

Kylylahti

Alternative Names: Wallaby, Wombat

Occurrence type: deposit

Commodity	Rank	Total measure	Total production	Total resource	Importance
copper	1	101261,12 t	74268 t	26993,12 t	Medium sized deposit
zinc	2	28887,36 t	13325 t	15562,36 t	Small deposit
silver	3	5,74 t	5,74 t	0 t	Occurrence
gold	3	5,98 t	4,05 t	1,93 t	Small deposit
cobalt	4	13930,18 t	6149 t	7781,18 t	Medium sized deposit
nickel	4	22349,94 t	3138 t	19211,94 t	Medium sized deposit

Easting EUREF: 619358,388
Northing EUREF: 6971692,611

Easting YKJ: 3619578
Northing YKJ: 6974614

Discovery year: 1984

Discovered by: Outokumpu Oy

Province: Outokumpu (Co, Cu)

District: Keretti (Co, Cu)

References: 5, 28, 34, 37, 39, 47

Mineral deposit type

Group: Metallogenic deposit

Main type: VMS (mixed hydrothermal)

Sub type 1: Outokumpu-type

Comments: The discordant and dyke-like nature of the ore imply its origin either by 1) pervasive mechanical or hydrothermal mobilisation and relocation of sulphides from a pre-existing proto-ore or 2) by precipitation of quartz and sulphides directly into the vein-like ore bodies. Outokumpu-type ore.

References: 28

Dimension

Expression: exposed

Form: discordant

Shape: tabular

Length (m): 1500

Width (m): NA

Thickness (m): 15

Depth (m): 700

Area (ha): NA

Dip azimuth: NA

Dip: 85

Plunge azimuth: 202

Plunge dip: NA

Orientation method: NA

Holder history

Current holder: Boliden Kylylahti Oy

Years: 2014

Holding type: Mining concession (old law)

Previous holders:

Company	Years	Holding type	Comments
Vulcan Resources Ltd	NA	NA	NA
Outokumpu Oy	NA	NA	NA
Kylylahti Copper Oy	1992	Mining concession (old law)	NA

EXPLORATION ACTIVITY

Altona Mining Ltd

Years	Activity type	Geologist	Exploration result	Ref
2013-2013	core drilling	Jari Juurela	mineral resource defined	
	Intersections			
	HoleID	KE-1		
	From-To	245-347		
	Length	102m		
	copper	0,8%		
	gold	1ppm		
	zinc	0,2%		
	Comments	Including: 12 m @ 2.0% Cu, 2.6 g/t Au, 0.7% Zn 85 m @ 0.6%Cu, 0.8 g/t Au, 0.1% Zn		
	HoleID	KU-900		
	From-To	189-276		
	Length	87m		
	copper	1,1%		
	gold	0,8ppm		
	zinc	0,6%		
	Comments	Including: 19 m @ 0.7% Cu, 1.5 g/t Au, 0.3 % Zn 9 m @ 0.5% Cu, 1.0 g/t Au, 0.4% Zn 15 m @ 1.8%Cu, 0.4 g/t Au, 1.0% Zn 25 m @ 1.9%Cu, 0.8 g/t Au, 0.9% Zn		
	HoleID	KU-901		
	From-To	192-299		
	Length	107m		
	copper	1%		
	gold	1,4ppm		
	zinc	0,4%		
	Comments	Including: 12 m @ 0.1% Cu, 3.6 g/t Au, 0.0% Zn 17 m @ 0.6%Cu, 2.0 g/t Au, 0.6% Zn 5 m @ 1.1%Cu, 4.4 g/t Au, 0.2% Zn 29 m @ 0.5%Cu, 0.6 g/t Au, 0.5% Zn 34 m @ 2.0%Cu, 0.7 g/t Au, 0.6% Zn		
	HoleID	KU-902		
	From-To	237-345		
	Length	108m		
	copper	2,4%		
	gold	1ppm		
	zinc	0,8%		
	Comments	Including: 5 m @ 0.2% Cu, 5.1 g/t Au, 0.0% Zn 30 m @ 0.5%Cu, 0.2 g/t Au, 0.7% Zn 58 m @ 4.2%Cu, 1.2 g/t Au, 1.0% Zn		

Vulcan Resources Ltd

Years	Activity type	Geologist	Exploration result	Ref
2004-2004	core drilling	J. Vesanto , N. Walker	NA	39
	Core drilling (reconnaissance drilling): 26.6 km.			

2004-2004	subsurface exploration	J. Vesanto , N. Walker	NA	
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Outokumpu Oy

Years	Activity type	Geologist	Exploration result	Ref
1997-1998	detailed geology	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36

1997-1998	detailed geochemistry	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1997-1998	subsurface exploration	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1997-1998	detailed geophysics	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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Geological Survey of Finland

Years	Activity type	Geologist	Exploration result	Ref
1992-1992	regional geophysics	NA	key geological features	
	<i>Low-altitude airborne magnetic, electromagnetic and radiometric survey</i>			

Outokumpu Oy

Years	Activity type	Geologist	Exploration result	Ref
1991-1995	detailed geophysics	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36

1991-1995	detailed geology	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1991-1995	subsurface exploration	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1991-1995	detailed geochemistry	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1983-1986	detailed geology	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1983-1986	subsurface exploration	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1983-1986	detailed geochemistry	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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1983-1998	core drilling	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	39
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	<i>Core drilling (reconnaissance drilling): 90 drill holes, 43.5 km.</i>			
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1983-1986	detailed geophysics	P. Hakanen , T. Korkalo , L. Pekkarinen , K. Söderholm	NA	25, 28, 35, 36
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RESOURCES AND RESERVES

Most recent

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Boliden AB	2018	31.12.2018	PERC Code	31
<i>Comments: Mineral resources remaining 31.12.2018 were presumably not used during 2019 and 2020 before closure of mine in autumn 2020 and therefore they are assumed to still exist.</i>					
Category:		Measured mineral resource			
Tonnage:		2510000 t			
copper		0,56 %			
gold		0,24 ppm			
zinc		0,3 %			
nickel		0,25 %			
cobalt		0,14 %			
Cutoff:		NA			
Category:		Indicated mineral resource			
Tonnage:		3639000 t			
copper		0,34 %			
gold		0,36 ppm			
zinc		0,21 %			
nickel		0,27 %			
cobalt		0,11 %			
Cutoff:		NA			
Category:		Inferred mineral resource			
Tonnage:		737000 t			
copper		0,08 %			
gold		0,02 ppm			
zinc		0,05 %			
nickel		0,42 %			
cobalt		0,04 %			
Cutoff:		NA			
Category:		Measured, indicated and inferred mineral resource			
Tonnage:		6886000 t			
copper		0,392 %			
zinc		0,226 %			
gold		0,28 ppm			
nickel		0,279 %			
cobalt		0,113 %			
Cutoff:		NA			

