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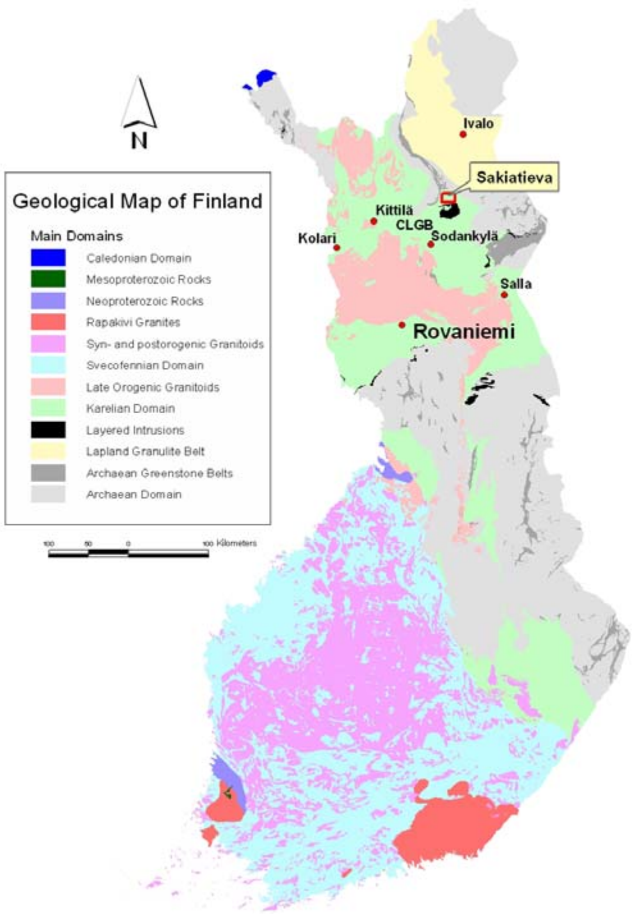
Report on the Sakiatieva gold exploration claims Ruosselkä 8 (Mine Reg. no 7300/1) and Sakiatieva (Mine Reg. no 7392/1), Sodankylä, Finland

Veikko Keinänen, Eelis Pulkkinen, V. Juhani Ojala, Heikki Salmirinne, Tegist Chernet, Jorma Räsänen, Pertti Turunen and Olli Sarapää



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Report on the Sakiatieva gold exploration claims Ruosselkä 8 (Mine Reg. no 7300/1) and Sakiatieva (Mine Reg. no 7392/1), Sodankylä, Finland

Abstract

Geological Survey of Finland (GTK) has explored the Ruosselkä area, which includes the Sakiatieva prospect, during 1999-2006. The prospect is located in the municipality of Sodankylä, about 70 km to the northeast from the town of Sodankylä. The area is within the Paleoproterozoic Central Lapland Greenstone Belt. GTK discovered the gold mineralization in Sakiatieva after a systematic exploration program using till geochemistry, heavy mineral sampling and ground geophysical survey, which included magnetic, electromagnetic VLF-R, and electrical IP methods, and diamond drilling (58 drill holes/5165 m). Based on the current drilling results, the mineralized zone is 200 m long and 10 m wide, but it is open at depth and along strike at both ends. The gold mineralization is controlled by a NE-SW-trending alteration and deformation zone and it is hosted by mafic volcanic rocks and graphitic phyllites metamorphosed at upper greenschist facies to lower amphibolite facies conditions. The main gangue minerals are carbonate, quartz, diopside, biotite, feldspar and chlorite. Pyrrhotite is the most common sulphide mineral. Other sulphides include chalcopyrite, pyrite, tellurides galena, sphalerite, scheelite and molybdenite. Gold occurs as native, free grains in grain boundaries of silicate minerals and sulphides. The amount of ore minerals correlate positively with magnetic properties and negatively with density. The most significant gold intersections are given below:

	Trench (channel samples)	Length vs Au g/t
	M10/2001	6.0 m @ 4.8 g/t
	M11/2001	2.0 m @ 1.4 g/t
x	M2/2004	7.0 m @ 13.7 g/t
	M3/2004	3.0 m @ 3.1 g/t

	Drill hole	Intersection	From the depth (m)
	R310	2.0 m @ 3.3 g/t	28.0
	R311	1.0 m @ 4.8 g/t	69.0
	R256	1.5 m @ 2.8 g/t	53.0
xx	R258	1.5 m @3.8 g/t	49.0
xxx	R259	1.0 m @ 4.8 g/t	79.0
xxxx	R268	4.6 m@7.2 g/t	62.8

x including 2.0 m @ 36.9 g/t, xx 0.75 m @ 7 g/t, xxx 0.5 m @ 8.4 g/t, xxxx 1.6m@19.5 ppm

Keywords

gold prospect, exploration, claims, report, geochemistry, magnetic, VLF-R and IP measurements, drilling, mineralogy, sulphide occurrence, structural geology, physical properties

Geographical area Finland, Province of Lapland, Sodankylä, Ruosselkä, Sakiatieva

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Tiivistelmä

Geologian tutkimuskeskus (GTK) on tutkinut Ruosselän aluetta, jonka sisällä Sakiatievan kulta-aihe on, vuosina 1999-2006. Sakiatieva sijaitsee Sodankylän kunnassa, noin 70 km kirkonkylältä koilliseen. Tutkimusalue kuuluu geologisesti paleoproterotsooiseen Keski- Lapin vihreäkivivyöhykkeeseen. Sakiatievan kultamineralisaatio löydettiin systemaattisen geokemiallisen, geofysikaalisen, raskasmineraali- ja kairausohjelman tuloksena. GTK on kairannut alueelle 58 kairareikää/5165m. Tämän hetkisten kairaustietojen pohjalta mineralisaatio on 200 metrin pituinen ja noin 10 m levyinen, mutta sen mitat ovat auki sekä syvyys- että pituussuunnassa. Kultamineralisaatiota kontrolloi NE-SW –suuntainen deformaatio- ja muuttumisvyöhyke. Kultamineralisaation isäntäkiviä ovat emäksiset vulkaniitit sekä grafiittipitoiset fylliitit, jotka ovat metamorfoituneet amfiboliittifasieksen alaosan olosuhteissa. Mineralisoituneiden osien päämineraaleja ovat karbonaatti, kvartsi, diopsidi, tremoliitti, serisiitti, albiitti, kalimaasälpä ja kloriitti. Sulfidimineraaleista runsaimmin esiintyy magneettikiisua. Muita sulfidimineraaleja ovat kuparikiisu, rikkikiisu, telluridit, kulta sekä aksessorisesti esiintyvät lyijyhohde, sinkkivälke, scheeliitti, molybdeenihohde, magnetiitti ja arseenikiisu. Kulta esiintyy silikaatti- ja sulfidimineraalien raerajoilla ja raoissa. Malmimineraalien määrä korreloi positiivisesti magneettisten ominaisuuksien ja negatiivisesti tiheyden kanssa. Merkittävimmät analyysitulokset:

	Kaivanto (sahatut näytteet)		Pituus vs Au g/t
	M10/2001		6.0 m @ 4.8 g/t
	M11/2001		2.0 m @ 1.4 g/t
x	M2/2004		7.0 m @ 13.7 g/t
	M3/2004		3.0 m @ 3.1 g/t
	Syväkairausreikä	**Lävistys**	**Yläsyvyys (m)**
	R310	2.0 m @ 3.3 g/t	28.0
	R311	1.0 m @ 4.8 g/t	69.0
	R256	1.5 m @ 2.8 g/t	53.0
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Asiasanat (kohde, menetelmät jne.)

Kulta, malminetsintä, valtaus, raportti, magneettiset, VLF-R ja IP-mittaukset, tutkimusmontutus, moreeninäytteenotto, syväkairaus, mineralogia, geokemia, sulfidiesiintymä, rakennegeologia, petrofysikaaliset ominaisuudet

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LITERATURE

1 INTRODUCTION

1.1 Background

Geological Survey of Finland (GTK) discovered the Sakiatieva gold prospect after a systematic geochemical, geophysical, heavy mineral and drilling program during 1999–2006 in the Ruosselkä area, which is located about 70 km to the northeast from the town of Sodankylä (Fig. 1). Consequently, in this report the area surrounding the Sakiatieva prospect is called the "Ruosselkä area". The area was selected as an exploration target after a regional scale geochemical survey, which showed anomalous Au concentrations in till over an area of 150 km^2 (Pulkkinen et al. 2006). This was followed by a heavy mineral survey, which revealed angular gold nuggets in till within the gold anomalous area. One of the sampling sites was located in Sakiatieva (Fig. 2). The follow up drilling results have been promising and the area is considered to have potential for a significant gold mineralization and the Ministry of Trade and Industry of Finland offers the Sakiatieva gold prospect for purchase through an international tendering process. The Sakiatieva prospect was previously reported to the Ministry in 2005. Since then more drilling, chemical analyses, mineralogical study, structural analyses and deposit modelling have been carried out and these new results have been added into this report.

1.2 GTK's role in the minerals sector

One of the main duties of GTK is to promote mineral exploration and mining in Finland.

GTK is responsible for acquisition and management of geoscience information in Finland, with a particular emphasis on to providing high quality data to the exploration and mining sector. Through a comprehensive mapping and research program, GTK also identifies and documents areas with mineral potential, in order to encourage follow-up exploration and exploitation by the private sector, with the aim of supporting sustainable use of both bedrock resources and surficial deposits. All GTK discoveries are offered to the private sector through an open tendering process arranged by the Ministry of Trade and Industry. Neither the Finnish Government nor GTK have any role in the downstream development of mineral deposits.

In addition to above mentioned activities, GTK offers the minerals industry expertise in Fennoscandian economic geology, as well as confidential, client-tailored exploration services, including geophysical surveys and modern chemical, mineralogical and mineral processing laboratory services, both within Finland and worldwide.

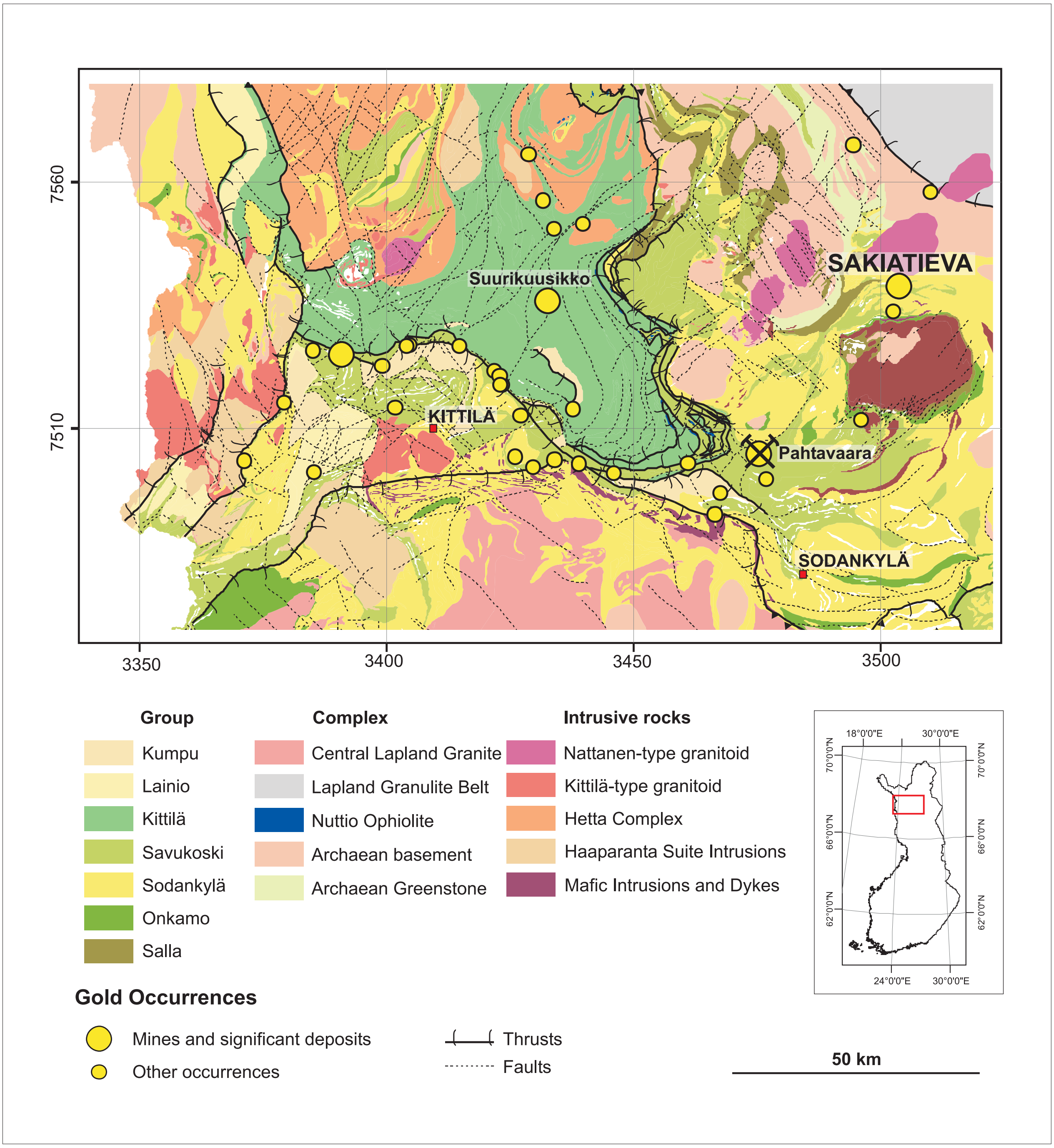

Figure 1. *Geological map of the Central Lapland Greenstone Belt showing the location of the Sakiatieva gold prospect.*

2 GENERAL PROPERTY DESCRIPTION

2.1 Titles

GTK has currently decided to relinquish all applied claims and applied claim extension made for the Sakiatieva prospect area (see Keinänen et. al 2006). The known Au occurrence lies in the expired claims named as "Ruosselkä 8" and "Sakiatieva" (Table 1).

The land within the exploration claims areas is state owned. As stated in the Finnish mining law, an exploration licence entitles the holder to carry out activities in the claim area with or without the consent of the landowner. The claim holder must, however, compensate the landowner in full for any permanent or temporary damage or inconveniences caused by the exploration activities inside or outside the claim area. The claimant shall also act in compliance with environmental legislation and other land laws and regulations.

Table 1. *Claims of GTK in the Sakiatieva area*

Claim name	Claim no.	Map sheet	Claim size	Claim registered	Claim expiration
Ruosselkä 8	7300/1	374102	7.6 ha	5 Nov. 2001	5 Nov. 2006
Sakiatieva	7392/1	374102	77.4 ha	26 Feb. 2002	26 Feb. 2007

2.2 Location, access and infrastructure

The Sakiatieva prospect is located in the Ruosselkä area about 70 kilometres northeast of the Sodankylä town in the province of Lapland, northern Finland at Lat. 67.94419N , Long. 27.15927E (decimal degrees), Finnish KKJ zone 3 coordinates 7539800 mN 3506850 mE (Figs. 2 and 3). The Sodankylä is the administration centre of the municipality of Sodankylä with population of about 9200. The claims of GTK are located on the national map sheets 3741 02 and 3741 03. Road access to the area is by the national highway no. 4 and along a good quality gravel road (25 km). The last two kilometres is a timber haulage track, which is drivable for four-wheel drive vehicles, the road is also passable for heavy vehicles in winter when the ground is frozen. In Sodankylä, there is a small airport for charter traffic. The airports in Rovaniemi (205 km south), Ivalo (100 km north) and Kittilä (80 km west from Sodankylä) serve daily flights to Helsinki. The nearest railway station is 205 km south in Rovaniemi.

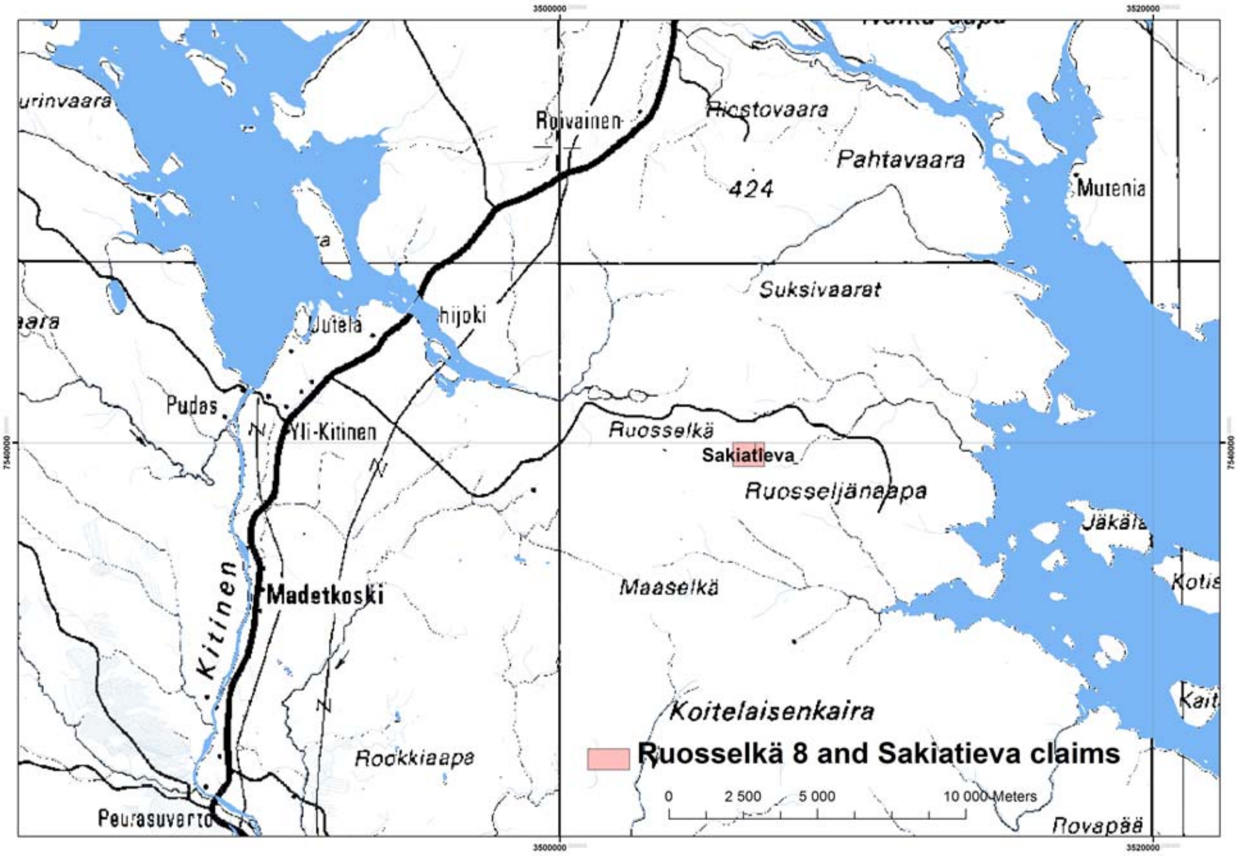

Figure 2. *Road map showing the location of Sakiatieva (no. 7392/1) and Ruosselkä 8 (no. 7300/1) claims. (National Land Survey of Finland, license 13/MYY/07).*

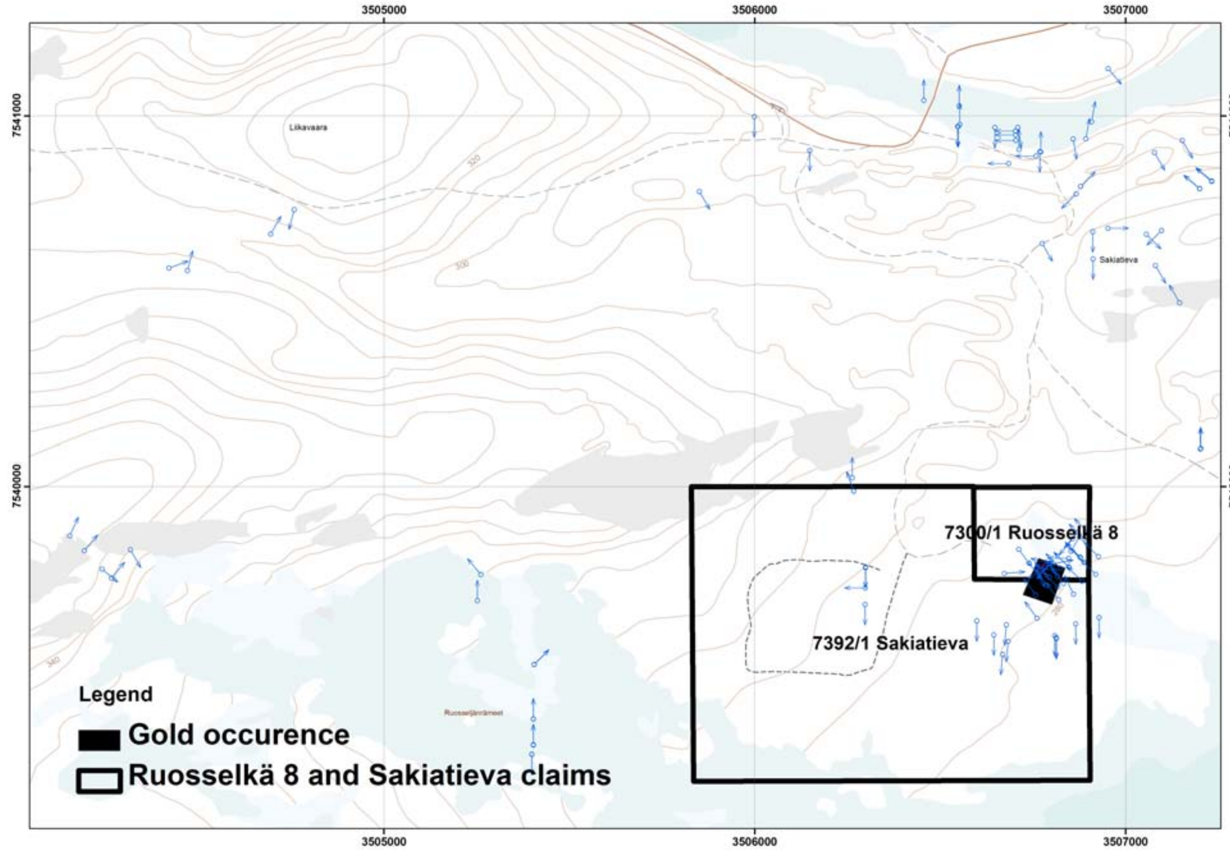

Figure 3. Basemap of the Sakiatieva prospect. showing the location of Sakiatieva (no. 7392/1) and Ruosselkä 8 (no. 7300/1) claims. The blue arrows indicate the diamond drill hole sites. (Basemap @ National Land Survey of Finland, license 13/MYY/07).

