Surface and drill-hole geological and geochemical data capture, analysis, input and visualisation

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PRESENTATION OUTLINE

1. Introduction
   - Background
   - Current Project

2. Methodology
   - Data Extraction Process

3. Results/Discussion

4. Conclusion
INTRODUCTION

- Papua New Guinea undoubtedly is a mining state, whose economy and services is driven by mineral exports

- Almost 7 million people spread over a land area of 462,840 km²

- Blessed with vast natural resources in all sectors – in minerals, oil & gas, agriculture, forestry, and fisheries.
The mineral wealth of Papua New Guinea is the result of its geology, which is attributed to the interaction between the Australian and Pacific Plate giving rise to:

- the complex geological structure,
- rugged landform and
- mineral formation
INTRODUCTION – BACKGROUND

2002 - 2005

- 1st Mining Sector Institutional Strengthening Technical Assistance Project (MSISTAP) by World Bank
- Tender awarded to Terra Search Pty Ltd
- Open-file exploration data from approximately the eastern half of PNG
- More than 400,000 data points recorded
- Approx. 2-3 million geological, geochem and surface and drill hole points of data held in exploration reports within the MRA library
INTRODUCTION – BACKGROUND

2014

• WBTA2, Terra Search Pty Ltd re-engaged for 12 months
• Compiled more than 20,000 data points
• More than 700,000 data points recorded (4.5 years)
• Skills transfer
• Continuation of the exercise by MRA staff
INTRODUCTION – CURRENT PROJECT

2015
- MRA took over data extraction and compilation in May
- Internal transfer of 2 staff
- Training

2016
- 1000 data points per monthly target commencing Feb
- Focus on Stream and Rock samples
- 4471 Soil, 4825 Sed, 2986 Rock samples extracted
- 12,282 data points recorded to date
DATA EXTRACTION

2 main Sources
- Sample location maps
DATA EXTRACTION

2 main Sources
- Ledgers/Lab sheets
DATA EXTRACTION

Data Templates
- Rock, Stream, Soil and Drill Holes
- Data validation using VALDATA (Excel Add-in). With ValData, you are able to access look-up tables for the coded fields within the template.
- JOBLIST
- Template loaded into database

| Prospect_Code | Company | Sheet_Number | Sample | Data_Type | Mesh | Grid_ID | Over_SIMesh | Under_SIMesh | Locality        | Amg_N  | Amg_E  | Date_Sampled | Au   | Au1  | Cu  | Pb  | Zn  | Ag  | As  | Hg  |
|---------------|---------|--------------|--------|-----------|------|---------|-------------|--------------|----------------|--------|--------|--------------|------|------|-----|-----|-----|-----|-----|-----|-----|
| TIFALMIN      | CRA     | 7187 1283196 | SSS    | Mesh      | AMG  | 547184.00 | 9438950.00  | 17/03/1986   | Sokontumin River | 0.05   | 10     | 0.05          | 40   | 10   | 165 | 155 | 0.4 | 6   | 4   | 2   |
| TIFALMIN      | CRA     | 7187 1283197 | PC     | Mesh      | AMG  | 547184.00 | 9438950.00  | 17/03/1986   | Sokontumin River | 0.05   | 10     | 0.05          | 170  | 35   | 155 | 155 | 0.4 | 6   | NA  | 4   |
| TIFALMIN      | CRA     | 7187 1283198 | SSS    | Mesh      | AMG  | 547422.88 | 9438901.00  | 17/03/1986   | Sokontumin River | 3.85   | 6      | 0.05          | 40   | 10   | 55  | 55  | NA  | 4   | 2   | 2   |
| TIFALMIN      | CRA     | 7187 1283199 | PC     | Mesh      | AMG  | 547422.88 | 9438901.00  | 17/03/1986   | Sokontumin River | 3.85   | 6      | 0.05          | 10   | 10   | 55  | 55  | NA  | 4   | 2   | 2   |
| TIFALMIN      | CRA     | 7187 1283377 | SSS    | Mesh      | AMG  | 555042.06 | 9435401.00  | 17/03/1986   | Illam River     | NA     | NA     | NA            | 10   | 10   | 55  | 55  | NA  | 4   | 2   | 2   |
| TIFALMIN      | CRA     | 7187 1283377 | SSS    | Mesh      | AMG  | 555042.06 | 9435401.00  | 17/03/1986   | Illam River     | NA     | NA     | NA            | 10   | 10   | 55  | 55  | NA  | 4   | 2   | 2   |
**DATA EXTRACTION**

