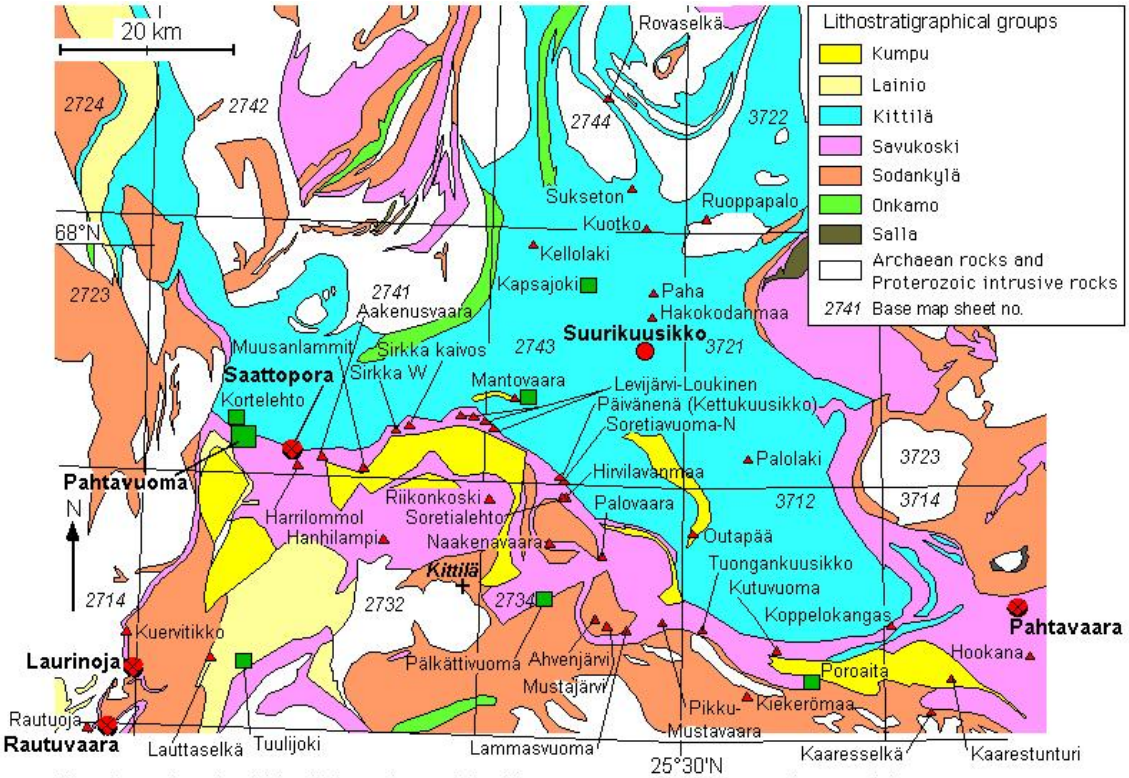
Pahtavaara (3km east to west) - new geological theory



Local geology:

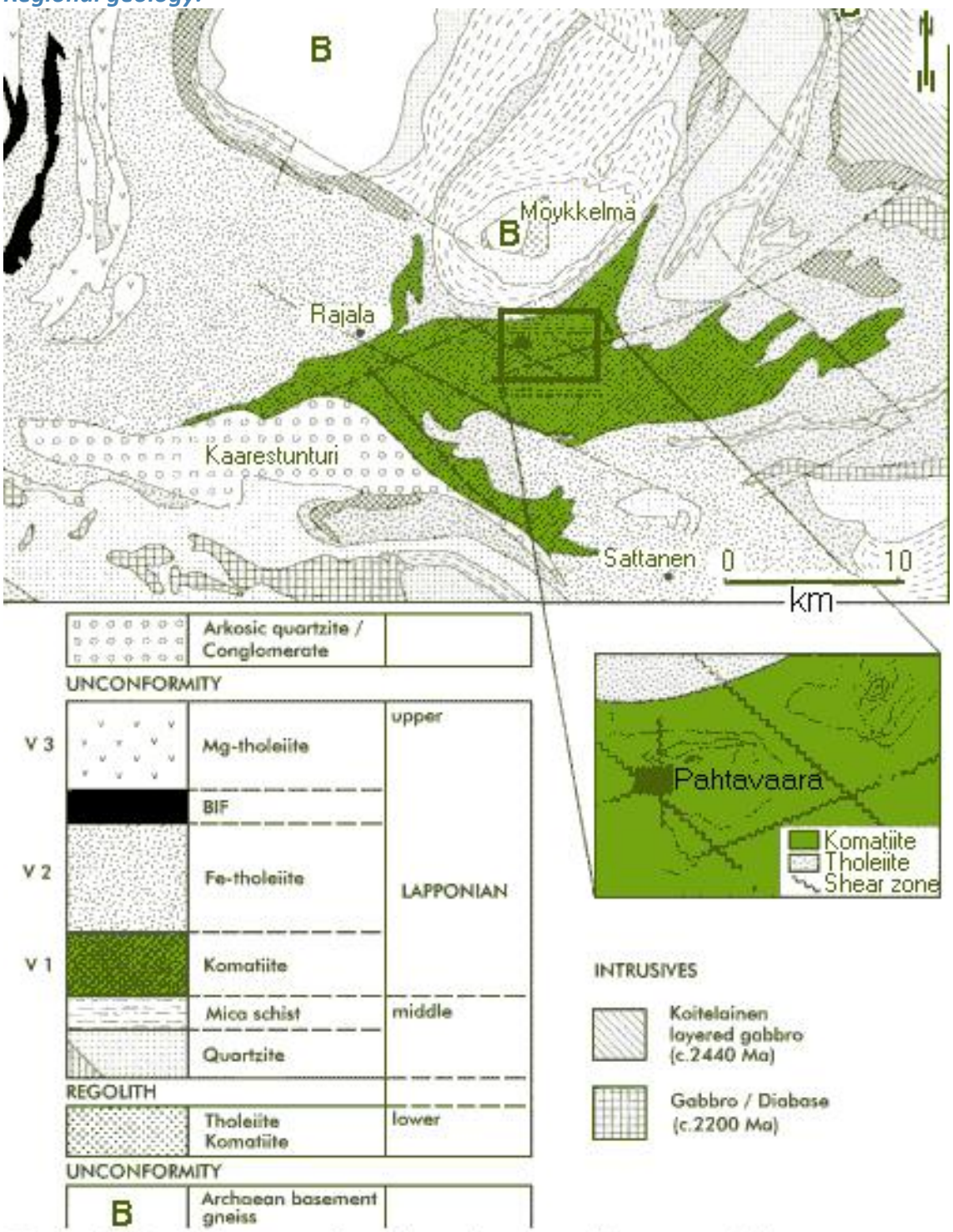


Regional geology:



Zinc (green) and gold (red) deposits and significant prospects in the central parts of the Central Lapland greenstone belt. Lithostratigraphy from Lehtonen et al. (1998). Edited by P. Eilu (2007)

Regional geology:



Generalized geology, stratigraphy and structural features of the eastern part of the early Proterozoic Central Lapland Greenstone Belt. The location of the detailed study area on the southwestern flank of hill Pahtavaara is shown on the inset map.
From Korkiakoski (1992). Edited by P.Eilu (1999)

Alteration:

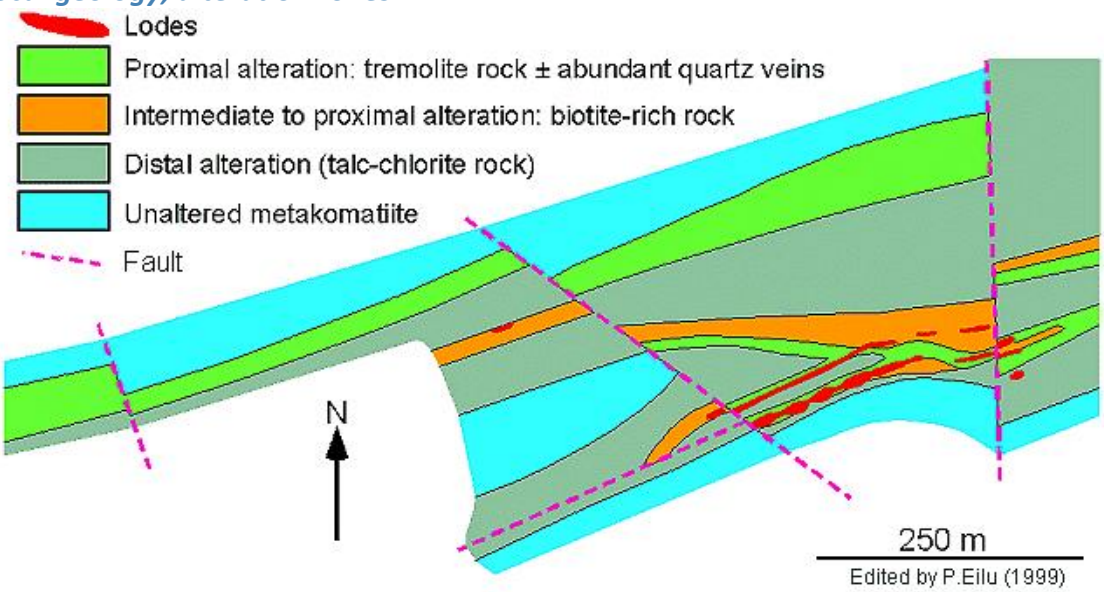
A. Biotite-chlorite-magnetite rock (proximal alteration) with pyrite-bearing talc-carbonate veins.

B. Biotite-chlorite-magmetite assemblage in host rock. Talc-carbonate veins. Both contain green tremolite porphyroblasta. Abundant pyrite where amphibole occurs in formerly magnetite-rich areas.

C. Biotite-chlorite-magnetite-dolomite rock and carbonate veins.

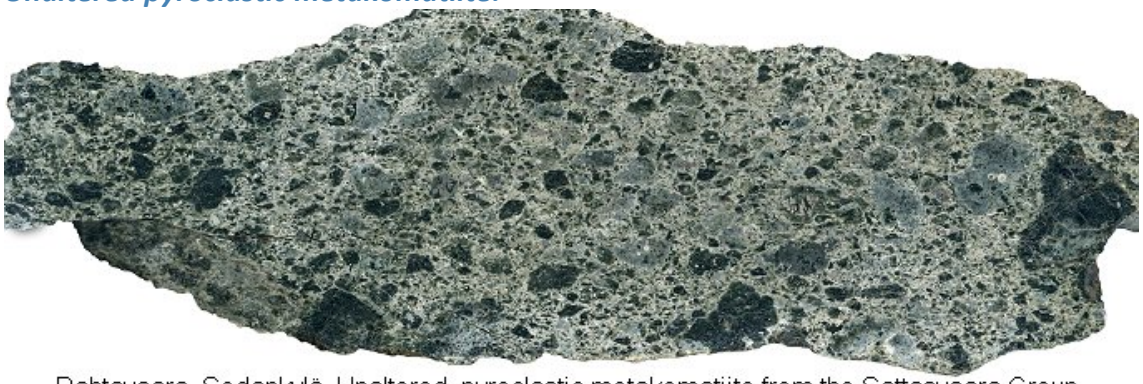
From Korkiakoski (1992).