2.3 Physiography, climate and vegetation

The weather conditions in the area are those of the characteristic northern Fennoscandian climate with temperate summer and cold winter. During the summer months (June–August) the rainfall is 90 mm and the temperature is mostly between 10°C and 25°C, and during the winter months (October – April) between -5°C and -35°C. Snow covers the terrain from November to May months and maximum thickness of the snow varies from 0.8 to 1.2 m in the end of March. Lakes, rivers, bogs and ground are frozen in winter allowing easy access for drilling in wet areas.

Topographically most of the area is gently undulating hilly terrain (260 – 380 m asl.). The Sakiatieva prospect lies in the low terrain being about 280 m asl. Consequently the ground in the prospect area remains waterlogged and rather difficult to pass by heavier vehicles during the spring and early summer. Therefore drilling has to be conducted in late summer (July-August) or in winter when the ground is frozen. Two small, but water-rich brooks named Ruosselänhaara and Sompiohaara run through the area: the one to W and the other to E from the valley called Eilitsemänvuoma.

In the region, weathering-resistant rock types, such as quartzite and granite, are well exposed whereas the outcrops of soft rocks like metasediments and metavolcanic rocks are uncommon. Especially the deformed and altered mineralized rocks are deeply weathered and rarely exposed.

The overburden is composed of till except for peat bogs and narrow sandy areas associated with rivers and brooks. The thickness of till varies from one to 40 m. The thickest till cover is in the area of end moraines in the hill area called “Sakiatieva”. Glacial transport direction is from northwest.

The Ruosselkä area is a typical sub-arctic terrain. Pines predominate in the forests of well-drained areas, whereas spruces and mountain birch grow in the low and poorly drained areas. The ground vegetation is composed of lichens, mosses and heather and various types of grass. The wood have been cut into timber during 70's and thereafter reforested several times. However, the reforestation with pine has been unsuccessful.

2.4 Quaternary geology

Glacial drift covers the Ruosselkä area except for the highest hills. The drift is 1–40 m thick. In the area of thick drift, till consist of two distinct units. The upper one refers to the till bed 2 and the lower one to the till bed 3 according to the classification of Hirvas et al. (1977) for the northern Finland. The topmost layer of the drift consists of outwash gravel and stony till banks of the terminal flow of the latest glaciation.

Several metres thick saprock between glacial till and fresh bedrock is common. Typically the alteration and deformation zones related to gold mineralization have weathered much deeper than less altered rocks, in places partial weathering goes down to tens of metres.

The glacial transport distance in the region has been estimated at the locality of Roivainen, eight km north of Ruosselkä, using magnetic susceptibility data from till (Härkönen and Pulkkinen, 1981). This investigation showed that the glacial transport direction was from WNW in both of the till beds. In addition, the results suggest that the glacial transport distance is short (50–100 m) in the areas of shallow drift (1–3 m) and long (up to two kilometres) in the areas of thicker drift (over 10 m).

2.5 Property history

The Ruosselkä area was first explored for nickel at the end of 1960's (Nenonen 1975). In addition, the post orogenic Nattanen type granites were explored for Mo during 1980's (Front et al. 1985). The results of regional geochemical mapping of till showed the first indications of gold in the area (Salminen 1995) indicating 150 km^2 of Au-anomalous terrain (Fig. 4). This encouraged to follow-up studies in the Ruosselkä area. GTK carried out a pilot heavy mineral study during the summer 1988 covering an area of 120 km2. In total, 42 test pits were made and 20 litres of till was sampled from each of them. Stones were separated from the sample using a 10 mm grid sieve. The sieved till was put into a sluice which made the primary concentration of heavy minerals. The concentrate was then panned down to gold. The results revealed angular gold nuggets in several samples in the southern part of the Ruosselkä area.

GTK started a local scale exploration program to locate the source of the gold in 1999. The exploration targeted the areas around the Ruosselkä granite intrusion and the volcanic-sedimentary rocks south of the intrusion. The exploration area was in total about 200 km^2. Firstly, 1177 old till samples collected in 1970’s in the area of the Ruosselkä granite intrusion were assayed for

Au and Te. Au concentration of till is higher than 20 ppb at 52 sampling sites. The maximum gold content of the 1177 samples was 250 ppb (mean 8.9 ppb, standard deviation 19.2). The maximum Te concentration was 182 ppb (mean 25 ppb, standard deviation 15.4). During the follow up exploration campaign, several targets in the gold anomalous areas were drilled and trenched, and a gold occurrence was located in Sakiatieva. Furthermore, several other gold, copper and nickel showings were indicated during the program.

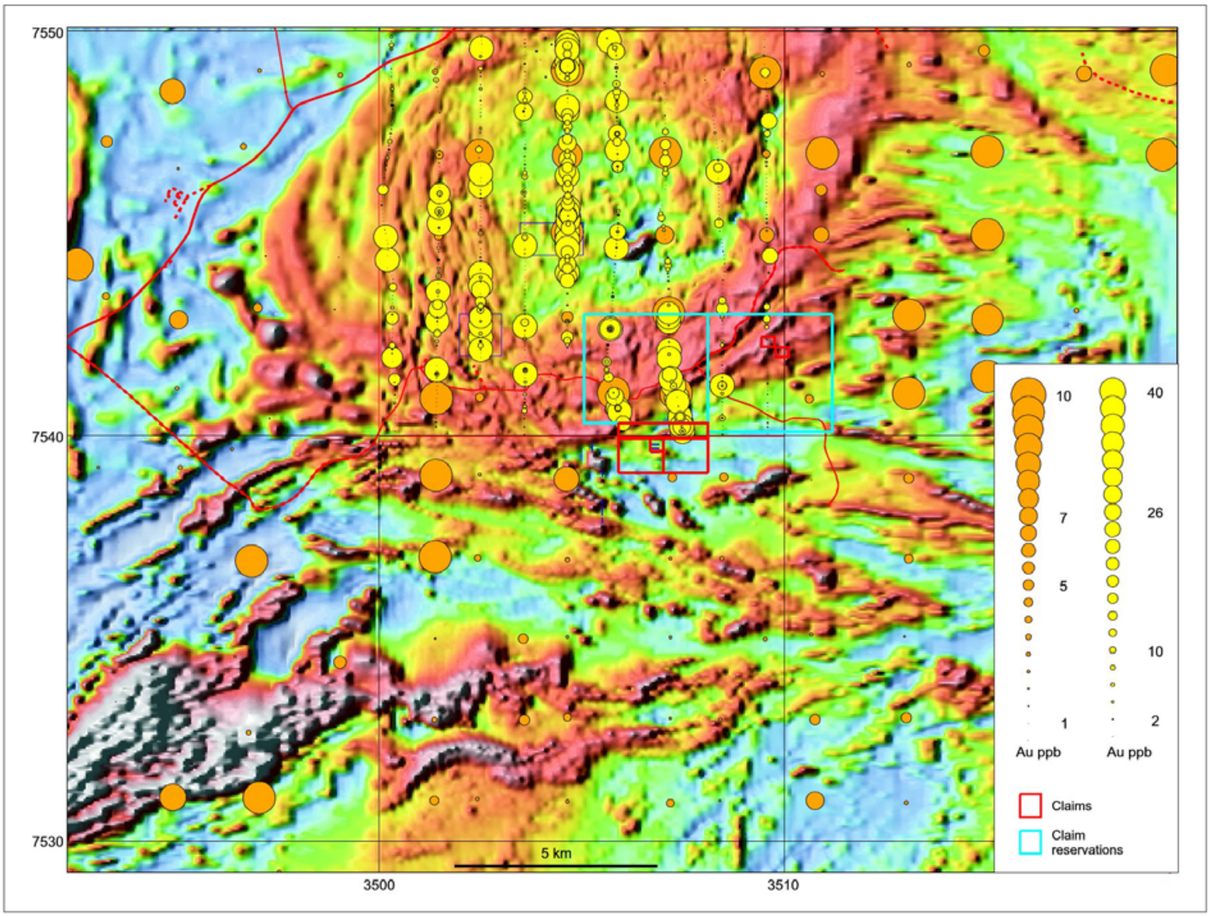

Figure 4. *The results of the regional (orange symbols) and local (yellow symbols) geochemical surveys of the fine fraction of till (<0.06 mm). In the Ruosselkä area, gold concentrations in most samples are above the regional median (1.2 ppb). Background map is a colour-shaded aeromagnetic image. The GTK claims and old claim reservations also shown in the map.*

3 REGIONAL SETTING

3.1 Geological setting

This description of the geology of Ruosselkä area hosting the Sakiativa prospect (Fig. 5) is based on the review by Räsänen (2005). The area is situated on the northern part of the Paleoproterozoic Central Lapland Greenstone Belt (CLGB) (Lehtonen et al. 1998) (Fig. 1). The bedrock is composed of supracrustal rocks, which are intruded by post-orogenic 1.78-1.80 Ga old Nattanen-type granites (Haapala et al. 1987, Vaasjoki 2001).

In the Ruosselkä area, the bedrock consists of mafic and ultramafic volcanic rocks and intrusive rocks with minor felsic volcanic rocks and sedimentary rocks. They belong to the Sodankylä and Savukoski Groups while the rocks of the older Salla and Onkamo Groups as well the rocks of the younger Kittilä, Lainio and Kumpu Groups seem to be missing, but the bedrock is poorly exposed in large areas. However, outcrops and diamond drillings together with geophysical low-altitude maps and ground measurements indicate that the bedrock is strongly deformed, it is folded at least twice (Sorjonen-Ward et al. 1992) and cut by several faults and fracture or shear zones. The older folding has roughly an EW-trending fold axis (N-S shortening) and it controls the regional lithology also containing southward overturned rock piles with tectonic contacts and overthrusting. The folds, generated by the younger folding and having a NE-SW –trending axis, are commonly difficult to observe on rocks. Its axial plane, nevertheless, emerges as NW-dipping foliation or cleavage of schistose bedrock.

The lowermost lithostratigraphic rock unit in the area (see legend in Fig. 5) is the Pauttisselkä Member of the Sodankylä Group. It composes of arkose quartzite with mica-rich interbeds and it changes gradually into graded mica schist, called the Viuvalonlatva Member. They integrate the Postojoki Formation, which turns out as a southward overturned antiform, on which mica schist exists in a refolded drag fold. Mafic dikes and an unidentified gabbro intrusion penetrate the very poorly exposed Postojoki Formation.

Volcanic rocks of the Ruosselkä Formation lie on the Postojoki Formation and start the rock series of the Savukoski Group. The contact of the formations is not exposed but based on diamond drilling it is sheared and highly schistose indicating that the contact is tectonic which the lack of outcrops also may indicate. The Ruosselkä formation is poorly exposed and the information comes from drill cores. The formation is composed of mafic to partly intermediate massive and amygdaloidal lava flows and tuffites together with some associated gabbroic cumulates. These are called the Sakiatieva Member, which is about 200 m thick but may be later divided into more than one member. Volcanic rocks are altered and deformed; in places they are amphibolite like in appearance and contain mineralized parts. Geochemically they can be classified as Fe-basalts but some of the analyse points plot in the fields of Mg-basalts and komatiites, probably, due to alteration and enrichment of Mg and Al (Fig. 6), but they all are LREE-enriched (Fig. 8).

The overlying Matarakoski Formation is composed of sulphide-bearing sedimentary rocks and contains two members, which have been recognized about 10 km south of Sakiatieva, in the Maaselkä area, where they can be identified due to better outcrops and diamond drillings. The lower Maaselkä Member contains black schists together with graded greywacke-like schists with interbeds of black quartzites and sulphide-bearing felsic tuffites. The upper Viuvalojoki Member contains fine-grained quartzites rich in feldspar and, most likely, volcanogenic quartz-feldspar schists including graphite- and sulphide-bearing interbeds. Komatiitic dikes cut both of the members and the felsic tuffogenic rocks are commonly albitised. In different diagrams the analyse points of tuffites plot in the calc-alkaline field (Fig. 6) and typically they are highly enriched in LREE.

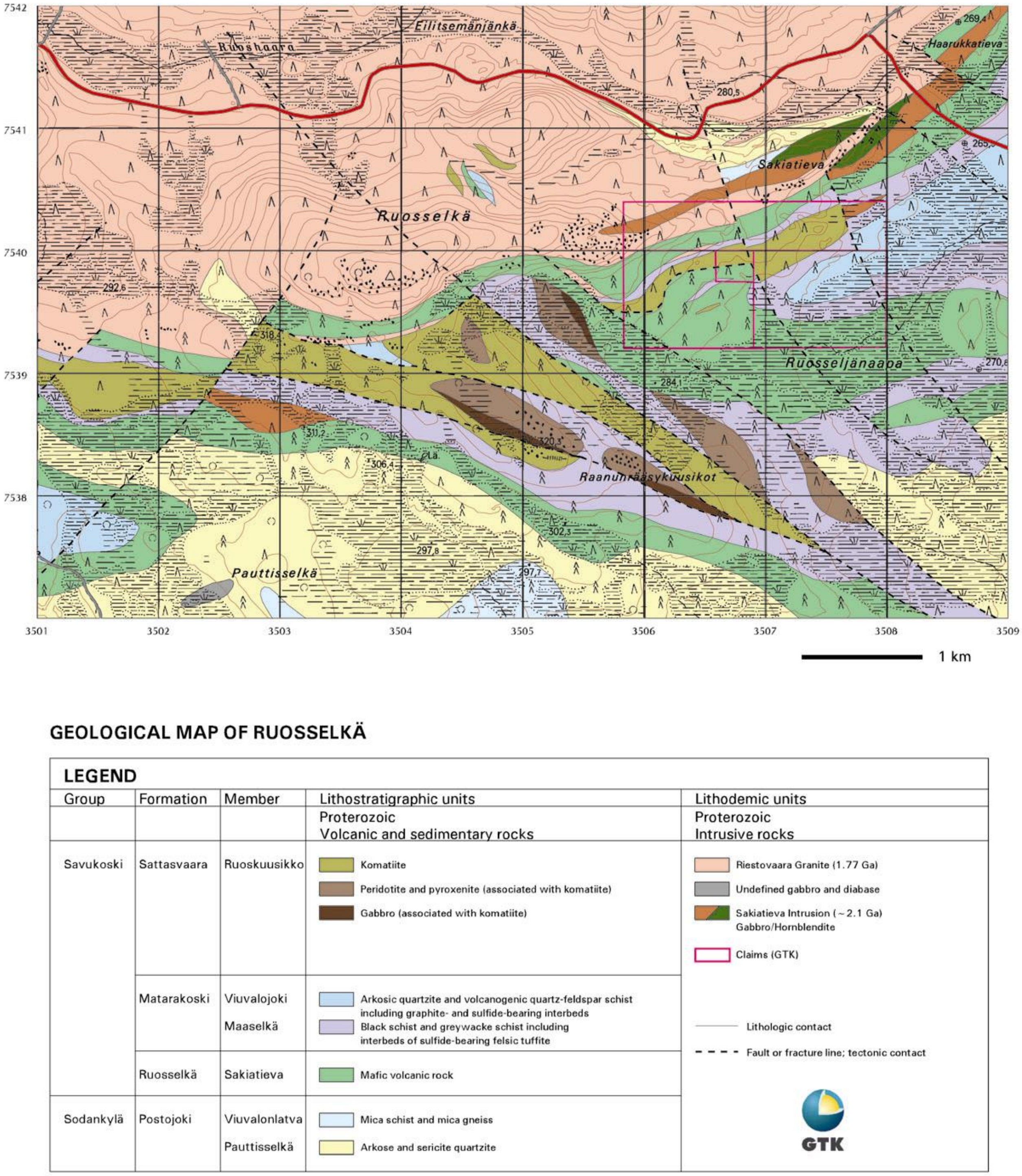

Figure 5. *Geological map of the Ruosselkä area (Adapted from Räsänen 2005).*

Ultramafic to mafic volcanic rocks, called the Ruoskuusikko Member of the Sattasvaara Formation, overlie the schists of the Matarakoski Formation. It is composed of massive and pillow lavas together with pillow breccias and hyaloclastic tuffs and associated cumulate rocks ranging from peridotite to gabbro. Most of the fine-grained volcanic rocks are highly deformed and volcanic structures are destroyed. Thought the associated cumulate rocks are also deformed and serpentine- and also carbonate-altered their original cumulate texture is usually still

recognizable. A typical cumulate body contains a peridotite base overlain by pyroxenite and also alternating beds or layers of peridotite and pyroxenite while the top is composed of gabbro. They include layer-like beds containing disseminated Fe-sulphide and in places also some Ni- and Cu-sulphides. In addition, some layers are slightly enriched in PGE. Structurally komatiitic rocks lie in synclines. Geochemical analyses show that their composition ranges from peridotic komatiites to komatiitic basalts and form in the Jensen-diagram a continuous series (Fig. 6) and on a CMA-diagram they follow the magmatic olivine- and olivine/pyroxene-control line (Fig. 7). However, there is a considerable scatter as the sample include highly altered and some magnetite-rich rocks. The Ruoskuusikko Member ultramafic rocks are depleted and mafic komatiites are slightly enriched in LREE. However, their ultramafic cumulates show negative Eu-anomaly while plagioclase-bearing mafic gabbroic cumulates show positive Eu-anomaly (Figs. 9-13).

The Sakiatieva Intrusion is composed of gabbros and hornblendites. Based on a few outcrop observation and diamond drilling they all seem to be quite monotonous and sulphide-poor cumulate rocks, which are cut by granites. The Sakiatieva gabbros and some gabbroic cumulates of the Ruosselkä Formation are very similar in appearance, and they have similar geochemistry. The Sakiatieva gabbros and the volcanic rocks of the Ruosselkä Formation plot on the Jensen diagram in the field of Fe-basalts. Their compositions overlap on the CMA-diagram as well (Figs. 6 and 7). Regarding REE-elements both of them also seem to display quite similar patterns (Figs. 8 and 13). This would indicate, that the rocks of the Sakiatieva Intrusion and the volcanic rocks of the Ruosselkä Formation are generated from the same magma source.

Carbonate-rich layers of the quartzite have altered into tremolite and diopside skarns in the contact zone between a granite dyke and volcanosedimentary sequence on the northern slope of the Sakiatieva hill indicating a contact metamorphic effect. The rocks of the sequence are tightly folded and there are several thrusts and steeply dipping faults within the unit. The bulk geometry of the area is the result of N-S directed shortening rotating in E-W shortening (Sorjonen-Ward et al. 1992). The regional metamorphic grade of the rocks in the area is close to the greenshist to -amphibolite facies boundary.

