Hannukainen

Occurence type: deposit

Commodity	Rank	Total measure	Total production	Total resource	Importance
iron	1	73009561,53 t	1865241,53 t	71144320 t	Medium sized deposit
gold	2	17,23 t	0,21 t	17,02 t	Medium sized deposit
copper	2	392723,74 t	14813,74 t	377910 t	Medium sized deposit
cobalt	3	29835 t	0 t	29835 t	Medium sized deposit

Easting EUREF: 371340,168
Northing EUREF: 7496345,436
Easting YKJ: 3371461
Northing YKJ: 7499478

Discovery year: 1974
Discovered by: Rautaruukki Oy
Province: Pajala-Kolari (Fe, Cu, Au)
District: Kolari (Fe, Cu, Au)
Comments: Discovery in subcrop under till and gravel, following an airborne and ground magnetic surveys covering an area in the vicinity the Rautuvaara Mine located 10 km south of Hannukainen.
References: 2, 4, 11, 14, 18, 21, 26, 27, 33

Mineral deposit type

Group: Metallogenic deposit
Main type: IOCG (mixed hydrothermal)
Comments: Mineralisation took place from hypersaline fluids, under conditions of 450-550°C, 1.5-3.5 kbar.
References: 15

Dimension

Expression: concealed
Form: concordant
Shape: lensoidal
Length (m): 2700
Width (m): 1300
Thickness (m): 40
Depth (m): NA
Area (ha): NA
Dip azim: 270
Dip: 18
Plunge azim: 225
Plunge dip: 15
Orientation method: NA
Dimension comments: Several plate or lensoidal ore bodies up to 50 m thick, located along a thrust zone.

Holder history

Current holder: Hannukainen Mining Oy
Years: 2022

Holding type: Application for mining permit

Previous holders:

Company	Years	Holding type	Comments
Vuoksenniska Oy	NA	NA	Holding the area in 1940s
Hannukainen Mining Oy	2015	Claim (old law)	NA
Northland Mines Oy	2006-2014	Claim (old law)	NA
Northland Resources Ab	2005	NA	NA
Polar Mining Oy	2003-2005	Claim (old law)	NA
Outokumpu Oy	1985-2003	Mining concession (old law)	NA
Rautaruukki Oy	1979	Mining concession (old law)	NA
Rautaruukki Oy	1967-1985	NA	NA
Otanmäki Oy	1960-1967	NA	NA
Suomen Malmi Oy	1956-1960	NA	NA

EXPLORATION ACTIVITY

Hannukainen Mining Oy

Years	Activity type	Geologist	Exploration result	Ref
2017	ore beneficiation tests	NA	NA	8
	300 tons of sample material run in pilot-plant tests in 2018: total Fe recovery in final magnetite concentrate at 70-74 %, and Cu recovery 78.2-78.6 %.			

2016	mine workings reconnaissance	NA	NA	
	Ongoing EIA process			

Northland Resources Ab

Years	Activity type	Geologist	Exploration result	Ref
2007-2012	detailed geophysics	NA	key geological features	27
	Ground magnetic and gravity surveys, down-hole surveys			

Northland Resources Inc

Years	Activity type	Geologist	Exploration result	Ref
2007-2011	feasibility study	NA	positive feasibility study	18, 27
	Mineral resource and reserve estimates, preliminary feasibility study.			

2007-2007	core drilling	NA	geophysical anomaly	19, 20, 21, 22, 23
	Core drilling (reconnaissance drilling): 72 diamond-drill holes.			
	Intersections			
	HoleID	NA		
	From-To	NA		
	Length	6,2m		
	gold	0,27ppm		
	copper	4,75%		
	iron	53,41%		
	HoleID	NA		
	From-To	NA		
	Length	9,6m		
	gold	0,99ppm		
	copper	1,11%		
	iron	46,9%		
	HoleID	NA		
	From-To	NA		
	Length	33,1m		
	gold	0,33ppm		
	copper	0,77%		
	iron	37,7%		
	HoleID	NA		

	From-To	NA
	Length	29,1m
	gold	0,75ppm
	copper	0,81%
	iron	39,7%
	HoleID	NA
	From-To	NA
	Length	11,2m
	gold	1,09ppm
	copper	0,75%
	iron	51,39%

2007-2012	ore beneficiation tests	NA	positive feasibility study	19, 20, 21, 22, 23
	Metallorgical test work for PEA			

2006-2012	subsurface exploration	NA	key geological features	19, 20, 21, 22, 23
	Re-logging and re-assaying the old drill core			

2006-2012	detailed geology	NA	key geological features	27
	Detailed bedrock mapping			

2005-2012	core drilling	NA	key geological features	19, 22, 23, 27
	Until June 2010, 337 holes drilled, in total 51,004 m.			
	Intersections			
	HoleID	HAN-089		
	From-To	NA		
	Length	21,5m		
	gold	0,56ppm		
	copper	0,87%		
	iron	35,5%		
	HoleID	LAU-177		
	From-To	NA		
	Length	31,9m		
	gold	0,23ppm		
	copper	0,47%		
	iron	34,6%		
	HoleID	LAU-251		
	From-To	NA		
	Length	32,4m		
	gold	0,38ppm		
	copper	0,91%		
	iron	37,8%		

Rautaruukki Oy

Years	Activity type	Geologist	Exploration result	Ref
1974-1987	core drilling	A. Hiltunen	mineral reserve defined	4, 6
	293 diamond-drill holes, in total 22,448 m, covering both the Hannukainen and Kuervitikko deposits			

1974-1985	excavation	A. Hiltunen	key geological features	4, 6
	Removal of the overburden			

1967-1985	detailed geology	A. Hiltunen	key geological features	4, 6

1967-1985	detailed geochemistry	A. Hiltunen	NA	4, 6

1967-1985	detailed geophysics	A. Hiltunen	mineral occurrences	4, 6

1967-1985	regional geophysics	A. Hiltunen	mineral occurrences	4, 6, 27
	Low-altitude airborne magnetic survey indicated four magnetite ore bodies.			

Otanmäki Oy

Years	Activity type	Geologist	Exploration result	Ref
1960-1967	detailed geology	NA	key geological features	4

1960-1967	detailed geophysics	NA	key geological features	4

Suomen Malmi Oy

Years	Activity type	Geologist	Exploration result	Ref
1956-1960	subsurface exploration	NA	NA	4

1956-1960	detailed geology	NA	NA	4

1956-1960	regional geophysics	NA	NA	4

Vuoksenniska Oy

Years	Activity type	Geologist	Exploration result	Ref
1941-1945	detailed geophysics	NA	NA	4

1940-1945	detailed geology	NA	NA	4

RESOURCES AND RESERVES

Most recent

Type:	Company:	Year:	Date:	Calc Method:	Reference:
UNFC	Geological Survey of Finland	2021	2.2.2021	UNFC Code, reclassified	5, 14
	Comments: The Co resource was not included into the 2012 then CRISCO-compliant resource, but is estimated otherwise for the entire resource. No information on E- and Z-axis matters, but extensive and probably reliable Co grade data.				
	Category:	**343**			
	Tonnage:	**221 Mt**			
	cobalt	135 ppm			
	Cutoff:	**NA**			
	Comments: This is the entire deposit, but only for cobalt content, based on the same samples as for teh Fe, Cu and Au resource				

Type:	Company:	Year:	Date:	Calc Method:	Reference:
UNFC	Geological Survey of Finland	2021	2.2.2021	UNFC Code, reclassified	5
	Comments: Originally measured + indicated + inferred resource according to CIM. However, the company has left the tenement and the current holder company has not provided an update on the resource. Hence the 2012 resource is no more CRIRSCO-compliant. The Co resource was not included into the 2012 then CRISCO-compliant resource, but is estimated otherwise for the entire resource.				
	Category:	**331**			
	Tonnage:	**154 Mt**			
	iron	32,24 %			
	copper	0,18 %			
	gold	0,09 ppm			
	Cutoff:	**NA**			
	Category:	**331+332+333**			
	Tonnage:	**221 Mt**			
	iron	32,192 %			
	gold	0,077 ppm			
	copper	0,171 %			
	Cutoff:	**NA**			
	Category:	**332**			
	Tonnage:	**6 Mt**			
	iron	30,37 %			
	copper	0,17 %			
	gold	0,07 ppm			
	Cutoff:	**NA**			
	Category:	**333**			
	Tonnage:	**61 Mt**			
	iron	32,25 %			
	copper	0,15 %			
	gold	0,044 ppm			
	Cutoff:	**NA**			

