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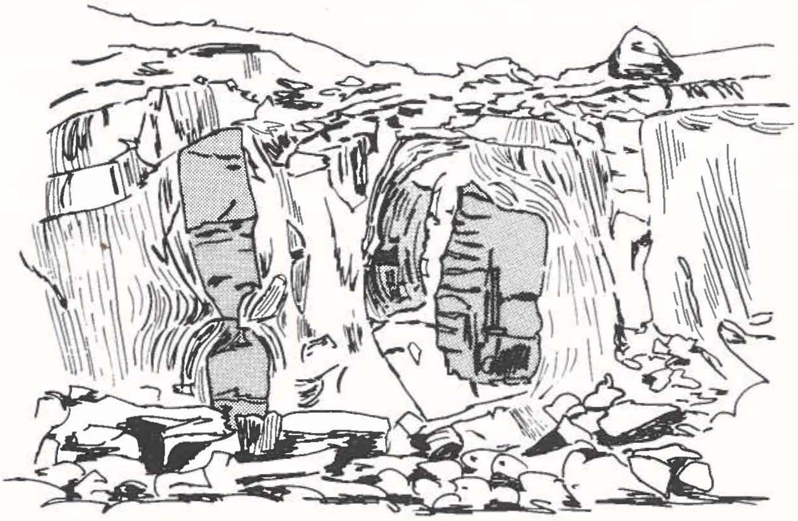
# Tungsten mineralization in the Nuuk region, West Greenland

Peter W. Uitterdijk Appel



March 1990

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Front page: Massive boudinaged calc-silicate bands in mica-quartzites. The sediments were deposited in an interlude between two volcanic cycles in Ivisârtoq of the inner Godthåbsfjord area. Note hammer for scale.

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## ABSTRACT

The first traces of scheelite in West Greenland were found in Godthåbsfjord in 1982. Subsequent field work revealed scheelite in the mid-Archaean Malene supracrustal rocks occurring as enclaves in gneisses over an area of at least 35 000 km$^2$. Of lesser importance from an economic point of view is the scheelite in the early Archaean Isua-Akilia supracrustal enclaves.

The Malene supracrustal rocks comprise thick sequences of basic and ultrabasic pillow lavas interspaced with peridotites as well as minor amounts of cordierite-silimanite-bearing quartz-mica schists. The scheelite in the Malene supracrustal rocks is stratabound and occurs in banded amphibolites and calc-silicate horizons. The scheelite-bearing horizons are associated with tourmalinites, pyrite-rich zones and locally with gahnite-bearing sulphide-rich anthophyllite-gedrite rocks. The scheelite-bearing zones can be traced for kilometres along strike.

The scheelite occurs as small grains and veinlets arranged parallel to the banding of the rock, as disseminated grains, as cm-sized porphyroblasts and as joint coatings. Most of the scheelite has a low molybdenum content.

In the Ivisârtoq area of the inner Godthåbsfjord, a c. 3.5 km long scheelite-bearing calc-silicate horizon has been channel sampled. This revealed up to 0.35 % tungsten over a width of 2.5 m, but the grades vary considerably along strike. Towards the end of the field season a scheelite-bearing calc-silicate zone was found at several sites in an about 10 km long peridotite horizon, which separates two basic volcanic cycles. Channel sampling revealed up to 0.38 % tungsten over a width of 1.5 m.

## DANSK SAMMENDRAG

Det wolfram-holdige mineral scheelit blev påvist i Vestgrønland i 1982, hvor det blev fundet som små korn i elvsedimenter i Godthåbsfjorområdet. Senere samme år, blev de første mineraliseringer af scheelit fundet på Storøen nordøst for Nuuk. Siden har GGU gennemført en wolframeftersøgning indenfor Nuuk kommune. Som resultat af denne eftersøgning påvistes scheelit i en lang række områder i Nuuk kommune.

Der er gennemført detailundersøgelser i mindre områder såsom St. Malene lige syd for Nuuk, på Sermitsiaq nordøst for Nuuk samt i Ivisârtoq i den indre

del af Godthåbsfjorden. I samtlige områder er der påvist udstrakte scheelit mineraliseringer med meget vekslende lødighed.

I 1989 gennemførtes en undersøgelse i Ivisârtoq omfattende en detalieret prøveindsamling af en tidligere fundet scheelit mineralisering. Kemiske analyser af de indsamlede prøver giver stedvis gode lødigheder, men disse lødigheder viser sig ikke at være konstante hen langs horizonten. I sommeren 1989 opdagedes yderligere scheelit-førende horizonter, men da de blev fundet ret sent på feltsæssonen, lige før sneen faldt, kunne der kun prøvetages et par steder. Disse prøver gav stedvis gode wolframlødigheder, men tilsyneladende noget uregelmæssigt fordelt.

Området indenfor Nuuk kommune er langt fra færdigundersøgt med henblik på wolfram forekomster, hvorfor yderligere feltarbejde på længere sigt bør gennemføres. Imidlertid har udviklingen i wolframpriserne i løbet af firserne ikke været gunstige for wolframproduktionen i den vestlige verden. Kina, der er den totalt dominerende producent af wolfram, har nu i en del år solgt wolframmetal og malm til priser, der ligger langt under produktionsprisen i den vestlige verden. Sålænge Kina sælger wolfram til så lave priser, vil enhver form for wolframproduktion i vesten af nuværende kendte forekomster antagelig være tabsgivende.

# INTRODUCTION

The area dealt with in this report is situated around Nuuk, the capital of Greenland. The area is bounded by Godthåbsfjord in the North and extends down to Frederikshåb Isblink in the South (Fig. 1). The size of the area is about 35 000 $km^2$. The main emphasis in this report is on the northern part of this area.

Considering that the area in question is situated next to the Capital of Greenland where sea ice rarely hampers sailing and with a geology so favorable for mineral deposits, it is remarkable that so little mineral exploration has been carried out by mining companies. The Fiskenæsset area (Fig. 2) has been explored rather surficially for chromite and platinum in a major anorthosite complex, whereas the rest of the area is almost virgin ground. Kryolitselskabet Øresund A/S, Copenhagen has carried out very scattered exploration in the Godthåbsfjord area for a short time during the sixties. A small company has carried out limited exploration in the L. Narssaq area south of Nuuk for molybdenum in calc-silicates of the Malene supracrustal sequence. Kidd Creek Ltd. carried out a short reconnaiscance study in the Godthåbsfjord area during one field season just before the company was taken over by Falconbridge. The company reports dealing with the above mentioned activities are available at GGU.

GGU started a stream sediment sampling programme for heavy mineral investigation in 1982, and this programme continued with several breaks during the eighties until 1989. During this period a large part of the coastal area and some parts of the inland areas were covered by a pan sampling programme (Appel, 1989). As a result of these activities a major tungsten province was outlined in West Greenland, covering most of the Nuuk area. Within this province selected areas have been investigated by UV-lamping and detailed mapping. One of the most significant results of this campaign was the discovery in 1987 of an extensive scheelite-bearing stratabound calc-silicate zone in the Ivisârtoq area, of the inner Godthåbsfjord. During the field season 1989 this zone was sampled in detail, and another extensive scheelite-bearing calc-silicate zone was discovered, which also appears to be stratabound.

## ACCESSIBILITY AND LOGISTICS

Nuuk is one of the so-called open water towns of West Greenland; under normal conditions ships can enter the harbour 12 months per year. This applies to the whole coast shown on Fig. 1. During the period 1970 to 1989 sea ice has not created any problems in the area around Nuuk. However, in 1983 problems for smaller vessels were encountered in the Fiskenæsset - Frederikshåb Isblink area. During the winter the inner parts of the fjords are covered by ice, which renders the area inaccissable for smaller boats for 3 to 4 months per year. The innermost part of Godthåbsfjord, that is from the fjord south of Ivisârtoq and further into the fjord, glacier ice calving from the two glaciers renders sailing by any size of boat virtually impossible during most of the year.

The Nuuk region is generally covered by snow during the period September to beginning of June, although local conditions as well as elevation have a major influence on the snow cover.

Nuuk, the capital of Greenland, has a population of well over 10 000. Most kinds of logistic support can be obtained here. Nuuk has a small ship yard as well as most sorts of shops and repair facilities. Helicopter and fixed-wing aircraft charters are available. Nuuk has a 900 m landing strip with flight connections to Denmark via Sdr. Strømfjord and to North America via Frobisher Bay.

Topographic maps at scales 1:250 000 and 1:20 000 as well as aerial photographs at scale 1:40 000 are available from Kort og Matrikelstyrelsen, Copenhagen. Furthermore hydrological maps covering the area have been published by Greenland Technical Organisation (Nuna-Tech).

## GENERAL GEOLOGY

The geology of the Nuuk region has been described in some detail by McGregor et al. (1986) to whom the reader is referred for details. Furthermore the following geologic maps in 1:100 000 covering most of the area have been published (Fig. 1):

65 V. 2 S Isukasia.
64 V. 2 N Ivisârtoq.

64 V. 1 S Qôrqut.
63 V. 2 N Kangiata Nuna
63 V. 1 N Buksefjorden
63 V. 2 S Sinarsuk
63 V. 1 S Grædefjorden
62 V. 1 N Bjørnesund

GGU's ore data base contains details of all mineral showings, published and unpublished results and relevant company data. Information on the region may be obtained through this data base by the end of 1990.

Simplified chronology of the Nuuk region (Based on McGregor et al., 1983)

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(11) Metamorphism at 1500-1600 Ga that caused partial recrystallisation and is recorded in Rb-Sr mineral ages. Simple shear deformation producing faults predominantly with NE-trend, along which there was retrogression to greenschist facies. Intrusion of basic dykes before and associated with faulting.

(10) Granites and pegmatites intruded in NNE-SSW trending belt to form the Qôrqut granite complex: 2530 Ga.

(9) Ductile deformation concentrated in linear belts. Thermal disturbance and influx of $H_2O$-rich fluids caused retrogression from granulite facies to amphibolite facies in some areas. Intrusion of minor granitoid dykes and pegmatites - Qârusuk dykes 2600-2700 Ga.

(8) Metamorphism reaching granulite facies in parts of the area: c. 2800 Ga.

(7) Thrusting, syntectonic intrusion of very voluminous tonalitic-granodioritic magmas - Nûk gneisses - within the period 3100-2900 Ga accompained and followed by polyphase deformation.

(6) Intrusion of layered anorthosite-leucogabbro complexes (e.g.Fiskenæsset complex).

(5) Deposition of sediments, dominantly submarine extrusion of mafic and ultramafic volcanics and related shallow intrusions - Malene supracrustal rocks (3300 - 3000 Ga).

(4) Intrusion of basic dyke swarms - Ameralik dykes.

(3) Metamorphism culminating in granulite facies conditions in the south of the region - c. 3600 Ga intrusion of Fe-rich granitic rocks and associated subordinate ferrodiorites, granites and trondhjemites: Amîtsoq iron-rich association.

(2) Intrusion (syntectonic?) of voluminous tonalitic-granodioritic magmas Amîtsoq grey gneisses c. 3600 Ga. Injection of pegmatites and granitic sheets, deformation and metamorphism up to amphibolite facies.

(1) Extrusion of mafic and felsic volcanic rocks. Deposition of chemical sediments (iron-formation) and subordinate felsic and pelitic sediments, intrusion of mafic and ultramafic sheets - Isua-Akilia association - c. 3800 Ga.

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The oldest rocks are the Early Archaean Isua-Akilia supracrustals deposited some 3800 Ga ago. The main outcrop is at Isukasia (Fig. 1) a little north of the area dealt with in this report. Within the Godthåbsfjord area Isua-Akilia supracrustals occur as minor enclaves ranging from a few metres to several hundred metres in length. These supracrustals are enclosed in the Amîtsoq gneisses.

The next event was the deposition of the Malene supracrustals 3300 to 3000 Ga ago. These supracrustals occur as small and large enclaves in the Nûk gneisses throughout the Nuuk region (Fig. 2). It is, however, a matter of debate whether all these Malene supracrustal enclaves represent one major supracrustal belt broken up by deformation, or whether some of the enclaves represent remnants of supracrustal belts of slightly different age, widely deposited and brought together by plate tectonic events (Friend et al., 1987, 1988). In the present report all the supracrustals post-dating the Isua-Akilia rocks supracrustals will be collectively named Malene supracrustals.

Both supracrustal sequences as well as the two types of gneisses have been repeatedly deformed and metamorphosed several times under amphibolite-facies conditions. Locally granulite-facies conditions prevailed e.g. in the Sermilik area (Fig. 2).

The last major rock forming event in the area was the emplacement of the Qôrqut granite during the late Archaean (2530 Ga).

## ISUA-AKILIA SUPRACRUSTAL ROCKS

The main outcrop of these rocks occurs at Isukasia somewhat north of the Nuuk region (Fig. 1). At Isukasia the supracrustals form a c. 30 km long and up to 4 km wide arcuate belt consisting of banded to massive amphibolites, ultramafic lense shaped bodies, garnet-staurolite schists, carbonate beds and a conglomerate (Nutman et al., 1983). Furthermore different facies of iron-formation are seen of which oxide facies is the most common, constituting a major quartz-magnetite banded occurrence with about two billion tons of 32 % iron ore. Abundant, but minor horizons of carbonate, silicate and rare sulphide facies iron-formation are seen (Appel, 1987).

In the Nuuk region and further south, the Isua-Akilia supracrustals are from an economic point of view of minor importance. They do however contain scheelite. As it happens the first in situ scheelite in West Greenland was found in Isua-Akilia supracrustal rocks on Storø, Godthåbsfjorden. The scheelite occurs in banded amphibolites as disseminated grains, veinlets and porphyroblasts as well as joint coatings. These showings are considered insignificant.

## MALENE SUPRACRUSTAL ROCKS

These supracrustals have been described in detail by Chadwick & Coe, 1983; Beech & Chadwick, 1980; Chadwick, 1986, to whom the reader is referred for further information.

The dominant rock type in the Malene supracrustals is a banded to pillow structured amphibolite representing mafic to ultramafic volcanic rocks. Presumed spinifex structures have been observed on one location in the Godthåbsfjord area (M. Downes Kidd Creek Ldt. pers. comm. 1985). Ultrabasic rocks occur as lenseshaped bodies or as thin extensive sheet-like bodies, which locally can be used as marker horizons between successive cycles of basic volcanism (Chadwick, 1986). Interlayered in the mafic volcanics are horizons of metasediments comprising garnet-sillimanite schists, cordierite-anthophyllite schists, tourmalinites, minor iron-formations as well as massive to banded pyrite $\pm$ pyrrhotite horizons with varying amounts of fuchsite, magnetite, chalcopyrite, molybdenite and gahnite (zinc-spinel). Locally, carbonate horizons up to several tens of metres wide are seen.

In the Malene supracrustal rocks different types of mineralizations have been found of which tungsten mineralization are the most significant. These are the subject of this report.

Copper mineralizations are found scattered throughout the banded amphibolites as small disseminated grains of chalcopyrite frequently betrayed by patches of malachite. Chalcopyrite is also found as rare grains in pyrite-rich horizons. The highest copper contents so far found, occur in anthophyllite-gedrite-rich bands with varying amounts of pyrite, pyrrhotite and magnetite. These bands are up to two metre thick and contain up to 0.18 % Cu.

Zinc has been found as rare grains of sphalerite and as quite abundant grains of gahnite in the anthophyllite-gedrite bands described above. In these bands zinc contents up to 1.1 % were encountered. Zinc, as trace element in the scheelite-bearing banded amphibolites displays very strong positive correlation (0.9) with tungsten.

Tin minerals have not been observed, but anomalous contents up to 0.12 % Sn have been found in the previously mentioned anthophyllite-gedrite bands.

Molybdenite has been found as scattered grains and porphyroblasts in virtually every rock type in the Nuuk region, but it appears to be most abundant in the Malene supracrustal banded amphibolites and calc-silicate rocks.

The Malene supracrustal rocks have been repeatedly deformed and metamorphosed, mostly under amphibolite facies conditions, but locally e.g. in the Sermilik area (Fig. 2), granulite facies conditions attained. In the Godthåbsfjord area extensive pegmatites intruded the Malene supracrustal rocks and were subsequently deformed. None of these pegmatites appear to be mineralized with tungsten minerals, but are pure quartz, feldspar and mica pegmatites with occasional large black tourmalines and allanite.

## STREAM SEDIMENT INVESTIGATIONS

Stream sediment sampling has been carried out in the Nuuk region, and the heavy mineral concentrates investigated for scheelite. Grains of scheelite were found in virtually every stream draining either Isua-Akilia supracrustals or Malene supracrustal enclaves, whereas streams draining the Fiskenæsset anorthosite complex, the gneisses and the Qôrqut granite were barren (Appel, 1989). The heavy mineral concentrates were analysed for different elements by various techniques. It was noted that gold and tungsten display a strong positive correlation (Appel, 1989).

The following areas, display significant scheelite anomalies in the heavy mineral concentrates from stream sediments, although no follow-up has been carried out.

Bjørnesund
Grædefjorden
Alangordlia
Bjørneøen

## BJØRNESUND

The area in question includes the Bjørnesund area proper as well as the area between Bjørnesund and Frederikshåb Isblink (Fig. 2).

Quite extensive supracrustal belts are exposed in Bjørnesund proper, and streams draining these supracrustals carry appreciable amounts of scheelite. Heavy mineral concentrates from the same streams carry gold in excess of 100 ppb.

The southernmost supracrustal outcrops are located in fairly flat terrane with only few and slow running streams producing very unfavourable conditions for heavy mineral concentrates. In spite of these poor conditions scheelite anomalies, as well as a single gold anomaly, were encountered. (Appel, 1979).

## GRÆDEFJORDEN

In this area a 25 km long supracrustal belt outcrops, and heavy mineral concentrates from stream sediments contain scheelite as well as some gold (>100 ppb).