Granite dykes similar to the post-orogenic Nattanen granite intersect all the other lithological units in the area. Fine to coarse grained, reddish granitic dykes are from 0.2 to 40 m thick, flat or gently dipping and have a NE strike and a dip to the SE.

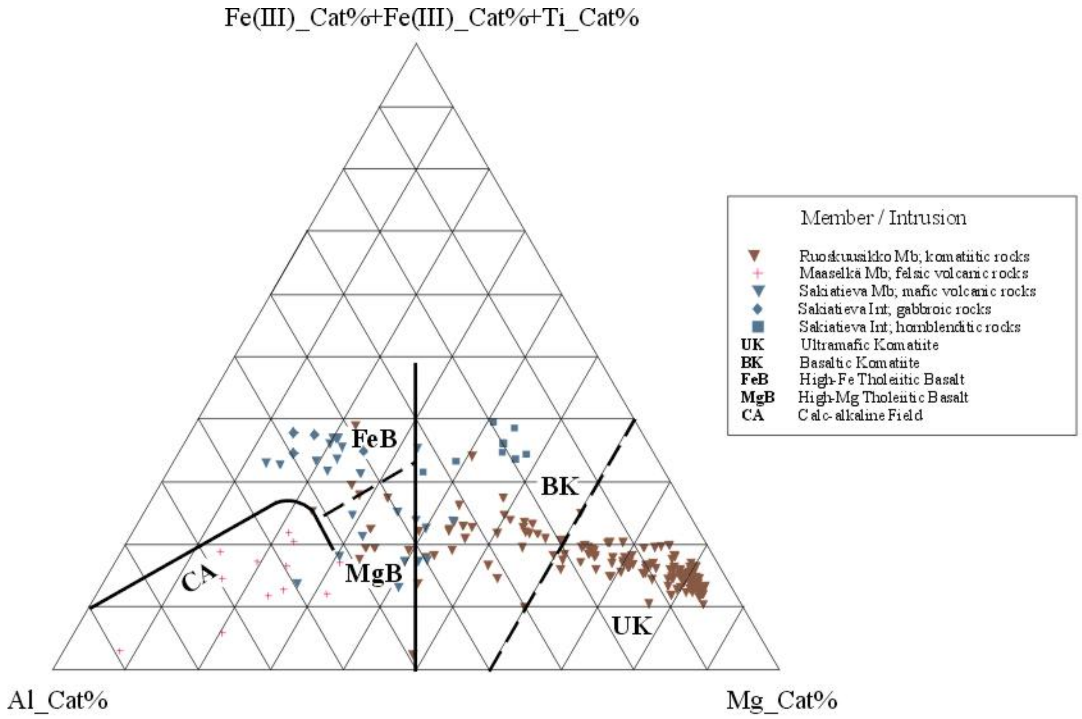

Figure 6. *Ruosselkä area volcanic rocks on the Jensen diagram (Mb = Member, Int = Intrusion, n=199)*

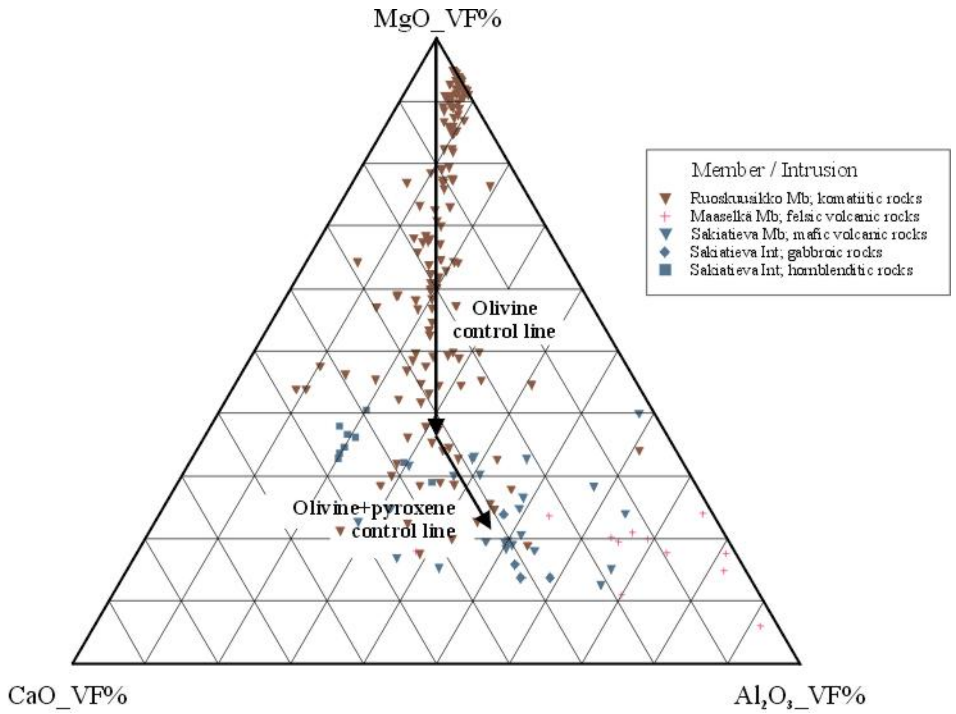

Figure 7. *Ruosselkä area volcanic rocks on the CMA diagram (Mb = Member, Int = Intrusion, n=199)*

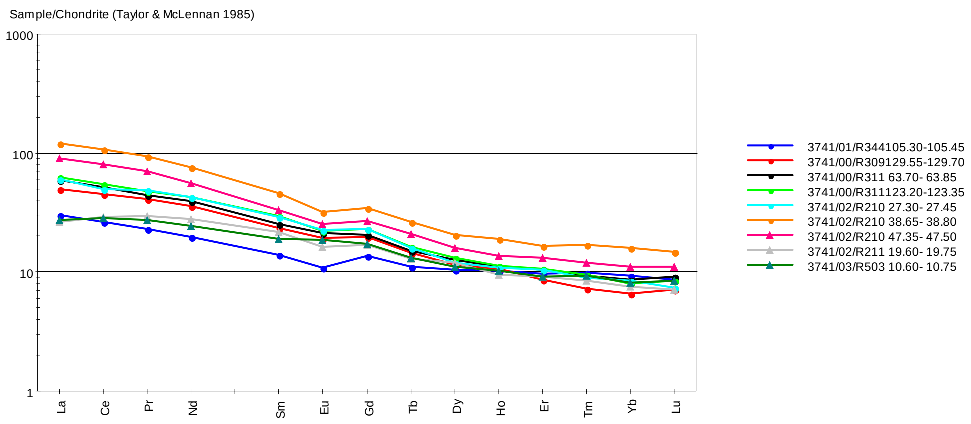

Figure 8. *REE diagram of the Sakiatieva Member mafic volcanic rocks (n=8)*

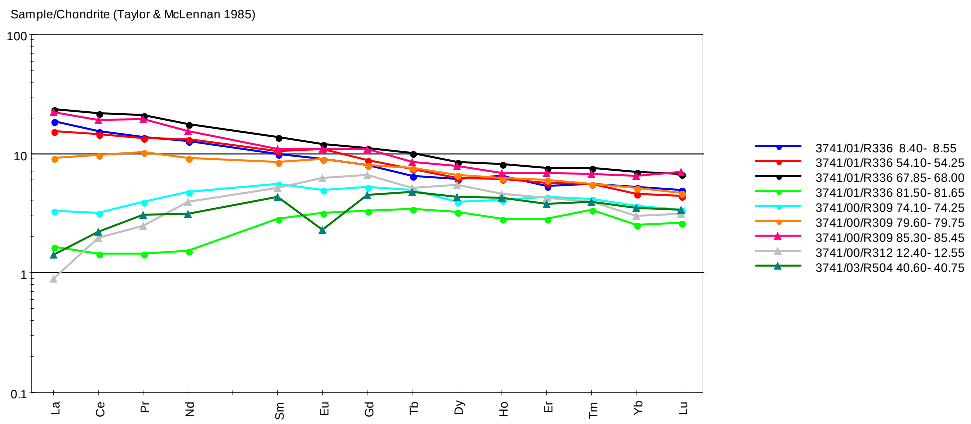

Figure 9. *REE diagram of the Ruoskuusikko Member mafic and ultramafic komatiites (n=9)*

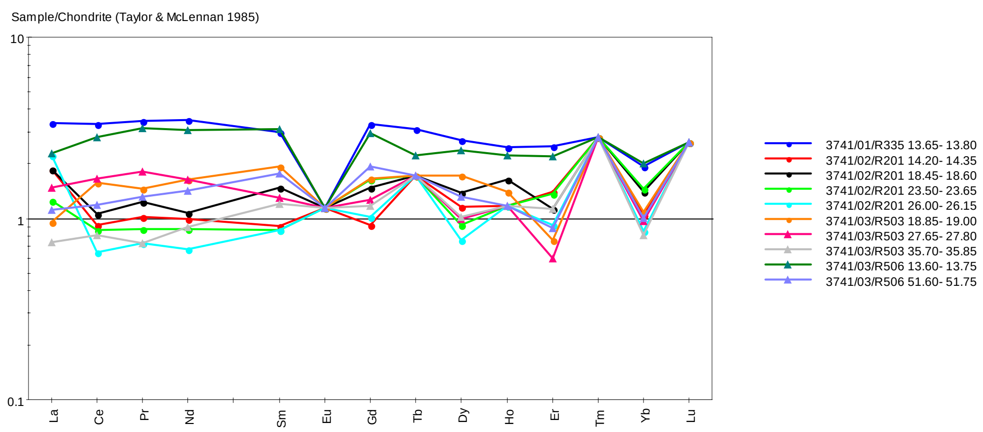

Figure 10. *REE diagram of the Ruoskuusikko Member peridotites (n=10)*

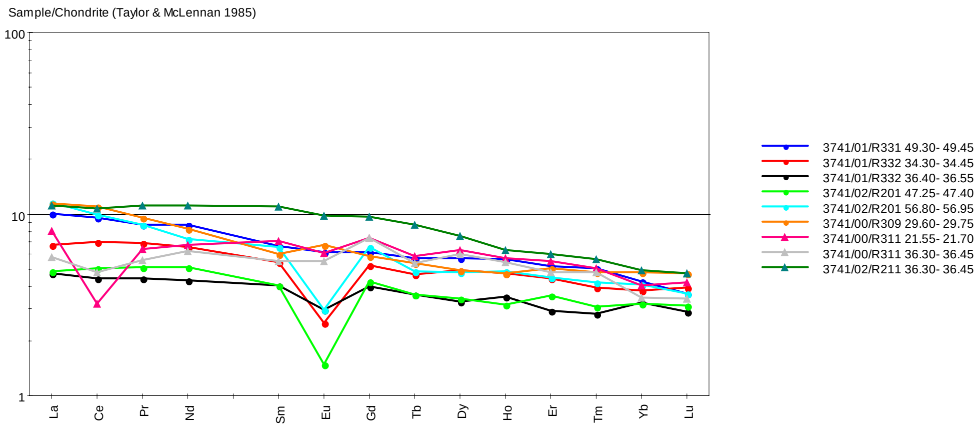

Figure 11. *REE diagram of the Ruoskuusikko Member pyroxenites (n=9)*

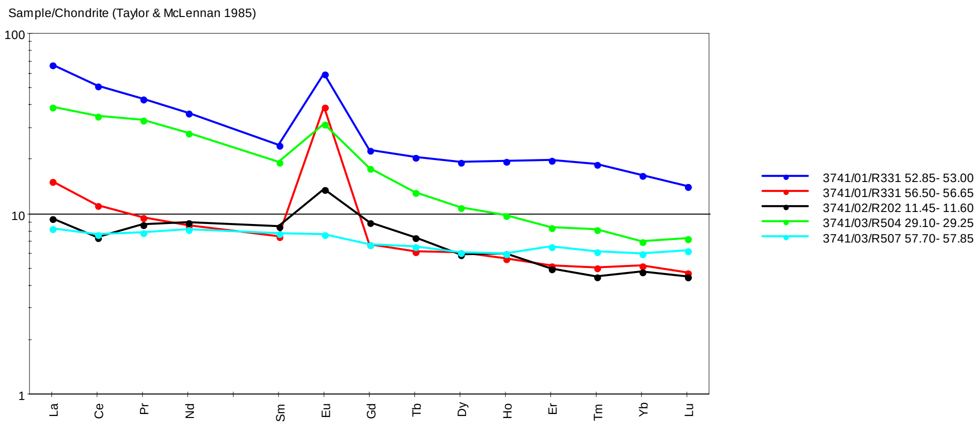

Figure 12. *REE diagram of the Ruoskuusikko Member gabbros (n=5)*

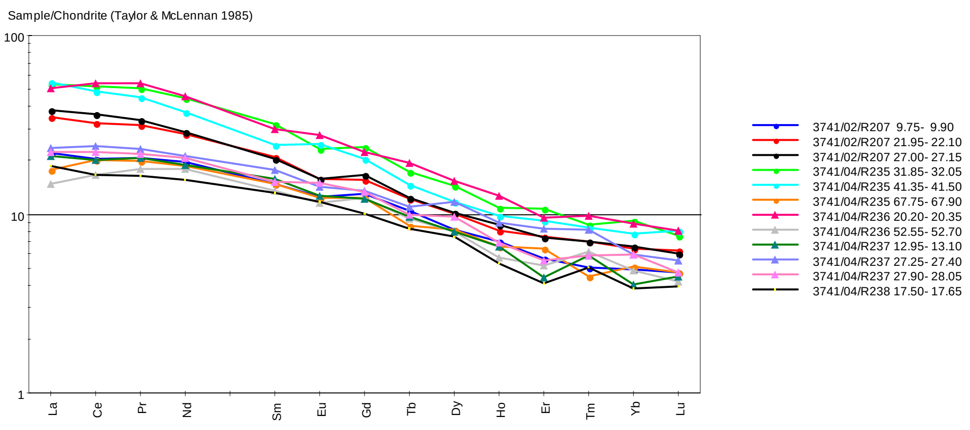

Figure 13. *REE diagram of the Sakiatieva Intrusion gabbros (n=3) and hornblendites (n= 9)*

3.2 Economic geology

There is no metal mining in the immediately vicinity of the Sakiativa prospect, but there is a small dimension stone quarry at the eastern end of the Sakiatieva granite outcrop from where coarse grained, brownish granite was mined and processed. The product was commercially marketed as "Lapponia Brown" (Rask 1990).

About 60 km north of Sakiatieva, in the Ivalojoki River area, are the historical gold panning areas where alluvial and supergene gold was discovered in 1868. Panning is still going on, mostly as a tourist attraction, with individual panning prospects typically containing a few hundreds grams of pannable gold. However, there has been very little modern exploration for primary gold in the area.

The Suurikuusikko gold mine, which is about 75 km W, and the Pahtavaara gold mine, which is about 50 km SW of the Sakiativa area, are previously-tendered prospects discovered by GTK. At Suurikuusikko, Agnico-Eagle Mines Limited has defined a 2.4 Moz probable reserve, (http://www.gsf.fi/explor/gold/suurikuusikko.htm). The current resource (published 05.06.2006) is 14.2 million tons at 5.2 g/t Au. Pahtavaara, on the other hand, is an operating mine which produced about 32000 oz (1060 kg) in 2004 (http://www.scanmining.se/pressmeddelanden/050112_pm.html).

The Sakiatieva prospect is the first known gold occurrence in the Ruosselkä area. The Maaselkä Cu-Co-occurrence lies about ten kilometres to the SW from Sakiatieva (Rossi 1983). About 15 kilometres south of Sakiatieva, there is a chromium occurrence associated with the Koitelainen layered intrusion (Mutanen 1979) with several potential ore bodies summing up perhaps >100 Mt @ 13–16 % Cr. The Keivitsa Ni-Cu-Au-PGE occurrence (Mutanen 1997), which is currently explored by Scandinavian Minerals Limited (http://www.scandinavianminerals.com/), is about 30 km SW of Sakiatieva.

4 EXPLORATION

4.1 Current exploration program – Exploration techniques and results

4.1.1 Sampling, drilling, sample preparation and assaying

In total, GTK has drilled 58 drill holes (5165 m) in the Sakiatieva prospect area. The diamond drill core size used was 35 mm (T46 bit) during shallow test drilling of the first drilling campaign in 2000. The core losses were up to 70% in the weathered bedrock, and it was noticed that the zones of alteration and gold mineralization were also those of the deepest weathering. To improve core recovery, 75 mm core size (T86 bit) was used during the follow up drilling in winter 2003. In spite of the larger core diameter, the core losses were still significant in the weathered rock. Later during 2004-2006, 46 mm core size (T56 bit) was used. Polymeric liquids in drilling fluids were used during the last drilling campaign in October 2004. This improved the core recovery significantly and core losses were reduced to 10%.

The drill core was split with a diamond saw, and half core was sampled for the assay using geological contacts with a maximum sample length of one metre. The half core was crushed in a jaw crusher and pulverized in a ring or a disc mill depending on the sample weight.

The mineralized zone was trenched in summers 2003 and 2004. In the exploration trenches, weathered bedrock samples analyzed (each about four kg) consist of nine sub-samples collected within one square meter area. The trench samples, each about four kg in size were pulverized in a disc mill.

Drill core were assayed in the GTK Geolaborary by GFAAS (Geolaboratory method 522U, GFAAS, *aqua regia* leach, Hg co-precipitation, 20 g of sample material) and for the trench samples Pb-Fire assay (Geolaboratory method 704A and 705A GFAAS, Pb-Fire Assay, 25–50 g sample) was used. In addition, to evaluate cyanide-soluble free gold, the sodium cyanide leach method with a 3-hour tumbling with the LeachWELL accelerator (Geolaboratory method 235A) was used for 12 high grade samples and the results indicate that gold is free milling.

Silver, Al, As,B, Ba, Ca, Cd, Co, Cr, Cu, Fe, La, Li, Mg, Mo, Na, Ni, P, Pb, Sb, Sc, Si, Sr, Th, Ti, V, Y and Zn were analysed using a ICP-AES technique with aqua regia digestion (Geolaboratory method 511P). In addition, Bi, Sb, Se and Te were analyzed for all samples from the last drilling campaign (holes R273-R279) with the Geolaboratory method 511U (ICP-AES technique with aqua regia digestion) and 13 selected samples from drill hole R275 with the method 175X (XRF, pressed pellets).

4.2 Geochemical surveys

Gold and Te were assayed from the archived till samples collected in 1970's during the regional geochemical mapping program (Gustavsson et al. 1979) using Geological Survey of Finland Geolaboratory method 522U (GFAAS; *aqua regia* leach, Hg-co-precipitation, 20 g subsample, <0.06 mm fraction of till). The mean concentration of gold for 1117 samples selected in the Ruosselkä area over 100 km^2 is 9.4 ppb and the standard deviation 19.7 ppb. Gold content exceeds 20 ppb in 100 samples.

The Ruosselkä heavy mineral survey of till covered 120 km^2 and consisted of 25 large samples. Each sample weighted about 200 kg and was collected within a 10 m x 10 m area from five subsites. The initial heavy fraction concentration of the samples was done in the field with a sluice and furrow and the concentrate was hand panned to magnetite. The final separations were made with an electromagnetic separator (Frantz) in the GTK mineral laboratory at Rovaniemi.

4.3 Geological mapping

GTK has mapped the region including the Ruosselkä area at 1:100,000 scale and the geological map was published in 2005. A more detailed geological mapping in the Ruosselkä area has been done during the current exploration program (Rantala 2003). However, the outcrop conditions in the Sakiatieva prospect are poor and the geological map interpretations (Figs. 5 and 26) are mainly based on geophysical surveys, trench mapping and drilling.

4.4 Geological surveys

High-resolution, low-altitude airborne magnetic, electromagnetic and radiometric surveys measured for national aerogeophysical mapping project cover the study area. The line spacing is 200 meters and survey altitude 30–40 meters. Magnetic, electromagnetic VLF-R and electrical IP methods have been used for more detail ground geophysical surveys in the area. Description of ground geophysical data with index map is presented in Fig. 14 and appendix 1.

The strongest magnetic anomalies in the study area are caused by ultramafic komatiites. In the Sakiatieva prospect, there is a weak 100-200 nT magnetic anomaly due to pyrrhotite (Fig. 15). Direction of the magnetic and VLF-R profiles in prospect area has been SW-NE, which is the same than mineralization trend. Because of this magnetic data don't contain the optimized response from mineralized shear zone. Tilt derivative (TDR) calculated from the magnetic data define trends of lithological units, fold structures and shear zones very well and also the prospect area stand out as a positive anomaly (Fig. 16).

