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Tittel Ni-, Au- PGE-exploration in the Karasjok Greenstone Belt, 2006				
Forfatter Jokela, Jukka		Dato År 18.12. 2006	Bedrift (Oppdragsgiver og/eller oppdragstaker) Store Norske Spitsbergen Kullkompani AS Store Norske Gull	
Kommune Karasjok	Fylke Finnmark	Bergdistrikt	1: 50 000 kartblad 20341 20342 20343 20344 20331 20332 20333 20334	1: 250 000 kartblad Karasjok
Fagområde Geologi Geokjemi Geofysikk		Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt) Skoganvarrer, Gallojavri, Bahkilvarri, Baeivesgieddi Karasjok	
Råstoffgruppe Malm/metall		Råstofftype Ni Au Pge		
Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse Ten different working areas were predefined for the field season 2006 by evaluating and processing the pre-existing geological, geophysical, geochemical and other exploration data. Two mapping groups and one heavy mineral sampling group carried out preliminary nickel-, gold- and PGE-exploration in most of these areas of interest. Sulphide bearing ultramafic cumulate rocks were observed in several different locations. Signs of visible gold were observed in an iron formatin outcrop at the central and SW-parts of the greenstone belt. Heavy mineral sampling returned several interesting gold nugget anomalies, especially in the central and SW-parts of the greenstone belt.				

Store Norske Gull; Ni-, Au- and PGE-exploration in the Karasjok Greenstone Belt, 2006.**Summary**

Ten different working areas were predefined for the field season 2006 by evaluating and processing the pre existing geological, geophysical, geochemical and other exploration data. Two mapping groups and one heavy mineral sampling group carried out preliminary nickel-, gold- and PGE-exploration in most of these areas of interest. Sulphide bearing ultramafic-mafic cumulate rocks were observed in several different locations. Signs of visible gold were observed in an iron formation outcrop at the central and SW-parts of the greenstone belt. Heavy mineral sampling returned several interesting gold nugget anomalies, especially in the central and SW-parts of the greenstone belt.

1. Introduction

The Karasjok greenstone belt (KGB) is located in Finnmark, northern Norway. North-south trending KGB is c.160 km long and 20-40 km wide. Direct southern continuities of the KGB, in the Finnish side of the border, are about 70 km long and are called as the Pulju greenstone belt. In greater scale Karasjok - and Pulju greenstone belts are part of the Proterozoic Central Lapland greenstone belt, representing the lower and central parts of the greenstone belt stratigraphy.

Based on lithological and structural analogies to the other parts of the Central Lapland greenstone belt in Finland, the Karasjok greenstone belt is considered to be highly prospective for komatiite hosted nickel deposits, orogenic gold deposits and also for layered intrusion hosted PGE deposits. To date exploration for nickel, gold and PGE in the belt has been preliminary and sporadic and the belt is clearly under-explored as to these metals.