## ALANGORDLIA

This is a fjord north of Sermilik where sediments from streams the catchment areas of which contains small supracrustal enclaves contain relatively high amounts of scheelite. None of the stream sediments from this area have been analysed for gold.

## BJØRNEØEN

The stream sediments from this large island in the Godthåbsfjord contain anomalous amounts of scheelite, especially those draining the north-eastern part of the island. None of the stream sediments have been analysed for gold.

## SCHEELITE OCCURRENCES

Stream sediment sampling revealed that scheelite in the Nuuk region mainly is confined to supracrustal rocks. So far only a fairly limited amount of prospecting for in situ scheelite by ultra-violet light (UV-lamping) has been carried out. The preliminary and locally detailed prospecting with UV-light for scheelite revealed a fairly uniform appearance of the tungsten mineral. The scheelite occurs mostly in banded amphibolites as tiny grains frequently arranged in thin bands parallel to the regional banding. Scheelite also occurs as slightly discordant veinlets and stringers as well as joint coatings and as centimetre-sized porphyroblasts. Most of the scheelite displays a bluish to white fluorescence indicating low molybdenum contents. Locally bluish and yellowish scheelite is found in the same rock sample but no regular distribution pattern has been revealed. The above description of the scheelite holds for most of the area except the Ivisârtoq area.

Prospecting for scheelite has been carried out in varying detail in the areas listed below. The northernmost area around Ivisârtoq has been studied in most detail. This area will be described first, followed by areas further south.

1. Ivisârtoq
2. Storø
3. Sermitsiaq
4. St. Malene
5. L. Narssaq
6. Simiútat
7. Sermilik

IVISARTOQ

This area is at present level of knowledge the most promising from an economic point of view. The area is situated in the inner part of the Godthåbsfjord, bounded to the east by the Inland Ice, to the south by the active glacier Narssap Sermia, to the west by Godthåbsfjorden and to the north by a small fjord and a retreating glacier (Fig. 2 & 3). The topography is fairly smooth, with gentle gneiss terrane enclosing the Malene supracrustal belt, which "stands out" locally with near vertical slopes down to the gneisses. The highest point in the area 1217 m is situated in the supracrustals.

Stream sediment sampling carried out 1985 revealed a series of promising scheelite anomalies (Appel, 1989). Follow-up work in 1987 revealed an extensive scheelite-bearing stratabound calc-silicate zone, and in 1989 the presence of several stratabound scheelite-rich calc-silicate horisons were proven.

Detailed mapping of the Ivisârtoq area has been carried out by a team from Exeter University, UK. Chadwick (1986) produced a detailed map (1:20 000) as well as a fairly detailed description of the stratigraphy. The following account on the geology, is based on Chadwick's work updated by the authors field work in 1987 and 1989.

The Malene supracrustal belt at Ivisârtoq consists mainly of amphibolites with frequent well preserved pillow structures that indicate a major overturned syncline structure (Fig. 3 & 4) (Chadwick, 1986).

Chadwick's (1986) mapping showed that the basic volcanics can be subdivided into several cycles (Fig. 4). The lower sequence of pillowed amphibolites is separated from upper amphibolites by the so-called magnetic marker (A on Fig. 4). This is a schistose magnetite-rich rock of ultrabasic composition locally lapilli structured. It occurs as an up to 50 m thick and 7 km long horizon. Overlying this horizon are metasediments such as impure carbonates locally metamorphosed into calc-silicates, metaquartzites (metarhyolites?), rare fine-grained tourmalinites and a scheelite-bearing calc-silicate horizon. These were deposited in the break in the the basic volcanism.

The upper amphibolite sequence can be subdivided into four volcanic cycles each separated by sheet like peridotite bodies, termed peridotite markers.

Sulphide zones are found within most volcanic cycles. In the lower amphibolite sequence an c. 50 m thick and 15 km long very prominent pyrite-rich zone occurs. It consists of massive to semi-massive sometimes banded pyrite + quartz rock, with small amounts of fuchsite and rare grains and porphyroblasts of molybdenite. Twenty samples from this zone have been analysed for gold + 33 elements. Only low gold values (<100 ppb) were encountered, however, surprisingly high barium contents > 1 % were found (Table 5).

In the upper amphibolite sequence sulphide-rich zones are found. Slightly below the lower peridotite marker (B on Fig. 4) an up to 10 m wide pyrite zone appears. The zone, which can be traced at intervals for kilometres along strike consist of quartz, mica and feldspar, as well as pyrite in thin bands, stringers and disseminated grains. This pyrite zone has been chip sampled and analysed for gold + 33 elements, see below.

Further up in the upper amphibolite sequence scattered massive to semi-massive pyrrhotite lenses occur. They are a few metres thick, and traceable for a few tens of metres along strike. Three samples have been analysed. The maximum gold content is 13 ppb.

In the upper sequence of pillowed amphibolites, locally thin kyanite-bearing schists occur together with fuchsite stained quartzitic rocks and up to 10 cm wide tourmalinites.

Calc-silicates are abundant in the Ivisârtoq supracrustal rocks. They occur in different settings and were formed by different processes. Some types are scheelite-bearing whereas others are virtually barren. The calc-silicates appear to have one thing in common. They are stratabound, but not necessarily stratiform. Three main types of calc-silicate rocks have been recognised in the Ivisârtoq area:

1. Calc-silicates in carbonates
2. Calc-silicates in pillow lavas
3. Calc-silicates spatially associated with ultramafics

The first type occurs in tens of metres thick horizons in the sequence of metasediments deposited on top of the magnetic marker (Fig. 4). These calc-silicates are typically interlayered with or grade into impure carbonates consisting of calcite with smaller amounts of hornblende, chlorite and epidote. The calc-silicates which are fairly coarse grained consist of garnet and diopside with epidote and rare vesuvianite. The calc-silicates were formed during metamorphism of impure carbonates. Scheelite is found in trace amounts only.

The second type occurs in patches, bands, veins and veinlets of diopside ± epidote ± garnet in pillowed basic volcanics. The initial calc-silicate replacement of pillows took place in their centres leaving the originally fine grained rims unaffected. More advanced stages of replacement show small isolated amphibole patches in the light green diopside ± epidote ± garnet rock. The final replacement result in massive calc-silicate bands. These bands are clearly discordant on a small scale. They do, however, seem to be more abundant in specific pillow lava flows, than others, and are thus regarded as stratabound.

The calc-silicates occurring in the centre of pillows do not normally carry scheelite, but when present it is often in the very centre of the replaced pillows. In the massive calc-silicate bands scheelite appears to be irregularly distributed, often as scattered fairly coarse bluish fluorescent grains.

Some chip sampling of scheelite-bearing calc-silicates in pillow structured amphibolites has been carried out.

The third type of calc-silicates is the most interesting from an economic point of view, since this type is the host of two persistant scheelite-bearing calc-silicate horizons. The stratigraphically oldest horizon occurs just above the magnetic marker (C on Fig. 4) with a thin amphibolite in between, and overlain by banded metasediments (meta acid volcanics?) together with rare thin tourmalinites. The scheelite-bearing calc-silicate horizon is a medium grained rock consisting of diopside and epidote with varying amounts of garnet, scheelite and sphene locally with small amounts of plagioclase. This horizon, which is frequently strongly boudinaged, can be traced at intervals for more than 3000 m.

The scheelite in the magnetic marker scheelite zone is frequently fairly fine grained and occurs as millimetre wide stringers arranged parallel to the regional trend. Scheelite also occurs as rare centimetre sized porphyroblasts. The scheelite in this zone displays a variety of fluorescence colours from bluish through white to yellowish. The most common is bluish to white. The different fluorescence colours can be displayed by grains within a hand specimen, and there is no obvious distribution pattern of the different fluorescence colours. This scheelite zone has been extensively chip sampled and the samples have been analysed for gold + 33 elements.

Higher up in the supracrustal pile the onset of renewed basic volcanic activity is witnessed by a sequence of pillow lavas locally with interlayered sulphide zones (Fig. 4). The upper volcanic sequence can be subdivided into four cycles each separated by a peridotite marker (B-E on Fig. 4). Within the first peridotite marker (B on Fig. 4), which can be traced intermittantly for well over ten kilometres, is a scheelite-bearing calc-silicate zone. It consists mainly of pyroxene with an intermediate composition between diopside and hedenbergite, yellow epidote with varying amounts of scheelite together with small amounts of garnet, pyrrhotite and chalcopyrite as well as garnet with a composition intermediate between grossularite and andradite. The scheelite in this zone is somewhat irregularly distributed, but tends to occur as millimetre wide stringers arranged parallel to the regional banding. Scheelite also occurs as disseminated grains, as centimetre sized porphyroblasts and joint coatings. The mineral also occurs as up to ten centimetre thick boudinaged bands of massive scheelite.

Most of the scheelite found in the peridotite marker displays a strong yellow fluorescence indicating molybdenum contents up to a few percent. The peridotite scheelite zone has been chip sampled and analysed for gold + 33 elements.

The channel sampling was carried out by a portable rock saw, with a water cooled diamond blade. Two oblique cuts were made and the resulting sample has a triangular cross section with each side about 4 cm in length. The length of each sample varies from 10 cm to 60 cm.

The up to 3 m thick scheelite-bearing zone overlying the magnetic marker was sampled along 15 channel-zones with a combined length of almost 34 m. A sketch of the channel-zones is presented on Fig. 6 and 7, and the location of the channel-zones is given on Fig. 3. The analytical results are also listed in Table 1. The tungsten content in this zone appears to vary considerably along strike. The most interesting results were obtained in channel-zones 7 and 8. In the first zone there are two sections which gave the following width * grade 0.9 m * 0.3% W and 0.75 m * 0.17 % W respectively separated by 0.7 m covered by overburden. Channel-zone 8 cuts 2.5 m with 0.35 % W.

The scheelite-bearing zone associated with the first peridotite marker (B on Fig. 4) has been channel sampled at 8 sites (Fig. 3). The total length of the channelzones is 9 metres. A sketch of the channel-zones is in Fig. 8, and the analytical results are seen in Table 2. The best results from the peridotite marker is from channel-zone 22, which grades 0.38 % W over a width of 1.5 m. It should be borne in mind that this scheelite-zone locally hosts up to 10 cm wide massive scheelite bands traceable intermittantly for some tens of metres along strike.

Two sulphide-bearing metasedimentary (acid volcanogenic) horizons separated by a pegmatite have been channel sampled along a total width of slightly less than 14 metres (channel-zones 23 and 24 on Fig. 3). A sketch is in Fig. 10 and the analytical results are presented in Table 3.

A few garnet-rich scheelite-bearing calc-silicate zones in pillow lavas have been channel sampled (Fig. 9), and the analytical results are listed in Table 4. The garnet-scheelite calc-silicate zones in the pillow-lavas yield significant grades, but the lack of continuity along strike so far observed is disappointing.

Neutron activation analysis of the scheelite-bearing zones has yielded a number of significant differences in major and trace element contents. The most significant are listed here with average and range:

| | Cr ppm | | Fe % | | Co ppm | | Ni ppm | | Br ppm | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Average | Range | Av. | R. | Av. | R. | Av. | R. | Av. | R. |
| Magnetic marker scheelite-zone (83 anal.) | 912 | 240-1500 | 7.5 | 3.3-10.0 | 105 | 47-170 | 746 | 220-1200 | < 1 | 0-23 |
| Peridotite marker scheelite-zone (33 anal.) | 2055 | 520-3200 | 7.6 | 6.0-12.0 | 105 | 75-160 | 1034 | 640-1800 | 70 | 0-418 |
| Pillow lava hosted scheelite-zones (14 anal.) | 162 | 92-300 | 5.6 | 3.7-6.7 | 40 | 0-58 | 107 | 26-170 | 6 | 0-18 |

These results are surprising. In spite of the significant surficial similarities between the Magnetic marker scheelite-zone and the scheelite-zone in the Peridotite marker, they show considerable differences in element composition, especially Cr, Ni and Br contents. This suggests a somewhat different genesis of the two types of scheelite-mineralization. The pillow lava hosted scheelite-mineralizations have very low trace element contents compared with the previously described mineralizations, showing that this mineralization type was formed by quite distinct processes. All three types of mineralizations have one feature in common: they are stratabound but not quite stratiform. The calc-silicate zones hosting scheelite were formed prior to the deformation of the supracrustals, it is so far uncertain when they became mineralized and where the tungsten enriched brines came from.

## STORØ

On this island in Godthåbsfjord, scheelite was first found as grains in heavy mineral concentrates from stream sediments (Appel, 1989); later the in situ scheelite was discovered on Storø. This was in Isua-Akilia enclaves (Appel, 1983). Subsequently scheelite was found in banded amphibolites and massive hornblendites of Malene age as disseminated grains, as porphyroblasts and as joint coatings.

The possibilities for finding a economically viable scheelite deposit on Storø are not exhausted.

## SERMITSIAQ

This large island situated in the outer part of Godthåbsfjorden (Fig. 2), exposes extensive outcrops of Malene supracrustal amphibolites. Intercalated in the amphibolites are thin metasedimentary horizons. Scheelite prospecting has been carried out by Olsen (1986) as part of a thesis at the University of Århus, who found an abundance of scheelite showings in banded amphibolites as disseminated grains and as porphyroblasts, but also as clearly discordant stringer zones.

## STORE MALENE

Store Malene is a c. 800 m high mountain range situated behind Nuuk. Detailed mapping has been carried out together with some UV-lamping (Appel & Garde, 1987). The supracrustals comprise amphibolites, quartz-mica schists, anthophyllite-cordierite schists ± tourmaline as well as tourmalinites. The latter consisting of tourmaline with small amounts of plagioclase and scheelite occur as up to one metre wide bands which can be traced for kilometres along strike (Appel, 1986, 1988B). Furthermore thin bands of calc-silicates occur in metasediments. Scheelite occurs in banded amphibolites and in tourmalinites.

The Malene supracrustals are partly exposed in near vertical cliffs, which have not been prospected for scheelite apart from scattered boulder tracing. Only about one third of the easy accessable Malene supracrustals have been preliminary prospected for scheelite.

From the Store Malene area 43 grab samples of amphibolites have been analysed for gold + 20 elements. The gold contents range up to 130 ppb, but are mainly below 5 ppb. Tungsten contents vary from less than 2 ppb to more than 2 %. Many of the highest tungsten contents appear in the tourmalinites. The chromium contents are somewhat elevated with an average of 625 ppm and a maximum of 2500 ppm. Complete set of results are obtainable from GGU.

## LILLE NARSSAQ

In this area (Fig. 2) the most prominent feature from a scheelite point of view are several tens of metres thick bands of calc-silicate rocks occurring in amphibolites. In the calc-silicates molybdenite porphyroblasts are fairly widespread. Furthermore metre-wide pyrrhotite-rich zones are seen.

Scheelite with yellowish fluorescence occurs as scattered grains and porphyroblasts in a few thin zones in the calc-silicates. Only one night of UV-lamping has been carried out.

## SIMIUTAT

The Malene supracrustal rocks on these small islands (Fig. 2) comprise amphibolites with interlayered anthophyllite-gedrite-rich bands. These bands contain substantial amounts of magnetite, pyrite and pyrrhotite as well as lesser amounts of chalcopyrite, molybdenite and gahnite. The anthophyllite-gedrite bands display a peculiar minor element composition with 1.1 % Zn, 0.18 % Mo, 0.12 % Sn and 170 ppm W (Appel, 1988A).

No economic size or grades of scheelite mineralizations were found, and the chance of finding economic scheelite deposits on these small islands is negligible.

Four samples from scheelite-bearing zones have been analysed for gold + 20 elements. All samples contained less than 5 ppb gold. A detailed analytical programme has been carried out on the anthophyllite-gedrite horizon as quoted above. The complete set of analyses can be obtained on request.

## SERMILIK

Sermilik is situated on the north shore of Sermilik fjord (Fig. 2). The Malene supracrustals, which have been metamorphosed under granulite facies conditions, comprise mainly hypersthene-bearing amphibolites, with interlayered quartz-sillimanite horizons as well as horizons of carbonates. The carbonate beds consist of calcite with small amounts of sulphides, diopside, olivine and hercynite together with a few specks of scheelite. Furthermore metre wide sulphide zones occur in the amphibolites.

UV-lamping has only been carried out during a couple of nights. A large part of the supracrustals outcrop in near vertical cliffs, which are difficult to prospect. The possibilities of finding an ore deposit is thus by no means exhausted.

No systematic sampling has been carried out in the Sermilik area. Thirty-eight grab samples have been analysed for gold + 33 elements. The tungsten values range from less than 2 ppm to 9580 ppm, and gold contents up to 39 ppb were encountered. The complete set of analysis is available on request.

## CONCLUSIONS

The tungsten investigations carried out in the Nuuk region has shown the following:

1. Tungsten mainly occurs in supracrustal rocks.
2. The Malene supracrustal rocks constitute a tungsten province in West Greenland.
3. The Malene supracrustal rocks host several zinc anomalies as well as minor iron-formations.
4. Tungsten occurs in scheelite, which mostly has low contents of molybdenum.
5. Scheelite occurs stratabound in banded amphibolites, calc-silicate rocks and tourmalinites.
6. The scheelite-bearing rocks can be traced for kilometres along strike.
7. Channel-sampling across scheelite-bearing calc-silicate bands in Ivisârtoq, east of Nuuk, has revealed grades up to 0.35% W over a width of 2.5 metres.
8. There is a positive correlation between gold and tungsten in heavy mineral concentrates from stream sediments in the Nuuk region.

