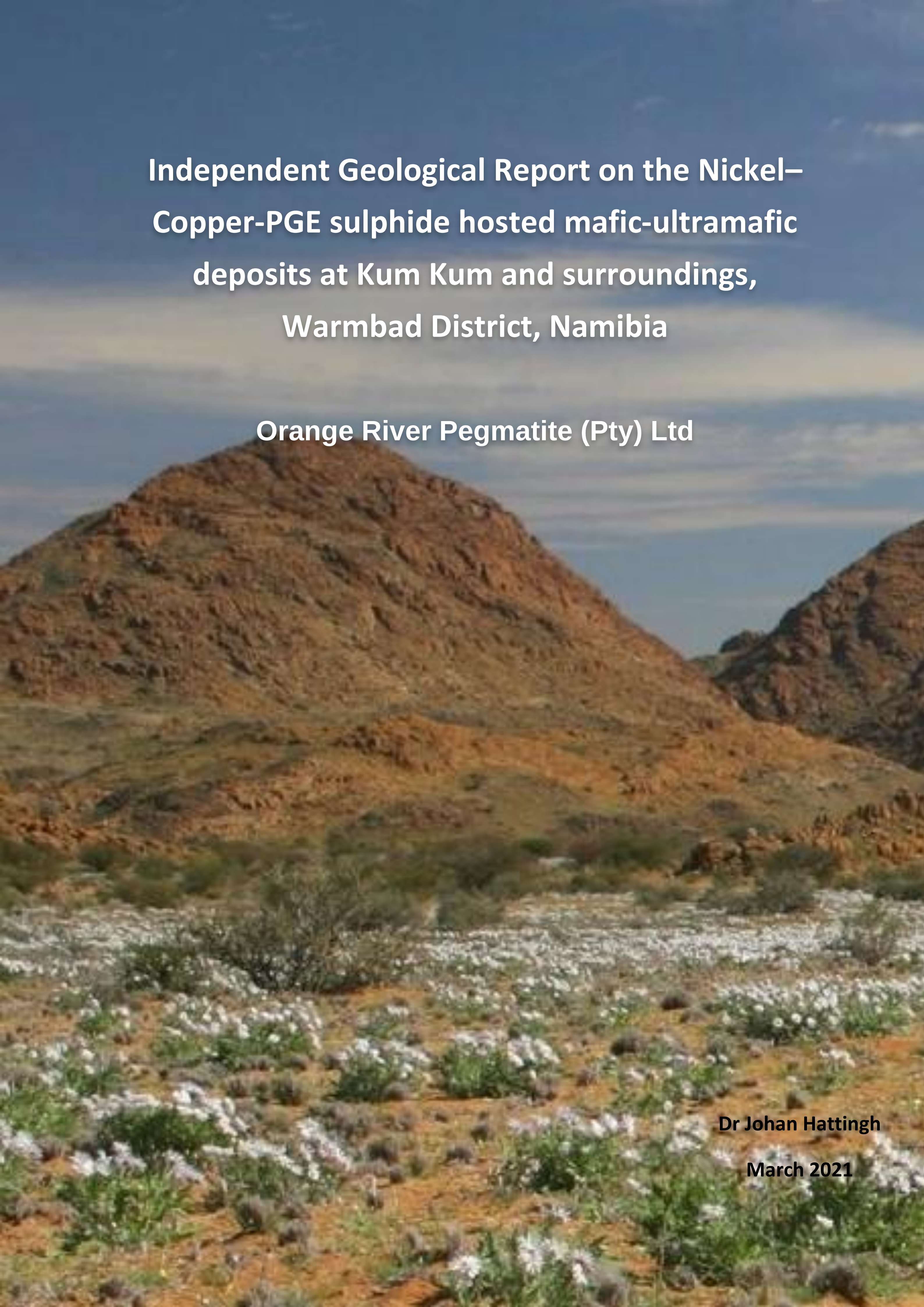
Independent Geological Report on the Nickel–Copper-PGE sulphide hosted mafic-ultramafic deposits at Kum Kum and surroundings, Warmbad District, Namibia

Orange River Pegmatite (Pty) Ltd



Dr Johan Hattingh

March 2021

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Prepared by
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1. Executive summary

The Nickel–Copper-Platinum Group Elements (PGE) sulphide mineralisation of the mafic-ultramafic Kum Kum Intrusive Suite of Orange River Pegmatite (Pty) Ltd (ORP) is accommodated in two project areas. The Kum-Kum Suite area that comprises two Exclusive Prospecting Licences (EPLs), EPL 6940 and EPL 7295, and the Tantalite Valley Igneous Complex mafic and ultramafic mineralisation area, covered by the third EPL, EPL 5047, to the west of the Kum Kum Intrusive Suite. EPL 5047 covers the Swanson Tantalum Project as well as the Tantalite Valley Igneous Complex. The Swanson Project tantalum prospect at EPL 5047 is a separate project and does not form part of the base metal projects of ORP and is therefore not covered in this report. These ORP licences are all situated in southern Namibia, near the South African border, with the Kum-Kum Project located approximately 15 km north of the Orange River and 100 km south of the nearest significant town, Karasburg and the Tantalite Valley Igneous Complex some 20 km to the west-northwest of Kum-Kum. The EPLs comprise an area of approximately 78,761 hectares in extent and fall within the Karas Region of Southern Namibia.

Geologically, the area forms part of the northern zone of the Namaqua Mobile Belt, a region of high-grade metamorphism of the amphibolite and granulite facies. Granitic rocks predominate although there are extensive tracts of metasedimentary and metavolcanic lithologies. The area is known for its economically important mineralization notably the Okiep copper deposits, the base metal deposits in the vicinity of Aggeneys and Gamsberg, the copper mineralization of the Haib volcanics, and the spodumene/beryl/tantalite mineralization of the Namaqualand pegmatite belt.

EPL 6940 and EPL 7295 cover almost the entire tholeiitic mafic-ultramafic intrusions, of the Kum-Kum Intrusive Suite also known as the Kum-Kum Igneous Complex. Regional scale exploration conducted by Rio Tinto Exploration Ltd and Falconbridge Ltd in the early 1970's demonstrated that the Kum-Kum Suite hosts significant contact- and disseminated-type Ni-Cu sulphide mineralization (pyrrhotite-chalcopyrite-pentlandite-pyrite). Ni and Cu grades attained by Rio Tinto and Falconbridge ranged between 0.21 – 0.58 % Ni and 0.30 – 0.50 % Cu for mineralised drill hole intersection thickness of up to 30 m. These were the only results the company was able to obtain. There is no indication that PGE and/or precious metal test work was conducted at the time. In addition, no detailed geophysical work has been conducted to date on any of the EPLs and the sub-surface distribution of the sulphide mineralization remains unexplored.

Significant nickel anomalies, with corresponding high copper values, were obtained on the farms Keimasmund 98, Orange Fall 101, Vaaldoorn 91 and Nautsis 92, which falls under EPL

6940. The anomalous nickel areas on Keimasmund 98 and Orange Fall 101 occur mainly on the western side of Swartberg with values up to 408 ppm Ni. An area measuring 3 km by 1.5 km had soil geochemistry values exceeding 150 ppm Ni against a background of 35 ppm Ni. During the investigation, no signs of visual mineralization were observed by the Falconbridge geologists in the surrounding outcrops.

The Kum-Kum Project is an early stage exploration project, however, work completed to date by ORP has demonstrated that the Kum-Kum Intrusive Suite meets the mineral-systems-approach criteria for exploration targeting magmatic-hosted sill/dyke complex-type Ni-Cu-(PGE)-(Au)-(V-Co-Cr-Fe) sulphide deposits. The suite also fulfils the descriptive mineralisation model for magmatic-hosted Ni-Cu-PGE sulphide deposits, applied to similar economic deposits and economic mineralized magmatic systems around the world, such as Jinchuan, Huangshan, Huangshandong, Hongqiling, Limahe, Qingquanshan, and Qingbulake in China and the Eagle and Eagle's Nest deposits in North America (USA and Canada).

Based on limited field investigations and a review of the available literature, ORP considers the Kum-Kum Intrusive Suite under-explored, and highly prospective with a high discovery potential for magmatic-hosted Ni-Cu-(PGE)-(Au)-(V-Co-Cr-Fe) sulphide deposits and has identified a number of primary exploration targets.

The Project does not contain any Ore Reserves or Mineral Resources, as defined by the JORC Code. Under the definition provided by the ASX and in the VALMIN Code, the Kum Kum Project is classified as an 'exploration project', which is inherently speculative in nature. ORP’s Projects are considered to be sufficiently prospective, subject to varying degrees of risk, to warrant further exploration and development of their economic potential, consistent with the programs proposed by Creo.

2. Introduction and General Property Description

2.1. Introduction

This report has been prepared as a technical review document recording the current status of exploration work at EPL 5047, EPL 6940 and EPL 7295 and it therefore reflects exploration results to date and declares the status as was defined by results from the current exploration campaign.

The report was prepared at the request of the ORP and in the execution of the mandate, a technical assessment has been prepared for ORP in compliance with and to the extent required by the JORC Code issued by the Australasian Institute for Mining and Metallurgy (AusIMM), under whose technical jurisdiction these mineral resources fall. The guidelines as set out in the JORC Code are considered by ORP to be a concise recognition of the best practice reporting methods for this type of mineral development, and accord with the principles of open and transparent disclosure that are embodied in internationally accepted Codes for Corporate Governance.

This report describes the exploration results at EPL 5047, EPL 6940 and EPL 7295 and has been based upon exploration data provided by the geologists of ORP, which has been thoroughly verified by the author.

2.2. Competent Person, Site Visit and Data Validation

Johan Hattingh employed by Creo as a geologist with 30 years of experience, is the author responsible for the preparation of this Competent Persons Report. Johan Hattingh is a Competent Person (CP), as defined by the JORC Code. The Competent Person considers the JORC Code to be the most appropriate standard for the Public Reporting of Exploration Results, Mineral Resources and Ore Reserves. The JORC Code sets out minimum standards, recommendations, and guidelines for Public Reporting.

Johan Hattingh has been intimately involved with the polymetallic mafic and ultra-mafic deposits in Namaqualand and southern Namibia since 2004, where he conducted numerous exploitation campaigns on nickel-copper-cobalt bearing igneous rocks. Johan visited the Kum-Kum Project a number of times since 2009. The technical information used in this Competent Persons Report was provided by ORP and was used in good faith by Creo. Where possible, Creo has satisfied itself that such information is both appropriate and valid to ensure JORC compliance in terms of the level of disclosure.

Johan Hattingh is independent from ORP with no current or historical involvement directly or indirectly with the company other than arm's length resource verification on an *ad hoc* basis. The author also does not have any shareholding in ORP, or in a subsidiary company or any other company that is currently contracted to ORP.

Compensation for the technical report is exclusively based on a market related remuneration fee.

3. Corporate Structure

3.1. Location

ORP owns the Exclusive Prospecting Licences (EPL 5047, EPL 7295 and EPL 6940) (Figure 2) situated between 18° and 20° E, and 28° S in Namibia.

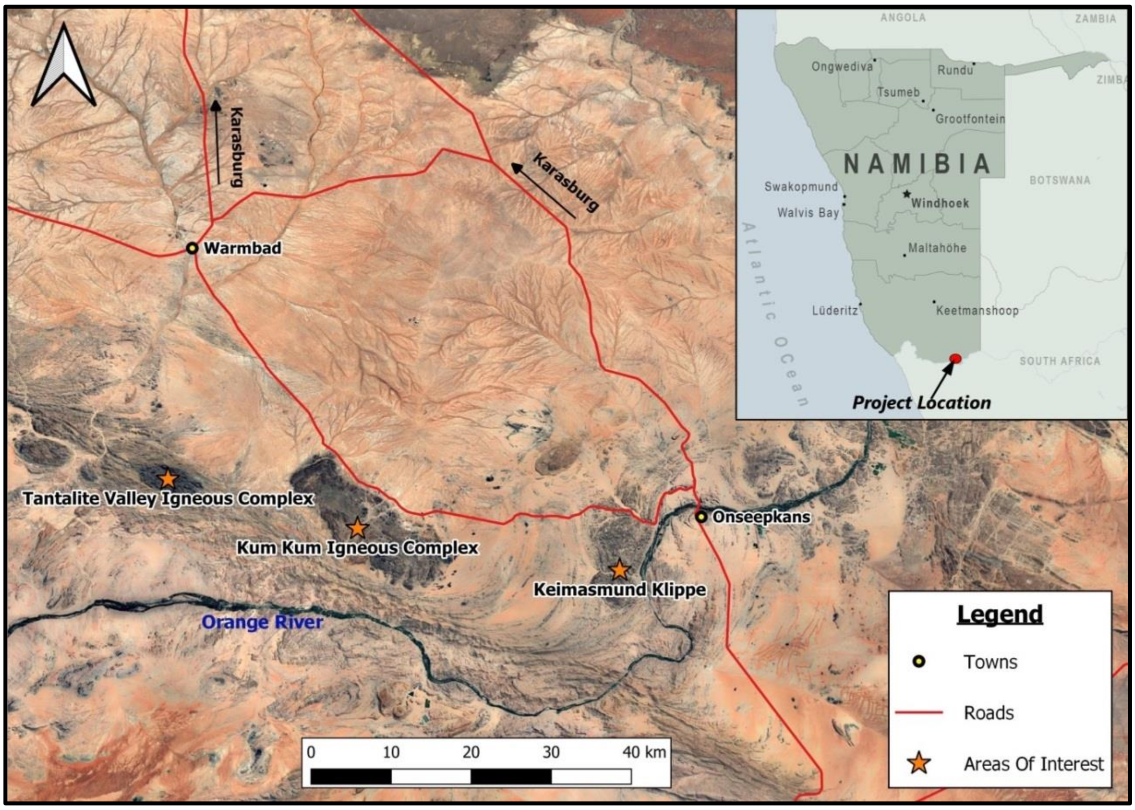

Figure 1: Location map of the project area, along with the areas of interest.

This property is located in the Karas Region, southern Namibia, near the South African border, and approximately 15 km to the north of the Orange River. The EPLs are situated 100 km south of Karasburg, 40 km south of Warmbad and 250 km southeast of Lüderitz, where Lüderitz is the nearest port. Although the B1 main national road from Noordoewer to Windhoek is some distance away, the area is serviced by well-maintained, secondary dirt roads which make the area accessible all year round. It is only on the property itself where access is poor in difficult terrain and is mainly restricted to farm and mountain tracks that require a 4x4 vehicle.

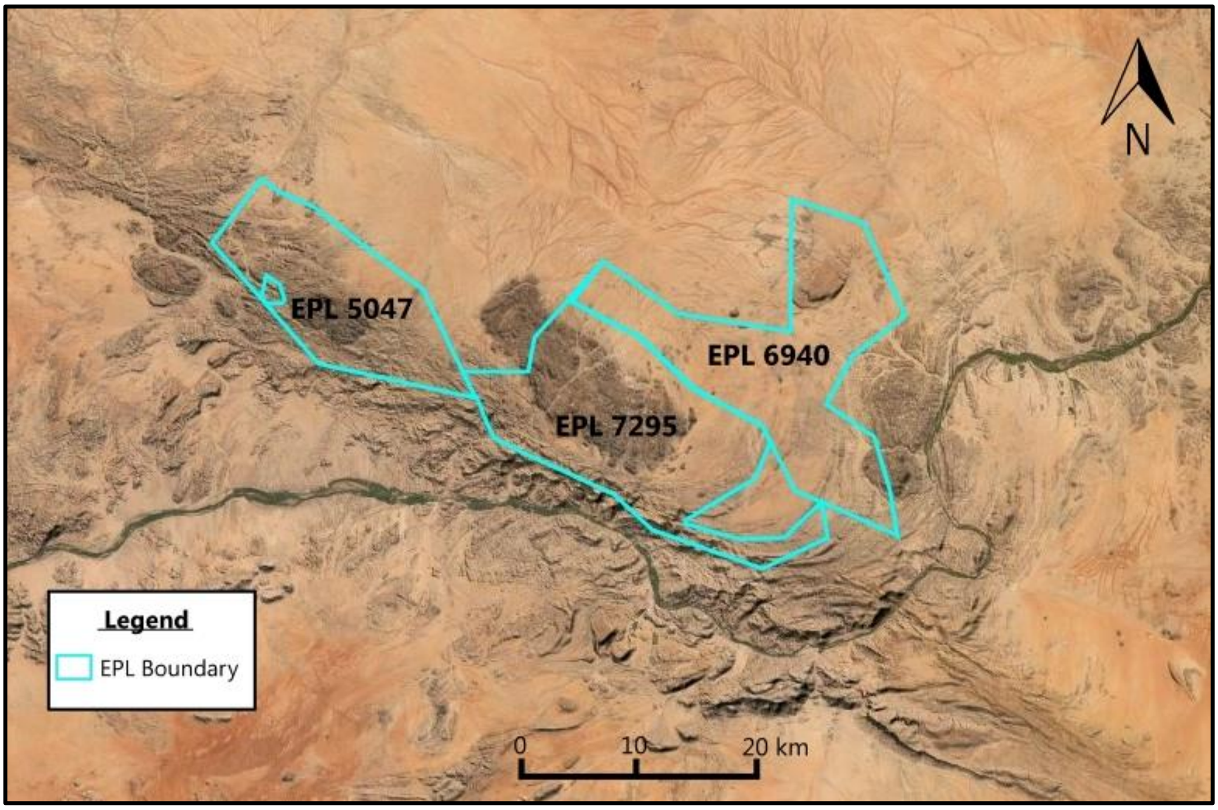

Figure 2: Map indicating the location of EPL 6940, EPL 5047 and EPL 7295 which are held by ORP.

3.2. Company Details

ORP is a Namibian registered company with registration number 2018/0020. The company has its offices in Windhoek, Namibia, as well as an exploration office and general infrastructure on site within the Tantalite Valley project area. ORP currently holds three EPLs; EPL 5047, EPL 6940 and EPL 7295.

3.3. Mineral Tenure

Creo's Competent Person has reviewed the mineral tenure related to the ORP exploration areas at Kum Kum and has independently verified the legal status and ownership of the Permits including underlying property and mining agreements.

The Kum Kum Project comprise of three exclusive exploration licenses, EPL 5047, EPL 7295 and EPL 6940, all held by ORP. The project covers a total area of 78,761 hectares.

ORP also obtained an Environmental Clearance Certificate on 4 April 2019 from the Ministry of Environmental and Tourism which is valid for a period of three years, allowing the company to undertake exploration activities on the EPLs.

Tables 1-3 show the important information for each of the EPLs.

