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High-Resolution Heliborne Magnetic and TDEM Survey

Solitude Lake Project, Savant Lake Area Patricia Mining Division, Ontario 2021

Copper Ridge Exploration Corp. 9285 203B Street Langley, BC, Canada, V1M 2L9



Prospectair Geosurveys

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I. INTRODUCTION

Prospectair conducted a heliborne magnetic (MAG) and time-domain electromagnetic (TDEM) survey for the mineral exploration company Copper Ridge Exploration Corp. on its Solitude Lake Property, located in the Savant Lake area, Patricia Mining Division, Province of Ontario (Figure 1). The survey was flown on June 21st, 2021.



Figure 1: General survey location

One survey block was flown for a total of 249 I-km (Table 1). A total of 3 production flights were performed using Prospectair's Eurocopter EC120B, registration C-GEDI. The helicopter and survey crew operated out of the Sioux Lookout Airport located about 110 km to the southwest of the block (Figure 2). The block is found approximately 40 km to the north of Savant Lake, the closest village.

Table 1: Survey block particulars

Block	NTS Mapsheets	Line-km flown	Flight numbers	Date Flown	
Solitude Lake	052J10	249 l-km	Flt 1 to 3	June 21 ^{sth}	

Figure 2: Survey location and base of operation



The Solitude Lake block was flown with traverse lines at 50 m spacing and control lines spaced every 500 m. The survey lines were oriented N160. The control lines were oriented perpendicular to traverse lines. The average height above ground of the helicopter was 83 m, with the mag sensor and receiver coil at 58 m, and the transmitter loop at 33 m above the ground. The average survey flying speed (calculated equivalent ground speed) was 32.5 m/s. The survey area is covered by forest, lakes and a few wetlands, and the topography is generally gentle, with only a few low-level hills. The elevation is ranging from 402 to 445 m above mean sea level (MSL). The survey block is approximately located to the south of the Fitchie and Solitude Lakes, and to the west of the Neverfreeze Lake. Road 599, which links Savant Lake to the northern community of Pickle Lake, passes less than 3 km to the west of the block. Coordinates outlining the survey block are given in Appendix A, with respect to NAD-83 datum, UTM projection zone 15N. The location of the Solitude Lake Property claims (in red) and of the survey lines is shown on Figure 3. The Property claims numbers covered by the survey are listed in Appendix B.



Figure 3: Survey lines and Solitude Lake Property claims

II. HISTORY

The property is currently in the early stages of exploration and has been historically sparse and has not been the focus of widespread work. The earliest regional-scale mapping efforts were undertaken by the Ontario Department of Mines in 1927 (Moore, 1927). Prospecting in the Savant Lake area revealed several gold occurrences which were subsequently explored from the 1960s onwards.

A rash of activity began in the area north and west of Savant Lake in the 1960s. The iron ore prospect at North Kashaweogama Lake (about 15 km SW of the Property) was discovered in the early 1960s; the strike extension of this iron formation (to within 3 km of the Solitude Lake Property boundary) was drilled by Hanna Mining in 1967. Hanna Mining held claims that came within 600 m of the present Property boundary, to the west, and completed a detailed geologic mapping program on this part of their property in the same year (Hogg 1967). The Hanna mapping program revealed an east-west- striking complex of mafic volcanics interspersed with sulphide and oxide iron formations, "basic tuffs" (likely tectonized/schisted mafic volcanics), greywackes, and chert-and graphite-bearing quartzites. A grab assay of 0.05% Cu is noted on the Hanna maps about 1,500 m west of the Solitude Lake Property boundary.

The first well-recorded exploration within Solitude Lake Property limits dates to 1968 when Canadian Nickel Co (Canico) completed ten drillholes. These were presumably aimed at the east-west conductive and magnetic targets, also visible in later surveys. Many assessment files refer to airborne surveys completed by Canico and/or Inco in "the late 1960s" but the Authors were unable to locate any actual survey documents.

The most promising of the Canico drillholes was #37663 which encountered several sulphidic and graphitic schists containing up to 5% cpy over a core length of 9.6 m (Thomson 1968). Most drillholes encountered zones of semi massive sulphides hosted by iron formations, graphitic shales and volcanics, many of which contained at least trace chalcopyrite, and occasional sphalerite, according to the logs. No assay information is reported in any of the drill logs, nor are any plans or drill sections presented in any of the available assessment files. A later prospectus by Redstone Resources refers to drillhole 37663 (as part of a discussion of properties adjacent to theirs, which covered the western extreme of the current Solitude Lake Property) and states that an assay interval of 0.7% Cu over 70 ft (= 21.3 m) was returned (Paterson 1976). The Authors have been unable to locate the assay information upon which this figure is based.

In the years following the Canico work the central part of the current Solitude Lake Property fell into the ownership of Durnin and Read, local prospectors, while the western, unexplored portion was held by the aforementioned Redstone Resources.

Both of these claim blocks were acquired by Surveymin Ltd in 1976 who then completed ground resistivity and magnetic surveys along 400 ft-separated gridlines covering an area of about 250 Ha, corresponding to the area around the best Canico drillhole and the westward strike extensions. This work outlined a series of broadly east-west conductors, notably the closely spaced "A" and "B" conductors which can be traced over about 2.5 km. The conductors were interpreted to be offset by a late, cross-cutting fault which lines up with local topographic lineaments (Kuryliw 1976). Based on the Canico drilling, the "A" conductor represents a 1-2 m thick massive pyrrhotite horizon within andesites, while the "B" conductor has the strongest coincident magnetic response and may PROSPECTAIR – DYNAMIC DISCOVERY GEOSCIENCE

represent an oxide iron formation. Kuryliw (1976) mentions that outcrops are common in the western portion of the Property, but this had never been comprehensively mapped until the recent program.

In 1978, Surveymin completed two drillholes testing the "B" conductor. Both confirmed the presence of the py-po-cpy-bearing graphite schist; the brecciated texture of the horizon was also noted (Surveymin 1978). The interval in hole S-79-1 contained ">1% chalco" over 40 ft (= 12.2 m) and "minor - >1% chalco" over 97 ft (29.6 m) in hole S-79- 2. The logs indicate that samples were taken but assays are not reported. Lineations were high against the core (80-87°) indicating that these intervals, while not quantitative, are close to true width.

Also in that year, local prospector George Armstrong completed a winter drill program on Neverfreeze Lake. This program was beyond the Solitude Lake Property boundary but the southernmost hole, #6, was within 100 m of the boundary. Sulphidic graphite schists were seen in all six drillholes of which most, including #6, carried "some chalcopyrite".

Maps of the drillhole locations and historic claim fabrics are difficult to reconstruct. No collars were identified in the field during the 2021 program or the Minroc site visit. The Authors caution that the drillhole locations given in this Report come with potential errors in the order of 50 mm.

DDH	Company	Year	Claim	UTME	UTM N	Dip	Azimuth	Length (m)	Reference
34500	Canadian Nickel	1968	653237	673944	5607002	-50	360	53.4	Thomson 1968
37630	Canadian Nickel	1968	657732	675242	5605809	-50	360	38.1	Scheibler 1968
37631	Canadian Nickel	1968	657732	675626	5605703	-50	360	43.6	Scheibler 1968
37632	Canadian Nickel	1968	657735	675606	5605426	-50	360	52.7	Scheibler 1968
37661	Canadian Nickel	1968	653237	674226	5607010	-55	360	53.7	Thomson 1968
37663	Canadian Nickel	1968	653237	674287	5606811	-55	360	57	Thomson 1968
37664	Canadian Nickel	1968	653237	673868	5606425	-50	360	56.4	Sheibler & Fimmerman 1968
37665	Canadian Nickel	1968	653237	673891	5606251	-50	360	53.7	Sheibler & Fimmerman 1968
37666	Canadian Nickel	1968	653237	673850	5606114	-50	360	53.3	Sheibler & Fimmerman 1968
37667	Canadian Nickel	1968	653237	673979	5606805	-50	360	61.6	Thomson 1968
S-79-1	Surveymin	1978	653237	674335	5606884	-50	360	71.6	Surveymin 1978
S-79-2	Surveymin	1978	653237	674213	5606863	-50	360	80.8	Surveymin 1978

Table 2 Table of Drillholes on the Solitude Lake Property

III. GEOLOGIC SETTING

Regional Geology

The Solitude Lake Property lies within the Wabigoon Subprovince, an Archean terrane consisting of greenschist-grade volcanic-sedimentary sequences ("greenstone belts") and voluminous granitoidal batholiths. In age the Wabigoon units range from 2.77 to 2.72 Ga (Sanborn-Barrie & Skulski 2006). To its south, the Wabigoon is in contact with the Quetico Subprovince, which consists of slightly younger (-2.69 Ga; Davis et al 1990) clastic sediments derived in part from Wabigoon units.

To the north of the Wabigoon Subprovince lie the Winnipeg River and English River Subprovinces. Respectively these consist of tonalitic gneisses of 3.2-2.8 Ga, and clastic

sediments of 2.72 Ga derived from the Uchi volcanic sequences further north (Corfu et al 1995). All of the above are components of the Superior Province and were accreted in a series of late Archean orogens. To the east, the Archean terranes are covered by Phanerozoic sequences of the Hudson Bay / James Bay platform. Around Lake Nipigon, the Wabigoon Subprovince is intruded by Proterozoic diabase sills of substantial size and affiliated with the Midcontinent Rift system.