Previous work on the scheelite in the Malene supracrustal rocks indicated that the scheelite in the banded amphibolites and in the tourmalinites is of submarine exhalative origin and that the scheelite was precipitated on the sea-floor contemporaneously with the deposition of the basic tuffs and tourmaline. The tungsten-bearing brines contained high amounts of zinc, iron and boron (Appel, 1986; 1988B)

The close association of zinc with tungsten as well as the abundance of scheelite indicates that the Malene supracrustal rocks not only holds a potential for scheelite deposits, but also for zinc deposits. This assumption is suggested also by the occurrence of the zinc-spinel gahnite, which is regarded as a tracer mineral for stratabound zinc deposits such as Broken Hill, Australia.

The genesis of the scheelite-mineralizations at Ivisârtoq area is uncertain, and it is likely that somewhat different processes were involved in formation of the different types of scheelite occurrences. It seems likely, however, that the magnetic marker and the peridotite marker scheelite zones were formed by simmilar processes. These involved extensive sea-floor leaching of peridotites, leaving an unusual Al-Ca-rich rock with high contents of Cr, Ni and Co. During metamorphism and deformation shearzones were formed and they preferably were located in the incompetent altered peridotite. The shear zones are thus stratabound. Metal enriched brines were channelled through these shearzones and scheelite was precipitated where the tungsten-rich brines met Ca-rich rocks. The brines possibly contained other metals as well e.g. zinc, but the metal was not precipitated contemporaneously with the scheelite, but must be sought elsewhere in the Malene supracrustal rocks. Assuming that the brines were auriferous and the gold was transported in sulphide complexes, then gold would expectedly have precipitated where the shear zones intersected iron-rich rocks, and these rocks would at the present time be betrayed by the presence of pyrite and or pyrrhotite.

## FUTURE WORK

As direct result of the activities described in this paper the following future activities are suggested.

1. Follow-up of scheelite ± gold anomalies in stream sediments.
2. Further work at Ivisârtoq.

Follow-up of heavy mineral anomalies in stream sediment samples should be carried out in the Bjørnesund, Grædefjorden, Alangordlia, Sermilik and Bjørneøen areas.

In Bjørnesund and in the area between Bjørnesund and Frederikshåb Isblink (Fig. 2) large supracrustal sequences occur. Detailed mapping of these should take place as well as further prospecting for gold and tungsten. This prospecting should include night work with UV-lamping.

Grædefjorden, Sermilik and Alangordlia will each require some additional field work including UV-lamping.

Bjørneøen in Godthåbsfjorden host large outcrops of Malene supracrustals, which contain scheelite mineralisations, which require quite extensive field work.

Finally Storø in Godthåbsfjorden and the area immediately south of Store Malene should be prospected. The topography is quite rough, but the proximity to Nuuk make these areas promising.

Some further work at Ivisârtoq is suggested. Of prime importance is sampling of the calc-silicate zone associated with the first peridotite marker. Particularly interesting would be sampling where this zone contains sulphides, since such zone might prove auriferous. Prospecting should also be carried out in the other peridotite markers further up in the volcanic pile. These may host shear zones resembling the calc-silicates at magnetic marker and the first periodotite marker. These younger shear zones could be enriched in tungsten or other metals leached from the thick pile of volcanics below.

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TABLE 1 A. Au + 33 elements in Magnetic marker scheelite zone Ivisartoq.

| GGU NO | Na % | Sc ppm | Cr ppm | Fe % | Co ppm | Ni ppm | Zn ppm | As ppm | Se ppm | Br ppm | Rb ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353313 | 0.55 | 19.0 | 770 | 8.4 | 170 | 760 | 270 | 46 | 0 | 0 | 41 |
| 353314 | 0.43 | 24.0 | 830 | 9.0 | 140 | 750 | 310 | 24 | 0 | 0 | 0 |
| 353315 | 0.56 | 17.0 | 640 | 7.8 | 130 | 740 | 0 | 7 | 0 | 0 | 0 |
| 353316 | 0.55 | 24.0 | 810 | 8.6 | 110 | 560 | 0 | 17 | 0 | 1 | 0 |
| 353317 | 0.25 | 24.0 | 1100 | 9.2 | 140 | 830 | 270 | 17 | 0 | 0 | 0 |
| 353318 | 0.18 | 22.0 | 930 | 7.5 | 110 | 700 | 0 | 12 | 0 | 0 | 0 |
| 353319 | 0.25 | 21.0 | 930 | 10.0 | 140 | 920 | 390 | 10 | 0 | 0 | 0 |
| 353320 | 0.16 | 28.0 | 1200 | 7.3 | 92 | 540 | 220 | 8 | 0 | 0 | 0 |
| 353321 | 0.15 | 26.0 | 1100 | 9.0 | 120 | 860 | 260 | 6 | 0 | 0 | 0 |
| 353322 | 0.21 | 22.0 | 1000 | 10.0 | 140 | 1100 | 330 | 6 | 0 | 0 | 0 |
| 353323 | 0.32 | 28.0 | 1300 | 10.0 | 120 | 850 | 0 | 7 | 0 | 0 | 0 |
| 353324 | 0.31 | 28.0 | 1000 | 10.0 | 140 | 870 | 440 | 12 | 0 | 0 | 0 |
| 353325 | 0.24 | 30.0 | 1200 | 10.0 | 150 | 900 | 280 | 18 | 0 | 0 | 22 |
| 353326 | 0.15 | 27.0 | 1200 | 9.0 | 130 | 770 | 310 | 14 | 0 | 0 | 0 |
| 353327 | 0.16 | 27.0 | 1200 | 8.8 | 130 | 740 | 270 | 9 | 0 | 0 | 0 |
| 353328 | 0.16 | 19.0 | 780 | 6.4 | 89 | 810 | 220 | 27 | 0 | 1 | 0 |
| 353331 | 0.14 | 26.0 | 750 | 6.6 | 82 | 580 | 0 | 20 | 0 | 0 | 0 |
| 353332 | 0.22 | 31.0 | 940 | 8.5 | 120 | 830 | 420 | 4 | 0 | 0 | 0 |
| 353333 | 0.15 | 35.0 | 1500 | 8.7 | 130 | 1100 | 210 | 5 | 0 | 0 | 0 |
| 353334 | 0.13 | 29.0 | 1000 | 8.7 | 110 | 880 | 200 | 2 | 0 | 0 | 0 |
| 353335 | 0.27 | 25.0 | 910 | 9.0 | 110 | 880 | 220 | 2 | 0 | 0 | 0 |
| 353336 | 0.45 | 19.0 | 740 | 9.1 | 94 | 830 | 280 | 2 | 0 | 0 | 22 |
| 353337 | 0.27 | 26.0 | 1100 | 7.8 | 120 | 770 | 280 | 2 | 0 | 0 | 15 |
| 353338 | 0.14 | 20.0 | 900 | 8.1 | 110 | 720 | 240 | 2 | 0 | 0 | 0 |
| 353339 | 0.16 | 21.0 | 920 | 8.6 | 120 | 810 | 320 | 1 | 0 | 0 | 0 |
| 353340 | 0.10 | 20.0 | 960 | 6.6 | 93 | 690 | 290 | 8 | 0 | 0 | 0 |
| 353341 | 0.13 | 21.0 | 890 | 8.4 | 120 | 860 | 240 | 2 | 0 | 0 | 0 |
| 353342 | 0.14 | 20.0 | 840 | 7.6 | 110 | 900 | 270 | 2 | 0 | 0 | 0 |
| 353343 | 0.21 | 21.0 | 730 | 6.1 | 81 | 760 | 0 | 1 | 0 | 0 | 41 |
| 353344 | 0.14 | 20.0 | 960 | 7.5 | 110 | 910 | 300 | 4 | 0 | 0 | 0 |
| 353345 | 0.13 | 23.0 | 1100 | 6.8 | 96 | 610 | 0 | 3 | 0 | 0 | 0 |
| 353346 | 0.37 | 21.0 | 900 | 7.9 | 120 | 810 | 220 | 5 | 0 | 0 | 0 |
| 353347 | 0.09 | 21.0 | 1000 | 6.4 | 89 | 620 | 0 | 2 | 0 | 0 | 0 |
| 353348 | 0.10 | 22.0 | 1100 | 7.1 | 90 | 670 | 0 | 1 | 0 | 0 | 0 |
| 353349 | 0.11 | 20.0 | 990 | 7.3 | 110 | 850 | 260 | 0 | 0 | 0 | 0 |
| 353350 | 0.11 | 19.0 | 910 | 7.3 | 110 | 900 | 0 | 2 | 0 | 0 | 0 |
| 353351 | 0.07 | 18.0 | 830 | 5.8 | 68 | 780 | 0 | 1 | 0 | 0 | 0 |
| 353352 | 0.10 | 20.0 | 980 | 6.3 | 90 | 780 | 0 | 2 | 0 | 0 | 0 |
| 353353 | 0.10 | 21.0 | 1000 | 6.6 | 92 | 580 | 220 | 0 | 0 | 0 | 0 |
| 353354 | 0.72 | 23.0 | 1100 | 7.4 | 98 | 630 | 0 | 0 | 0 | 0 | 0 |
| 353355 | 0.61 | 21.0 | 950 | 6.9 | 88 | 590 | 0 | 0 | 0 | 0 | 0 |
| 353356 | 0.06 | 17.0 | 850 | 5.3 | 69 | 450 | 0 | 0 | 0 | 4 | 0 |
| 353357 | 0.06 | 16.0 | 810 | 5.5 | 66 | 490 | 0 | 0 | 0 | 5 | 0 |
| 353358 | 0.35 | 29.0 | 1200 | 8.5 | 120 | 830 | 220 | 1 | 0 | 0 | 370 |
| 353359 | 0.13 | 22.0 | 920 | 7.0 | 100 | 780 | 260 | 0 | 0 | 0 | 0 |
| 353360 | 0.64 | 18.0 | 760 | 5.8 | 87 | 680 | 0 | 0 | 0 | 0 | 0 |

TABLE 1 A. Au + 33 elements in Magnetic marker scheelite zone Ivisartoq.

| GGU NO | Na % | Sc ppm | Cr ppm | Fe % | Co ppm | Ni ppm | Zn ppm | As ppm | Se ppm | Br ppm | Rb ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353361 | 0.88 | 20.0 | 950 | 6.8 | 97 | 670 | 0 | 0 | 0 | 0 | 0 |
| 353362 | 0.08 | 16.0 | 840 | 6.2 | 80 | 500 | 220 | 0 | 0 | 2 | 0 |
| 353363 | 0.92 | 20.0 | 840 | 6.6 | 80 | 560 | 0 | 0 | 0 | 0 | 0 |
| 353364 | 0.86 | 20.0 | 980 | 7.3 | 95 | 730 | 0 | 0 | 0 | 0 | 0 |
| 353365 | 0.82 | 22.0 | 990 | 8.0 | 110 | 970 | 210 | 0 | 0 | 0 | 0 |
| 353366 | 0.12 | 20.0 | 970 | 8.1 | 120 | 1100 | 220 | 0 | 0 | 0 | 0 |
| 353367 | 0.09 | 20.0 | 890 | 6.0 | 78 | 540 | 0 | 0 | 0 | 0 | 0 |
| 353368 | 0.09 | 20.0 | 980 | 6.3 | 85 | 560 | 240 | 0 | 0 | 0 | 0 |
| 353369 | 0.85 | 17.0 | 240 | 3.3 | 47 | 220 | 0 | 1 | 0 | 0 | 0 |
| 353370 | 0.13 | 44.0 | 1100 | 7.8 | 110 | 720 | 300 | 6 | 0 | 6 | 0 |
| 353371 | 0.15 | 25.0 | 1100 | 8.4 | 130 | 770 | 210 | 13 | 0 | 9 | 0 |
| 353372 | 0.90 | 20.0 | 210 | 6.0 | 91 | 460 | 240 | 3 | 0 | 3 | 130 |
| 353373 | 0.17 | 27.0 | 540 | 9.3 | 120 | 640 | 270 | 23 | 0 | 17 | 0 |
| 353378 | 0.83 | 23.0 | 850 | 7.3 | 96 | 640 | 0 | 22 | 0 | 6 | 16 |
| 353379 | 0.84 | 23.0 | 770 | 6.9 | 86 | 630 | 0 | 19 | 0 | 7 | 28 |
| 353380 | 0.83 | 20.0 | 770 | 7.2 | 80 | 560 | 250 | 3 | 0 | 7 | 23 |
| 353381 | 1.10 | 27.0 | 870 | 8.4 | 88 | 520 | 220 | 16 | 0 | 1 | 11 |
| 353382 | 0.34 | 22.0 | 1100 | 8.4 | 110 | 880 | 0 | 9 | 0 | 7 | 16 |
| 353383 | 0.29 | 16.0 | 830 | 7.7 | 88 | 750 | 0 | 15 | 0 | 6 | 0 |
| 353384 | 0.49 | 23.0 | 1200 | 10.0 | 110 | 630 | 0 | 18 | 0 | 8 | 0 |
| 353385 | 0.31 | 16.0 | 990 | 9.1 | 100 | 730 | 0 | 36 | 0 | 5 | 11 |
| 353386 | 0.35 | 17.0 | 980 | 8.6 | 98 | 840 | 0 | 28 | 0 | 5 | 0 |
| 353387 | 1.20 | 34.0 | 700 | 6.6 | 86 | 370 | 0 | 5 | 0 | 4 | 30 |
| 353388 | 1.40 | 29.0 | 1200 | 7.5 | 120 | 730 | 370 | 7 | 0 | 7 | 20 |
| 353389 | 0.17 | 29.0 | 1100 | 7.7 | 130 | 890 | 0 | 2 | 0 | 9 | 0 |
| 353390 | 0.15 | 32.0 | 1300 | 7.7 | 140 | 1000 | 210 | 1 | 0 | 11 | 0 |
| 353391 | 0.10 | 25.0 | 850 | 7.9 | 98 | 650 | 230 | 1 | 0 | 14 | 0 |
| 353392 | 2.00 | 17.0 | 450 | 6.1 | 76 | 390 | 0 | 5 | 0 | 9 | 0 |
| 353393 | 0.35 | 19.0 | 980 | 8.9 | 110 | 730 | 250 | 5 | 0 | 8 | 0 |
| 353394 | 0.45 | 16.0 | 860 | 8.9 | 100 | 950 | 260 | 8 | 0 | 7 | 15 |
| 353396 | 0.24 | 16.0 | 770 | 9.1 | 110 | 1000 | 280 | 25 | 0 | 8 | 0 |
| 353397 | 0.18 | 15.0 | 800 | 8.5 | 110 | 970 | 310 | 5 | 0 | 7 | 0 |
| 353398 | 0.36 | 16.0 | 880 | 6.9 | 86 | 690 | 240 | 0 | 0 | 7 | 36 |
| 353399 | 0.23 | 15.0 | 830 | 8.3 | 100 | 980 | 320 | 7 | 0 | 7 | 14 |
| 353432 | 0.21 | 16.0 | 820 | 8.6 | 100 | 1200 | 0 | 0 | 0 | 23 | 48 |
| 353591 | 0.28 | 18.0 | 970 | 6.6 | 79 | 670 | 0 | 0 | 0 | 7 | 12 |
| 353592 | 0.24 | 16.0 | 890 | 6.9 | 84 | 840 | 0 | 0 | 0 | 6 | 22 |

TABLE 1 B. Au + 33 elements in Magnetic marker scheelite zone Ivisartoq.

| GGU NO | Zr ppm | Mo ppm | Ag ppm | Cd ppm | Sn ppm | Sb ppm | Te ppm | Cs ppm | Ba ppm | La ppm | Ce ppm | Sm ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 353313 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0 | 9 | 120 | 20 | 60 | 5.8 |
| 353314 | 0 | 0 | 0 | 0 | 0 | 2.1 | 0 | 0 | 0 | 31 | 71 | 6.9 |
| 353315 | 0 | 0 | 0 | 0 | 0 | 2.3 | 0 | 0 | 0 | 27 | 52 | 5.1 |
| 353316 | 0 | 0 | 0 | 0 | 0 | 2.7 | 0 | 0 | 0 | 20 | 46 | 4.8 |
| 353317 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 2 | 0 | 42 | 81 | 8.1 |
| 353318 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0 | 0 | 0 | 29 | 66 | 6.5 |
| 353319 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 0 | 0 | 27 | 52 | 5.8 |
| 353320 | 0 | 0 | 0 | 0 | 0 | 1.5 | 0 | 0 | 0 | 42 | 99 | 7.9 |
| 353321 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 0 | 0 | 37 | 74 | 7.0 |
| 353322 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 0 | 0 | 37 | 71 | 6.5 |
| 353323 | 0 | 0 | 0 | 0 | 0 | 1.8 | 0 | 0 | 140 | 43 | 88 | 7.8 |
| 353324 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0 | 2 | 0 | 47 | 100 | 7.9 |
| 353325 | 0 | 0 | 0 | 0 | 0 | 1.9 | 0 | 7 | 0 | 44 | 93 | 8.1 |
| 353326 | 0 | 0 | 0 | 0 | 0 | 2.0 | 0 | 0 | 0 | 37 | 97 | 7.3 |
| 353327 | 0 | 0 | 0 | 0 | 0 | 1.9 | 0 | 0 | 0 | 36 | 81 | 7.2 |
| 353328 | 0 | 0 | 0 | 0 | 0 | 1.6 | 0 | 0 | 0 | 28 | 56 | 7.4 |
| 353331 | 0 | 2 | 0 | 0 | 0 | 1.2 | 0 | 0 | 0 | 65 | 150 | 13.0 |
| 353332 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 18 | 44 | 4.8 |
| 353333 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 0 | 100 | 35 | 82 | 7.0 |
| 353334 | 0 | 0 | 0 | 0 | 0 | 1.0 | 0 | 0 | 0 | 14 | 44 | 4.2 |
| 353335 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 120 | 19 | 39 | 4.4 |
| 353336 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 1 | 150 | 16 | 25 | 4.0 |
| 353337 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 2 | 150 | 29 | 69 | 6.7 |
| 353338 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0 | 31 | 54 | 6.8 |
| 353339 | 530 | 0 | 0 | 0 | 0 | 0.7 | 0 | 0 | 0 | 39 | 80 | 7.0 |
| 353340 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0 | 0 | 0 | 29 | 53 | 6.8 |
| 353341 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 32 | 63 | 6.8 |
| 353342 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0 | 0 | 0 | 32 | 62 | 6.5 |
| 353343 | 0 | 3 | 0 | 0 | 0 | 0.8 | 0 | 1 | 140 | 32 | 79 | 6.5 |
| 353344 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0 | 0 | 0 | 37 | 86 | 7.5 |
| 353345 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 23 | 46 | 6.2 |
| 353346 | 0 | 17 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 29 | 61 | 6.0 |
| 353347 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 29 | 59 | 6.7 |
| 353348 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0 | 22 | 41 | 6.0 |
| 353349 | 0 | 3 | 0 | 0 | 0 | 0.7 | 0 | 0 | 0 | 40 | 91 | 6.9 |
| 353350 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 23 | 50 | 5.5 |
| 353351 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 19 | 32 | 5.1 |
| 353352 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 22 | 47 | 5.9 |
| 353353 | 0 | 4 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 25 | 54 | 5.9 |
| 353354 | 0 | 160 | 0 | 14 | 0 | 0.3 | 0 | 0 | 0 | 32 | 69 | 6.4 |
| 353355 | 0 | 120 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 28 | 56 | 5.4 |
| 353356 | 0 | 23 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 26 | 44 | 5.4 |
| 353357 | 0 | 33 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 22 | 23 | 5.2 |
| 353358 | 0 | 2 | 0 | 0 | 0 | 0.5 | 0 | 68 | 1400 | 38 | 95 | 8.4 |
| 353359 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 33 | 73 | 6.6 |
| 353360 | 0 | 79 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 28 | 54 | 6.2 |