Table 1: EPL 5047 Information

Licence:	Exclusive Prospecting Licence
Licence Number:	EPL 5047
Holder:	Orange River Pegmatite (Pty) Ltd.
Size:	19,493 hectares
Commodities:	Base Metals, Industrial Minerals & Precious Metals
Farms:	Kinderzit 132, Umeis 110 and Norechab 130

Table 2: EPL 6940 Information

Licence:	Exclusive Prospecting Licence
Licence Number:	EPL 6940
Holder:	Orange River Pegmatite (Pty) Ltd.
Size:	29,531 hectares
Commodities:	Base Metals, Industrial Minerals & Precious Metals
Farms:	Orange Fall 101, Keimasmund 98, Nautsis 92

Table 3: EPL 7295 Information

Licence:	Exclusive Prospecting Licence
Licence Number:	EPL 7295
Holder:	Orange River Pegmatite (Pty) Ltd.
Size:	29,737 hectares
Commodities:	Base Metals, Industrial Minerals & Precious Metals
Farms:	Kum-Kum Ezelruhe 107

3.4. Land Use Agreement

A land-use agreement, including access to the property for exploration has been signed with the owners of the farms Norechab 130, Kinderzit 132 and Umeis 110, which falls under EPL 5047. Figure 10 shows the location of the farms.

4. Accessibility, Climate, Infrastructure and Physiography

4.1. Topography and Elevation

On a national scale, three distinct regional features dominate the Namibian topography. The west of the country is characterized by a narrow coastal plain that extends inland for approximately 120 km, also known as the Namib Desert. An eroded escarpment, which forms part of southern Africa's great escarpment lies at the eastern edge of this coastal plain, stretching in a north-south direction from the Kunene River on the Angolan border, southwards and terminating against the Huab River. This plateau continuous southwards towards the Orange River, on the border with the Republic of South Africa.

Locally the licenses are located, at the nearest point, approximately 11 km to the north of the Orange River, with the elevations varying from 300 m at the river to 850 masl within the higher topography of the area. The area to the north and east of the EPLs is relatively flat and in the south the relief gradually slopes towards the Orange River. Uneven and high relief is present within the boundaries of the EPLs, primarily as a result of the weather resistant, mafic and ultramafic rocks of the Tantalite Valley Complex, Kum-Kum Complex and the Keimasmund Klippe that outcrops within the boundaries of the EPLs (Figure 3).

Figure 3: A view to the south of the project area, indicating the topography of the region.

Drainage systems here form part of the head water streams of southward-draining tributaries of the Orange River. All streams are perennial.

4.2. Vegetation and Wildlife

Vegetation is sparse, typically xerophytic and consists mainly of occasional karoo-type shrubs and succulents in the rocky parts. This semi-desert environment also supports sparse grass cover, as well as camelthorn, ebony and sheppard trees in a shallow sandy soil. The camelthorn and ebony trees are normally more prevalent along the dry watercourses where underground water supports them. These trees are however common in the region.

The area includes numerous faunal species such as gemsbok, kudu, zebra and some small game, but none of these species are exclusive to the study area.

4.3. Climate

Namibia's climate is one of the driest in Africa, with sunny, warm days and cool nights, especially during the winter months. The northern part of Namibia is always warmer; having a climate similar to that of southern Angola, but nationally, the country has a semi-desert climate, with extreme heat in the months between December and March.

There are two rainy seasons, one during December and a second with rain between January and April. The average annual rainfall varies from 250 mm in the southern region and the western highlands, to 700 mm in the extreme north-east.

The prospect area itself is present within an arid to semi-arid climatic condition with an average rainfall that ranges between 50 to 100 mm per annum. It can be described as semi-desert with occasional thunderstorm experienced during the summer rainfall months of December to April. The average sunshine hours per day ranges between 9 – 10 hours, resulting in an annual average temperature of 18 - 19^{o}C. Summer temperatures can however exceed 50^{o}C.

4.4. Infrastructure

The project area is located 100 km to the south of Karasburg in southern Namibia. All the roads leading to the property are well maintained gravel roads and are passable all year round. It is only on the property itself where a 4x4 vehicle is required.

The Karasburg – Lüderitz railway line is located 90 km to the north of the project area. Labour is available from the nearby Karasburg and Warmbad towns, with Karasburg and Keetmanshoop being able to supply most exploration and mining requirements that is necessary to implement an exploration and mining programme. Major items can be sourced from Windhoek and what is not available there can be obtained in South Africa. Windhoek is serviced by daily commercial flights from South Africa.

5. Geological Setting

5.1. Regional Geology

The Namaqua-Natal Metamorphic Province (NNMP) in Namibia and South Africa forms the western sector of the 100-400 km wide Namaqua-Natal metamorphic belt (Figure 4) that spans southward across the subcontinent. It forms a small, but significant segment of the global network of Grenville-aged orogenic belts that were created during the assembly of the supercontinent Rodinia in the late (ca. 1350-1050 Ma) Mesoproterozoic (Lambert, 2013).

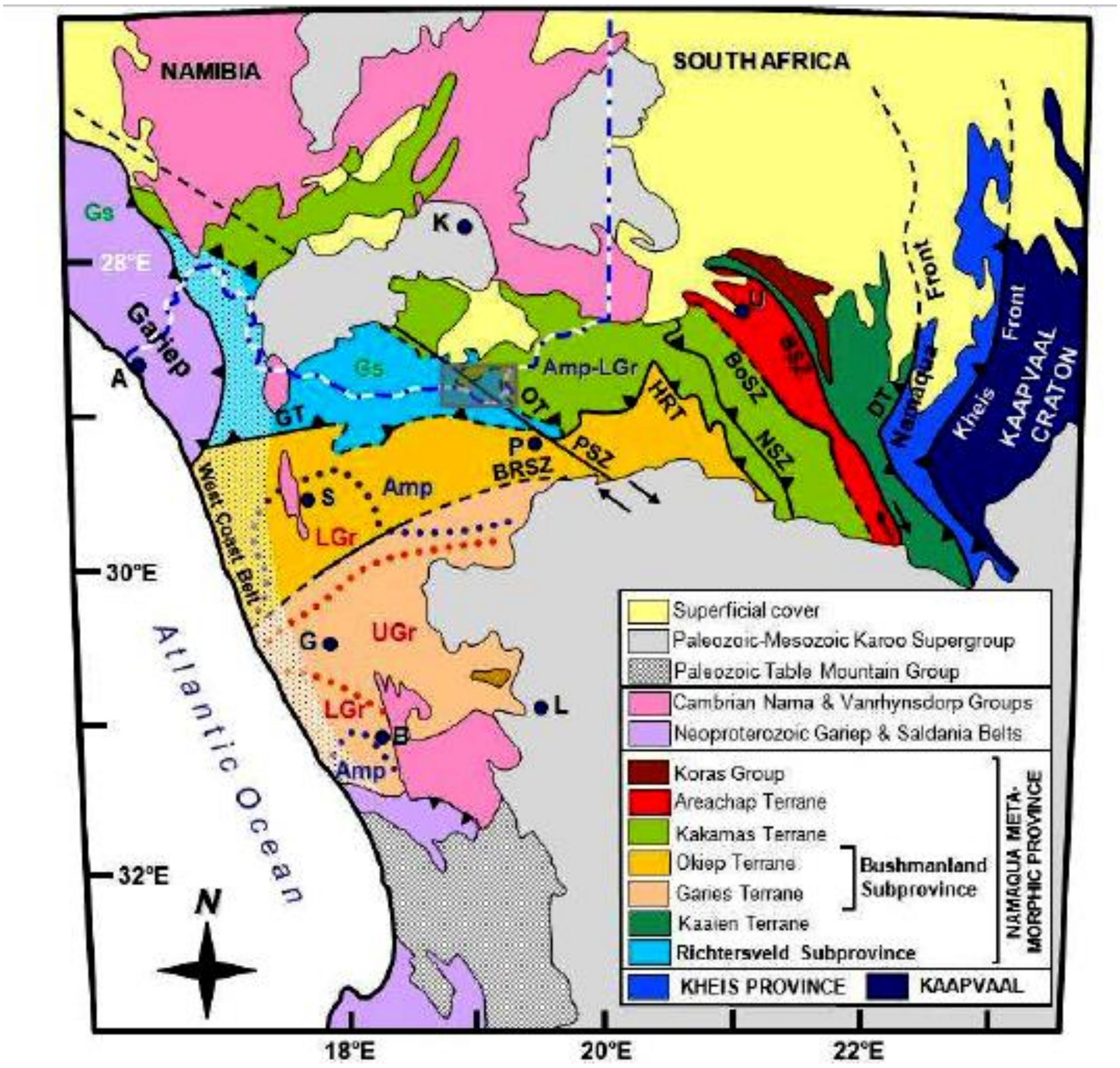

Figure 4: Tectonostratigraphic and metamorphic subdivision of the NNMP as well as the major crustal features and terrane. Boundaries. OT = Onseepkans Thrust; PSZ = Pofadder Shear-zone.

The NNMP records the accretion of juvenile Mesoproterozoic (1600-1200 Ma) supracrustal and plutonic rocks and the reworking of existing Kheisian age (ca. 2000 Ma) continental crust along the SW edge of the Archaean (>2500 Ma) Kaapvaal Craton. The amalgamation has traditionally been interpreted to be the result of continent – continent and/or arc-continent-continent collisional tectonics that culminated between ca. 1200 and 1100 Ma

(Lambert, 2013). The final convergent/collisional stages are referred to as the Namaqua Orogeny and are thought to be dominated by early north-verging folding and thrusting followed by oblique trans-current shearing as a consequence of SW-directed indentor tectonics. Subsequent deformation during the Neoproterozoic Pan African orogenic event is believed to have only affected the West Coast Belt (Figure 4).

Recent geochronological studies have highlighted a more complex and polyphase evolution of the Namaqua Orogeny in which at least two distinct tectono-metamorphic episodes at ca. 1200 and 1030 Ma can be distinguished. The regional significance of these tectonic phases is not well understood and controversially discussed, but both events are associated with voluminous granite plutonism and high-grade metamorphism (amphibolite-facies and higher), particularly in the central-western parts of the orogen. The second, high temperature metamorphic event is considered as the peak metamorphic event and commonly considered to be the result of the mafic underplating of the Namaquan crust that also finds its expression in the intrusion of mafic bodies such as those of the Koperberg Suite and the mafic complexes in southern Namibia between 1060-1020 Ma (Lambert, 2013).

NNMP

Based on variations in depositional environments and metamorphic grade, the NNMP has been subdivided into various terranes and sub-provinces (Figure 4), separated by major structural breaks. The ages of structures of the purported terranes are, however, similar and both the presence and the significance of supposedly terrane-bounding faults remain controversial. The presently accepted subdivision of the NNMP includes, from west to east, the Richtersveld Sub-province, Bushmanland Sub-province, Kakamas, Areachap and Kaaien Terranes (Lambert, 2013). The ORP EPLs fall exclusively in the Richtersveld Sub-province (Figure 4).

Richtersveld Sub-province

The Richtersveld Sub-province represents a Palaeoproterozoic (1700-2000 Ma) block within the NNMP that largely escaped Mesoproterozoic reworking, experiencing only low- to medium-grade (greenschist-facies) metamorphism in its centre. Metamorphic grades and the extent of the Namaquan overprint increase eastwards (Figure 5) to reach amphibolite-facies grades that were attained at ca. 1200 Ma. The Richtersveld Sub-province is made up of ca. 2000 Ma volcano-sedimentary successions that were intruded by voluminous granite and granodiorite between 1730 Ma – 1900 Ma interpreted to represent the relics of a Palaeoproterozoic island arc. The stratigraphic subdivision of the Richtersveld Sub-province is highly contended with models largely based on age correlations of units across shears and the contentious existence of bounding shear-zones separating the Richtersveld Sub-province from the other terranes. The structural ambiguity has led to further subdivision of the

Richtersveld Sub-province into smaller lithostratigraphic terranes and/or incorporation of the Richtersveld Sub-province into the Bushmanland Sub-province (Lambert, 2013).

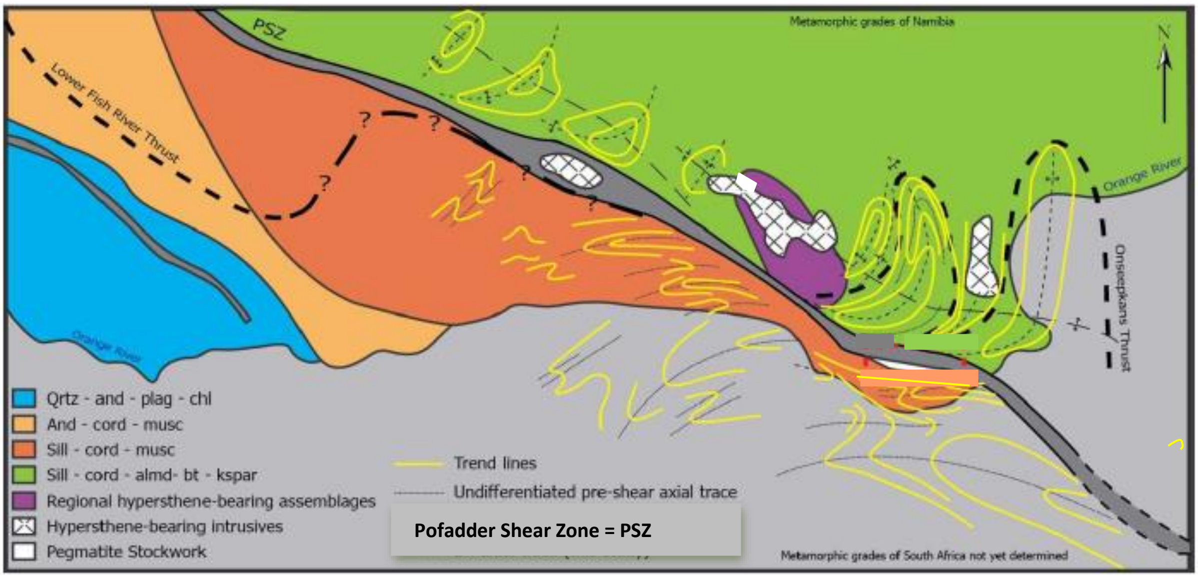

Figure 5: Structural and metamorphic map of the eastern parts of the Richtersveld Subprovince in the vicinity of the PSZ, illustrating the progressive increase in regional metamorphic grade from west to east, from Lambert (2013).

Figure 5 illustrates how the Pofadder Shear Zone (PSZ) parallel metamorphic isograds separating two distinctly different metamorphic domains of upper-amphibolite to lower-granulite facies rocks in the north from mid- to lower amphibolite-facies rocks in the south. This division extends northwards and form the continuation of the Lower Fish River Thrust, synonymous with the Tantalite Valley Line, where the actual contacts are obscured by the later Pofadder Shear-zone (Figure 5).

Gordonia Sub-province

Recent work, specifically in Namibia, has incorporated the Kakamas and Areachap Terranes into the Gordonia Sub-province. The Gordonia Sub-province is separated from the Kaaien Terrane by the Brakbos Shear. The Boven Rugzeer Shear is proposed to separate the Kakamas from the Areachap Terrane. The Kakamas Terrane is generally considered to be composed of high-grade supracrustal gneisses, charnokites and granites with the late stage NNW- trending Neusberg Shear-zone separating an arenite and calc-arenite supracrustal succession in the east from high-grade metapelite and biotite-garnet paragneisses in the west. The Areachap Terrane represents a narrow, NNW-trending terrane comprised of 1300 Ma amphibolite-grade metabasic and intermediate supracrustal gneisses. The Areachap Terrane contains juvenile Mesoproterozoic crust, showing clear subduction-related signatures that are interpreted to indicate a series of volcanic arcs (Lambert, 2013).

Late stage evolution of the NNMP

Following the burial and late-stage high-T metamorphism, un-roofing of the Namaqua orogen led to the cooling of the NNMP rocks to temperatures below ca. 350°C by 950-980 Ma. During the exhumation and cooling, deformation was characterised by the development and/or reactivation of a series of ductile, dextral NW-SE trending shears (Figure 6). Shearing is interpreted to have occurred due to lateral escape tectonics in response to the sustained southward indentation of the rigid Kaapvaal Craton into the newly accreted NNMP. The PSZ also referred to as the Pofadder-Marshal Rocks Lineament or the Tantalite Valley mylonite belt, is the largest and best exposed example of these late-tectonic shear-zones. The PSZ, along with the other late-stage dextral shears throughout the NNMP, exhibits retrograde deformation fabrics and mineral assemblages that indicate formation under broadly greenschist-facies conditions. Shear-zone kinematics are commonly dominated by wrench faulting with localised dip-slip components in response to northerly directed principal stresses at the later stages of indentation tectonics (Lambert, 2013).

Work on shears from this late-stage cluster has largely been economically motivated and centred around the copper district of the Areachap Terrain with little focus on the PSZ and, significantly, its relationship to the pegmatites of the regional pegmatite belt (Lambert, 2013).

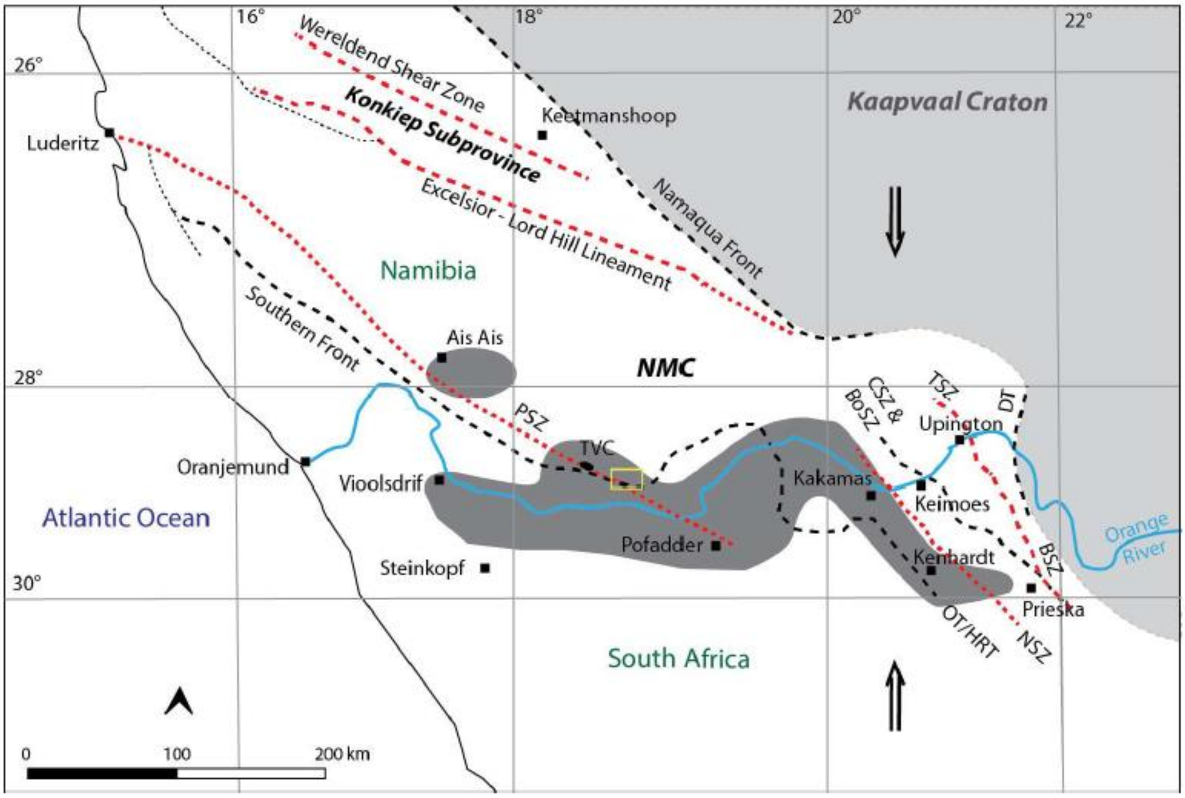

Figure 6: Diagram illustrating the position of NW-SE trending structural features within the NNMP. Abbreviated structures; OT = Onseepkans Thrust; PSZ = Pofadder Shear-zone; HRT = Hartbees River Thrust; CSZ = Cnydas Shear-zone; BoSZ = Boven Rugzeer Shear-zone; NSZ = Neusberg Shear-zone; TSZ = Trooilapspan Shear-zone; BSZ = Brakbos Shear-zone; DT= Dabeep Thrust.