Local geology; alteration zones:



Geology of the Pahtavaara area at bedrock surface according to Karvinen (1990). Interpretation of alteration zonation after Eilu (1997) and Niiranen (pers. comm. 1998).

Unaltered pyroclastic metakomatiite:

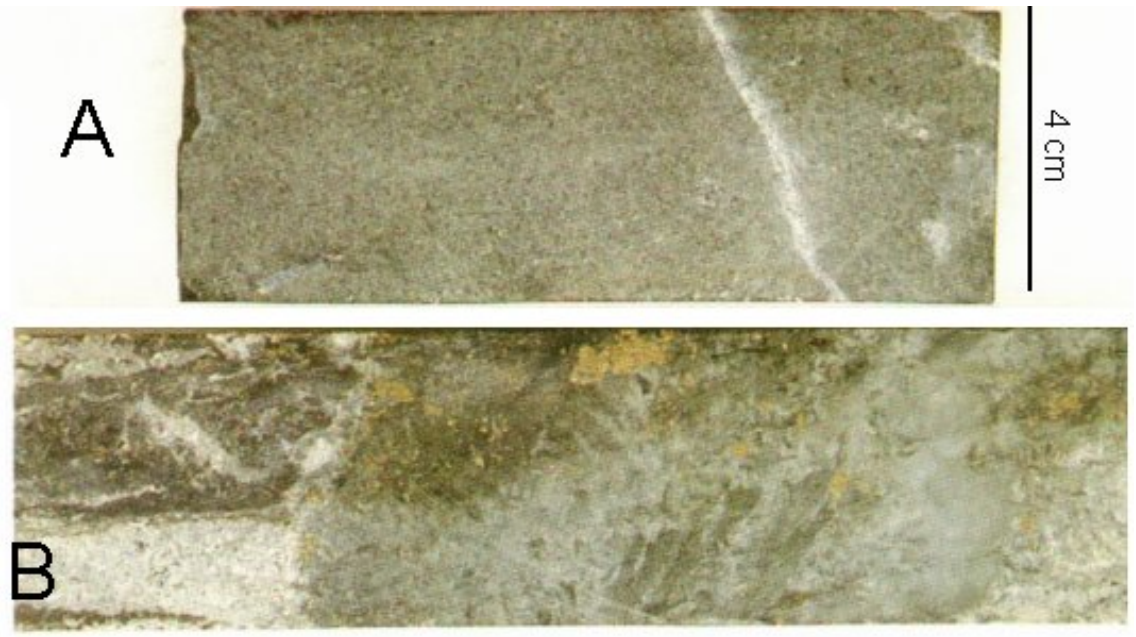


Pahtavaara, Sodankylä. Unaltered, pyroclastic metakomatiite from the Sattasvaara Group, Pahtavaara. Mineral assemblage: tremolite - talc - dolomite(?) - chlorite. Primary volcaniclastic textures are well preserved. Field of view 17 cm. Photo Jari Väätäinen.

Gold in quartz vein:

Gold (encircled) at the contact between a quartz vein and the komatiitic host rock in high-grade ore at Pahtavaara, Sodankylä. The mineral assemblage of the altered komatiite is here dominated by tremolite with minor biotite, dolomite and quartz. Field of view is approx. 5 cm. Photo Jari Väätäinen.

Alteration zones:

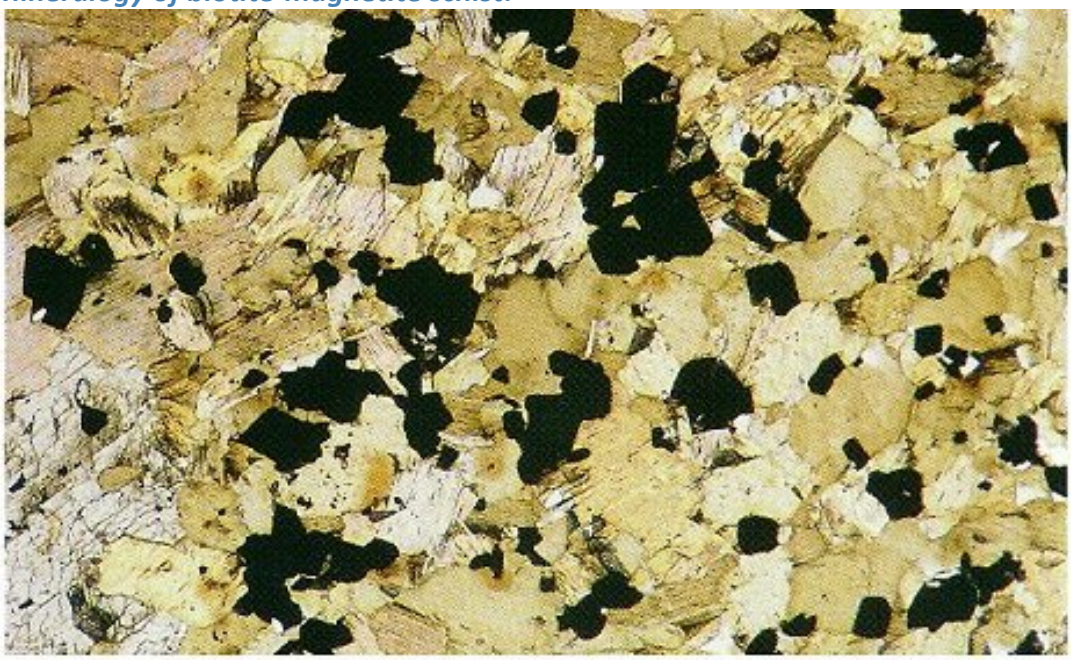


A. Fine-grained tremolite-chlorite-carbonate rock: distal alteration in komatiite

B. Proximal assemblage biotite-chlorite-magnetite in komatiite. Talc-carbonate veins. Abundant, grey-green, tremolite porphyroblasts. Yellow pyrite.

