Pahkalampi

Alternative Names: Tormua 6, Lauttalampi
Occurence type: deposit

Commodity	Rank	Total measure	Total production	Total resource	Importance
gold	1	2,06 t	NA	2,06 t	Small deposit

Easting EUREF: 619176,349
Northing EUREF: 7240616,675
Easting YKJ: 3619397
Northing YKJ: 7243647

Discovery year: 1996
Discovered by: Geological Survey of Finland
Province: Kuhmo (Ni, Ag, Au)
District: Tormua (Au)
Comments: Discovery by GTK: a tiny mineralised outcrop found during exploration for base metals at Moukkori. This led to extensive ground geophysical and till geochemical surveys in the region. The Pahkalampi deposit was detected by driling into a till geochemical anomaly. First indication for gold in the region were the auriferous glacial erratics found by an amateur prospector in 1989.
References: 3, 4, 6, 9, 10, 13, 14, 15

Mineral deposit type

Group: Metallogenic deposit
Main type: Orogenic (metamorphic hydrothermal)
Comments: Orogenic "mesothermal" deposit, formed during D3 deformation at peak-metamorphic 5 kbar and 600°C or under slightly lower temperature, during late-Archaean cratonisation.
References: 5

Dimension

Expression: exposed
Form: discordant
Shape: NA
Length (m): NA
Width (m): NA
Thickness (m): NA
Depth (m): NA
Area (ha): NA
Dip azim: NA
Dip: 80
Plunge azim: 25
Plunge dip: 60
Orientation method: NA
Dimension comments: The deposit comprises several subparallel, narrow lodes. The resource estimate only covers one of the lodes.

Holder history

Current holder: Mineral Exploration Network (Suomi) Oy
Years: 2023
Holding type: Application for exploration permit

Previous holders:

Company	Years	Holding type	Comments
Geological Survey of Finland	NA	NA	NA
Endomines Oy	-2005	NA	NA
Otso Gold Oy	2013	Application for exploration permit	NA
Nordic Mines AB	2005-2013	Claim (old law)	NA

EXPLORATION ACTIVITY

Geological Survey of Finland

Years	Activity type	Geologist	Exploration result	Ref
1996-1996	regional geophysics	Erkki Luukkonen	key geological features	
	Low-altitude airborne magnetic, electromagnetic and radiometric survey			

1990-1997	detailed geophysics	Erkki Luukkonen	geophysical anomaly	1, 2, 5, 7, 12
	ground magnetic, slingram, VLF-R, total intensity and IP survey			

1990-2001	regional geochemistry	Markku Tenhola	geochemical anomaly	
	Greenstone belt-wide till-geochemical survey with 16 damples per one sq.km			

1990-1997	ore beneficiation tests	Erkki Luukkonen	NA	1, 2, 5, 7, 12

1990-1997	core drilling	Erkki Luukkonen	mineralized zone identified	5, 10
	The Pahkalampi deposit was detected by driling into a till geochemical anomaly; Core drilling (reconnaissance drilling): 34 diamond-drill holes, total 3804 m, and 8 RC holes, total 446 m.			
	Intersections			
	HoleID	NA		
	From-To	NA		
	Length	16,6m		
	gold	1,4ppm		
	HoleID	NA		
	From-To	NA		
	Length	1m		
	gold	61,5ppm		
	HoleID	NA		
	From-To	NA		
	Length	1m		
	gold	7,8ppm		
	HoleID	NA		
	From-To	NA		
	Length	1m		
	gold	18,1ppm		
	HoleID	NA		
	From-To	NA		
	Length	1m		
	gold	12ppm		
	HoleID	NA		
	From-To	NA		
	Length	1m		
	gold	45,1ppm		