Due to graphite and sulphide dissemination, the mineralized zone is conductive and well detected by electromagnetic VLF-R and electric IP/resistivity soundings as conductivity and chargeability anomalies. In figure 17 apparent resistivity of VLF-R measurements is presented. Strongly weathered bedrock in the prospect area makes shape of the VLF-R anomalies more fuzzy. Fold structures surrounding the prospect has also conductivity anomalies detected by VLF-R and IP/resistivity methods (Figs. 17 and 18).

Dipole-dipole array was used for the IP/resistivity soundings in the first ground geophysical surveys. Dipole-dipole system is very sensitive to vertical structures. Due to horizontal structures like dry sand and gravel layers in soil, and weathered bedrock, data measured by dipole-dipole system has quite low signal-to-noise ratio. Nevertheless, resistivity data gives same kind of conductivity image than VLF-R method, and anomalies associated with weathered bedrock and fold structures are detected (Fig 19). In summer 2006, a pole-dipole array, which has a much higher signal strength compared to dipole-dipole array, was applied. Four profiles across the mineralization were measured. It was detected that the graphite and sulphide-bearing deformation zone can be divided into two different parts (Figs. 19 and 20).

4.5 Petrophysical measurements

The petrophysical properties of the drill core samples from 26 holes were measured in laboratory conditions at Rovaniemi. The suite consisted of the measurement of density, magnetic susceptibility, and the intensity of remanent magnetization from 2412 samples. The measurements are discussed more thoroughly in the report by Turunen and Keinänen (2007).

The correlation between density and the analysed elements is low, which suggests that structural properties of rocks are the reasons behind density variation. Alteration has a minor lowering effect on density. There is a negative correlation between density and Au content, as well as between density and rocks containing sulphides. The variation of density within each rock type is bigger than between separate rock types.

Susceptibility of ore containing rocks is somewhat increased but is not separable from phyllites. The correlation coefficients between susceptibility and analysed elements are mostly positive. Susceptibility increases weakly with increasing gold content. Introduction of sulphides means an increase in susceptibility. Alteration has no positive or negative effect on susceptibility.

The intensity of remanence correlates strongly with susceptibility and what is said about susceptibility applies to remanence, too.

Electric and radioactive methods would possibly have been useful in detecting ore and especially gold bearing rocks. Unfortunately, all the drill holes were blocked and no downhole loggings could be made. Gamma radiation intensity was checked from the cores of hole R259 in laboratory. Radiation intensity was very low and no difference between separate rock types was detected; only the section 85 – 93 m of silicified phyllite showed slightly increased radiation. The apparently negative radiation values are the result of the statistical nature of radioactive radiation and the very low radiation levels.

Figure 21 shows petrophysical data from the cores of the section through drill holes R258 – R259. The two graphs at the bottom show a closer look at the depth of high gold values.

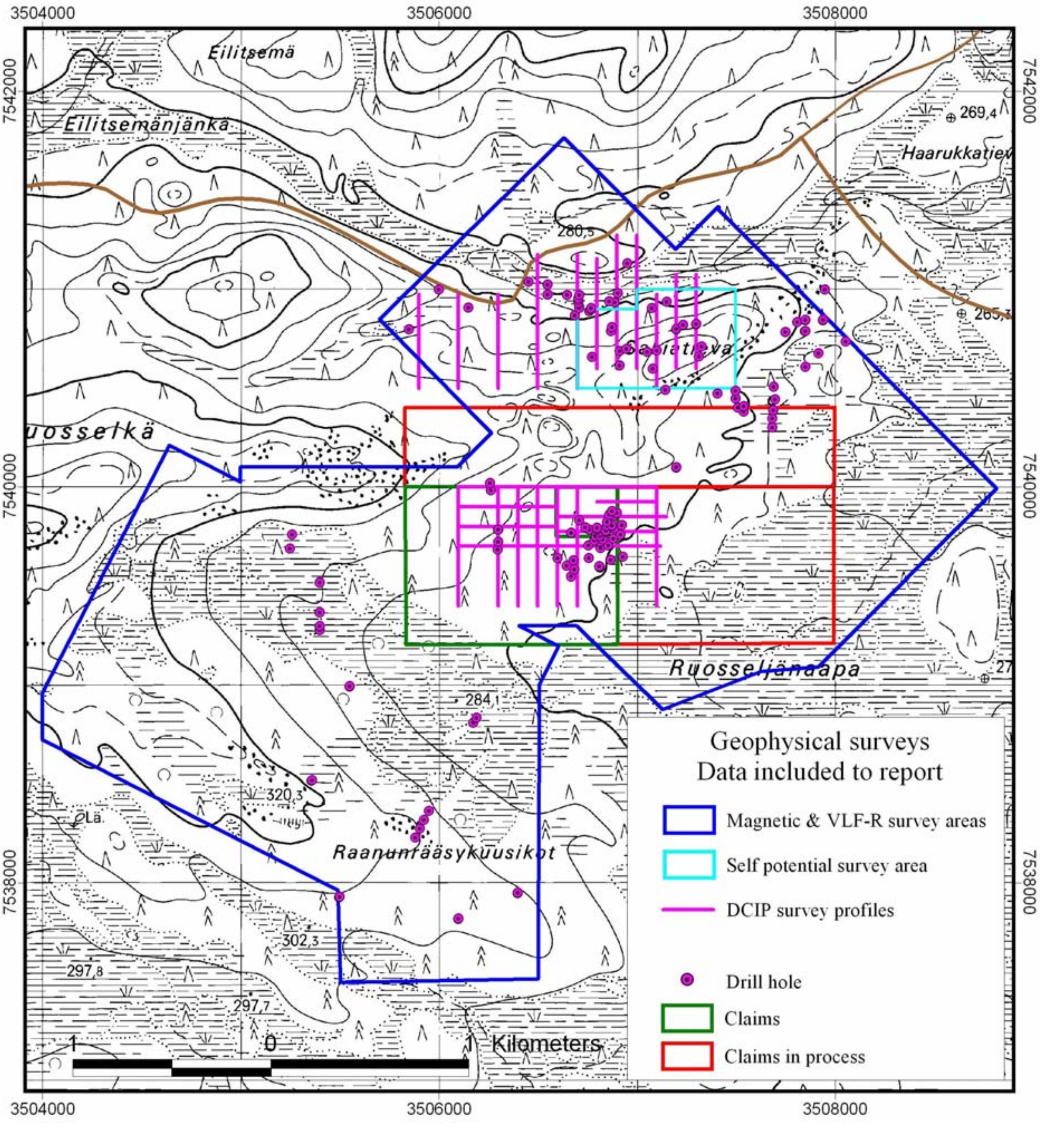

Figure 14. *Index map of the Sakiatieva ground geophysical surveys. (Basemap @ National Land Survey of Finland, license 13/MYY/07).*

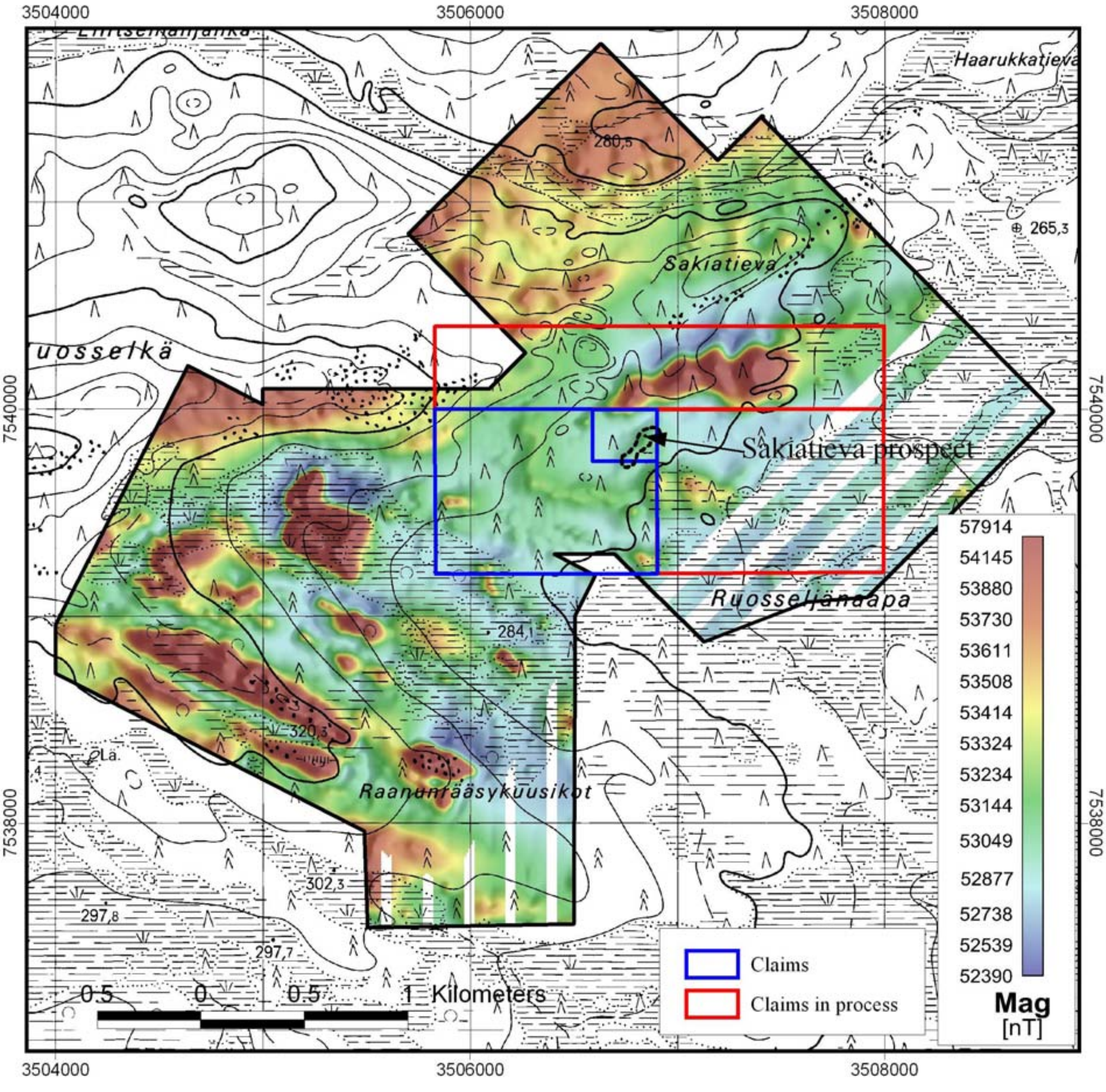

Figure 15. *Shaded relief map of total magnetic field. The dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. (Basemap @ National Land Survey of Finland, license 13/MYY/07).*

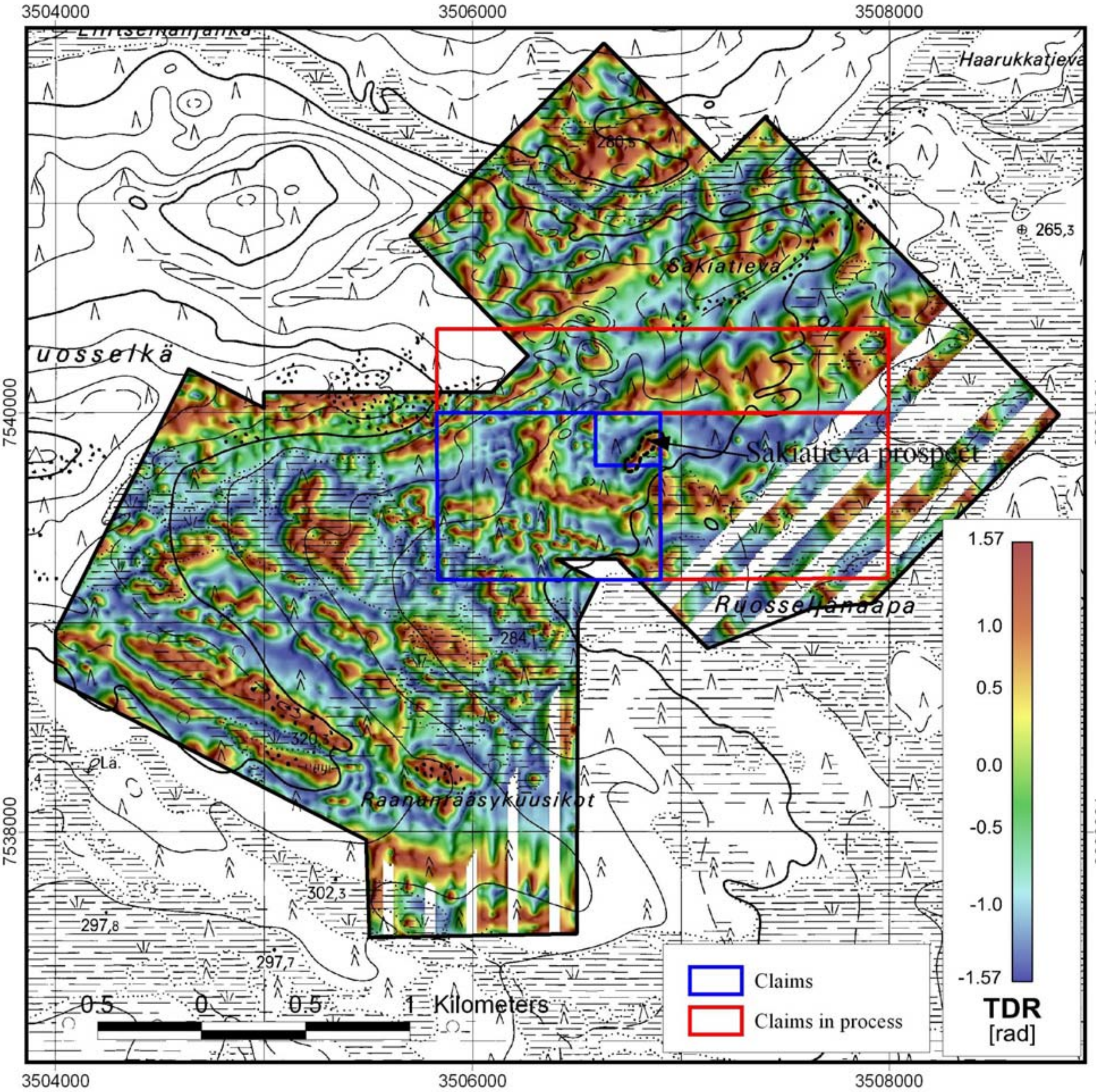

Figure 16. *Tilt derivative map calculated from ground magnetic data. The dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. (Basemap @ National Land Survey of Finland, license 13/MYY/07).*

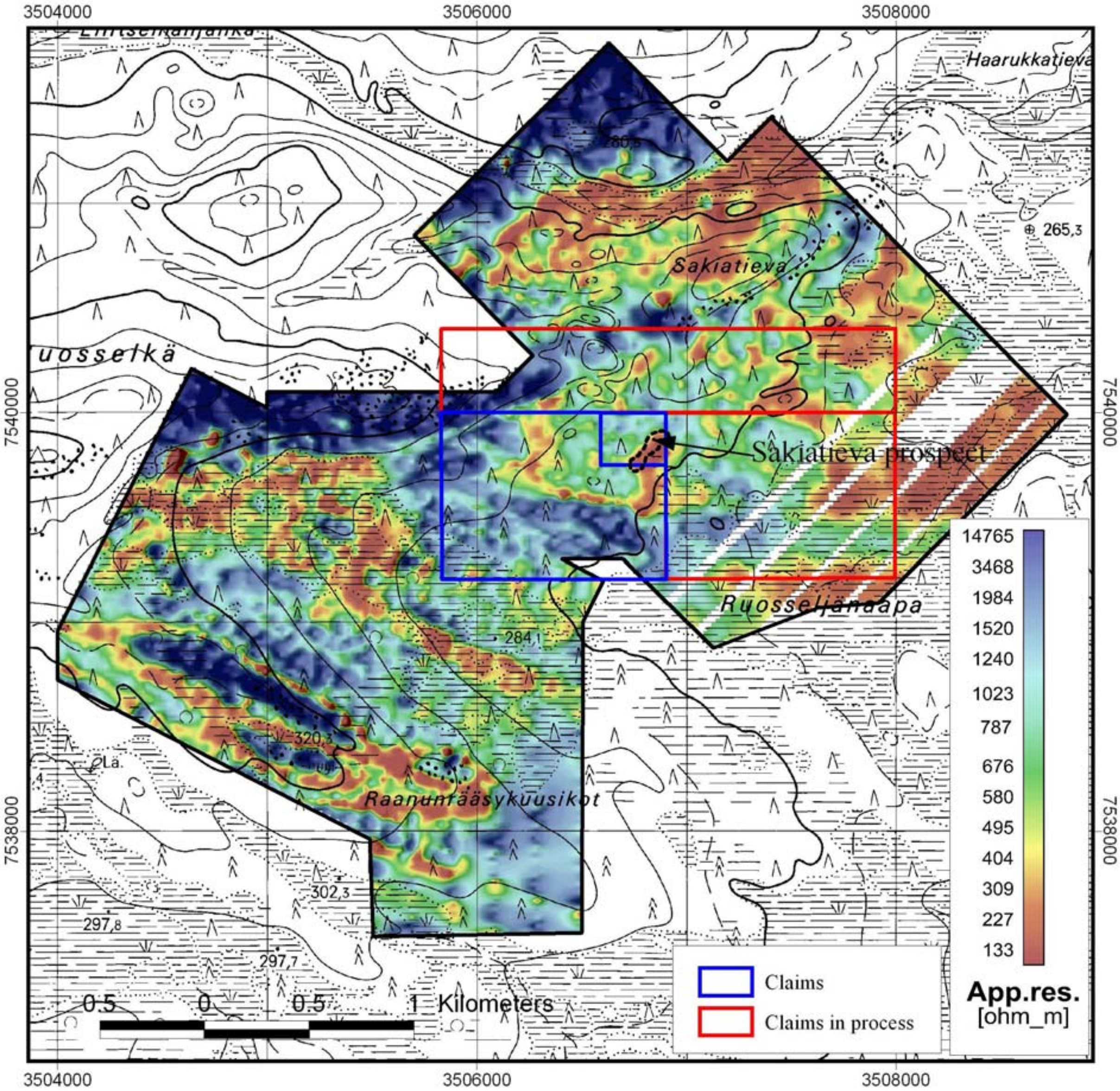

__Figure 17.__ VLF-R apparent resistivity map from Sakiatieva area. The dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. (Basemap @ National Land Survey of Finland, license 13/MYY/07).