From Korkiakoski (1992).

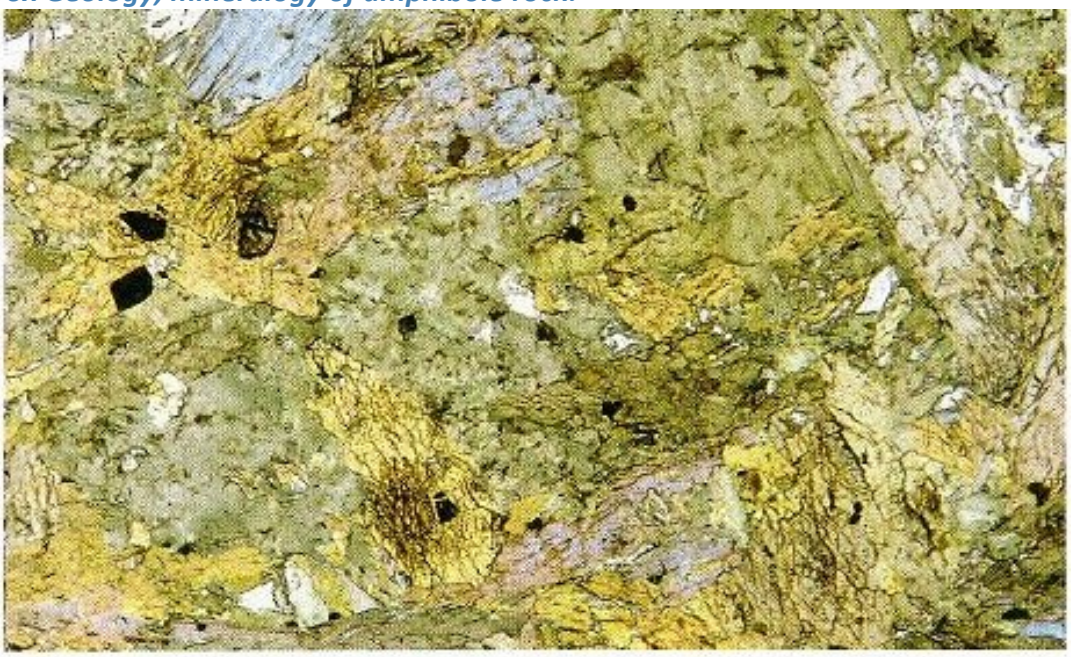
Mineralogy of biotite-magnetite schist:



Pahtavaara, Sodankylä; ore. Biotite-magnetite schist with some amphibole (light green; lower left corner). Biotite is brown and magnetite black. Drill core 506/28.40 m. Field of view is 2 mm in width.

(from Korkiakoski 1992)

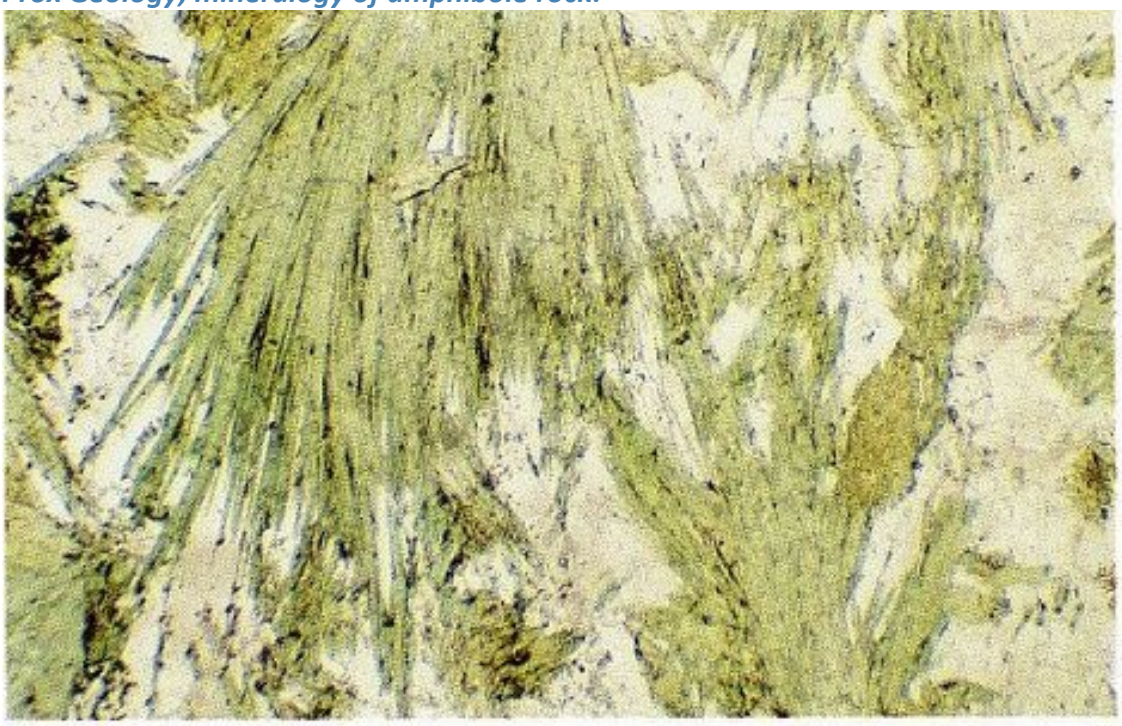
Prox Geology; mineralogy of amphibole rock:



Pahtavaara, Sodankylä; ore. Coarse-grained amphibole rock with radiating amphibole (mainly green). Some biotite (upper centre, brown) occurs as inclusions in amphibole. Minor albite, carbonate and magnetite are also present. Drill core 512/13.70 m. Field of view is 5 mm in width.