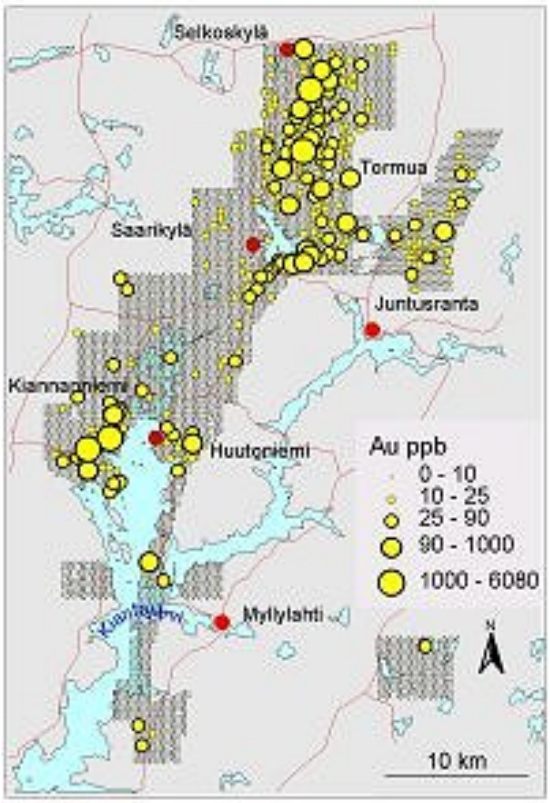
1990-1997	detailed geology	Erkki Luukkonen	key geological features	1, 2, 5, 7, 12
	A tiny mineralised outcrop found during exploration for base metals at Moukkori. This led to extensive ground geophysical and till geochemical surveys in the region.			

1990-1997	excavation	Erkki Luukkonen	key geological features	1, 2, 5, 7, 12

1987-1987	regional geochemistry	Markku Tenhola	geochemical anomaly	1, 2, 4, 5, 7, 12
	Country-wide till-geochemical survey			

Figures

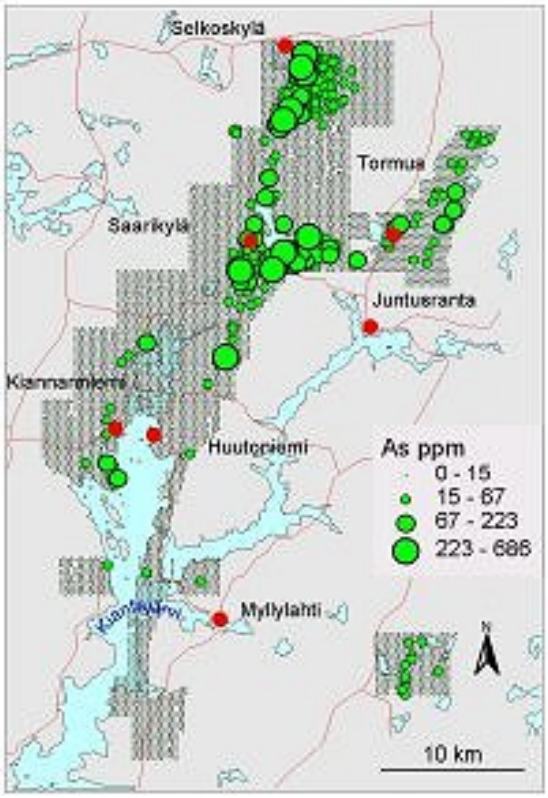
Suomussalmi greenstone belt: aeromagnetic image and gold occurrences:

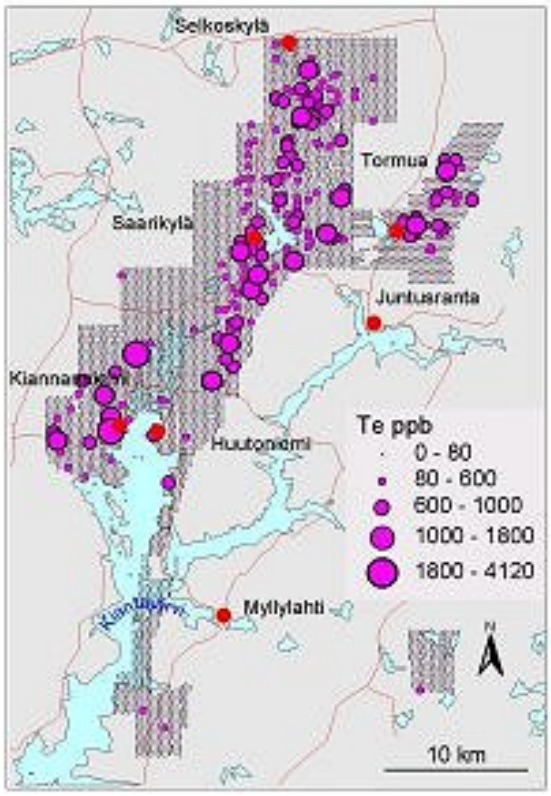


Suomussalmi greenstone belt

As, Au and Te in till

(Luukkonen et al. 2002)