Previous calculations

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Northland Resources Ab	2012	NA	CIM standards	29
	Comments: Effective date 24 October 2012.				
	Category:	**Measured mineral resource**			
	Tonnage:	**154 Mt**			
	iron	32,24 %			
	copper	0,18 %			
	gold	0,09 ppm			
	Cutoff:	**NA**			
	Category:	**Indicated mineral resource**			
	Tonnage:	**6 Mt**			
	iron	30,37 %			
	copper	0,17 %			
	gold	0,07 ppm			
	Cutoff:	**NA**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**61 Mt**			
	iron	32,25 %			
	copper	0,15 %			
	gold	0,044 ppm			
	Cutoff:	**NA**			
	Category:	**Measured, indicated and inferred mineral resource**			
	Tonnage:	**221 Mt**			
	iron	32,192 %			
	copper	0,171 %			
	gold	0,077 ppm			
	Cutoff:	**NA**			
	Comments: All ore bodies jointly				

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Northland Resources Ab	2012	NA	CIM standards	29
	Comments: Effective date 24 October 2012.				
	Category:	**Proved ore reserves**			
	Tonnage:	**91,8 Mt**			
	iron	32,2 %			
	copper	0,186 %			
	gold	0,088 ppm			
	Cutoff:	**NA**			
	Category:	**Probable ore reserves**			
	Tonnage:	**0,8 Mt**			
	iron	32,6 %			
	copper	0,148 %			
	gold	0,06 ppm			
	Cutoff:	**NA**			
	Category:	**Proved and probable ore reserves**			
	Tonnage:	**92,6 Mt**			
	iron	32,203 %			
	copper	0,186 %			
	gold	0,088 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Northland Exploration Finland Oy	2010	NA	NI 43-101	18, 27
	Category:	**Measured mineral resource**			
	Tonnage:	**101 Mt**			
	iron	33,8 %			

	copper	0,17 %
	gold	0,067 ppm
	Cutoff:	**iron 15 %**
	Category:	**Indicated mineral resource**
	Tonnage:	**9 Mt**
	iron	35 %
	copper	0,13 %
	gold	0,023 ppm
	Cutoff:	**iron 15 %**
	Category:	**Inferred mineral resource**
	Tonnage:	**88 Mt**
	iron	31,7 %
	copper	0,13 %
	gold	0,041 ppm
	Cutoff:	**iron 20 %**
	Category:	**Measured, indicated and inferred mineral resource**
	Tonnage:	**198 Mt**
	iron	32,921 %
	copper	0,15 %
	gold	0,053 ppm
	Cutoff:	**NA**

Type:	**Company:**	**Year:**	**Date:**	**Calc Method:**	**Reference:**
Resource	Northland Exploration Finland Oy	2007	NA	NA	21
	Comments: The lodes Kuervaara, Vuopio, Laurinoja, Lauku, Kivivuopio				
	Category:	**NA**			
	Tonnage:	**166,2 Mt**			
	iron	35,1 %			
	copper	0,17 %			
	gold	0,065 ppm			
	Cutoff:	**iron 15 %**			

MINING

Hannukainen

Alternative Names: Laurinoja, Kuervaara
Easting EUREF: 371340,168
Northing EUREF: 7496345,436
Status: Feasibility
Previous status: Closed
Operating years: 1978-2017
Years in production: 14
Total ore mined: 4563380 t
Comments: In the Hannukainen area, there are two old open-pit mines, Laurinoja and Kuervaara, from which Rautaruukki Oyj extracted iron ore between 1978 and 1988. A total of 3.26 million metric tons (Mt) of iron ore were extracted from the Laurinoja open-pit mine, and 1.1 Mt from Kuervaara. After the operations of Rautaruukki Oyj, Outokumpu Oyj extracted copper-gold-bearing iron ore from Laurinoja, totaling 0.45 Mt, between 1989 and 1990.
In mine project phase since 17.2.2011
References: 1, 9, 16, 17, 28, 31, 32

Total production:

Product	Product measure
copper	14813,74 t
iron	1865241,53 t
gold	212,97 kg

Other materials:

Material type	Material measure
Waste rock	5632959 t

Mining activity:

Year	Ore mined	Ore processed	Activity type	Production	Other material
2017	300 t	300 t	test mining		
1990	200098 t	207171 t	open-pit mining		
				gold 207,17 kg copper 1926,69 t	Waste rock 170496 t
1989	25211 t	18138 t	open-pit mining		
				gold 5,8 kg copper 59,85 t	Waste rock 87826 t
1988	671900 t	671900 t	open-pit mining		
				iron 288917 t copper 2418,84 t	Waste rock 1278500 t
1987	727600 t	727600 t	open-pit mining		
				iron 312868 t copper 2619,36 t	Waste rock 1339800 t
1986	583800 t	583800 t	open-pit mining		
				iron 251034 t copper 2101,68 t	Waste rock 686800 t
1985	334000 t	334000 t	open-pit mining		
				iron 143620 t copper 1202,4 t	Waste rock 578300 t
1984	386102 t	386102 t	open-pit mining		

				iron 166023,86 t copper 1389,97 t	Waste rock 527609 t
1983	435572 t	435572 t	open-pit mining		
				iron 187295,96 t copper 1568,06 t	Waste rock 389177 t
1982	424136 t	424136 t	open-pit mining		
				iron 182378,48 t copper 1526,89 t	Waste rock 433009 t
1981	275435 t	275435 t	open-pit mining		
				iron 118437,05 t	Waste rock 107002 t
1980	209817 t	209817 t	open-pit mining		
				iron 90221,31 t	Waste rock 34440 t
1979	167409 t	167409 t	open-pit mining		
				iron 71985,87 t	Waste rock 0 t
1978	122000 t	122000 t	open-pit mining		
				iron 52460 t	Waste rock 0 t

Figures

Laurinoja open pit, Hannukainen mine, Kolari, 1985. Photo Pasi Eilu

Laurinoja open pit, Hannukainen mine, Kolari, June 1984. Photo Pasi Eilu

GEOLOGY

Host rock: Diorite, Hornblende-Diopside Metasomatic rock, Magnetite Metasomatic rock
Wall rock: Monzonite, Quartzite, Pegmatite, Amphibolite

Diorite (Host rock)

Rock type: Host rock
Proportion: minor
Grain size: Medium grained 2 - 5 mm
Color: Grey
References: 4, 13
Comments: Haparanda Suite intrusion

Textures
Massive

Alteration:	Distribution:	Degree:	Relation to mineralization:
albitic alteration	NA	NA	NA
Comments: In hanging wall			

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		

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1860-2200		N

Hornblende-Diopside Metasomatic rock (Host rock)

Rock type: Host rock
Proportion: minor
Grain size: Coarse grained 5 - 50 mm
Color: Green
References: 4, 12, 13, 23

Other minerals:

Mineral	Proportion	Mineral texture
Diopside	present	
Hornblende	present	

Textures
Massive
Banded

Alteration:	Distribution:	Degree:	Relation to mineralization:
calcsilicate alteration	NA	NA	NA
Comments: diopside-hornblende-magnetite			

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		

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1860-2200		N

Magnetite Metasomatic rock (Host rock)

Rock type: Host rock
Proportion: major
Grain size: Coarse grained 5 - 50 mm
Color: Black
References: 4, 6, 8, 12, 13, 15, 23, 27
Comments: Several ore bodies, oriented along the regional dominant lineation, at least: Kuervaara, Vuopio, Laurinoja, Lauku, Kivivuopio. 500-1200 m long, 100-500 m wide and 5-40 m thick.The Au-Cu ore body detected in 2005: horizontal extent >600 m x >850 m, avg thickness 17.5 m, open to the NE and SW. Another, 15 m thick, Au-Cu ore body detected in the hangingwall in 2007.

