

# Muusanlammit

**Alternative Names:** Muusanlammet

**Occurrence type:** occurrence

Commodity	Rank	Total measure	Total production	Total resource	Importance
gold	1	NA	NA	NA	NA
copper	2	NA	NA	NA	NA
silver	4	NA	NA	NA	NA

Easting EUREF: 399223

Easting YKI: 3399355

Northing EUREF: 7519512

Northing YKI: 7522654

**Discovery year:** 1948

**Discovered by:** Atri Oy

**Province:** Kittilä (Au, Cu)

**District:** Sirkka (Cu, Au, Ni, Co)

**Comments:** Discovery during the late 1940s when diamond-drilled into a geophysical anomaly. In 1984, re-discovered by Outokumpu: diamond drilling into geophysical and till geochemical anomalies + reanalysis of core drilled in 1970's during base-metal exploration.

**References:** 10

## Mineral deposit type

**Group:** Metallogenic deposit

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

**Sub type 1:** Au-Cu

**Comments:** Pre-gold, syngenetic chalcopyrite-pyrrhotite mineralisation hosted by the graphitic phyllites; this is overprinted by epigenetic, "mesothermal" gold mineralisation.

**References:** 2, 7, 8, 9

## Dimension

**Expression:** NA

**Area (ha):** NA

**Form:** NA

**Dip azim:** NA

**Shape:** NA

**Dip:** NA

**Length (m):** NA

**Plunge azim:** NA

**Width (m):** NA

**Plunge dip:** NA

**Thickness (m):** NA

**Orientation method:** NA

**Depth (m):** NA

## Holder history

**Previous holders:**

Company	Years	Holding type	Comments
Altius Finland Oy	2017-2018	Reservation	NA
Mawson Resources Ltd	2014	Reservation	NA

Magnus Minerals Oy	2011-2012	Claim reservation (old law)	NA
Polar Mining Oy	2007	NA	NA
Björkdalsgruvan Ab	2004-2006	NA	NA
Outokumpu Finnmines Oy	1984-1990	Claim (old law)	NA
Outokumpu Oy	1976-1981	Claim (old law)	NA
Imatran Voima Oy	1959-1963	Claim (old law)	NA
Vuoksenniska Oy	1953-1956	Claim (old law)	NA
Atri Oy	1949-1952	Claim (old law)	NA

## EXPLORATION ACTIVITY

### Outokumpu Oy

Years	Activity type	Geologist	Exploration result	Ref
1984-1990	core drilling	Risto Anttonen, Osmo Inkinen	NA	2, 8
<i>Core drilling (reconnaissance drilling): 6 diamond-drill holes during the years 1984 and 1990.</i>				
<b>Intersections</b>				
	HoleID	NA		
	From-To	NA		
	Length	6,6m		
	gold	2,41ppm		
1983-1990	detailed geochemistry	Risto Anttonen, Osmo Inkinen	NA	4
<i>As, Co, Cu, Ni and U show anomalous values in till, but it remains unknown if these are related to Au.</i>				
1983-1990	detailed geophysics	Risto Anttonen, Osmo Inkinen	NA	2
<i>Magnetic methods show the location of the ultramafic units, and slingram indicates the Fe sulphide-bearing graphitic phyllites.</i>				
1983-1990	excavation	Risto Anttonen, Osmo Inkinen	NA	2, 4, 5, 7, 8, 9, 11

### Geological Survey of Finland

Years	Activity type	Geologist	Exploration result	Ref
1981-1982	regional geochemistry	NA	NA	
<i>Regional geochemical till survey</i>				
1979-1979	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
1975-1975	core drilling	Reino, R	NA	2, 4, 5, 7, 8, 9, 11
<i>Core drilling (reconnaissance drilling): 7 diamond-drill holes, total 912 m.</i>				
<b>Intersections</b>				
	HoleID	ML-1		
	From-To	NA		
	Length	29,9m		
	copper	0,37%		
	Comments	including 1.01 % Cu / 4.94 m		
	HoleID	ML-4		

	From-To	NA
	Length	1,4m
	copper	1,13%

1974-1974	detailed geology	Reino, R	NA	2, 4, 5, 7, 8, 9, 11
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1973-1974	detailed geophysics	Reino, R	NA	2
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1972-1974	detailed geochemistry	Reino, R	NA	4
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## Atri Oy