RESOURCES AND RESERVES

Most recent

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Nordic Mines AB	2007	NA	Non-compliant resource estimate	8
	Comments: The resource estimate only covers one of the lodes.				
	Category:	**Inferred mineral resource**			
	Tonnage:	**0,59 Mt**			
	gold	3,5 ppm			
	Cutoff:	**NA**			

Previous calculations

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Endomines Oy	2003	NA	JORC code	11
	Category:	**Inferred mineral resource**			
	Tonnage:	**0,2 Mt**			
	gold	3 ppm			
	Cutoff:	**NA**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Endomines Oy	2003	NA	JORC code	11
	Category:	**Indicated mineral resource**			
	Tonnage:	**0,05 Mt**			
	gold	5,6 ppm			
	Cutoff:	**gold 2 ppm**			
	Category:	**Inferred mineral resource**			
	Tonnage:	**0,2 Mt**			
	gold	3 ppm			
	Cutoff:	**gold 2 ppm**			
	Category:	**Indicated and inferred mineral resource**			
	Tonnage:	**0,25 Mt**			
	gold	3,5 ppm			
	Cutoff:	**gold 2 ppm**			

Type:	Company:	Year:	Date:	Calc Method:	Reference:
Resource	Geological Survey of Finland	1997	NA	NA	5, 7
	Comments: Possibly, several lodes - the resource estimate only includes one lode				
	Category:	**Indicated mineral resource**			
	Tonnage:	**0,05 Mt**			
	gold	5,5 ppm			
	Cutoff:	**NA**			

GEOLOGY

Host rock: Amphibolite, Granitic rock, Uralite porphyrite
Wall rock: Mica schist

Amphibolite (Host rock)

Rock type: Host rock
Proportion: major
Grain size: NA
Color: NA
References: 1, 5
Comments: The deposit is in the Tormua Schist Belt which forms the NE part of the late Archaean Suomussalmi Greenstone Belt and is in the rocks of the 3.0-2.8 Ga Luoma Group of the greenstone belt. It is in a second-order D3 fault zone. Abundant auriferous quartz veins

Ore minerals:

Mineral	Proportion	Mineral texture
Bismuth	minor	Dissemination
Calaverite	minor	Dissemination
Chalcopyrite	minor	Dissemination
Cobaltite	minor	Dissemination
Electrum	minor	Dissemination
Frohbergite	minor	Dissemination
Galena	minor	Dissemination
Gold	minor	Dissemination
	Native gold is intergrown with tellurides; Au also in gold tellurides; gold and tellurides are commonly as inlusions in pyrite, pyrrhotite, quartz, albite and K feldspar. In addition, there are free gold grains with silicates. Grain size of gold is <15 um, generally <5 um, but significantly coarser gold may occur in quartz veins.	
Hessite	minor	Dissemination
Ilmenite	minor	Dissemination
Löllingite	minor	Dissemination
Petzite	minor	Dissemination
Pyrite	minor	Dissemination
Pyrrhotite	major	Dissemination
Rutile	minor	Dissemination
Sphalerite	minor	Dissemination
Tellurobismuthite	minor	Dissemination
Volynskite	minor	Dissemination

Other minerals:

Mineral	Proportion	Mineral texture
Biotite	present	
K-Feldspar	present	
Plagioclase	present	
Quartz	present	
Scheelite	present	
Titanite	present	
Tourmaline	present	

Textures

Granoblastic

Alteration:	Distribution:	Degree:	Relation to mineralization:
epidote alteration	NA	NA	NA
sericitic alteration	Disseminated	NA	Syn
Comments: Proximal alteration assemblage: plagioclase-hornblende-quartz-epidote-titanite			