The Solitude Lake Property is situated in the northernmost portion of the Sturgeon Lake Greenstone Belt (SLGB). The SLGB consists of mid- to late-Archean volcanic sequences and minor sedimentary sequences, originating in oceanic terranes and continental margins and is shaped like an elongated "S" surrounded on all sides by late Archean granitoids, the largest of which is the Lewis Lake Batholith which fills the southern lobe of the "S". The bulk of the SLGB, around Sturgeon Lake itself, consists of the South Sturgeon, Handy Lake, Fourbay Lake, Quest Lake and Central Sturgeon mafic to felsic volcanic assemblages of oceanic island arc origin.

The northern portion of the SLGB, around Savant Lake, consists of a basin roughly bounded by the Kashaweogama and Savant Lake Faults. Jutten Group tholeiitic mafic- intermediate volcanics comprise the majority of the northern portion of the Belt. The core of the basin is filled with coarse clastic and chemical sediments of the West Shore Group.



Figure 4: Regional Geology of Solitude Lake

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Local and Property Geology

The Solitude Lake Property lies at the northern extreme of the SLGB, on a tongue of volcanic and sedimentary units stretching east-west (Breaks 1976). This tongue is bounded to the north by a substantial gneissose granodiorite mass (the Lewis Creek Batholith), while the southern edge abuts the granodiorite Tersha Lake Stock. Both bodies of granodiorite are known from drilling on the Property. Based on outcrops a short distance west of the Property, the east-west sequence consists mostly of schistose basalts, with "tuffs" (possibly more strongly deformed mafics), iron formations and gabbros in the centre of the belt (Hogg 1967). Dips are subvertical. These units are attributed to the Jutten Group (Sanborn-Barrie 2000). The strike of this volcanicsedimentary sequence abruptly turns north-northeast close to the eastern edge of the Property. The area around Neverfreeze Lake is underlain by a synform striking north- northeast, with the Jutten Group volcanics on the outer limb, surrounding a band of conglomerates of the Narrows Formation, with West Shore Formation greywackes and iron formations in the core of the synform (Sanborn-Barrie 2000). These units likely form limited subcrop in the eastern extreme of the Property.

Drillhole logs on the Property frequently mention "strongly banded" appearances in the mafic-intermediate "tuffs". Graphite schists, quartz-carbonate vein systems and breccia zones are mentioned frequently. Dykes and lenses of quartz feldspar porphyry are frequently seen; one example appears to fill the gap between the "A" and "B" conductors on the east side of the late cross-cutting fault. Drillholes alternatively mention "silicified zones" and horizons of quartzite; given the brevity of some of the drill log information it is not clear if these refer to the same or different lithologies.

Quaternary deposits of glaciofluvial sand and boulder clay cover much of the Property. Overburden in drillholes can reach depths of 50 feet (about 10 vertical metres).



Figure 5: Property Geology of Solitude Lake

Mineralization

Mineralization, as noted in historic drillholes, consists of disseminated, stringer and semimassive pyrite, pyrrhotite and chalcopyrite, with minor sphalerite, set within graphitic schists, silicified and/or chloritic mafic volcanics, and "quartzites". The best mineralized of these zones are described as being brecciated and welded with quartz- carbonate veining (Surveymin 1978).

Descriptions in the Canadian Nickel drill logs are sparse. The two Surveymin DDH are better logged and contain information such as dip angles (generally 70-80° to core) which is absent in the Canadian Nickel logs. The log for DDH S-79-1 mentions 40 ft of ">1% chalco" alongside other sulphide mineralization; the true width of this interval would therefore be in the region of 11 m. Paterson (1976) mentions that drillhole 37663 was assayed, returning an interval of "0.7% copper over a core length of 70 feet" (21 m). The Authors have not been able to corroborate this figure in any other historic reports. In the Ontario Mineral Deposit Inventory this copper occurrence is referred to as the "Armstrong Option (1978)".

"Trace pyrite" is mentioned, but not sampled, within the feldspar porphyry in S-79-2 (Surveymin 1978). This, and any other similar units which may be present on the Property, should be considered a potential target for gold mineralization.

The Property is at too early a stage of exploration for any meaningful comments to be made regarding the grade, tenor, strike length or vertical extent of the mineralization. The Authors also caution that the width figures described above are based on a very limited amount of drilling.

IV. DEPOSIT TYPES

The Solitude Lake Property is considered fertile for Volcanogenic Massive Sulphide (VMS) and orogenic gold, or greenstone-hosted gold deposits.

Volcanogenic Massive Sulphide (VMS)

VMS deposits typically consist of semi massive to massive lenses of sulphide, constrained by stratigraphy and spatially associated with vein stockworks and distinctive alteration patterns, including zones of carbonate, silica, chlorite, sericite and potassic alteration. VMS deposits are widely understood to be formed by hydrothermal activity in marine environments with extensional tectonic settings and are frequently found in Archean "greenstone" terranes hosted within mafic-felsic volcanic and/or volcanic-sedimentary cycles. Major sulphides present include pyrite, pyrrhotite, sphalerite and galena in the lenses, and chalcopyrite is typically present within the stockwork "pipe" or "feeder zone" in the footwall. The hangingwall is often accompanied by horizons of chert or iron formation. These types of deposits are significant economic sources of zinc, lead, silver and copper. Following the original deposition, later tectonic and hydrothermal activity may remobilize part of the mineralization.

Known zinc and copper occurrences, consisting of "VMS style" mineralization are well known and well studied in the southern portion of the Sturgeon Lake Greenstone Belt (the Mattabi, Lyon Lake, F Group and Sturgeon Lake mines, all about 85 km south of the Property), as well as the Sabin deposit, 35 km south of the Property.

The Sturgeon Lake VMS deposits, combined from 1970 to 1991, produced a total of 18,663,000 tonnes with average grades of 8.06% Zn, 1.09% Cu, 119.6 g/t Ag and 0.5 g/t Au (Franklin 1995).

Significant examples of VMS deposits elsewhere include the Kidd Creek deposit near Timmins, Ontario, as well as the Noranda and Matagami camps in Quebec. "Gold-rich VMS" deposits form a distinct subclass, an example being LaRonde in Cadillac, Quebec.

Orogenic Gold

Orogenic gold deposits are common in Archean greenstone terranes of the Canadian Shield. These deposits generally consist of a system of auriferous quartz-carbonate veins, which

have a strong spatial association with crustal-scale, compressional or transpressional shear zones with mixed brittle-ductile expression (or second or third order deformation zones). Further, there is commonly an association with particular lithologies, which are theorized to create favourable rheological or chemical environments for vein emplacement and/or gold precipitation. In many camps there is an affinity with porphyritic intermediate-felsic intrusives, iron formations and "Timiskaming-type" conglomerates; in the Sturgeon Lake area a common association is with porphyry sills and horizons of iron formation.

The shear zone is generally theorized to act as a pathway for hydrothermal fluids. These fluids are then emplaced as veins in dilated portions of ductile-deformed units, in brecciated portions of more brittle units, or in pore spaces of more porous units. Gold, which is often in solution with sulphur or arsenic in these fluids, will then be precipitated wherever the sulphur or arsenic can react with minerals in the country rock. Orogenic gold deposits can have highly complex geometries due to the intricate interplay of faults and favourable host units, continued tectonic activity on the shear zone after the emplacement of the mineralized veins, and disruption by later tectonic events.

The SLGB is home to one past producing gold mine, the St Anthony mine on Sturgeon Lake's North Arm. St Anthony produced 63,310 oz Au in several periods from 1919 to 1942 (Evans 2009). Here, and at the King Bay gold occurrences in central Sturgeon Lake, gold is found in coarse, native form in dense stockworks of blue quartz associated with porphyry sills within chlorite and sericite altered mafic volcanics.

Major examples of iron formation associated orogenic gold deposits from elsewhere in northwest Ontario include the Musselwhite mine north of Pickle Lake, and the historic Central Patricia and Dona Lake mines in Pickle Lake.

Magmatic Massive Sulphide (MMS)

While less likely, the potential for the Solitude Lake property to host magmatic massive sulphide deposits should not be discounted, particularly given the relative lack of intensive exploration in the property area. MMS deposits are primary sulphide deposits which form pseudo stratigraphic horizons of massive, net-textured, stringer and/or disseminated sulphide within voluminous layered intrusive bodies, deposited as a result of their fractional crystallization. These deposits are major sources of copper, nickel, titanium, vanadium, chromium and platinum-group elements.

Major examples of MMS deposits from Archean terranes in Ontario include the Texmont, Langmuir, Alexo and Montcalm deposits, all in the Timmins-Cochrane area.

The metamorphic reworking of Archean MMS deposits can result in the remobilization of part of the mineralization, and re-emplacement of copper sulphides in veins and shears. This is theorized to have occurred at the Thierry deposit, north of the Property near Pickle Lake (Patterson & Watkinson 1984). Given the paucity of detailed geologic information, it is possible that the chalcopyrite mineralization at Solitude Lake has been remobilized from a magmatic source.

Due to the lack of data and poor quality of historic geophysical work on the property, a modern airborne survey would give clarity to geophysical anomalies which would subsequently allow for high-confidence target generation.

V. SURVEY EQUIPMENT

Prospectair provided the following instrumentation for this survey.

Airborne Magnetometers

Geometrics G-822A

Both the ground and heliborne systems used a non-oriented (strap-down) optically-pumped Cesium split-beam sensor. These magnetometers have a sensitivity of 0.005 nT and a range of 15,000 to 100,000 nT with a sensor noise of less than 0.02 nT. The heliborne sensor was mounted in a bird made of non-magnetic material located 25 m below the helicopter when flying. Total magnetic field measurements were recorded at 10 Hz in the aircraft. The ground system was recording magnetic data at 1 sample every second.