TABLE 1 B. Au + 33 elements in Magnetic marker scheelite zone Ivisartoq.

| GGU NO | Zr ppm | Mo ppm | Ag ppm | Cd ppm | Sn ppm | Sb ppm | Te ppm | Cs ppm | Ba ppm | La ppm | Ce ppm | Sm ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 353361 | 0 | 71 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 30 | 62 | 6.5 |
| 353362 | 0 | 8 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 26 | 44 | 6.0 |
| 353363 | 0 | 55 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 24 | 56 | 5.7 |
| 353364 | 0 | 78 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 23 | 51 | 5.4 |
| 353365 | 0 | 50 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 31 | 61 | 6.5 |
| 353366 | 0 | 3 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 35 | 71 | 7.4 |
| 353367 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 33 | 63 | 7.3 |
| 353368 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 34 | 79 | 7.4 |
| 353369 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 130 | 38 | 110 | 11.0 |
| 353370 | 610 | 0 | 0 | 0 | 0 | 1.8 | 0 | 0 | 0 | 24 | 60 | 10.0 |
| 353371 | 0 | 0 | 0 | 0 | 0 | 1.1 | 0 | 0 | 0 | 63 | 140 | 10.0 |
| 353372 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 6 | 3100 | 71 | 160 | 10.0 |
| 353373 | 0 | 0 | 0 | 0 | 0 | 1.0 | 0 | 0 | 0 | 29 | 53 | 6.0 |
| 353378 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0 | 0 | 190 | 23 | 44 | 4.7 |
| 353379 | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 1 | 240 | 12 | 17 | 4.4 |
| 353380 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 190 | 18 | 28 | 4.1 |
| 353381 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0 | 0 | 170 | 16 | 33 | 5.0 |
| 353382 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0 | 20 | 40 | 4.7 |
| 353383 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0 | 19 | 40 | 3.8 |
| 353384 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 1 | 0 | 23 | 45 | 4.5 |
| 353385 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 0 | 0 | 16 | 26 | 3.4 |
| 353386 | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 0 | 0 | 19 | 35 | 3.9 |
| 353387 | 0 | 2 | 0 | 0 | 0 | 0.6 | 0 | 0 | 280 | 55 | 130 | 10.0 |
| 353388 | 0 | 11 | 0 | 0 | 0 | 0.7 | 0 | 0 | 330 | 48 | 120 | 8.9 |
| 353389 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 23 | 54 | 5.3 |
| 353390 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 21 | 28 | 5.6 |
| 353391 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 22 | 50 | 4.3 |
| 353392 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 430 | 46 | 100 | 6.3 |
| 353393 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 130 | 22 | 49 | 4.3 |
| 353394 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 17 | 41 | 3.8 |
| 353396 | 0 | 2 | 0 | 0 | 0 | 2.0 | 0 | 0 | 170 | 15 | 32 | 3.5 |
| 353397 | 0 | 11 | 0 | 0 | 0 | 1.6 | 0 | 0 | 210 | 14 | 25 | 3.2 |
| 353398 | 0 | 30 | 0 | 0 | 0 | 2.5 | 0 | 0 | 480 | 19 | 37 | 3.7 |
| 353399 | 0 | 15 | 0 | 0 | 0 | 2.2 | 0 | 0 | 150 | 18 | 30 | 3.5 |
| 353432 | 1800 | 42 | 0 | 0 | 0 | 0.0 | 0 | 12 | 350 | 25 | 0 | 5.7 |
| 353591 | 890 | 34 | 0 | 0 | 0 | 2.4 | 0 | 0 | 350 | 14 | 0 | 3.4 |
| 353592 | 570 | 19 | 0 | 0 | 0 | 1.5 | 0 | 0 | 260 | 15 | 18 | 3.4 |

TABLE 1 C. Au + 33 elements in Magnetic marker scheelite zone Ivisartoq.

| GGU NO | Eu ppm | Tb ppm | Yb ppm | Lu ppm | Hf ppm | Ta ppm | W ppm | Ir ppb | Au ppb | Th ppm | U ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353313 | 0 | 1 | 0 | 0.0 | 0 | 2 | 3 | 0 | 25 | 2.7 | 1.0 |
| 353314 | 0 | 1 | 0 | 0.0 | 0 | 3 | 2 | 0 | 8 | 2.9 | 3.1 |
| 353315 | 0 | 0 | 0 | 0.0 | 3 | 3 | 3 | 0 | 0 | 2.4 | 2.4 |
| 353316 | 0 | 2 | 0 | 0.0 | 3 | 2 | 0 | 0 | 6 | 1.3 | 3.0 |
| 353317 | 2 | 2 | 0 | 0.0 | 2 | 4 | 12 | 0 | 0 | 3.7 | 3.1 |
| 353318 | 0 | 1 | 5 | 0.0 | 2 | 6 | 3 | 0 | 0 | 2.1 | 4.2 |
| 353319 | 0 | 1 | 0 | 0.0 | 0 | 5 | 3 | 0 | 0 | 2.4 | 1.9 |
| 353320 | 0 | 2 | 9 | 0.0 | 3 | 10 | 5 | 0 | 0 | 4.2 | 6.9 |
| 353321 | 0 | 0 | 0 | 0.0 | 0 | 5 | 5 | 0 | 0 | 3.4 | 4.0 |
| 353322 | 0 | 0 | 0 | 0.0 | 3 | 3 | 4 | 0 | 0 | 3.4 | 3.0 |
| 353323 | 2 | 1 | 0 | 0.0 | 0 | 3 | 5 | 0 | 0 | 3.1 | 1.7 |
| 353324 | 0 | 1 | 9 | 0.0 | 3 | 13 | 3 | 0 | 0 | 4.4 | 4.4 |
| 353325 | 0 | 2 | 15 | 0.0 | 3 | 17 | 2 | 0 | 0 | 3.5 | 7.8 |
| 353326 | 0 | 1 | 13 | 0.0 | 0 | 14 | 4 | 0 | 0 | 2.8 | 9.1 |
| 353327 | 0 | 2 | 16 | 0.0 | 3 | 20 | 3 | 0 | 0 | 3.0 | 9.0 |
| 353328 | 0 | 2 | 6 | 0.0 | 3 | 9 | 23 | 0 | 0 | 3.2 | 15.0 |
| 353331 | 0 | 2 | 6 | 0.0 | 4 | 11 | 12 | 0 | 0 | 6.7 | 5.4 |
| 353332 | 0 | 0 | 6 | 0.0 | 0 | 5 | 0 | 0 | 0 | 1.2 | 2.4 |
| 353333 | 0 | 2 | 0 | 0.0 | 3 | 5 | 5 | 0 | 0 | 2.8 | 2.3 |
| 353334 | 0 | 1 | 0 | 0.0 | 0 | 2 | 0 | 0 | 0 | 1.1 | 1.1 |
| 353335 | 0 | 0 | 0 | 0.0 | 0 | 2 | 0 | 0 | 0 | 1.3 | 1.8 |
| 353336 | 0 | 0 | 0 | 0.0 | 0 | 2 | 0 | 0 | 0 | 1.6 | 1.2 |
| 353337 | 0 | 0 | 0 | 0.0 | 2 | 3 | 6 | 0 | 0 | 2.9 | 2.2 |
| 353338 | 0 | 1 | 0 | 0.0 | 2 | 3 | 21 | 0 | 0 | 3.0 | 2.8 |
| 353339 | 0 | 1 | 0 | 0.0 | 3 | 4 | 4 | 0 | 0 | 3.8 | 2.0 |
| 353340 | 0 | 0 | 0 | 0.0 | 3 | 4 | 9 | 0 | 0 | 3.0 | 2.1 |
| 353341 | 0 | 1 | 0 | 0.0 | 0 | 4 | 13 | 0 | 0 | 2.8 | 2.6 |
| 353342 | 0 | 1 | 0 | 0.0 | 3 | 4 | 3 | 0 | 0 | 3.0 | 3.0 |
| 353343 | 0 | 0 | 0 | 0.0 | 0 | 16 | 216 | 0 | 0 | 3.2 | 1.5 |
| 353344 | 0 | 1 | 0 | 0.0 | 3 | 4 | 6 | 0 | 0 | 4.0 | 4.5 |
| 353345 | 0 | 0 | 0 | 0.0 | 3 | 4 | 5 | 0 | 0 | 2.2 | 2.0 |
| 353346 | 0 | 0 | 0 | 0.0 | 2 | 4 | 1890 | 0 | 0 | 2.9 | 4.2 |
| 353347 | 0 | 0 | 0 | 0.0 | 3 | 3 | 24 | 0 | 0 | 2.8 | 2.2 |
| 353348 | 0 | 0 | 0 | 0.0 | 3 | 4 | 7 | 0 | 0 | 2.3 | 1.9 |
| 353349 | 0 | 0 | 0 | 0.0 | 3 | 3 | 150 | 0 | 0 | 4.0 | 1.7 |
| 353350 | 0 | 0 | 0 | 0.0 | 3 | 3 | 14 | 0 | 0 | 2.1 | 1.5 |
| 353351 | 0 | 0 | 0 | 0.0 | 2 | 3 | 5 | 0 | 0 | 2.0 | 1.7 |
| 353352 | 0 | 0 | 0 | 0.0 | 3 | 3 | 6 | 0 | 0 | 2.3 | 1.2 |
| 353353 | 0 | 0 | 0 | 0.0 | 3 | 2 | 204 | 0 | 0 | 2.3 | 1.4 |
| 353354 | 0 | 0 | 0 | 0.0 | 0 | 3 | 9600 | 0 | 0 | 2.8 | 2.4 |
| 353355 | 0 | 0 | 0 | 0.0 | 0 | 2 | 7260 | 0 | 0 | 2.3 | 1.8 |
| 353356 | 0 | 0 | 0 | 0.0 | 6 | 2 | 1420 | 0 | 0 | 1.2 | 1.6 |
| 353357 | 0 | 0 | 0 | 0.7 | 15 | 2 | 1920 | 0 | 0 | 1.3 | 0.9 |
| 353358 | 0 | 1 | 0 | 0.0 | 0 | 6 | 110 | 0 | 0 | 4.7 | 3.5 |
| 353359 | 0 | 0 | 0 | 0.0 | 2 | 3 | 34 | 0 | 0 | 3.1 | 2.0 |
| 353360 | 0 | 0 | 0 | 0.0 | 0 | 3 | 4780 | 0 | 0 | 3.1 | 2.3 |

TABLE 1 C. Au + 33 elements in Magnetic marker scheelite zone Ivisartoq.

| GGU NO | Eu ppm | Tb ppm | Yb ppm | Lu ppm | Hf ppm | Ta ppm | W ppm | Ir ppb | Au ppb | Th ppm | U ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353361 | 0 | 0 | 0 | 0.0 | 0 | 3 | 4470 | 0 | 0 | 3.2 | 2.5 |
| 353362 | 0 | 1 | 0 | 0.0 | 0 | 3 | 686 | 0 | 0 | 2.1 | 1.6 |
| 353363 | 0 | 0 | 0 | 0.0 | 0 | 3 | 3760 | 0 | 0 | 2.5 | 1.9 |
| 353364 | 0 | 0 | 0 | 0.0 | 0 | 3 | 4770 | 0 | 0 | 2.5 | 1.6 |
| 353365 | 0 | 0 | 0 | 0.0 | 0 | 3 | 3200 | 0 | 0 | 3.0 | 2.5 |
| 353366 | 0 | 0 | 0 | 0.0 | 3 | 3 | 83 | 0 | 0 | 3.7 | 2.1 |
| 353367 | 0 | 1 | 9 | 0.7 | 3 | 12 | 48 | 0 | 0 | 4.0 | 2.6 |
| 353368 | 0 | 1 | 9 | 0.8 | 4 | 10 | 23 | 0 | 0 | 3.1 | 3.4 |
| 353369 | 0 | 2 | 7 | 0.0 | 8 | 3 | 24 | 0 | 0 | 8.7 | 3.2 |
| 353370 | 0 | 2 | 5 | 0.0 | 5 | 6 | 15 | 0 | 0 | 2.8 | 2.6 |
| 353371 | 0 | 0 | 0 | 0.0 | 4 | 5 | 13 | 0 | 0 | 6.7 | 2.6 |
| 353372 | 0 | 0 | 0 | 0.0 | 7 | 3 | 10 | 0 | 0 | 12.0 | 3.1 |
| 353373 | 0 | 0 | 0 | 0.0 | 3 | 5 | 6 | 0 | 0 | 3.0 | 1.9 |
| 353378 | 0 | 0 | 0 | 0.0 | 0 | 3 | 8 | 0 | 0 | 2.0 | 1.8 |
| 353379 | 0 | 0 | 0 | 0.0 | 2 | 10 | 9 | 0 | 0 | 1.5 | 1.7 |
| 353380 | 0 | 0 | 0 | 0.0 | 0 | 7 | 6 | 0 | 0 | 1.9 | 1.9 |
| 353381 | 0 | 0 | 0 | 0.0 | 0 | 2 | 7 | 0 | 0 | 1.7 | 0.7 |
| 353382 | 0 | 0 | 0 | 0.0 | 3 | 3 | 7 | 0 | 0 | 2.2 | 1.8 |
| 353383 | 0 | 0 | 0 | 0.0 | 0 | 5 | 3 | 0 | 0 | 5.7 | 2.7 |
| 353384 | 0 | 0 | 0 | 0.0 | 2 | 5 | 5 | 0 | 0 | 3.0 | 3.3 |
| 353385 | 0 | 0 | 0 | 0.0 | 0 | 2 | 4 | 0 | 0 | 1.7 | 2.1 |
| 353386 | 0 | 0 | 0 | 0.0 | 0 | 2 | 3 | 0 | 0 | 1.8 | 1.3 |
| 353387 | 0 | 1 | 0 | 0.0 | 4 | 4 | 8 | 0 | 0 | 5.0 | 2.0 |
| 353388 | 0 | 0 | 0 | 0.0 | 2 | 3 | 6 | 0 | 0 | 4.3 | 1.7 |
| 353389 | 0 | 0 | 0 | 0.0 | 2 | 1 | 6 | 0 | 0 | 2.0 | 0.8 |
| 353390 | 0 | 0 | 0 | 0.0 | 2 | 2 | 6 | 0 | 0 | 2.3 | 1.2 |
| 353391 | 0 | 0 | 0 | 0.0 | 0 | 2 | 0 | 0 | 0 | 1.5 | 0.9 |
| 353392 | 3 | 0 | 0 | 0.0 | 4 | 2 | 3 | 0 | 0 | 6.6 | 1.6 |
| 353393 | 0 | 0 | 0 | 0.0 | 0 | 1 | 3 | 0 | 0 | 1.7 | 0.8 |
| 353394 | 0 | 0 | 0 | 0.0 | 0 | 1 | 5 | 0 | 0 | 1.8 | 0.9 |
| 353396 | 0 | 0 | 0 | 0.0 | 0 | 1 | 206 | 0 | 0 | 1.4 | 1.2 |
| 353397 | 0 | 0 | 0 | 0.0 | 0 | 1 | 805 | 0 | 0 | 1.0 | 1.3 |
| 353398 | 0 | 0 | 0 | 0.0 | 8 | 0 | 2870 | 0 | 0 | 1.0 | 1.6 |
| 353399 | 0 | 0 | 0 | 0.0 | 0 | 0 | 1220 | 0 | 12 | 1.1 | 0.8 |
| 353432 | 0 | 0 | 0 | 0.0 | 0 | 8 | 4180 | 0 | 0 | 0.0 | 0.0 |
| 353591 | 0 | 0 | 0 | 0.0 | 0 | 1 | 2780 | 0 | 0 | 0.0 | 1.7 |
| 353592 | 0 | 0 | 0 | 0.0 | 0 | 1 | 1620 | 0 | 10 | 0.0 | 1.6 |