The PSZ also includes early syn-tectonic mafic and ultramafic, orthopyroxene-bearing intrusions which is represented by the Tantalite Valley Complex on EPL 5047. These were emplaced along the boundary between the above-mentioned sub-provinces.

5.2. The Richtersveld Magmatic Arc

The Richersveld Magmatic Arc (RMA) forms a ~200 km wide, wedge shaped crustal block in the western parts of the NNMP (Figure 7). This tectonic domain comprises crustal material that was initially generated in a Paleoproterozoic island arc setting (Reid, 1997). The magmatic arc is predominantly composed of calc-alkaline felsic and mafic volcanics, with minor sedimentary units, of the Orange River Group (ORG) (Reid, 1997) and sparse hypabyssal and voluminous plutonic equivalents of the Vioolsdrift Suite and its metamorphic equivalents (Macey *et al.,* 2017).

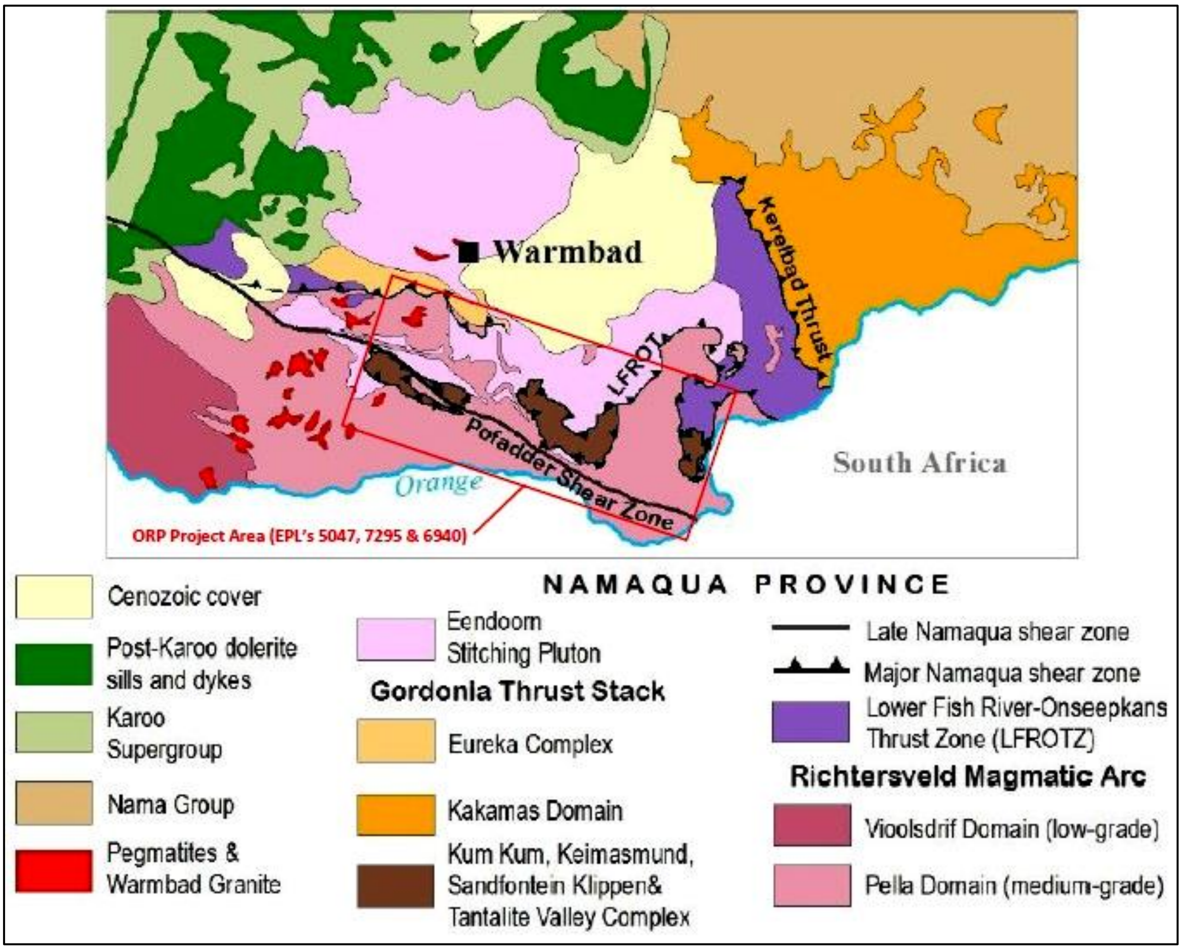

Figure 7: Major tectonostrigraphic zones of the 2818 Warmbad geological sheet (modified after Schreiber, 2016), showing the Vioolsdrift and Pella Domains of the Richtersveld Magmatic Arc.

The RMA is composed of two parts that are distinct from each other based on their metamorphic grade. A western part of Paleoproterozoic crust, termed the Vioosldrif Domain

(Figure 7), consisting of greenschist facies crust that was largely excluded from the pervasive crustal reworking during the Mesoproterozoic Namaqua Orogeny. Secondly, to the east, is the amphibolite facies Pella Domain (Macey *et al*., 2017). The Pella Domain is characterized by a pervasive Namaquan overprint that has converted the Paleoproterozoic volcanic and plutonic units into medium- to high-metamorphic grade gneisses.

5.2.1. Vioolsdrift Domain

The ~1800 Ma Orange River Group of the Vioolsdrif Domain represents a full suite of calc-alkaline volcanic rock types that range in composition from basalt to rhyolite (Reid, 1997). The group predominantly contains variously textured aphanitic to porphyritic lavas, although pyroclastic and volcanoclastic rocks do occur. Quartzites and conglomerates occur as minor components (Macey *et al.,* 2017).

The Vioolsdrift Domain also contains gneisses of the Orange River Group which is intruded by the voluminous plutonic and hypabyssal rocks of the Vioolsdrift Suite. The Vioolsdrift Suite forms a calc-alkaline magma series (granite gneiss, metagabbro, metadiorite and granodiorite) that is subdivided into several units based on intrusive age relationships. The mafic units of the Vuurdood Gabbro and closely associated and slightly younger Goabis Diorite form a minor component within the Vioolsdrift Suite, although, forming numerous bodies within the Vioolsdrift Domain (Macey *et al.,* 2017; Reid, 1997).

5.2.2. Pella Domain

The Pella Domain consists of units from the Vioolsdrift Domain that were strongly reworked during the main Namaquan Orogenic event from ~1215 Ma to 980 Ma (Cornell et al., 2006, Macey *et al*., 2017) into supracrustal paragneisses (Orange River Group) and orthogneisses (Vioolsdrift Suite), with all original intrusive contacts now extensively tectonised (Macey *et al.,* 2017). This makes the relative stratigraphic ages between units challenging to determine and many stratigraphic subdivisions have since been proposed. Recent geochronological studies by Macey *et al*. (2017) proposed a stratigraphic subdivision in that the Orange River Group and the Pella Domain be subdivided into four lithodemic units: The Goudom-, Umeiss-, Gaidip- and Hom Gneiss.

Based on their matching geochemistry and overlapping U-Pb ages, Macey et al. (2017) further subdivided the Vioolsdrift Suite of the Pella Domain into several lithodemic orthogneiss units that largely retains nomenclature of their low-grade equivalents in the Vioolsdrift Domain, namely the Goodhouse Sub-suite - and the Ramansdrift Alkali Granite Gneiss.

The Vuurdood Sub-suite in the Pella Domain comprises pre-tectonic meta-gabbros and hornblendite, which collectively forms a minor part of the Vioolsdrift Suite. The meta-dioritic to meta-gabbroic rocks of the Goabis Sub-suite also represent a minor component of the Vioolsdrift Suite and occur mostly in the western parts of the Pella Domain. The southern and eastern parts of the Pella Domain host sheet/dyke-like and plug-lyke bodies of amphibolite and associated calc-silicate (metasomatized equivalents of these mafic dykes) rocks of the Girtis Suite. The ~1.2 Ga D2 thrusting saw the intrusion of the ~1220 Ma Orange River Fall Suite of leucogranitic augen gneisses and leucogranite gneisses (Macey *et al*., 2017), that is restricted to the northern and eastern parts of the Pella Domain.

5.3. Tectono-metamorphic history of the NNMP

Regional fabrics surrounding the PSZ have been well documented in numerous studies that distinguishes six (D1 – D6) different phases of deformation. The D5 and D6 episodes relate to deformation along the PSZ. Differences in the nomenclature between the terminologies relate to the recognition of the progressive nature of deformation events, particularly shearing associated with the PSZ. Deformation stages D1 – D3 are associated with regional deformation events in the Bushmanland and Gordonia Sub-provinces, whereas the D4 deformation is related to deformation along the PSZ and exclusively to the structures associated with the PSZ.

A brief synopsis of the structural nomenclature adapted in this report below.

D1: This early deformation phase is characterised by rootless, isoclinal folds within older (ca. 1800 Ma) supracrustal rocks occurring in other parts of the NNMP.

D2: This deformation phase is considered the principal deformation phase of the Namaqua orogeny with associated amphibolite-grade metamorphism in the southern parts of the Bushmanland Sub-province. D2 fabrics are characterised by large-scale, east-west trending, isoclinal folds (F2) and an associated, regionally consistent, E-W trending penetrative, sub-horizontal foliation (S2), with an E- or NE- plunging L2 mineral stretching lineation. The stretching lineation is thought to be parallel to the regional top-to-the SW kinematics and transport direction during the Namaqua orogeny. S2 is largely defined by the alignment of biotite, muscovite and sillimanite in metapelites and quartzo-feldspathic rocks, whereas hornblende aggregates define the foliation in mafic schists and gneisses.

Gneisses are mainly banded hornblende-biotite gneisses or quartzo-feldspathic gneisses. The S2 foliation is further defined by the alignment of porphyroclasts and the formation of quartzo-feldspathic augen gneisses and hornblende-biotite augen gneisses where quartz and biotite and/or hornblende mineral aggregates anastomose around large (1 cm – 5 cm) K-feldspar augen respectively.

This phase of deformation (D2) ended between ca. 1120 Ma, bracketed by the age of the youngest deformed gneisses of the Little Namaqualand Suite from rocks of the weakly deformed Spektakel Suite.

D3: The D3 deformation event is characterised by kilometre-scale, originally E-W-trending, upright- to inclined, shallow-plunging, open F3 folds. These large-scale F3 folds rotate existing F2 folds and earlier (D1-D2) fabrics (Figure 5). The formation of these folds is closely linked to the formation of steep structures containing syn-deformation intrusions and melt breccias. Rocks of the 1060-1030 Ma Koperberg Suite in the Okiep Copper District, intruded during the D3 event, thereby constraining the late-Namaquan timing of F3 folding. This timing is coeval with the peak of high-T metamorphism in the NNMP and granulite-facies conditions in the highest-grade parts of the Bushmanland Sub-province.

D4: This deformation phase relates to the deformation within and adjacent to the PSZ. Due to the superimposition and transposition of earlier fabrics into D4 shear-zones, a clear distinction of fabrics in the regional-scale shear-zones is often difficult, particularly in the high-strain core of the PSZ. Fabrics associated with the PSZ (D4) are defined by both amphibolite- and greenschist-facies mineral assemblages and show a range from pervasive ductile (continuous) via brittle-ductile fabrics to essentially brittle (discontinuous) fabrics.

There are clear overprinting relationships from earlier amphibolite-grade and ductile to greenschist-facies and more brittle fabrics, indicating that deformation occurred under progressively lower-grade conditions during a prolonged period of exhumation. Hence, D4 fabrics and structures are treated in this study to describe a polyphase deformation history related to progressive shearing along the PSZ. The largely co-axial nature of high- and lower-grade planar and linear fabrics indicates the progressive nature of the deformation. Based on overprinting relationships, mineral assemblages and deformation textures of the D4 event have been subdivided in this study into separate stages (D4a-b), representing the progressive evolution of the shear-zone and related fabrics.

5.4. The Lower Fish River – Onseepkaans Thrust Zone (LFROTZ)

The Lower Fish River-Onseepkans Thrust Zone (LFROTZ) separates the SW-vergent Gordonia Thrust Stack (hanging wall) from the RMA and the Bushmandland Sub-province (footwall) (Figure 7). This mega-structure can be traced from the Ais-Ais area to southeast of Onseepkaans (Schreiber, 2016). The LFROTZ represents a major regional structure of the NNMP, where north and south of Onseepkaans the LFROTZ is represented by a complex, polyphase imbricate thrust zone several km’s wide, which varies widely along strike both in thickness and lithotectonic character. The LFROTZ contains variably sheared rocks from both the Kakamas and the Pella Domains as well as the Eendoorn stitching pluton units associated with it (Figure 7). The geometry and structural fabrics of the LFROTZ are variably affected by the mega-scale F3 folding and D4 shearing. The former caused km-scale dome-and-basin deformation of the sub-horizontal thrust sheet and subsequent erosion resulted in the formation of windows of the Pella footwall within the LFROTZ, and klippen of Gordonia rocks in the Pella Domain, with two main structures named the "Ear" (fenster) and the "Eye" (klippe) (Figure 8).

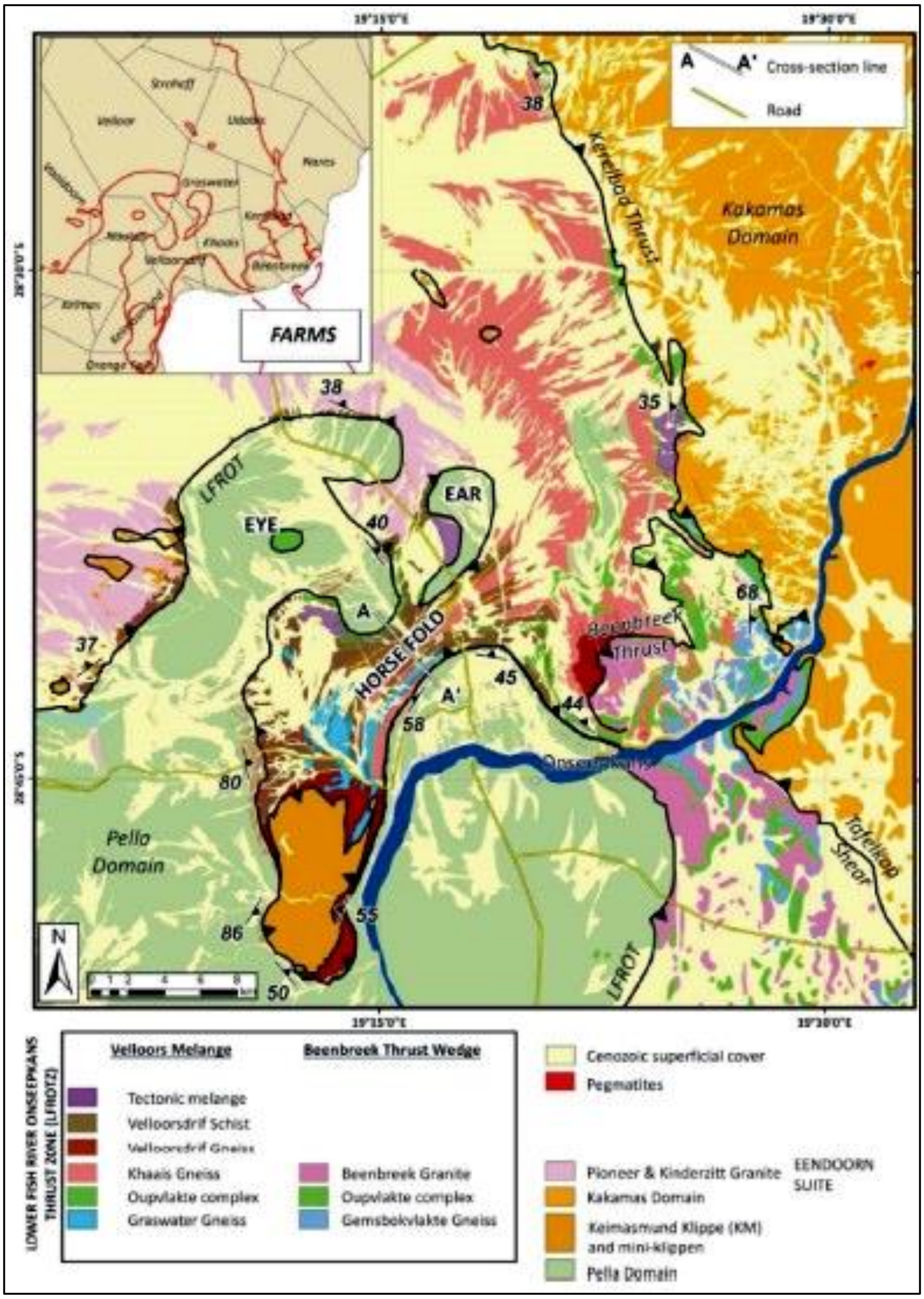

Figure 8: The Lower Fish River-Onseepkaans Thrust Zone (LFROTZ) north of Onseepkaans showing major bounding thrusts and lithostratigraphic units. Note the fenster and klippe relationship with units of the Kakamas Domain and the Pella Domain(Schreiber, 2016).

Two main phases of thrusting along the LFROTZ during the D2 Namaquan Orogeny were recognized in field evidence and through geochronological data by Macey et al. (2015). The thrusting was associated with intense bimodal magmatism along the thrust plane, which intruded the immediate footwall (Pella Domain) and hanging wall (Gordonia Klippe).

5.5. The mega-scale Pofadder Shear Zone

The PSZ, which crosscuts the project area, is a Mesoproterozoic – Neoproterozoic NW-SE trending zone that formed during the final stages of the polyphase evolution of the western sector of the Namaqua Natal Metamorphic Province. Locally, the Namaqua Orogeny concluded with the development of the dextral D4 transpressional PSZ, possibly related to late stage lateral escape of the NNMP.