Time-Domain Electromagnetic Transmitter and Receiver

ProspecTEM

Prospectair Geosurveys significantly modified and improved the *Emosquito II* that was built by THEM Geophysics of Gatineau (Québec) to develop ProspecTEM. It is a powerful lightweight system adapted for small size helicopters and easy manoeuvrability enabling the system to be flown as close to the ground as safely possible and ensuring maximum data resolution. Advanced signal processing technique and a full processing package was developed in house to optimize the ProspecTEM data. The technical specifications are listed below in Table 2.

ProspecTEM system employs a transient or time-domain electromagnetic transmitter that drives an alternating current through an insulated electrical coil system. The towing bridle is constructed from a Kevlar rope and multi-paired shielded cables. It is attached to the helicopter by a weak link assembly. An onboard harness with outboard connectors mounted on a plate allows for quick disconnection or connection of the exterior elements. The system uses a 4 KW generator and a large condenser to transmit alternating 2.75-ms half sine pulses with intervening off-times of 13.916 ms electric pulse, 60 pulses per second.

The current in the coil produces an electromagnetic field. Termination of the current flow is not instantaneous but occurs over a very brief period of time (a few microseconds) known as the ramp time, during which the magnetic field is time-variant. The time-variant nature of the primary electromagnetic field, which propagates downward and outward into the subsurface, induces eddy currents which characteristics are governed by rocks conductivity distribution. These eddy currents generate a secondary electromagnetic field, in accordance with Faraday's Law. This secondary field immediately begins to decay in the process. Measurements of the secondary field are made only during the time-off period by a vertical component receiver located almost halfway between the helicopter and the <u>PROSPECTAIR – DYNAMIC DISCOVERY GEOSCIENCE</u>

transmitter loop. It is placed with the magnetometer taped to a horizontal boom which supports the receiving coils tear-drop shape vessel at its end. The boom has an elastic suspension. A proprietary suspension system protects the orthogonal coils assembly and limits the total field excursions. The tear-drop vessel acts as a vane and maintains the mast in the line of flight.

Depth of investigation depends on the time interval after shutoff of the current, since at later times the receiver is sensing eddy currents at progressively greater depths. The intensity of the eddy currents at specific times and depths is determined by the bulk conductivity of subsurface rock units and their contained fluids.

Item	Specification
Transmitter:	
Loop Diameter:	5.6 meters
Current Waveform:	Half-Sine
Turns:	2
Pulse Length	2.75 ms
Frequency	30 Hz
Loop Area	25 m²
Peak Current	3000A
Tow Cable Length	65 meters
Self-Powered	13HP Honda coupled with 28 Volts Alternator
Receiver:	
Coils axis	Z
Configuration	Coaxial (Z)
Two channels	Current and Z
Max Sampling rate	1000 points per half cycle at 90 Hz
Survey sampling rate	1000 per half cycle at 30Hz
Sampling	Full waveform
Gates	Programmable
On time signal	Recorded
Mechanical:	
Maximum survey speed:	120 km per hour
Transmitter height	30 meters AGL
Receiver height	55 meters
Weight (Total)	200 kg

Table 3: Technical specifications of the ProspecTEM Time-Domain system



Figure 6: ProspecTEM system configuration

Real-Time Differential GPS

Omnistar DGPS

Prospectair uses an OmniStar differential GPS navigation system to provide real-time guidance for the pilot and to position data to an absolute accuracy of better than 5 m. The *Omnistar* receiver provides real-time differential GPS for the Agis on-board navigation system. The differential correction data set was relayed to the helicopter via the appropriate Omnistar network satellite for the survey location. The receiver optimizes the corrections for the current location.

Airborne Navigation and Data Acquisition System *Pico-Envirotec AGIS-XP system*

The Airborne Geophysical Information System (AGIS-XP) is advanced, software driven instrument specifically designed for mobile aerial or ground geophysical survey work. The AGIS instrumentation package includes a GPS based navigation system, real-time flight path information that is displayed over a map image of the area, and reliable data acquisition software. Thanks to simple interfacing, the radar and barometric altimeters, the TDEM system and the Geometrics magnetometer are easily integrated into the system and digitally recorded. Automatic synchronization to the GPS position and time provides very close correlation between data and geographical position. The AGIS is equipped with a software suite allowing easy maintenance, upgrades, data QC, and project and survey area layout planning.

Magnetic Base Station

GEM GSM-19

A GEM GSM-19 Overhauser magnetometer, a computer workstation and a complement of spare parts and test equipment serve as the base station. Prospectair establish the base station in a secure location with low magnetic noise. The GSM-19 magnetometer has resolution of 0.01 nT, and 0.2 nT accuracy over its operating range of 20,000- to 100,000 nT. The ground system was recording magnetic data at 1 Hz.

Altimeters

Free Flight Radar Altimeter

The Free Flight radar altimeter measures height above ground to a resolution of 0.5 m and an accuracy of 5% over a range up to 2,500 ft. The radar altimeter data is recorded and sampled at 10 Hz.

Prospectair Digital Barometric Pressure Sensor

The barometric pressure sensor measures static pressure to an accuracy of \pm 4 m and resolution of 2 m over a range up to 30,000 ft above sea level. The barometric altimeter data are sampled at 10 Hz.

Survey helicopter

Eurocopter EC120B (registration C-GEDI)

The survey was flown using Prospectair's EC120B helicopter that handles efficiently the equipment load and the required survey range. Table 3 presents the EC120B technical specifications and capacity, and the aircraft is shown in Figure 5.

Table 4: Technical specifications of the EC120B Eurocopter helicopter

Item	Specification
Powerplant	One 376kW (504hp) Turbomeca Arrius 2F
Rate of climb	1,150 ft/min
Cruise speed	223 km/h – 120 kts
Service ceiling	17,000 ft
Range with no reserve	710 km
Empty weight	991 kg
Maximum takeoff weight	1,715 kg

Figure 7: C-GEDI Eurocopter EC120B



VI. SURVEY SPECIFICATIONS

Data Recording

The following parameters were recorded during the course of the survey:

In the helicopter:

- GPS positional data: time, latitude, longitude, altitude, heading and accuracy (PDOP) recorded at intervals of 0.1 s.
- > Total magnetic field: recorded at intervals of 0.1 s.
- > Terrain clearance as measured by the radar altimeter at intervals of 0.1 s.
- > Z and Current TDEM channels at 90000Hz.

At the base and remote magnetic ground stations:

- Total magnetic field: recorded at intervals of 1 s.
- > GPS time recorded every 1 s to synchronize with airborne data.

Technical Specifications

The data quality control was performed on a daily basis. The following technical specifications were adhered to:

- Height 85m target terrain clearance for the MAG-TDEM survey except in areas where Transport Canada regulations prevent flying at this height, or as deemed necessary by the pilot to ensure safety. Traverse lines and control lines must be flown at the same altitude at points of intersection; the altitude tolerances are limited to no more than 30 m difference between traverse lines and control lines.
- Airborne Magnetometer Data The noise envelope not to be exceeded 0.5 nT more than 500 m line-length without a reflight.
- Diurnal Specifications A maximum tolerance of 5.0 nT (peak to peak) deviation from a long chord of one minute at the base station.
- *EM data* No spikes on Z channel and constant current confirmed.
- Flying Speed The average ground speed for the survey aircraft shall be 120 kph. The acceptable high limit is 160 kph over flat topography.
- *Radar Altimeter* minimal accuracy of 5%, minimum range of 0-2500 m.
- Barometer Absolute air pressure to 0.1 kPa.
- Flight Path Following Maximum deviation of 30% of line spacing allowed over a maximum line distance of 300 m.

VII. SYSTEM TESTS

Magnetometer System Calibration

The survey configuration using a bird towed 25 m below any magnetic piece of the helicopter allows the simplification of the magnetic calibration requirement. Consequently, heading error and aircraft movement noise was considered negligible and no correction was applied to the data.

Instrumentation Lag

The data lag is a combination of two factors: 1) the time difference between when a reading is sensed, and when that value is recorded by the acquisition system, and 2) the time taken for the sensor to arrive at the location of the GPS antenna. The second factor is defined by the physical distance between the GPS antenna and any given sensor, and the speed of the aircraft. The total magnetic lag value for the AGIS acquisition system has been calculated to 0.19 s for this survey. The TDEM lag has been calculated to 1.11 s.

VIII. FIELD OPERATIONS

The survey operations were conducted out of the Sioux Lookout Airport on June 21st, 2021. The MAG-TDEM data acquisition required 3 flights. At the end of the production day, the data were sent to Dynamic Discovery Geoscience's office via internet. The data were then checked for Quality Control to ensure they fulfilled contractual specifications. The full dataset was inspected prior to provide authorization for the field crew to demobilize. The GEM-19 magnetic base station was set up in a magnetically quiet area close to the block, at latitude 50.5898783°N, longitude 90.6075191°W. The survey pilot was Guy Labelle and the survey system technician was Pascal St-Denis Mercier.

Figure 8: Example of a magnetic base station setup



IX. DIGITAL DATA COMPILATION

Data compilation including editing and filtering, quality control, and final data processing was performed by Joël Dubé, P.Eng. Processing was performed on high performance desktop computers optimized for quick daily QC and processing tasks. Geosoft software Oasis Montaj version 9.10 and Matlab R2018a were used.

Magnetometer Data

The airborne magnetometer data, recorded at 10 Hz, were plotted and checked for spikes and noise on a flight basis. A 0.19 second lag correction was applied to all data to correct for the time delay between detection and recording of the airborne data.

