

Syrjälä

Alternative Names: Kuohusuo, Syrjä

Occurrence type: prospect

Commodity	Rank	Total measure	Total production	Total resource	Importance
gold	1	0,19 t	NA	0,19 t	Occurrence

Easting EUREF: 596064,694

Northing EUREF: 7225705,686

Easting YKJ: 3596276

Northing YKJ: 7228730

Discovery year: 1995

Discovered by: Geological Survey of Finland

Province: Kuhmo (Ni, Ag, Au)

District: Tormua (Au)

Comments: The first indications were a regional Au anomaly in till and an auriferous sample from a glacial erratic boulder, found by an amateur prospector; further indications were the high Au, As and Te concentrations detected by percussion drilling into till-bedrock interface; the deposit was detected by drilling

References: 1, 3, 4, 6, 7, 9, 10, 11

Mineral deposit type

Group: Metallogenic deposit

Main type: Orogenic (metamorphic hydrothermal)

Comments: Orogenic "mesothermal" deposit with a distinct structural control and having formed under amphibolite-facies conditions, formed during late-Archaean cratonisation.

References: 8

Dimension

Expression: exposed

Form: discordant

Shape: irregular

Length (m): NA

Width (m): 12

Thickness (m): NA

Depth (m): 100

Area (ha): NA

Dip azimuth: 45

Dip: 65

Plunge azimuth: NA

Plunge dip: NA

Orientation method: NA

Dimension comments: Three lodes, one at Syrjälä N and two at Syrjälä S, The S lode is in a contact zone between mafic and intermediate volcanic rocks. The N lode is 1-4 m thick, is open at 70 m depth.

Holder history

Current holder: Kalevala Gold Oy

Years: 2020

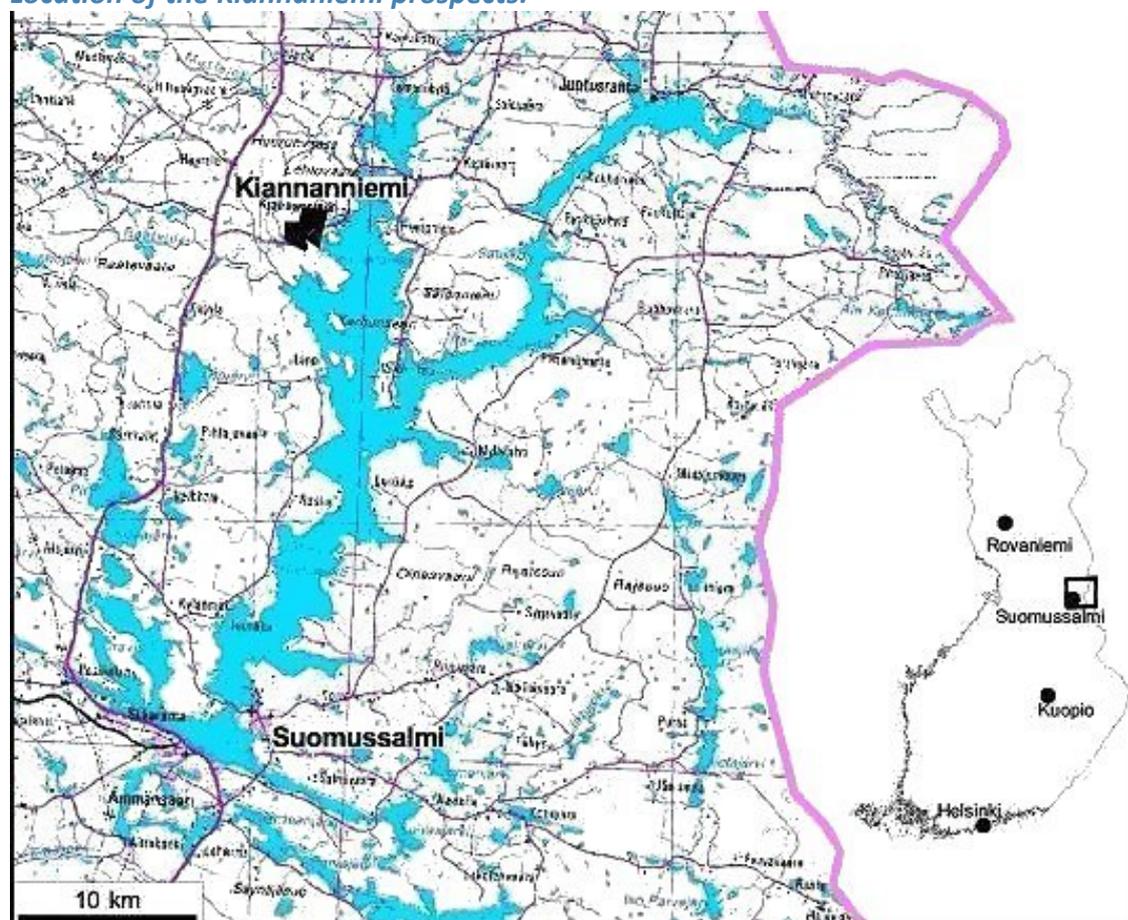
Holding type: Application for exploration permit

Previous holders:

Company	Years	Holding type	Comments
Kalevala Gold Oy	2013-2020	Application for exploration permit	NA
Polar Mining Oy	2003-2006	NA	NA
Outokumpu Oy	2001-2003	NA	NA
Geological Survey of Finland	1996-2001	NA	NA

Figures

Location of the Kiannaniemi prospects:



Roads (purple), lakes and rivers (blue) and railway (black line to the W of Suomussalmi town). From Pietikäinen et al. (2001).

EXPLORATION ACTIVITY

Mineral Exploration Network (Finland) Limited

Years	Activity type	Geologist	Exploration result	Ref
2013-2016	detailed geophysics	NA	geophysical anomaly	3, 7
<i>Ground magnetic and IP surveys in the Syrjälä Project area</i>				
2013-2016	detailed geochemistry	NA	geochemical anomaly	3, 7
<i>Till geochemical survey in the Syrjälä Project area</i>				

Polar Mining Oy

Years	Activity type	Geologist	Exploration result	Ref
2003-2006	detailed geochemistry	Jukka Jokela	geochemical anomaly	5
<i>Extensive Au-Te anomaly in till.</i>				