Years	Activity type	Geologist	Exploration result	Ref
1940-1952	excavation	Birger Ohlsson	NA	2, 3, 7, 8, 9

1940-1952	core drilling	Birger Ohlsson	NA	7, 8, 9
<i>Core drilling (reconnaissance drilling): 16 diamond-drill holes.</i>				
<b>Intersections</b>				
	HoleID	M1		
	From-To	NA		
	Length	2,9m		
	copper	1,1%		

1940-1952	detailed geology	Birger Ohlsson	NA	2, 3, 7, 8, 9
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1940-1952	regional geology	Birger Ohlsson	NA	2, 3, 7, 8, 9
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1940-1952	detailed geophysics	Birger Ohlsson	NA	2
<i>Magnetic methods show the location of the ultramafic units, and slingram indicates the Fe sulphide-bearing graphitic phyllites.</i>				

## GEOLOGY

**Host rock:** Graphite Phyllite, Tuffaceous sandstone, Komatiite

### Graphite Phyllite (Host rock)

**Rock type:** Host rock

**Proportion:** major

**Grain size:** NA

**Color:** NA

**References:** 1, 2, 3, 6, 7, 8, 9

**Comments:** The occurrence comprises quartz-carbonate veins and intensely altered phyllite and intermediate tuffite. The occurrence is in, or next to, intersection between the E-W trending Sirkka Shear Zone and a NE-trending shear zone.

#### Ore minerals:

Mineral	Proportion	Mineral texture
Argentopentlandite	minor	
Arsenopyrite	minor	
Chalcopyrite	minor	
Gersdorffite	minor	
Gold	present	
Graphite	minor	
Ilmenite	minor	
Pentlandite	minor	
Pyrite	major	
Pyrrhotite	minor	
Rutile	minor	

#### Other minerals:

Mineral	Proportion	Mineral texture
Ankerite	present	
Chlorite	present	
Dolomite	present	
Quartz	present	
Sericite	present	
Siderite	present	
Tourmaline	present	

Alteration:	Distribution:	Degree:	Relation to mineralization:
albitic alteration			
<i>Comments: Albitisation and part of carbonation may have preceded gold mineralisation, taken place before regional deformation, as a synvolcanic, spilitic stage of alteration.</i>			
sericitic alteration			
<i>Comments: Sericitisation, sulphidation and part of carbonation, with formation of abundant quartz veins, are probably related to the syn-peak metamorphic gold mineralisation.</i>			
carbonate alteration			

#### 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
<i>Comments: Metamorphic peak during D2, thrusting during D3 was at least partly post-peak, late metamorphic.</i>			

### Geological age:

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

## Tuffaceous sandstone (Host rock)

**Rock type:** Host rock

**Proportion:** major

**Grain size:** NA

**Color:** NA

**References:** 1, 2, 3, 6, 7, 8, 9

### Other minerals:

Mineral	Proportion	Mineral texture
Calcite	present	Alteration product
Chlorite	present	Alteration product
Talc	present	Alteration product

Alteration:	Distribution:	Degree:	Relation to mineralization:
albitic alteration	NA	NA	Syn
<i>Comments: Albitised zones are 1-90 m wide and their lateral and vertical extents are several hundreds of metres.</i>			
sulphidation	NA	NA	Syn
sericitic alteration	NA	NA	Syn
carbonate alteration	NA	NA	Syn

### 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: 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)	1600-2500		N