Ground magnetometer data were recorded at 1 sample per second and interpolated by a spline function to 10 Hz to match airborne data. Data were inspected for cultural interference and edited where necessary. Some low-pass filtering was deemed necessary on the ground station magnetometer data to remove minor high frequency noise. The diurnal variations were removed by subtracting the ground magnetometer data to the airborne data and by adding back the average of the ground magnetometer value.

The levelling corrections were applied in several steps. First of all, a correction for altitude was applied by multiplying the First Vertical Derivative of the pre-levelled data by the difference between the actual survey altitude and the average survey altitude. Standard levelling corrections were then performed using intersection statistics from traverse and tie lines. After statistical levelling was considered satisfactory, decorrugation was applied on the data to remove any remaining subtle non-geological features oriented in the direction of the traverse lines.

Once the Total Magnetic Intensity (TMI) was gridded, its First Vertical Derivative (FVD) and Second Vertical Derivative (SVD) were calculated to enhance narrower geological features. Finally, the component of the normal Earth's magnetic field, described by the International Geomagnetic Reference Field (IGRF), has been removed from the TMI to yield the residual TMI. This ensures that the very long wavelength signal within the block is indeed originating from the local geology and not from the Earth's expected regional gradient.

In order to enhance the subtle magnetic features some more, the Tilt Angle Derivative (TILT) was also computed for this project.

It has been shown that it is possible to use the Tilt Angle Derivative to estimate both the location and depth of magnetic sources (Salem et al., 2007).

When two body of different magnetic susceptibility are in contact, the vertical and horizontal gradients along a horizontal line perpendicular to the vertical contact are governed by the following equations:

 $\delta M/\delta h=2KFc(z_c/(h^2+z_c^2))$ $\delta M/\delta z=2KFc(h/(h^2+z_c^2))$

where K = susceptibility contrast F = magnetic field's strength c = 1-cos²(field Inclination)sin²(field Declination) h = location along an horizontal axis perpendicular to the contact z_c = contact depth $\delta M/\delta h$ = sqrt($(\delta M/\delta x)^2$ + $(\delta M/\delta y)^2$)

The Tilt Angle (θ) is defined as $\theta = \tan^{-1}[(\delta M/\delta z)/(\delta M/\delta h]$

By substitution of the gradients we get θ = tan⁻¹ [h/z_c]

This has two main implications for any given anomaly:

- 1- The 0° angle line is located directly above the contact between a magnetic source and the surrounding rock. This allow for accurate estimation of source location.
- 2- The distance between the 0° and the +45° lines as well as the distance between the -45° and the 0° lines are equal to the depth of the source at the contact. This allow for a direct estimation of the depth of the source of the anomaly. The depth estimated with this method is actually the distance between the magnetic sensor and the top of the source. Knowing that the sensor was 58 m above the ground in average enables direct depth estimates.

In practice, the signal originating from multiple sources at different depth within a same area will cause juxtaposition of the Tilt Angle values, and complicate location and depth estimation. Nevertheless, the method remains an excellent tool for rapid assessment of sources characteristics, without the need for complex assumptions to be made or heavy computer requirements, as is the case with 3D Euler deconvolution or 3D data inversions.

Radar Altimeter Data

The terrain clearance measured by the radar altimeter in metres was recorded at 10 Hz. The data were filtered to remove high frequency noise using a 1 sec low pass filter. The final data were plotted and inspected for quality.

Positional Data

Real time DGPS correction provided by Omnistar was applied to the recorded GPS positional data.

Positional data (Lat, long, UTM X, UTM Y, geoid height) were recorded at 10 Hz sampling rate and all data processing was performed in the WGS-84 datum. The delivered data are provided in X, Y locations in UTM projection zone 15 North, with respect to the NAD-83 (CSRS) datum. Altitude data were initially recorded relative to the GRS-80 ellipsoid, but are delivered as orthometric heights (MSL elevation).

Terrain Data

Terrain elevation data (also referred to as digital elevation model, or DEM) are computed from the altitude of the helicopter, given by DGPS recordings, and the radar altimeter data.

TDEM Data

The PicoEnvirotec EM Digital Acquisition System records the vertical component (Z) of the receiver coils at a sampling rate of 90000Hz. There are 30 full cycles (60 half cycles) of the full waveform (Tx ON and OFF time) every second.

The first data manipulation involves a stacking procedure where each half cycle is weighted with respect to the previous cycle (\pm ¼), the next cycle (\pm ¼) and its own value (\pm ½). The positive and negative signs of the respective multiplication coefficients are used to make positive all negative half cycles. The next step is the half cycle averaging corresponding to the desired sampling rate. In the present case, from the 60 stacked positive half cycles per second, 6 consecutive half cycles are averaged to produce one sample every 0.1 sec.

The windowing settings for the 40 different channels are presented in Table 4. Channels 1 to 11 correspond to the ON-time measurements and channels 12 to 40 correspond to the OFF-time. Channel 12 isn't used for interpretation and mapping as some 'ramp-off' effects remain that alters the data quality. Each window is filtered with a median filter removing spikes and with a finite impulse response (FIR) selective filter of the 251th order improving the signal to noise ratio. An average lag correction of 1.11 sec was applied to the data after being empirically determined by flying a sharp anomaly in two opposite direction.

Channel	Starting	Width	Pulse	Channel	Starting	Width	Pulse
#	time	(msec)		#	time	(msec)	
	(msec)				(msec)		
1	0.16667	0.01667	ON	21	3.15000	0.53333	OFF
2	0.25000	0.01667	ON	22	3.26667	0.53333	OFF
3	0.33333	0.01667	ON	23	3.40000	0.53333	OFF
4	1.30000	0.01667	ON	24	3.40000	1.10000	OFF
5	1.31667	0.01667	ON	25	3.45000	1.10000	OFF
6	1.33333	0.01667	ON	26	3.65000	1.10000	OFF
7	2.58333	0.01667	ON	27	3.88333	1.10000	OFF
8	2.66667	0.01667	ON	28	4.13333	1.10000	OFF
9	2.80000	0.08333	ON	29	4.43333	1.10000	OFF
10	2.81667	0.08333	ON	30	4.76667	1.10000	OFF
11	2.83333	0.08333	ON	31	5.16667	1.10000	OFF
12	2.85000	0.16667	RAMP	32	5.20000	2.20000	OFF
13	2.86667	0.18333	OFF	33	5.55000	2.20000	OFF
14	2.86667	0.25000	OFF	34	6.13333	2.20000	OFF
15	2.86667	0.36667	OFF	35	6.78333	2.20000	OFF
16	2.91667	0.36667	OFF	36	7.51667	2.20000	OFF
17	2.91667	0.53333	OFF	37	8.36667	2.20000	OFF
18	2.95000	0.53333	OFF	38	9.33333	2.20000	OFF
19	3.00000	0.53333	OFF	39	10.4500	2.20000	OFF
20	3.03333	0.53333	OFF	40	11.7000	2.20000	OFF

Table 5: Setting used in the windowing of the full waveform

As for the magnetic data, levelling corrections were applied to the TDEM data using intersection statistics from traverse and tie lines, as well as light decorrugation based on gridded information, in order to remove base line offsets. The levelled TDEM data are delivered in the database.

Gridding

The magnetic, early off-time TDEM (channel 13), mid off-time TDEM (channel 20), and late off-time TDEM (channel 27) data were interpolated onto a regular grid using a bi-directional gridding algorithm to create a two-dimensional grid equally incremented in x and y directions.

The final grids were created with 10 m grid cell size, appropriate for the survey lines spaced at 50 m. Traverse lines were used in the gridding process.

X. RESULTS AND DISCUSSION

Magnetic data

The Residual Total Magnetic Intensity (TMI) of the Solitude Lake block, presented in Figure 7 together with TDEM anomalies, is relatively active and varies over a range of 2,270 nT, with an average of -129 nT and a standard deviation of 196 nT.

The survey block can be subdivided in two distinct domains based on their magnetic responses. The first domain, which dominates most of the surveyed area, occurs as a wide central band depicting a "flattened U" or "banana" shape, with one end pointing to the northwest tip of the block and the other end pointing towards the northeast. The magnetic signal seen in this domain is very dynamic and organized as series of deformed linear magnetic features characteristic of alternating sequences of mafic volcanics with sedimentary or intermediate to felsic volcanic rocks, with possibly some small size intrusive stocks locally. The second domain is seen at the southwest and southeast tips of the block, as well as along its northern edge, sandwiching the first domain. It is characterized by mostly homogeneous magnetic textures and decreased signal variability, typical of large size felsic to intermediate intrusions or of areas dominated by sedimentary rocks. The strongest anomalies of the survey are found at the south end of the block and possibly relate to iron formations or ultramafic rocks. Stronger anomalies are best seen on Figure 8 which shows the residual TMI data with a linear color distribution. Other weaker anomalies that are still relatively strong are all located within the central magnetic domain and are likely associated to mafic volcanic or intrusive rocks.

Most magnetic lineaments are found within the central magnetic domain. They are generally trending WNW-ESE in the western part of the block, and are gradually changing to a NE-SW orientation towards the east, or even to a NNE-SSW strike at the northeast corner of the block. Several lineaments are locally curved, and even possibly heavily folded locally, mostly in the central part of the surveyed area, attesting that the area underwent strong deformation events in the past. In general terms, magnetic lineaments are related to rock formations that are enriched in magnetic minerals (magnetite and/or pyrrhotite).

Throughout the block, it is possible to detect structural features offsetting observed magnetic lineaments and causing abrupt interruption or changes of the magnetic response. These features are typically caused by faults, fractures and shear zones. If they are thought to be favorable structures in the exploration context of the Solitude Lake project, they should be paid particular attention and should be the object of a comprehensive structural interpretation, which is beyond the scope of this report.