Previous calculations

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Boliden AB	2019	31.12.2019	PERC Code	17
<i>Comments: This reserve has been used by the end of 2020 and therefore it is not included anymore in the combined resources of reserves of Kylylahti.</i>					
Category:		Proved ore reserves			
Tonnage:		392000 t			
gold		1,08 ppm			

copper	0,73 %
zinc	0,33 %
nickel	0,24 %
cobalt	0,18 %
Cutoff:	NA
Category:	Probable ore reserves
Tonnage:	110000 t
gold	1,77 ppm
copper	0,32 %
zinc	0,11 %
nickel	0,27 %
cobalt	0,1 %
Cutoff:	NA
Category:	Proved and probable ore reserves
Tonnage:	502000 t
copper	0,64 %
zinc	0,282 %
gold	1,231 ppm
nickel	0,247 %
cobalt	0,162 %
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Boliden AB	2018	31.12.2018	PERC Code	31
Category:	Proved ore reserves				
Tonnage:	843000 t				
copper	0,87 %				
gold	0,87 ppm				
zinc	0,44 %				
nickel	0,22 %				
cobalt	0,19 %				
Cutoff:	NA				
Category:	Probable ore reserves				
Tonnage:	493000 t				
copper	0,35 %				
gold	1,11 ppm				
zinc	0,13 %				
nickel	0,27 %				
cobalt	0,13 %				
Cutoff:	NA				
Category:	Proved and probable ore reserves				
Tonnage:	1336000 t				
copper	0,678 %				
zinc	0,326 %				
gold	0,959 ppm				
nickel	0,238 %				
cobalt	0,168 %				
Cutoff:	NA				

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Boliden AB	2017	31.12.2017	CRIRSCO Code	16
<i>Comments: Boliden's Mineral Resources and Mineral Reserves have been estimated and compiled in accordance with recommendations for application in their respective countries by the Swedish, Finnish and Norwegian industry organisations for mining and metal companies - SveMin, FinnMin and Norsk Bergindustri, respectively - known as the FRB standard.</i>					
Category:	Measured mineral resource				
Tonnage:	1900000 t				
gold	0,3 ppm				

copper	0,66 %				
zinc	0,3 %				
nickel	0,23 %				
cobalt	0,14 %				
Cutoff:	NA				
Category:	Indicated mineral resource				
Tonnage:	3900000 t				
gold	0,4 ppm				
copper	0,34 %				
zinc	0,2 %				
nickel	0,27 %				
cobalt	0,12 %				
Cutoff:	NA				
Category:	Inferred mineral resource				
Tonnage:	150000 t				
gold	0 ppm				
copper	0,28 %				
zinc	0,1 %				
nickel	0,27 %				
cobalt	0,08 %				
Cutoff:	NA				
Category:	Measured, indicated and inferred mineral resource				
Tonnage:	5950000 t				
copper	0,441 %				
zinc	0,229 %				
gold	0,358 ppm				
nickel	0,257 %				
cobalt	0,125 %				
Cutoff:	NA				
Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Boliden AB	2017	31.12.2017	CRIRSCO Code	16
<i>Comments: Boliden's Mineral Resources and Mineral Reserves have been estimated and compiled in accordance with recommendations for application in their respective countries by the Swedish, Finnish and Norwegian industry organisations for mining and metal companies – SveMin, FinnMin and Norsk Bergindustri, respectively – known as the FRB standard.</i>					
Category:	Proved ore reserves				
Tonnage:	1000000 t				
gold	0,9 ppm				
copper	1,2 %				
zinc	0,6 %				
nickel	0,21 %				
cobalt	0,24 %				
Cutoff:	NA				
Category:	Probable ore reserves				
Tonnage:	700000 t				
gold	1,5 ppm				
copper	0,5 %				
zinc	0,2 %				
nickel	0,29 %				
cobalt	0,15 %				
Cutoff:	NA				
Category:	Proved and probable ore reserves				
Tonnage:	1700000 t				
copper	0,912 %				
zinc	0,435 %				
gold	1,147 ppm				
nickel	0,243 %				

cobalt	0,203 %
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Boliden AB	2016	NA	NA	23

Comments: 31.12.2016

Resources do not include reserves.

Calculation is probably done with the method called FRB standard.

Category:	Measured mineral resource
Tonnage:	1,9 Mt
gold	0,4 ppm
copper	0,84 %
zinc	0,4 %
nickel	0,2 %
cobalt	0,2 %
Cutoff:	NA
Category:	Indicated mineral resource
Tonnage:	3,2 Mt
gold	0,6 ppm
copper	0,43 %
zinc	0,2 %
nickel	0,3 %
cobalt	0,1 %
Cutoff:	NA
Category:	Inferred mineral resource
Tonnage:	0,1 Mt
gold	0,5 ppm
copper	1,4 %
zinc	0,5 %
nickel	0,1 %
cobalt	0,3 %
Cutoff:	NA
Category:	Measured, indicated and inferred mineral resource
Tonnage:	5,2 Mt
copper	0,598 %
zinc	0,279 %
gold	0,525 ppm
nickel	0,26 %
cobalt	0,14 %
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Boliden AB	2016	NA	JORC code	23

Comments: 31.12.2016

Resources do not include reserves.

Calculation is probably done with the method called FRB standard.