**Explorer III Database**
- Job and Assay template

![Job Template and Assay Job](image)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Title</th>
<th>Lab</th>
<th>Locn</th>
<th>Code</th>
<th>Preparation</th>
<th>Method</th>
<th>Analysis Type</th>
<th>Detl Limit</th>
<th>Upper Detl Limit</th>
<th>Units</th>
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<td>Au</td>
<td>ANA</td>
<td>LAE</td>
<td>W/FLUX</td>
<td>ANA</td>
<td>LAE</td>
<td>GG313</td>
<td>FA-01</td>
<td>0.005</td>
<td>ppm</td>
</tr>
<tr>
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<td>Au1</td>
<td>ANA</td>
<td>LAE</td>
<td>W/FLUX</td>
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<td>LAE</td>
<td>GG313</td>
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<tr>
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<td>ANA</td>
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<td>145</td>
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<td>ppm</td>
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<tr>
<td>Pb</td>
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<td>ANA</td>
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<td>GA140</td>
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<td>HA122</td>
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<td>ppm</td>
</tr>
</tbody>
</table>
Explorer III Database

- Developed by Terra Search Pty Ltd
- DBMS designed to hold data from any minerals project anywhere in the world.
- The tools provided for loading, validating, viewing, printing and exporting the data.
- While highest data quality advocated, possible to enter lesser quality data into the system.
- Users ensure data entered is of the best quality available.
DATA EXTRACTION

Explorer III Database
• Data tables

[Image of a software interface with data tables and geological information]
Attribute data as viewed in a GIS (a), Sample locations with digitized points in green (b) hand-drafted poor quality sample location map (c) transformed and displayed in a GIS (d)
RESULTS

Data points compiled as of May 2016:

- 4825 Stream Sediment
- 2986 Rock Chip
- 4771 Soil
- 309 Drill hole samples
- **TOTAL: 12,351**
RESULTS

Gold occurrence
RESULTS

Copper occurrence
RESULTS

PAPUA NEW GUINEA MINERAL OCCURRENCE GRID FOR COBALT (Co)
RESULTS

PAPUA NEW GUINEA MINERAL OCCURRENCE GRID FOR NICKEL (Ni)

LEGEND
- Ni samples greater than 1000 ppm
- Ni samples greater than 100,000 ppm

GRIDDING DETAILS
- INPUT: dataset “Sed_3Ni”
- # of samples: 47012
- OUTPUT: 601 columns, 385 rows
- cell size: 0.025
- epochs: 1000, 2000
- METHOD: Inverse Distance Weighting
- Search distance: 0.06
- using the 8 nearest neighbours only in the 4 sectors

DATA SOURCE
- Terra Search Milestone 13 Report, Dec 2015
CONCLUSION

- Value adding to poor-quality manually drafted maps from reports with no coordinates
- Fully attributed point data in GIS enables further data analysis and provides insight into the nature of mineral occurrence
- Versatile database management system developed over many years.
- Flexibility to link with other existing database within the organization
- Increase in Exploration licenses
Beams, S. D. & Lethbridge, D., 2014. Milestone # 7, Third Data Delivery - Fourth Tranche Training & Mentoring and rapidly enhancing skills, Australia: Terra Search Ltd.

Beams, S. D. & Lethbridge, D., 2014. Milestone #6, Second Data Delivery - Third Tranche Training & Mentoring and rapidly enhancing skills, Australia: Terra Search Ltd.


Vinaka