Geological Survey of Finland

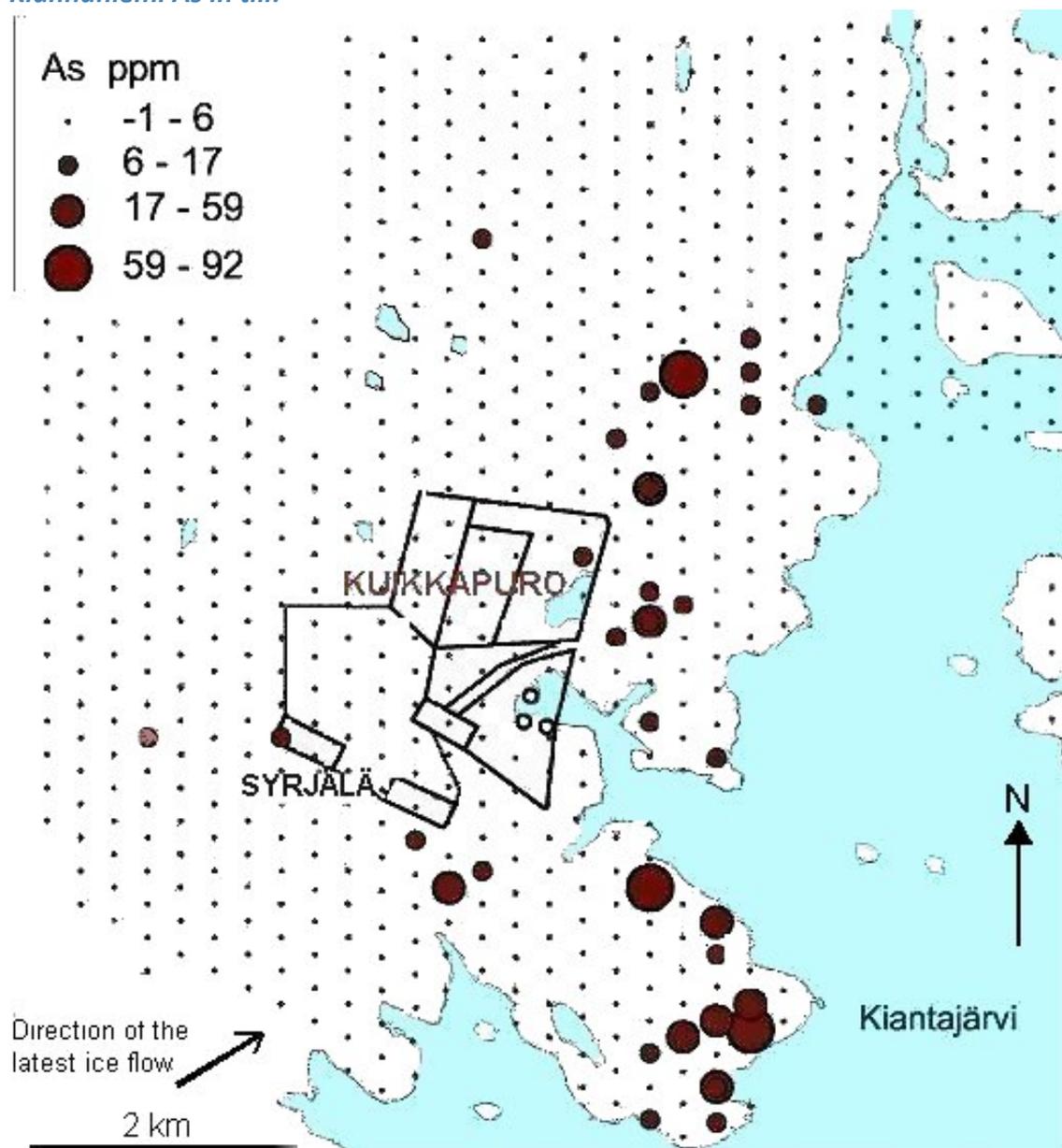
Years	Activity type	Geologist	Exploration result	Ref
1996-1998	percussion drilling	Erkki Luukkonen, Kimmo Pietikäinen.	NA	2, 5, 9, 10
<i>High Au, As and Te concentrations detected by percussion drilling into till-bedrock interface.</i>				
1996-1999	core drilling	Erkki Luukkonen, Kimmo Pietikäinen.	NA	5, 10, 12
<i>41 diamond-drill holes, total 3133 m.</i>				
Intersections				
	HoleID	R318		
	From-To	24-25		
	Length	1m		
	gold	5,2ppm		
	Comments	<i>Syrjälä N</i>		
	HoleID	R318		
	From-To	25-26		
	Length	1m		
	gold	2,9ppm		
	Comments	<i>Syrjälä N</i>		
	HoleID	R321		
	From-To	33,3-34,3		
	Length	1m		
	gold	12,7ppm		
	Comments	<i>Syrjälä S</i>		
	HoleID	R328		
	From-To	17,1-18,1		
	Length	1m		

	gold	2,5ppm
	<i>Comments</i>	<i>Syrjälä N</i>
	HoleID	R335
	From-To	29-30
	Length	1m
	gold	85,7ppm
	<i>Comments</i>	<i>Syrjälä S</i>
	HoleID	R343
	From-To	94,8-95,8
	Length	1m
	gold	3,9ppm
	<i>Comments</i>	<i>Syrjälä S</i>
	HoleID	NA
	From-To	NA
	Length	0,2m
	gold	57ppm

1995-1998	detailed geophysics	Erkki Luukkonen, Kimmo Pietikäinen.	geophysical anomaly	10
	<i>Magnetic, slingram and IP ground survey. The IP indicated the pyrite-rich horizons and ground-magnetic survey possible shear or fault zones; no specific response by slingram.</i>			
1995-1998	detailed geology	Erkki Luukkonen, Kimmo Pietikäinen.	key geological features	2, 5, 9, 10
1995-1997	detailed geochemistry	Kimmo Pietikäinen	geochemical anomaly	
	<i>First indications were a regional Au anomaly in till and an auriferous sample from a glacial erratic boulder.</i>			
1990-2001	regional geochemistry	Markku Tenhola	geochemical anomaly	
	<i>Greenstone belt-wide till-geochemical survey with 16 damples per one sq.km</i>			
1987-1987	regional geochemistry	Markku Tenhola	geochemical anomaly	5
	<i>Country-wide till-geochemical survey</i>			
1977-1977	regional geophysics	NA	key geological features	2, 5, 9, 10
	<i>Low-altitude airborne magnetic, electromagnetic and radiometric survey</i>			

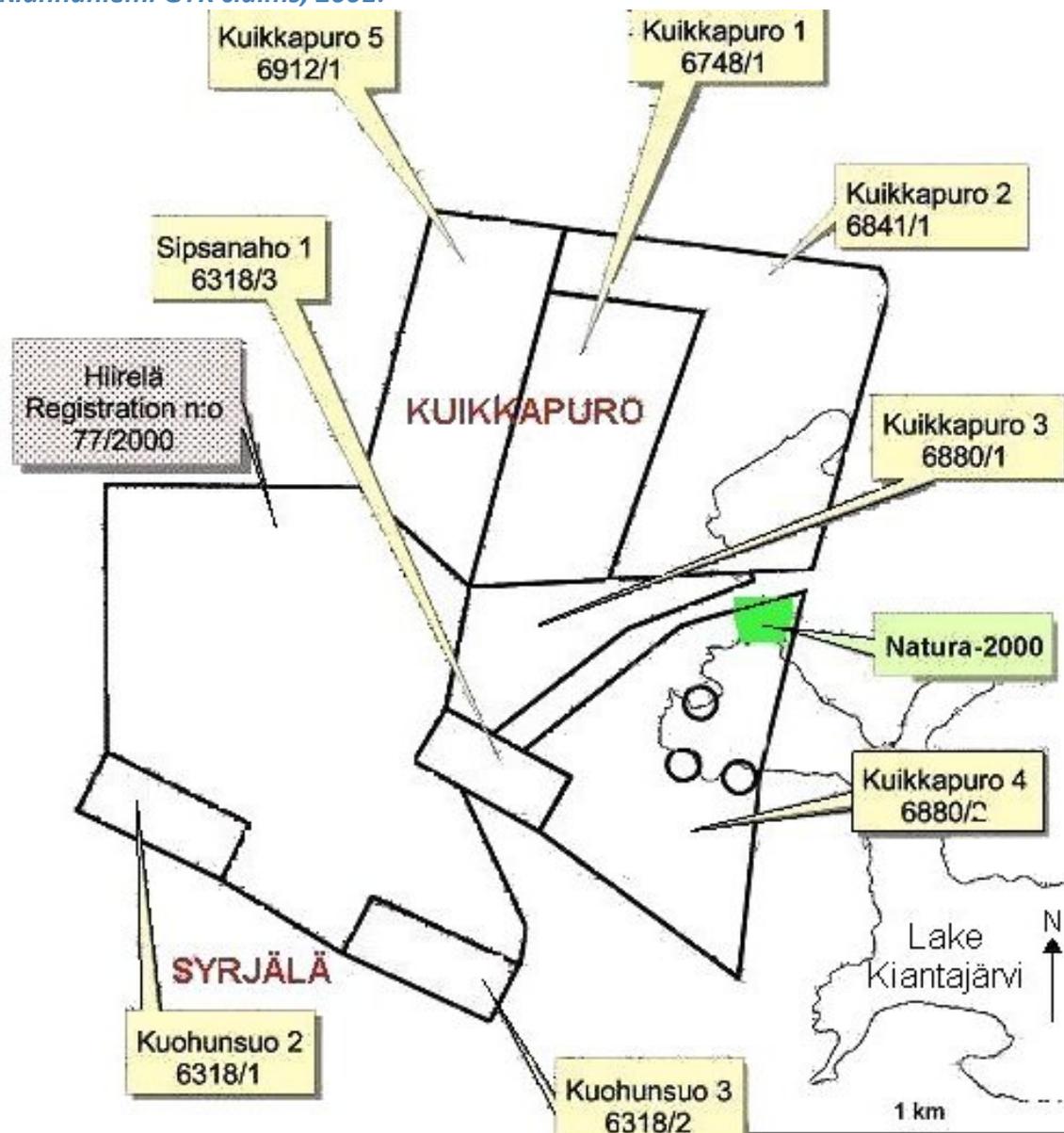
Figures

Kiannaniemi As in till:



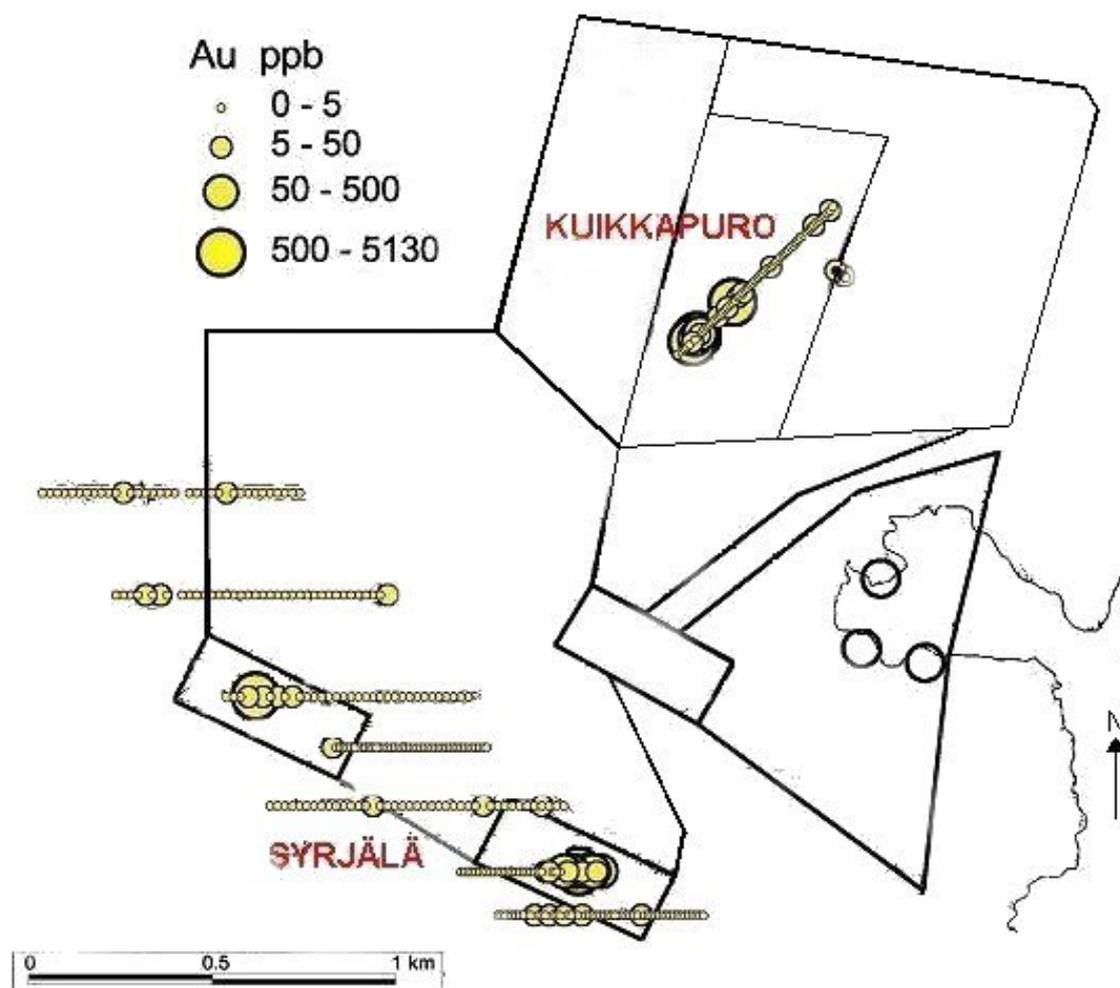
Arsenic in basal till in the Kiannaniemi area. Also the claim boundaries are indicated. From Pietikäinen et al. (2001)

Kiannaniemi GTK claims, 2001:



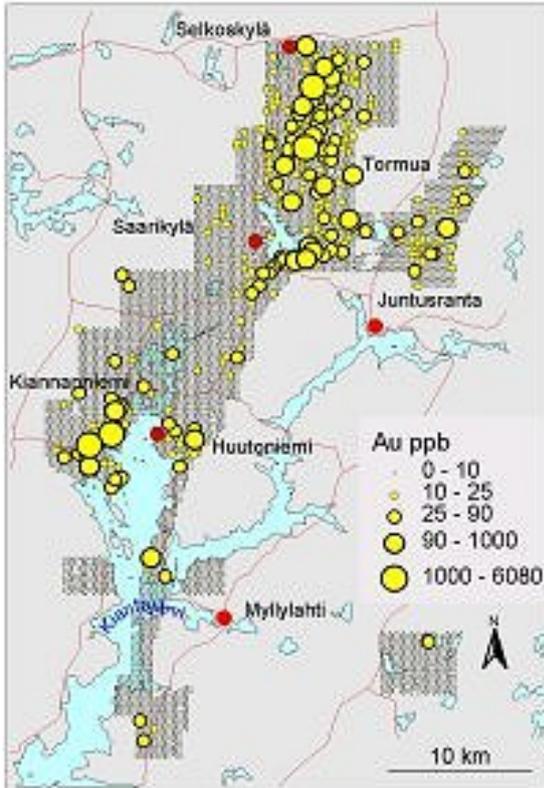
Location map for exploration claims in the Kiannaniemi area.
From Pietikäinen et al. (2001).

Kuikkapuro-Syrjälä: Au in till-bedrock interface:



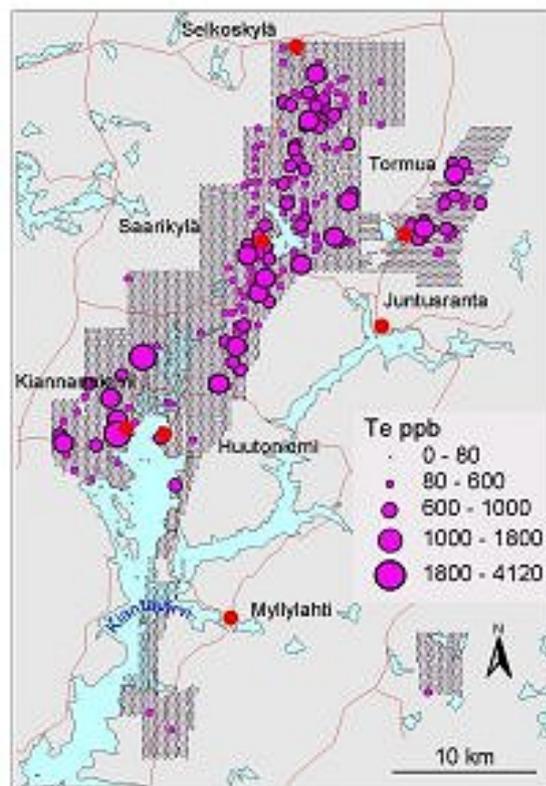
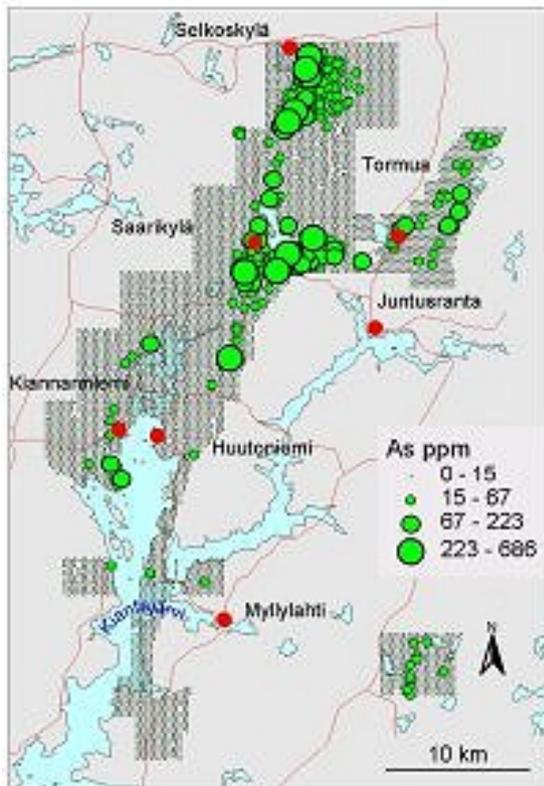
Gold in the till-bedrock interface in the Kiannanniemi area. Also the claim boundaries are indicated. From Pietikäinen et al. (2001)

Suomussalmi greenstone belt: As, Au and te in basal till:



**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	Geological Survey of Finland	2000	NA	Non-compliant resource estimate	10
<i>Comments: Syrjäla South only</i>					
Category:		Poorly estimated mineral resource, poorly documented			
Tonnage:		90000 t			
gold		1,15 ppm			
Cutoff:		gold 0,5			
Category:		Poorly estimated mineral resource, poorly documented			
Tonnage:		147000 t			
gold		1,305 ppm			
Cutoff:		gold 0,5			
Category:		Poorly estimated mineral resource, poorly documented			
Tonnage:		57000 t			
gold		1,55 ppm			
Cutoff:		gold 0,5			

GEOLOGY

Host rock: Intermediate volcanic rock, Mafic volcanic rock, Quartz vein, Felsic volcanic rock, Komatiite, Uralite porphyrite

Intermediate volcanic rock (Host rock)

Rock type: Host rock

Proportion: major

Grain size: NA

Color: NA

References: 5, 10

Comments: The mineralisation is in the rocks of the 2.8-2.7 Ga(?) Saarikylä Group of the greenstone belt. It is in a sequence dominated by mafic and intermediate metavolcanic rocks, dipping at 65°, with minor metakomatiitic units, in a contact zone between mafic and intermediate to felsic units, in an overturned antiform.