Category:	Proved ore reserves
Tonnage:	0,8 Mt
copper	1,5 %
zinc	0,6 %
nickel	0,17 %
cobalt	0,28 %
gold	1 ppm
Cutoff:	NA
Category:	Probable ore reserves
Tonnage:	1,1 Mt
gold	1,3 ppm
copper	1 %
zinc	0,5 %
nickel	0,24 %
cobalt	0,22 %

Cutoff:	NA
Category:	Proved and probable ore reserves
Tonnage:	1,9 Mt
copper	1,211 %
zinc	0,542 %
gold	1,174 ppm
nickel	0,211 %
cobalt	0,245 %
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Boliden AB	2015	NA	JORC code	12, 22

Comments: 31.12.2015

Category:	Measured mineral resource
Tonnage:	1,7 Mt
gold	0,3 ppm
copper	0,75 %
zinc	0,4 %
nickel	0,2 %
cobalt	0,2 %
Cutoff:	NA

Category:	Indicated mineral resource
Tonnage:	3 Mt
gold	0,6 ppm
copper	0,47 %
zinc	0,3 %
nickel	0,3 %
cobalt	0,2 %
Cutoff:	NA

Category:	Inferred mineral resource
Tonnage:	0,1 Mt
gold	1,6 ppm
copper	0,71 %
zinc	0,2 %
nickel	0,3 %
cobalt	0,1 %
Cutoff:	NA

Category:	Measured, indicated and inferred mineral resource
Tonnage:	4,8 Mt
copper	0,574 %
zinc	0,333 %
gold	0,515 ppm
nickel	0,265 %
cobalt	0,198 %
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Boliden AB	2015	NA	JORC code	12, 22

Comments: 31.12.2015.

Reported mineral reserves are not included in the mineral resources.

In Kylälahti, Ni and Co can only be extracted from the AuCu/AuNi ore type, which represents approximately 20 percent of the mineral reserves.

Category:	Proved ore reserves
Tonnage:	0,7 Mt
gold	0,8 ppm
copper	1,6 %
zinc	0,7 %
nickel	0,14 %
cobalt	0,25 %
Cutoff:	NA
Category:	Probable ore reserves

Tonnage:	2,2 Mt
gold	1 ppm
copper	1,3 %
zinc	0,5 %
nickel	0,2 %
cobalt	0,25 %
Cutoff:	NA
Category:	Proved and probable ore reserves
Tonnage:	2,9 Mt
copper	1,372 %
zinc	0,548 %
gold	0,952 ppm
nickel	0,186 %
cobalt	0,25 %
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Boliden AB	2014	NA	CRIRSCO Code	9, 10

Comments: FRB standard.

Mineral Resources excl. mineral reserves

Category:	Measured mineral resource
Tonnage:	1,2 Mt
copper	0,77 %
gold	0,3 ppm
zinc	0,4 %
Cutoff:	copper
Category:	Indicated mineral resource
Tonnage:	2,8 Mt
copper	0,53 %
gold	0,6 ppm
zinc	0,3 %
Cutoff:	copper
Category:	Inferred mineral resource
Tonnage:	0,5 Mt
copper	1,48 %
gold	1,3 ppm
zinc	0,4 %
Cutoff:	copper
Category:	Measured, indicated and inferred mineral resource
Tonnage:	4,5 Mt
copper	0,7 %
zinc	0,338 %
gold	0,598 ppm
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Boliden AB	2014	NA	CRIRSCO Code	9, 10

Comments: FRB standard

Category:	Proved ore reserves
Tonnage:	0,4 Mt
copper	1,59 %
gold	0,6 ppm
zinc	0,7 %
Cutoff:	copper
Category:	Probable ore reserves
Tonnage:	3,5 Mt
copper	1,58 %
gold	1 ppm
zinc	0,6 %
Cutoff:	copper
Category:	Proved and probable ore reserves

Tonnage:	3,9 Mt
copper	1,581 %
zinc	0,61 %
gold	0,959 ppm
Cutoff:	NA

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Altona Mining Ltd	2013	NA	JORC code	4
Category:		Measured mineral resource			
Tonnage:		1,2 Mt			
zinc		0,56 %			
copper		1,19 %			
cobalt		0,22 %			
gold		0,48 ppm			
nickel		0,19 %			
Cutoff:		copper			
Category:		Indicated mineral resource			
Tonnage:		7,2 Mt			
copper		1,35 %			
gold		0,77 ppm			
zinc		0,53 %			
cobalt		0,24 %			
nickel		0,23 %			
Cutoff:		copper			
Category:		Inferred mineral resource			
Tonnage:		0,5 Mt			
copper		1,38 %			
gold		1,71 ppm			
zinc		0,54 %			
cobalt		0,27 %			
nickel		0,24 %			
Cutoff:		copper			
Category:		Measured, indicated and inferred mineral resource			
Tonnage:		8,9 Mt			
copper		1,33 %			
cobalt		0,239 %			
nickel		0,225 %			
zinc		0,535 %			
gold		0,784 ppm			
Cutoff:		NA			