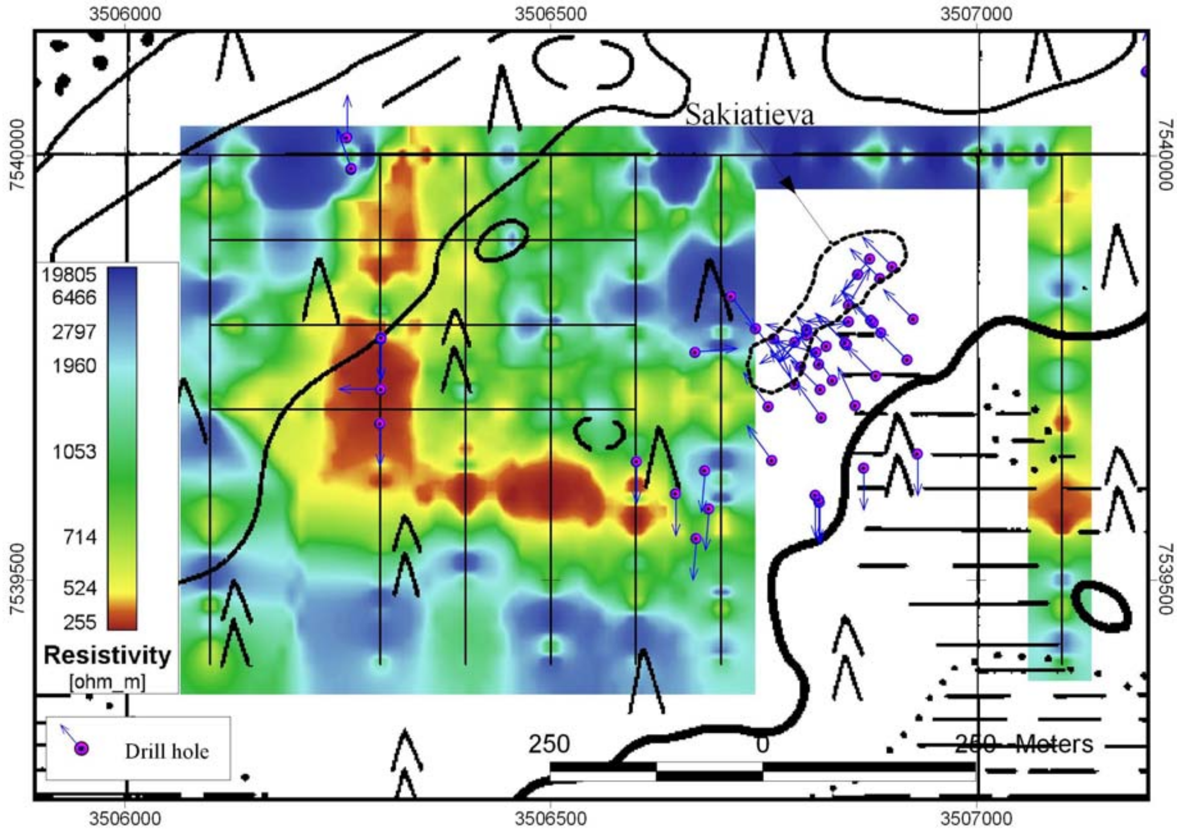

Figure 18. *Resistivity surface interpolated from dipole-dipole DCIP models from depth of ~20-30 meter. The dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. Drill hole locations are also presented and the dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. (Basemap @ National Land Survey of Finland, license 13/MYY/07).*

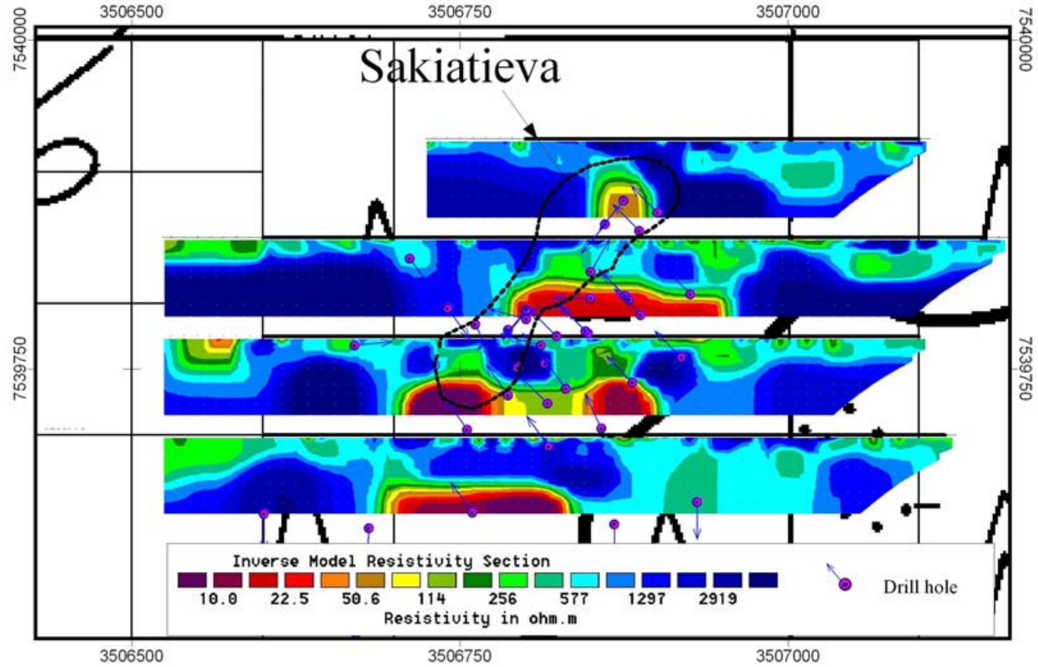

Figure 19. *Vertical sections of chargeability models interpreted from pole-dipole DCIP soundings. Depth extent of sections is ~65 meter. The dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. Drill hole locations are presented in XY-plane. (Basemap @ National Land Survey of Finland, license 13/MYY/07).*

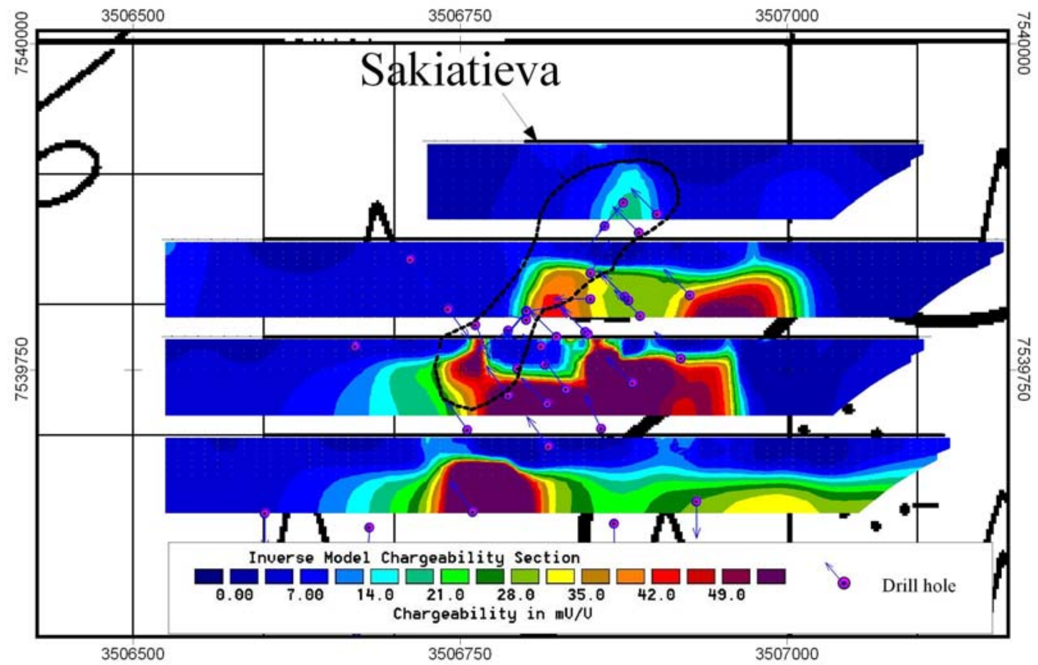

Figure 20. *Vertical sections of chargeability models interpreted from pole-dipole DCIP soundings. Depth extent of sections is ~65 meter. The dotted line shows the interpreted trend of the gold mineralization at Sakiatieva. Drill hole locations are presented in XY-plane. (Basemap @ National Land Survey of Finland, license 13/MYY/07).*

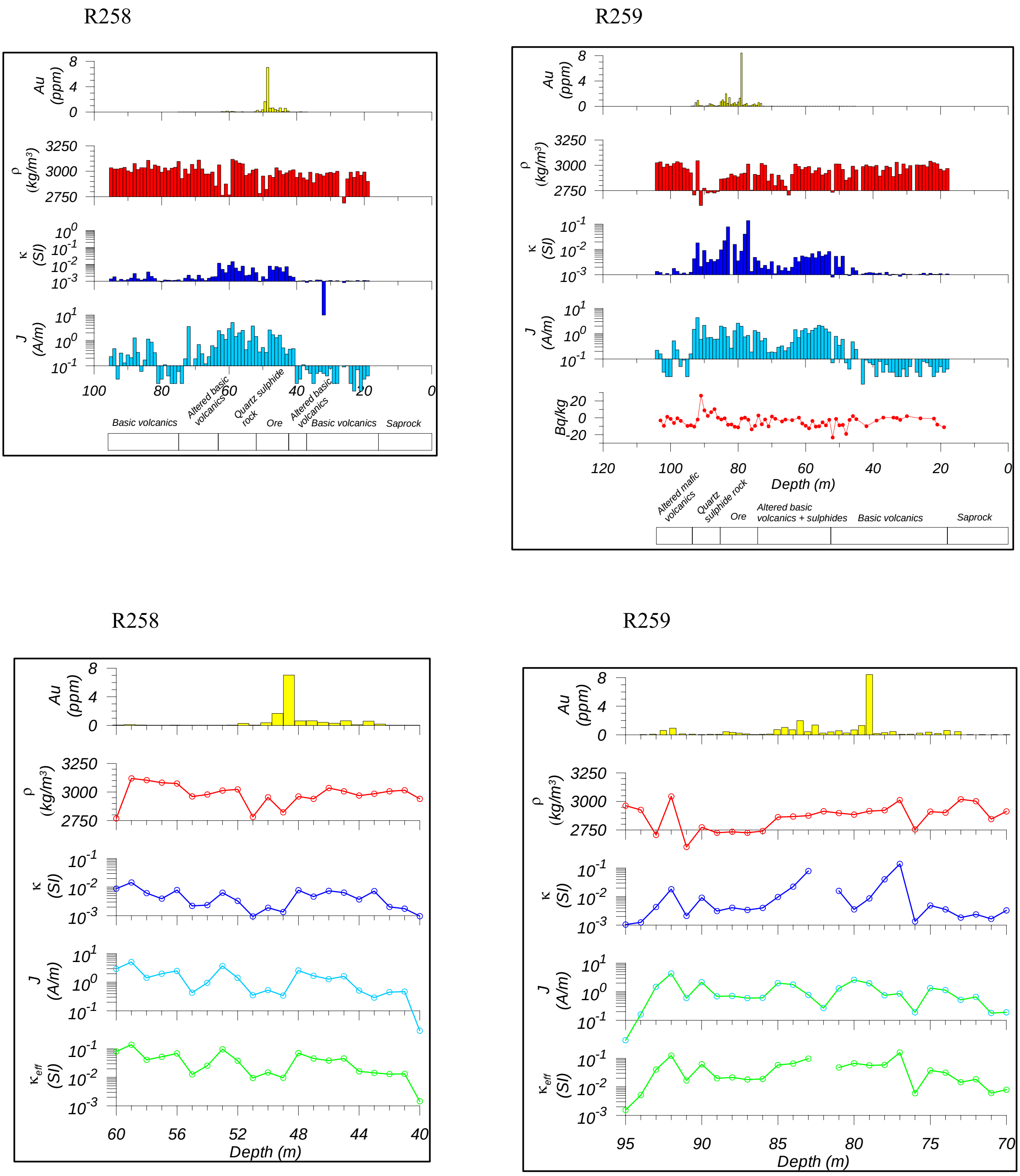

Figure 21. *Petrophysical measurements from the section through drill holes R258 – R259 (for a closer look at the geology of the section, see fig. 25).*

5 PROPERTY GEOLOGY

5.1 The Sakiatieva gold prospect

The dominant trend of lithological units in the Ruosselkä area is E-W, but in the Sakiatieva prospect the lithological tend is SW- NE (Fig. 22). The rocks have been folded and metamorphosed at greenschist to lower-amphibolite facies conditions before the gold mineralization took place. The fold axis measured from oriented drill core plunges moderately to the NE and NW.

Distal alteration in mafic rocks is defined by weak silification and appearance of biotite and carbonate and calc-silicate minerals. In graphitic phyllites the distal alteration is defined by silica alteration (Figs. 23-26).

The proximal alteration zone in the mafic volcanic rocks is defined by carbonate, biotite, tremolite, diopside, rutile and sulphides. The proximal alteration in the phyllitic sedimentary rocks is marked by sericitization, silicification, carbonatization and sulphidation (Fig. 27). The calcareous interlayers of phyllitic rocks are altered into coarse-grained diopside-carbonate-sulphide rocks. Quartz-carbonate-sulphide veins and breccias are abundant in the proximal alteration zone.

The highest gold values at Sakiatieva are associated with strongly altered and deformed rocks. The drill-tested mineralization is about 200 m long and 10 m wide and interpreted to be parallel with a NE-trending shear zone. The ground geophysical measurements suggest that the gold mineralization related alteration zone is 50 – 200 m wide and 400 m long (Fig. 19). Higher gold grades appear to form steeply NE plunging zones, which have a lower resistivity than the less altered parts. The gold grades in the weathered bedrock sampled from the exploration trenches are higher than in fresh rock indicating supergene enrichment in the weathering profile (Fig. 28 and 29).

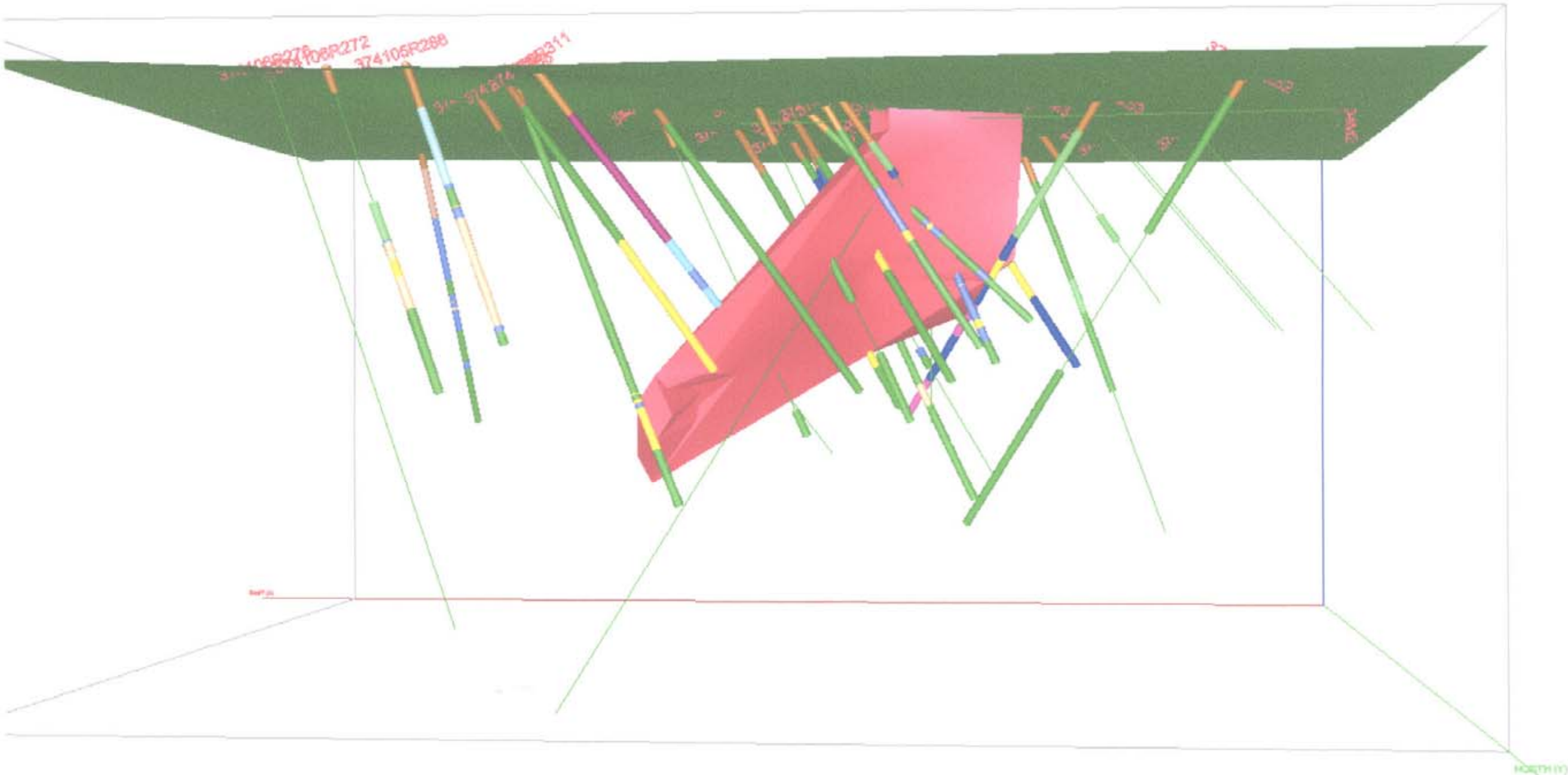

Figure 22. *Perspective view of the 3D-model of the Sakiatieva mineralization, view to south.*

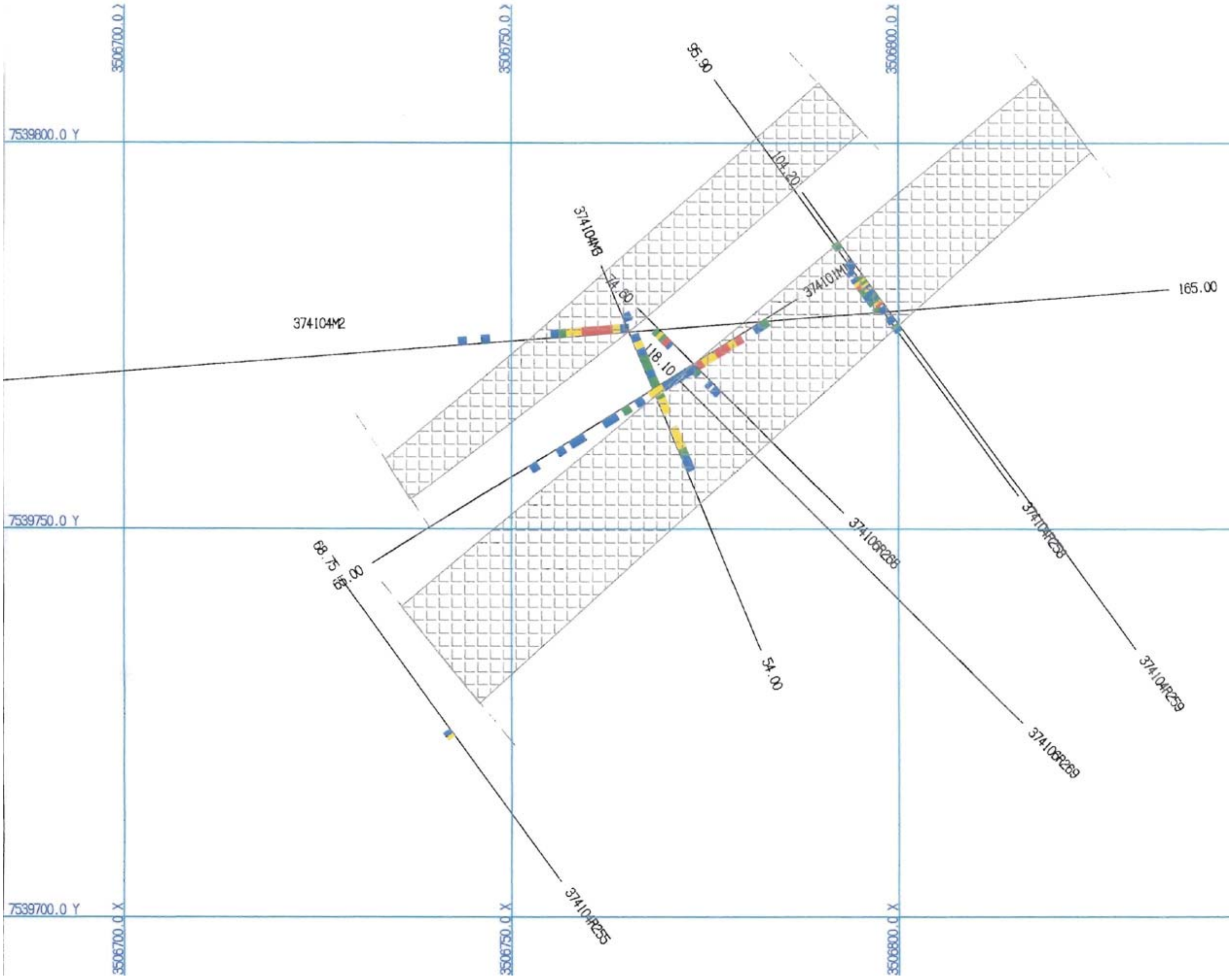

Figure 23. *Plan view and cross sections through the main mineralized zone showing the interpreted ore and alteration zone.*