TABLE 2 A. Au + 33 elements i 1.st peridotite marker scheelite zone Ivisartoq.

| GGU NO | Na % | Sc ppm | Cr ppm | Fe % | Co ppm | Ni ppm | Zn ppm | As ppm | Se ppm | Br ppm | Rb ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353491 | 0.43 | 25.0 | 3200 | 7.0 | 110 | 1400 | 290 | 3 | 0 | 23 | 0 |
| 353492 | 0.65 | 25.0 | 2100 | 7.1 | 110 | 1100 | 230 | 6 | 0 | 169 | 0 |
| 353495 | 0.82 | 19.0 | 520 | 8.0 | 100 | 710 | 290 | 25 | 0 | 15 | 25 |
| 353498 | 0.28 | 22.0 | 2200 | 6.9 | 96 | 1000 | 200 | 5 | 0 | 19 | 0 |
| 353499 | 0.77 | 27.0 | 2200 | 7.8 | 110 | 950 | 0 | 15 | 0 | 11 | 0 |
| 353500 | 0.73 | 25.0 | 1800 | 7.1 | 92 | 640 | 270 | 7 | 0 | 13 | 14 |
| 353501 | 0.21 | 24.0 | 2200 | 6.4 | 120 | 1200 | 330 | 4 | 0 | 31 | 0 |
| 353502 | 0.26 | 25.0 | 2200 | 7.1 | 110 | 970 | 310 | 5 | 0 | 127 | 0 |
| 353503 | 0.48 | 23.0 | 2200 | 6.4 | 110 | 1000 | 570 | 4 | 0 | 214 | 0 |
| 353504 | 0.52 | 20.0 | 1900 | 6.8 | 110 | 870 | 210 | 7 | 0 | 27 | 0 |
| 353505 | 1.00 | 22.0 | 1500 | 6.9 | 100 | 810 | 0 | 5 | 0 | 86 | 0 |
| 353506 | 0.38 | 22.0 | 2200 | 7.3 | 110 | 1100 | 230 | 7 | 0 | 20 | 0 |
| 353507 | 0.18 | 18.0 | 1600 | 6.0 | 110 | 770 | 260 | 4 | 0 | 26 | 0 |
| 353508 | 0.27 | 21.0 | 2000 | 6.2 | 110 | 1100 | 370 | 7 | 0 | 150 | 0 |
| 353509 | 0.62 | 22.0 | 2200 | 6.0 | 98 | 930 | 0 | 5 | 0 | 155 | 0 |
| 353510 | 0.22 | 25.0 | 2300 | 7.5 | 130 | 1300 | 260 | 23 | 0 | 22 | 0 |
| 353511 | 0.37 | 22.0 | 1900 | 6.9 | 93 | 1200 | 220 | 11 | 0 | 222 | 0 |
| 353512 | 0.72 | 22.0 | 2300 | 7.2 | 110 | 920 | 0 | 9 | 0 | 19 | 0 |
| 353513 | 0.35 | 41.0 | 1800 | 7.7 | 160 | 1800 | 260 | 7 | 0 | 22 | 0 |
| 353514 | 0.49 | 25.0 | 2500 | 7.7 | 93 | 1300 | 0 | 4 | 0 | 418 | 21 |
| 353515 | 0.23 | 22.0 | 2100 | 7.1 | 120 | 1100 | 220 | 13 | 0 | 84 | 0 |
| 353516 | 0.47 | 24.0 | 2300 | 7.2 | 110 | 1000 | 210 | 15 | 0 | 24 | 0 |
| 353517 | 0.34 | 34.0 | 1900 | 7.2 | 140 | 1700 | 300 | 7 | 0 | 52 | 0 |
| 353518 | 0.43 | 22.0 | 2800 | 7.7 | 100 | 870 | 0 | 5 | 0 | 154 | 0 |
| 353519 | 0.21 | 34.0 | 2300 | 8.9 | 83 | 1200 | 0 | 2 | 0 | 23 | 0 |
| 353520 | 0.19 | 37.0 | 2700 | 10.0 | 81 | 1100 | 0 | 2 | 0 | 19 | 0 |
| 353521 | 0.91 | 53.0 | 2000 | 7.8 | 120 | 890 | 300 | 0 | 0 | 0 | 27 |
| 353523 | 0.25 | 30.0 | 1300 | 9.1 | 97 | 810 | 470 | 1 | 0 | 27 | 0 |
| 353524 | 0.21 | 26.0 | 1200 | 9.1 | 77 | 640 | 290 | 0 | 0 | 30 | 0 |
| 353525 | 0.24 | 35.0 | 1900 | 12.0 | 76 | 720 | 0 | 0 | 0 | 59 | 0 |
| 353526 | 0.30 | 30.0 | 1500 | 9.4 | 94 | 910 | 470 | 0 | 0 | 47 | 17 |
| 353587 | 0.29 | 30.0 | 3200 | 9.4 | 97 | 1200 | 400 | 0 | 0 | 15 | 0 |
| 353588 | 0.14 | 20.0 | 1800 | 7.4 | 75 | 910 | 250 | 0 | 0 | 0 | 0 |

TABLE 2 B. Au + 33 elements i 1.st peridotite marker scheelite zone Ivisartoq.

| GGU NO | Zr ppm | Mo ppm | Ag ppm | Cd ppm | Sn ppm | Sb ppm | Te ppm | Cs ppm | Ba ppm | La ppm | Ce ppm | Sm ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 353491 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 1.1 |
| 353492 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 3 | 130 | 0 | 0 | 0.8 |
| 353495 | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 0 | 270 | 81 | 170 | 10.0 |
| 353498 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0.8 |
| 353499 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 1.2 |
| 353500 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 12 | 1.4 |
| 353501 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 1.1 |
| 353502 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 2 | 0 | 0 | 0 | 1.2 |
| 353503 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 1 | 190 | 0 | 0 | 0.9 |
| 353504 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0.9 |
| 353505 | 0 | 5 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 1.4 |
| 353506 | 0 | 10 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 1.0 |
| 353507 | 1100 | 37 | 0 | 0 | 0 | 0.0 | 0 | 1 | 260 | 95 | 210 | 12.0 |
| 353508 | 0 | 13 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 1.0 |
| 353509 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 1.0 |
| 353510 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0.8 |
| 353511 | 0 | 11 | 0 | 0 | 0 | 0.0 | 0 | 2 | 0 | 0 | 0 | 0.8 |
| 353512 | 0 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0.9 |
| 353513 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 1 | 0 | 0 | 0 | 0.8 |
| 353514 | 1500 | 58 | 0 | 0 | 0 | 0.0 | 0 | 0 | 550 | 6 | 0 | 1.0 |
| 353515 | 2700 | 94 | 0 | 0 | 0 | 0.0 | 0 | 1 | 0 | 0 | 0 | 1.0 |
| 353516 | 0 | 2 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 1.0 |
| 353517 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0.6 |
| 353518 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0.7 |
| 353519 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 6 | 0 | 1.9 |
| 353520 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 5 | 0 | 1.7 |
| 353521 | 1900 | 78 | 0 | 0 | 0 | 0.0 | 0 | 2 | 1100 | 0 | 0 | 2.1 |
| 353523 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 1.1 |
| 353524 | 1300 | 28 | 0 | 0 | 0 | 0.0 | 0 | 0 | 190 | 0 | 0 | 1.0 |
| 353525 | 2600 | 229 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 1.2 |
| 353526 | 0 | 13 | 0 | 0 | 0 | 0.0 | 0 | 0 | 170 | 0 | 0 | 1.2 |
| 353587 | 730 | 44 | 0 | 0 | 0 | 0.0 | 0 | 0 | 290 | 0 | 0 | 1.5 |
| 353588 | 0 | 3 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 1.0 |

TABLE 2 C. Au + 33 elements i 1.st peridotite marker scheelite zone Ivisartoq.

| GGU NO | Eu ppm | Tb ppm | Yb ppm | Lu ppm | Hf ppm | Ta ppm | W ppm | Ir ppb | Au ppb | Th ppm | U ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353491 | 0 | 0 | 0 | 0.0 | 0 | 0 | 15 | 0 | 0 | 0.7 | 0.6 |
| 353492 | 0 | 0 | 0 | 0.0 | 0 | 0 | 14 | 0 | 0 | 0.0 | 0.0 |
| 353495 | 3 | 1 | 0 | 0.0 | 5 | 7 | 14 | 0 | 0 | 9.2 | 3.4 |
| 353498 | 0 | 0 | 0 | 0.0 | 0 | 0 | 55 | 0 | 0 | 0.0 | 0.0 |
| 353499 | 0 | 0 | 0 | 0.0 | 0 | 0 | 6 | 0 | 0 | 1.1 | 0.0 |
| 353500 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 1.2 | 0.0 |
| 353501 | 0 | 0 | 0 | 0.0 | 0 | 0 | 25 | 0 | 0 | 0.0 | 0.0 |
| 353502 | 0 | 0 | 0 | 0.0 | 0 | 0 | 130 | 0 | 0 | 0.0 | 0.0 |
| 353503 | 0 | 0 | 0 | 0.0 | 0 | 0 | 51 | 0 | 0 | 0.0 | 0.0 |
| 353504 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 0.5 | 0.0 |
| 353505 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 1.7 | 0.8 |
| 353506 | 0 | 0 | 0 | 0.0 | 0 | 0 | 321 | 0 | 0 | 0.0 | 0.0 |
| 353507 | 0 | 1 | 0 | 0.7 | 0 | 0 | 1800 | 0 | 0 | 0.0 | 0.0 |
| 353508 | 0 | 0 | 0 | 0.0 | 0 | 0 | 626 | 0 | 0 | 0.0 | 0.0 |
| 353509 | 0 | 0 | 0 | 0.0 | 0 | 0 | 22 | 0 | 0 | 0.8 | 0.0 |
| 353510 | 0 | 0 | 0 | 0.0 | 0 | 0 | 62 | 0 | 0 | 0.0 | 0.0 |
| 353511 | 0 | 0 | 0 | 0.0 | 0 | 0 | 429 | 0 | 0 | 0.0 | 0.0 |
| 353512 | 0 | 0 | 0 | 0.0 | 0 | 0 | 180 | 0 | 6 | 0.0 | 0.0 |
| 353513 | 0 | 0 | 0 | 0.0 | 0 | 2 | 11 | 0 | 0 | 0.0 | 1.2 |
| 353514 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3020 | 0 | 0 | 0.0 | 0.8 |
| 353515 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4090 | 0 | 0 | 0.0 | 0.0 |
| 353516 | 0 | 0 | 0 | 0.0 | 0 | 0 | 110 | 0 | 0 | 0.0 | 0.0 |
| 353517 | 0 | 0 | 0 | 0.0 | 0 | 0 | 17 | 0 | 0 | 0.0 | 1.2 |
| 353518 | 0 | 0 | 0 | 0.0 | 0 | 0 | 50 | 0 | 0 | 0.0 | 0.6 |
| 353519 | 0 | 0 | 0 | 0.0 | 0 | 0 | 18 | 0 | 5 | 0.7 | 2.8 |
| 353520 | 0 | 0 | 0 | 0.0 | 0 | 0 | 93 | 0 | 0 | 0.9 | 2.9 |
| 353521 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3850 | 0 | 0 | 0.0 | 1.2 |
| 353523 | 0 | 0 | 0 | 0.0 | 0 | 0 | 150 | 0 | 0 | 0.0 | 2.7 |
| 353524 | 0 | 0 | 0 | 0.0 | 0 | 0 | 2090 | 0 | 0 | 0.0 | 1.3 |
| 353525 | 0 | 0 | 0 | 0.0 | 0 | 1 | 15900 | 0 | 0 | 0.0 | 0.0 |
| 353526 | 0 | 0 | 0 | 0.0 | 0 | 0 | 891 | 0 | 0 | 0.0 | 1.3 |
| 353587 | 0 | 0 | 0 | 0.0 | 0 | 9 | 3920 | 0 | 0 | 0.0 | 9.2 |
| 353588 | 0 | 0 | 0 | 0.0 | 0 | 5 | 170 | 0 | 0 | 0.0 | 6.6 |

TABLE 3 A. Au + 33 elements in pyritiferous metasedimentary zone Ivisartoq.

| GGU NO | Na % | Sc ppm | Cr ppm | Fe % | Co ppm | Ni ppm | Zn ppm | As ppm | Se ppm | Br ppm | Rb ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353529 | 1.90 | 44.0 | 300 | 8.2 | 56 | 160 | 0 | 0 | 0 | 1 | 140 |
| 353530 | 4.20 | 37.0 | 220 | 7.0 | 150 | 480 | 0 | 2 | 0 | 0 | 90 |
| 353531 | 4.10 | 43.0 | 230 | 6.4 | 97 | 470 | 260 | 2 | 0 | 0 | 140 |
| 353532 | 2.50 | 48.0 | 250 | 8.4 | 130 | 480 | 310 | 4 | 0 | 2 | 180 |
| 353533 | 3.70 | 39.0 | 220 | 7.0 | 110 | 400 | 280 | 4 | 0 | 0 | 270 |
| 353534 | 3.70 | 45.0 | 260 | 8.4 | 140 | 440 | 240 | 4 | 0 | 0 | 330 |
| 353535 | 3.20 | 38.0 | 210 | 10.0 | 140 | 490 | 0 | 3 | 0 | 0 | 160 |
| 353536 | 3.60 | 37.0 | 210 | 9.4 | 170 | 610 | 240 | 2 | 0 | 0 | 260 |
| 353537 | 3.20 | 37.0 | 210 | 11.0 | 130 | 590 | 460 | 0 | 0 | 0 | 450 |
| 353538 | 3.00 | 37.0 | 220 | 11.0 | 77 | 640 | 0 | 1 | 0 | 0 | 560 |
| 353539 | 2.90 | 39.0 | 210 | 8.1 | 100 | 500 | 0 | 2 | 0 | 0 | 600 |
| 353540 | 3.20 | 39.0 | 250 | 5.3 | 100 | 400 | 250 | 1 | 0 | 0 | 810 |
| 353541 | 3.10 | 31.0 | 190 | 3.9 | 73 | 340 | 0 | 0 | 0 | 0 | 580 |
| 353542 | 1.70 | 45.0 | 760 | 7.3 | 81 | 450 | 0 | 0 | 0 | 0 | 850 |
| 353543 | 2.80 | 26.0 | 150 | 2.5 | 33 | 130 | 0 | 0 | 0 | 0 | 500 |
| 353544 | 3.30 | 45.0 | 260 | 5.1 | 110 | 380 | 0 | 2 | 0 | 0 | 150 |
| 353545 | 2.90 | 43.0 | 260 | 4.0 | 79 | 300 | 0 | 3 | 0 | 0 | 140 |
| 353546 | 3.20 | 40.0 | 220 | 3.3 | 70 | 270 | 0 | 3 | 0 | 0 | 170 |
| 353547 | 3.30 | 48.0 | 270 | 3.9 | 80 | 300 | 0 | 2 | 0 | 0 | 200 |
| 353548 | 2.70 | 48.0 | 260 | 3.8 | 88 | 290 | 0 | 3 | 0 | 2 | 120 |
| 353549 | 2.20 | 39.0 | 220 | 3.9 | 78 | 260 | 0 | 0 | 0 | 0 | 94 |
| 353550 | 2.80 | 31.0 | 180 | 3.6 | 62 | 200 | 0 | 0 | 0 | 0 | 140 |
| 353551 | 3.50 | 40.0 | 230 | 3.6 | 67 | 260 | 0 | 0 | 0 | 0 | 110 |
| 353552 | 3.70 | 42.0 | 240 | 3.5 | 74 | 260 | 0 | 0 | 0 | 0 | 100 |
| 353555 | 3.00 | 52.8 | 320 | 4.1 | 110 | 420 | 0 | 0 | 0 | 0 | 180 |
| 353556 | 1.90 | 48.0 | 390 | 3.0 | 63 | 190 | 0 | 0 | 0 | 3 | 140 |
| 353557 | 3.00 | 39.0 | 210 | 2.6 | 73 | 230 | 0 | 0 | 0 | 2 | 92 |
| 353558 | 3.10 | 35.0 | 190 | 2.7 | 67 | 210 | 0 | 0 | 0 | 1 | 45 |
| 353559 | 2.00 | 36.0 | 290 | 5.0 | 86 | 280 | 0 | 0 | 0 | 0 | 140 |
| 353560 | 2.40 | 43.0 | 330 | 3.0 | 73 | 250 | 0 | 1 | 0 | 0 | 110 |
| 353561 | 2.30 | 40.0 | 220 | 3.8 | 85 | 260 | 0 | 0 | 0 | 0 | 130 |

TABLE 3 B. Au + 33 elements in pyritiferous metasedimentary zone Ivisartoq.