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	-5	-600
Comments: Post-mineralisation D4 deformation					

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Mesoarchean (3200-2800 Ma)	2800-3000		N

Granitic rock (Host rock)

Rock type: Host rock
Proportion: minor
Grain size: NA
Color: NA
References: 5
Comments: Tourmaline-bearing granitoid. TTG granitoids, from 2739±8 Ma to 2697±10 Ma of age, are abundant within and near the greenstone belt. The ca. 2700 Ma granitoids (syn-D3) have intruded into the supracrustal sequence, so 2.70 Ga may be the age of this rock, too.

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	-5	-600

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Neoarchean (2800-2500 Ma)	2700-2740		N

Uralite porphyrite (Host rock)

Rock type: Host rock
Proportion: minor
Grain size: NA
Color: NA

References: 5
Comments: Abundant auriferous quartz veins

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	-5	-600

Geological age:

Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Mesoarchean (3200-2800 Ma)	2800-3000		N

Mica schist (Wall rock)

Rock type: Wall rock
Proportion: minor
Grain size: NA
Color: NA
References: 5

Metamorphic description:

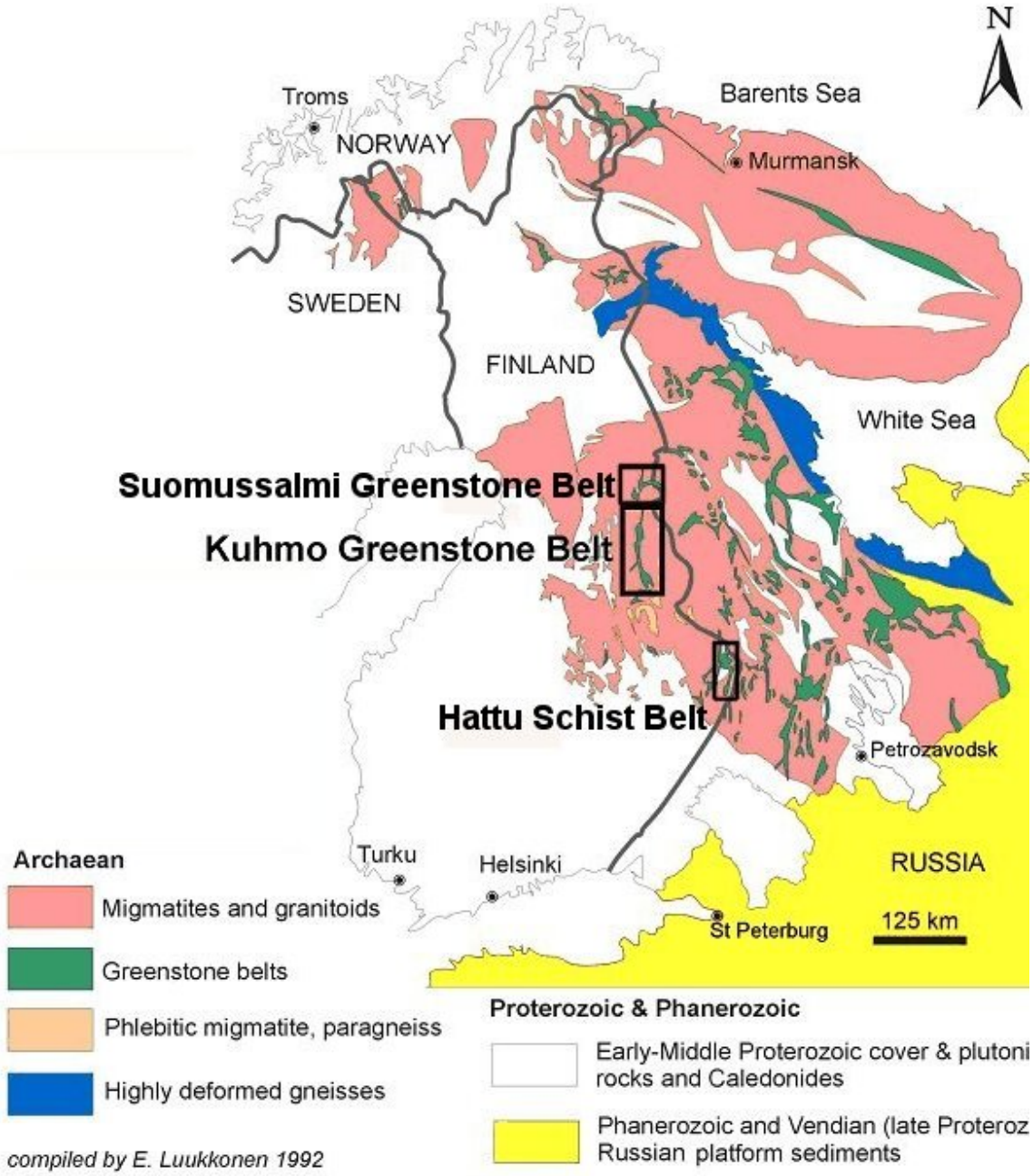
Type:	Facies:	Degree:	Relation to mineralization:	Min P- Max P (kbar)	MIn T- Max T (°C)
Regional	amphibolite metamorphic facies	medium metamorphic grade	NA	-5	-600