The late D4 steep structures are found to be synchronous with intrusions of S-type pegmatites and leucogranites (Orange River Pegmatite Belt). D4 is defined as a progressive dextral shearing event that can be subdivided into three main phases based on cross-cutting relationships, differences in fabric elements and strain regimes during the shear-zone evolution and progressive exhumation, (Lambert, 2013). D4a: initial stages of shear zone development, characterised by ductile drag, rotation and transposition of the wall rock gneisses into parallelism with the PSZ. D4b: the dominant fabric within the shear core; characterised by the progressively overwhelming development of upper-greenschist/lower amphibolite facies, pervasively banded, brittle-ductile mylonites, cataclasites and extensive phyllonites. D4c: narrow (< 30 m) discrete, ultra-mylonitc shear zones that crosscut and displace earlier PSZ structures at shallow angles (Lambert, 2013).

In the Kum Kum region, the PSZ forms a 7 km-wide D4b mylonitic core-zone with the drag of the adjacent wall rocks up to 30 km north of the shear zone. Here the shear displays an asymmetrical strain gradient across the shear, progressing from the D4a-deformed northern wall rocks to a sharp D4b southern margin where phyllonites are juxtaposed against only weakly deformed (D2) wall rocks.

The variation in the manifestation of the D4 fabrics along strike likely reflects an inward plunging/deepening of the shear towards its central exposure. Several other parallel shears and splays off the PSZ are identified in the project area which have similarities in characteristics, strain regimes, orientations, geometries, kinematics and affiliation with late-stage felsic granites and pegmatites and are considered to be coeval structures formed under similar tectonic regimes.

6. Local Geology

The Tantalite Valley Complex area have been mapped and described in some degree of detail by Moore *et al*. (1979) and Von Backström (1976), however, the Kum Kum Intrusive Suite (Kum Kum Klippe area) and Keimasmund Klippe area is limited to regional mapping by the Geological Survey of Namibia (Macey *et al*., 2015; Schreiber, 2016). The current understanding of the Kum Kum Project area relies heavily on the work of Schreiber (2016).

6.1. The mafic-ultramafic Kum Kum Intrusive Suite

The Kum Kum Intrusive Suite (Figure 10), host rock of the Ni-Cu-PGE mineralized mafic-ultramafic lithologies (and metamorphic equivalents thereof), consists generally of rocks with a gabbronorite composition, which outcrops within the Gordonia Klippen (Figure 8). Small isolated outcrops of Kum Kum Intrusive Suite rocks also occur within the Arus- and Umeis Gneisses and as pods within the Pofadder Shear Zone (the largest of which is the Tantalite Valley Complex) (Schreiber, 2016).

The Kum Kum Intrusive Suite is variably metamorphosed and altered, with significant proportions of green amphibole. Ultramafic rocks, principally troctolite and pyroxenite, with a weak metamorphic/alteration overprint occur in the Tantalite Valley Complex (Kartun, 1979). Small doleritic dykes are also associated with the Kum Kum Intrusive Suite and cross cutting both the Kum Kum Intrusive Suite and the Eendoorn Granite (Figure 12b). An intrusive age of 1213 ± 4 Ma was determined for gabbronorites of the Kum Kum Klippe (Macey *et al*., 2015; Schreiber, 2016).

Gabbros, gabbronorites and their metamorphic equivalents make up the bulk of the Kum Kum Klippe. The Kum Kum rocks occur as scree covering conical hills (Figure 9). The dominant rock type is gabbronorite consisting of ~50% orthopyroxene, 20% clinopyroxene, 25% plagioclase, 3% biotite and minor opaque minerals; secondary minerals present are amphibole, biotite and sericite. The amphibole in most cases is a green hornblende, often associated with quartz and apatite. Where gabbroic rocks are in close association with Vioolsdrift gneisses, they usually show a weak to moderate gneissic foliation and are generally finer grained than their un-foliated equivalents. The presence of metapelite enclaves in the Kum Kum gabbro suggests an intrusive relationship with the Arus Gneiss. Contacts between the gabbroic Kum Kum rocks and alkali granite dykes of the Sambok Suite are usually sheared and locally display chilled margins in the Kum Kum gabbros (Schreiber, 2016).

Meta-gabbronorite is the dominant rock type in the central and northern parts of the Kum Kum Klippe and is present as irregular-shaped large bodies locally surrounding pods of gabbronorite and olivine gabbronorite. Petrographically the meta-gabbronorites show partial recrystallization of igneous mineralogy, though primary textures (plagioclase laths) can still be observed. The main characteristics of the meta-gabbronorites is the presence of olive-green hornblende (5 – 30%) and red-brown biotite (± 5%), which is intimately associated with pyroxene and opaque minerals (Schreiber, 2016).

Gabbronorites and micro-gabbronorites of the Kum Kum Klippe occur in small lenses (tens to 100's of m's) and isolated outcrops is usually in association with Eendoorn Granite. While the gabbros intrude pelitic granulites of the Arus Gneiss, the relationship with the granite is unclear, with contacts generally being strongly sheared and mylonitic. In outcrop the gabbronorites and olivine gabbronorites have a coarse-grained granular texture, characterised by differential weathering of the different mineral phases (Macey *et al*., 2015; Schreiber, 2016)

Petrographically the gabbronorites and olivine gabbronorites are distinguished from the meta-gabbronorites by the presence of olivine (Figure 14) and the lack of amphibole and biotite. They consist of plagioclase (55 – 65%), relatively fresh olivine (~15%), ortho- and clinopyroxene (20 – 30%) and opaques (~3%) (Schreiber, 2016).

A contaminated meta-gabbro, interpreted as a mixing zone between granitic Eendoorn rocks and Kum Kum gabbros occurs in the southern part of the Kum Kum Klippe (Kartun, 1979). This rock is characterized by a heterogenous texture, containing random large porphyroblasts/porphyclasts with reaction rims. Mixing between mafic and felsic melts has generated complex patterns (Figure 12a) (Kartun, 1979; Schreiber, 2016).

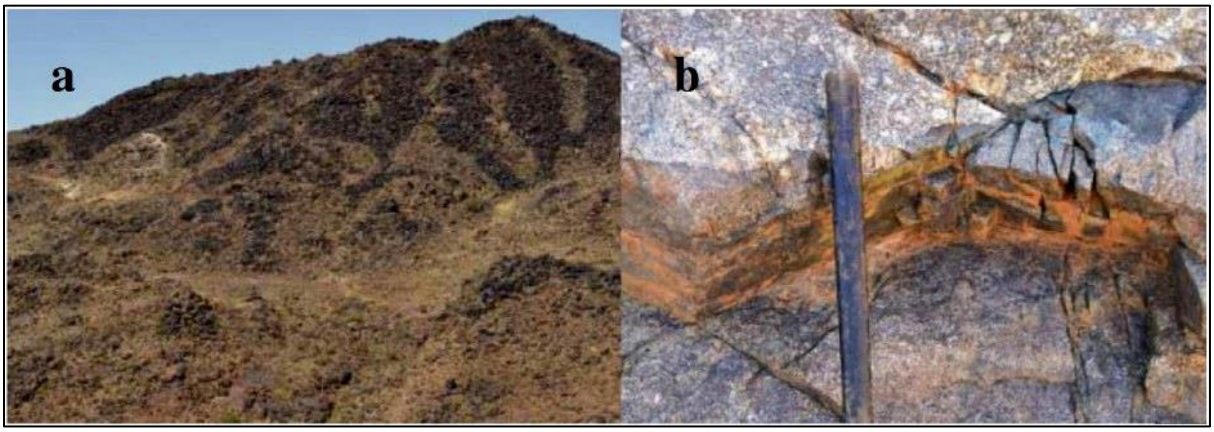

Figure 9: Slope covered by scree of Kum Kum gabbroic rocks (a); chilled margin in Kum Kum gabbro (bottom) against Eendoorn Stitching Pluton (top; b), Schreiber (2016).

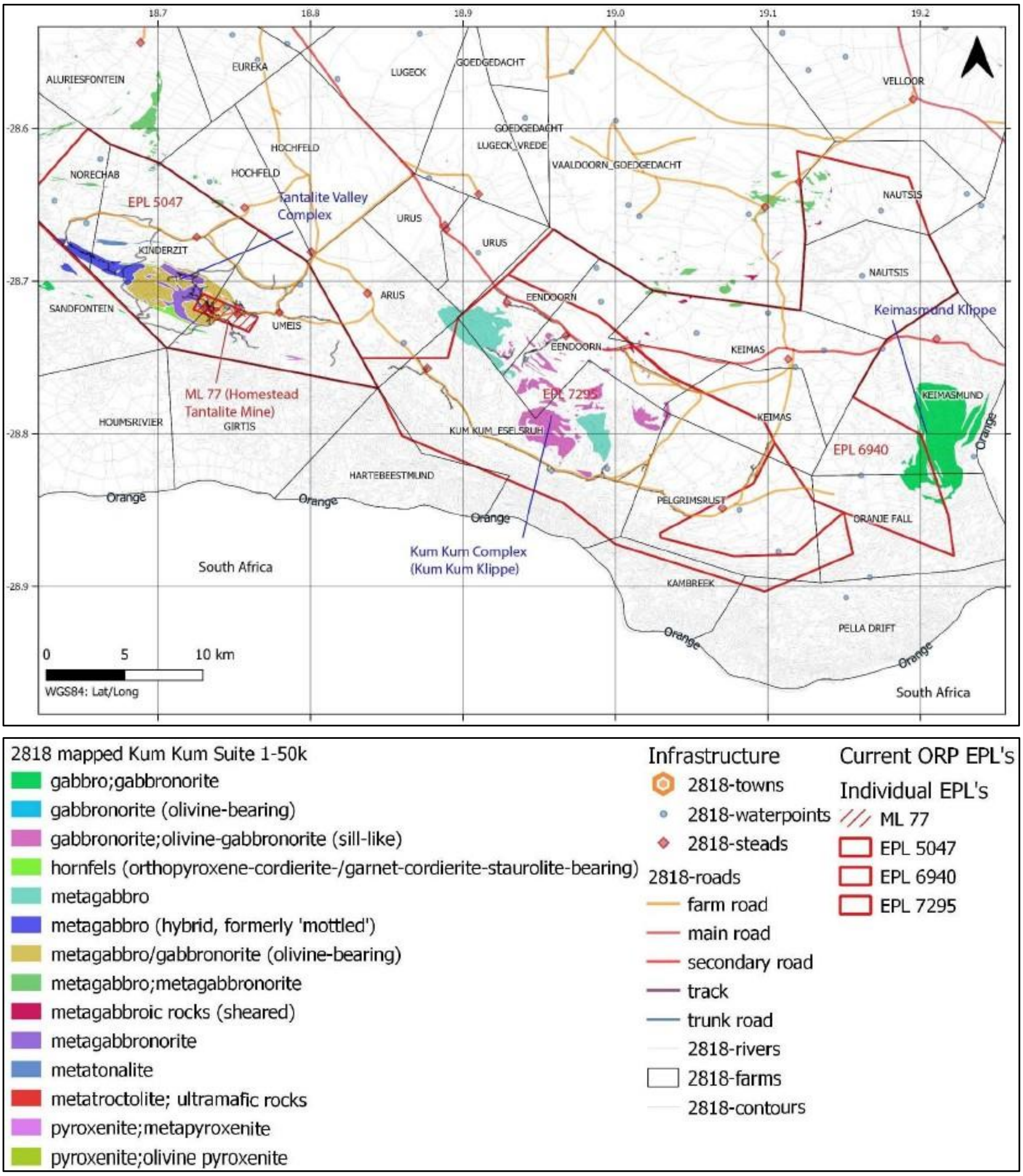

Figure 10: Overview of the distribution of the Kum Kum Intrusive Suite rocks over the project area (ORP's EPLs 5047, 7295 and 6940). The Tantalite Valley and Kum Kum Intrusive Suitees are entirely located within ORP's EPLs. The distribution of the Kum Kum Intrusive Suite rocks has been well constrained by recent mapping programs by the Geological Survey of Namibia and the Council for Geosciences (South Africa). NW portion – Tantalite Valley Complex; SE portion – Kum Kum Intrusive Suite (Klippe) & Keimasmund Klippe.

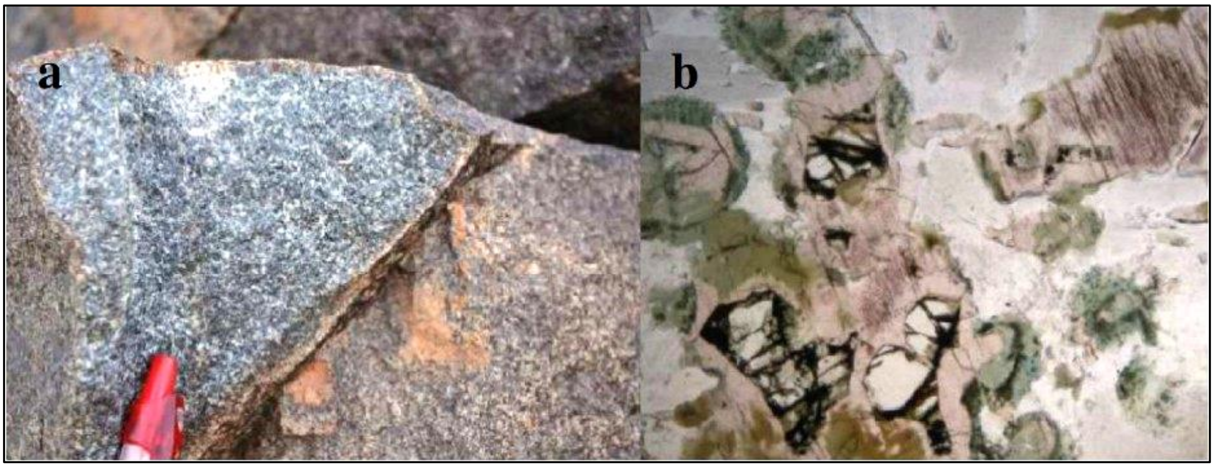

Figure 11: Fresh gabbronorite of the Kum Kum Intrusive Suite (a); olivine-gabbronorite showing three grains of olivine with the left side surrounded by orthoyroxene with amphibole and biotite beards, PPL (b) from Schreiber (2016).

Figure 12: Hybrid/mixed gabbro and granite (a); sheared and foliated dolerite dyke cross-cutting Eendoorn granite (b) from Schreiber (2016).

6.1.1. The Tantalite Valley Complex

The approximately 27 km^2 Tantalite Valley Complex forms a prominent black mountain locally known as Swartberg or Signalberg, and consists of variably altered olivine-metagabbro, meta-gabbronorite, meta-troctolite and ultramafic rocks of the Kum Kum Intrusive Suite (Figures 12 & 14).

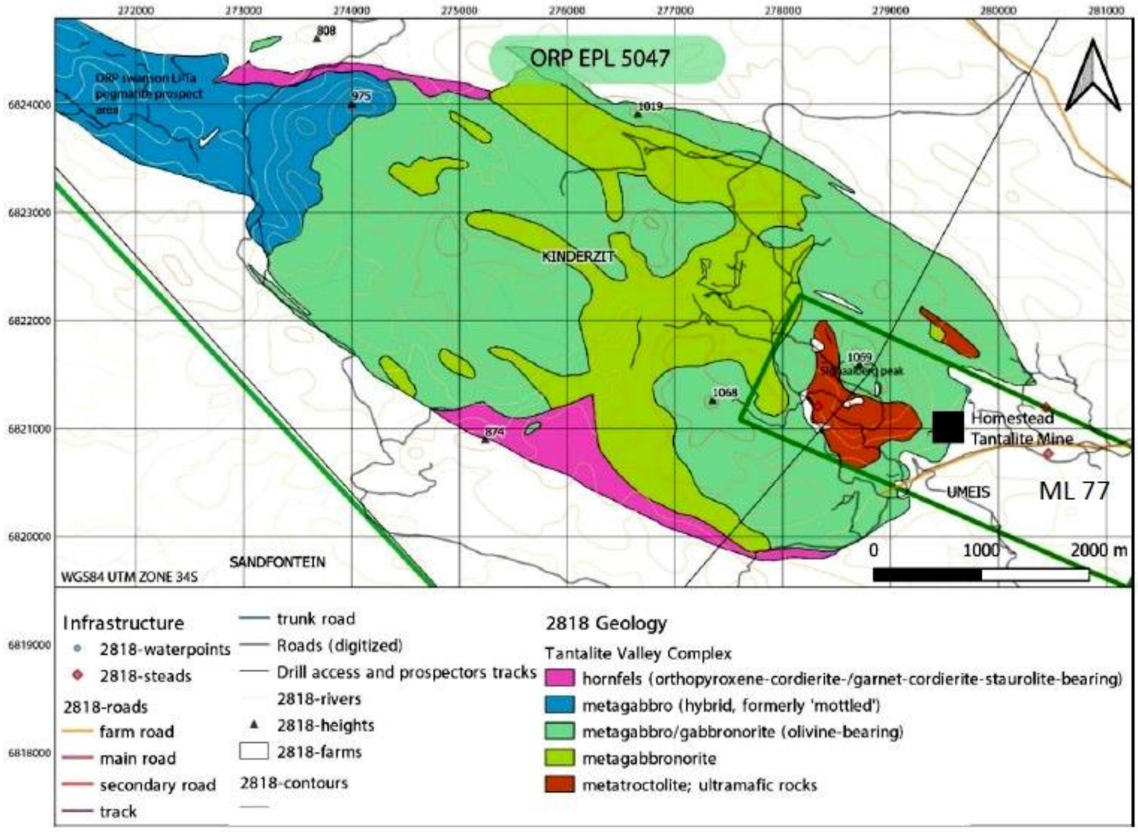

Figure 13: Geological map showing the distribution of Kum Kum Intrusive Suite lithologies in the Tantalite Valley Igneous Complex on the farms Kinderzit and Umeis, on ORP's EPL 5047. Modified after Macey et al. (2015) and Schreiber (2016).

A long spur of hybrid or "mottled" metagabbro (Moore, 1975; Kartun, 1979) extends from the north-western end of the main body, while a hornfels zone defines the contact metamorphic zone around the complex (Figure 13) (Moore *et al*., 1979). The margins of the main body are strongly foliated and small shear zones parallel to the enclosing D4-PSZ occur within it. Retrograde chlorite, talc and serpentine are abundant in these shear zones.