| GGU NO | Zr ppm | Mo ppm | Ag ppm | Cd ppm | Sn ppm | Sb ppm | Te ppm | Cs ppm | Ba ppm | La ppm | Ce ppm | Sm ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 353529 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 30 | 290 | 0 | 0 | 1.5 |
| 353530 | 0 | 5 | 0 | 0 | 0 | 0.4 | 0 | 7 | 400 | 0 | 13 | 1.5 |
| 353531 | 0 | 6 | 0 | 0 | 0 | 0.6 | 0 | 12 | 390 | 0 | 0 | 2.0 |
| 353532 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0 | 16 | 140 | 0 | 0 | 2.2 |
| 353533 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 20 | 430 | 0 | 0 | 1.8 |
| 353534 | 0 | 6 | 0 | 0 | 0 | 0.3 | 0 | 27 | 220 | 5 | 14 | 2.1 |
| 353535 | 0 | 4 | 0 | 0 | 0 | 0.7 | 0 | 10 | 190 | 0 | 0 | 1.8 |
| 353536 | 0 | 2 | 0 | 0 | 0 | 0.5 | 0 | 17 | 180 | 0 | 0 | 1.9 |
| 353537 | 0 | 2 | 0 | 0 | 0 | 0.0 | 0 | 31 | 250 | 0 | 0 | 1.9 |
| 353538 | 0 | 4 | 0 | 0 | 0 | 0.0 | 0 | 37 | 350 | 0 | 0 | 2.0 |
| 353539 | 0 | 13 | 0 | 0 | 0 | 0.0 | 0 | 39 | 320 | 0 | 0 | 2.0 |
| 353540 | 0 | 9 | 0 | 0 | 0 | 0.0 | 0 | 62 | 340 | 0 | 0 | 1.3 |
| 353541 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 33 | 290 | 0 | 0 | 1.9 |
| 353542 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 80 | 230 | 0 | 0 | 2.4 |
| 353543 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 15 | 170 | 10 | 30 | 4.4 |
| 353544 | 0 | 3 | 0 | 0 | 0 | 1.1 | 0 | 11 | 270 | 0 | 0 | 2.2 |
| 353545 | 0 | 0 | 0 | 0 | 0 | 1.9 | 0 | 9 | 400 | 0 | 0 | 2.3 |
| 353546 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0 | 10 | 200 | 5 | 13 | 2.2 |
| 353547 | 0 | 0 | 0 | 0 | 0 | 1.5 | 0 | 12 | 440 | 0 | 0 | 2.5 |
| 353548 | 0 | 2 | 0 | 0 | 0 | 1.1 | 0 | 5 | 450 | 0 | 19 | 2.4 |
| 353549 | 0 | 2 | 0 | 0 | 0 | 0.9 | 0 | 5 | 690 | 6 | 22 | 2.3 |
| 353550 | 0 | 2 | 0 | 0 | 0 | 0.4 | 0 | 7 | 900 | 10 | 26 | 3.0 |
| 353551 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | 6 | 810 | 8 | 17 | 2.6 |
| 353552 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0 | 5 | 970 | 7 | 18 | 2.6 |
| 353555 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 9 | 560 | 6 | 19 | 2.4 |
| 353556 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 6 | 840 | 0 | 0 | 1.9 |
| 353557 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 6 | 270 | 6 | 13 | 2.3 |
| 353558 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 5 | 130 | 5 | 11 | 2.5 |
| 353559 | 0 | 5 | 0 | 0 | 0 | 0.0 | 0 | 9 | 350 | 0 | 0 | 2.2 |
| 353560 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 5 | 410 | 0 | 13 | 2.6 |
| 353561 | 0 | 2 | 0 | 0 | 0 | 0.0 | 0 | 8 | 410 | 6 | 16 | 2.6 |

TABLE 3 C. Au + 33 elements in pyritiferous metasedimentary zone Ivisartoq.

| GGU NO | Eu ppm | Tb ppm | Yb ppm | Lu ppm | Hf ppm | Ta ppm | W ppm | Ir ppb | Au ppb | Th ppm | U ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353529 | 0 | 0 | 0 | 0.0 | 0 | 0 | 53 | 0 | 0 | 0.0 | 0.0 |
| 353530 | 0 | 0 | 0 | 0.0 | 0 | 0 | 14 | 0 | 0 | 0.6 | 1.0 |
| 353531 | 0 | 0 | 0 | 0.0 | 0 | 0 | 170 | 0 | 0 | 0.5 | 1.6 |
| 353532 | 0 | 0 | 0 | 0.0 | 0 | 0 | 39 | 0 | 0 | 0.0 | 1.7 |
| 353533 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 0.0 | 1.4 |
| 353534 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3 | 0 | 0 | 0.0 | 1.3 |
| 353535 | 0 | 0 | 0 | 0.0 | 0 | 0 | 2 | 0 | 0 | 0.0 | 1.7 |
| 353536 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 9 | 0.0 | 1.2 |
| 353537 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 0.0 | 0.8 |
| 353538 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3 | 0 | 0 | 0.0 | 1.1 |
| 353539 | 0 | 0 | 0 | 0.0 | 0 | 0 | 9 | 0 | 0 | 0.0 | 0.9 |
| 353540 | 0 | 0 | 0 | 0.0 | 0 | 0 | 12 | 0 | 0 | 0.0 | 0.8 |
| 353541 | 0 | 0 | 0 | 0.0 | 0 | 6 | 8 | 0 | 0 | 3.4 | 9.5 |
| 353542 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3 | 0 | 0 | 1.0 | 1.1 |
| 353543 | 0 | 0 | 0 | 0.0 | 0 | 14 | 4 | 0 | 0 | 12.0 | 13.0 |
| 353544 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3 | 0 | 7 | 1.2 | 2.7 |
| 353545 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 6 | 1.9 | 1.6 |
| 353546 | 0 | 0 | 0 | 0.0 | 0 | 1 | 3 | 0 | 0 | 2.2 | 1.8 |
| 353547 | 0 | 0 | 0 | 0.0 | 0 | 0 | 2 | 0 | 0 | 1.1 | 1.6 |
| 353548 | 0 | 0 | 0 | 0.0 | 2 | 0 | 7 | 0 | 0 | 1.1 | 1.6 |
| 353549 | 0 | 0 | 0 | 0.0 | 0 | 0 | 40 | 0 | 7 | 2.0 | 1.6 |
| 353550 | 0 | 0 | 0 | 0.0 | 3 | 0 | 6 | 0 | 0 | 6.0 | 2.8 |
| 353551 | 0 | 0 | 0 | 0.0 | 0 | 0 | 5 | 0 | 0 | 3.4 | 2.1 |
| 353552 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 2.5 | 1.5 |
| 353555 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 1.1 | 1.3 |
| 353556 | 0 | 0 | 0 | 0.0 | 0 | 0 | 5 | 0 | 0 | 0.0 | 1.0 |
| 353557 | 0 | 0 | 0 | 0.0 | 0 | 0 | 3 | 0 | 0 | 1.6 | 1.4 |
| 353558 | 0 | 0 | 0 | 0.0 | 0 | 0 | 2 | 0 | 0 | 1.8 | 1.4 |
| 353559 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 1.4 |
| 353560 | 0 | 0 | 0 | 0.0 | 0 | 0 | 4 | 0 | 0 | 2.2 | 1.6 |
| 353561 | 0 | 0 | 0 | 0.0 | 0 | 0 | 2 | 0 | 0 | 2.5 | 1.6 |

TABLE 4 A. Au + 33 elements in scheelite-bearing garnet calc-silicate zones Ivisartoq.

| GGU NO | Na % | Sc ppm | Cr ppm | Fe % | Co ppm | Ni ppm | Zn ppm | As ppm | Se ppm | Br ppm | Rb ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353407 | 0.29 | 34.0 | 300 | 6.7 | 51 | 150 | 0 | 3 | 0 | 0 | 0 |
| 353469 | 0.23 | 21.0 | 92 | 4.7 | 27 | 85 | 0 | 0 | 0 | 2 | 12 |
| 353470 | 0.45 | 36.0 | 150 | 6.6 | 50 | 170 | 0 | 1 | 0 | 6 | 16 |
| 353471 | 0.18 | 32.0 | 140 | 6.3 | 51 | 150 | 200 | 0 | 0 | 8 | 0 |
| 353472 | 0.11 | 29.0 | 120 | 6.2 | 34 | 91 | 0 | 0 | 0 | 4 | 0 |
| 353473 | 0.26 | 28.0 | 130 | 6.1 | 46 | 140 | 230 | 0 | 0 | 5 | 20 |
| 353474 | 0.23 | 35.0 | 170 | 6.4 | 58 | 130 | 270 | 0 | 0 | 5 | 0 |
| 353566 | 0.09 | 26.0 | 150 | 5.8 | 51 | 91 | 310 | 0 | 0 | 9 | 0 |
| 353567 | 0.15 | 49.0 | 99 | 3.7 | 0 | 26 | 0 | 0 | 0 | 18 | 0 |
| 353570 | 0.10 | 29.0 | 240 | 4.5 | 25 | 64 | 0 | 0 | 0 | 4 | 21 |
| 353571 | 0.10 | 27.0 | 180 | 5.3 | 46 | 100 | 210 | 0 | 0 | 4 | 10 |
| 353572 | 0.09 | 23.0 | 120 | 5.0 | 36 | 83 | 0 | 0 | 0 | 5 | 0 |
| 353573 | 0.22 | 18.0 | 180 | 5.2 | 36 | 110 | 0 | 0 | 0 | 11 | 46 |
| 353590 | 0.52 | 32.0 | 200 | 6.1 | 43 | 110 | 220 | 0 | 0 | 10 | 14 |

TABLE 4 B. Au + 33 elements in scheelite-bearing garnet calc-silicate zones Ivisartoq.

| GGU NO | Zr ppm | Mo ppm | Ag ppm | Cd ppm | Sn ppm | Sb ppm | Te ppm | Cs ppm | Ba ppm | La ppm | Ce ppm | Sm ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 353407 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 1 | 0 | 0 | 0 | 2.5 |
| 353469 | 720 | 18 | 0 | 0 | 0 | 0.0 | 0 | 1 | 0 | 0 | 0 | 2.0 |
| 353470 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 1 | 0 | 0 | 0 | 2.4 |
| 353471 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 2.1 |
| 353472 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 2.5 |
| 353473 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 1 | 0 | 6 | 0 | 2.4 |
| 353474 | 0 | 11 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 1.9 |
| 353566 | 0 | 11 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 8 | 0 | 1.8 |
| 353567 | 0 | 19 | 0 | 0 | 0 | 0.0 | 0 | 2 | 100 | 9 | 0 | 4.4 |
| 353570 | 660 | 19 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 2.2 |
| 353571 | 0 | 11 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 1.9 |
| 353572 | 740 | 17 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 1.6 |
| 353573 | 0 | 5 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 6 | 20 | 2.1 |
| 353590 | 2000 | 78 | 0 | 0 | 0 | 0.0 | 0 | 0 | 220 | 0 | 0 | 2.1 |

TABLE 4 C. Au + 33 elements in scheelite-bearing garnet calc-silicate zones Ivisartoq.

| GGU NO | Eu ppm | Tb ppm | Yb ppm | Lu ppm | Hf ppm | Ta ppm | W ppm | Ir ppb | Au ppb | Th ppm | U ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 353407 | 0 | 0 | 0 | 0.0 | 0 | 0 | 35 | 0 | 17 | 0.0 | 0.0 |
| 353469 | 0 | 0 | 0 | 0.0 | 0 | 3 | 1790 | 0 | 0 | 0.0 | 1.0 |
| 353470 | 0 | 0 | 0 | 0.0 | 0 | 0 | 99 | 0 | 0 | 0.0 | 1.1 |
| 353471 | 0 | 0 | 0 | 0.0 | 0 | 0 | 110 | 0 | 0 | 0.0 | 1.2 |
| 353472 | 0 | 0 | 0 | 0.7 | 0 | 2 | 12 | 0 | 0 | 0.0 | 0.5 |
| 353473 | 0 | 0 | 0 | 0.0 | 0 | 0 | 62 | 0 | 0 | 0.0 | 1.3 |
| 353474 | 0 | 0 | 0 | 0.5 | 0 | 1 | 837 | 0 | 0 | 0.0 | 0.6 |
| 353566 | 0 | 0 | 0 | 0.0 | 0 | 0 | 948 | 0 | 0 | 0.0 | 2.2 |
| 353567 | 0 | 3 | 34 | 5.4 | 10 | 12 | 2280 | 0 | 0 | 1.9 | 2.0 |
| 353570 | 0 | 1 | 0 | 0.8 | 0 | 3 | 1350 | 0 | 0 | 0.0 | 0.0 |
| 353571 | 0 | 0 | 5 | 0.0 | 0 | 1 | 734 | 0 | 0 | 0.0 | 0.0 |
| 353572 | 0 | 0 | 0 | 0.0 | 0 | 2 | 1230 | 0 | 0 | 0.0 | 0.0 |
| 353573 | 0 | 0 | 0 | 0.0 | 0 | 3 | 302 | 0 | 0 | 0.0 | 0.0 |
| 353590 | 0 | 0 | 0 | 0.6 | 0 | 0 | 4280 | 0 | 0 | 0.0 | 0.0 |

| GGU no | Au ppb | Cr ppm | Co ppm | Ni ppm | Mo ppm | Ba ppm | Cu ppm | Pb ppm | Zn ppm |
|---|---|---|---|---|---|---|---|---|---|
| 263601 | 20 | 160 | 89 | 760 | 12 | 13500 | 1320 | 11 | 63 |
| 263604 | 12 | 220 | 160 | 510 | 14 | 10100 | 987 | 3 | 105 |
| 263605 | 5 | 270 | 21 | 290 | 8 | 7400 | 228 | 5 | 171 |
| 263606 | 10 | 130 | 200 | 260 | 13 | 13300 | 766 | 8 | 48 |
| 263607 | 0 | 160 | 180 | 240 | 10 | 4800 | 53 | 15 | 39 |
| 263609 | 0 | 120 | 160 | 200 | 10 | 5800 | 57 | 10 | 60 |
| 263610 | 7 | 170 | 170 | 280 | 10 | 10300 | - | - | - |
| 301096 | 9 | 260 | 72 | 620 | 9 | 16700 | 772 | 6 | 101 |
| 301100 | 9 | 320 | 18 | 670 | 11 | 10200 | - | - | - |

Table 5. Trace element composition of massive pyrite zone at Ivisârtoq

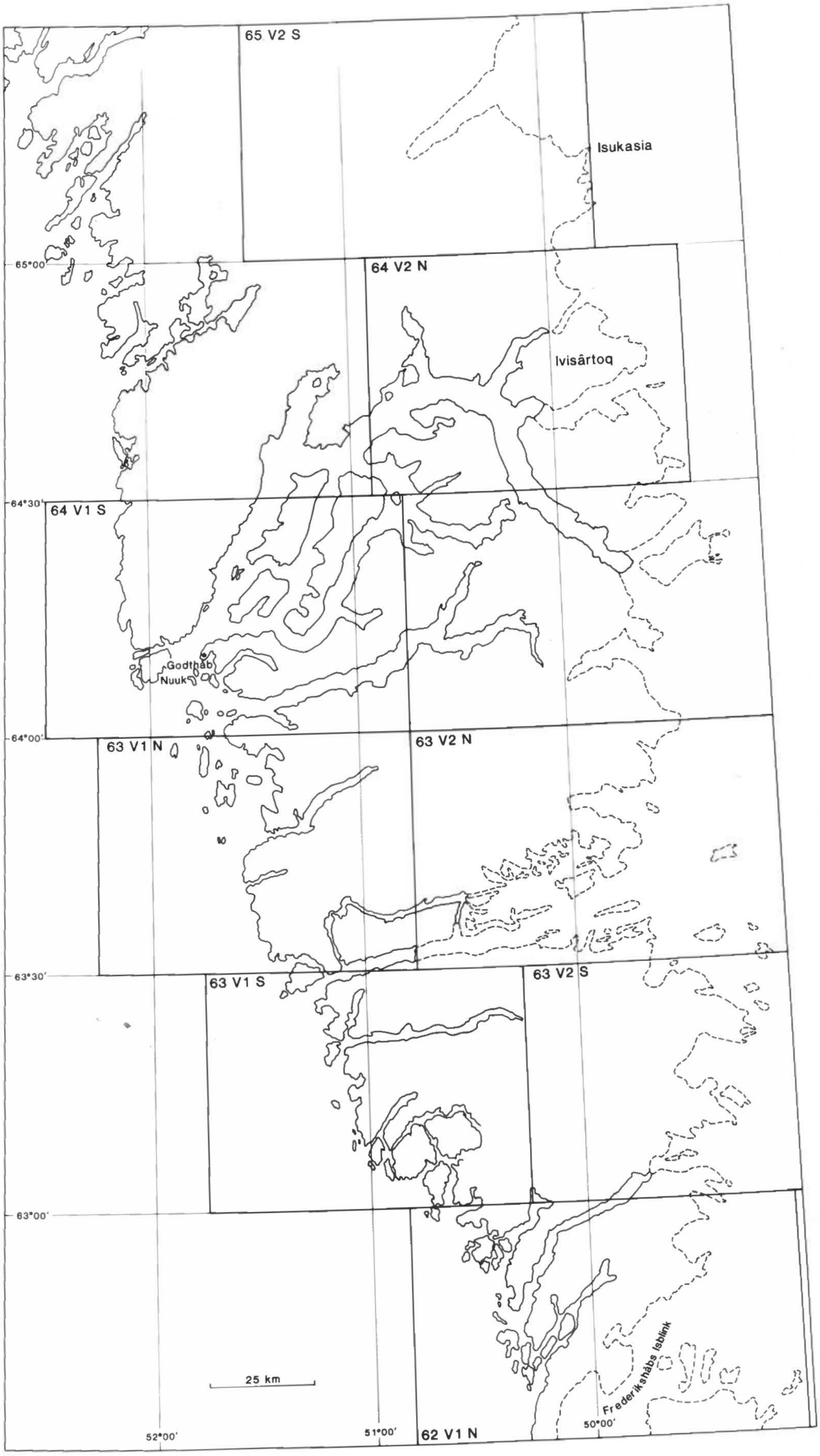



Fig. 1. Index map showing position of published 1:100000 geologic maps.