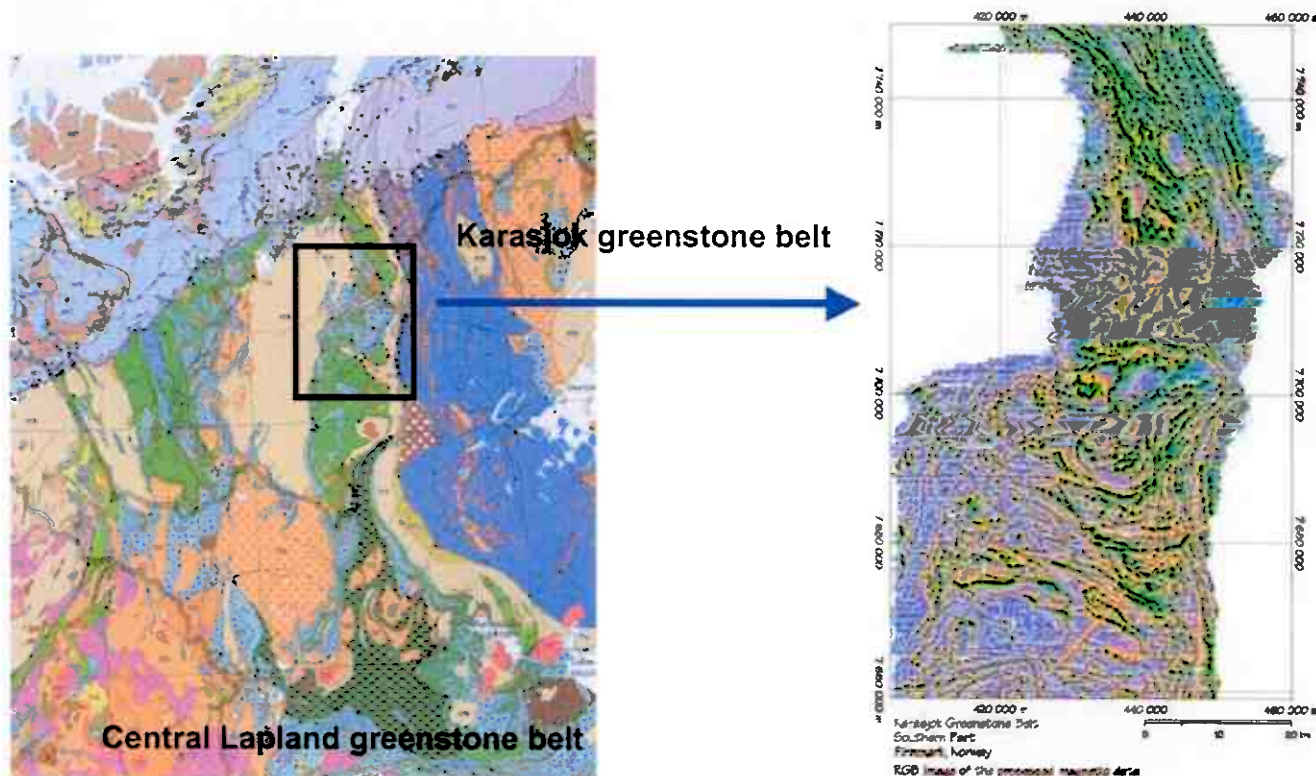


Figure 1. A. Central Lapland greenstone belt. **B.** Karasjok greenstone belt (processed image of magnetic data).

2. Objectives of the work

Aim of the ongoing work is to carry out an effective and successful exploration programme for finding of komatiite hosted nickel deposits, orogenic gold deposits and layered intrusion hosted PGE deposits in the Karasjok greenstone belt.

Project planning and implementation as well as evolving interpretation of the exploration results are based on modern exploration models and tools.

The success of the project is greatly based on skilful and effective staff. One aim of this project is also to train students and junior geologists as competent exploration geologists with classical field skills combined with modern geological knowledge and technology.

3. Exploration in the Karasjok greenstone belt, 2006

3.1. Exploration rights

In the beginning of the year 2006 Store Norske Gull had altogether 286 claims and pre claims in the Karasjok greenstone belt. During summer 2006 174 new pre claims were applied to complete the exploration rights in the areas of interest for the company.

3.2. Data compilation and processing

Digital data compilation, processing and analysing was started in the late 2005. Digital exploration data includes geological, geophysical and geochemical data. The used data is mainly from NGU's geological databases. There is also some historical data from different mining companies, which have carried out exploration in the study area during earlier years. Topographic data is also included in the digital exploration data package.

Digital image processing methods were used in displaying the structure of, and the variations in the exploration data in an optimal way. Statistical multicomponent analyses are used to distinguish ore potential targets from other objects. Especially, digitally processed geophysical images have promoted to the lithological and structural analysis of the exploration area. Statistical processing of various geochemical data was used in the explorational evaluation of the original data.

GIS (Geographic Information System) tools were utilized to integrate, analyse, interpret and display all different geodata from the Karasjok greenstone belt. The results are written out as images and thematic maps. GIS software is also used as an everyday tool in SNG's exploration work.