(from Korkiakoski 1992)

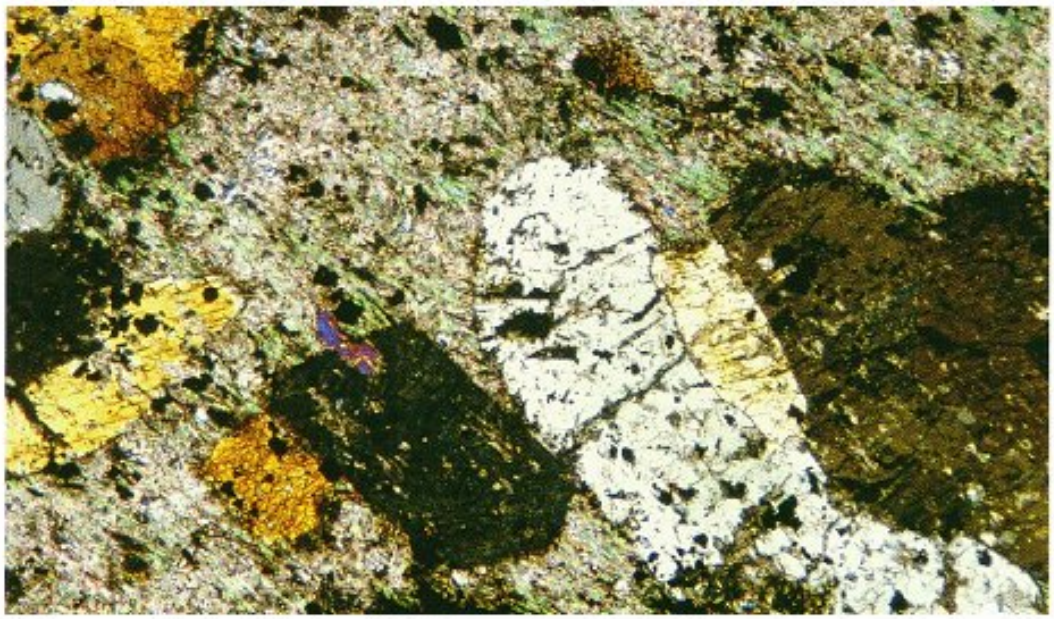
Prox Geology; mineralogy of amphibole rock:



Pahtavaara, Sodankylä; ore. Coarse-grained radiating amphibole rock (amphibole in green) with abundant carbonate and quartz with minor albite (light grey). Drill core 239/8.10 m. Field of view is 2.0 cm in width. Photographed by S. Gehör.

(from Korkiakoski 1992)

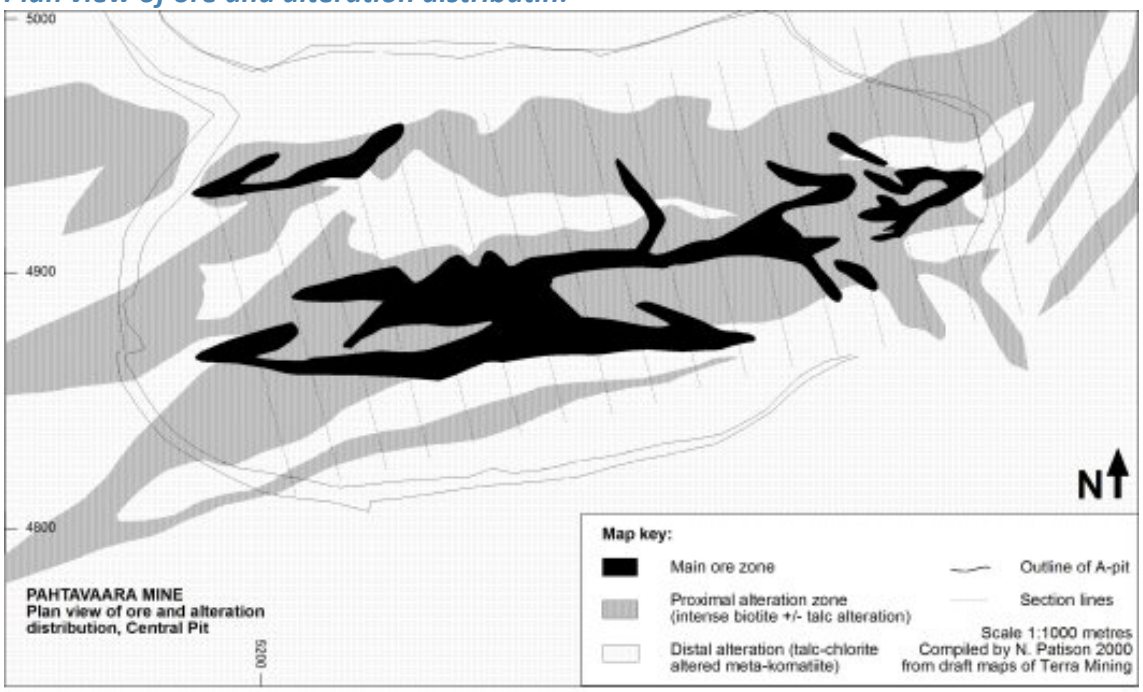
Mineralogy of talc-carbonate-chlorite schist:

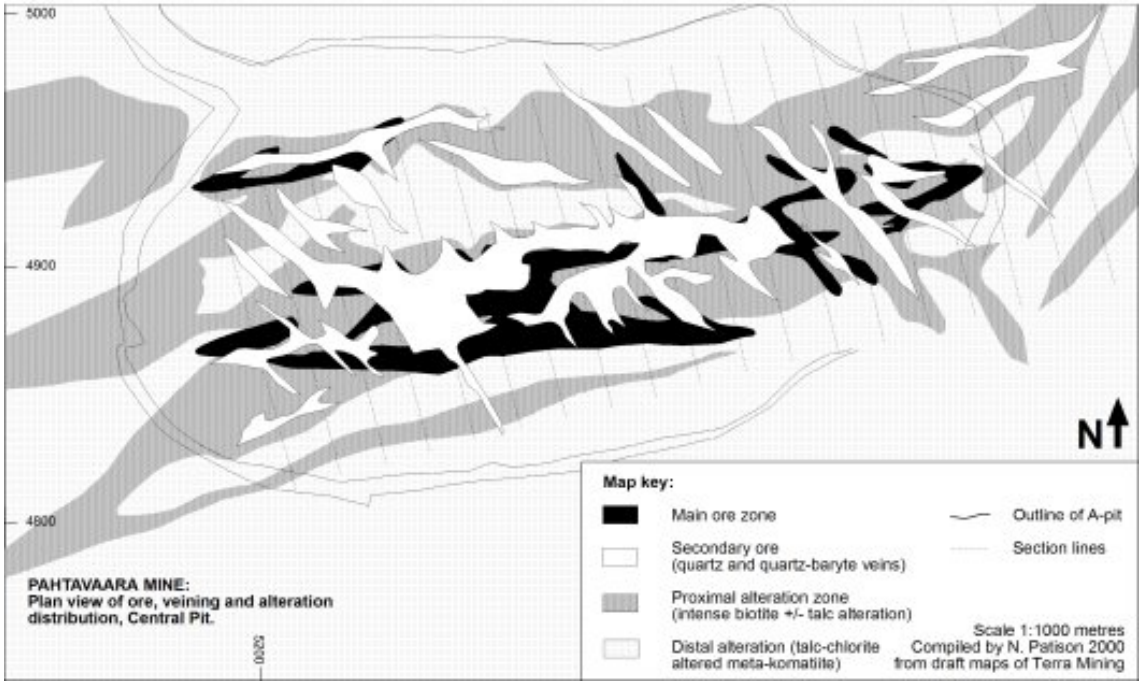


Pahtavaara, Sodankylä. Amphibole porphyroblastic talc-carbonate-chlorite schist; distal alteration. Large amphibole crystals shown in variable colours, fine-grained talc in green and carbonate-chlorite in grey. Some magnetite (black) also occurs. Drill core 508/128.90 m. Field of view is 5 mm in width.

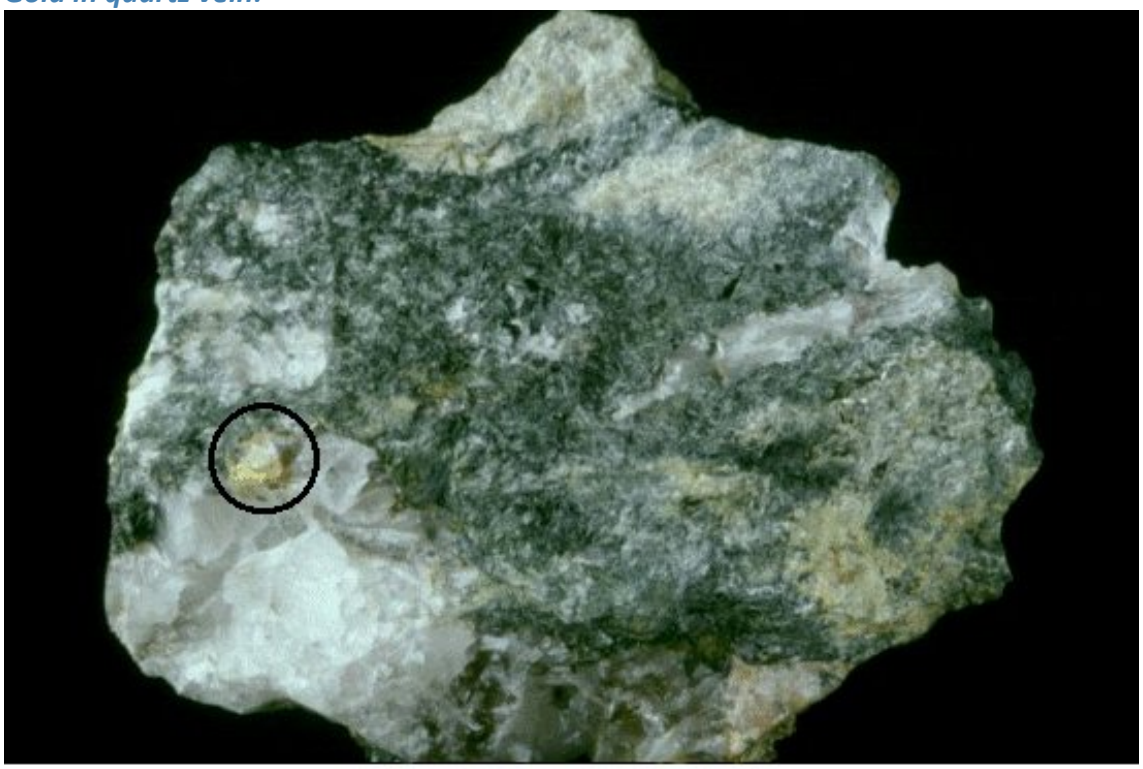
(from Korkiakoski 1992)

Plan view of ore and alteration distributin:





Gold in quartz vein:



Gold (encircled) in contact zone between quartz vein and komatiitic host rock in high-grade ore at Pahtavaara, Sodankylä. Diameter of the sample approx. 10 cm. Photo Jari Väätäinen.