Ore minerals:

Mineral	Proportion	Mineral texture
Allanite	present	
Chalcopyrite	major	Stringer, Dissemination
Gold	minor	
	Associated with chalcopyrite, magnetite and silicate gangue: inclusions in pyrite with chalcopyrite, in cracks is magnetite and pyrite, inclusiuons in chalcopyrite.	
Magnetite	major	Banded, Massive
	MgO content is mainly below 0.2 %.	
Molybdenite	minor	
	Typically occurs in association with chalcopyrite	
Pyrite	major	Dissemination, Stringer
	Co content of pyrite 0.1-1.9 %	
Pyrrhotite	major	Stringer, Dissemination
	The most common sulphide mineral at the deposit. Contains 0.098 % Ni and 0.22 % Co in the Vuopio and Laurinoja ore bodies.	
Telluride	minor	

Other minerals:

Mineral	Proportion	Mineral texture
Actinolite	present	

Albite	minor
Andradite	minor
Apatite	present
Biotite	minor
Calcite	minor
Diopside	major
Epidote	minor
Microcline	minor
Quartz	minor
Scapolite	minor
Titanite	minor
Uraninite	trace
Ferrotschermakite	major
	Ferrotschermakite according to 2017 MLA study

Textures
Massive
Banded
Disseminated

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		

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:		
Paleoproterozoic (2500-1600 Ma)	1797-1810	1804	Y		
Comments: Mineralisation took place around 1800 or between 1.86 and 1.76 Ga.					
Radiometric age:	**Method:**	**Age:**	**Error (Ma):**	**Mineral:**	**Reference:**
	U-Pb	1797	5	Zircon	4, 12, 15
	U-Pb	1810		Titanite	4, 12, 15

Monzonite (Wall rock)

Rock type: Wall rock
Proportion: major
Grain size: Medium grained 2 - 5 mm
Color: Reddish
References: 4, 10, 12, 15
Comments: Haparanda Suite intrusion

Textures
Massive

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		

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1860-2200		N

Quartzite (Wall rock)

Rock type: Wall rock
Proportion: minor
Grain size: NA
Color: NA
References: 4, 10, 12, 15, 23

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		
Comments: Quartz-feldspar ± sillimanite.					

Pegmatite (Wall rock)

Rock type: Wall rock
Proportion: minor
Grain size: Coarse grained 5 - 50 mm
Color: Red
References: 12, 13, 15
Comments: Late, cross-cutting pegmatite dykes

Amphibolite (Wall rock)

Rock type: Wall rock
Proportion: minor
Grain size: NA
Color: NA
References: 4, 10, 12, 13, 15

Alteration:	Distribution:	Degree:	Relation to mineralization:
biotite alteration	NA	NA	NA
Comments: In foot wall			

Metamorphic description:

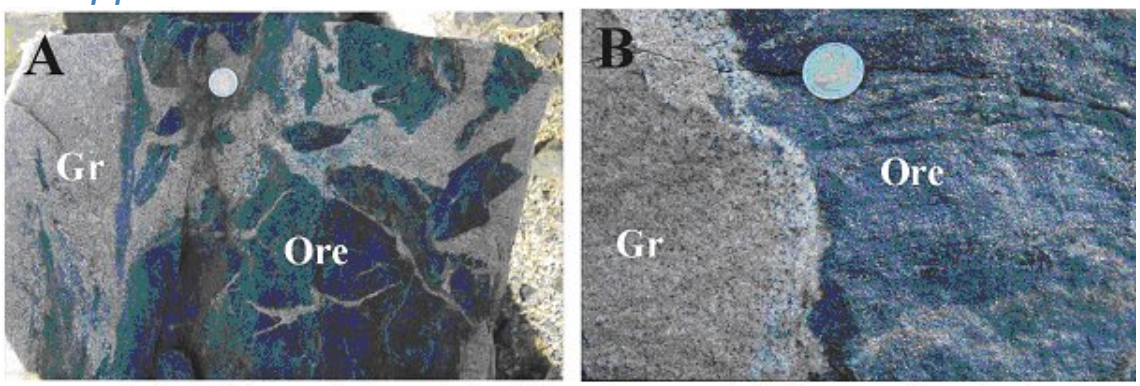
Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	MIn T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA		
Comments: Hornblende-plagioclase ± biotite, titanite, magnetite, epidote.					

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Paleoproterozoic (2500-1600 Ma)	1860-2200		N

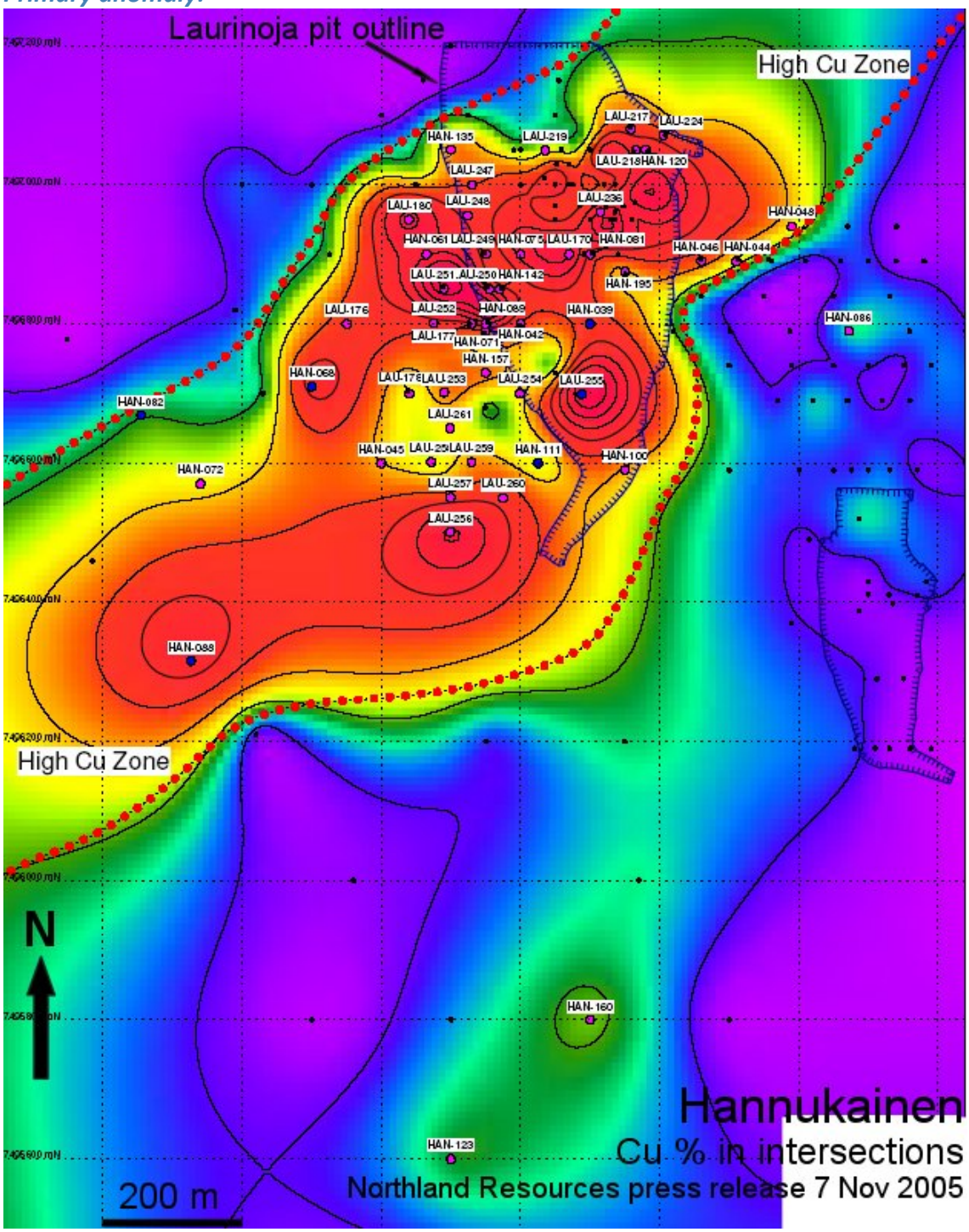
Figures

Outcrop photo:

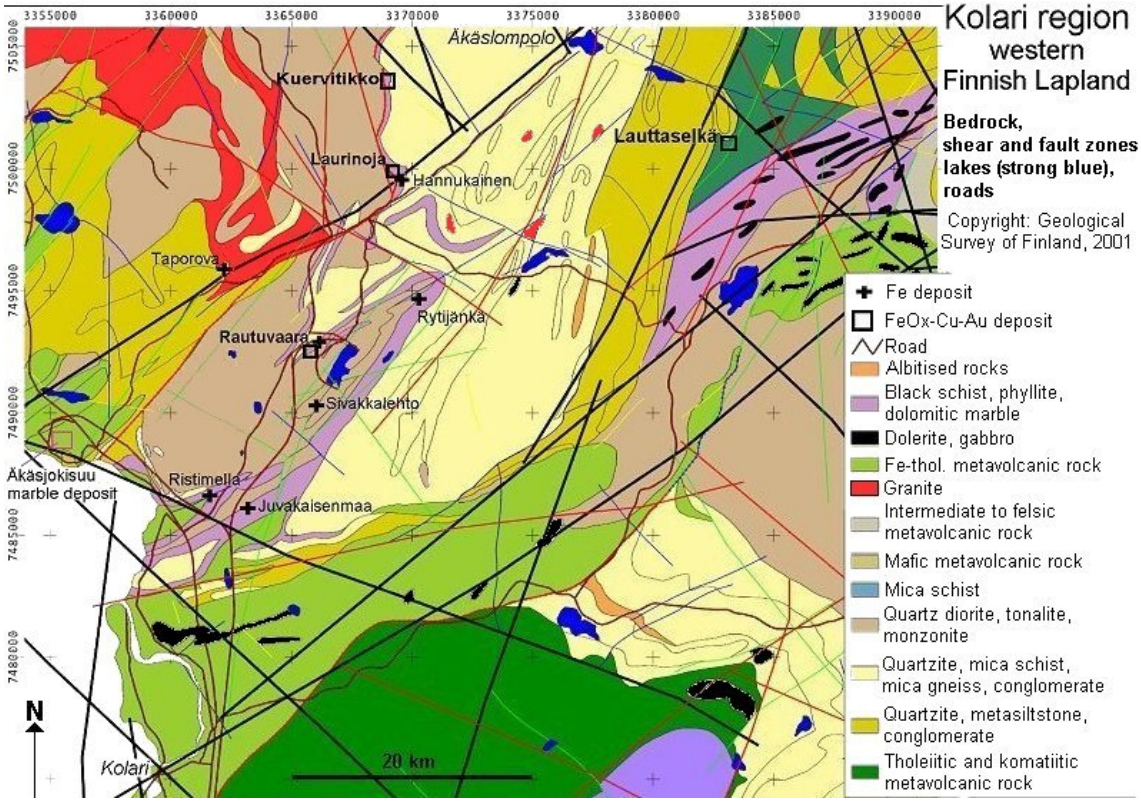


A 1766 Ma granite brecciates (A) and crosscuts (B) the ore at Laurinoja. Note the chilled margin in granite (B) and how the granite appears to have no effect on the sulfides in the ore. From Niiranen (2004).

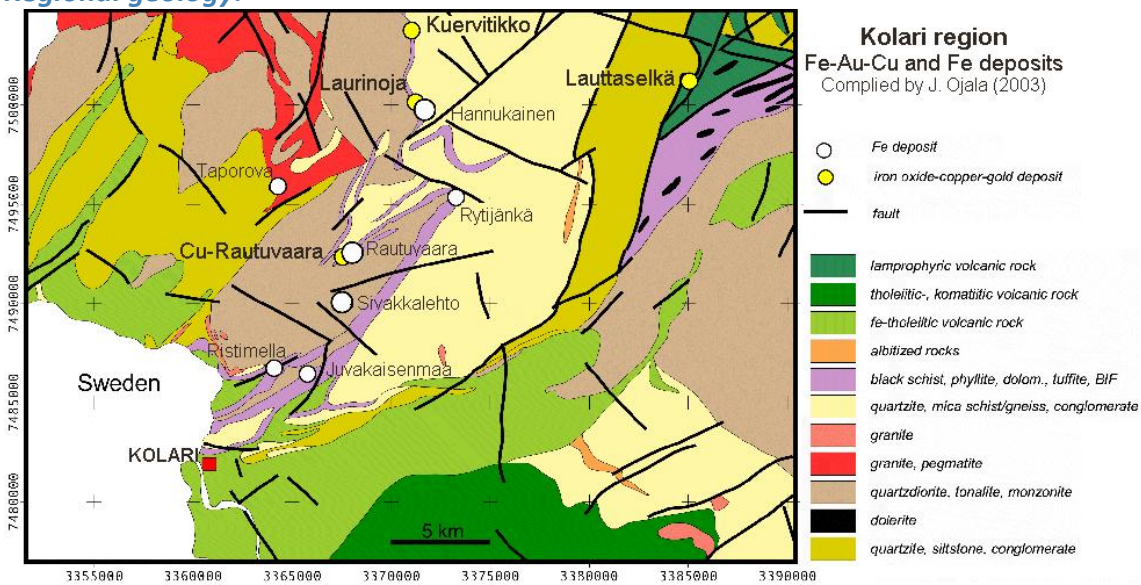
Primary anomaly:



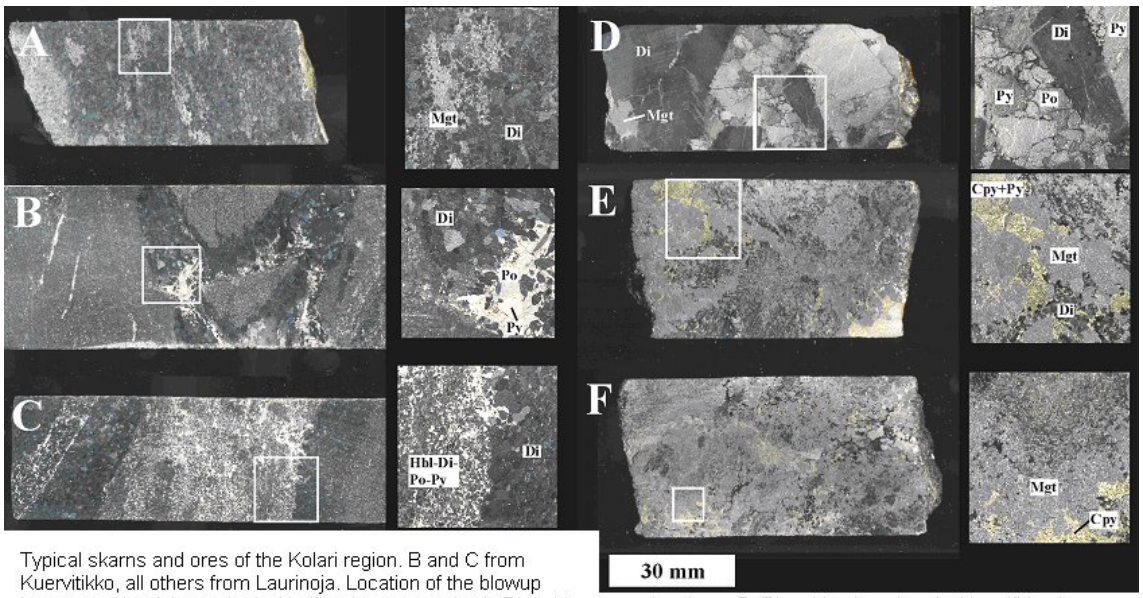
Regional geology:



Regional geology:

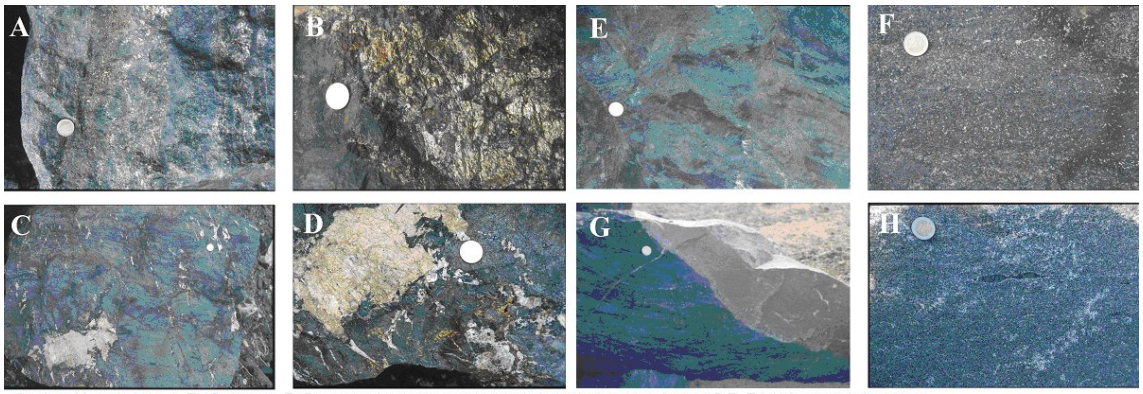


Structure:



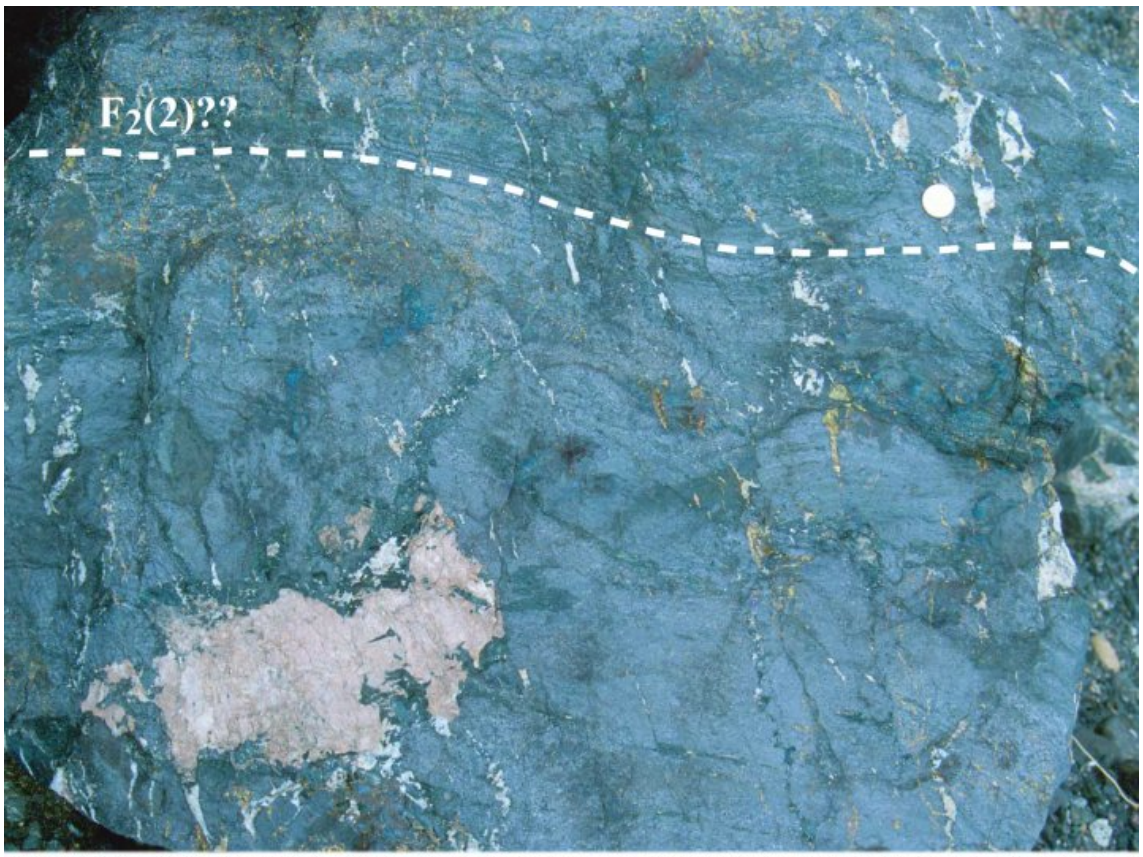
Typical skarns and ores of the Kolari region. B and C from Kuervitikko, all others from Laurinoja. Location of the blowup images on the right marked with the white rectangle. A. Diopside-magnetite skarn. B. Diopside skarn band with sulfides in metalava. C. Diopside skarn with pyrite-pyrrhotite dissemination. D. Coarse-grained diopside-pyrite-pyrrhotite skarn. Locally these rocks contain significant amount of chalcopyrite. E. Laurinoja Fe-Cu-Au ore. F. Laurinoja Fe-Cu-Au ore. Note the difference in grain size for magnetite between non-sulfidic parts and in association with sulfides. From Niiranen (2004).

Structure:



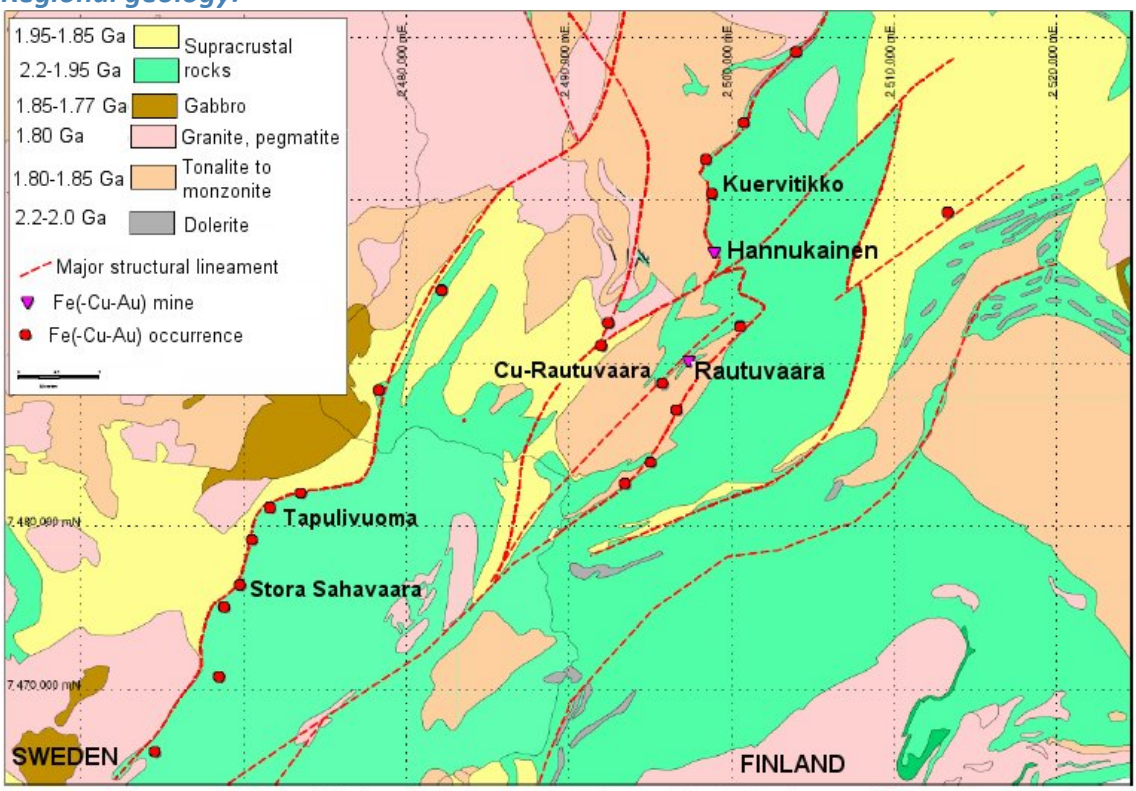
Ore from Hannukainen. A. Fe-Cu-Au ore. B. Coarse-grained pyrite-pyrrhotite-chalcopyrite in magnetite ore. C-D. Brittle fractures in ironstone, chalcopyrite-pyrite-scapolite-quartz infill. Second generation of sulfides? E. Sulphide-free iron ore with diopside gangue.
F. Coarse-grained ore with diopside-albite-scapolite gangue. G. 1766 Ma granite crosscutting the Fe-Cu-Au ore. This is the very boulder from which the granite was dated.
F. Hangingwall diorite. Note the dark mafic enclave(?). From Niiranen (2004).