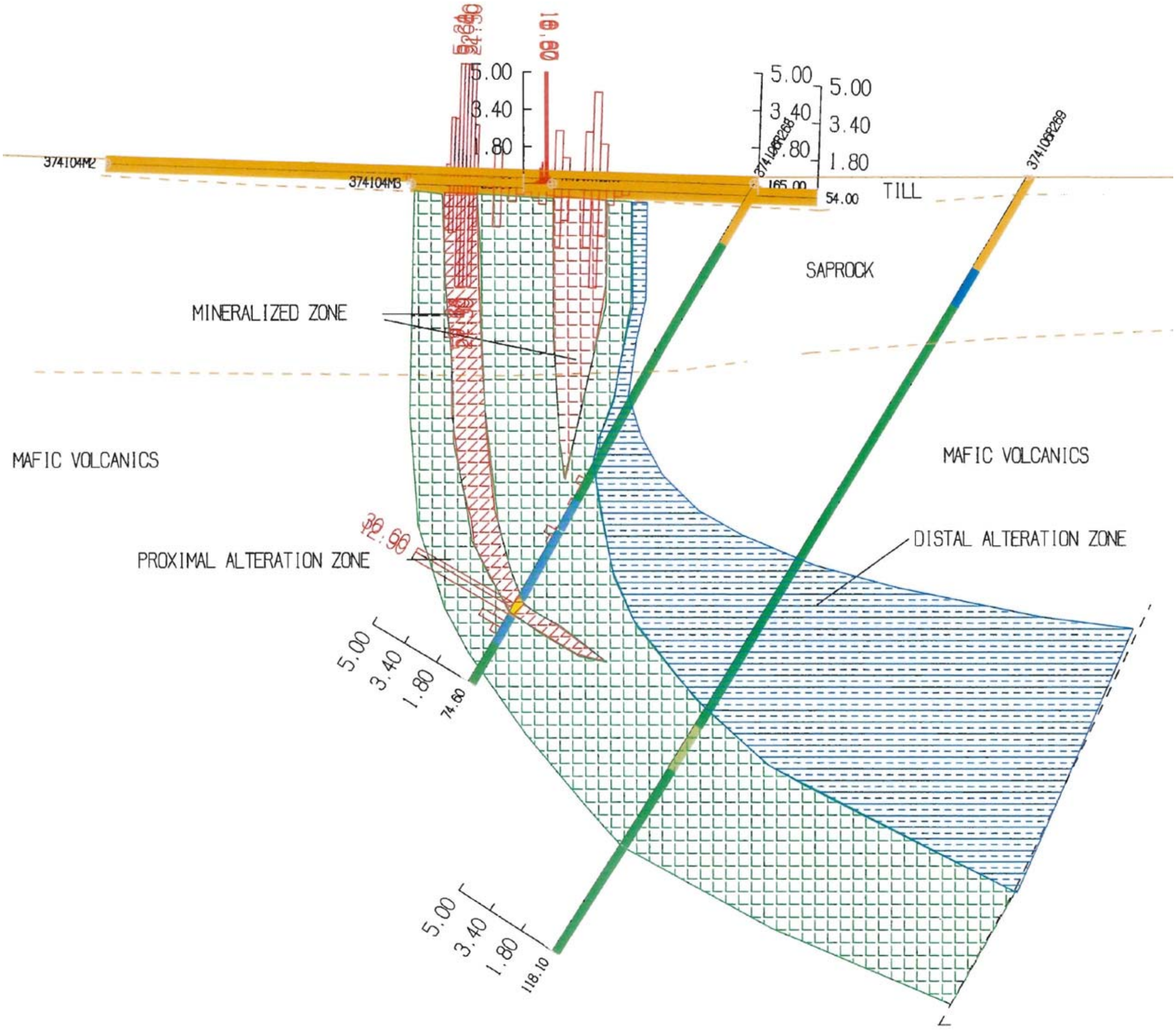

Figure 24. *Section trough drill holes R268-R269 and the exploration trenches. Gold values above the drill hole trace.*

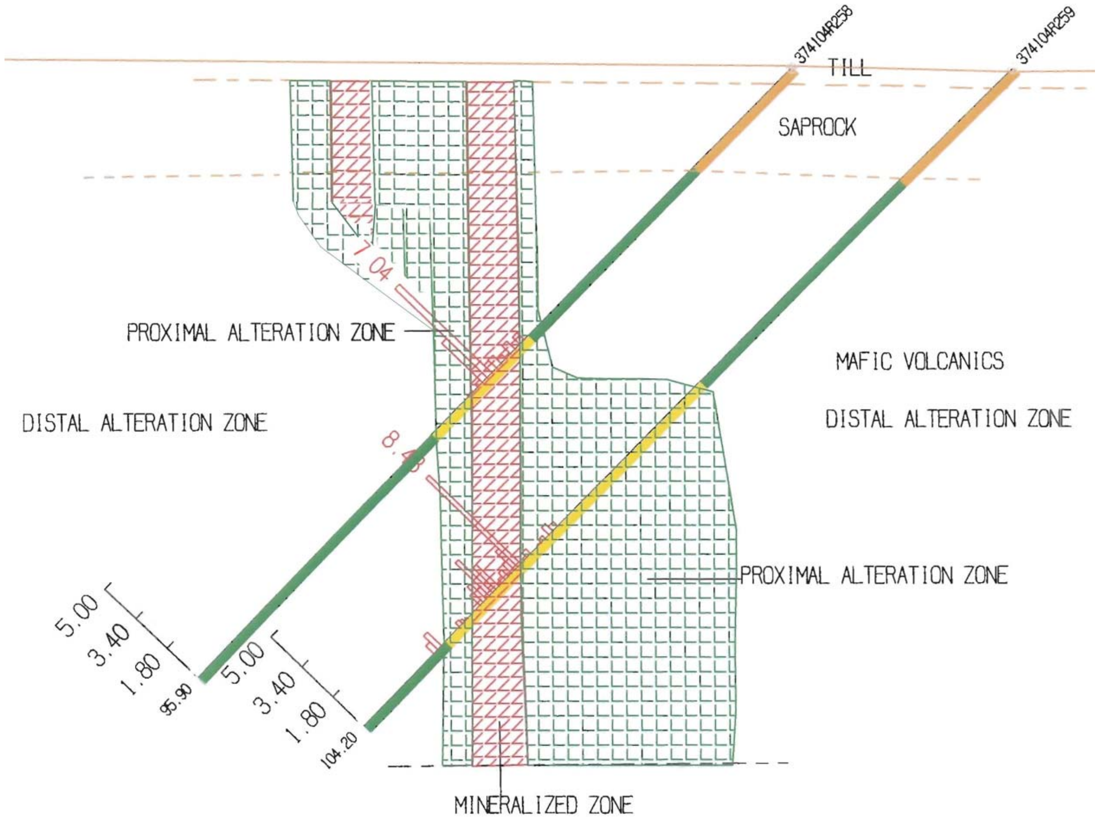

Figure 25. *Section through drill holes R258-R259. Gold values above the drill hole trace.*

Figure 26. *Photograph showing a high grade intersection between 61.80 m - 68.35 m in the drill core R268. (weighted mean 7 ppm Au, max 30 ppm). Note the alteration related bleaching.*

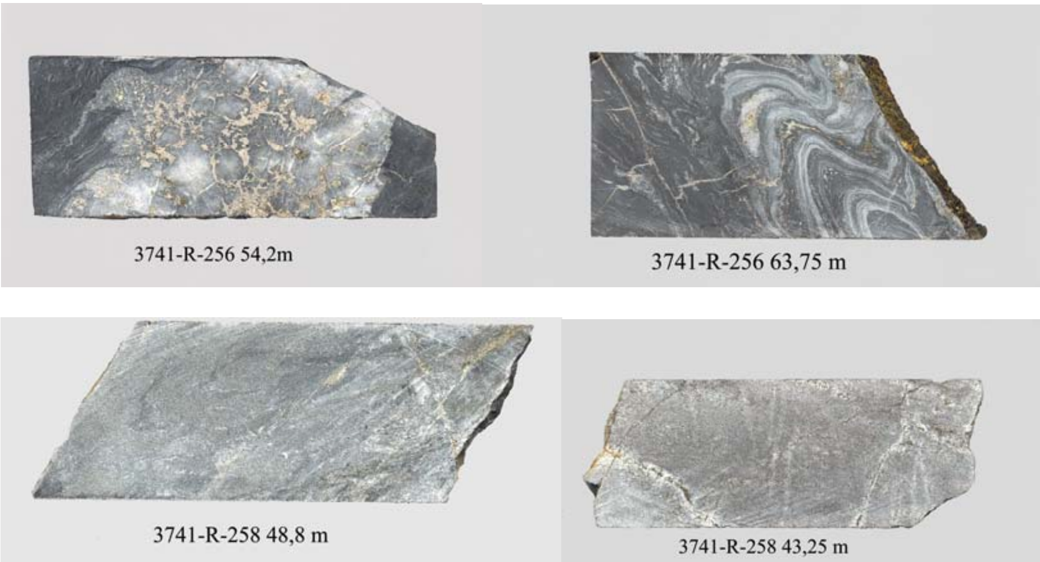

Figure 27. *Typical samples from the Sakiatieva gold mineralization: Pyrrhotite and chalcopyrite in gold-bearing quartz vein (R256 54.2 m), tightly folded quartz and sulphide rich skarn banded graphitic phyllite (R256, 63.75 m), quartz, carbonate and sulphides in mafic volcanite, which contains 7 ppm Au, 3 % S (R258, 48.8 m), altered mafic volcanic with quartz veins and some sulphides (R258, 43.25 m).*

5.2 Structural geology

The Sakiatieva area is poorly exposed and the bedrock surface exposed in the exploration trenches is typically the lower saprolite or the saprock part of the weathering profile. In places, the weathering profile is tens of meters thick and in fault and shear zones weathering is even deeper. Consequently, structural geology interpretations are based on the aerogeophysical and ground geophysical maps and oriented drill core (from six holes).

The main lithological trend in the area is E-W along the southern side of a post tectonic Nattanen granitoid intrusion (age 1.77 Ga) (Figs. 5 and 30). However, it is quite obvious from the magnetics that the area has a complex deformation history (Figs. 15 and 16). This is also seen in the exploration trenches where folded graphitic layers in sedimentary rocks give indication of a complex fold interference (Figs. 28-30). Several deformation stages can be distinguished but they do not necessary represent temporally different events and may be transitional and belong to a single deformation event. Therefore, the convention Dn to Dn+x is used to distinct between deformation stages and related structures, which can be recognized and separated in terms of fabrics and overprinting relationships.

Figure 28. *Photo of the floor of the exploration trench showing the ore exposure. Note the folded black graphitic layers and that the bedrock is strongly weathered (saprock). View to east.*

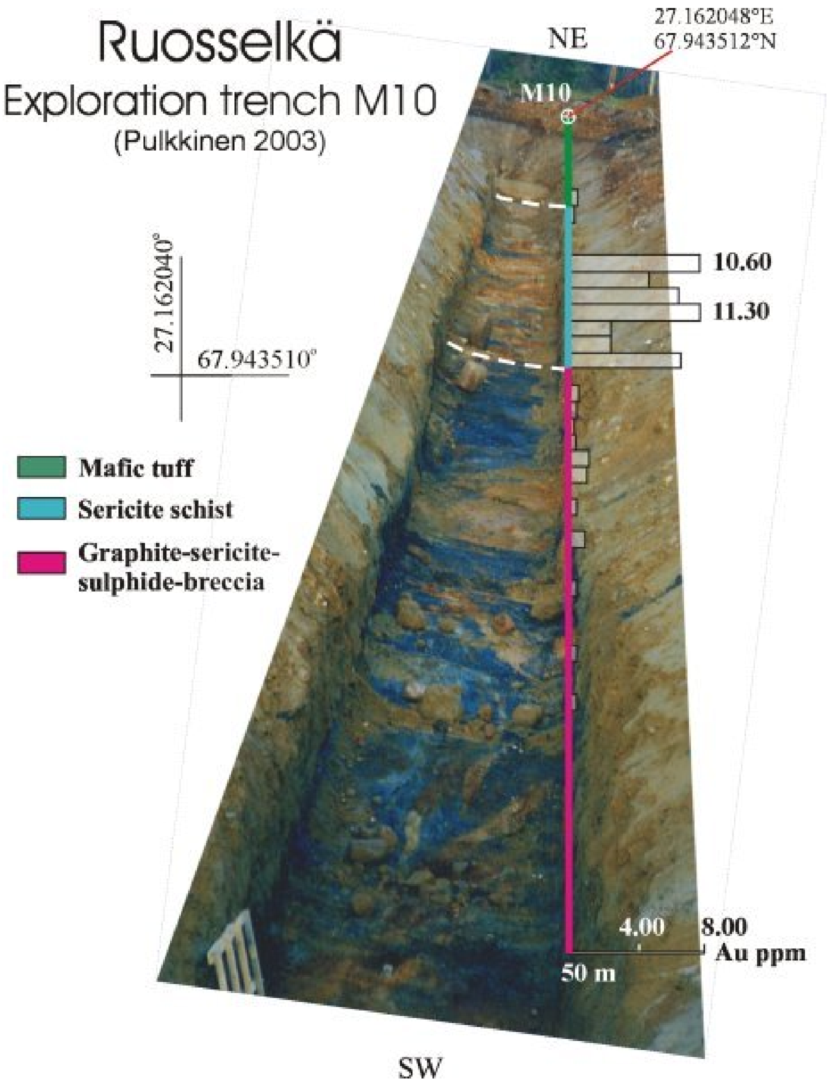

Figure 29. *Photograph of the exploration trench M10 with gold assay values (ppm), note the high gold content (up to 11.3 ppm) in iron oxide stained sericite schist.*

In the drill core, primary bedding is preserved in places, but no reliable younging orientations have been observed. The dip of the main foliation (Sn) is mostly moderate and the dip direction varies from north to east (Fig. 31a). The mean orientation of Sn is 33→057 (Fig. 31b). The fitted beta axis plunges 32→042, which is very close to measured Fn+1 axis orientations (Figs. 31c, 32c). Two styles of folds have been observed in drill core, tight to isoclinal recumbent chevron folds (Fig. 32b, interpreted as Fn) and larger amplitude rounded hinge folds which crenulate the Sn foliation (Fig. 32c, interpreted as Fn+1). The measured orientations of the Sn+1 crenulation cleavage (mean 84→317) also fits to axial plane of measured fold axis and calculated beta axis (Fig. 33) sulphide (pyrrhotite) mineralization have been partially remobised along the Fn+1 axial planes and crenulation cleavage (Fig. 34).

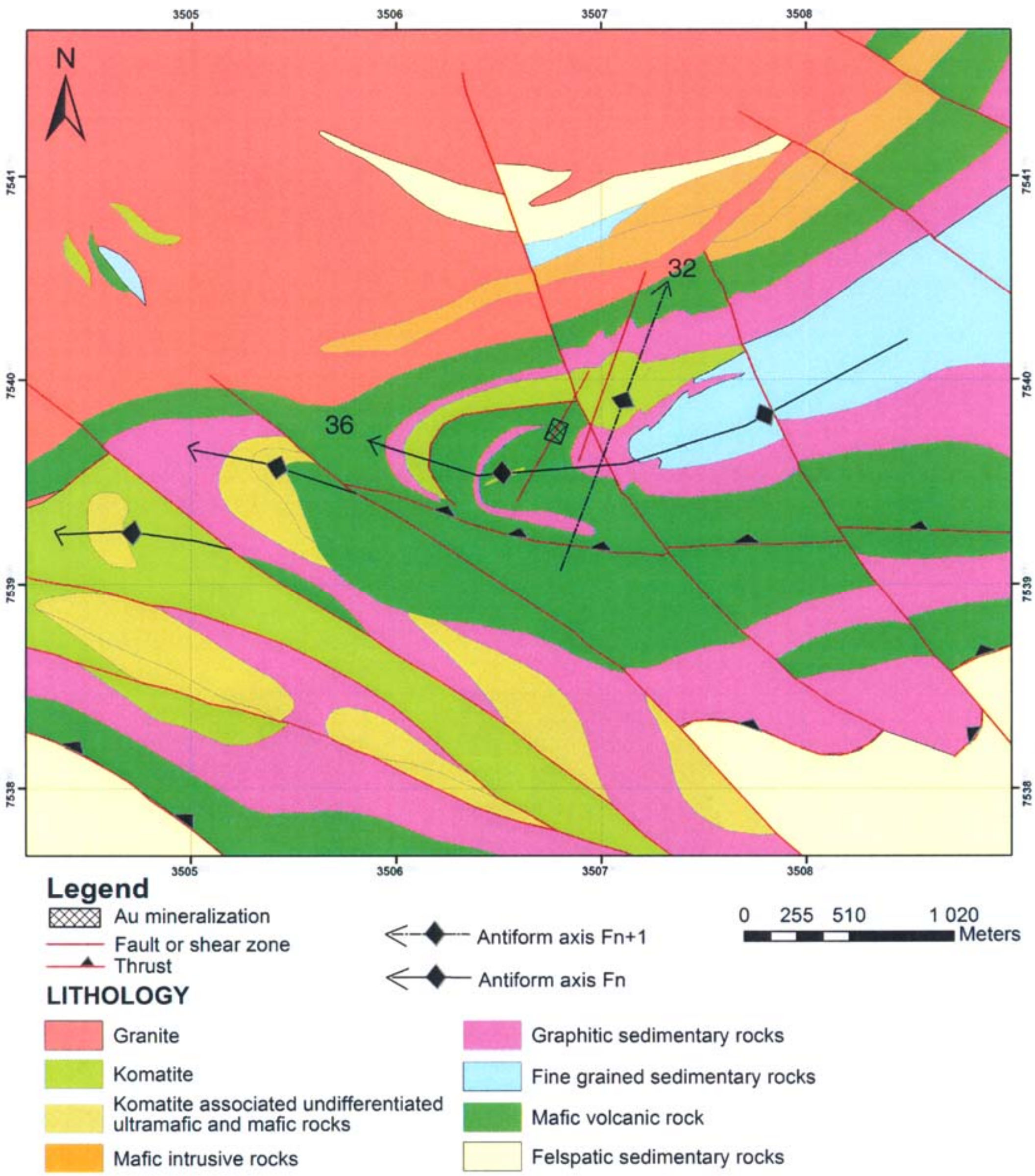

Figure 30. *Solid geology interpretation of the Sakiatieva prospect area.*

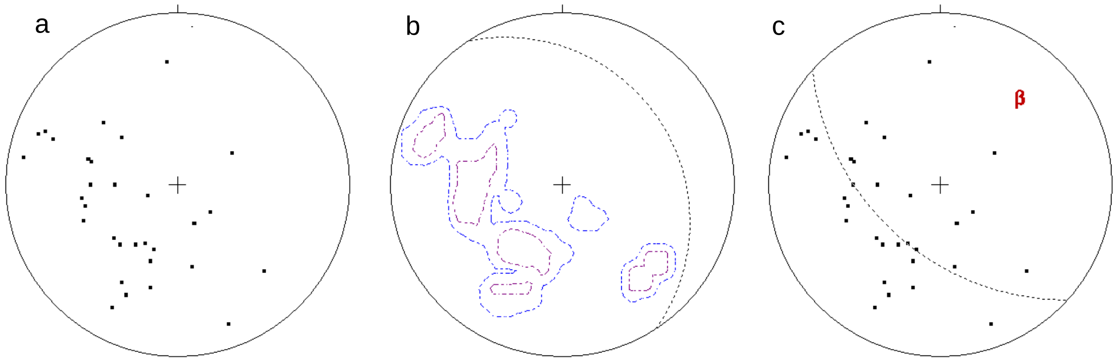

Figure 31. *Summary stereoplots (lower hemisphere equal area) of representative orientations. a) foliation poles (Sn), b) contoured foliations poles and mean great circle 33→057, c) foliation poles and fitted beta axis (fold axis).*

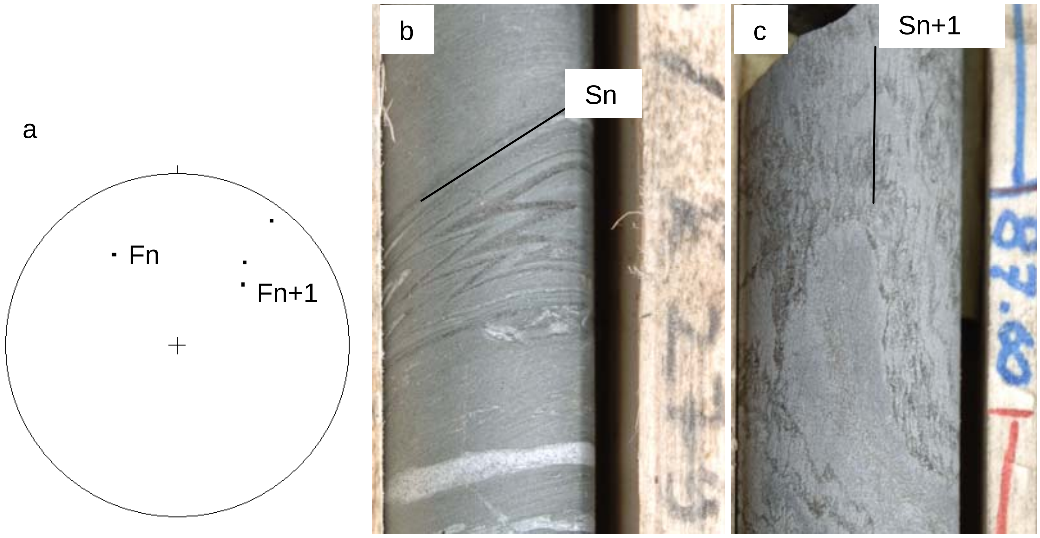

Figure 32. *a) Stereoplot of measured fold axis (Fn = 36→325, mean Fn+1 = 32→040), b) Fn fold axis style, c) Fn+1 fold and crenulation cleavage (Sn) (Hole R279).*