On the basis of the data- and image processing results, ten (10) different target areas were defined for Ni- and Au-exploration (geological mapping and sampling). Four of them are located south of the Karasjok town and six north of the Karasjok town.

3.3. Fieldwork

Fieldwork was carried out by three field groups. Geological mapping and lithological sampling was carried out by Audun Andersen (AAN), Jon Frantzen (JHF), Pekka Kämäräinen (VPK) and Harald Hansen (HAH). Heavy mineral sampling was carried out by Hannu Panttila (HPP) and Hannu Ahola (HA). Fieldwork was supervised and conducted by Jukka Jokela (KJJ) (Polar Mining Oy) and Jörgen Stenvold (JST) (Store Norske Gull).

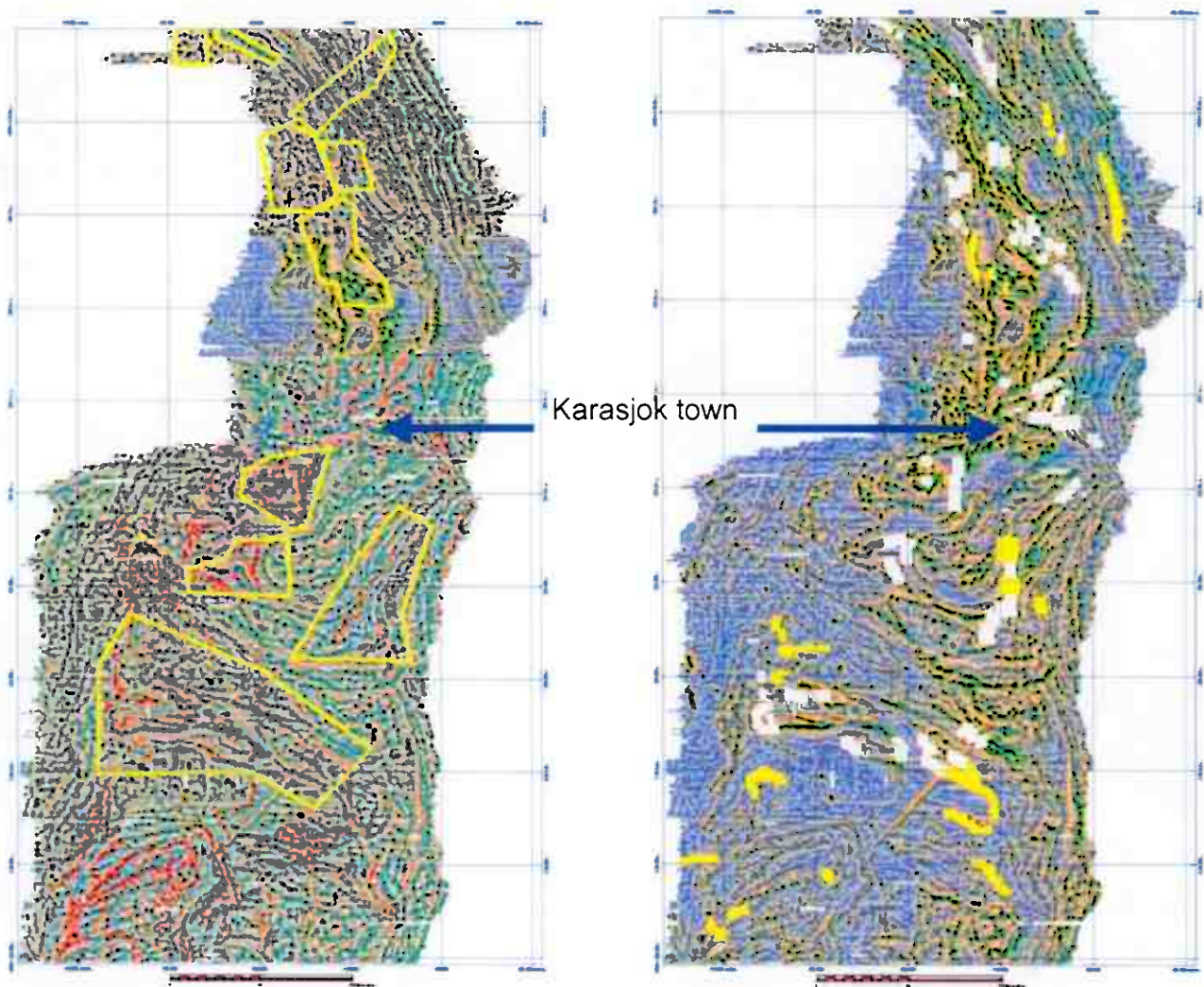


Figure 2. A. Exploration areas 2006 (on a processed image of magnetic and EM data) **B.** SNG's existing claims and pre claims (white squares) and 2006 applied pre claims (yellow squares) (on a processed image of magnetic data). Grid of the maps is 10x10 km.

3.3.1. Geological mapping

The main object for the two mapping groups was to carry out geological mapping and lithological sampling in the predefined areas of interest to north and south of the Karasjok town. Fieldwork included lithological, structural and alteration mapping and lithological sampling. One important part of the work was to check and collect geological information from the geophysical ultramafite anomalies (defined by processed geophysical images). Fieldwork was started and carried out in most of the predefined working areas. However, none of these areas were fully researched at this stage of fieldwork.

A total of 589 outcrop observations were made during the field season. 138 outcrop - and boulder samples were sent for analysis to the ALSChemex laboratory (XRF, ME-MS, ICP, PGE and Au). All outcrop - and boulder observation data has been entered and saved into a MS Access based database.

According the mapping observations and collected hand specimens from the checked geophysical ultramafite anomalies these anomalies are originated mostly in different types of ultramafic cumulate - or flow rocks as was the hypothesis. Some of these anomalies are caused by iron formations, magnetite