Figure 14: Meta-gabbronorite of the Tantalite Valley Complex, with desert varnish (left); grain-size banding in meta-gabbronorite (right) from Schreiber (2016)

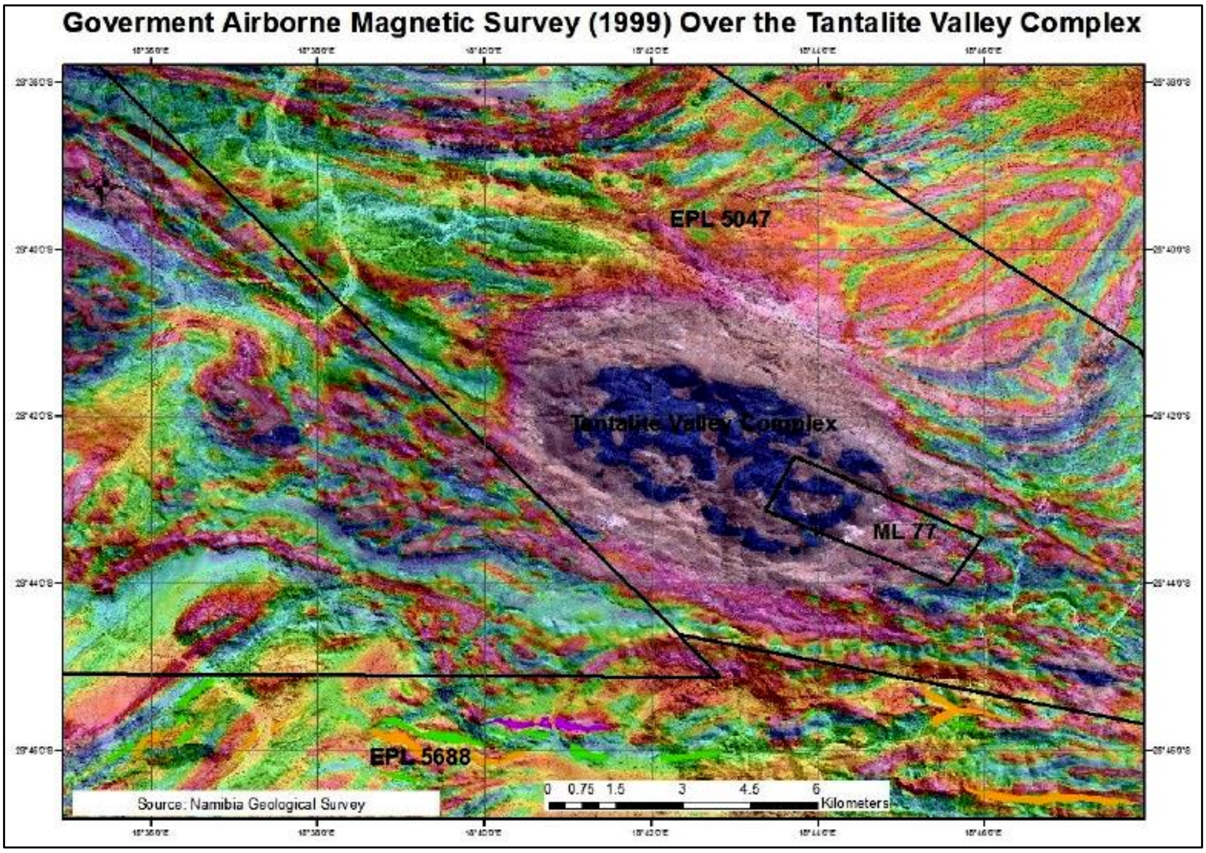

Figure 15: The Tantalite Valley Complex with its distinct aeromagnetic signature hosted within the NW trending PSZ (data from Namibian Geological Survey).

Two sets of fine-grained mafic dykes occur. Meta-dolerite dykes with an original ophitic texture and dips ranging from sub-vertical to near horizontal form the older set and occur only in the meta-gabbro. The second set consisting of fine-grained gabbronorite, cuts metagabbro and gabbronorite and extends into the country rocks (Schreiber, 2016).

Homogenous dark red to black, coarse-grained olivine meta-gabbronorite/meta-gabbro is the dominant rock type, forming most of the topographic high areas in the southeast and west of the complex; in the eastern part these rocks are interspersed with meta-troctolite and pods of other ultramafic rocks (Figure 13). Mineralogically two main types can be distinguished; the olivine gabbronorite consisting of plagioclase and clinopyroxene and the olivine meta-gabbro containing large anhedral olivine (up to 15 %), orthopyroxene as well as clinopyroxene. All olivine is partially altered, with serpentinite developed along the fractures, and fibrous beards of chlorite along the grain margins (Schreiber, 2016).

Meta-gabbronorite occurs in an irregular zone within the core of the Tantalite Valley Complex (Figure 13). Like the metagabbro it forms dark scree-strewn slopes on small koppies. Generally, the rocks have a homogenous coarse-grained texture, although some grain-size banding has been observed in the southeast of the complex (Figure 14) (Moore, 1975). Both ortho- and clinopyroxenes are variably altered to green amphibole and chlorite.

The northwestern spur of hybrid meta-gabbro is characterized by mixing of gabbroic and granitic melts, similar to the hybrid rocks of the Kum Kum Klippen (Macey *et al.,* 2015; Schreiber, 2016).

Late-stage ultramafic pods and small plugs of variable compositions form low lying boulder strewn areas and zones of limited outcrop, occurring within the central part of the complex, with a concentration in the southeast (Figure 16a). The dominant rock type is a meta-troctolite consisting of rounded anhedral olivine grains, with extensively altered interstitial material (probably plagioclase) making up around 10 – 15 %; meta-pyroxenite was locally observed (Moore, 1975).

The Tantalite Valley Complex intruded into the medium grade Orange River Group gneisses, which underwent contact metamorphic alteration and localized partial melting, resulting in the development of a spotted pelitic hornfels (Figure 16b). This variably banded 10 – 300 m thick unit is prominent along the southern and eastern margins of the complex, but also occurs intermittently along the northern contact (Moore *et al*., 1979).

Figure 16: Minor rock types of the Tantalite Valley Complex: boulder strewn outcrop of metatroctolite (a); porphyroblastic hornfels in the contact zone metamorphic zones surrounding the Tantalite Valley Complex (b)

7. Ni-Cu-PGE Deposit Model

ORP is of the opinion that the Kum Kum Intrusive Suite meets the mineral-systems-approach criteria applied as part of exploration targeting magmatic sill/dyke complex-type hosted Ni-Cu-PGE sulphide deposits (Barnes *et al.,* 2016; Begg *et al.,* 2010; Wua *et al*., 2018) and, in addition, it fulfils the descriptive deposit model for magmatic hosted Cu-Ni-(PGE)-(V-Co-Cr-Fe) sulphide deposits (Zientek, 2012). Analogous mineralized magmatic systems are to be seen in the Ovoid and Discovery Hill Zones of the Voisey's Bay Deposit (Canada), the Jinchuan, Huangshan, Huangshandong, Hongqiling, Limahe, Qingquanshan, and Jingbulake (Qingbulake) intrusions in China, and the Eagle and Eagle's Nest deposits in the USA and Canada, respectively (Lightfoot, 2015). Figure 18 demonstrates the geological similarities between the Tantalite Valley Complex and the Huangshandong Intrusion in China.

ORP has identified key geological characteristics which indicate that the Kum Kum Intrusive Suite hosts a prominent Ni-Cu-(PGE)-(V-Co-Cr-Fe) mineralization system. The following favourable geological characteristics of the Kum Kum Intrusive Suite are noted:

- Large volumes of (Macey *et al*., 2015; Schreiber, 2016) tholeiitic mafic-ultramafic Kum Kum Intrusive Suite magmas were emplaced relatively early-syn-tectonically into regional-scale, Kalahari-Craton-marginal, D2/D4 compressional and transpressional corridors within the Namaqua Natal Metamorphic Province, likely during a period of crustal thickening and later orogenic collapse (Cornell *et al*., 2016; Macey *et al*., 2017; Macheyeki, 2011; Schreiber, 2016).

- The mafic-ultramafic Kum Kum Intrusive Suite intrusions retain asymmetric rhomboid shapes, with the long axis sub-parallel to the regional-scale PSZ and LFROTZ structural corridors, (Lightfoot, 2015). The Kum Kum Intrusive Suite has a sill-like sheeted complex intrusive-character, while the Tantalite Valley Complex has a dyke/keel-like intrusive-character. The mafic-ultramafic rocks of both the Tantalite Valley Complex and the Kum Kum Intrusive Suite have an internally layered and cumulus (fractional) crystallization character, with the Tantalite Valley Complex also known to host significantly Ni-Cu mineralized late-stage conduit-like meta-troctolitic intrusions (Kartun, 1979; Schreiber, 2016). The continuation of the prospective Kum Kum Intrusive Suite Ni-Cu mineralization occurrences has been shown to exist along strike, largely parallel to the regional-scale D2/D4 compressional and transpressional corridors which exist in the area through the work of Rio Tinto Exploration and Falconbridge Exploration Ltd.

- The country rocks into which the Kum Kum Intrusive Suite intrudes are dominantly upper Greenschist to upper Amphibolite facies, Orange River Group gneisses of volcano-sedimentary origin (Macey *et al.*, 2015; Moore, 1975; Moore *et al*., 1979; Schreiber, 2016). The Orange River Group Gneiss provides a potential source for crustal sulphur, which is required for the process of sulphide immiscibility and segregation to occur (Barnes *et al*., 2016; Lightfoot, 2015). The very limited documented examples of disseminated- and contact-type massive and semi-massive sulphide mineralization known to occur in the Kum Kum Intrusive Suite all indicate that conditions for sulphide immiscibility, late-magmatic gravity driven migration of sulphide liquids, and syn- and post-tectonic sulphide remobilization have variably occurred in the various Kum Kum Intrusive Suite intrusions (Barnes, 2016). The late stage retrogressive metamorphic history of the D4 structural suggests that contact-type sulphide mineralization may be variably re-mobilized into brittle-ductile and brittle low-strain zones immediately within and around the Tantalite Valley Complex intrusive contact (Kartun, 1979; Moore, 1975).

- The available information on grade (Ni & Cu grades), mineralogical- (pyrrhotite-chalcopyrite-pentlandite) and lithological assemblages which comprise the Kum Kum Intrusive Suite rocks, indicates that known mineralization within the Kum Kum Intrusive Suite, at least in terms of selected Cu and Ni grades, variably overlap with known (average grade) brackets from world-class deposits of similar geological character (Zientek, 2012) (Figure 17).

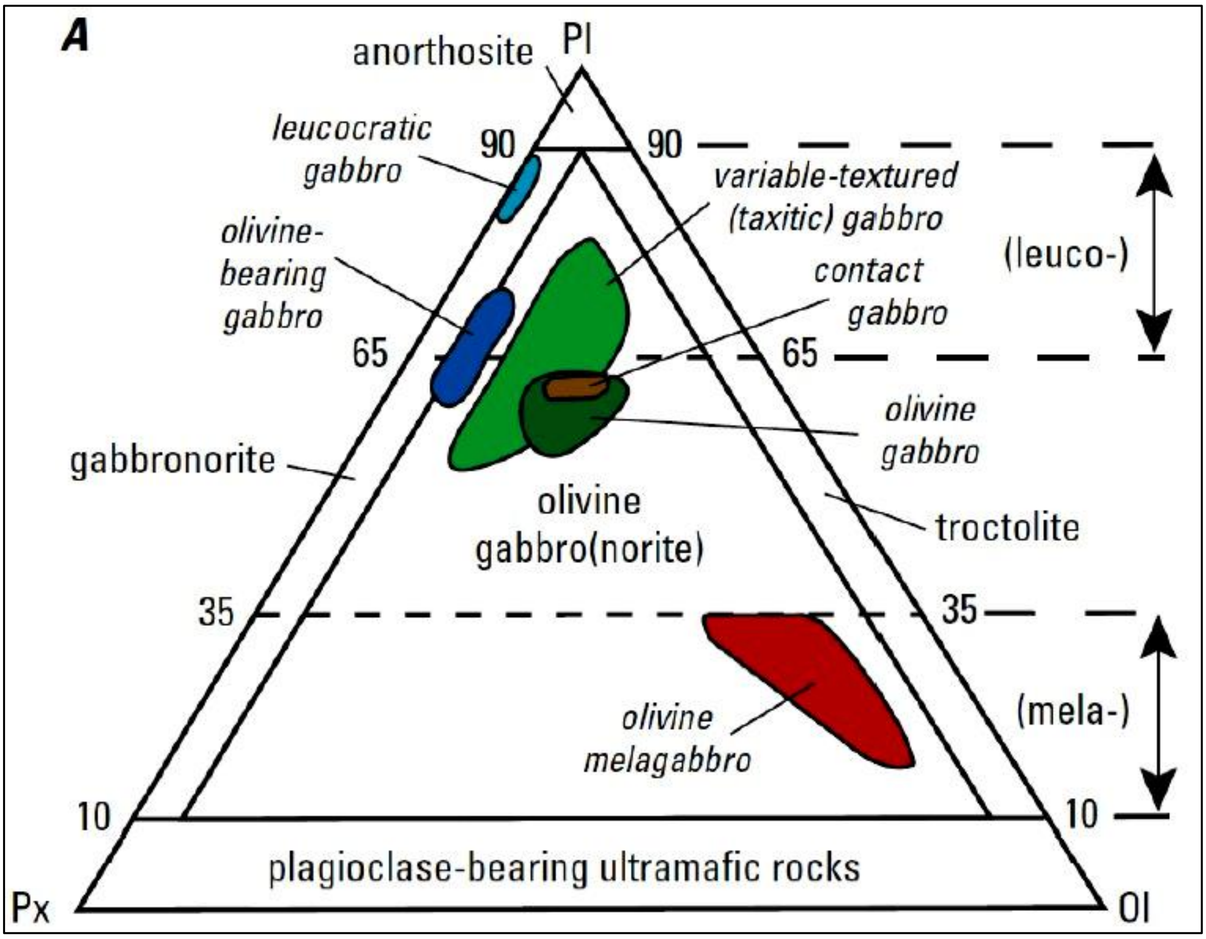

Figure 17: Ternary mafic-ultramafic plutonic igneous rock diagram indicating the typical rock-types which are associated with magmatic Ni-Cu-PGE sulphide deposits. All these rock types have been encountered and have shown to be variably mineralized, in the Kum Kum Intrusive Suite occurring in EPL 5047 and 6940, (Kartun, 1979), adapted from Zientek (2012).

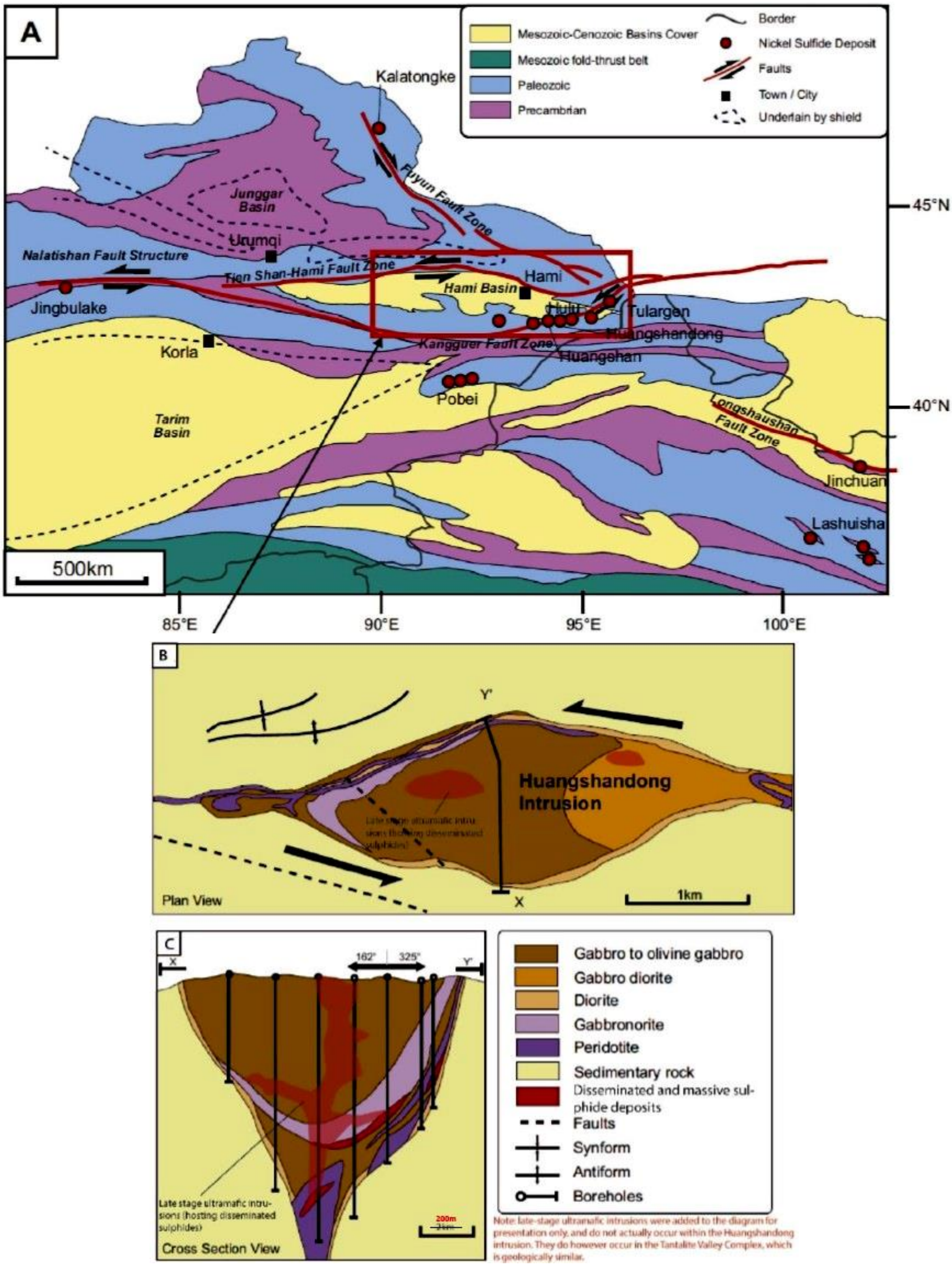

Figure 18: The geological model applied to the Tantalite Valley Complex, indicating the primary Ni-Cu-PGE exploration targets based on the Huangshandong intrusion in China, which is geologically comparable to the Tantalite Valley Complex in nearly all aspects. Modified

after Lightfoot et al (2015). A- Regional overview of the Huangshandong intrusion. B- Plan view of the Huangshandong intrusion. C- Cross section view of the Huangshandong intrusion indicating the locations of the disseminated and massive sulphide deposits.

8. Historical Background

Literature available on the known Ni-Cu mineralization of the Kum Kum Intrusive Suite rocks is limited to a few brief references offered by Hoal (1992), Kartun (1979), Miller (2008), Moore (1975), Schreiber (2016) and Von Backström (1976). The published information are largely short summaries of historical exploration reports from Falconbridge Explorations Ltd (1972), Rio Tinto Exploration (1971; 1972; 1973) and Tantalite Valley Minerals (Pty) Ltd (1972), which primarily deal with Ni-Cu mineralization associated with the Tantalite Valley Complex (EPL 5047). The exploration reports also provide very limited geological content, as the regional and local geological framework at the time of was not well established. All available published information regarding Ni-Cu mineralization of the Kum Kum Intrusive Suite rocks refer to work done exclusively within the boundaries of ORP's EPLs 5047, 7295 and 6940. A brief overview of the main historical exploration activities of Falconbridge Exploration Ltd and Rio Tinto Exploration in the project area (EPLs 5047, 7295 and 6940) is presented in figure 19.