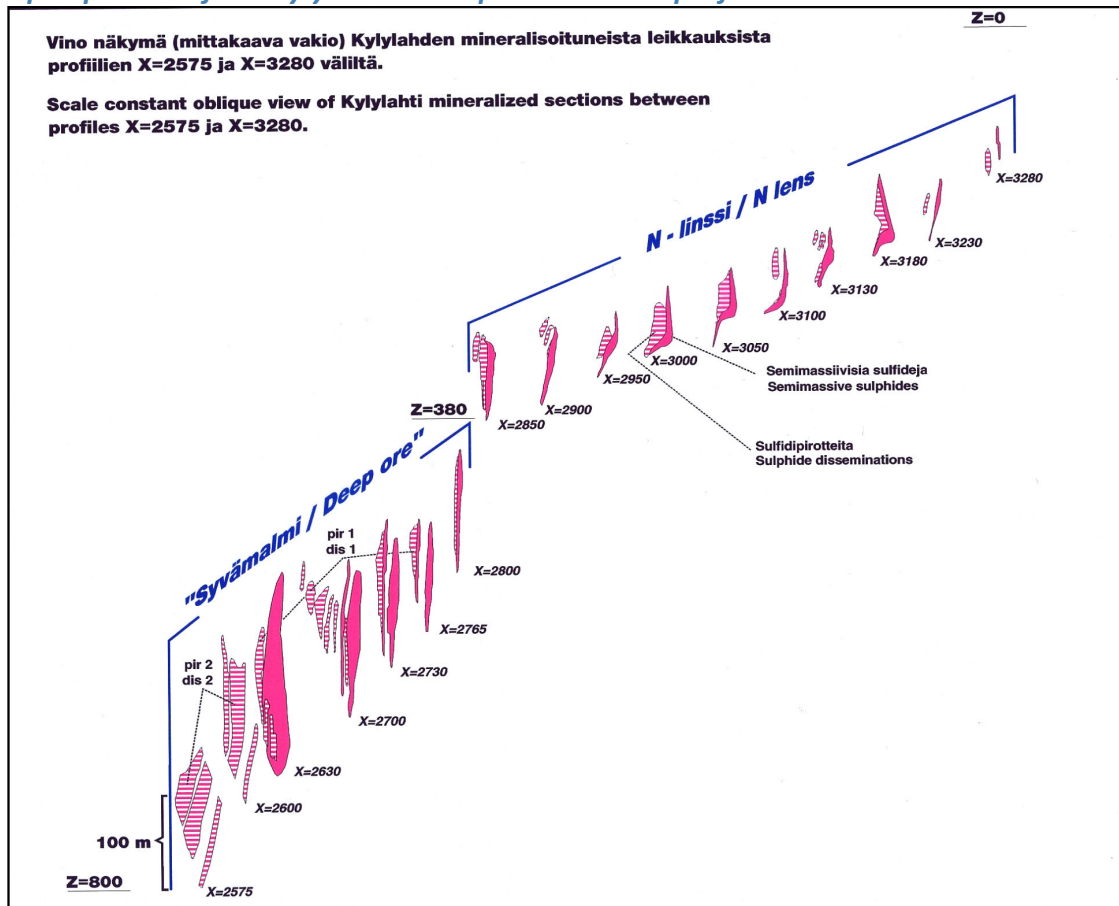
Type:	Company:	Year:	Date:	Calc Method:	Reference:
Reserve	Altona Mining Ltd	2013	NA	JORC code	
Category:		Proved ore reserves			
Tonnage:		0,57 Mt			
copper		1,43 %			
gold		0,66 ppm			
zinc		0,66 %			
Cutoff:		copper			
Category:		Probable ore reserves			
Tonnage:		3,98 Mt			
copper		1,7 %			
gold		0,86 ppm			
zinc		0,61 %			
Cutoff:		copper			
Category:		Proved and probable ore reserves			
Tonnage:		4,55 Mt			
copper		1,666 %			
zinc		0,616 %			
gold		0,835 ppm			
Cutoff:		NA			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Altona Mining Ltd	2010	NA	JORC code	25
Category:		NA			
Tonnage:		8,4 Mt			
cobalt		0,24 %			
gold		0,65 ppm			
copper		1,25 %			
nickel		0,2 %			
zinc		0,54 %			
Cutoff:		copper 1 %			
<i>Comments: With cut-off grade at 0.1 % Co for disseminated and 1.0 % Cu for semi-massive parts of the deposit</i>					

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Vulcan Resources Ltd	2009	NA	NA	28
<i>Comments: Mineralization at Kylylahti occurs in two elongated lenses (named Wallaby and Wombat by Vulcan Res.)</i>					
Category:		NA			
Tonnage:		8,1 Mt			
copper		1,18 %			
cobalt		0,24 %			
nickel		0,22 %			
zinc		0,47 %			
gold		0,66 ppm			
Cutoff:		NA			

Figures

A perspective of the Kylylahti ore deposit between profiles X=2575 and X=3280:



A perspective of the Kylylahti Cu-Co-Ni-Zn ore deposit showing distribution of the massive-semimassive and disseminated mineralizations. (From Kontinen et al., 2006)

MINING

Kylylahti

Easting EUREF: 619358,388

Northing EUREF: 6971692,611

Status: Care and maintenance

Previous status: Operating

Operating years: 2011-2020

Years in production: 10

Total ore mined: 6076367 t

Comments: 2010: Construction of the Kylylahti mine started.

References: 7, 20, 21, 26, 27, 29, 46

Total production:

Product	Product measure
silver	5,74 t
copper	74268 t
cobalt	6149 t
gold	4049 kg
zinc	13325 t
nickel	3138 t

Other materials:

Material type	Material measure
Waste rock	556537 t

Mining activity:

Year	Ore mined	Ore processed	Activity type	Production	Other material
2020	642775 t	681000 t	underground mining	copper 3609 t zinc 326 t nickel 989 t cobalt 447 t gold 623 kg	Waste rock 0 t
2019	680658 t	716000 t	underground mining	zinc 851 t copper 4826 t nickel 731 t cobalt 425 t gold 480 kg	Waste rock 0 t
2018	791424 t	785000 t	underground mining	zinc 1011 t copper 7353 t nickel 518 t cobalt 278 t gold 605 kg	Waste rock 1195 t
2017	765631 t	809000 t	underground mining	zinc 1682 t copper 9686 t gold 674 kg nickel 0 t cobalt 0 t	Waste rock 99 t
2016	815762 t	797000 t	underground mining		

				zinc 2477 t copper 12123 t gold 477 kg nickel 0 t cobalt 1780 t	Waste rock 25 t
2015	719053 t	733000 t	underground mining		
				zinc 2189 t copper 11835 t gold 421 kg cobalt 1700 t nickel 900 t	Waste rock 2928 t
2014	671465 t	669234 t	underground mining		
				cobalt 1519 t copper 10951 t zinc 1964 t gold 318 kg silver 2200 kg nickel 0 t	Waste rock 2135 t
2013	609342 t	605016 t	underground mining		
				copper 9134 t gold 302 kg zinc 2027 t silver 2241 kg nickel 0 t cobalt 0 t	Waste rock 33812 t
2012	380257 t	368859 t	underground mining		
				zinc 798 t copper 4751 t gold 149 kg silver 1302 kg nickel 0 t cobalt 0 t	Waste rock 346343 t
2011			test mining		
					Waste rock 170000 t

GEOLOGY

Ore: Sulphide ore

Host rock: Quartz rock, Metacarbonate-rock

Sulphide ore (Ore)

Rock type: Ore

Proportion: present

Grain size: NA

Color: NA

References: 25, 28, 39

Comments: Massive-semimassive mineralisation comprises 40% to 60% sulphides. Kylylahti mineralization is located at the contact of these rocks and sulphidic black schists at the eastern margin of the Kylylahti rock package.