rich metasediments (metamorphic magnetite) or by magnetite rich gabbros (magnetite cumulates of gabbros).

Observed ultramafic cumulate rocks are of varying olivine, olivine-pyroxene and pyroxene cumulates (serpentinites, metadunites, metaperidotites, metapyroxenites). Ultramafic komatiitic lava flow rocks are common through the whole study area.

Because of inadequate outcrop environments and lack of sufficient analytical data the origin of the ultramafic cumulate rocks is still obscured in several cases. Origin of the observed cumulated metaperidotite – metapyroxenite - gabbro formations may be of intrusive (differentiated layered intrusions) or extrusive origin (komatiitic basalt as parental magma). Pure olivine cumulates of komatiitic origin have been observed so far only from some locations of the study area.

Observed ultramafic cumulate rocks are carrying sulphides in several studied localities. Sulphides are mainly pyrrhotite, pyrite and chalcopyrite. Visible pentlandite was recognized in some samples. Composition of the fine-grained sulphide disseminations is in most cases difficult to determine without analysis results.

In the Skoganvarre area (45 km NW from the Karasjok town) as well as in the Gallojavri area (18 km NW from the Karasjok town) metapyroxenites were carrying malachite and chalcopyrite dissemination together with other sulphides. Signs of same kind of mineralizations were found also from some other studied localities. These types of ultramafic-mafic cumulate formations represents most probably layered intrusions and are of importance as exploration targets for PGE- (Ni) deposits.

In the Bahkilvarri area (10 km west of Karasjohka town) moderate alteration features (quartz-carbonate-albite-hematite-turmaline-sulphide) were observed in different places. Alteration is interpreted to be linked to NE-SW trending shearing deformation (D4?). Signs of visible gold (?) was observed in a banded iron formation outcrop at the Baeivesgieddi-area (40 km SW from Karasjohka town).