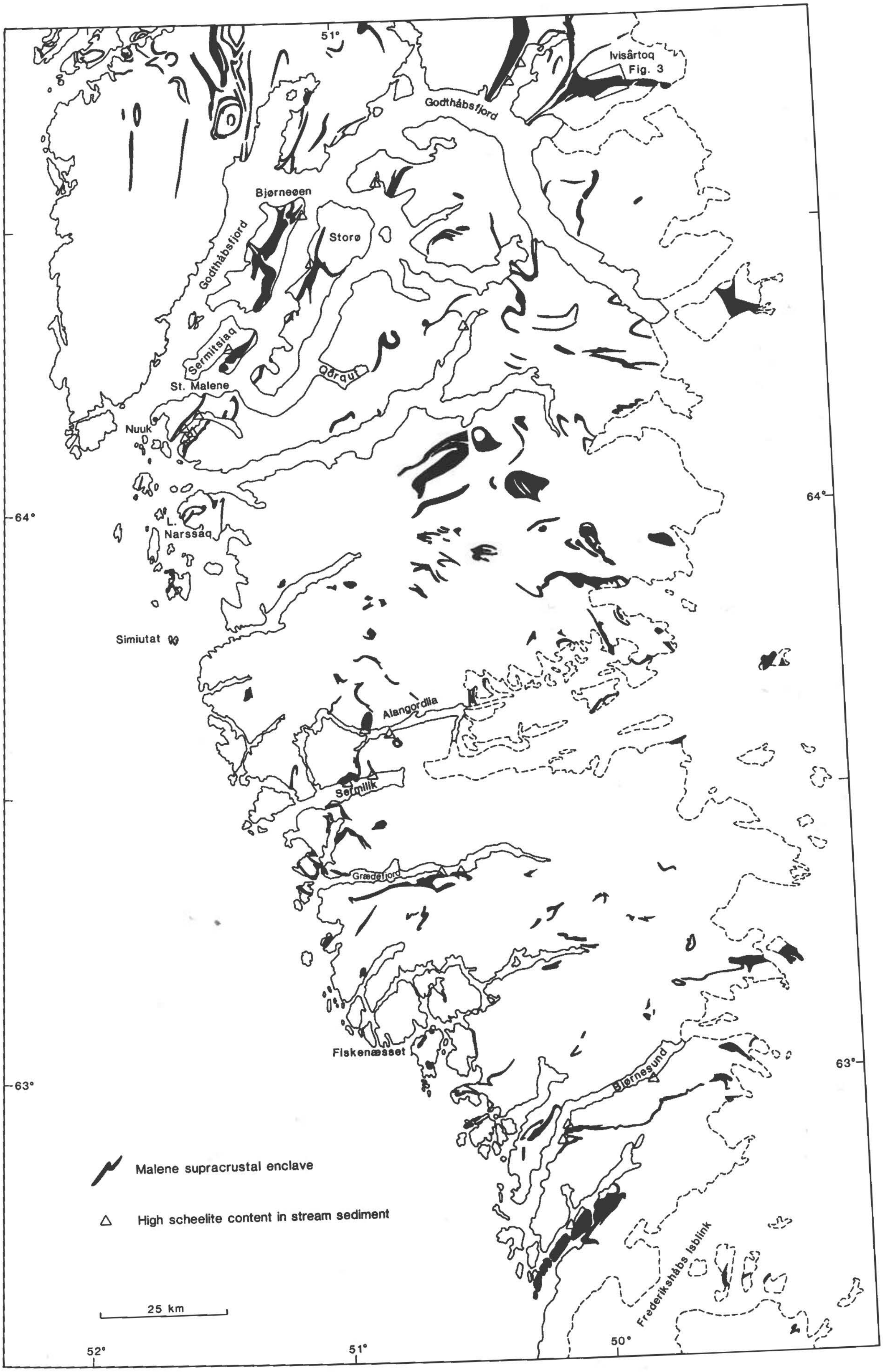

51°
Ivisârtoq
Fig. 3
Godthåbsfjord
Bjørneøen
Storø
Godthåbsfjord
Sermitsiaq
Qôrqut
St. Malene
Nuuk
64°
L. Narssaq
Simiutat
Alangordlia
Sermilik
Grædefjord
Fiskenæsset
Bjørnesund
63°
Frederikshåbs Isblink
Malene supracrustal enclave
High scheelite content in stream sediment
25 km
52°
51°
50°

Fig. 2

Ivisârtoq

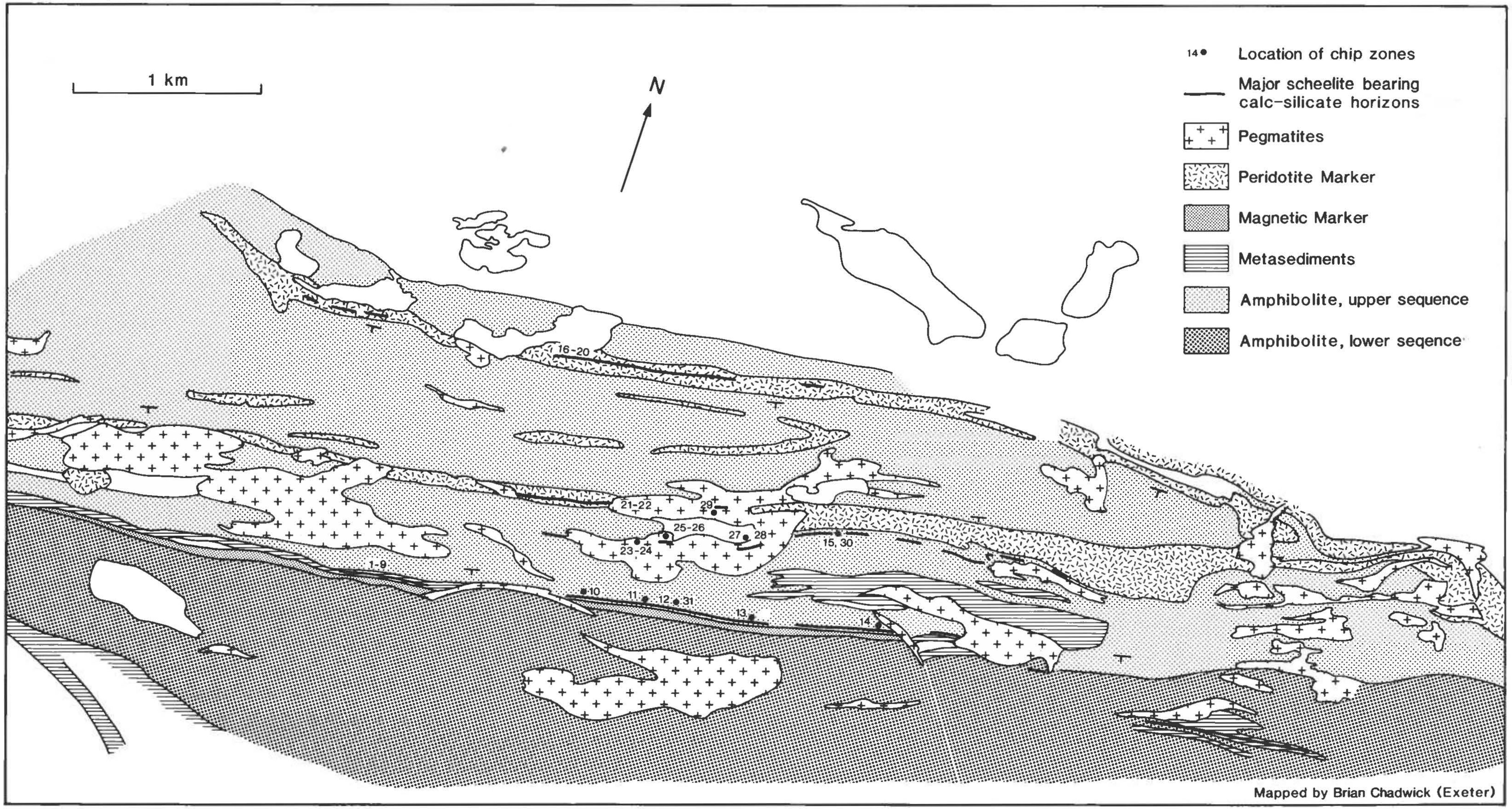



Fig. 3

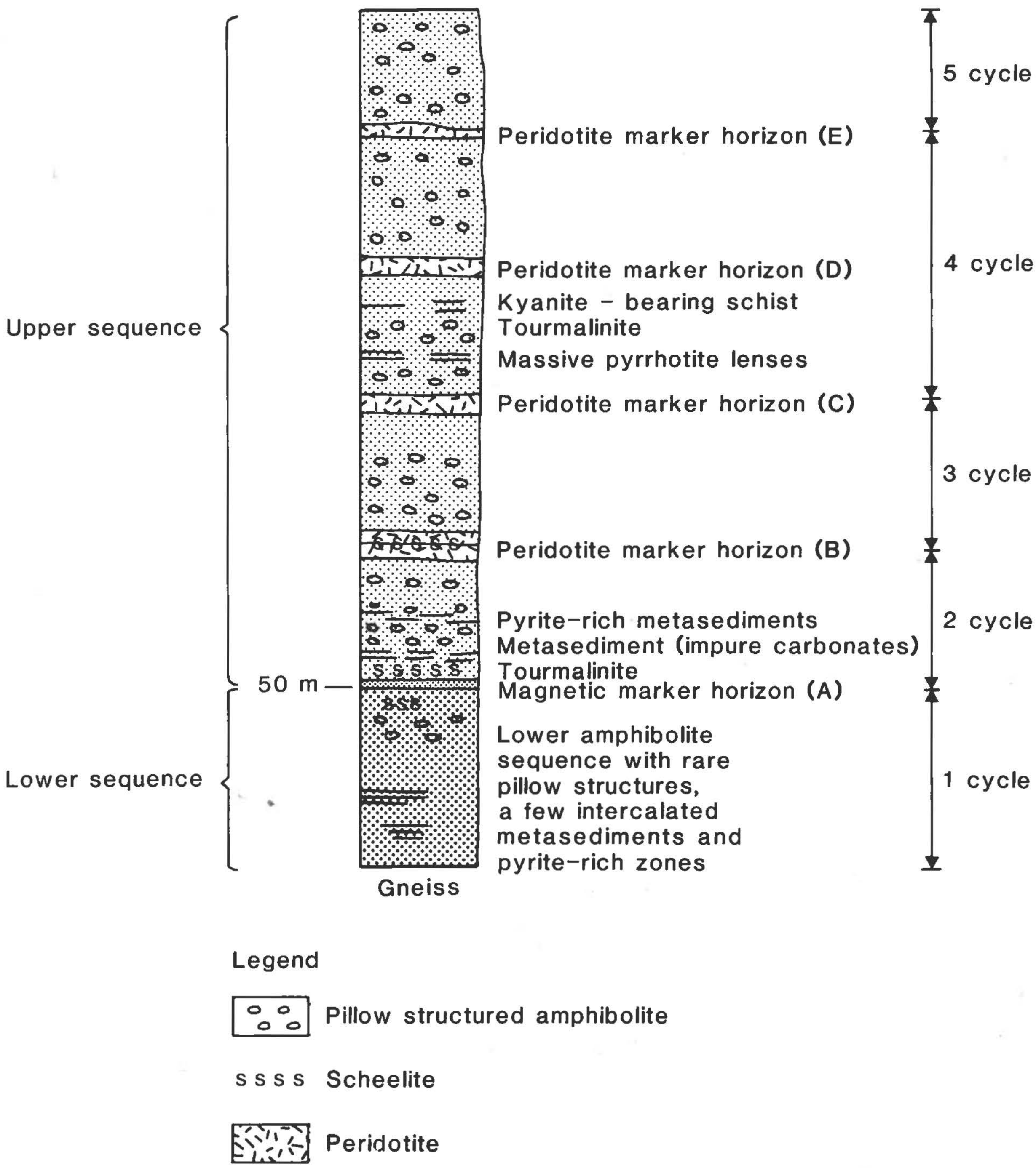
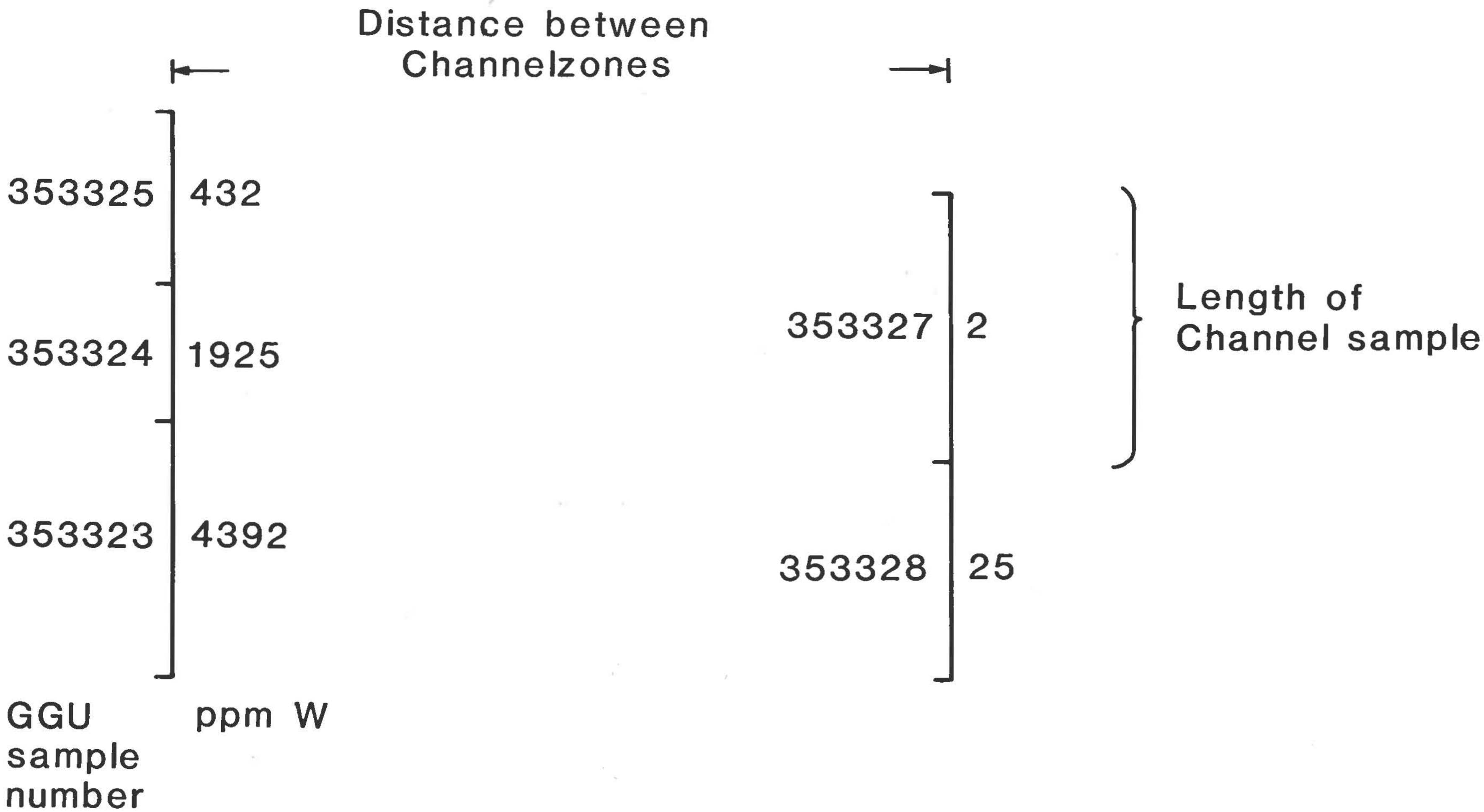

5 cycle
Peridotite marker horizon (E)
Peridotite marker horizon (D)
Kyanite - bearing schist
Tourmalinite
Massive pyrrhotite lenses
4 cycle
Upper sequence
Peridotite marker horizon (C)
3 cycle
Peridotite marker horizon (B)
Pyrite-rich metasediments
Metasediment (impure carbonates)
Tourmalinite
2 cycle
50 m
Magnetic marker horizon (A)
Lower amphibolite sequence with rare pillow structures, a few intercalated metasediments and pyrite-rich zones
Lower sequence
1 cycle
Gneiss
Legend
Pillow structured amphibolite
s s s s Scheelite
Peridotite

Fig. 4


Distance between
Channelzones
353325
432
353324
1925
353323
4392
GGU
sample
number
ppm W
353327
2
353328
25
Length of
Channel sample