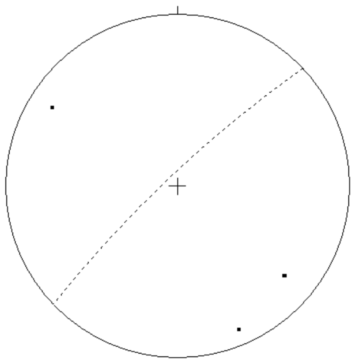

Figure 33. *Orientations of Sn+1 crenulation cleavage (mean orientation 84→317).*

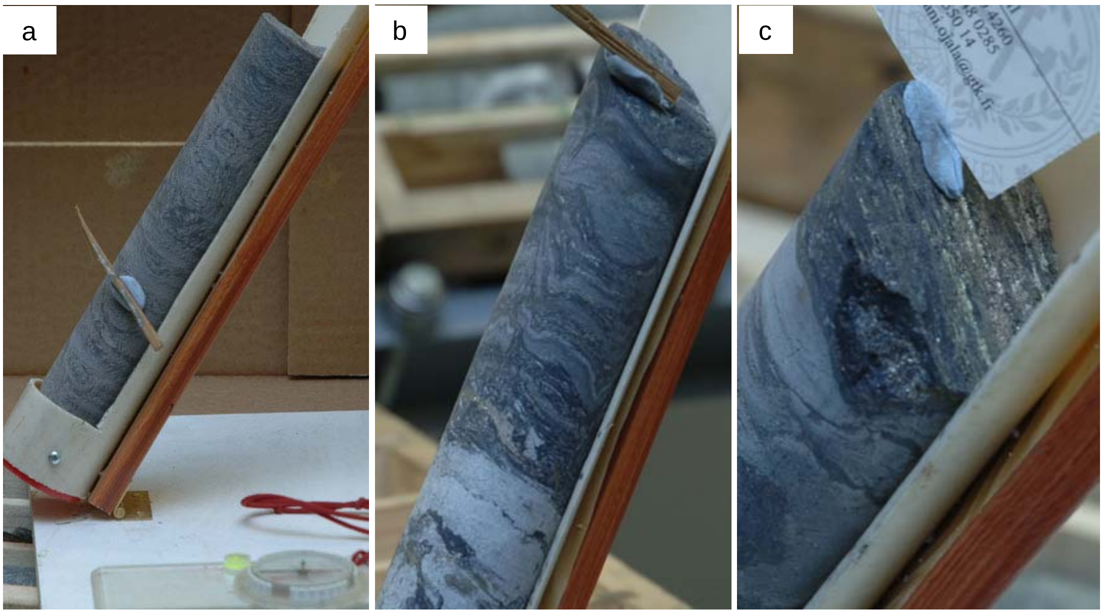

Figure 34. *Images of drill core (hole R279) showing a) NE plunging fold axis (Fn+1), b) minor axial plane shears and sulphides partially remobilised along the axial plane shears, c) crenulation (axis same as Fn+1) and partially remobilised sulphides plunging along crenulation axis. (These intersections are outside of the mineralization).*

Only few mineralized sections of the core were successfully oriented due to strong shearing and broken core. The measured two weakly mineralized quartz veins cut the foliation as demonstrated by their different orientation to the mean foliation orientation (Fig. 35). Mineralized shear foliation orientations are within the variation of Sn orientations and most of the dip NE. However, there are also SW dipping mineralized shears (Fig. 36).

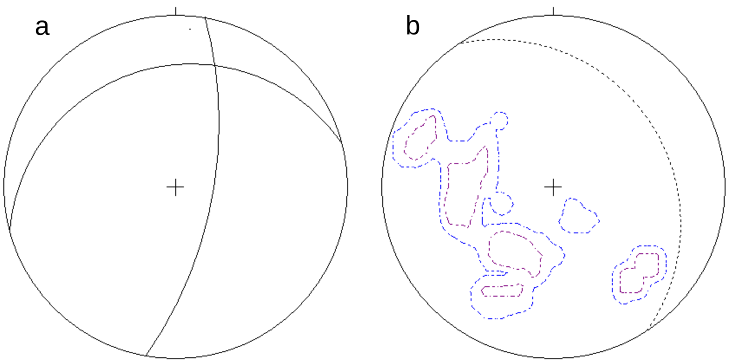

Figure 35. *a) Mineralized N and E dipping quartz veins plotted as great circles (Au grade 0.3 and 0.6 g/t), b) the mean Sn orientation for the comparison.*

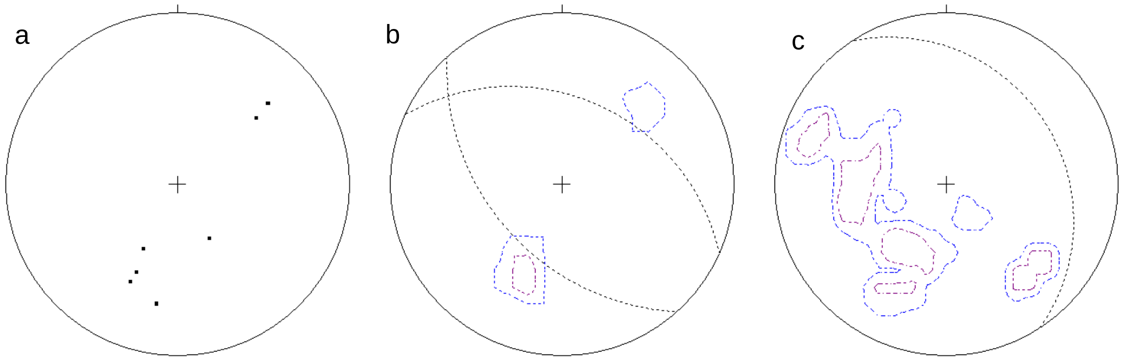

__Figure 36.__ Summary plots foliation orientations of the mineralized shears. a) poles to shear foliations, b) contoured poles and fitted their best fit orientations as great circles (48→024 and 56→228), c) the mean Sn orientation for the comparison.

It is interpreted that the geometry of the area is the result of N-S shortening. Compression has then rotated to E-W and reactiavated earlier faults and folded the earlier folds (Fig. 37). The current interpretation is that the mineralization trends NE-SW and has moderate plunge. This orientation correlates with the Fn+1 axial plane and fold axis plunge. The foliations within the mineralized shears trend NW-SE and dip NE and SW but in the exposed ore zone in the exploration trench there were no obvious visual indications of structures in this orientation (Fig. 28).

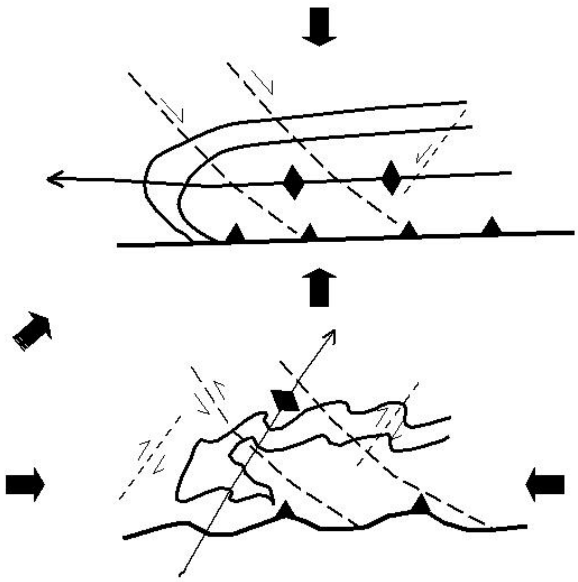

__Figure 37.__ Schematic structural history interpretation of the Sakiatieva area. It is interpreted that the compressional deformation started with a N-S compression stage, which rotated through NE-SW to E-W compression. During later stages earlier formed structures deformed and faults reactivated according to the new stress field.

5.3 Geochemistry of the mineralization

The mineralized zone is at least 200 m long and up to 15 metres wide (average 6 m) which has been interpreted to plunge moderately to NE and continue to the depth of over 100 m. The threshold value of 0.2 ppm was selected for the mineralization according to cumulative distribution of the Au-contents (Fig. 37). The mineralization has been intersected in 21 drill holes and three trenches. The total length of analysed samples is 177 metres and the average gold content 1.7 ppm (0.2-52.4). The average gold intersections in different drill holes and trenches have been summarized in Table 2. The gold mineralization is characterized by high sulphide and base metal anomalies (Figs. 39-41, Table 3).

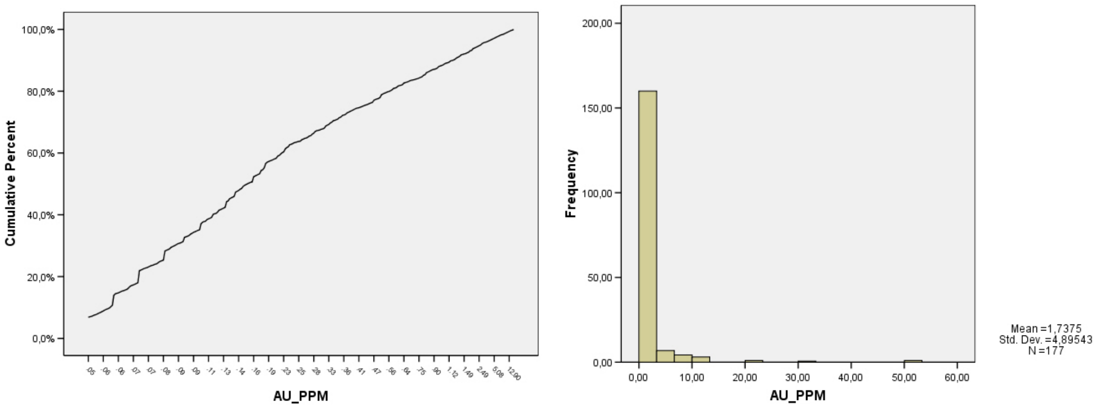

Figure 38. *Cumulative distribution of gold contents (Au>0.05 ppm) and gold frequence (Au>0.2 ppm).*

Table 2. *Gold content in the Sakiatieva drill cores (R) and trenches (M). N is the length of the samples in m.*

HOLE-ID	Mean	N	Std. Deviation	Minimum	Maximum
374100R310	1.7355	11	1.93424	.32	5.98
374100R311	4.7700	1	.	4.77	4.77
374101M10	2.1925	24	3.33570	.21	11.30
374104M2	8.2150	12	15.19392	.21	52.40
374104M3	1.2039	18	1.16365	.21	4.43
374104R253	.3672	10	.14022	.23	.63
374104R255	.9170	2	.99247	.34	1.49
374104R256	1.2908	10	1.08949	.20	3.34
374104R257	.5964	2	.52021	.36	1.11
374104R258	1.3249	8	2.13622	.28	7.04
374104R259	.9314	13	1.62537	.24	8.43
374105R260	.7182	15	.52531	.21	2.20
374105R261	.5974	8	.39444	.22	1.31
374105R262	.5390	1	.00000	.54	.54
374105R265	.6137	11	.34868	.23	1.36
374105R266	.6831	4	1.11719	.22	3.01
374106R268	3.3086	11	7.86447	.20	30.60
374106R270	.4315	2	.13081	.34	.52
374106R273	.5095	4	.36657	.20	1.12
374106R274	.4335	4	.33052	.22	.93
374106R275	.7477	2	.70895	.24	1.23
374106R276	.3833	2	.06935	.35	.50
374106R277	.4019	3	.34825	.24	.90
374106R278	.3667	2	.17889	.26	.50
Total	1.7375	177	4.89543	.20	52.40

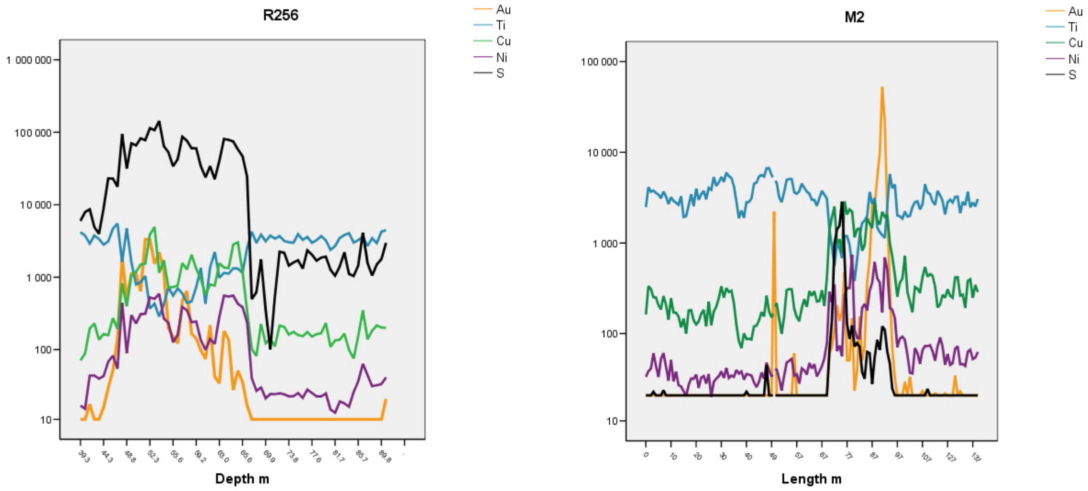

Figure 39. *Element profiles along the drill hole R256 (38.50-89.6 m) and trench M2. Gold (ppb) has positive correlation with Cu, Ni and S (ppm), and negative correlation with Ti, in ore zone between unaltered mafic volcanic rocks, drill core R256. In the trench M2, high concentrations of Au in the weathered bedrock suggest supergene gold enrichment.*

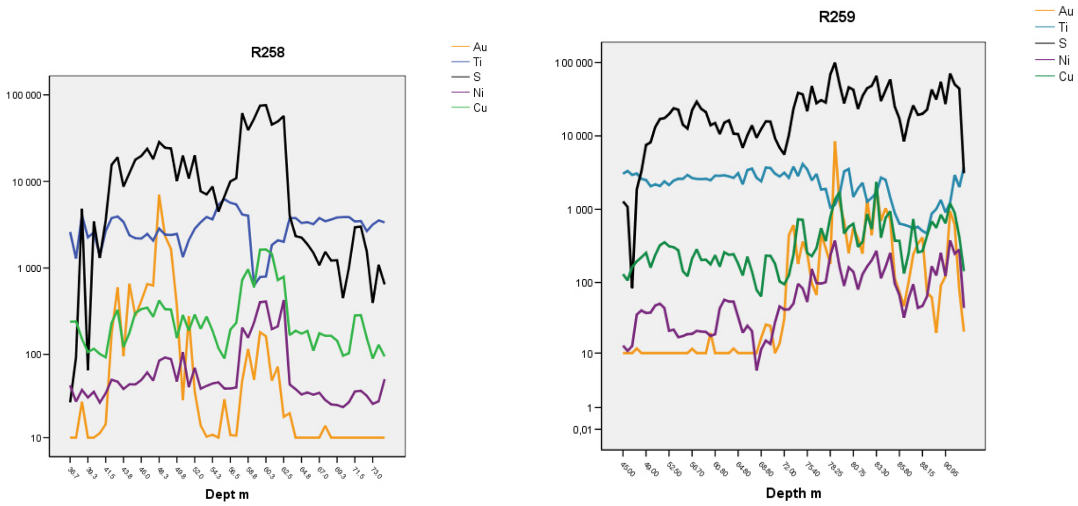

Figure 40. *High base metal levels of the ore zone correlate with gold in the drill profile of R258 (36.70-73.0 m) and R259 (45.00 –90.95 m), although behaviour of gold is more complex in R258.*

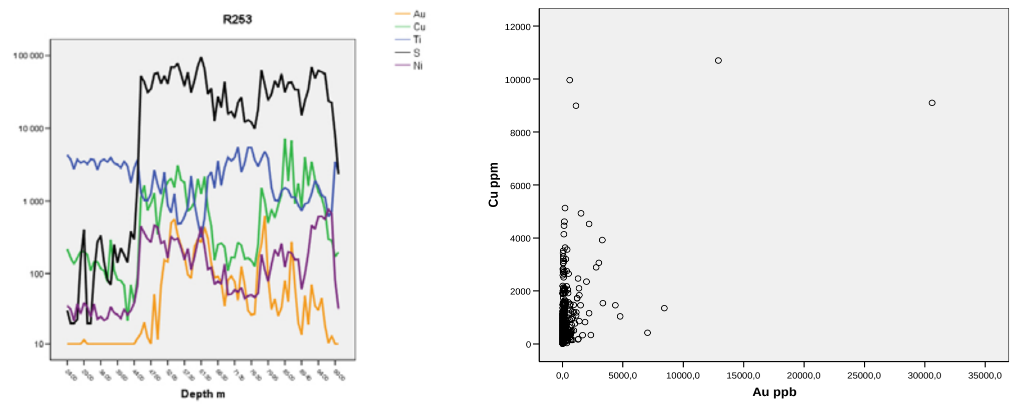

Figure 41. *The behaviour of Au and other elements in altered fyllite and volcanite of R253 (24-99 m) indicates that the drill hole may bypass a high grade gold zone. In gold-bearing samples copper-content is highly anomalous.*

Table 3. *Gold and base metal contents in the Sakiatieva mineralization (Au>200 ppb)*

Drill hole		Au ppb	Cu ppm	Zn ppm	Cr ppm	Ni ppm	Pt ppm	S ppm
255	Mean	917	1130	38	98	755	17	46450
	N	2	2	2	2	2	2	2
	Std. Deviation	992	572	43	1	684	11	29531
	Maximum	1490	1460	63	99	1150	23	63500
256	Mean	1381	1581	27	62	329	11	77726
	N	9	9	9	9	9	9	9
	Std. Deviation	1085	1230	25	39	155	4	31653
	Maximum	3340	4930	90	149	591	23	143000
257	Mean	596	4770	69	110	187	15	38120
	N	2	2	2	2	2	2	2
	Std. Deviation	520	8226	16	87	246	13	66040
	Maximum	1110	9960	82	159	337	28	78900
258	Mean	1355	290	30	11	59	10	19018
	N	8	8	8	8	8	8	8
	Std. Deviation	2025	85	11	10	20	0	6133
	Maximum	7040	421	59	31	92	10	28600
259	Mean	931	693	44	53	147	11	39165
	N	13	13	13	13	13	13	13
	Std. Deviation	1625	527	26	31	100	3	20444
	Maximum	8430	2350	104	115	375	24	99400
260	Mean	718	1291	23	77	217	11	58343
	N	15	15	15	15	15	15	15
	Std. Deviation	525	1239	11	36	129	2	33000
	Maximum	2200	4530	51	144	438	15	119000
261	Mean	587	862	31	295	299	12	30628
	N	8	8	8	8	8	8	8
	Std. Deviation	375	793	19	269	220	3	35201
	Maximum	1310	2650	76	700	733	20	129000
266	Mean	683	1912	44	157	422	13	59428
	N	4	4	4	4	4	4	4
	Std. Deviation	1117	1478	30	188	262	5	49610
	Maximum	3010	3560	80	549	743	20	102000
268	Mean	3309	3052	68	67	312	11	65138
	N	11	11	11	11	11	11	11
	Std. Deviation	7864	3346	84	23	240	3	50499
	Maximum	30600	10700	274	105	723	20	167000
310	Mean	1277	1716	32	138	579		40026
	N	8	8	8	8	8		8
	Std. Deviation	1530	1084	19	86	509		41654
	Maximum	4370	3640	59	225	1380		95100
311	Mean	4770	1040	16	139	308	11	45000
	N	1	1	1	1	1	1	1
	Maximum	4770	1040	16	139	308	11	45000
Total	Mean	1340	1451	38	97	280	11	48907
	N	80	80	80	80	80	72	80
	Std. Deviation	3139	1845	38	123	267	3	37084
	Maximum	30600	10700	274	700	1380	28	167000

5.4 Ore minerals

Following description of the ore and rock forming minerals of the Sakiatieva mineralization is based on the report by Chernet (2006). The main sulphide minerals are pyrrhotite, pyrite, chalcopyrite, and sphalerite along with rare disseminated tellurides, native gold, electrum and complex minerals composed of U-Pb and U-Pb-Th (Fig 41).