3.3.2. Geochemical heavy mineral sampling

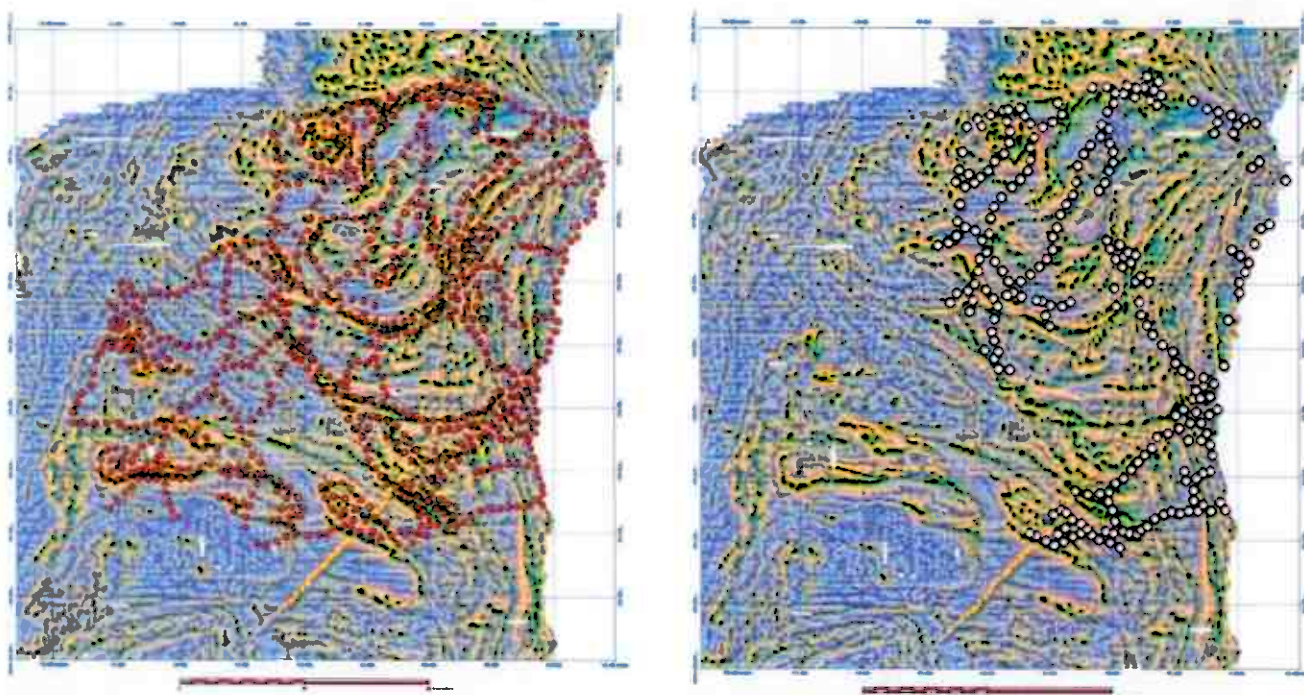


Figure 3. A. Heavy mineral sampling plan for the southern part of the greenstone belt. **B.** Sampled area 2006. Grid of the maps is 5 km.

Plan for the geochemical heavy mineral sampling in the southern part of the greenstone belt was made with the help of processed and analysed geological, geophysical, geochemical and geographical data-sets. During the field season 2006 heavy mineral sampling was carried out in the area south and east of Karasjok River. Size of the area covered with sampling is about 40 km x 38 km.

Total of 287 heavy mineral samples were collected, separated, panned and studied under microscope from the study area. Same amount of geochemical till samples were also collected from the same sampling pits for further geochemical assaying. All the collected heavy mineral data is entered and saved into a MS Access based database.

Several major and minor heavy mineral anomalies were found from the studied area. Most of the anomalies are located in the western or northern parts of the study area. Some of these anomalies are already rechecked but most of them should be rechecked during next field season.

4. Future work

4.1. Geological mapping

Geological mapping and lithological sampling will continue in the predefined and claimed target areas during the field season 2007.

More detailed mapping and sampling will be carried out for example in the Skoganvarre, Goalbejavri and Dapmotvarri ultramafic-mafic formations. These study areas are located in the central and northern parts of the greenstone belt. The Baeivesgieddi area, in the southern part of the greenstone belt, will be studied briefly for the possible signs of gold.

Anomalous gold values were also returned from some samples of the fieldwork 2005. Origin of these anomalies will be checked more detailed during field season 2007.