Gold in quartz vein:

High-grade ore:

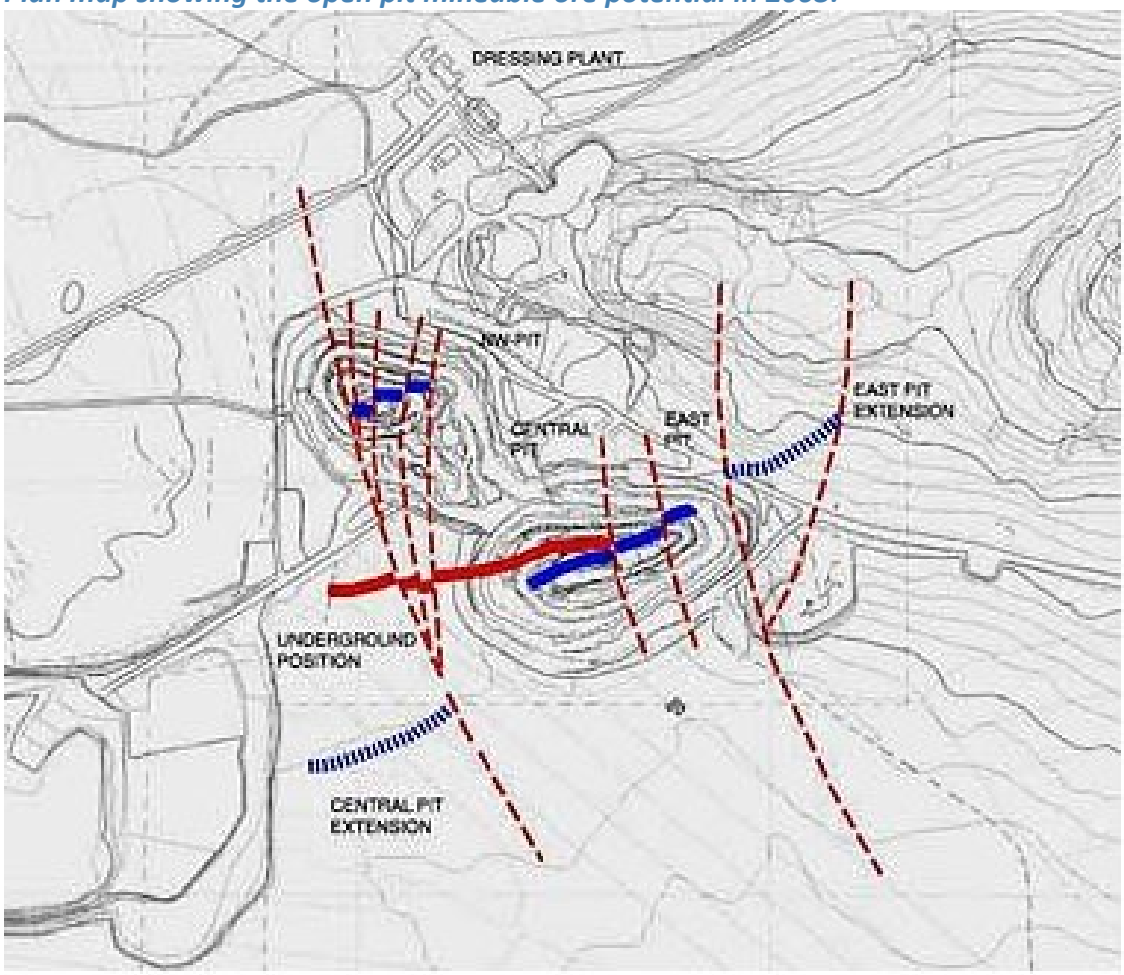
Pahtavaara, Sodankylä. High-grade ore (several tens of ppm Au). White quartz-baryte vein material, and dark green (tremolite-rich) and black (biotite-rich) altered host rock. Scale is in cm.

Photo Hannu Venho

Gold in quartz vein:

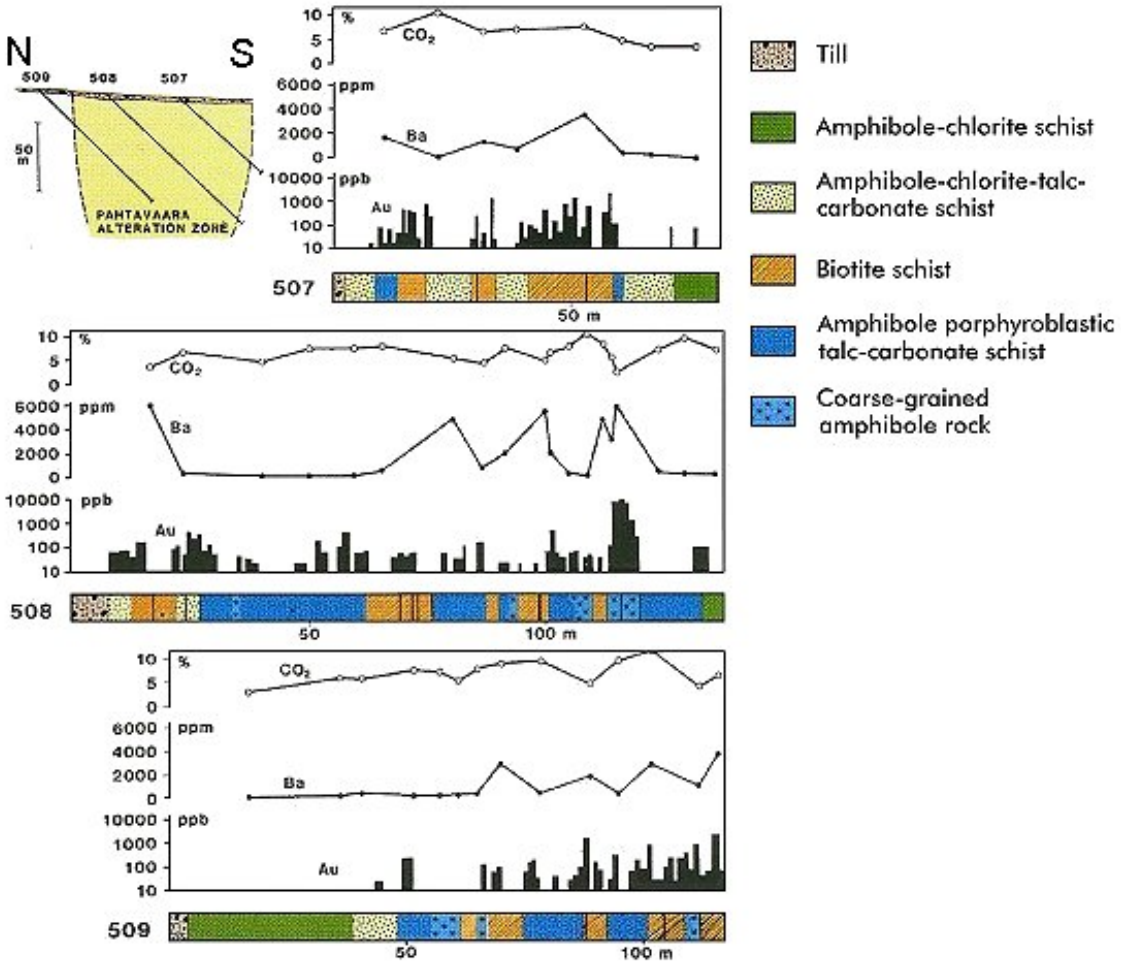
Visible gold (yellow) in contact zone between a quartz-barite vein (white) and coarse-grained amphibole rock (green). Exploration Trench 5, high-grade ore. Field of view is 10 cm in width.
(from Korkiakoski 1992)

Plan map showing the open pit mineable ore potential in 2003:



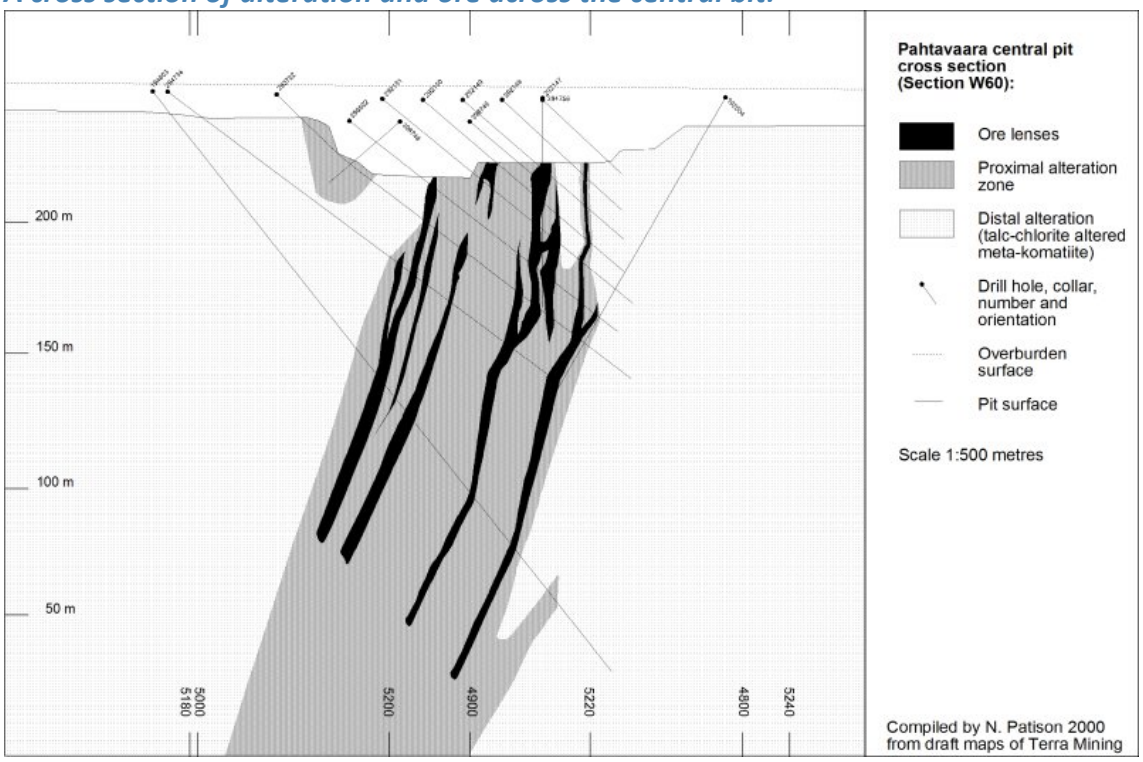
Plan map showing the open pit mineable ore potential, marked with broken blue line and underground mineral resources marked in red. Unbroken blue line is marking the position of the mined ore. Source: www.scanming.se (28/04/2003).

Au, Ba and Co2 across the alteration zone:



Au, Ba and CO2 across the Pahtavaara alteration zone.
Vein thicknesses have been exaggerated.
From Korkiakoski (1992).

A cross section of alteration and ore across the central bit:



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