Ore minerals:

Mineral	Proportion	Mineral texture
Chalcopyrite	major	
Cobaltite	minor	
	<i>Average: Co 29.05%, Ni 0.1%, As 33.09%</i>	
Cobaltpentlandite	minor	
	<i>Average: Co 37.56%, Ni 16.11%, As 0.03%</i>	
Electrum	minor	
	<i>partly Hg-bearing</i>	
Gold	minor	
	<i>partly Hg-bearing</i>	
Magnetite	minor	
Pyrite	major	
	<i>Average: Co 1.61%, Ni 0.05%, As 0.19%</i>	
Pyrrhotite	major	
	<i>Average: Co 0.08%, Ni 0.15%, As 0.01%</i>	
Sphalerite	minor	
	<i>Average: Zn 58.56%, Fe 7.04%, Co 0.63%</i>	

Other minerals:

Mineral	Proportion	Mineral texture
Calcite	present	
Quartz	present	
Rutile	present	
Tremolite	present	

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)	1600-2500		N

Quartz rock (Host rock)

Rock type: Host rock

Proportion: present

Grain size: NA

Color: NA

References: 39

Comments: Disseminated ore contains 5% to 40% sulphides and veinlets. The Kylylahti ore deposit is hosted within a package of serpentinite, talc-carbonate, tremolite skarn and quartz rocks. The ultramafic rocks have been metasomatically altered to a tremolite skarn-quartz rock-sulphide assemblage.

Other minerals:

Mineral	Proportion	Mineral texture
Quartz	present	

Textures

Massive
Foliated

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)	1600-2500		N

Metacarbonate-rock (Host rock)

Rock type: Host rock

Proportion: present

Grain size: NA

Color: NA

References: 39

Comments: Disseminated ore contains 5% to 40% sulphides and veinlets. The Kylylahti ore deposit is hosted within a package of serpentinite, talc-carbonate, tremolite skarn and quartz rocks. The

ultramafic rocks have been metasomatically altered to a tremolite skarn-quartz rock-sulphide assemblage.

Textures

Massive
Foliated

Metamorphic description:

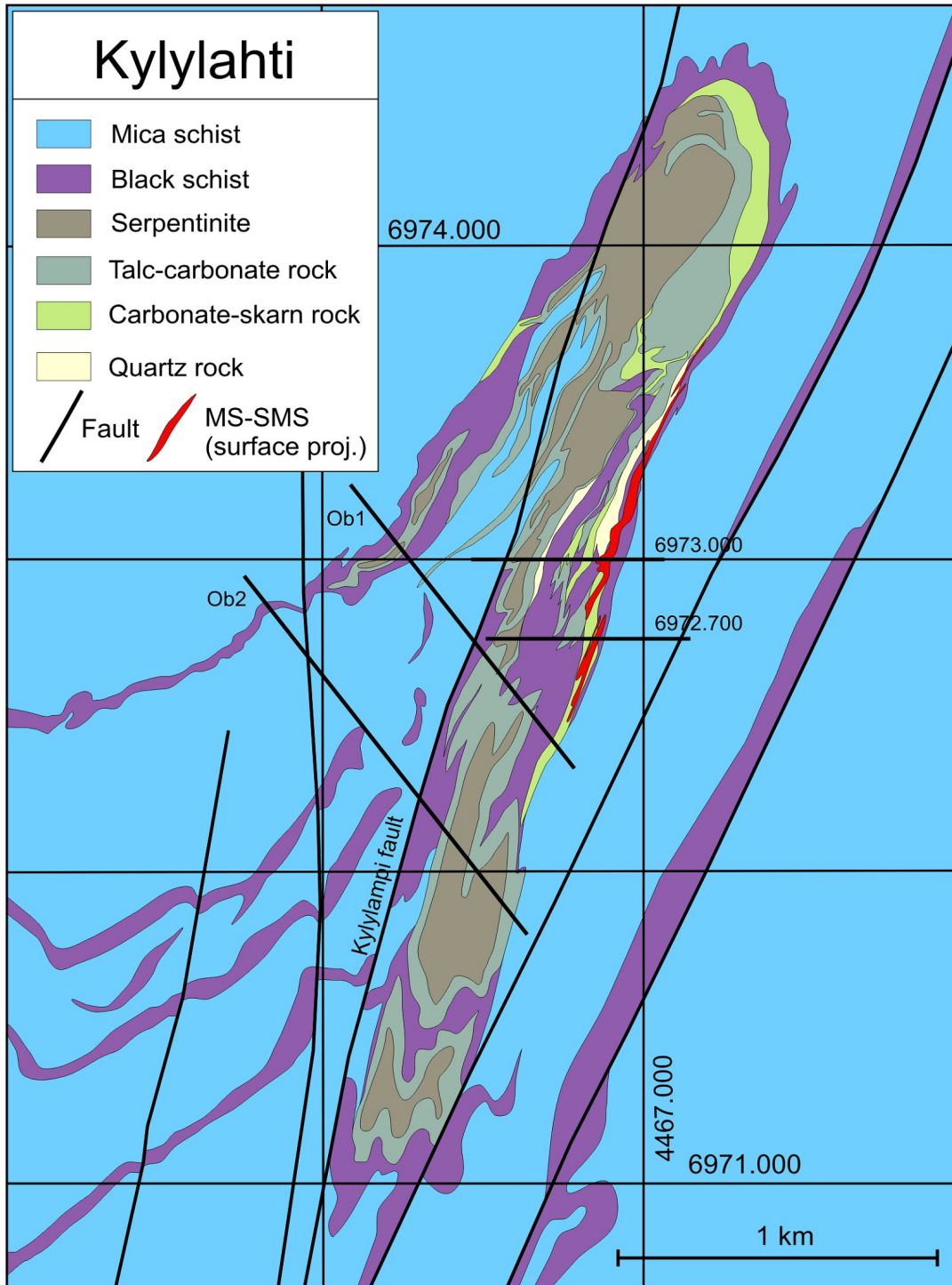
Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	Min T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA		

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:		
Paleoproterozoic (2500-1600 Ma)	1970-1970	1970	N		
Radiometric age:	Method:	Age:	Error (Ma):	Mineral:	Reference:
	NA	1970			28