4.2. Heavy mineral sampling and other geochemical sampling

Heavy mineral sampling will continue first by the checking of major and minor anomalies of 2006 sampling. Sampling will continue later in the western and southwestern parts of the greenstone belt. The Baeivesgieddi area will be sampled more detailed already in early stage of the summer.

A geochemical MMI-sampling project will be carried out in some selected target areas during the summer 2007. This project will test the possibilities to use this new sampling and analytical method in SNG's exploration work. Some old gold prospects will also be tested for the reference material of the study (e.g. Sargejokka).

4.3. Airborne geophysical survey

Store Norske Gull is planning to carry out an extensive geophysical airborne survey in the Karasjok Greenstone Belt during field season 2007. Most of the survey will be flight by 200-100 meters line space. Airborne geophysical survey is planned to be carried out during the late July and early August.

4.4. Data

Geological maps of the Karasjok greenstone belt (NGU) will be digitised as vector format to get better control and advantageous use for the good quality older geological data.

4.5. Exploration staff

Exploration work of the field season 2007 is going to be carried out by two mapping groups and one heavy mineral / geochemical sampling group. Contractors will be used for geophysical survey and for possible mechanical till sampling. Local workers will also be used for the help of SNG's exploration group. Work will be conducted and supervised by the chief - and senior geologists of Store Norske Gull.

4.6. Miscellaneous

Three new master theses are associated with the exploration project of Store Norske Gull in the Karasjok greenstone belt. Subjects of these studies are:

- To study and compare lithology, mineralogy and origin of some komatiitic cumulus and flow rocks in the northern part of the greenstone belt.
- To study and compare lithology, mineralogy and possibilities of PGE showings of some of the layered intrusions in the greenstone belt.
- To test the new geochemical sampling and analysis method, MMI (Mobile Metal Ions), in some selected nickel and gold targets.