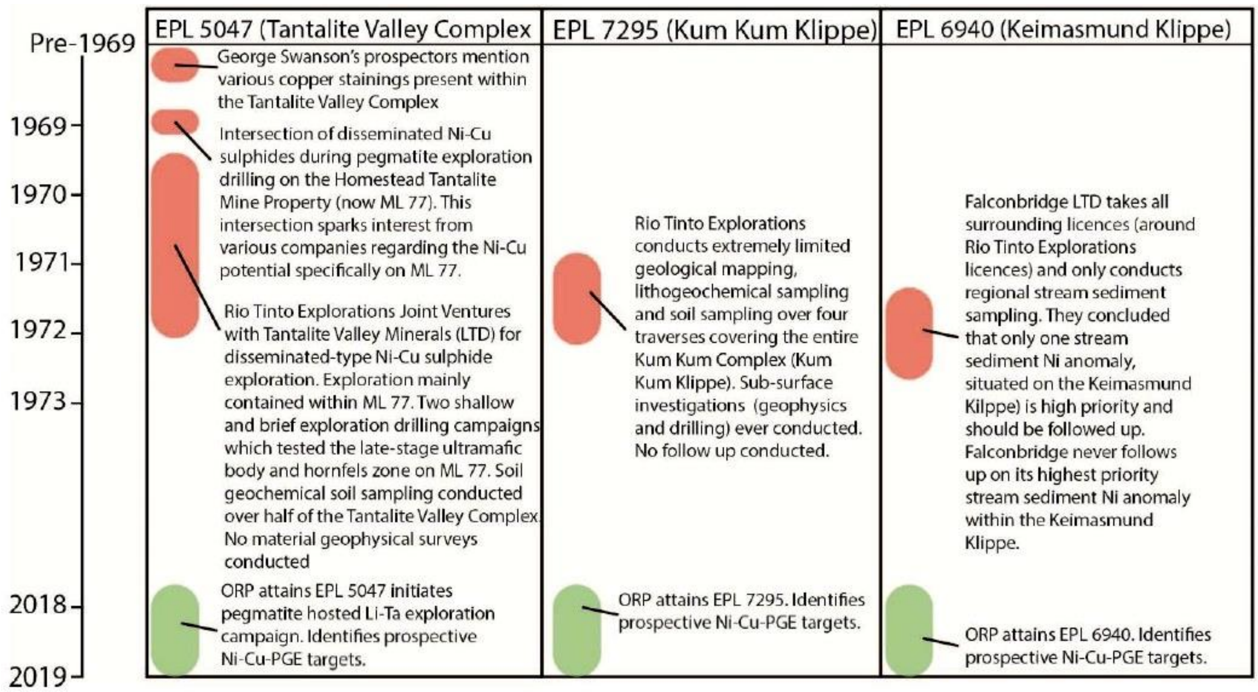

Figure 19: Main historical Ni-Cu exploration periods over the Kum Kum Intrusive Suite rocks in the project area. Note the intensive reconnaissance and exploration activities were limited to the periods of 1970 – 1972 and are exclusively associated to the companies Rio Tinto Exploration and Falconbridge LTD. There is no indication that Ni-Cu exploration in the area occurred after 1972.

8.1. Summary of historical exploration and known mineralization

As indicated in figure 19, there was an assortment of Ni-Cu reconnaissance and exploration activities by Rio Tinto Exploration and Falconbridge Ltd in the project area between 1970 and 1972; of which there is no record of any detailed follow-up exploration activities. The most intensive reconnaissance exploration program was piloted by Rio Tinto Exploration over the Tantalite Valley Complex and included soil geochemical sampling, ground-IP geophysics and a number of exploration drill holes; all very limited in extent (i.e. mostly restricted to Mining Licence 77, which falls within EPL 5047, but is not part of the EPL and has a separate owner). Work by Falconbridge Ltd was restricted to litho-geochemical and stream sediment sampling in the east, north and southeast portions of Kum Kum Intrusive Suite area (the area is today covered by ORP's EPLs and the actual Kum Kum Intrusive Suite itself, with some important work occurring on the Keimasmund Klippe on ORP's EPL 6940). The aim of Falconbridge Ltd was to identify and prioritize prospective Ni-Cu target areas which are today known to occur in the mafic-ultramafic rocks of the Kum Kum intrusive Suite (first discovered in the Tantalite Valley Complex). It should be noted that Rio Tinto Exploration's drilling activities during 1971 - 1972 were entirely limited to Mining Licence 77 and its immediate surroundings, as they were in a joint venture agreement with Tantalite Valley Minerals (Homestead Tantalite Mine) at the time. Also, Falconbridge Ltd's general exploration activities over the eastern portions of the Kum Kum area were more regional in extent and were not confined to any prospect-scale areas, except for the Oranje Fall-Keimusmund farm areas (on ORP's EPL 6940) which yielded highly prospective Ni stream sediment anomalies.

Rio Tinto Exploration also conducted a limited reconnaissance program over the Kum Kum Intrusive Suite (EPL 7295) itself; with reconnaissance activities restricted to minimal litho-geochemical and soil sampling across only four traverses covering the entire Kum Kum Intrusive Suite (Rio Tinto Exploration, 1973). However, the reconnaissance findings presented in this report corroborate the presence of prospective lithologies and associated Ni-Cu mineralization in the area. No supporting information could be found that Rio Tinto Exploration ever conducted detailed exploration activities over the Kum Kum Intrusive Suite (EPL 7295). There is also no indication of any PGE test work conducted during any of the historical exploration programs on either the Tantalite Valley or the Kum Kum Intrusive Suite.

8.1.1. Rio Tinto Exploration results - Tantalite Valley Complex (EPL 5047)

In the course of exploration drilling of the pegmatites (1969) which are intrusive into the Tantalite Valley Complex on Tantalite Valley Mineral's Homestead Tantalite Mine (now Mining Licence 77), it was discovered that the meta-gabbroic and meta-ultramafic host rocks (mostly the meta-troctolite and meta-ultramafic rocks occurring in Mining Licence 77 as indicated in figure 13) (Macey *et al.*, 2015) intersected during drilling contained disseminated Ni-Cu-Fe sulphides in places. The mineralization comprised mostly of pyrrhotite with pentlandite, pyrite and chalcopyrite (Von Backström, 1976). Subsequent to the Ni-Cu sulphide discovery on now Mining Licence 77, the Homestead Tantalite Mine (Tantalite Valley Minerals Ltd) negotiated with the companies Okiep Copper Company, Falconbridge Ltd, J.C.I, Union Corporations, Anglo American Corp, Phelps Dodge and Rio Tinto Exploration, with Rio Tinto Exploration finally being awarded joint venture Ni-Cu exploration rights in 1970. Rio Tinto Exploration and Tantalite Valley Minerals executed two successive exploratory reconnaissance drilling campaigns (N-K- and TV-drill campaigns), soil sampling and a ground-based IP-geophysical investigation over the mineralized meta-ultramafic bodies and hornfels zone that occurs in Mining Licence 77 (Figure 20). The coordinates of the sampling and drilling are not recorded in the available historic reports, thus the locations cannot be plotted on maps with any degree of certainty.

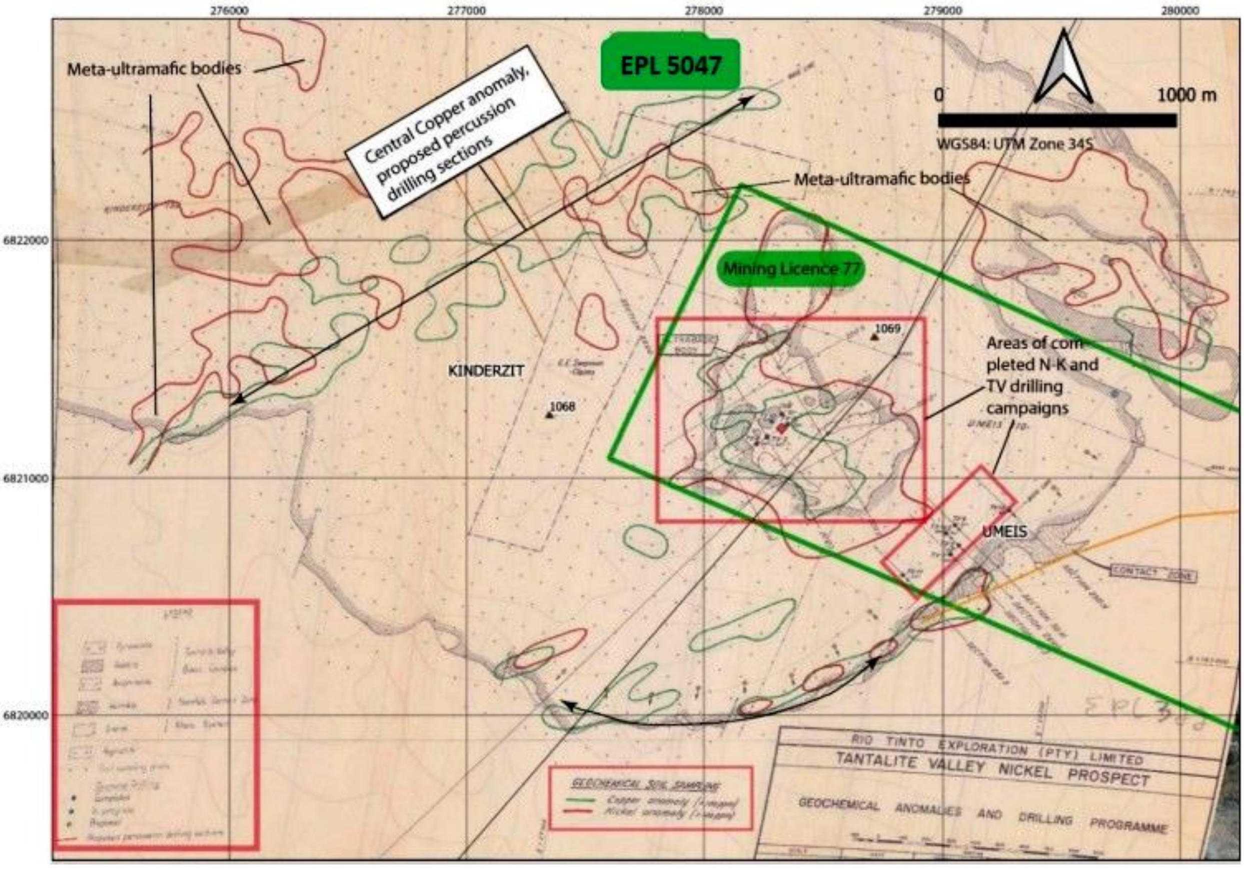

Figure 20: A copy of the Rio Tinto Exploration map from Rio Tinto Exploration (1972). Note the results of the soil sampling program across Mining Licence 77 which indicates well developed Cu and Ni soil geochemical anomalies elsewhere. Most of the completed reconnaissance exploration drilling completed by Rio Tinto Exploration was done on Mining Licence 77, however, the geological units which they investigated extend well beyond the licence boundaries. This map encompasses all of Rio Tinto Exploration' exploration activities

conducted on the Tantalite Valley Complex. The coordinates of the sampling and drilling are not recorded in the available historic reports, thus the locations cannot be plotted on maps with any degree of certainty.

8.1.1.1. Initial (N-K) drilling campaign

Rio Tinto Exploration piloted a further 13 exploration diamond drill holes (drill-series N and K) (Figure 21) after the initial discovery drill hole on the property, with a total depth of 1620 m for the drill campaign. Ni-Cu sulphide mineralization, over a mineralization drill hole intersection thickness of up to 30 m, at depths between 100 – 200 m.b.g.l., was demonstrated in four drill holes (Von Backström, 1976). Average values of Cu and Ni for mineralized zones intersected within the meta-gabbroic and meta-ultramafic bodies range from 0.21 – 0.58 % Ni and 0.30 – 0.50 % Cu (Tantalite Valley Minerals, 1972; Von Backström, 1976).

The drill hole information regarding log details and data along with information regarding how the intersections are calculated (eg. cut-off grades, minimum width, waste inclusion etc.), as recorded in Rio Tinto in-house reports (Rio Tinto Exploration, 1972), is incomplete.

The sulphide minerals intersected by Rio Tinto Exploration largely occurred within the amphibolitic units as irregular veinlets and patches, indicating that sulphide re-mobilization have variably occurred. Other sulphide mineralization along alteration cracks and as minute inclusions in olivine in meta-peridotite, and as rounded to irregular intercumulus patches in meta-gabbroic and meta-ultramafic rocks, were also noted (Beukes, 1976). The Ni-Cu mineralization which was intersected was hosted mostly by Rio Tinto Exploration logged "amphibole-fels" (consisting of actinolite and Cu-Ni-Fe sulphides) through to amphibolitic (and meta-gabbroic, meta-ultramafic) rocks (Von Backström, 1976).

8.1.1.2. Second (TV) drilling campaign

Following the completion of the first 13 drill holes (N-K drilling campaign), Rio Tinto Exploration decided to initiate an expanded exploratory drilling campaign on the same meta-ultramafic body, as well as now including the hornfels zone in the southeast, which had also been known for its minor copper showings for some time (Dormehels, 1986). The new drilling campaign consisted of 12 diamond drill holes (TV01-TV12), also on Mining Licence 77, of which down hole data for TV1 – TV08 could be retrieved (drill series TV) (Figure 22). The total length of the drill holes is not recorded in available documents. The drill holes located in the hornfels zone were inclined from the interior side of the Tantalite Valley Complex – hornfels contact outwards, towards the surrounding tectonised Orange River Group Gneisses.

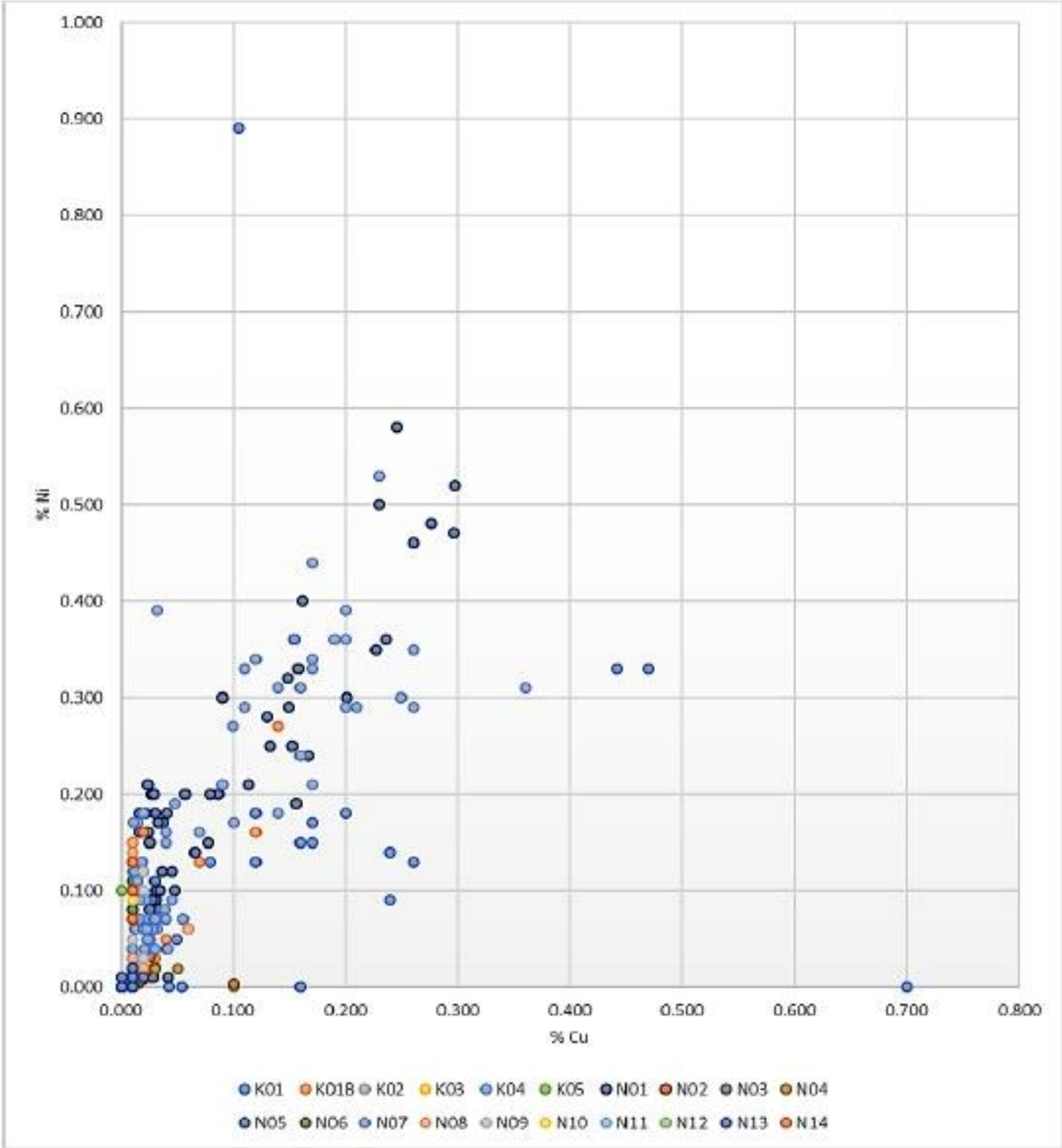

Figure 21: Scatter plot of Ni-Cu values for available sample data collected during Rio Tinto Exploration's initial 13-hole drilling campaign (N and K) on the meta-ultramafic body occurring on Mining Licence 77.

The diamond drilling, which Rio Tinto Exploration completed in Mining Licence 77 over the hornfels zone indicated that a near-surface Ni-Cu mineralized zone is present and is vertically disposed, on average 17 m in width and contains average Ni and Cu values of 0.18% and 0.18% respectively (Rio Tinto Exploration, 1972). Rio Tinto Exploration (1972) described the surface mineralization exposed in the hornfels zone as “sulphide shoots within the contact rocks”.