Gangue minerals are dominated by carbonate, quartz, tremolite, diopside, mica and rutile. The ore minerals are disseminated and generally constitute about 1 to 15% (vol.) of the rock but in some sections up 20-25%. The host rocks are mainly carbonaceous rock, quartz-sulphide rock, mafic volcanic rocks and phyllite. Proximal alteration is defined by sericitization, silicification, and carbonatization. Mineral aggregates are commonly sheared and clearly oriented. Veins and veinlets of quartz, carbonates and chlorite are common. Epidote along with chlorite are found abundantly in a few sections. These secondary minerals are in places positively correlated with the presence of gold and tellurides.

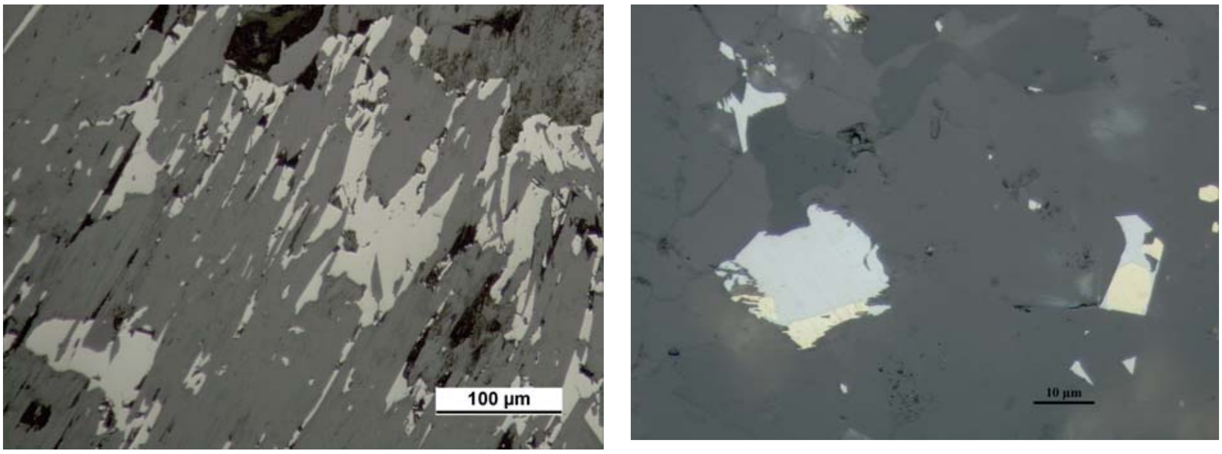

Figure 42. *Left, pyrrhotite intergrown with tremolite (Sample no. R256-57.95). Right, Au and tellurides (gold, bismuth telluride, altite) (Sample no. R268-63,25).*

5.5 Other targets near the Sakiatieva prospect

In addition to the main zone at Sakiatieva, there are other gold targets in a NE-trending fault zone on the top of a small hill about one kilometre NE of the Sakiatieva prospect (Pulkkinen and Salmirinne 2006). The rocks in the shear zone are altered into the assemblage of hornblende, biotite, chlorite and a fine-grained pyrrhotite-chalcopyrite. Native gold was observed in a thin section made from an outcrop sample from this shear zone. Gold occurred as inclusions in hornblende and was associated with small chalcopyrite grains (Rantala 2003). Three drill holes (R206, R207 ja R208) which intersect altered coarse grained mafic rocks, granitoid dykes and sericite schists in another NE-SW trending geophysical anomaly and the drill hole R206 intersects calc silicate (skarn) altered zones in sericite schists which contains up to 0.1–0.7 % Cu and 0.5–1.5 ppm Au in a 3 m section from 61.70 m of down-hole depth.

Gold values (up to 7 ppm) have been assayed in the drill hole R217 (Fig. 43), which is 500 m west of the main mineralized zone. The hole has been drill into a NE-SW trending geophysical anomaly similar to the main zone.

To locate the source of the gold nuggets recovered in the heavy mineral survey, exploration work should be continued in the area north of Ruosselkä. The current exploration program has also indicated an association between gold and iron oxides (Fig. 44). Further studies could test the occurrence of the IOCG-type deposits in the area. The high magnetic anomaly in the centre of the area remains untested.

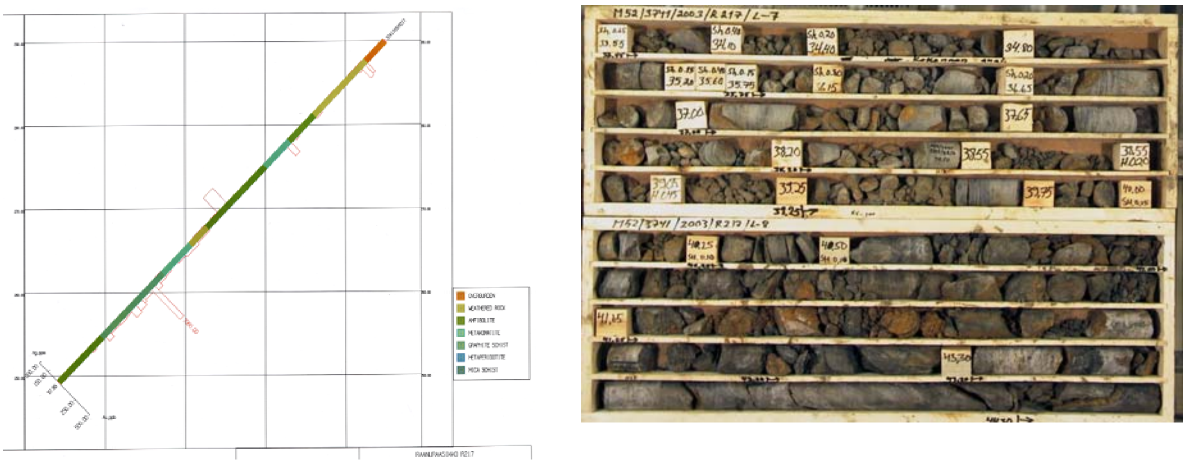

Figure 43. *Drill hole R217 which is 500 m to the west of the Sakiatieva prospect (location see Fig 4). The drill hole intersects alteration zones with 7 ppm Au between 41.00–41.65 m and 244 ppm Ag between 27.65–29.30 m.*

5.5.1 Hematite/magnetite veins

N-S orientated faults cut the Ruosselkä granite complex. At least one of the faults contains a fine-grained granite dyke with hematite veins. These veins apparently are the source of some gold nuggets and hematite-gold nuggets in till in the north slope of the hill NE of the Sakiatieva claims (Fig. 44).

It has been interpreted that most of the shear zones are steeply dipping. One of the NW-trending faults cuts through the southern part of Ruosselkä (Fig. 5). On the top of the Ruosselkä hill, the fault contains quartz-hematite breccia. Further NW in the area named Allas, the fault zone is composed of strongly disseminated to semimassive Fe-sulphides in an amphibole rock. One kilometre NW of the Allas target, in the Urakkaselän Palo target, there is a magnetite-rich amphibole rock inside the granite. The gold assays of the quartz-hematite breccia were below detection limit, but the disseminated sulphide rock at the Allas target contains up to 0.82 % Cu and 0.11 ppm Au. The maximum value assayed from a chip sample of the magnetite-rich amphibole rock is 0.1 ppm Au.

Figure 44. *Gold, magnetite, hematite and gold-hematite grains in heavy mineral concentrate separated with sluice and panning from till of the Sakiatieva hill.*

6 ENVIRONMENTAL STATEMENT

6.1 Environmental aspects

There are no nature conservation areas in the immediate vicinity of the Sakiatieva prospect. The nearest conservation area is five kilometres south in Koitelainen (Natura area). The Sakiatieva prospect and its surrounding area were logged during the 1970's. After logging the spruce and birch wood, the area was reforested for pine but the results have been poor and the forest has very little timber quality trees. The Sakiatieva prospect is a part of the reindeer herding area, which covers the whole Lapland province.

7 DISCUSSION AND CONCLUSIONS

GTK discovered the Sakiatieva Au occurrence after a systematic geochemical, geophysical, heavy mineral and drilling program carried out 1999–2006. The area was targeted after a regional scale geochemical survey which indicated anomalous Au concentrations in till over an area of 100 km^2. Heavy mineral surveys have proved to be useful when defining targets in the gold anomalous area. Drilling results in the Sakiatieva prospect have been promising and the prospect, and the surrounding Ruosselkä area, is considered to have potential for a significant gold deposit.

The gold mineralization at Sakiatieva is structurally controlled and follows the folded and deformed contact zones between mafic volcanic rocks and phyllites which are partly graphitic. The gold-related wallrock alteration is characterised by sericite, carbonate, quartz and sulphides in sedimentary rocks and biotite, carbonate, sulphides, quartz, rutile and calc silicates in mafic and ultramafic rocks. The host rocks were folded and metamorphosed at greenschist to lower-amphibolite facies conditions. The geometry of the rock units is mainly the result of NE-SW directed shortening.

The deformed and altered gold mineralized zones in the Ruosselkä area, and in the Sakiatieva prospect, are commonly deeply weathered. The core recovery from the weathering zone using conventional diamond drilling has been poor and this complicates resource estimates. The use of polymeric compounds in drilling fluids with triple tube core barrel improves the core recovery. However, weathering could be a bonus in exploitation, as the rock is softer and gold be could more easily extracted from weathered rock. In addition, there is supergene gold enrichment in the weathering profile.

8 RECOMMENDATIONS FOR FUTURE WORK

Obviously, more drilling is needed to evaluate better the extent and grades in the Sakiatieva prospect. Current interpretation is that NE-SW trending axial planar shear zone of Fn+1 fold controls the gold mineralization and the higher grade lode plunges moderately NE. However, in drill core scale there are NW-SE trending NE and SW dipping mineralized shears and current drilling direction has not adequately tested their significance and drilling to the direction 225º could reveal more information about their gold potential.

9 APPENDICES

1. Ground geophysical surveys
2. List of drill holes at the Sakiatieva prospect
3. Sakiatieva Gold Prospect, location of the drill holes

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Sodankylä; Sakiatieva area
Geophysical ground surveys
Data included to report

Magnetic

Data files:	m3741031.xyz (1999) 02mgld374103_1.xyz (2001-2002) 03mg374102_1.xyz (2003)
Equipment:	Proton magnetometer
Area:	3 survey area
Line direction:	SW-NE, N-S
Line spacing	50-100m
Point separation:	10m

VLF-R

Data files:	v3741031.xyz, v3741032.xyz (1999), 02vrld374103_1.xyz (2001-2002), 03vr374102_1.xyz (2003),
Equipment:	Geonics EM16R
VLF-R stations:	GBR 16.0 kHz / DHO38 23.4 kHz
Area:	3 survey area
Line direction:	SW-NE, N-S
Line spacing	50-100m
Point separation:	10m

Self potential (SP)

Data file:	sp374103.xyz (2000)
Equipment:	voltmeter
Area:	0.37 km2
Line direction:	N-S
Line spacing	20 m
Point separation:	5 m

DC-IP

Data files:	00ip374103c_1.xyz, b3741031.xyz (2000) Dipole_dipole_2000.gdb (Geosoft database, 2000) 05ip374102.xyz (2005) Dipole_dipole_2005.gdb (Geosoft database, 2005)
Equipment:	Scintrex IPR_12
Array:	Dipole-dipole (a=10m, n=1-8)
Area:	22 profiles
Line direction:	N-S, E-W
Point separation:	10 m

Data files:	06ip374102.XYZ (2006)
	Pole-dipole_2006.gdb (Geosoft database)
Equipment:	Scintrex IPR_12
Array:	Pole-dipole (a=20m, n=1-8)
Area:	4 profiles
Line direction:	E-W
Point separation:	20 m

Data file:	02ip374102_1.xyz (2002)
Equipment:	Syscal IP
Array:	Bipole-dipole / A50BM20N
Area:	15 profiles
Line direction:	E-W / N-S
Point separation:	20 m

Table 1. Geophysical ground measurements included to report in Sakiatieva study areas.

	points	***line_km***	***Area [km^2]***
Magnetic	14 856	145.800	~ 9.6
EM; VLF-R	15 463	151.980	~ 9.6
SP	3 841	19.000	~0.37
IP			
bibole-dipole	159	2.600	15 profiles
dipole-dipole	1308	13.080	22 profiles
pole-dipole	98	1.870	4 profiles

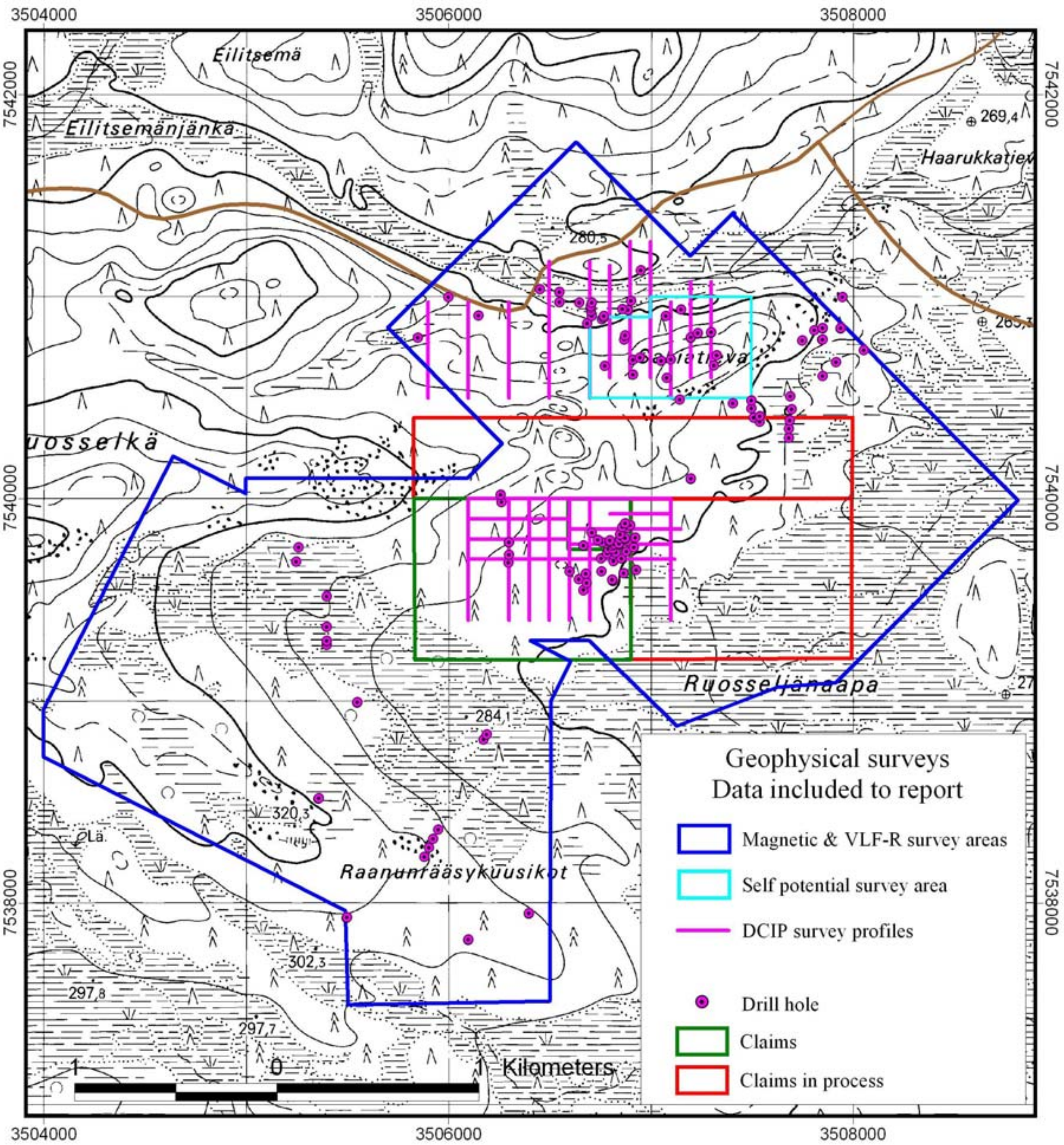

Figure 1. Index map of ground geophysical surveys in Sakiatieva study area. (Basemap @ National Land Survey of Finland, license 13/MYY/07)

List of drill holes at the Sakiatieva prospect

Drill hole	x	y	z	Length	Direction	Dip	Analyse orders	
M374100R301	7540599	3507081	300	125.2	150	45	78372	
M374100R304	7540684	3507055	300	68.3	135	60	78375	
M374100R305	7540699	3506950	300	42	90	45	78371	
M374100R306	7540689	3506914	300	80.6	180	45	78370	
M374100R307	7540659	3506775	300	111.1	150	45	78382	
M374100R308	7539794	3506801	300	32.15	80	45	91374	
M374100R309	7539595	3506815	277	144.8	180	45	64917	64919
M374100R310	7539794	3506801	300	36.1	220	45	64920	78378
M374100R311	7539878	3506875	282	124.9	220	45	64963	64964, 78377
M374100R313	7540491	3507145	300	69	330	45	78380	
M374101M10	7539780	3506787	277	65	238	5	64922	64926, 84819
M374101M11	7539592	3506816	276	82	180	5	64923	64926
M374101M12	7539602	3506647	300	75	180	5	64924	
M374101M9	7540616	3506915	300	67	180	5	64926	
M374102R199	7539299	3505401	285	94.8	360	45	64972	
M374102R200	7539369	3505401	285	64.25	360	45	84805	
M374102R201	7539279	3505401	285	65.6	180	45	64973	
M374102R204	7539519	3505401	280	35	45	45	n.a.	
M374102R205	7540662	3507314	290	88.55	180	45	84873	
M374102R206	7540799	3507201	295	90.7	310	45	84874	
M374102R207	7540819	3507234	295	74.3	310	45	84877	
M374102R208	7540824	3507301	285	74.8	310	45	84875	
M374102R209	7540021	3506261	285	50.7	360	45	84878	
M374102R210	7539984	3506266	285	61.9	340	45	84879	
M374102R211	7539784	3506301	285	60.6	180	45	84880	
M374102R212	7539724	3506301	285	40.3	270	45	84881	
M374102R213	7539684	3506300	285	37.1	180	45	84882	
M374102R214	7540711	3507328	300	116.05	180	45	78859	
M374102R215	7539689	3505250	260	73.55	360	45	64948	
M374103R216	7539759	3505261	260	55.25	320	45	78853	
M374103R217	7539784	3506301	290	57.65	180	45	78854	
M374104M1	7539784	3506301	290	61	180	0	64880	
M374104M2	7539768	3506670	281	165	85.5	5	64881	
M374104M3	7539784	3506762	277	54	157.5	5	64882	
M374104M4	7539632	3506868	274	39	180	0	64883	
M374104R252	7539834	3506712	281	149.05	144	46	91372	
M374104R253	7539796	3506741	280	110.7	144	45	91373	
M374104R254	7539641	3506760	278	128.05	324	60	91821	
M374104R255	7539704	3506756	279	68.75	324	45	91389	
M374104R256	7539730	3506787	279	91.05	324	45	91383	

Drill hole	x	y	z	Length	Direction	Dip	Analyse order	
M374104R257	7539691	3506818	278	131.5	324	45	91385	
M374104R258	7539754	3506815	278	95.9	324	45	91822	
M374104R259	7539735	3506831	278	104.2	324	44	91388	
M374105R260	7539768	3506812	279	75.9	285	45	201043	
M374105R261	7539788	3506801	279	70.9	285	60	201045	
M374105R262	7539777	3506848	278	100.5	315	45	201046	
M374105R263	7539806	3506876	279	100.5	315	44	89543	
M374105R264	7539791	3506888	278	45	315	45	n.a.	
M374105R265	7539803	3506879	279	118.7	315	60	201037	
M374105R266	7539855	3506887	281	74	315	61	201042	
M374106R267	7539775	3506824	279	95.35	315	56.5	201044	
M374106R268	7539751	3506794	279	74.6	315	59	201049	
M374106R269	7539724	3506817	280	118.1	315	59.5	201050	
M374106R270	7539779	3506846	279	97.6	315	58	201048	
M374106R271	7539649	3506931	278	118.4	180	45	89555	
M374106R272	7539869	3506901	281	83.2	315	60	201051	
M374106R273	7539705	3506858	278	136.65	335	43	203645	
M374106R274	7539740	3506882	278	162.5	315	43	203643	
M374106R275	7539759	3506919	277	154.75	315	43	203641	203642
M374106R276	7539807	3506926	279	131.2	315	43	203640	
M374106R277	7539804	3506850	279	116.2	270	60	203644	
M374106R278	7539824	3506850	280	157.9	30	59	203647	
M374106R279	7539640	3506601	278	134.45	180	59	203646	
M374199R138	7539629	3506681	280	59.25	185	45	70599	
M374199R139	7539584	3506686	280	43.1	185	45	70600	
M374199R140	7539549	3506671	280	43.95	185	45	70601	

Sakiatieva Gold Prospect, location of the drill holes