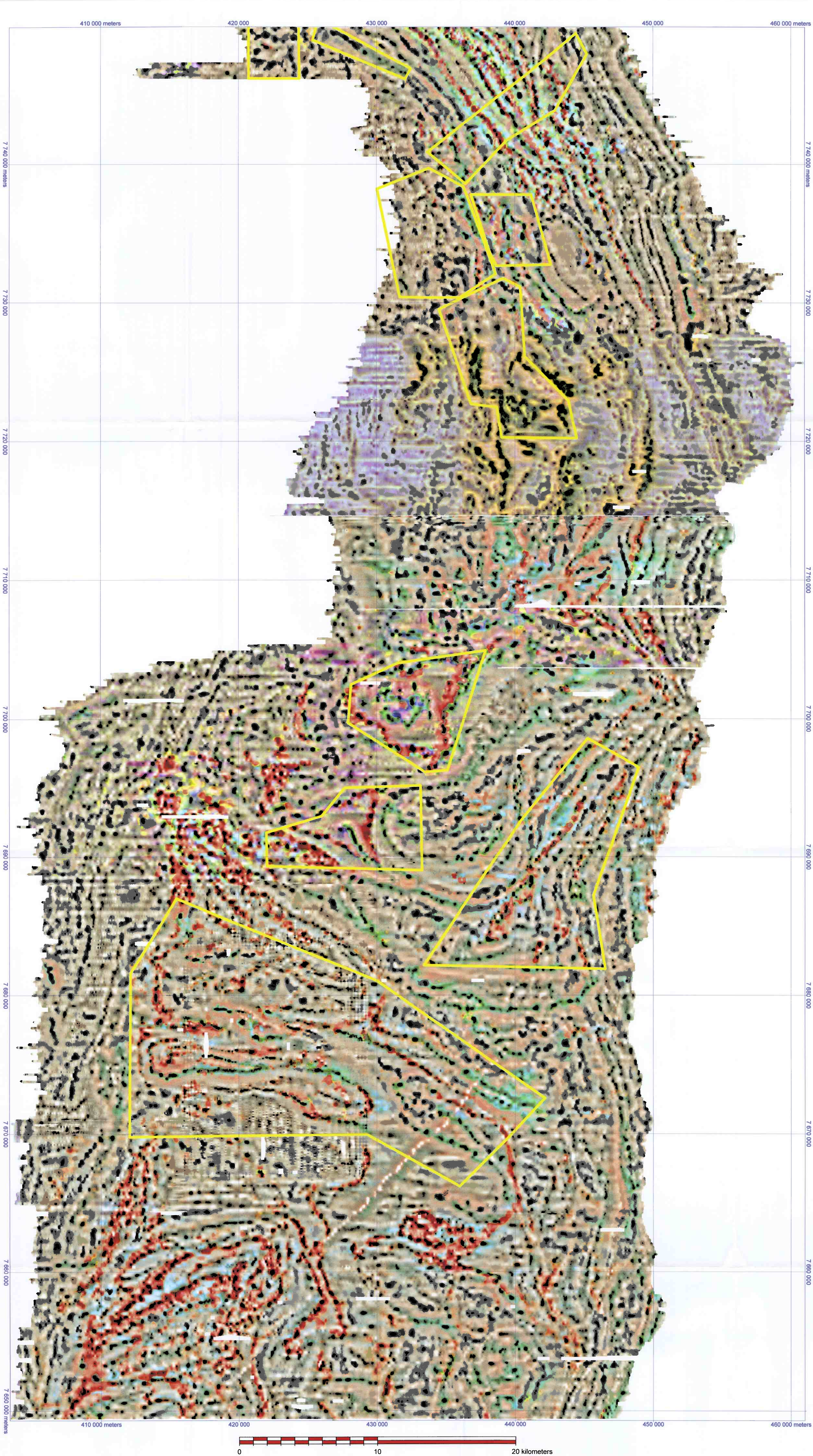
Jukka Jokela

Espoo 18.12.2006

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**Karasjok Greenstone Belt
Southern Part
Finnmark, Norway**

SNG's planned working areas 2006

RGBI Color Composite of
Processed Magnetic and EM Images
Geophysical Helicopter Survey Data

COORDINATE SYSTEM:

Name: WGS84 / UTM zone 35N (CM 27E)
Projection: UTM zone 35N (CM 27E)
Method: Transverse Mercator
Latitude of natural origin: N 0 00 00.000
Longitude of natural origin: E 27 00 00.000
Scale factor at natural origin: 0.9996
False easting: 500000 m
False northing: 0 m
Datum: World Geodetic System 1984 (WGS84)
Type: Geodetic
Epoch: 1984
Ellipsoid: WGS 1984
Semi-major axis 6378137
Inverse flattening: 298.257224
Prime Meridian: Greenwich
Valid Area: World
Coordinate System
Type: Projected
Axis 1: Easting, Unit: meter, Symbol: E
Axis 2: Northing, Unit: meter, Symbol: N

Blue UTM grid refer to WGS84
BLUE numbered lines indicate the UTM grid, zone 35

Data/Image Processing and Layout:
Jukka Jokela (KJJ) / SNG
03.05.2007



KARASJOK SKANNET BV 4862
VEDLEGG 2...sv...4
J.nr 06/00 139-3

Karasjok Greenstone Belt Southern Part Finnmark, Norway

RGB Color Composite of Processed Magnetic Images
Geophysical Helicopter Survey Data
Channels:
Red = Mag_REG ; Green = MagADA27 ; Blue = MagREG_SLOPE

COORDINATE SYSTEM:
Name: WGS84 / UTM zone 35N (CM 27E)
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SNG's existing claims 2006, white squares
and applied pre claims 2006, yellow squares