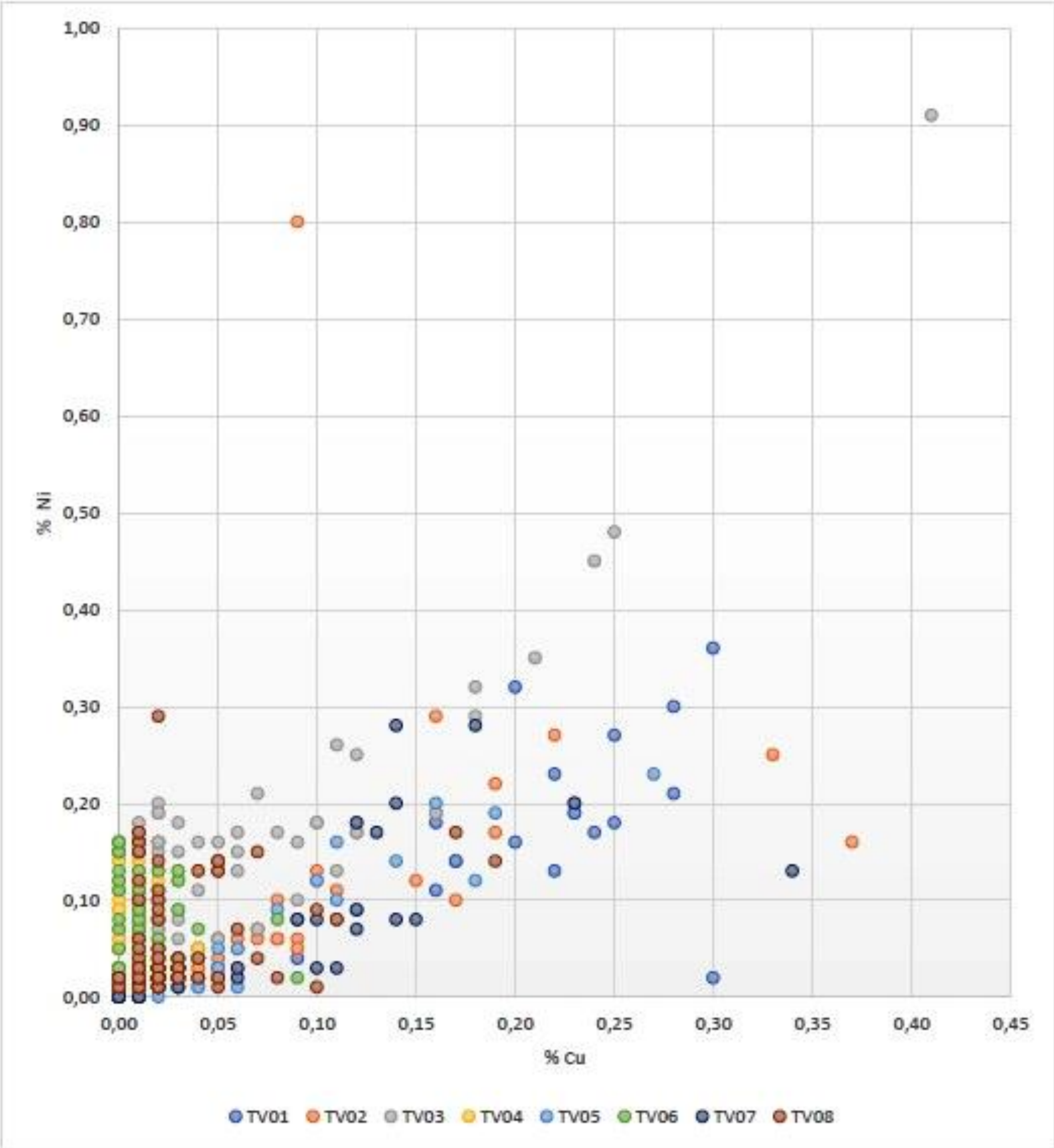

Figure 22: Scatter plot of Ni-Cu values of available data collected during Rio Tinto Exploration's second 12-hole drilling campaign (TV) which includes results from the hornfels zone occurring on Mining Licence 77.

8.1.1.3. Soil sampling campaign

1855 soil samples were collected on a 100 m grid covering the meta-ultramafic body occurring predominantly on Mining Licence 77 and its immediate surroundings, with a significant portion of the soil samples occurring on EPL 5047 (i.e. the "central copper anomaly"). The soil sampling program covered some 450 ha in extent (Figure 20) (Rio Tinto Exploration, 1972).

Based on the results of the soil sampling campaign Rio Tinto Exploration concluded that soils derived from the meta-ultramafic bodies retain higher Ni contents and that Cu anomalies are indicative of sub-surface Cu-Ni disseminated sulphides (Rio Tinto Exploration, 1972). A prominent "central copper anomaly" was identified through the soil sampling program (Figure 20) on EPL 5047, and Rio Tinto Exploration proposed exploration percussion drilling in a zone termed the central copper anomaly. No sub-surface drilling data on the "central copper anomaly" is available and no further information on follow up work on this anomaly could be found in the archives or published literature.

8.1.1.4. Ground-IP geophysical investigation

A ground-IP geophysical survey was conducted across strike over the hornfels zone in the south eastern portions of Mining Licence 77; however, the results of this work was inconclusive in determining any Cu-Ni mineralization, despite mineralization being intersected at depth during the TV drill campaign (Rio Tinto Exploration, 1972). This ground-IP geophysical survey is the only record of Ni-Cu geophysical prospecting to have occurred on the Kum Kum Intrusive Suite rocks at EPLs 5047, 7295 and 6490.

8.1.2. Rio Tinto Exploration results – Kum Kum Intrusive Suite/Klippe (EPL 7295)

The limited reconnaissance geological mapping, litho-geochemical sampling and soil sampling of Rio Tinto Exploration (Rio Tinto Exploration, 1973) was confined to only four traverses across the entire Kum Kum Intrusive Suite (Figure 23). They identified Ni-Cu sulphide mineralization in the form of disseminated pyrite, pyrrhotite, pentlandite, chalcopyrite and marcasite hosted within predominantly mafic units of the Kum Kum Intrusive Suite (likely olivine gabbros and gabbronorites of Macey *et al.* (2015); (Rio Tinto Exploration, 1973). No indication of any follow-up exploration work to have occurred on the property after 1973 exists.

8.1.3. Falconbridge Ltd exploration results (EPL 6940)

Shortly after Ni-Cu mineralisation was identified in the Tantalite Valley Complex on Mining Licence 77, Falconbridge Ltd applied for and was granted base metal prospecting rights over several farms occurring east, north and south east of the Kum Kum Intrusive Suite in 1971. At the time, no reliable geological framework (i.e. geological maps, field relationships, detailed distribution of lithological units, structural-metamorphic and/or geochronological constraints) existed for the area's which they applied for.

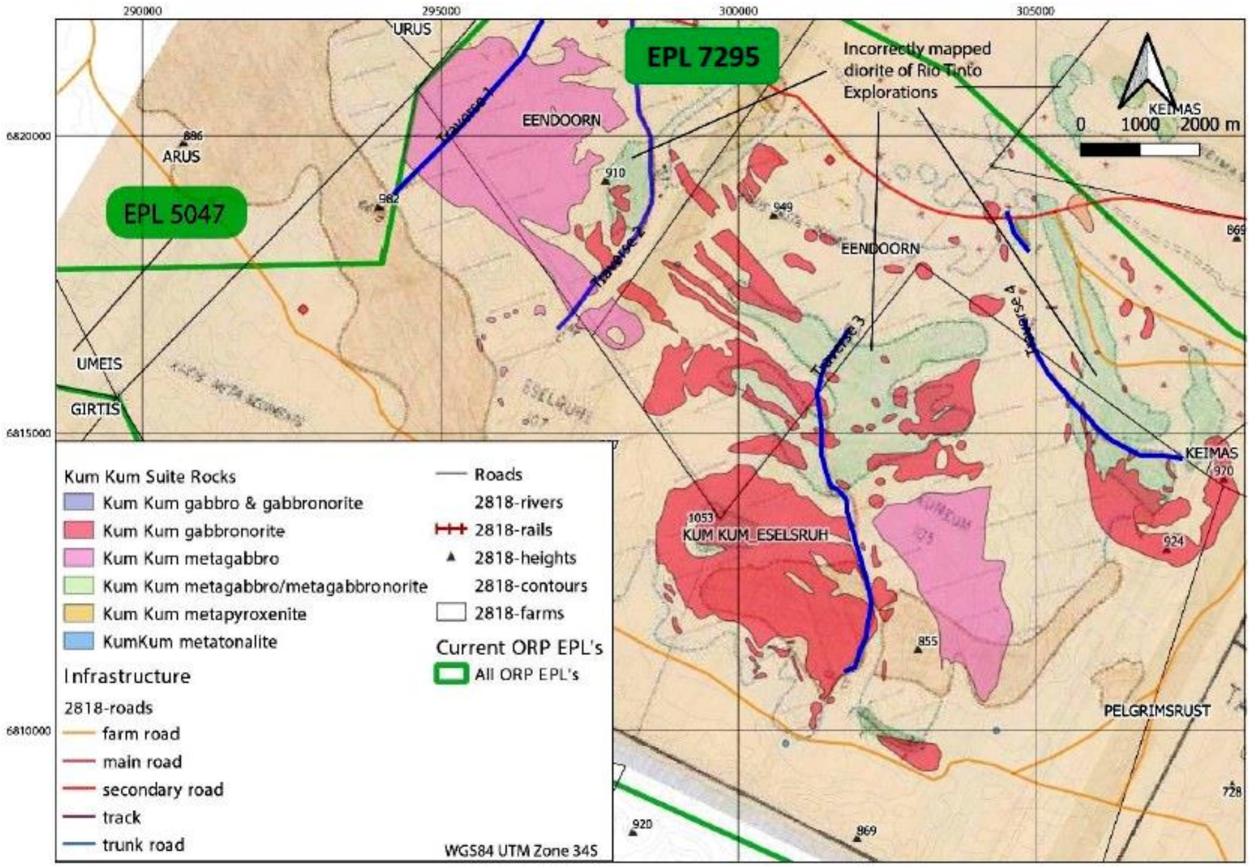

Figure 23: A geological reconnaissance map of Rio Tinto Exploration (1973) showing the reconnaissance activities (soil sampling and litho-geochemical sampling) were limited to only four traverses across the entire complex. The Rio Tinto Exploration (1973) geological map is also very limited, with some inaccuracies, with regards to lithological detail, when compared with the recent geological mapping completed (Macey et al., 2015; Schreiber, 2016). It is evident that Rio Tinto Exploration field work in the area only covered extremely small portions of the prospective lithologies and areas occurring in EPL 7295 during their reconnaissance program in 1972.

Early in 1972, Falconbridge Ltd initiated reconnaissance field work, comprised primarily of aerial photographic interpretation and general lithological ground-truthing (Falconbridge Explorations Ltd, 1972). Based on their aerial photograph interpretations completed over all the farms included in their prospecting rights, six Ni-Cu target exploration areas were delineated (farms Arus, Keimansmund, Oranje Fall, Nautsis, Stolznefels and Vaaldoorn). Falconbridge Ltd's follow-up reconnaissance geological field mapping of the six targets suggested that two of the targets had no Ni-Cu mineralization potential because only granitic and granodioritic gneisses were observed in the field. Stream sediment sampling was subsequently conducted over the four remaining prospective targets (farms Arus, Keimusmund-Oranje Fall, Nautsis and Stolzenfels) and comprised of 1050 samples analysed for Ni, Cu and Pb. Based on the results of the stream sediment sampling program Falconbridge Ltd eliminated three of their four remaining Cu-Ni target exploration areas (farms Arus, Nautsis and Stolzenfels); two target areas were eliminated because no Ni anomalies were encountered and one target area because the source of the Ni anomaly was found to be associated with a swarm of Karoo-aged dolerite dykes. The only remaining target area of interest to Falconbridge Ltd was on the shared border of farms Keimusmund and Oranje Fall, located on ORP's EPL 6940 (Figure 24).

The background values for Cu, Ni and Pb in the Keimusmund-Oranje Fall farm area was 30 ppm Cu, 35 ppm Ni and 20 ppm Pb, with several Ni anomalies with values up to 197 ppm Ni obtained (Falconbridge Ltd, 1972). Falconbridge Ltd conducted infill check stream sediment sampling of the Keimusmund-Oranje Fall farm areas and subsequently obtained anomalous Ni values exceeding 150 ppm and up to 408 ppm, limited to an area of 3 x 1.5 km. Follow-up geological investigation revealed that the anomalous area is situated within a synformally folded rock package consisting of a core of biotite-granodiorite containing numerous amphibolitic bodies (Falconbridge Ltd, 1972).

No evidence exists suggesting that Falconbridge Ltd ever pursued the stream sediment anomalies on the Keimusmund-Oranje Fall farm areas. Today it is known that the anomalous stream sediment Ni values which they encountered are associated with gabbro and gabbronorite units of the Kum Kum Intrusive Suite in the Keimasmund Klippe, which occur just off the main NW-SE axis of the Poffadder Shear Zone, but are still directly related to the main Tantalite Valley and Kum Kum intrusive complexes.

8.1.4. Creo Design 2009 soil geochemistry survey

During 2009, the area was re-investigated in an effort to locate the source of the anomalous nickel values reported by earlier workers. Special attention was paid to the mafic rocks in the anomalous areas, but, like Rio Tinto and Falconbridge, no mineralization could be found in the numerous outcrops examined. It also became obvious that the mountainous area on Keimasmund 98/Orange Fall 101 would require a thorough investigation to explore it conclusively for any sign of mineralization. The contact relationship between the granodiorite and the extensive outcrops of amphibolitiic rocks is complex and unresolved. The anomalous area on Vaaldoorn 91/Nautsis 92 has occasional small outcrops of mafic rocks without any obvious sign of mineralization. Sixty-four stream sediment samples were collected on the projected sample density of 1 per km^2.

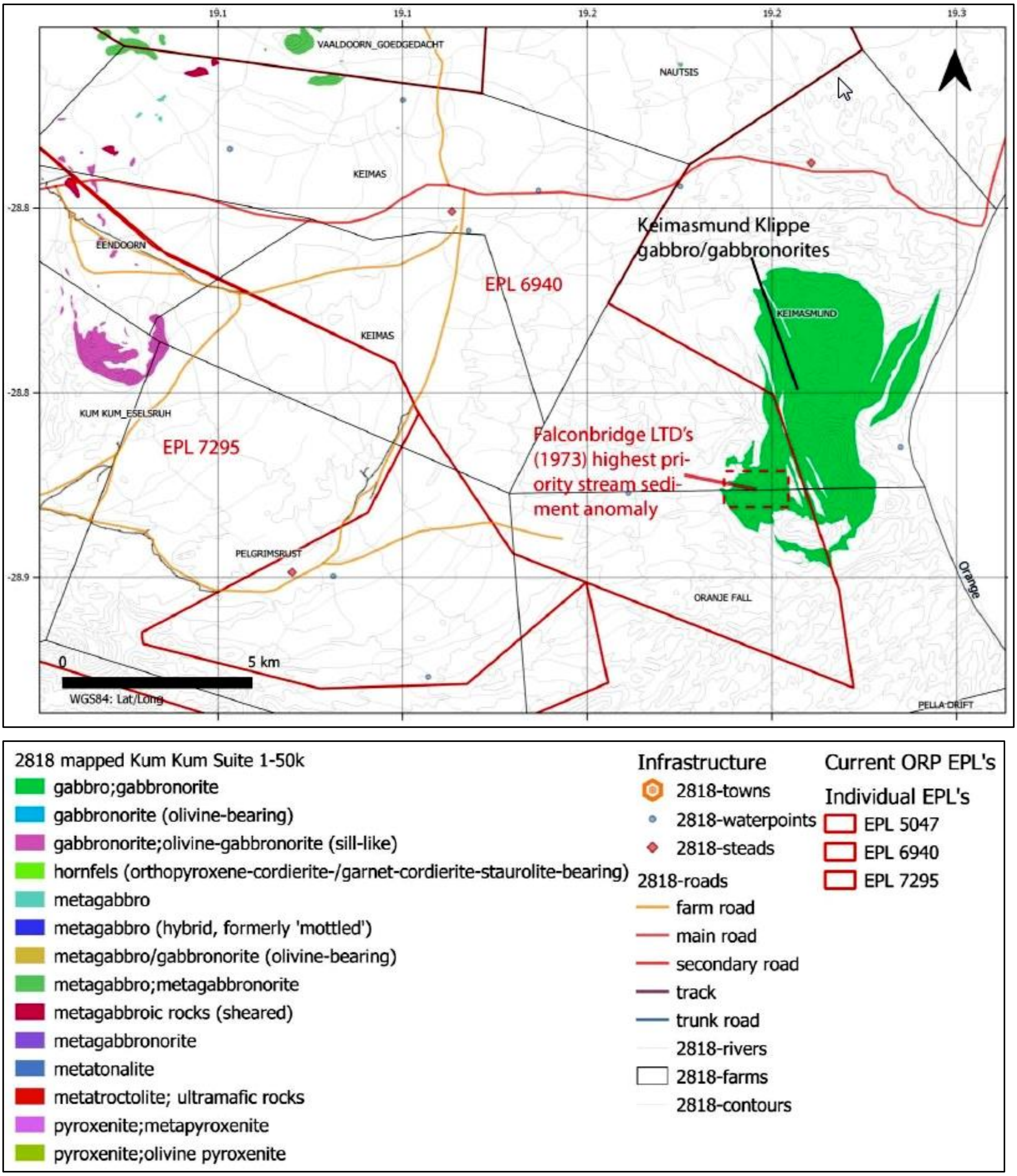

Figure 24: Overview of Falconbridge LTD's highest priority stream sediment Ni anomaly, with Ni values exceeding 150 ppm and up to 408 ppm (Falconbridge Ltd, 1972), occurring on the shared farm border of Oranje Fall and Keimusmund farms, which lies on ORP's EPL 6940. The anomaly is associated with the Gabbro's and Gabbronorites of the Keimasmund Klippe.

9. Exploration and Data collection

9.1. Orange River Pegmatite sampling

ORP was able to locate the historical Rio Tinto Exploration exploration camp site on the farm Umeis (Figure 25) (locality 283215X; 6822839Y; WGS84: UTM Zone 34 S) situated on EPL 5047. At this historical camp site there were drill core discard piles and evidence of grab sampling activities, discarded sample pulps, and several discarded grab samples/specimens (Figure 27). ORP collected samples comprising several fragments of discarded core as and documented the mineralization that could be observed in some of the discarded grab and core sample materials (Figures 25 & 26; Table 4).

Figure 25: The Rio Tinto Exploration exploration camp between 1971 – 1972 - from Rio Tinto Exploration (1972). This locality was positively identified in the field on Farm Umeis (EPL 5047).

Figure 26: Several discarded core samples were collected for re-evaluation. These samples were selected at random from a pile which seemed to have significant sulphide content evident by surface iron staining. Disseminated and vein-type sulphide textures were visible in several the samples. The samples were submitted to Sci-ba laboratories in Cape Town for multi-acid digestion with ICP-OES finish analysis. Samples X1453 & X1476 are QAQC blank silica chip CRM samples.

Figure 27: Well-mineralized discarded grab and core samples which were discovered at Rio Tinto Exploration 1971 - 1972 exploration camp site on farm Umeis. These samples have not yet been analysed. Mineralization primarily consists of pyrrhotite and chalcopyrite and is expected to contain significant quantities of pentlandite. The host rocks are all meta-ultramafic > meta-mafic (and appear to be retrograded with green amphibole, chlorite and serpentine being present). Specimens a – d exhibit a variation of network – massive vein/granular type sulphide mineralization textures, while specimens e – f is of an unsplit HQ-size core showing disseminated sulphide mineralization textures, with individual sulphide grains as large as 1 cm. Specimens g – h appear to be gossanous in nature, with indications of native sulphur, iron oxides and late calcite, which appear to conform to a relict foliation. Specimen g – h is likely to be sourced from the tectonised mineralized hornfels zone, while specimens a – f is likely sourced from the meta-ultramafic>meta-mafic bodies within the Tantalite Valley intrusive Complex itself. Since these specimens were all located at the positively identified Rio Tinto Exploration 1971 – 1972 exploration camp, it is likely that these samples have been sourced from the Mining Licence 77 area and are probably related to the K-N and TV drilling campaigns across the late-stage ultramafic units and the hornfels contact zone (Figure 20).