Structure:



Typical banded ironstone at Hannukainen. Note the possible F2 folding. The magnetite-skarn bands are crosscut by late chalcopyrite and scapolite-quartz-chalcopyrite-pyrite -filled fractures. Coin diameter 20 mm. Photo Tero Niiranen 2004.

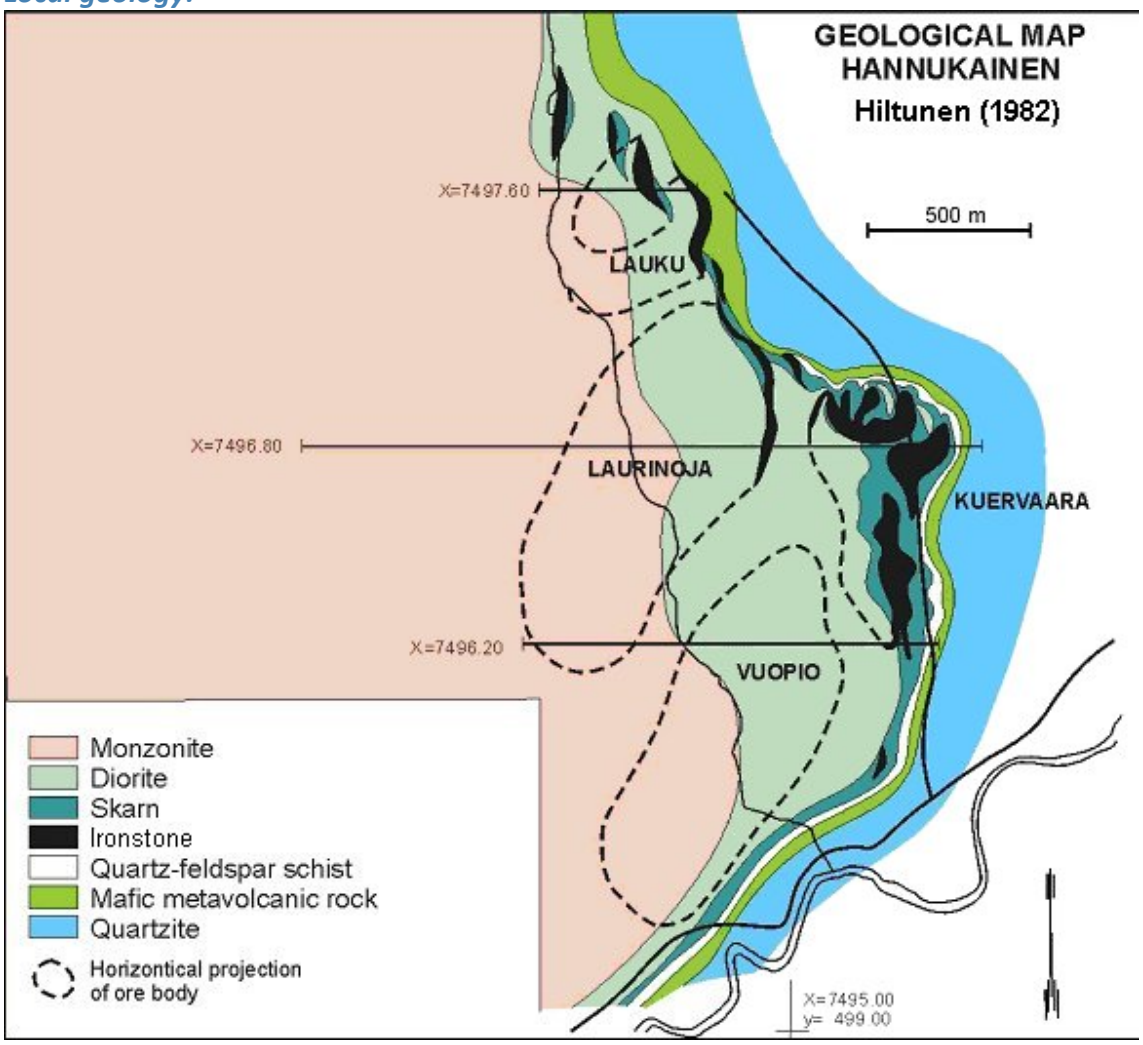
Regional geology:



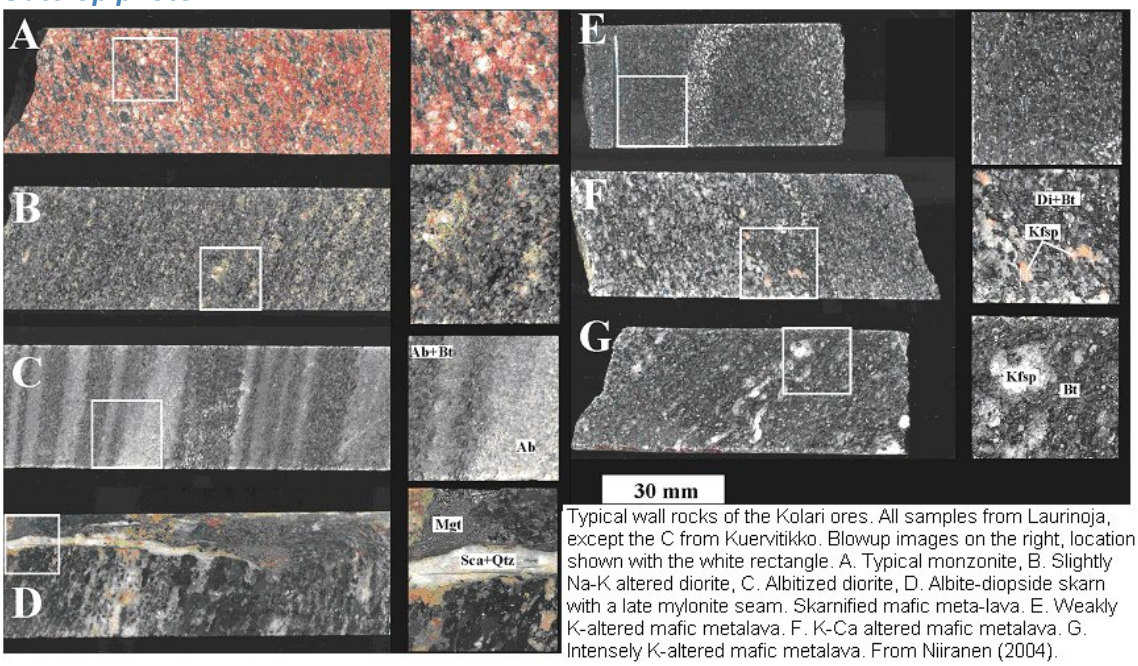
Kolari-Pajala region, IOCG deposits

Grid 10 km. From presentation by Tero Niiranen (Northland Resources) at FEM2007, Rovaniemi