Shorter wavelength anomalies are greatly enhanced on the FVD (Figure 9) and on the TILT (Figure 10) products. Since the FVD attenuates longer wavelength anomalies, and the TILT enhances very weak amplitude anomalies, they are the preferred products for structural interpretation. As well, a joint analysis of these results with the topography data (Figure 11) can help in the interpretation process of geological structures.



Figure 9: Total magnetic intensity with equal area color distribution and TDEM anomalies



Figure 10: Total magnetic intensity with linear color distribution and TDEM anomalies











Figure 13: Digital elevation model and TDEM anomalies

Time-Domain Electromagnetic data

There is no automatic picking program involved in the interpretation procedures of the ProspecTEM system. Identification of the EM anomalies is made from the EM profiles. Most of the time, the location of anomalies is based on the assumption that the causative source is a somewhat thick or flat lying conductor, which would generate an anomaly mostly centered over the conductor (Figure 12, A). It is important to understand that some other conductive bodies could generate a strong EM response that is offset from the mass centre of the source. For instance, a thin conductor with a steep dip would generate an "M" shape anomaly (Figure 12, B), with the stronger shoulder on the dip side. Therefore, caution must be taken when planning work at the location of an anomaly. It is recommended to combine other available geoscientific information and to review the EM anomaly location before to investigate an anomaly of interest.

Figure 14: Example of EM response over thin conductors



Thin conductor, 30° dip

Thin conductor, vertical

The classification of anomalies is based on the calculated time constant (TAU). The EM time constant is a general measure of the speed of decay of the electromagnetic response and reflects the "conductance quality" of a source. The decay rate of the secondary EM field recorded by the TDEM system is a function of the conductivity and geometry of conductors detected. A weak conductor, such as shallow conductive overburden, will show rapid response decay, thus a small value of the time constant. Conversely, a good conductor, such as a graphite or sulphide orebody, will have a response decaying slowly, relating to a large TAU value. The TAU is calculated using proprietary software and is derived from the best exponential least squares fit for channels Z13 to Z27. Calculating TAU for low amplitude anomalies that have their first off-time channel (channel 13) amplitude smaller than 75 nT/s can yield unreliable results given the weak response. As well, in some rare cases, despite stronger response of the first off-time channel, noise in the mid to late channels can cause the TAU estimation to be unreliable. No best fit were tried on these noisy or low signal anomalies and an arbitrary minimal time constant of 0.10 msec was attributed. Moreover, the resulting exponential best fit of the decay curve is extrapolated to the zero delay time, which can be used to compare the amplitude of anomalies.

On the Solitude Lake block, 539 EM anomalies are identified, classified and listed (Appendix C). All marginal/weak anomalies with TAU lower than 0.25 msec are included in a group represented by an empty circle on the anomaly map. In total, 46 anomalies are reported in this class. The remaining anomalies are classified in 4 other groups, with time-constant considered small (0.25 to 0.50 msec, 205 anomalies), intermediate (0.50 to 0.75 msec, 270 anomalies), strong (0.75 to 1.00 msec, 18 anomalies) and very strong (over 1.00 msec, 0 anomalies). These anomalies are reported on all the figures of this section, and the symbols used are similar to the legend on the maps. The early off-time map (Figure 13) provides a good overview of the TDEM response amplitude distribution.

EM anomalies seen in the area are characteristic of graphite and sulphide conductors. They are most often narrow, of variable amplitude, and usually with larger TAU values compared to typical conductive overburden EM responses, which is denoting better quality conductors. The orientation of conductive lineaments is clearly aligned with magnetic trends, which suggests that most conductive sources are indeed embedded in the bedrock. Furthermore, many conductive lineaments actually show a positive correlation to magnetic lineaments (Figures 7 to 10), which indicates that sulphides (including pyrrhotite), or possibly magnetite, are likely to compose at least part of the conductive sources. The most magnetic conductors are likely related to magnetite rich horizons, with possibly some contribution from sulphides occurrences, while the less magnetic ones could pertain to mineralized veins or smaller size sulphides occurrences with limited amounts of pyrrhotite. These conductors detected by the survey can be considered of interest for exploration in the Solitude Lake exploration context. This being said, some of the isolated and marginal anomalies, especially those found in topographic depressions, could also relate to local occurrences of conductive overburden.



Figure 15: Early off-time TDEM response and anomalies

XI. WORK RECOMMENDATION

The discussion on the geological implication of the survey data is minimal in this report. A more general study including information regarding the local geology and all other geoscience data available in the area would be necessary to extract the full potential of the geophysical data and help to confirm and prioritize exploration targets.

EM anomalies detected by this survey could be investigated with basic ground prospection methods at first. If interesting results are obtained, or if overburden proves too thick for prospecting, it is recommended to use ground resistivity/IP or EM techniques, depending on the nature of the sources, to accurately define targets for stripping and/or drilling. The implementation of a geochemical soil sampling program or of a till sampling program could also help further prioritize outlined anomalies.

In addition, given the geological context that may be considered prospective for gold mineralization, it is also recommended to use the newly acquired magnetic data, together with known local geological information, to carry out a comprehensive structural interpretation. In the case of gold lode deposits, the geophysical signature is often very subtle given the absence of marked physical properties contrast. The best approach is rather indirect, and consists in looking for geophysical signatures typical of faults and deformation structures, where gold bearing dilation zones can develop. The recommended structural interpretation work could help identifying structures that could then be investigated further.

XII. FINAL PRODUCTS

Digital line data

The Geosoft database is provided with the channels detailed in Table 5.

Table 6: MAG-TDEM line data channels

No.	Name	Description	Units
1	UTM_X	UTM Easting, NAD-83, Zone 15N	m
2	UTM_Y	UTM Northing, NAD-83, Zone 15N	m
3	Lat_deg	Latitude in decimal degrees (WGS-84)	Deg
4	Long_deg	Longitude in decimal degrees (WGS-84)	Deg
5	GPS_Z	Helicopter altitude (w.r.t. MSL)	m
6	Gtm_sec	Second since midnight GMT	Sec
7	Radar	Ground clearance given by the radar altimeter	m
8	DEM	CDED Digital Elevation Model (w.r.t. MSL)	m
9	Terrain	Digital Elevation Model calculated from GPS and Radar	m
10	Mag_Raw	Raw magnetic data	nT
11	Mag_Lag	Lagged magnetic data	nT
12	Gnd_mag	Base station magnetic data	nT
13	Mag_Cor	Magnetic data corrected for diurnal variation	nT
14	TMI	Fully levelled Total Magnetic Intensity	nT
15	TMIres	Residual TMI (IGRF removed)	nT
16	OFF_TIME	Amplitude of Off-time channels (13 to 36)	nT/s

Maps

All maps are referred to NAD-83 in the UTM projection Zone 15 North, with coordinates in metres. Maps are at a 1:10,000 scale. They are provided in PDF, PNG, Geotiff and Geosoft MAP formats for the products detailed in Table 6.

Table 7: Maps delivered

No.	Name	Description
1	DEM+FlightPath_Claims	Digital Elevation Model with flight path and properties claims
2	TMI	Residual Total Magnetic Intensity
3	FVD	First Vertical Derivative of the TMI
4	TILT	Tilt Angle Derivative of the TMI
5	Early_OffTime	Early_Off-Time TDEM response (Channel 13)
6	TDEM_Profiles+Anomalies	TDEM profiles with anomalies
7	TILT +TDEM_Anomalies	Tilt Angle Derivative of the TMI with TDEM anomalies

Grids

All grids are referred to NAD-83 in the UTM projection Zone 15 North, with coordinates in metres. Grids are provided in Geosoft GRD format, with a 10 m grid cell size, as well as in the Geotiff format for the products listed in Table 7.

Table 8: Grids delivered

No.	Name	Description	Units
1	DEM	CDED Digital Elevation Model	m
2	TERRAIN	Digital Elevation Model measured by helicopter	m
3	TMI	Total Magnetic Intensity	nT
4	FVD	First Vertical Derivative of TMI	nT/m
5	SVD	Second Vertical Derivative of TMI	nT/m²
6	TMIres	Residual TMI (IGRF removed)	nT
7	TILT	Tilt Angle Derivative of the TMI	Degree
8	Early_Off-Time	Early Off-Time TDEM response (Channel 13)	nT/s
9	Mid_Off-Time	Mid Off-Time TDEM response (Channel 20)	nT/s
10	Late_Off-Time	Late Off-Time TDEM response (Channel 27)	nT/s

Project report

The report is submitted in PDF format. The anomaly table presented in annex is also provided as a separate Excel spreadsheet.