Table 4: The multi-acid digestion with ICP-OES finish results reporting Cu, Cr, Zn, Ni and Co values for the randomly selected core samples (from pile showing significant oxide staining, where the core appeared to be largely unsplit/unsampled).

	Determinant	**Copper**	**Chromium**	**Zinc**	**Nickel**	**Cobalt**
Sample	Analyte	Cu	Cr	Zn	Ni	Co
1	x 1453	0.000%	0.001%	0.001%	0.000%	0.000%
2	x 1454	0.006%	0.007%	0.011%	0.030%	0.006%
3	x 1455	0.047%	0.030%	0.009%	0.024%	0.007%
4	x 1456	0.177%	0.021%	0.009%	0.297%	0.013%
5	x 1458	0.037%	0.011%	0.010%	0.018%	0.007%
6	x 1459	0.003%	0.317%	0.009%	0.145%	0.013%
7	x 1460	0.034%	0.005%	0.014%	0.023%	0.010%
8	x 1461	0.063%	0.228%	0.006%	0.155%	0.012%
9	x 1462	0.399%	0.034%	0.010%	0.162%	0.011%
10	x 1463	0.049%	0.002%	0.004%	0.005%	0.001%
11	x 1464	0.500%	0.139%	0.008%	0.098%	0.009%
12	x 1465	0.023%	0.111%	0.016%	0.015%	0.008%
13	x 1466	0.019%	0.008%	0.006%	0.010%	0.004%
14	x 1467	0.328%	0.028%	0.010%	0.324%	0.017%
15	x 1468	0.171%	0.038%	0.013%	0.142%	0.009%
16	x 1469	0.088%	0.003%	0.003%	0.051%	0.004%
17	x 1470	0.005%	0.427%	0.012%	0.165%	0.015%
18	x 1471	0.194%	0.237%	0.007%	0.237%	0.010%
19	x 1472	0.102%	0.015%	0.010%	0.062%	0.008%
20	x 1473	0.146%	0.007%	0.006%	0.193%	0.009%
21	x 1474	0.246%	0.017%	0.007%	0.201%	0.009%
22	x 1475	0.224%	0.011%	0.005%	0.302%	0.010%
23	x 1476	0.000%	0.001%	0.001%	0.000%	0.000%

The locations where the mineralized material in table 4 was originally sampled cannot be given with any degree of certainty; however, ORP is of the opinion that these samples and specimens are indicative of the mineralization which is associated with Kum Kum Intrusive Suite rocks comprising the Tantalite Valley Igneous Complex.

10.Mineral Resource Estimates

10.1. Introduction

Similar Ni-Cu mineralized magmatic systems occurring elsewhere, such as the Ovoid and Discovery Hill Zones of the Voisey's Bay Deposit (Canada), the Jinchuan, Huangshan, Huangshandong, Hongqiling, Limahe, Qingquanshan, and Jingbulake (Qingbulake) intrusions in China, and the Eagle and Eagle's Nest deposits in the USA and Canada, respectively (Lightfoot, 2015). Clear geological similarities exist between the Tantalite Valley Complex and the Huangshandong Intrusion in China. The Kum Kum Intrusive Suite grades of 0.21 – 0.58 % Ni and 0.30 – 0.50 % Cu fall within the grade ranges of several world-class sill/dyke complex-type magmatic Cu-Ni-PGE sulphide deposits.

10.2. Resource Potential

Detailed investigations concerning mining-, processing-, metallurgical-, infrastructure-, economic-, marketing-, legal-, environmental-, government- and social factors ("modifying factors'; JORC, 2012) have not been undertaken to date.

There is insufficient information (regarding crucial modifying factors) to estimate a Mineral Resource (JORC, 2012) at this date and currently no information regarding the potential recoveries of Ni and Cu from the Kum Kum Intrusive Suite is available.

The Project does not contain any Ore Reserves or Mineral Resources, as defined by the JORC Code. Under the definition provided by the ASX and in the VALMIN Code, the Kum Kum Project is classified as an 'exploration project', which is inherently speculative in nature. ORP's Projects are considered to be sufficiently prospective, subject to varying degrees of risk, to warrant further exploration and development of their economic potential, consistent with the programs proposed by Creo.

10.2.1. Data Acquisition Audit Procedure and Quality Assurance/Control

The available set of historic and recent samples, lithology and related geological information, sample ID, sample size, sample quality, and assay results, are stored electronically in an Excel™ database. The original sample data were captured into Excel™ and verified by the project geologist. All laboratory results were received in Excel™ format and were incorporated into the main database.

The Excel™ database is exported into modelling software for validation purposes. This software package has a series of automatic verification procedures including checking for overlapping intervals. Preliminary modelling provides a visual check that the drillholes plot correctly on the survey plan and that assay values are displayed correctly. Any errors identified are investigated by the responsible geologist prior to the commencement of more detailed two-dimensional modelling. Creo has not independently verified the underlying sampling and assay data. Creo considers that given the general sampling programme, geological investigations, check assaying and, in certain instances, independent audits, the procedures reflect an appropriate level of confidence.

10.2.2. Verification of Quality and Spatial of Data

Although limited sampling was conducted, Creo is satisfied that the correct quality assurance and quality control procedures were followed during the sample processing and that survey techniques capturing spatial data was accurate and true.

10.2.3. Volume estimation parameters and method

No volume estimations nor variography or advanced geostatistical methods were applied during this early stage of exploration.

10.2.4. Grade and tonnage estimation results

No grade or tonnages were estimated.

10.2.5. Grade Profile

Insufficient data prevents any attempt at statistical analysis of grade distribution as this would not be meaningful for this small number of samples.

11. CREO's Comments

ORP has demonstrated that good potential exists at its Nickel–Copper-PGE sulphide mineralisation at the Kum-Kum Project Tantalite Valley Igneous Complex mafic and ultramafic prospects. The three Exclusive Prospecting Licences (EPLs), EPL 6940 and EPL 7295 and EPL 5047 have significant potential for Nickel–Copper-PGE sulphide mineralisation in its mafic and ultramafic base metal bearing lithologies.

ORP made good advances in understanding the geology of the region and the local mineralisation parameters. With a well-managed exploration plan, such as ORP intends in launching, the chance of advancing the project is good.

12.Next Exploration Phase

Detailed litho-geochemical and mineral-geochemical work over the interior portions of the Tantalite Complex may yield insights into the Ni-Cu-PGE sulphide mineralization prospectivity of the Tantalite Valley Complex.

The lithological distribution and mineralization of the late stage ultra-mafic intrusions, mostly constrained to the interior portions of the complex, are also relatively well known and constrained. It follows that ground-based electromagnetics and induced polarization surveys are also considered to be the most cost-effective and relevant geophysical prospecting methods applicable for the exploration of late-stage ultra-mafic hosted Ni-Cu-PGE sulphide mineralization.

A significant exploration target, the highly prospective feeder-conduits to the late-stage mineralized ultramafic intrusions, are to date totally untested and have not even been postulated within any of the available historical literature. It is envisaged that detailed ground-based geophysical prospecting may reveal the presence of blind ultra-mafic feeder-conduits and/or ultra-mafic magma chambers, which may themselves host significant disseminated-type (and locally contact-type) Ni-Cu-PGE sulphide mineralization, especially where internal (sub-surface) geometric variations can be identified. There also exists a chance that near-surface ultramafic bodies remain undiscovered, as much of the complex is scree covered and has no record of any soil-geochemical investigations (i.e. the north western half of the complex) and is scree covered, which may have disguised their presence.

Modern day, super-high-resolution hyperspectral data can be commercially purchased and is currently available over the Kum Kum and Keimasmund Complex's. It will be beneficial to combine a detailed remote sensing analysis aimed at identifying outcropping and sub-outcropping gossanous materials potentially associated with mineralized portions of the Kum Kum Suite, complimenting a regional stream sediment sampling program, in order to further constrain potential target areas. If results of the stream sediment sampling program are positive, then selected areas may be targeted for detailed lithogeochemical sampling, geological mapping and possibly airborne geophysical surveys.

12.1. Work Programme

ORP has developed an exploration budget for an allocation of AUD 716,100 over two years which is summarised in Table 5. The majority of the exploration budget is assigned to VTEM geophysical survey to identify drill targets within the Projects.

Creo has reviewed the proposed budget and it is considered appropriate and reasonable for the mineralisation styles within the project and the stage of exploration. The proposed exploration budget exceeds the minimum required expenditure commitment for the Projects.

Table 5: Proposed work programme budget.

Exploration Budget - Kum Kum	Year 1 ($)		Year 2 ($)		Total ($)	
Licence Fees and Environmental	$	10,000	$	4,000	$	14,000
Field Expense	$	6,000	$	8,000	$	14,000
Soil / Grab Sampling	$	13,000	$	-	$	13,000
Geophysical Survey	$	-	$	500,000	$	500,000
Project Administration	$	10,000	$	10,000	$	20,000
Lexrox - Consultancy Agreement	$	60,000	$	30,000	$	90,000
Sub - Total	***$***	***99,000***	***$***	***552,000***	***$***	***651,000***
Contigency (10%)	$	9,900	$	55,200	$	65,100
Total	**$**	**108,900**	**$**	**607,200**	**$**	**716,100**

13.Recommendations

ORP has designed a very good exploration programme that intends to cover the steps required to eliminate risk and optimally develop this potential mineral resource by applying modern exploration techniques that were not available during the earlier work some 40 years ago. By conducting exploration in a phased approach the exploration project will have to progresses from the initial exploration and conceptual evaluation stage to the time when a management decision is made to advance to high resolution data sets. Here a number of studies will have to be conducted on the property. Each of these will be based on increasing amounts of data, will require increasing amounts of time to prepare, and will have increasing degrees of accuracy. Reporting of the results of any of these studies will be constructed so as to support a continuum of decisions on whether to proceed to the next phase of the project or not.

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Competent Person's Consent

Pursuant to the requirements of Listing Rules and
Clause 9 of the JORC Code 2012 Edition (Written Consent Statement)

Report name

Independent Geological Report on the Nickel–Copper-PGE sulphide hosted mafic-ultramafic deposits at Kum Kum and surroundings, Warmbad District, Namibia.

Released by Arcadia Minerals Ltd

On the Nickel–Copper-PGE sulphide hosted mafic-ultramafic deposits at Kum Kum and surroundings, Warmbad District, Namibia on which the Report is based, for the period ended 23 March 2021.

March 2021

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Statement

I, Johan Hattingh

confirm that I am the Competent Person for the Report and that:

- I have read and understood the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition).
- I am a Competent Person as defined by the JORC Code 2012 Edition, having twenty two years experience that is relevant to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I am registered with the South African Council for Natural Scientific Professions.
- I have reviewed the Report to which this Consent Statement applies.

I am a full time employee of Creo Design (Pty) Ltd and have been engaged by Arcadia Minerals Ltd to prepare the documentation on the Nickel–Copper-PGE sulphide hosted mafic-ultramafic deposits at Kum Kum and surroundings, Warmbad District, Namibia on which the Report is based, for the period ended 23 March 2021

I have disclosed to the reporting company the full nature of the relationship between myself and the company, including any issue that could be perceived by investors as a conflict of interest.

I verify that the Report is based on and fairly and accurately reflects in the form and context in which it appears, the information in my supporting documentation relating to Exploration Targets, Exploration Results, Mineral Resources.

Consent

I consent to the release of the Report and this Consent Statement by the directors of:

Arcadia Minerals Ltd

Signature of Competent Person

23 March 2021

Date:

South African Council for Natural Scientific Professions

Professional Membership:

#400112/93

Membership Number:

Signature of Witness:

Riaan Zeeman

Print Witness Name and Residence:

Robertson

Appendix I JORC Table 1

Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• ORP collected 23 samples comprising several fragments of discarded core from historical explorations. • Details about the sampling methods and techniques used ORP are not known, because it is not stated in available documents • Measures taken by ORP to ensure sample representivity and the appropriate calibration of any measurement tools or systems used are not known, because this information is not recorded in available documents. • Between 1971 & 1972 Rio Tinto Exploration executed two exploratory reconnaissance drilling campaigns on EPL 5047. During the first campaign 13 holes were drilled and during the second campaign 12 holes. • Rio Tinto Explorations collected 1855 soil samples on EPL 5047. • Rio Tinto Exploration conducted limited geological mapping, litho-geochemical sampling and soil sampling on EPL 7295. • Details about the sampling methods and techniques used by Rio Tinto Exploration on EPLs 5047 & 7295 are not known, because it is not stated in available documents. • During 1972 Falconbridge Ltd collected 1050 stream sediment samples on EPL 6940. • Creo Design conducted a soil geochemistry survey in 2009, during which they collected 64 stream sediment samples on EPL 6940. • Details about the sampling methods and techniques used by Falconbridge and Creo Design on EPL 6940 are not known, because it is not stated in available documents. • It is assumed that industry best practices of the time ("1970s") was used by Rio Tinto & Falconbridge and Creo Design (2009), however, measures taken by to ensure sample representivity and the appropriate calibration of any measurement tools or systems used

Criteria	JORC Code explanation	Commentary
		are not known, because this information is not recorded in available documents.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• No drilling was conducted by ORP. • Rio Tinto conducted 2 diamond drilling campaigns. • During the first campaign 13 holes were drilled, with a total depth of 1620 m for the campaign. • During the second campaign 12 holes were drilled. • Further information about the drilling techniques is not known, because it is not recorded in the available documents.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• No drilling was conducted ORP. • No information about drill sample recovery by Rio Tinto is known, because it is not recorded in the available documents.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• No drilling was conducted by ORP • The ORP grab samples have been logged according to industry standards. • It is assumed that the Rio Tinto core and soil samples have been logged according to industry standards at the time; however the specific logging techniques used are not stated in available documents. • It is assumed that the Falconbridge and Creo Design stream sediment samples have been logged according to industry standards at the time; however the specific logging techniques used are not stated in available documents.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in*	• It is assumed that sampling was undertaken using industry standard practices. • No information is available on sub-sampling techniques and sample preparation, because such procedures are not recorded in available documents.

Criteria	JORC Code explanation	Commentary
	situ material collected, including for instance results for field duplicate/second-half sampling. • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• The ORP grab samples were analysed using multi-acid digestion with ICP-OES analysis at SCI-BA Laboratories in Cape Town, South Africa. • The samples were analyzed for Cu, Cr, Zn, Ni and Co values. • The analytical methods used to analyze the Rio Tinto, Falconbridge and Creo Design samples are not stated in available documents. • It is assumed that industry best practices was used by the laboratories to ensure sample representivity and acceptable assay data accuracy, however the specific QAQC procedures used are not recorded in available documents.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• All samples and data were verified by the project geologist. • Creo reviewed all available sample and assay reports. • The original assay data has not been adjusted • Recording of field observations and that of samples collected was done in field notes and transferred to and electronic data base following the OPR Standard Operational Procedures. • Historic drilling records are incomplete.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• The locations where the mineralized material (discarded core) was originally sampled cannot be stated with any degree of certainty. • The coordinates of the sampling and drilling are not recorded in the available historic reports, thus the locations cannot be plotted on maps with any degree of certainty.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• No information is known about the spacing and distribution of the Rio Tinto drill holes, because it is not stated in available documents. • The soil sampling by Rio Tinto on EPL 5047 was done on a 100 m grid and covered 450 ha in extent. • No information is known about the spacing and distribution of the Rio Tinto sampling on EPL 7295, because it is not stated in available documents. • No information is known about the spacing and distribution of the Falconbridge sampling, because it is not stated in available documents.

Criteria	JORC Code explanation	Commentary
		• The Creo Design stream sediment sampling was done at 1 km^2/ sample. • The lack of data spacing and distribution information, makes it insufficient to establish the degree of geological and grade continuity that is appropriate to delineate a mineral resource. • No information about sample compositing is recorded in available documents.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Orientation of the sampling data in relation to the geological structure is not known, because it is not recorded in available documents.
Sample security	• *The measures taken to ensure sample security.*	• Measures taken to ensure sample security have not been recorded in available documents.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Audits and reviews were limited to the OPR Standard Operational Procedures in as far as data capturing was concerned during the sapling of mineralized outcrop and samples discarded on site during historic drilling campaigns.

Section 2 Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• EPL 5047, EPL 6940 and EPL 7295 are located in the Karas Region, southern Namibia, near the South African border, and approximately 15 km to the north of the Orange River and 100 km south of Karasburg. • The EPLs comprise an area of approximately 78,761 hectares. • ORP currently holds all three EPLs; EPL 5047, EPL 6940 and EPL 7295. • ORP also obtained an Environmental Clearance Certificate on 4 April 2019 from the Ministry of Environmental and Tourism. • A land-use agreement, including access to the property for exploration has been signed with the owners of the farms Norechab

Criteria	JORC Code explanation	Commentary
		130, Kinderzit 132 and Umeis 110.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Rio Tinto Exploration executed two successive exploratory reconnaissance drilling campaigns, soil sampling and a ground-based IP-geophysical investigation on EPL 5047 (1970-1972). • Rio Tinto Exploration conducted reconnaissance geological mapping, litho-geochemical sampling and soil sampling on EPL 7295 during 1973. • Falconbridge Ltd conducted reconnaissance field work, comprised primarily of aerial photographic interpretation, general lithological ground-truthing and stream sediment sampling on EPL 6940 during 1972. • Creo Design conducted a soil geochemistry survey on EPL 6940 during 2009.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• It is magmatic hosted Cu-Ni-(PGE)-(V-Co-Cr-Fe) sulphide deposits. • Mineralization is hosted in a magmatic sill/dyke complex within the tholeiitic mafic-ultramafic rock of the Kum Kum Intrusive Suite
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• The drill hole information regarding log details and data along with information regarding how the intersections are calculated (eg. cut-off grades, minimum width, waste inclusion etc.), as recorded in Rio Tinto in-house reports (Rio Tinto Exploration, 1972), is incomplete and thus not material to the project.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.*	• Information about data aggregation is not stated in the available documents.

Criteria	JORC Code explanation	Commentary
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• No information is available about the relationship between mineralization widths and intercept lengths of the drill holes, because it is not stated in the available documents. • The orientation and relationship to mineralization of the samples taken is not known, because it is not stated in the available documents.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• The appropriate diagrams and tabulations with the available information are supplied in the main report.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• This report has been prepared to present the obvious targets and results of historical and recent exploration activities.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Aeromagnetic survey data of EPL 5047 from the Namibian Geological Survey. • Rio Tinto conducted a ground-based IP-geophysical investigation on EPL 5047.
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Further exploration will be conducted in a phased approach; comprising of multiple studies each based on increasing amounts of data and will have increasing degrees of accuracy. • See sections 12 & 13 for a detailed description of further work to be done.