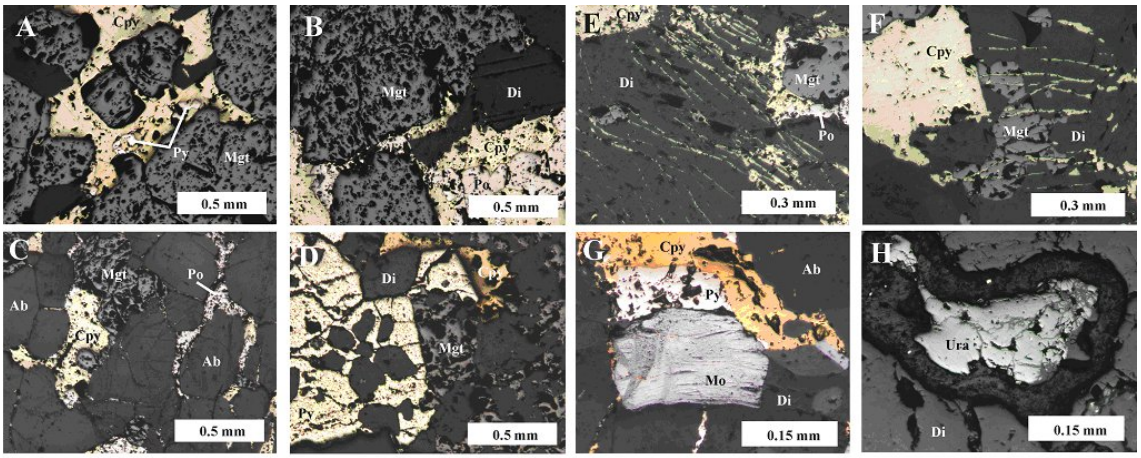
Local geology:



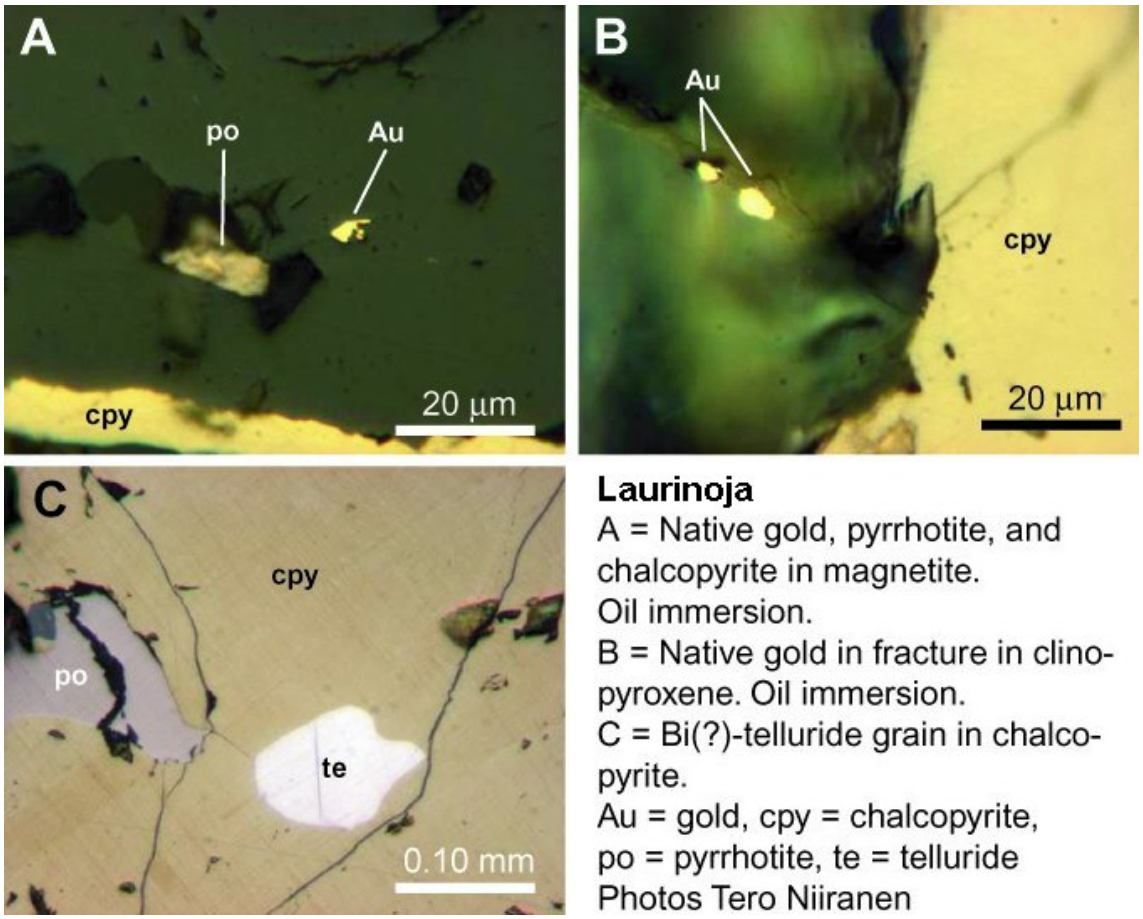
Outcrop photo:



Typical wall rocks of the Kolari ores. All samples from Laurinoja, except the C from Kuervitikko. Blowup images on the right, location shown with the white rectangle. A. Typical monzonite, B. Slightly Na-K altered diorite, C. Albitized diorite, D. Albite-diopside skarn with a late mylonite seam. Skarnified mafic meta-lava. E. Weakly K-altered mafic metalava. F. K-Ca altered mafic metalava. G. Intensely K-altered mafic metalava. From Niiranen (2004).



Ore mineral assemblages of the Kolari IOCG deposits in reflected light. A. Laurinoja magnetite-chalcopyrite-pyrite ore, diopside gangue.
B. Cu-Rautuvaara magnetite-chalcopyrite-pyrrhotite ore, diopside gangue. C. Cu-Rautuvaara magnetite-chalcopyrite-pyrrhotite assemblage in albite rock.
D. Kuervitikko magnetite-pyrite-chalcopyrite ore, diopside gangue. E & F. Chalcopyrite in thin fractures in diopside and magnetite, Laurinoja.
G. Molybdenite in association with chalcopyrite and pyrite, Laurinoja. H. Uraninite grain in diopside skarn. Tiny sulfide inclusions in uraninite. Note also the alteration halo around the uraninite grain. Cu-Rautuvaara. From Niiranen (2004).



Laurinoja
A = Native gold, pyrrhotite, and chalcopyrite in magnetite.
Oil immersion.
B = Native gold in fracture in clino-pyroxene. Oil immersion.
C = Bi(?)-telluride grain in chalco-pyrite.
Au = gold, cpy = chalcopyrite, po = pyrrhotite, te = telluride
Photos Tero Niiranen