Geological age:

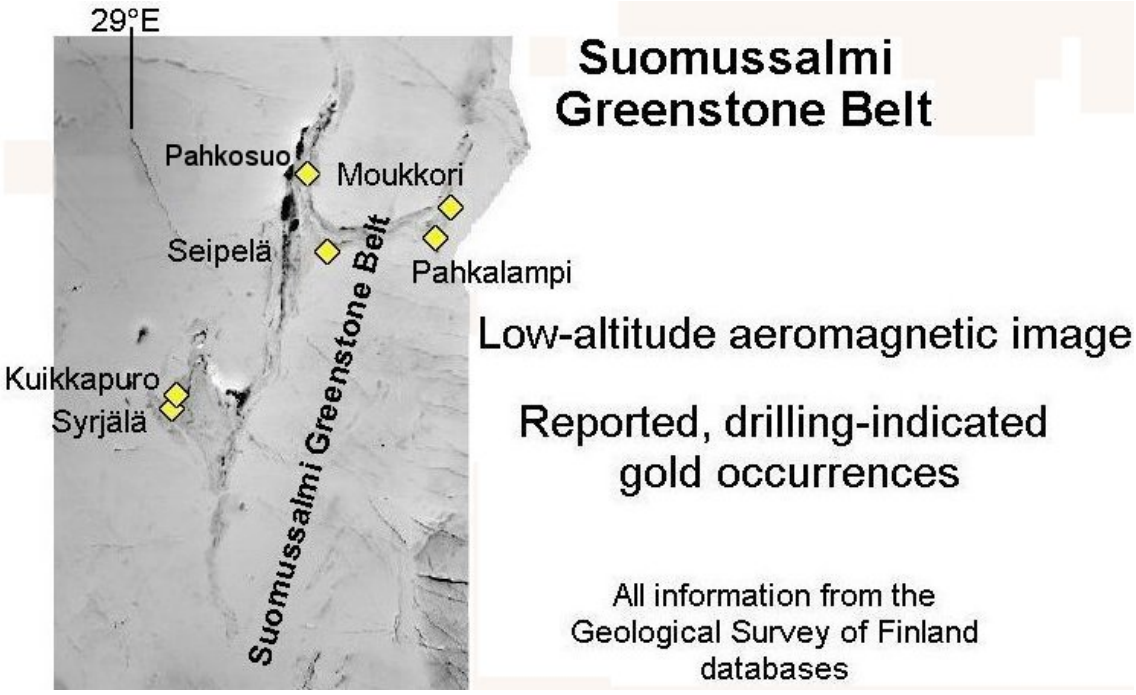
Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Mesoarchean (3200-2800 Ma)	2800-3000		N

Figures

East Finland greenstone belts in the Archaean of Fennoscandia:



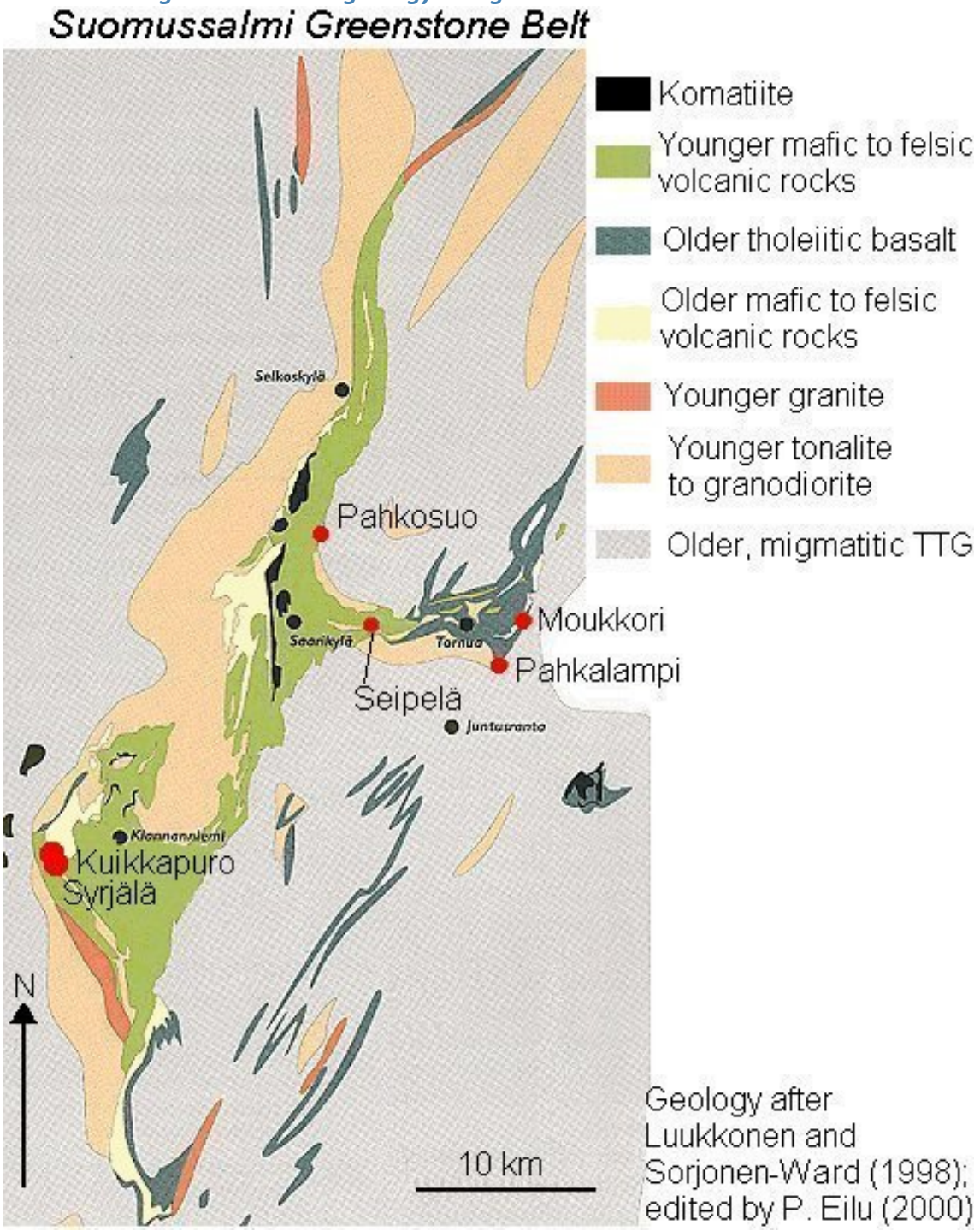
Suomussalmi greenstone belt: aeromagnetic image and gold occurrences:



3D model of the Pahkalampi deposit:

Pahkalampi, Suomussalmi Greenstone Belt. Drilling at and a 3D model of the deposit. Green: mineralisation with 0.5 ppm cut off, red: mineralisation with 2.0 ppm cutoff grade. Parkkinen (2001) 500 m from corner to corner in the model block.

Suomussalmi greenstone belt geology and gold occurrences:



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