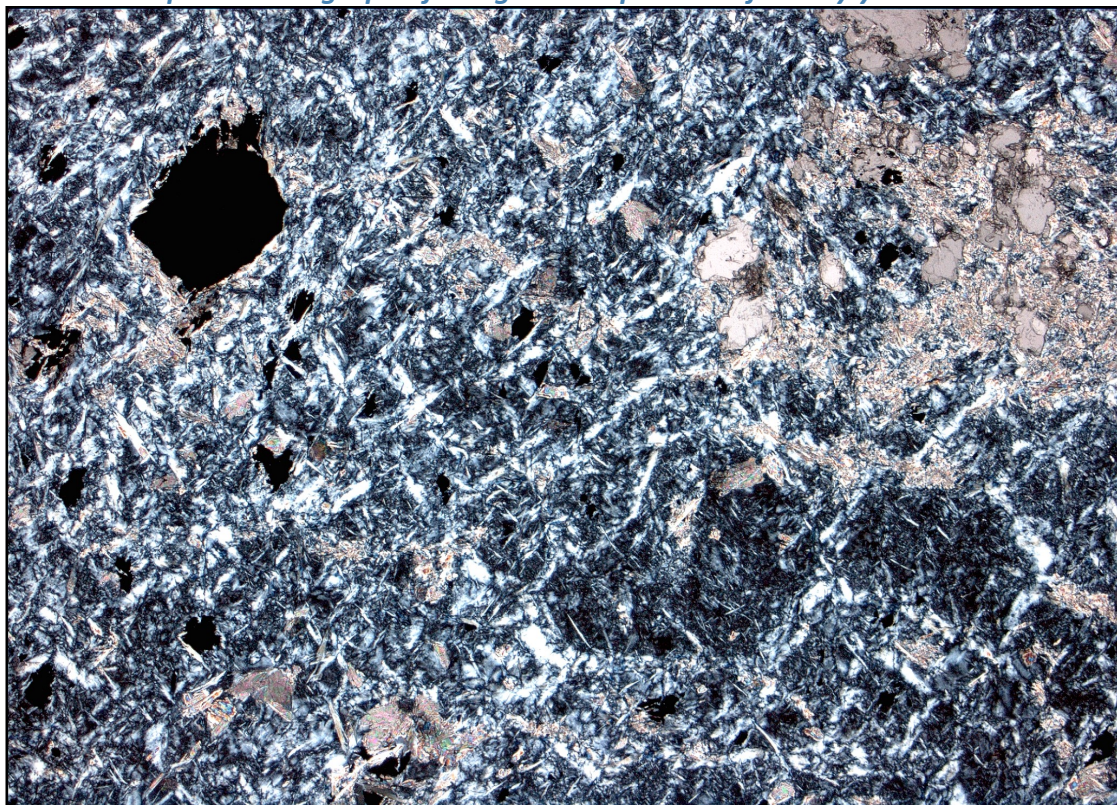
Figures

Geological map of the Kylylahti area, Polvijärvi:



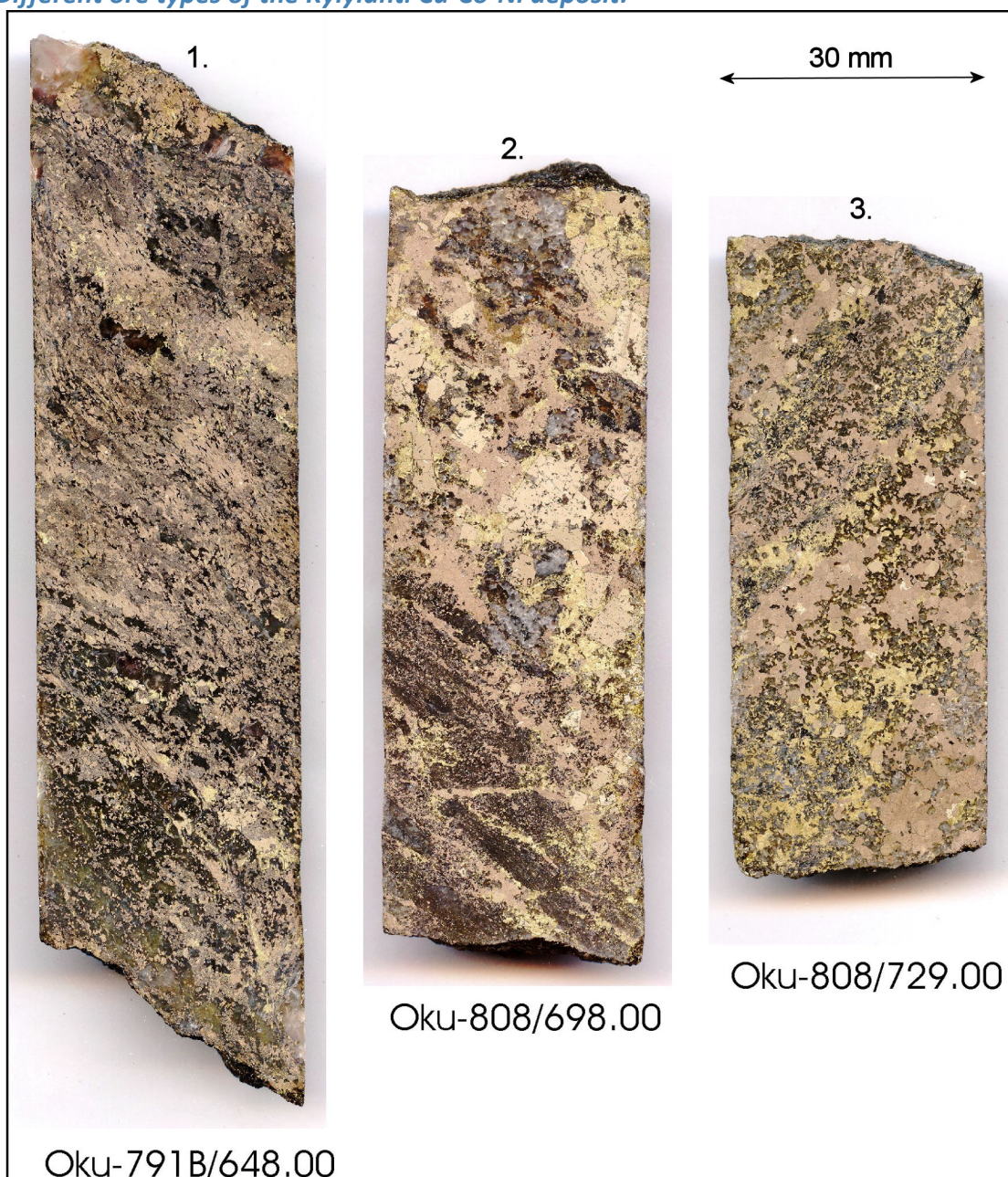
Geological map of the Kylylahti massif showing surface projection of the massive-semimassive Cu-Co-Ni-Zn mineralization (red). From Kontinen et al., 2006