Respectfully submitted,

FESSIO I. P. OUBL CENEC

Joël Dubé, P.Eng. July 14th 2021

XIII. REFERENCES

- Hogg, N; 1967: Geological Report on the Lucky Lake Group of Claims, Miniss River Project. Hanna Mining Company. AFRI document 52J10SE9226
- Kuryliw, C; 1976: Report on an Electromagnetic (EM-17) Survey, Solitude Lake Group. Surveymin Ltd. AFRI document 52J10SE0012
- Moore, E. S., 1927: Savant Lake Gold Area, Map 37J. AFRI document ARM37J
- Paterson, N R; 1976: Statement of Material Facts, Redstone Resources Inc. AFRI document 52J10SE0014
- Surveymin, 1978: Diamond drilling, area of Solitude Lake. AFRI document 52J10SE0003
- Thomson, J; 1968: Diamond drill logs. Canadian Nickel Co. AFRI document 52J10SE0007

XIV. Statement of Qualifications

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I, Joël Dubé, P.Eng., do hereby certify that:

- 1. I am a Professional Engineer specialized in geophysics, President of Dynamic Discovery Geoscience Ltd., registered in Canada.
- 2. I earned a Bachelor of Engineering in Geological Engineering in 1999 from the École Polytechnique de Montréal.
- 3. I am an Engineer registered with the Ordre des Ingénieurs du Québec, No. 122937, and a Professional Engineer with Professional Engineers Ontario, No. 100194954 (CofA No. 100219617), with the Association of Professional Engineers and Geoscientists of New Brunswick, No. L5202 (CofA No. F1853), with the Association of Professional Engineers of Nova Scotia, No. 11915 (CofC No. 51099), with Engineers Geoscientists Manitoba, No. 43414. (CofA No. 6897), with Professional Engineers & Geoscientists Newfoundland & Labrador, No. 10012 (PtoP No. N1134) and with the Northwest Territories Association of Professional Engineers & Geoscientists, No. L4447 (PtoP No. P1414).
- 4. I have practised my profession for 22 years in exploration geophysics.
- 5. I have not received and do not expect to receive a direct or indirect interest in the properties covered by this report.

Dated this 14th day of July, 2021

J. P. OUBL 100194954

Joël Dubé, P.Eng. #100194954

XV. Appendix A – Survey block outline

Solitude Lake Block

Easting	Northing
676143	5605054
674811	5605010
674796	5605473
674353	5605458
674338	5605922
673453	5605892
673437	5606356
671668	5606297
671622	5607692
676487	5607854
676441	5609243
676888	5609258
676997	5606011
676555	5605996
676570	5605533
676128	5605518

XVI. Appendix B – Property claims numbers covered by the survey

Tenure number
653237
653250
657731
657732
657733
657734
657735

XVII. Appendix C – Solitude Lake block TDEM anomaly table

				Time	Amplitude at
	UTM_X	UTM_Y		Constant	zero delay
Line	(m)	(m)	ID	(msec)	(nT/s)
70	671639	5607280	70.01	0.49	1225
80	671676	5607301	80.01	0.45	732
80	671639	5607386	80.02	0.44	701
90	671716	5607357	90.01	0.44	705
100	672089	5606479	100.01	0.10	0
100	671782	5607323	100.02	0.41	749
100	671717	5607480	100.03	0.51	148
110	672140	5606493	110.01	0.39	180
110	671833	5607327	110.02	0.41	852
120	672186	5606496	120.01	0.38	255
120	671997	5607029	120.02	0.10	0
120	671878	5607354	120.03	0.51	727
130	672233	5606527	130.01	0.10	0
130	672048	5607032	130.02	0.57	107
130	671935	5607356	130.03	0.56	943
140	672265	5606587	140.01	0.51	188
140	671994	5607335	140.02	0.51	1036
150	672296	5606637	150.01	0.54	270
150	672047	5607323	150.02	0.51	716
160	672342	5606661	160.01	0.65	459
160	672103	5607318	160.02	0.54	887
170	672394	5606660	170.01	0.56	316
170	672336	5606831	170.02	0.10	0
170	672207	5607169	170.03	0.93	150
170	672143	5607366	170.04	0.57	998
180	672536	5606440	180.01	0.10	0
180	672449	5606657	180.02	0.72	99
180	672372	5606874	180.03	0.87	123
180	6/2333	5606997	180.04	0.63	151
180	6/2211	5607318	180.05	0.71	/29
180	672167	5607433	180.06	0.57	1115
190	6/255/	5606508	190.01	0.48	142
190	672421	5606883	190.02	0.58	213
190	6/23//	5607010	190.03	0.55	536
190	6/22/0	5607288	190.04	0.65	577
190	672223	5607427	190.05	0.47	703
200	672598	5606553	200.01	0.54	260
200	672425	5607019	200.02	0.60	1214
200	672357	5607226	200.03	0.51	930
200	672300	5607380	200.04	0.44	547
210	672631	5606593	210.01	0.43	525
210	672452	5000915	210.02	0.70	240
210	672455	5607184	210.03	0.00	2320
210	6722410	5607204	210.04	0.32	333
210	672647	5606710	210.05	0.38	548 211
220	672505	5606910	220.01	0.40	242 665
220	672507	5000042	220.02	0.70	2500
220	672/07	5007092	220.03	0.50	2004
220	672440	5007241	220.04 220.04	0.40	2220
220	672401	5606277	220.05	0.28	200
230	672715	5606571	230.01	0.05	1/5
230	67760/	5606710	230.02	0.70	
230	672652	2000/19	230.05	0.50	1/120
250	072032	2000230	250.04	0.09	1430

230	672579	5607036	230.05	0.46	585
230	672503	5607250	230.06	0.47	1643
230	672450	5607403	230.07	0.56	122
240	672870	5606396	240.01	0.60	298
240	672780	5606619	240.02	0.49	381
240	672741	5606740	240.03	0.60	496
240	672715	5606814	240.04	0.78	519
240	672562	5607234	240.05	0.37	2025
240	672504	5607393	240.06	0.47	176
250	672917	5606406	250.01	0.65	456
250	672787	5606754	250.02	0.44	832
250	672632	5607191	250.03	0.38	1316
250	672512	5607508	250.04	0.10	0
260	672969	5606404	260.01	0.68	471
260	672856	5606725	260.02	0.54	380
260	672702	5607150	260.03	0.40	1745
260	672658	5607268	260.04	0.52	900
270	673018	5606401	270.01	0.71	1035
270	672905	5606721	270.02	0.62	270
270	672767	5607095	270.03	0.51	1036
270	672697	5607295	270.04	0.51	875
280	673089	5606379	280.01	0.77	607
280	673018	5606555	280.02	0.44	1106
280	672958	5606730	280.03	0.63	290
280	672828	5607092	280.04	0.49	1688
280	672764	5607253	280.05	0.31	1230
290	673130	5606398	290.01	0.69	545
290	673071	5606557	290.02	0.46	1213
290	672987	5606793	290.03	0.54	529
290	672864	5607124	290.04	0.44	1783
300	673184	5606422	300.01	0.62	483
300	673118	5606594	300.02	0.64	888
300	673036	5606804	300.03	0.47	515
300	672923	5607116	300.04	0.53	1122
310	673226	5606413	310.01	0.75	309
310	673167	5606590	310.02	0.73	978
310	673059	5606873	310.03	0.48	458
310	672952	5607182	310.04	0.59	866
320	673246	5606530	320.01	0.72	717
320	6/3206	5606644	320.02	0.61	1058
320	6/3100	5606915	320.03	0.52	272
320	6/3003	560/186	320.04	0.64	1025
330	6/3448	5606116	330.01	0.38	3/1
330	6/3264	5606604	330.02	0.61	2235
330	6/3226	5606/15	330.03	0.49	937
330	673069	560/1/4	330.04	0.62	606
340	673331	5606032	340.01	0.54	505
240	673323	5000591	340.02	0.38	270
240	673202	5000738	340.03	0.47	576
240	673100	5007001	340.04	0.49	444
250	672602	5605976	250.01	0.30	434
250	672551	5606110	250.01	0.70	415
350	672202	5000110	250.02	0.48	710
350	673303	5606333	250.03	0.00	2/12
350	673202	5607052	350.04	0.59	<u>م</u> م 345
350	673667	5007030	350.05	0.05	110
360	673600	5003940	300.01	0.92	252
360	673452	5606557	300.02	0.53	200
360	67330	5606937	360.03	0.08	250
360	673267	5607052	360.04	0.50	550
	0,520/	500,052	500.05	0.50	554

370	673650	5606143	370.01	0.57	386
370	673491	5606576	370.02	0.63	563
370	673416	5606784	370.03	0.40	294
370	673333	5607013	370.04	0.55	584
370	673299	5607122	370.05	0.44	187
380	673707	5606155	380.01	0.53	987
380	673553	5606562	380.02	0.47	306
380	673477	5606776	380.03	0.48	216
380	673409	5606948	380.04	0.70	407
380	673362	5607081	380.05	0.43	183
390	673753	5606141	390.01	0.84	1287
390	673621	5606532	390.02	0.50	277
390	673466	5606935	390.03	0.69	301
390	673423	5607058	390.04	0.45	179
400	673882	5605941	400.01	0.55	378
400	673825	5606105	400.02	0.63	524
400	673666	5606525	400.03	0.56	244
400	673527	5606913	400.04	0.64	425
400	673483	5607039	400.05	0.42	153
410	673927	5605959	410.01	0.63	993
410	673833	5606232	410.02	0.65	248
410	673734	5606497	410.03	0.03	379
410	673714	5606546	410.04	0.48	313
410	673657	5606689	410.05	0.40	315
410	673589	5606895	410.05	0.44	289
410	672800	5606208	410.00	0.01	205
420	673789	5606493	420.01	0.01	320
420	672726	5606665	420.02	0.40	261
420	672652	5606868	420.03	0.40	256
420	674024	5000808	420.04	0.08	422
430	672090	5606087	430.01	0.00	423
430	673036	5000087	430.02	0.57	245
430	673930	5000220	430.03	0.30	545
430	672791	5000519	430.04	0.42	200
430	673607	500002	430.03	0.59	307
430	673697	560682	430.06	0.52	252
440	674052	5606062	440.01	0.54	611
440	6/3989	5606233	440.02	0.48	394
440	6/3934	5606394	440.03	0.48	421
440	673891	5606517	440.04	0.42	642
440	6/3814	5606710	440.05	0.47	281
440	6/3/45	5606905	440.06	0.64	304
450	674091	5606096	450.01	0.50	824
450	674054	5606191	450.02	0.48	644
450	674020	5606281	450.03	0.34	605
450	6/3966	5606437	450.04	0.54	8/8
450	673919	5606580	450.05	0.53	460
450	673845	5606772	450.06	0.43	402
450	673798	5606896	450.07	0.67	331
460	674171	5606029	460.01	0.55	365
460	674131	5606128	460.02	0.51	509
460	674024	5606436	460.03	0.61	948
460	673969	5606576	460.04	0.53	878
460	673844	5606902	460.05	0.57	312
460	673927	5606687	460.06	0.39	413
470	674256	5605924	470.01	0.68	231
470	674217	5606040	470.02	0.69	280
470	674170	5606177	470.03	0.57	373
470	674122	5606308	470.04	0.49	525
470	674064	5606455	470.05	0.62	900
470	674027	5606557	470.06	0.49	1342
470	673983	5606677	470.07	0.51	512