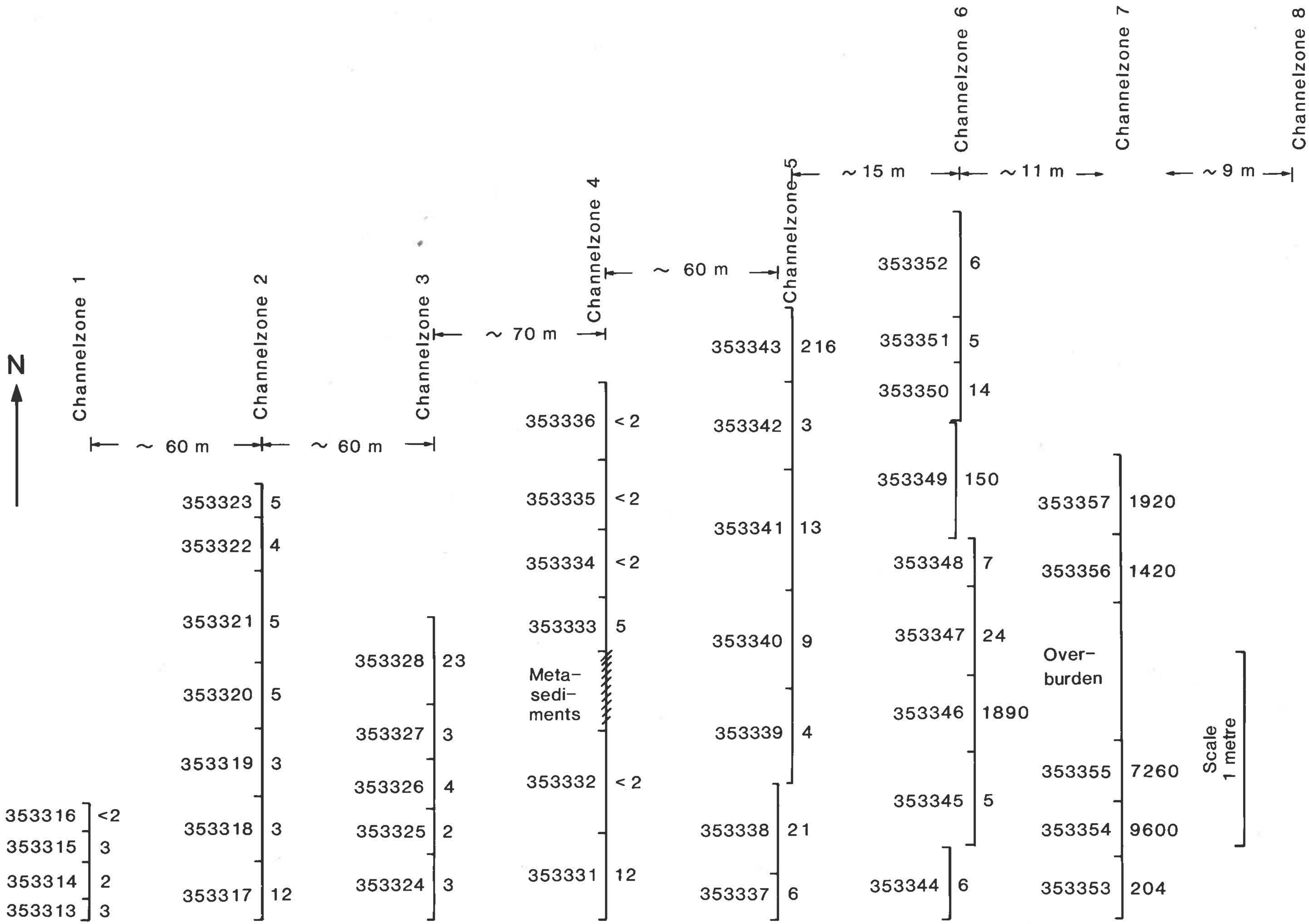



Fig. 6 Magnetic marker scheelite-horizon

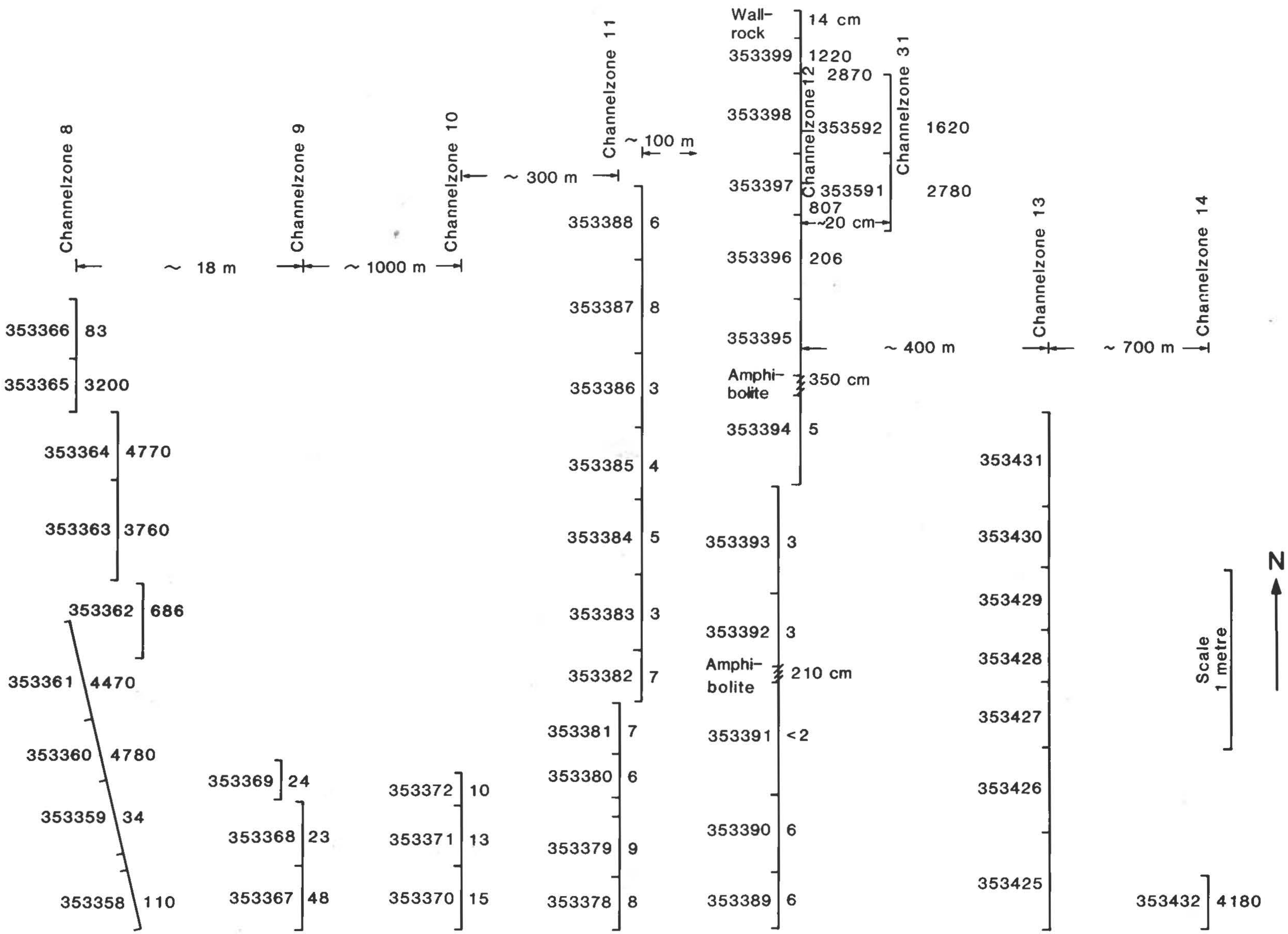



Fig. 7 Magnetic marker scheelite-horizon

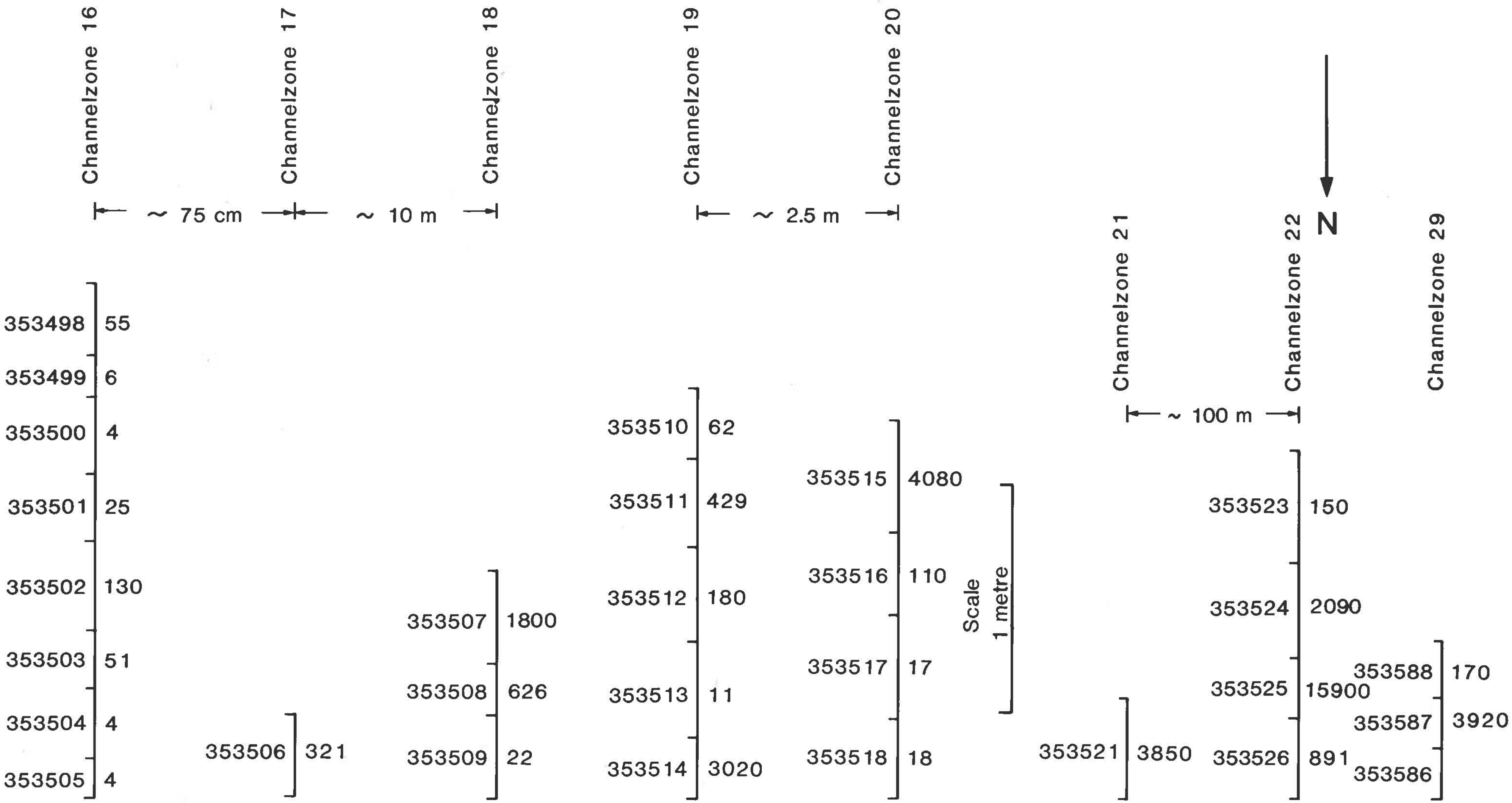



Fig. 8 First peridotite marker scheelite-horizon

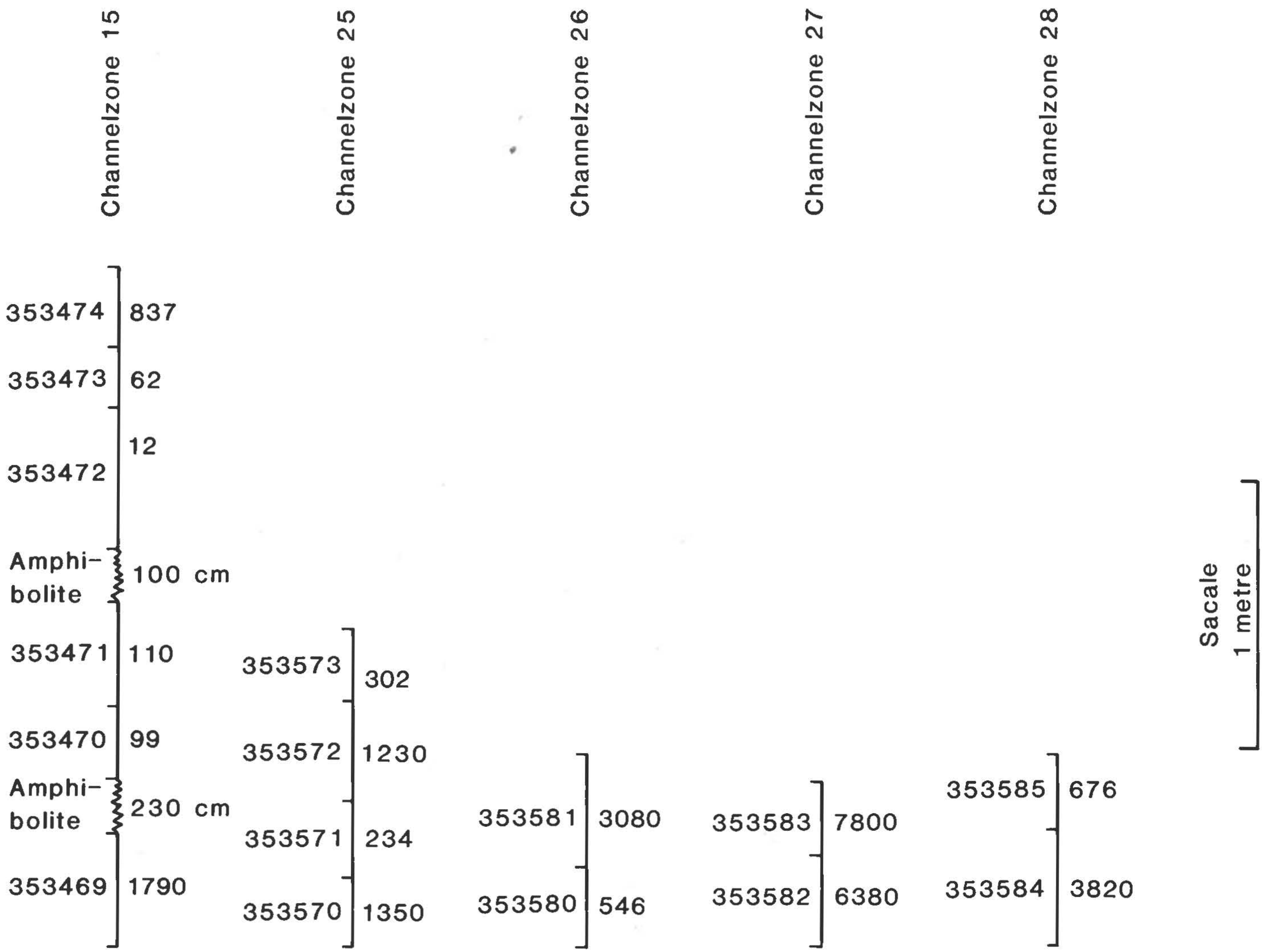



Fig. 9 Calc-silicate zones in pillow lavas

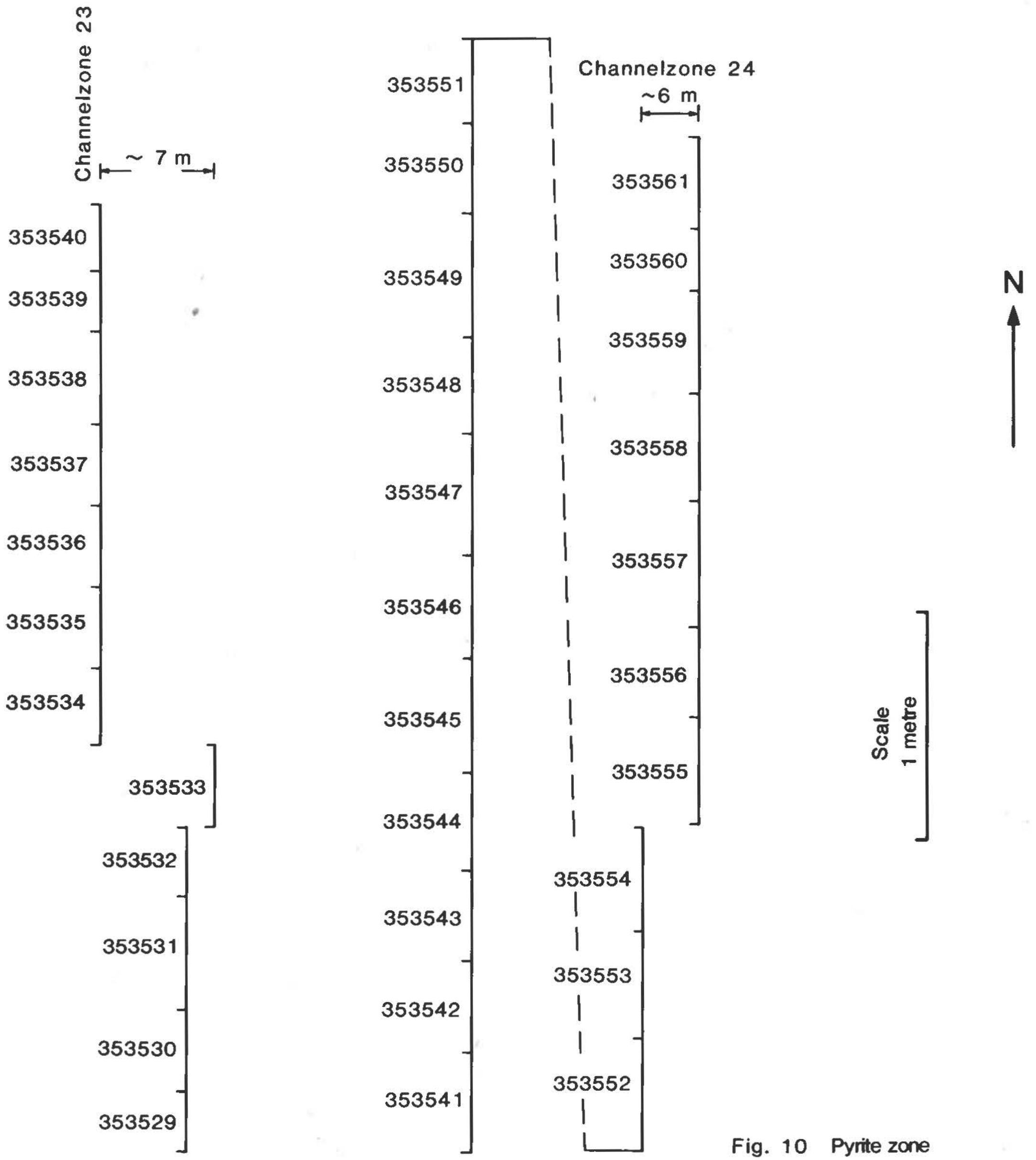



Fig. 10 Pyrite zone

ISSN 0903-7322