Ore minerals:

Mineral	Proportion	Mineral texture
Arsenopyrite	major	
Gold	minor	
Pyrite	major	
Pyrrhotite	major	

Other minerals:

Mineral	Proportion	Mineral texture
Biotite	present	
Hornblende	present	Alteration product
Plagioclase	present	Alteration product
Quartz	present	
Scheelite	present	
Sericite	present	
Tourmaline	present	

Structures

Tuff

Textures

Mylonitic

Blastoclastic

Alteration:	Distribution:	Degree:	Relation to mineralization:
sericitic alteration	NA	NA	NA
<i>Comments: Alteration halo extends for 0-70 m laterally away from ore-grade rock.</i>			
biotite alteration	NA	NA	NA
<i>Comments: Alteration halo extends for 0-70 m laterally away from ore-grade rock.</i>			

Geological age:

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

Mafic volcanic rock (Host rock)

Rock type: Host rock

Proportion: minor

Grain size: NA

Color: NA

References: 5, 10

Comments: The mineralisation is in a sequence dominated by mafic and intermediate metavolcanic rocks, with minor metakomatiitic units.

Textures

Porphyroblastic

Geological age:

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

Quartz vein (Host rock)

Rock type: Host rock

Proportion: minor

Grain size: NA

Color: NA

References: 5

Comments: Auriferous, deformed, quartz carbonate veins and barren, almost undeformed, quartz veins

Felsic volcanic rock (Host rock)

Rock type: Host rock

Proportion: minor

Grain size: NA

Color: NA

References: 5, 10

Geological age:

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

Komatiite (Host rock)

Rock type: Host rock

Proportion: minor

Grain size: NA

Color: NA

References: 5, 10

Geological age:

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

Uralite porphyrite (Host rock)

Rock type: Host rock

Proportion: minor

Grain size: NA

Color: NA

References: 5, 10

Textures

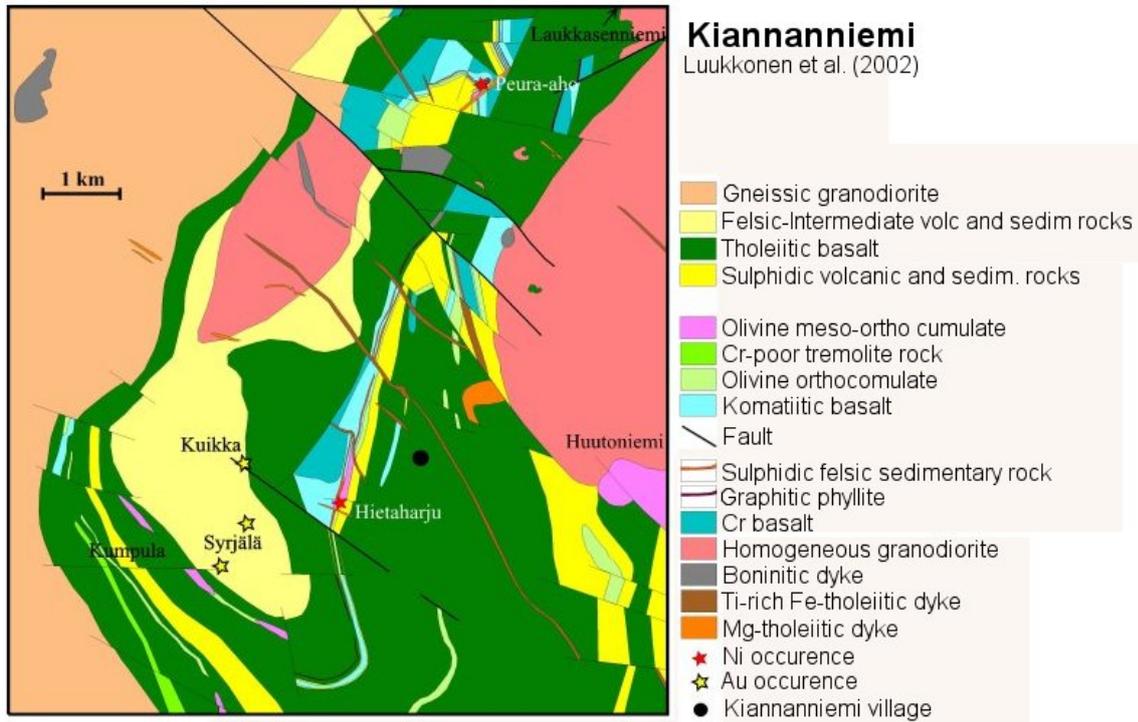
Porphyroblastic

Geological age:

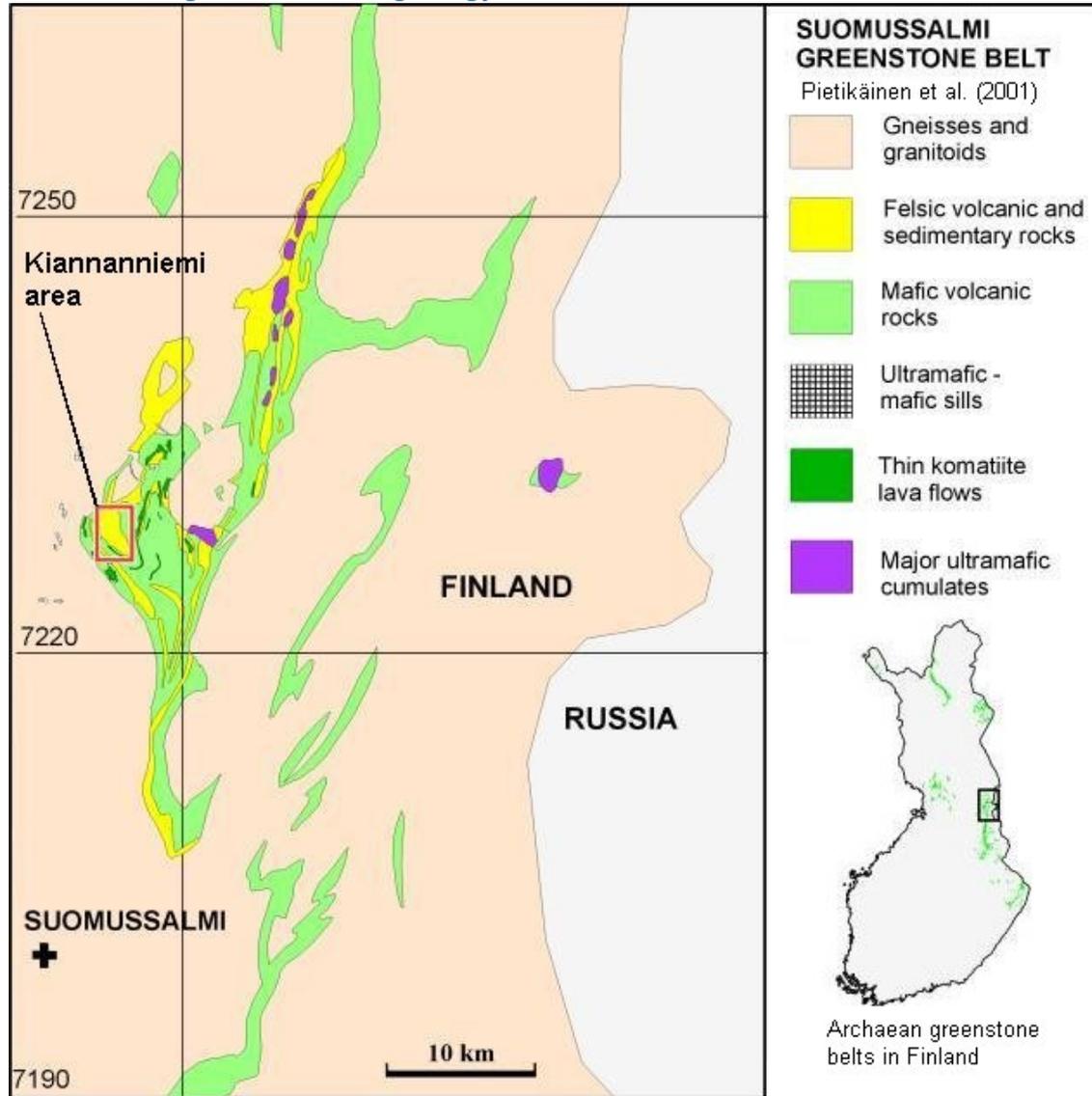
Geological era:	Max age - Minage (Ma):	Inferred age (Ma):	Age of mineralization:
Neoproterozoic (2800-2500 Ma)	2700-2800		N