Thin-section photomicrograph of antigorite serpentinite from Kylälahti:



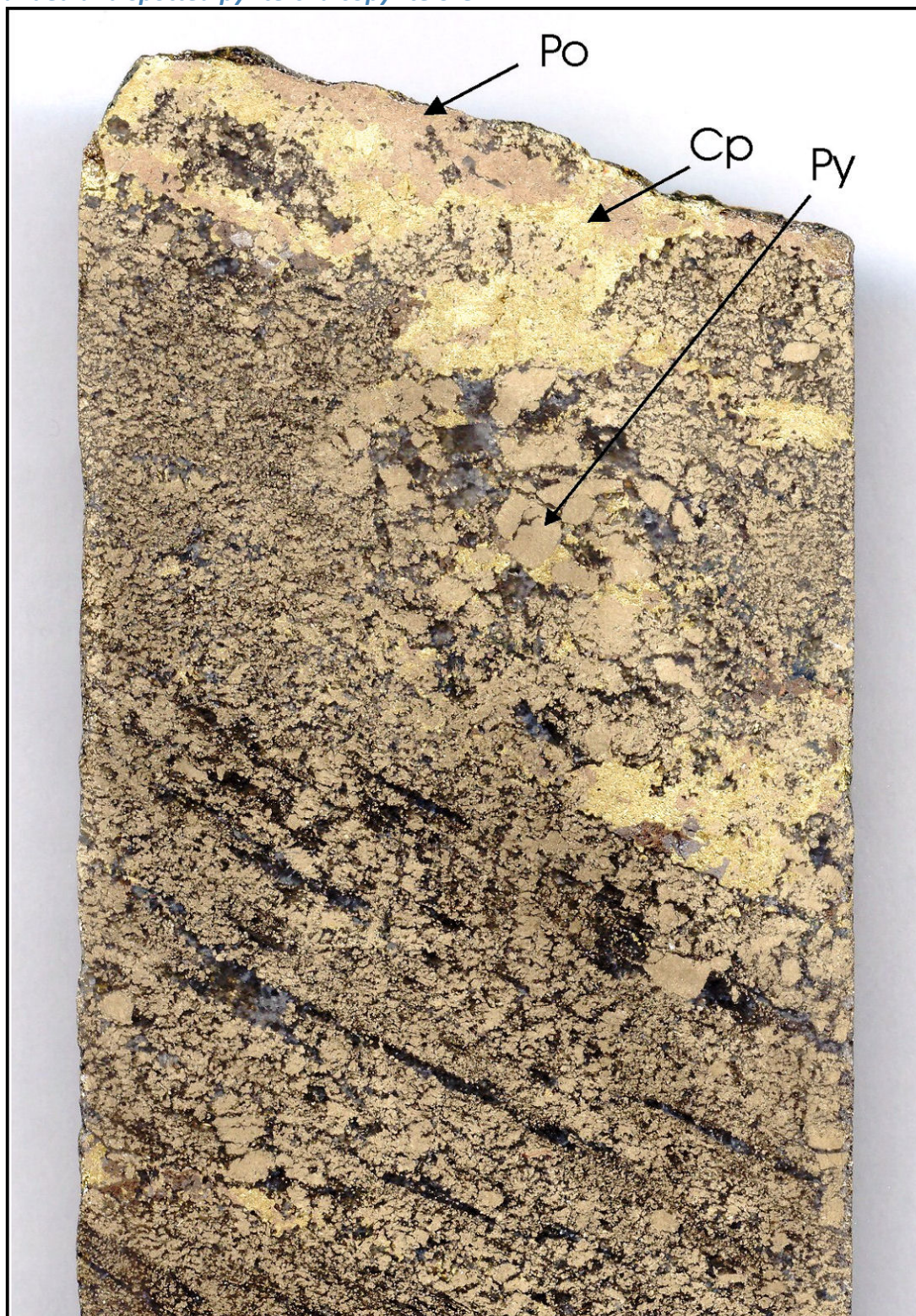
Typical antigorite serpentinite of the Kylälahti massif (di Olu-857/83.90 m). Carbonate is brown and granular, talc brown and flaky and antigorite grey and felty. The large black grain is ferrian chromite. Transmitted, cross-polarized light. Width of the photo is 46 mm. (From Kontinen et al., 2006)

Different ore types of the Kylylahti Cu-Co-Ni deposit:



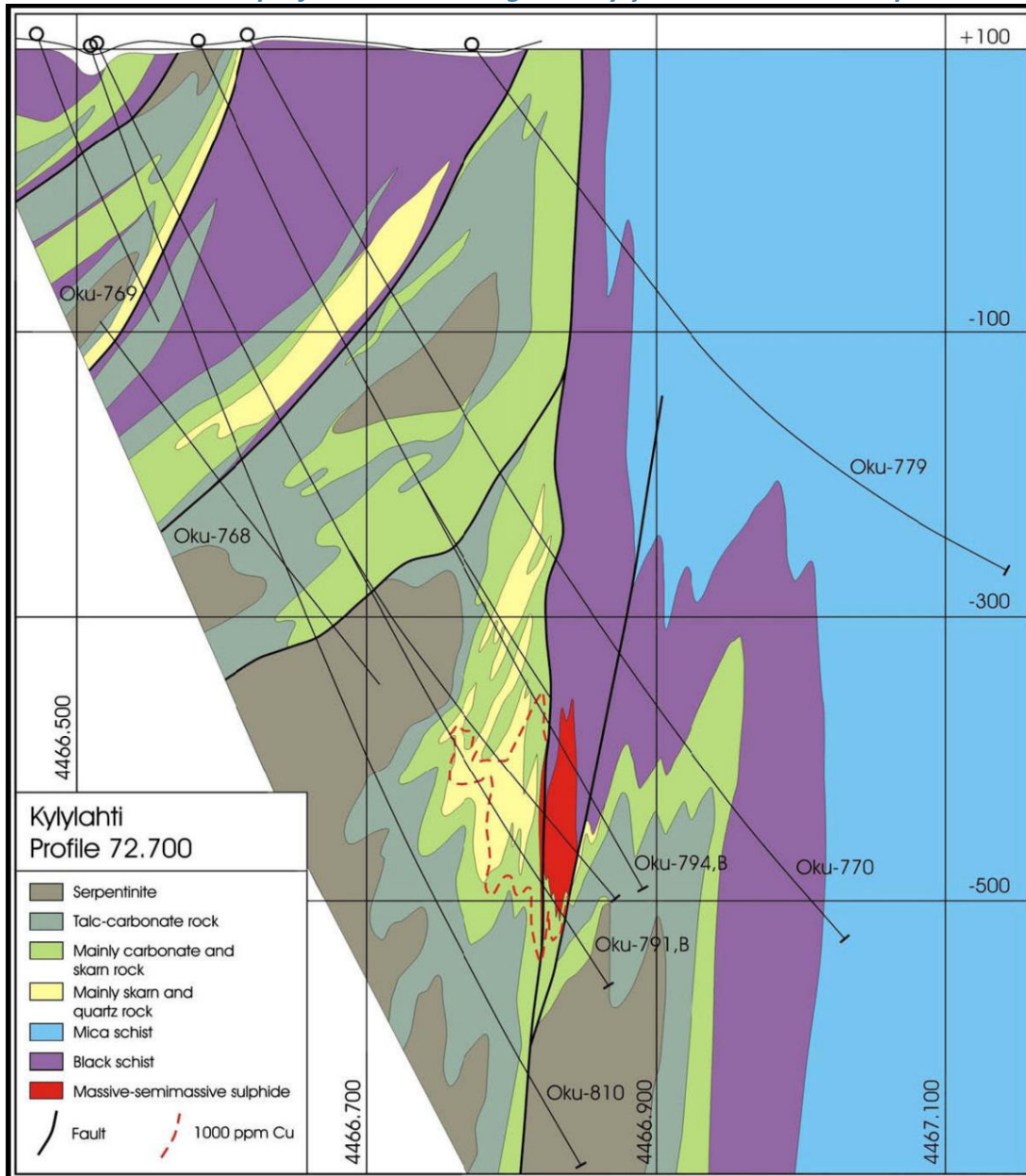
Ore types from Kylylahti: 1. pyrrhotite-magnetite ore with some chalcopyrite and pyrite, 2. large retrograde pyrite idiomorphs in pyrrhotite-chalcopyrite ore, 3. chalcopyrite-pyrrhotite ore in quartz rock. (From Kontinen et al., 2006)

Banded and spotted pyrite-chalcopyrite ore:



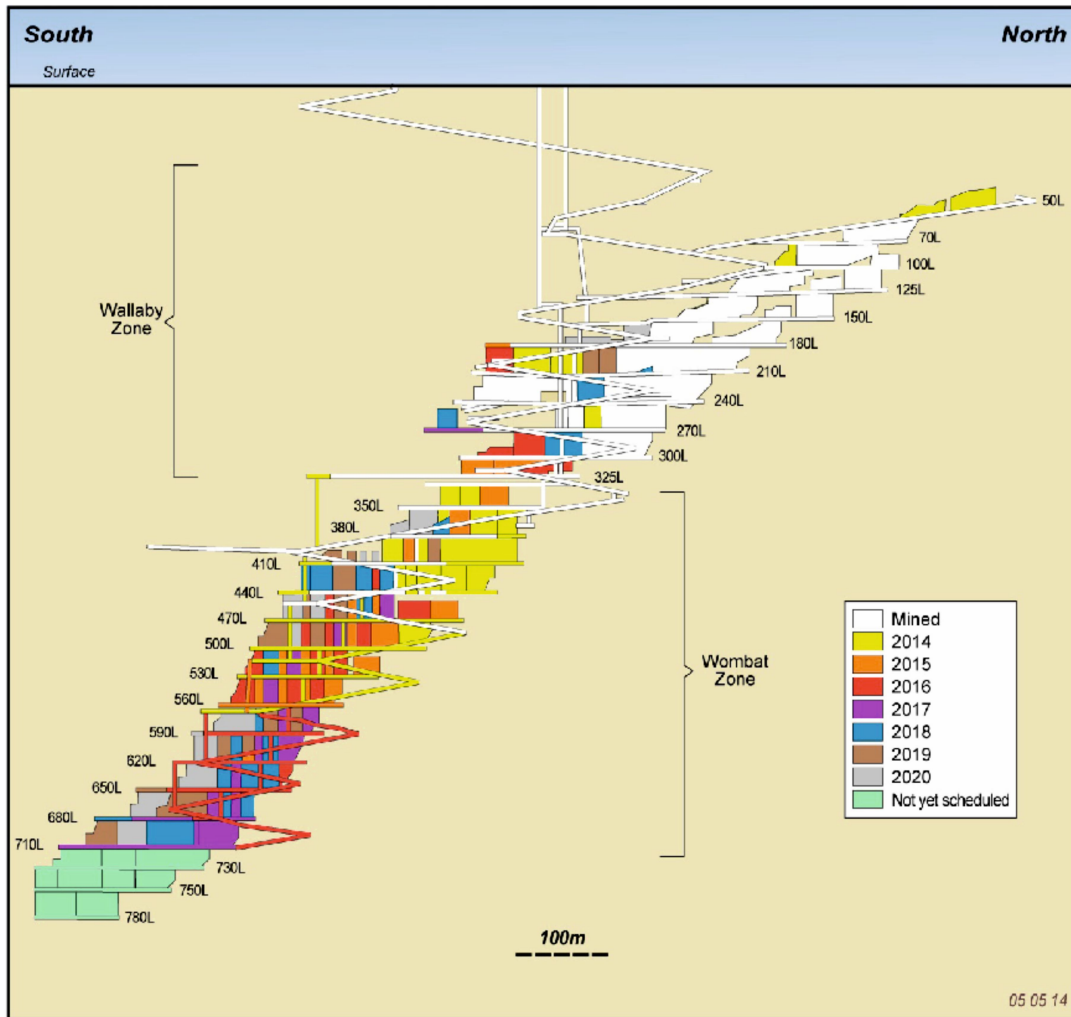
Shear banded spotted pyrite ore. Syntectonic pyrite (Py) spots are replaced by coarse-grained pyrrhotite (Po) and chalcopyrite (Cp). Width of the sample 40 mm.
Modified after Kontinen et al. (2006).

Vertical cross section profile 72.700 through the Kylylahti Cu-Co-Ni-Zn deposit:



Vertical cross section profile 72.700 through the Kylylahti Cu-Co-Ni-Zn deposit. (From Kontinen et al., 2006)

Longitudinal section of the Kylylahti mine showing the mine plan:



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