Data/Image Processing and Layout:
Jukka Jokela (KJJ) / SNG
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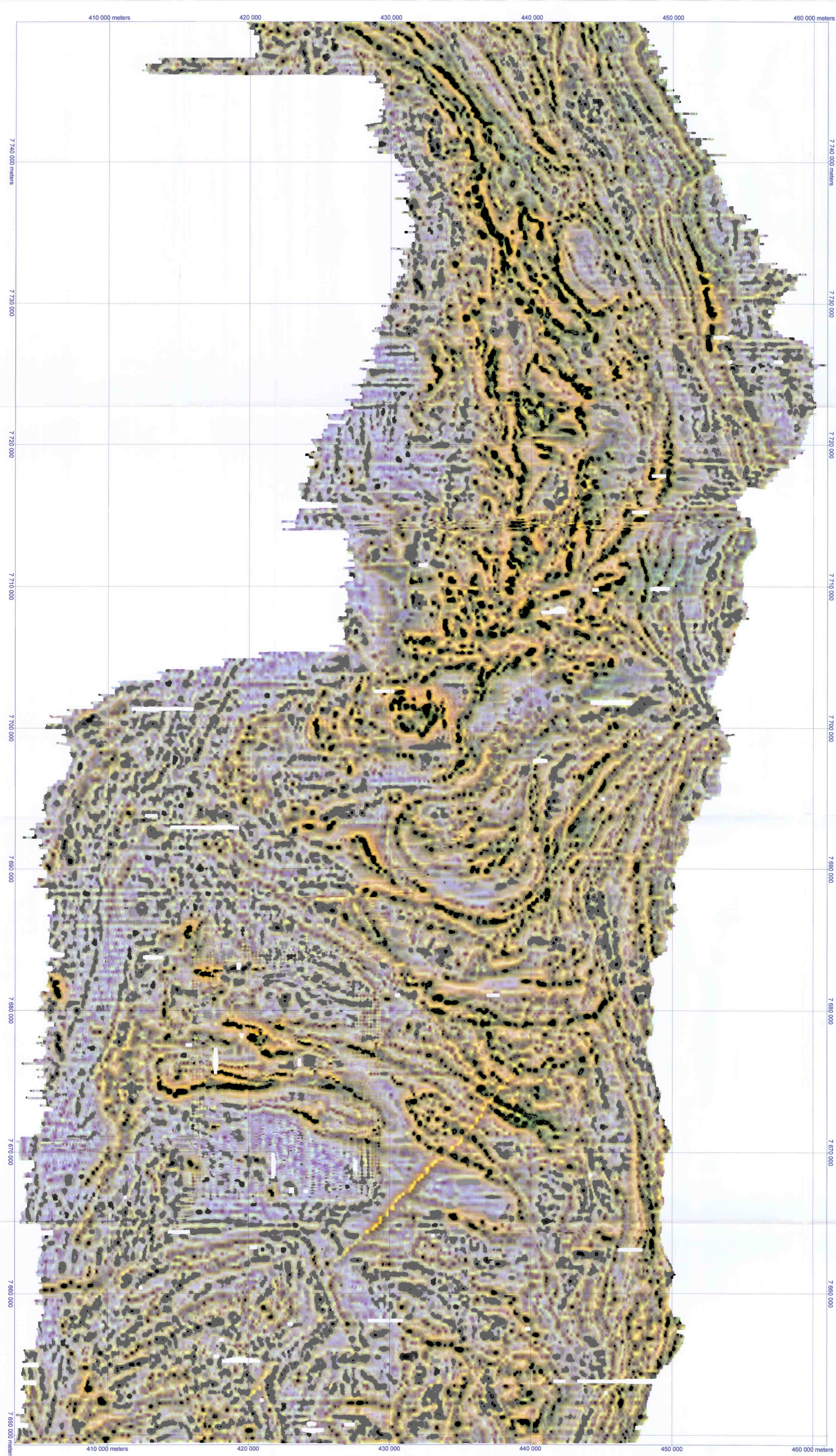
Karasjok Greenstone Belt
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Data/Image Processing and Layout:
Jukka Jokela (KJU) / SNG
03.05.2007



Karasjok Greenstone Belt
Southern Part
Finnmark, Norway

RGB Color Composite Image of
Processed Magnetic Data

Heavy mineral sampling 2006

COORDINATE SYSTEM:

Name: WGS84 / UTM zone 35N (CM 27E)

Projection: UTM zone 35N (CM 27E)

Method: Transverse Mercator

Latitude of natural origin: N 0 00 00.000

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