Figures

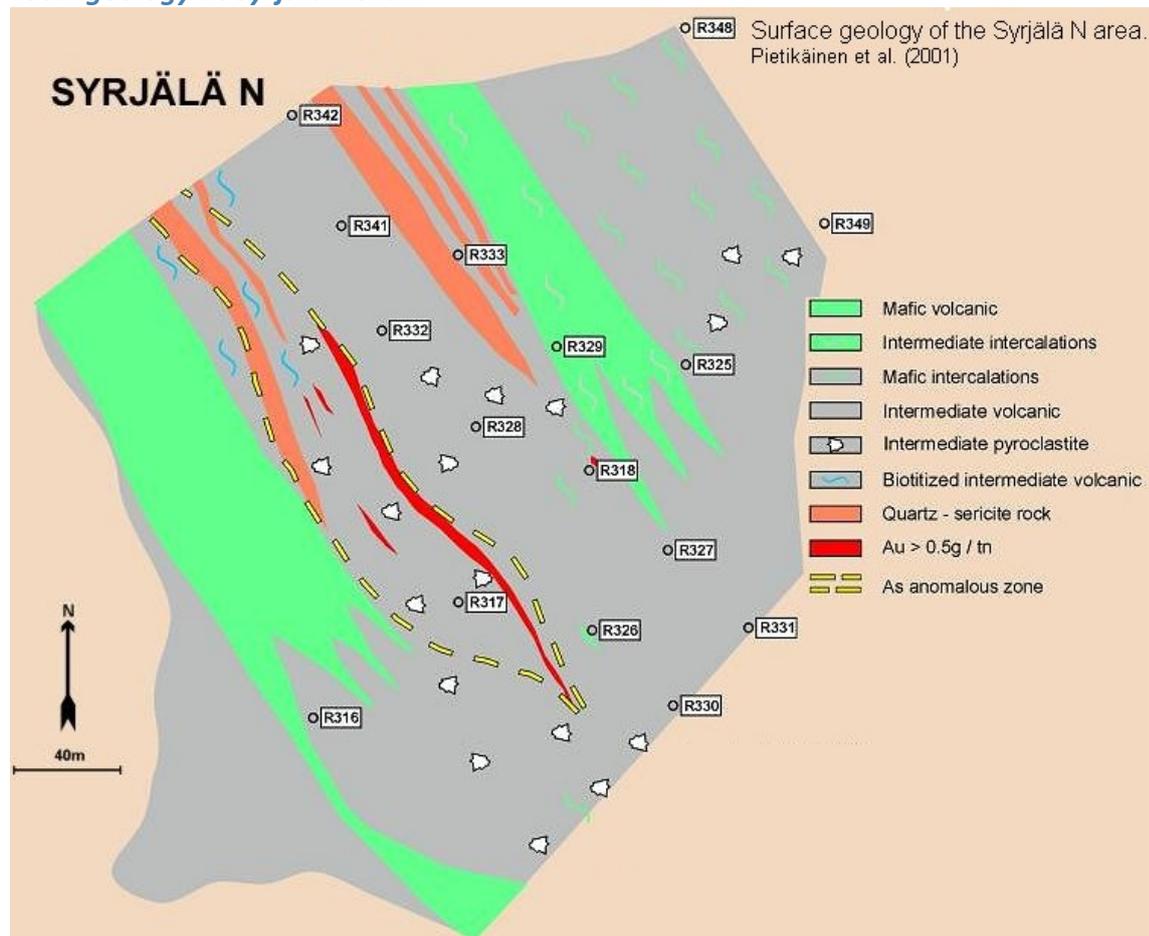
Kiannanniemi area geology, gold and nickel occurrences:



Suomussalmi greenstone belt geology:



Local geology at Syrjälä North:

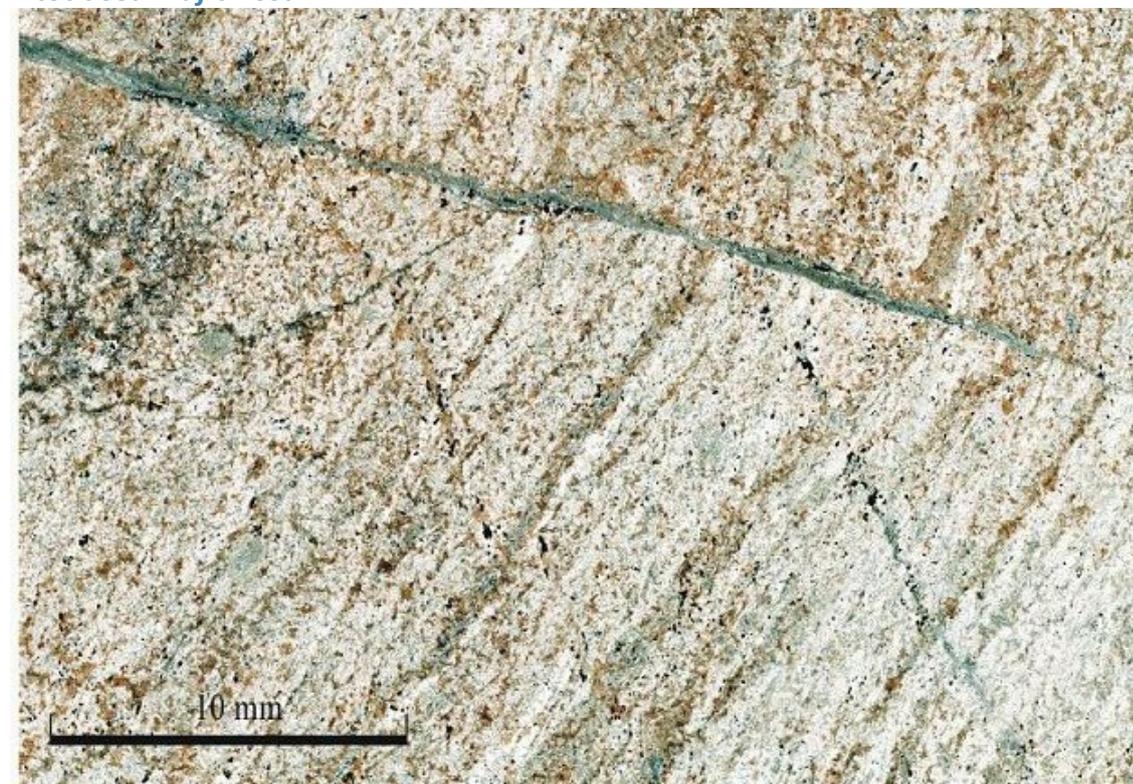


Unaltered host mafic rock:



Kuikkapuro: unaltered mafic host rock. From Pietikäinen et al. (2001)

Bitotitised mafic host:



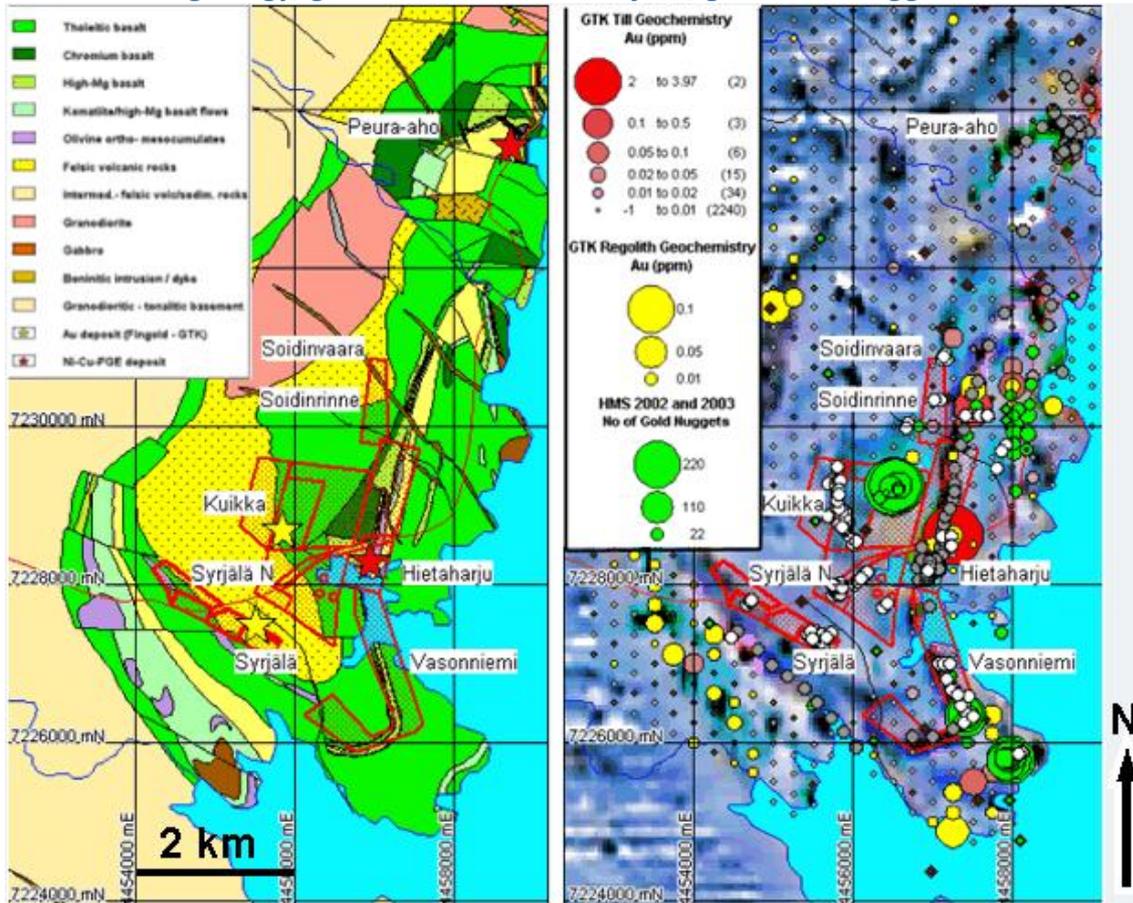
Photomicrograph of biotite alteration zone, R361/16.00m, at Kuikkapuro, Suomussalmi. From Pietikäinen et al. (2001).

Garnet-biotite altered mafic host:



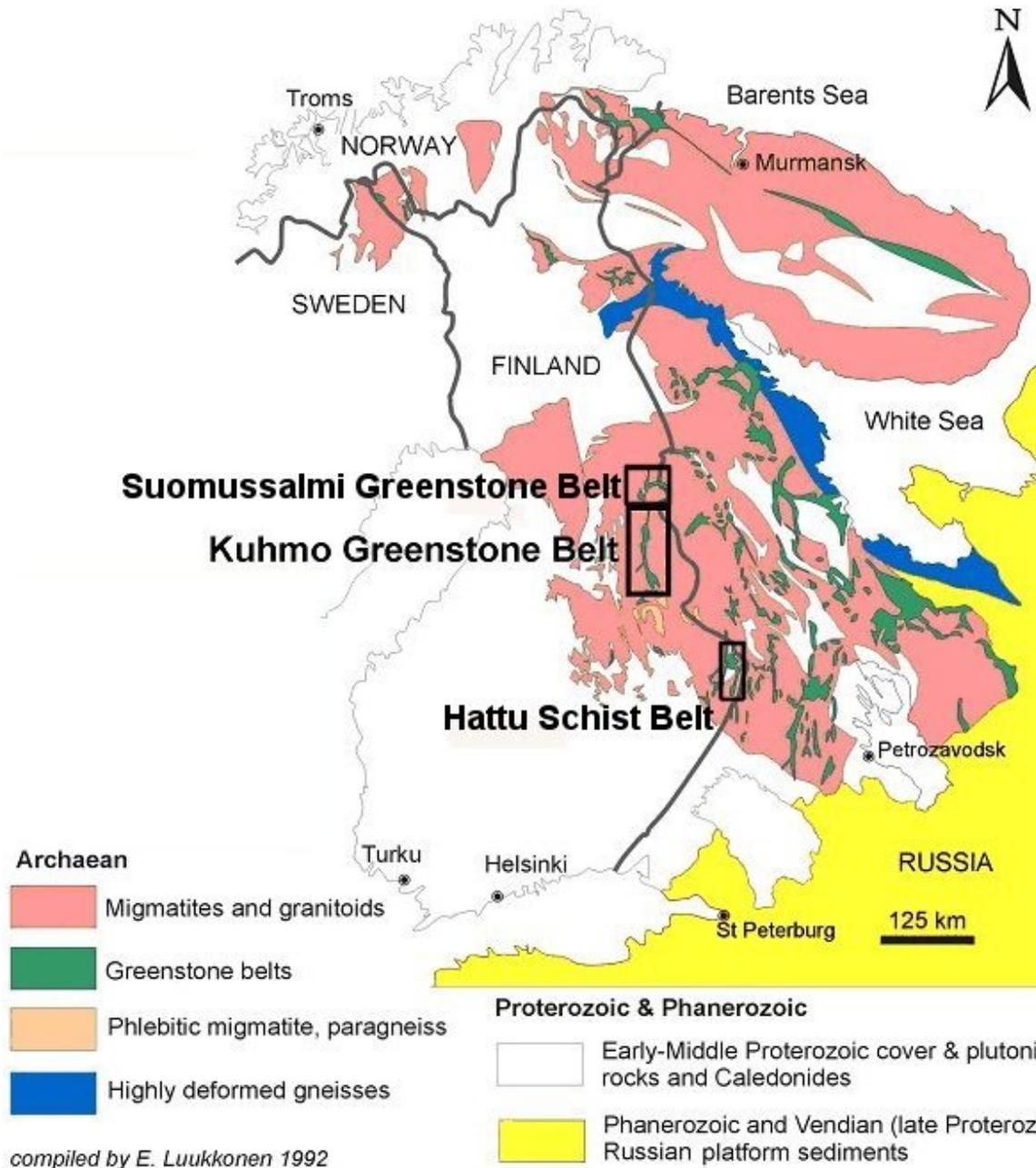
Photomicrograph of garnet-biotite alteration zone towards the west of the Kuikkapuro deposit.
From Pietikäinen et al. (2001).

Kiannaniemi: geology, gold at till-bedrock interface, gold micro nuggets in till:



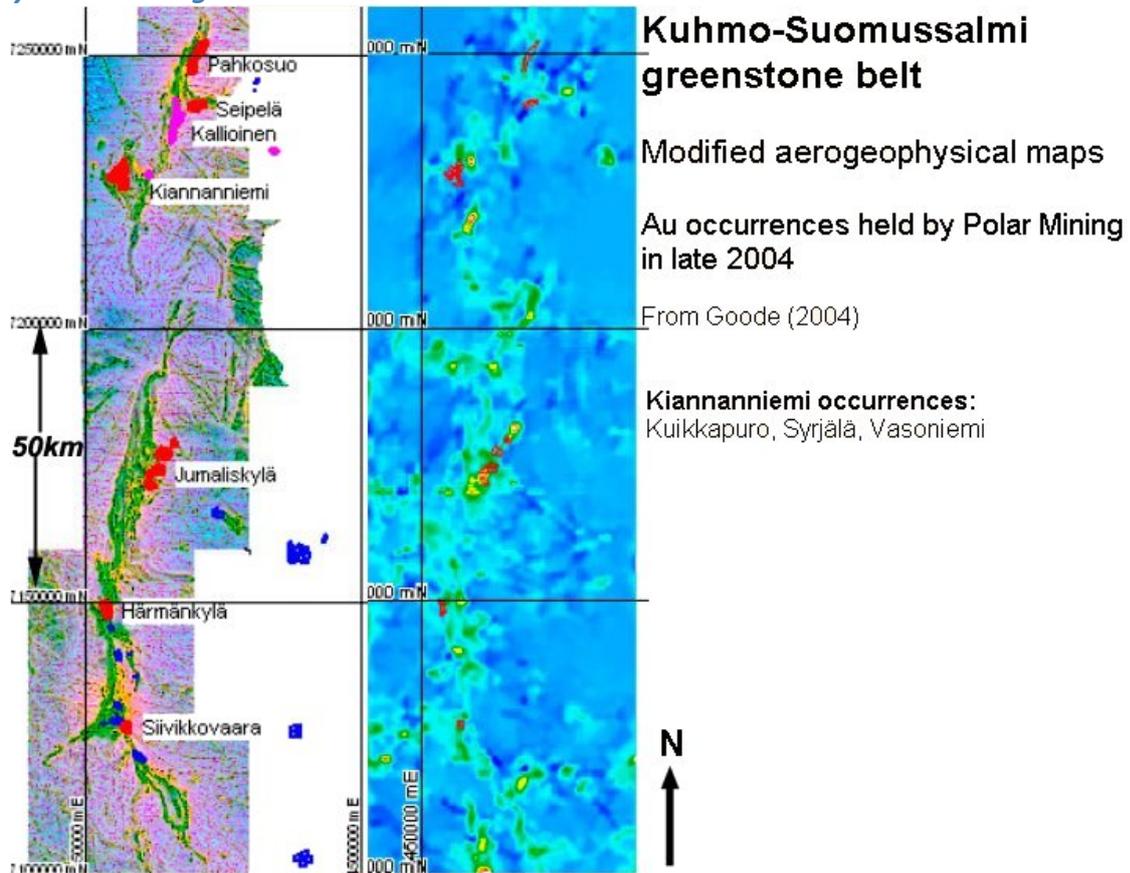
Kiannaniemi area: geology on left, till and regolith geochemistry and gold nuggets in till on right. Three known gold occurrences in the area are: Syrjälä, Vasonniemi, and Kuikkapuro (= Kuikka in the map). From Goode 2004.