470	673912	5606891	470.08	0.62	444
480	674390	5605717	480.01	0.56	134
480	674298	5605966	480.02	0.50	400
480	674195	5606255	480.03	0.58	763
480	674092	5606554	480.04	0.54	528
480	674047	5606676	480.05	0.64	743
480	673954	5606906	480.06	0.58	401
490	674481	5605625	490.01	0.10	0
490	674365	5605924	490.02	0.55	305
490	674227	5606323	490.02	0.55	840
490	674081	5606706	490.04	0.68	646
490	674001	5606927	490.05	0.58	858
500	67/153/	5605604	500.01	0.30	0.00
500	67//30	5605897	500.01	0.10	179
500	674290	5606276	500.02	0.05	680
	674230	5000270	500.03	0.70	600
500	674219	5000478	500.04	0.54	807
500	674137	5000094	500.05	0.05	897
500	674046	5606956	500.06	0.58	561
510	674503	5605860	510.01	0.60	152
510	6/4336	5606300	510.02	0.50	424
510	674259	5606508	510.03	0.59	1310
510	674191	5606705	510.04	0.53	1348
510	674091	5606973	510.05	0.61	978
520	674856	5605014	520.01	0.60	426
520	674652	5605588	520.02	0.10	0
520	674555	5605858	520.03	0.56	175
520	674395	5606282	520.04	0.52	343
520	674317	5606507	520.05	0.50	971
520	674252	5606670	520.06	0.50	1129
520	674154	5606953	520.07	0.69	770
530	674900	5605047	530.01	0.60	470
530	674599	5605874	530.02	0.39	370
530	674453	5606256	530.03	0.57	866
530	674300	5606686	530.04	0.60	710
530	674198	5606965	530.05	0.63	1108
540	674951	5605059	540.01	0.48	295
540	674708	5605704	540.02	0.52	125
540	674633	5605926	540.03	0.44	553
540	674554	5606145	540.04	0.48	951
540	674504	5606286	540.05	0.43	864
540	674354	5606683	540.06	0.59	1105
540	674248	5606985	540.07	0.58	1588
550	674983	5605107	550.01	0.56	494
550	674812	5605566	550.02	0.10	0
550	674743	5605767	550.03	0.64	118
550	674616	5606105	550.05	0.57	733
550	674545	5606314	550.05	0.32	509
550	674407	5606689	550.05	0.59	562
550	67/299	5606988	550.00	0.60	1231
550	675026	5000988	550.07	0.02	2231
500	675050	5005109	560.01	0.01	227
560	674633	5005008	560.02	0.53	140
500	0/409/	500057		0.55	720
560	0/4033	5000231	500.04	0.50	/1/
560	6/44/9	5000040	560.05	0.65	597
560	674346	5607002	560.06	0.63	909
570	675074	5605143	570.01	0.63	119
570	674932	5605534	570.02	0.10	0
570	674853	5605766	570.03	0.53	275
570	674762	5606007	570.04	0.59	426
570	674669	5606256	570.05	0.49	719
570	674534	5606630	570.06	0.59	516

570	674397	5607013	570.07	0.72	725
580	674901	5605778	580.01	0.48	444
580	674815	5606003	580.02	0.60	466
580	674728	5606253	580.03	0.45	397
580	674590	5606618	580.04	0.41	597
580	674567	5606688	580.05	0.49	242
580	674438	5607035	580.06	0.62	523
590	675041	5605537	590.01	0.52	368
590	674969	5605729	590.02	0.45	391
590	674878	5605974	590.03	0.60	1024
590	674767	5606288	590.04	0.38	465
590	674644	5606626	590.05	0.44	346
590	674507	5606997	590.06	0.52	419
600	675187	5605282	600.01	0.10	0
600	675079	5605581	600.02	0.53	1396
600	675017	5605752	600.03	0.51	391
600	674927	5605991	600.04	0.50	388
600	674826	5606274	600.05	0.46	266
600	674733	5606534	600.06	0.50	179
600	674650	5606759	600.07	0.51	154
600	674570	5606969	600.08	0.60	181
610	675285	5605144	610.01	0.90	121
610	675202	5605381	610.02	0.74	170
610	675119	5605604	610.03	0.56	2861
610	675025	5605869	610.04	0.42	634
610	674961	5606049	610.05	0.71	143
610	674869	5606292	610.06	0.54	223
610	674773	5606569	610.07	0.29	330
610	674667	5606843	610.08	0.57	118
610	674631	5606957	610.09	0.10	0
620	675341	5605158	620.01	0.68	207
620	675249	5605405	620.02	0.57	436
620	675172	5605599	620.03	0.65	2049
620	675087	5605859	620.04	0.65	406
620	675039	5605996	620.05	0.52	143
620	674830	5606556	620.06	0.30	346
620	674694	5606925	620.07	0.10	0
630	675369	5605196	630.01	0.53	338
630	675304	5605382	630.02	0.56	833
630	675223	5605612	630.03	0.65	1263
630	675165	5605790	630.04	0.64	250
630	675099	5605956	630.05	0.10	0
630	674866	5606598	630.06	0.28	370
630	674766	5606889	630.07	0.10	0
640	675417	5605230	640.01	0.55	786
640	675377	5605351	640.02	0.55	979
640	675275	5605622	640.03	0.56	656
640	675210	5605806	640.04	0.53	455
640	674952	5606478	640.05	0.10	0
640	674916	5606631	640.06	0.28	228
640	674826	5606863	640.07	0.10	0
650	675464	5605227	650.01	0.62	1052
650	675421	5605358	650.02	0.54	662
650	675304	5605685	650.03	0.47	492
650	675260	5605806	650.04	0.62	331
650	674948	5606657	650.05	0.24	335
650	674844	5606967	650.06	0.10	0
660	675516	5605266	660.01	0.57	1271
660	675483	5605364	660.02	0.69	1103
660	675352	5605708	660.03	0.37	739
660	675287	5605872	660.04	0.40	148

660	675008	5606655	660.05	0.32	202
660	674928	5606881	660.06	0.31	166
670	675576	5605226	670.01	0.64	399
670	675515	5605401	670.02	0.75	731
670	675400	5605707	670.03	0.38	846
670	675066	5606638	670.04	0.37	219
670	674951	5606947	670.05	0.10	0
680	675623	5605251	680.01	0.74	170
680	675583	5605363	680.02	0.95	134
680	675456	5605745	680.03	0.58	304
680	675127	5606607	680.04	0.38	181
680	675101	5606700	680.05	0.41	177
680	675022	5606919	680.06	0.33	167
680	674936	5607146	680.07	0.10	0
690	675626	5605358	690.01	0.85	102
690	675495	5605757	690.02	0.53	645
690	675176	5606610	690.02	0.46	168
690	675118	5606791	690.03	0.36	383
690	67/976	5607153	690.05	0.30	128
700	675625	5605525	700.01	0.44	259
700	675529	5005325	700.01	0.07	238 E44
700	675176	5005784	700.02	0.49	544
700	0/51/0	5606776	700.03	0.41	563
700	675026	5607190	700.04	0.39	260
/10	675745	5605355	710.01	0.10	0
/10	6/56/9	5605544	710.02	0.76	615
710	675574	5605814	710.03	0.52	701
710	675239	5606732	710.04	0.40	546
710	675073	5607215	710.05	0.32	365
720	675786	5605392	720.01	0.46	243
720	675724	5605563	720.02	0.73	582
720	675636	5605804	720.03	0.47	285
720	675323	5606692	720.04	0.49	332
720	675270	5606813	720.05	0.38	392
720	675116	5607246	720.06	0.39	439
730	675881	5605267	730.01	0.10	0
730	675827	5605422	730.02	0.47	194
730	675766	5605581	730.03	0.76	659
730	675675	5605824	730.04	0.48	431
730	675381	5606652	730.05	0.55	580
730	675320	5606793	730.06	0.46	420
730	675169	5607237	730.07	0.29	412
740	675894	5605391	740.01	0.10	0
740	675813	5605601	740.02	0.70	284
740	675738	5605840	740.03	0.59	978
740	675402	5606754	740.04	0.52	502
740	675360	5606852	740.05	0.32	657
740	675198	5607299	740.06	0.44	811
750	675922	5605439	750.01	0.10	0
750	675865	5605613	750.02	0.10	0
750	675775	5605860	750.03	0.54	669
750	675440	5606777	750.04	0.51	660
750	675400	5606885	750.05	0.28	785
750	675243	5607319	750.06	0.55	1371
760	675908	5605650	760.01	0.59	2370
760	675837	5605842	760.02	0.00	230
760	675622	5606380	760.02	0.42	215
760	675500	5606719	760.03	0.42	1055
700	C75401	2000/18	760.04	0.05	400
700	675200	5607316	700.05	0.47	498
700	0/3298	500/310	700.00	0.04	901
//U	0/5950	5005079	770.01	0.70	161
//0	6/56/2	5606427	//0.02	0.43	413