## Komatiite (Host rock)

**Rock type:** Host rock

**Proportion:** minor

**Grain size:** NA

**Color:** NA

**References:** 1, 2, 3, 6, 9

### 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		

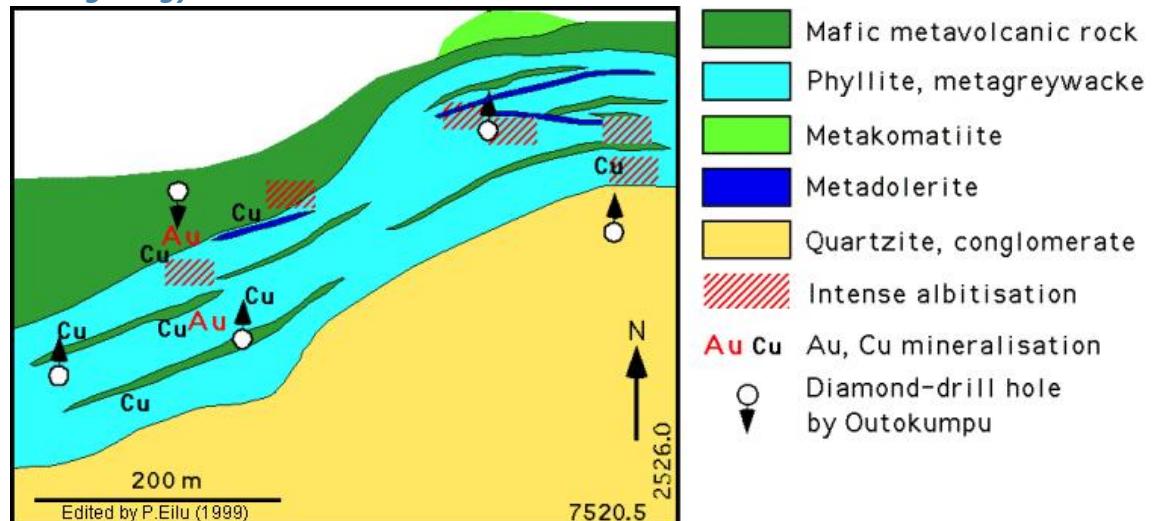
*Comments: Metamorphic peak during D2, thrusting during D3 was at least partly post-peak, late metamorphic.*

### Geological age:

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

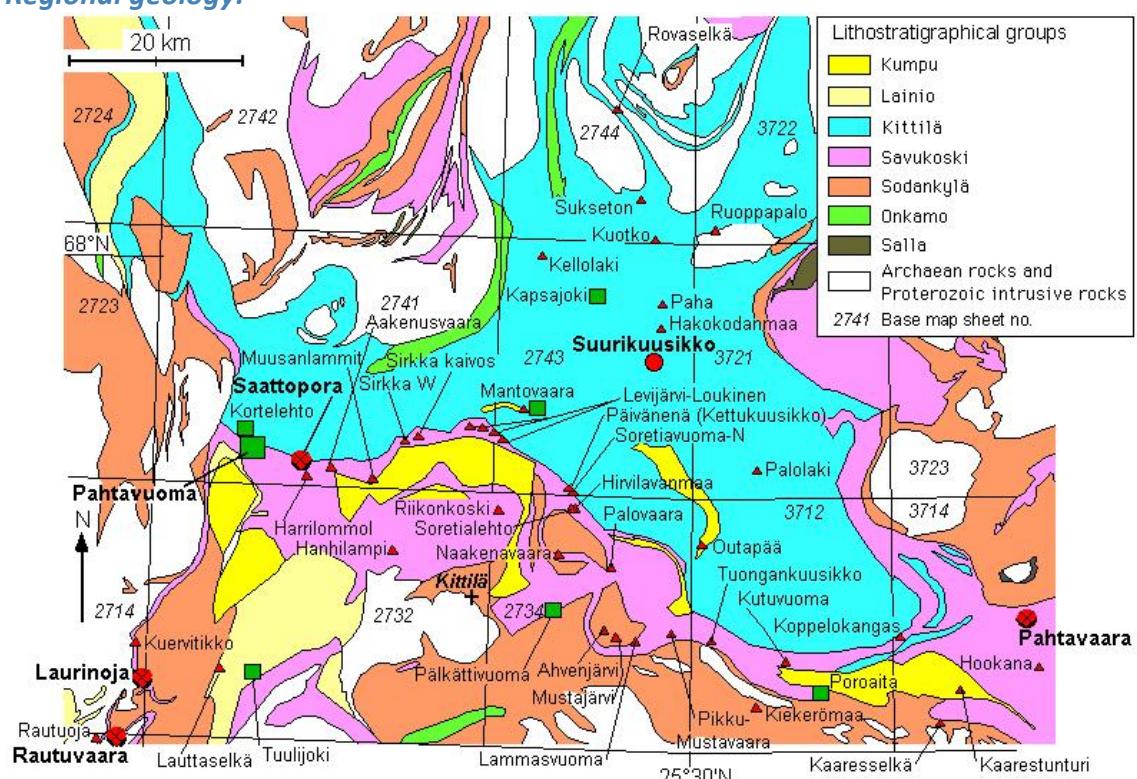
## Figures

### Local geology:



Geology at Muusanlammit. Modified from Roos (1987).

**Regional geology:**



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