East Finland greenstone belts in the Archaean of Fennoscandia:



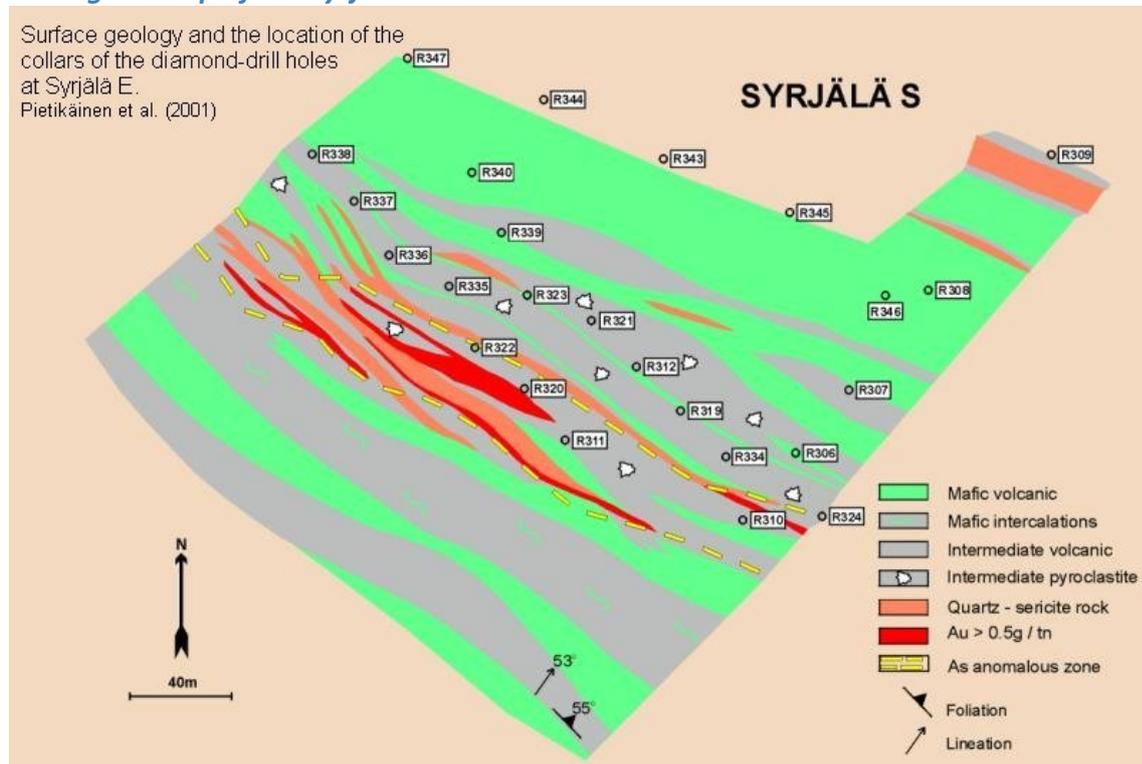
Kuhmo and Suomussalmi greenstone belts: processed aerogeophysics and tenements held

by Polar Mining in 2004:

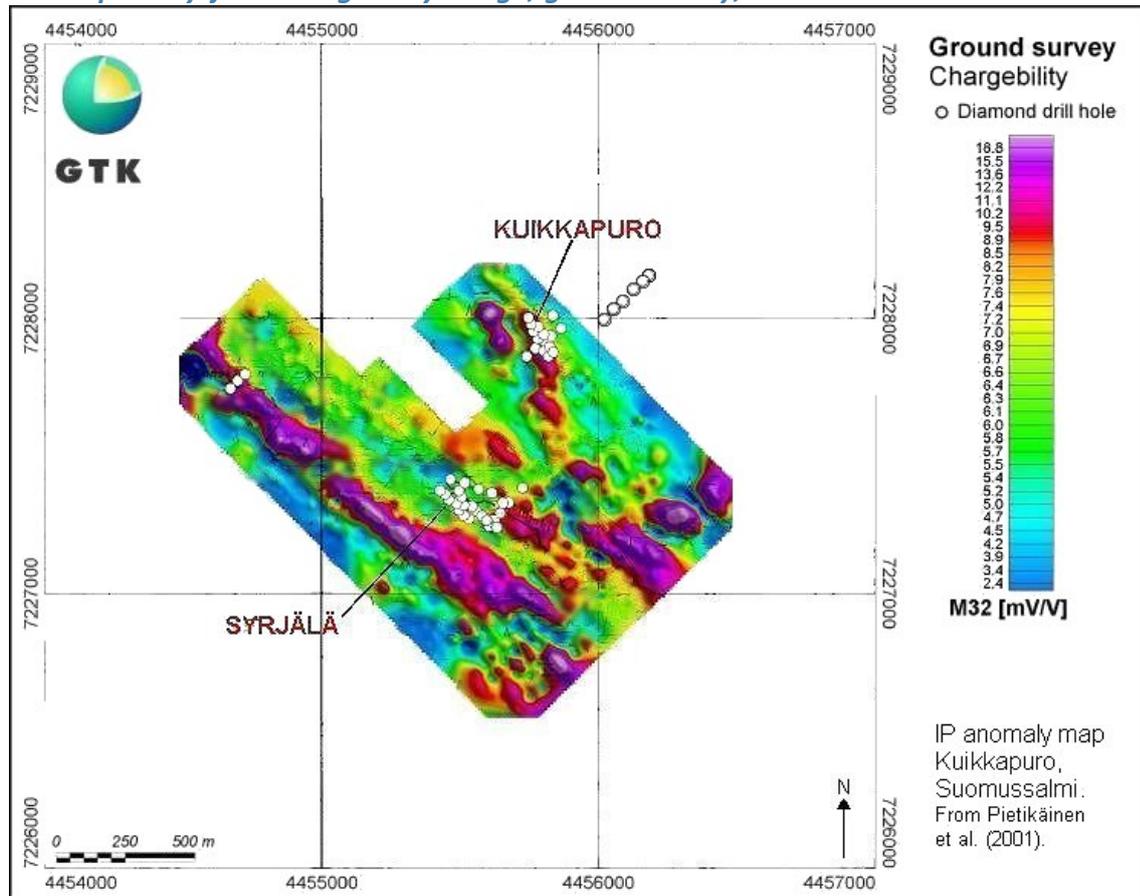


Geological map of the Syrjälä South:

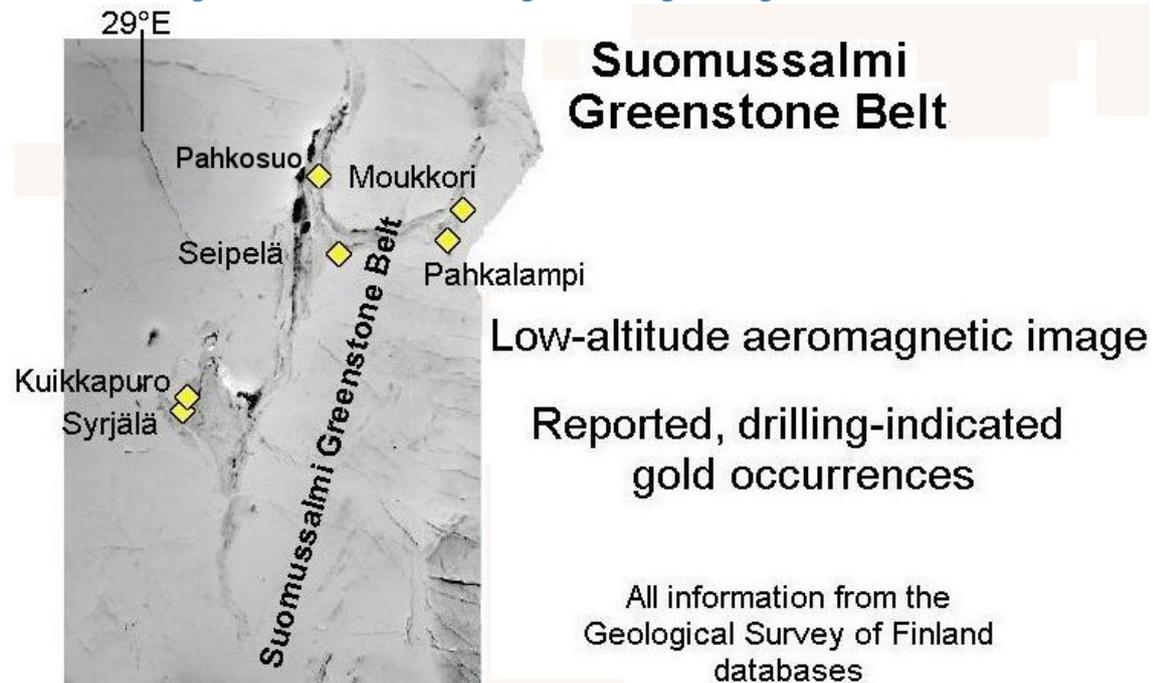
Surface geology and the location of the collars of the diamond-drill holes at Syrjälä E.
Pietikäinen et al. (2001)



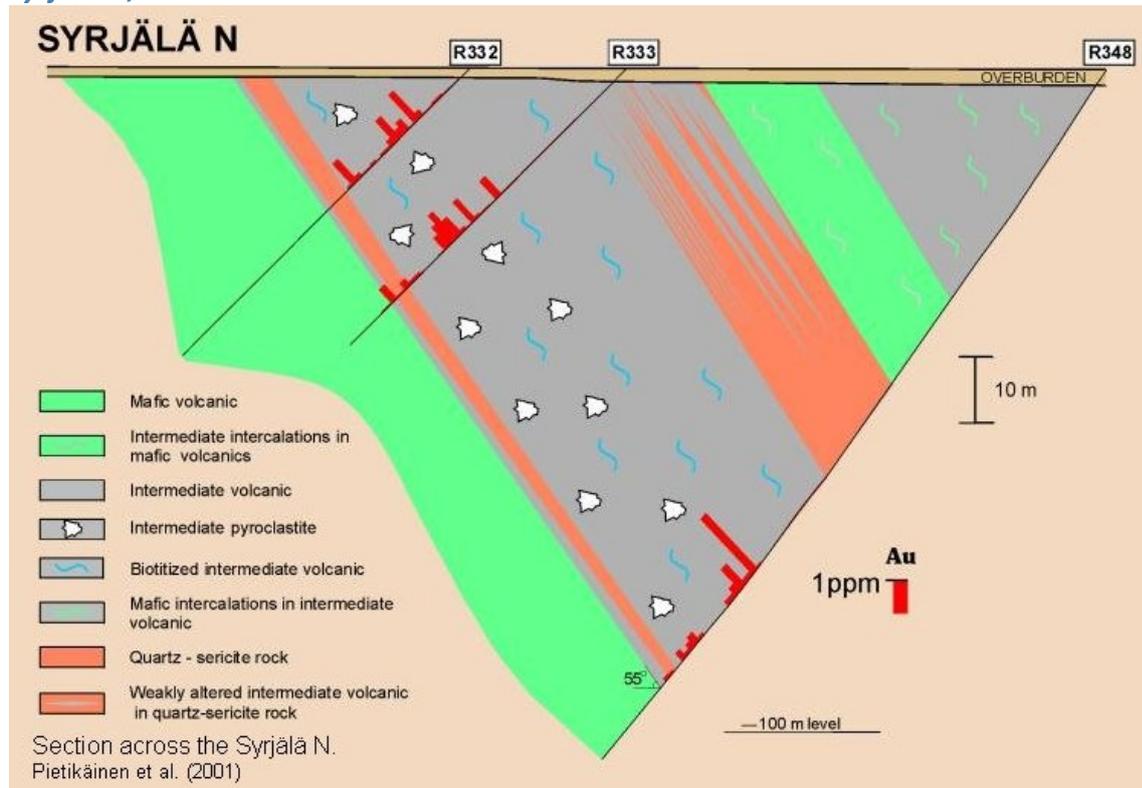
Kuikkapuro-Syrjälä: chargeability image, ground survey, and drill holes:



Suomussalmi greenstone belt: aeromagnetic image and gold occurrences:

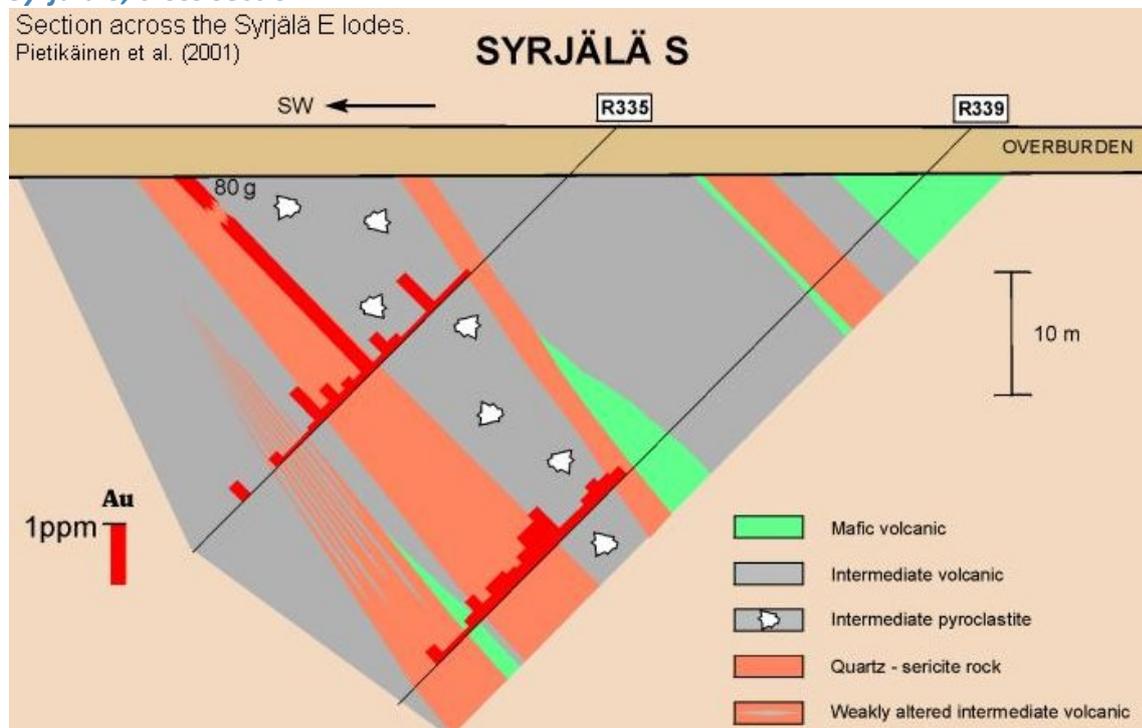


Syrjälä N, cross section:



Syrjälä S, cross section:

Section across the Syrjälä E lodes.
Pietikäinen et al. (2001)



REFERENCES

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7. MEN Finland 2015. Karelian Gold Project, Syrjälä Gold Field http://kareliangold.com/wp-content/uploads/2013/12/Syrjala_MM_20141129.pdf http://kareliangold.com/wp-content/uploads/2013/12/Syrjala_MM_20141129.pdf
8. Papunen, H., Halkoaho, T., Liimatainen, J. & Luukkonen, E. 2001. Metallogeny of the Archaean Tipasjärvi-Kuhmo-Suomussalmi greenstone belt, Finland. AGSO - Geoscience Australia, Record 2001/37, 456-458.
9. Pietikäinen, K. 1998. Personal communication 14/9/98.
10. Pietikäinen, K., Hartikainen, A., Niskanen, M. & Tenhola, M. 2000. The gold prospects; Kuikka, Syrjälä N, Syrjälä S and Tupakkiloma in Kiannanniemi, Suomussalmi, Eastern Finland. http://tupa.gtk.fi/raportti/valtaus/m06_4511_2000_1.pdf
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12. Sorjonen-Ward, P., Nironen, M. & Luukkonen, E. 1997. Greenstone associations in Finland. In: M. J. de Wit and L. D. Ashwal (eds) Greenstone Belts. Clarendon Press, Oxford. 677-698.