	770	675564	5606733	770.03	0.73	619
	770	675483	5606943	770.04	0.47	556
	770	675348	5607321	770.05	0.57	1160
	780	675991	5605711	780.01	0.55	196
	780	675706	5606482	780.02	0.41	168
	780	675599	5606793	780.03	0.65	577
-	780	675521	5606991	780.04	0.61	748
-	780	675402	5607327	780.05	0.47	498
	790	676028	5605750	790.01	0.68	106
	790	675749	5606520	790.02	0.10	0
	790	675644	5606803	790.03	0.69	761
	790	675561	5607026	790.04	0.60	1110
	790	675443	5607352	790.05	0.36	206
	800	676073	5605781	800.01	0.10	0
	800	675798	5606520	800.02	0.10	0
	800	675692	5606823	800.02	0.56	527
	800	675617	5607020	800.03	0.50	925
	800	675607	5007020	800.04 800.0F	0.07	202
	810	675951	5007520	810.03	0.37	302
	810	0/5851	5000529	810.01	0.10	210
	810	675743	5606821	810.02	0.58	210
	810	675661	5607042	810.03	0.61	842
	810	6/55/1	5607303	810.04	0.41	380
	820	675919	5606478	820.01	0.71	98
	820	675794	5606829	820.02	0.71	112
	820	675708	5607068	820.03	0.60	780
	820	675629	5607281	820.04	0.46	257
	830	676193	5605870	830.01	0.10	0
	830	676109	5606129	830.02	0.10	0
	830	675943	5606561	830.03	0.43	460
	830	675839	5606849	830.04	0.50	198
	830	675747	5607107	830.05	0.65	798
	830	675673	5607304	830.06	0.39	243
	840	676251	5605860	840.01	0.10	0
	840	676132	5606200	840.02	0.68	126
	840	675993	5606570	840.03	0.42	597
	840	675857	5606964	840.04	0.36	456
	840	675812	5607087	840.05	0.55	346
	840	675731	5607295	840.06	0.40	217
-	850	676279	5605934	850.01	0.50	240
	850	676184	5606208	850.02	0.63	155
	850	676037	5606599	850.03	0.48	806
	850	675978	5606759	850.04	0.60	101
	850	675870	5607067	850.05	0.50	265
	850	675782	5607306	850.06	0.35	205
	860	676331	5605940	860.01	0.10	0
	860	676280	5606088	860.02	0.10	0
	860	676223	5606230	860.02	0.10	0
	860	676092	5606600	860.04	0.10	272
	860	676035	5000005	960.04 960.0E	0.00	101
	860	675033	5000759	860.05	0.70	276
	860	675922	5607065	860.06	0.44	276
	000	0/5824	500/338	870.01	0.33	193
	8/0	0/0310	5606121	870.01	0.10	0
	8/0	676241	5606348	870.02	0.40	211
	870	676121	5606658	870.03	0.69	478
	870	675959	5607100	870.04	0.50	245
	870	675898	5607274	870.05	0.38	205
	870	675849	5607408	870.06	0.31	186
	880	676283	5606366	880.01	0.41	146
	880	676169	5606678	880.02	0.58	357
	880	676017	5607100	880.03	0.51	284
	880	675963	5607259	880.04	0.47	173

PROSPECTAIR – DYNAMIC DISCOVERY GEOSCIENCE

880	675902	5607410	880.05	0.51	141
890	676321	5606401	890.01	0.10	0
890	676210	5606695	890.02	0.40	333
890	676176	5606801	890.03	0.50	131
890	676059	5607116	890.04	0.60	269
890	676008	5607265	890.05	0.54	160
890	675929	5607477	890.06	0.65	100
900	676373	5606418	900.01	0.10	0
900	676288	5606652	900.02	0.32	289
900	676220	5606852	900.03	0.60	144
900	676081	5607196	900.04	0.53	871
900	675981	5607499	900.05	0.63	109
910	676421	5606416	910.01	0.10	0
910	676335	5606658	910.02	0.10	0
910	676245	5606898	910.03	0.50	163
910	676117	5607247	910.04	0.56	1297
910	676013	5607540	910.05	0.71	107
920	676450	5606484	920.01	0.10	0
920	676302	5606914	920.02	0.39	243
920	676158	5607298	920.03	0.62	1470
920	676034	5607629	920.04	0.58	157
930	676533	5606409	930.01	0.10	0
930	676335	5606943	930.02	0.41	509
930	676251	5607172	930.03	0.52	614
930	676199	5607322	930.04	0.80	1286
930	676060	5607693	930.05	0.40	534
940	676570	5606456	940.01	0.31	249
940	676372	5606995	940.02	0.32	540
940	676308	5607164	940.03	0.50	925
940	676237	5607361	940.04	0.78	1151
940	676108	5607715	940.05	0.36	742
950	676627	5606459	950.01	0.29	512
950	676478	5606832	950.02	0.29	171
950	676405	5607050	950.03	0.37	1026
950	676351	5607192	950.04	0.53	438
950	676286	5607376	950.05	0.68	1164
950	676154	5607740	950.06	0.28	757
960	676667	5606482	960.01	0.28	564
960	676552	5606796	960.02	0.10	0
960	676441	5607094	960.03	0.37	966
960	676398	5607207	960.04	0.42	479
960	676340	5607409	960.05	0.55	994
960	676195	5607754	960.06	0.30	599
970	676721	5606490	970.01	0.33	452
970	676645	5606671	970.02	0.36	176
970	676475	5607154	970.03	0.45	386
970	676373	5607431	970.04	0.54	1376
970	676242	5607779	970.05	0.32	335
980	676402	5607504	980.01	0.47	1694
980	676762	5606511	980.02	0.26	630
980	676693	5606689	980.03	0.43	169
980	676523	5607165	980.04	0.43	182
980	676323	5607722	980.05	0.32	443
990	676808	5606540	990.01	0.28	615
990	676723	5606759	990.02	0.31	240
990	676629	5607021	990.03	0.10	0
990	676531	5607295	990.04	0.20	116
990	676425	5607575	990.05	0.60	2117
990	676378	5607705	990.06	0.00	2117
1000	676255	5606524	1000.01	0.51	228
1000	676772	5606762	1000.01	0.37	151
1000	0,0,70	56667,62	1000.02	5.47	191

1000	676462	5607627	1000.03	0.59	1901
1010	676857	5606689	1010.01	0.41	806
1010	676788	5606865	1010.02	0.37	282
1010	676740	5607024	1010.03	0.43	232
1010	676505	5607647	1010.04	0.61	1908
1020	676915	5606682	1020.01	0.39	811
1020	676841	5606884	1020.02	0.47	247
1020	676785	5607019	1020.03	0.41	289
1020	676677	5607351	1020.04	0.51	184
1020	676551	5607685	1020.05	0.63	1329
1030	676959	5606719	1030.01	0.35	1040
1030	676842	5607021	1030.02	0.46	424
1030	676717	5607364	1030.03	0.50	398
1030	676607	5607670	1030.04	0.64	1645
1030	676574	5607757	1030.05	0.42	983
1040	676966	5606831	1040.01	0.29	1185
1040	676874	5607075	1040.02	0.45	1272
1040	676748	5607422	1040.03	0.59	204
1040	676636	5607735	1040.04	0.42	2921
1050	676923	5607091	1050.01	0.44	5240
1050	676709	5607651	1050.02	0.53	1217
1050	676659	5607799	1050.03	0.37	4324
1050	676501	5608244	1050.04	0.40	295
1060	676926	5607241	1060.01	0.56	2468
1060	676865	5607408	1060.02	0.56	603
1060	676776	5607631	1060.03	0.54	1726
1060	676706	5607840	1060.04	0.48	3542
1060	676531	5608302	1060.05	0.42	130
1070	676894	5607450	1070.01	0.72	1173
1070	676815	5607670	1070.02	0.50	4387
1070	676746	5607853	1070.03	0.51	3052
1070	676618	5608225	1070.04	0.61	463
1070	676543	5608413	1070.05	0.60	112
1080	676948	5607459	1080.01	0.72	663
1080	676857	5607727	1080.02	0.67	3902
1080	676790	5607918	1080.03	0.49	1733
1080	676703	5608124	1080.04	0.69	405
1080	676575	5608504	1080.05	0.51	795
1090	676891	5607769	1090.01	0.64	4583
1090	676767	5608084	1090.02	0.61	1683
1090	676605	5608544	1090.03	0.47	986
1100	676922	5607830	1100.01	0.74	2345
1100	676861	5608000	1100.02	0.48	2149
1100	676797	5608157	1100.03	0.42	3146
1100	676633	5608609	1100.04	0.65	1057
1110	676883	5608074	1110.01	0.63	1875
1110	676847	5608193	1110.02	0.42	2423
1110	676662	5608672	1110.03	0.69	1000
1120	676925	5608113	1120.01	0.64	1096
1120	676874	5608239	1120.02	0.40	1795
1120	676700	5608729	1120.03	0.85	1017
1130	676891	5608358	1130.01	0.50	1397
1130	676727	5608789	1130.02	0.80	954
1140	676761	5608843	1140.01	0.61	1021
1150	676801	5608883	1150.01	0.68	1156
1160	676838	5608938	1160.01	0.67	728
1170	676858	5609025	1170.01	0.45	1877
1180	676891	5609077	1180.01	0.61	1771
1100	0,0001	2002077	1100.01	0.01	1,11