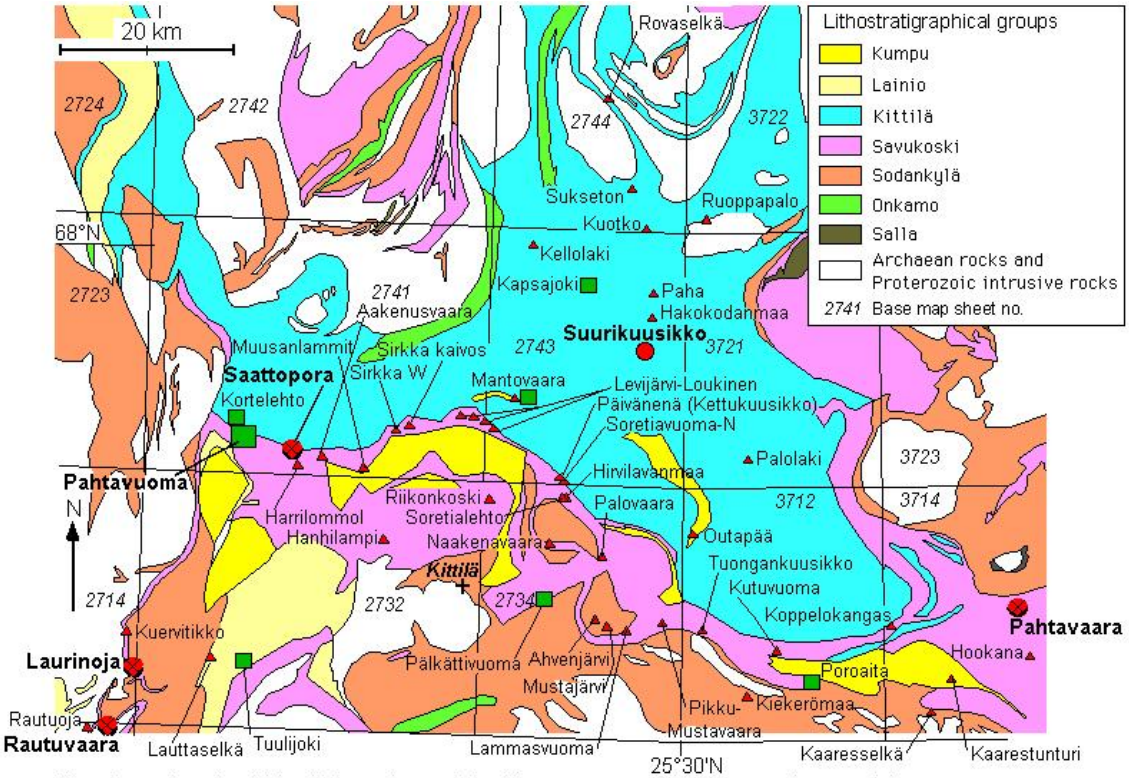
Ore outcrop:

Chalcopyrite- and gold-rich ore at Laurinoja, Hannukainen. The pencil is 12 cm long. Photo Pasi Eilu.

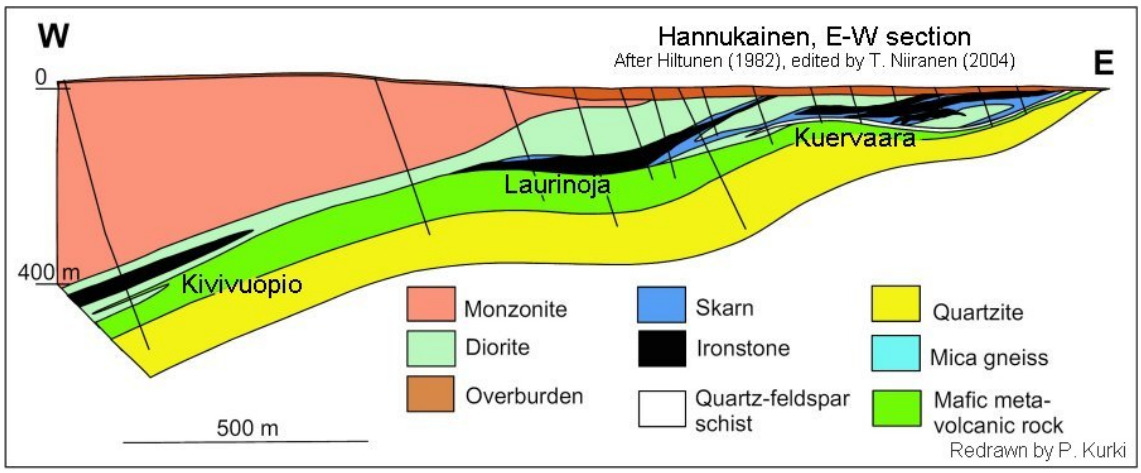
Ore outcrop:

Chalcopyrite-rich ore at Laurinoja, Hannukainen. The texture of the ore is alike that at Starra, Cloncurry, Australia. The pencil is 12 cm long. Photo Pasi Eilu.

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)



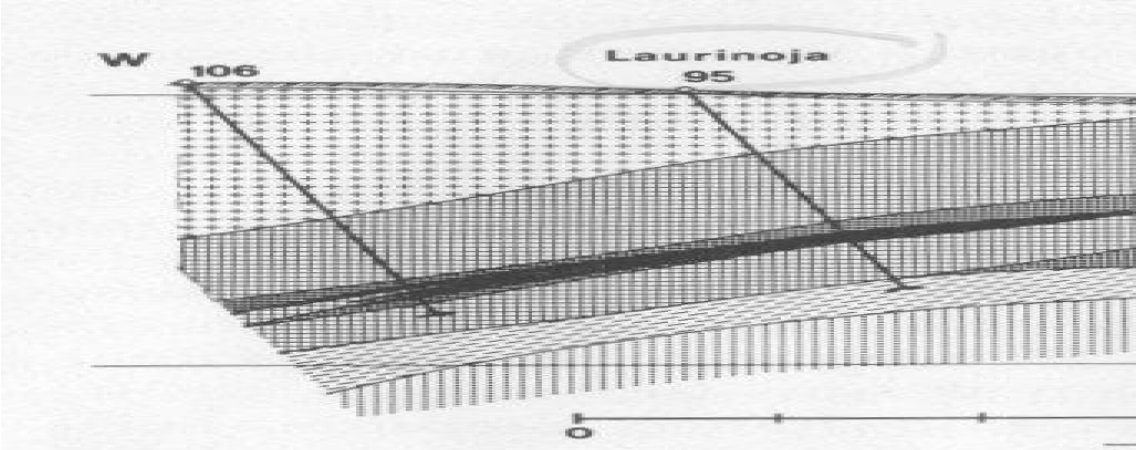


Fig. 41. Geological cross-section
nite; 2 — diorite. *Rautuvaara Fo*
bolite. *Niesakero—Kuertunturi q*

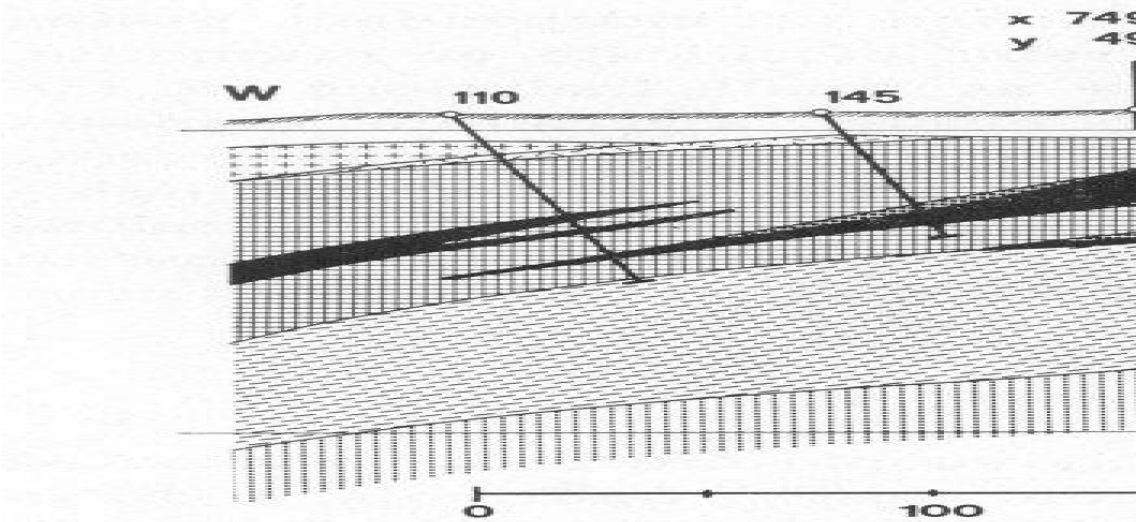


Fig. 53. Geological cross-section
tite; 2 — monzonite; 3 — diorite.
kero—Kuertunturi quartzite comp

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