

The Miriam case: A new type of uranium deposit within the Carboniferous sandstone-hosted Uranium Mineralisation of the Arlit Agadez province, Tim Mersoï Basin, Niger

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Summary – GoviEx Niger SA

GoviEx is a private exploration and development company with 10 tenements totaling approximately 5,000 km² of exploration ground in Niger, the world's sixth largest uranium producer. As of August 2012, GoviEx's properties contained more than 121 million pounds of NI 43-101-compliant uranium resources.

GoviEx's technical team has completed more than 550,000 m of drilling and radiometric logging on its tenements.

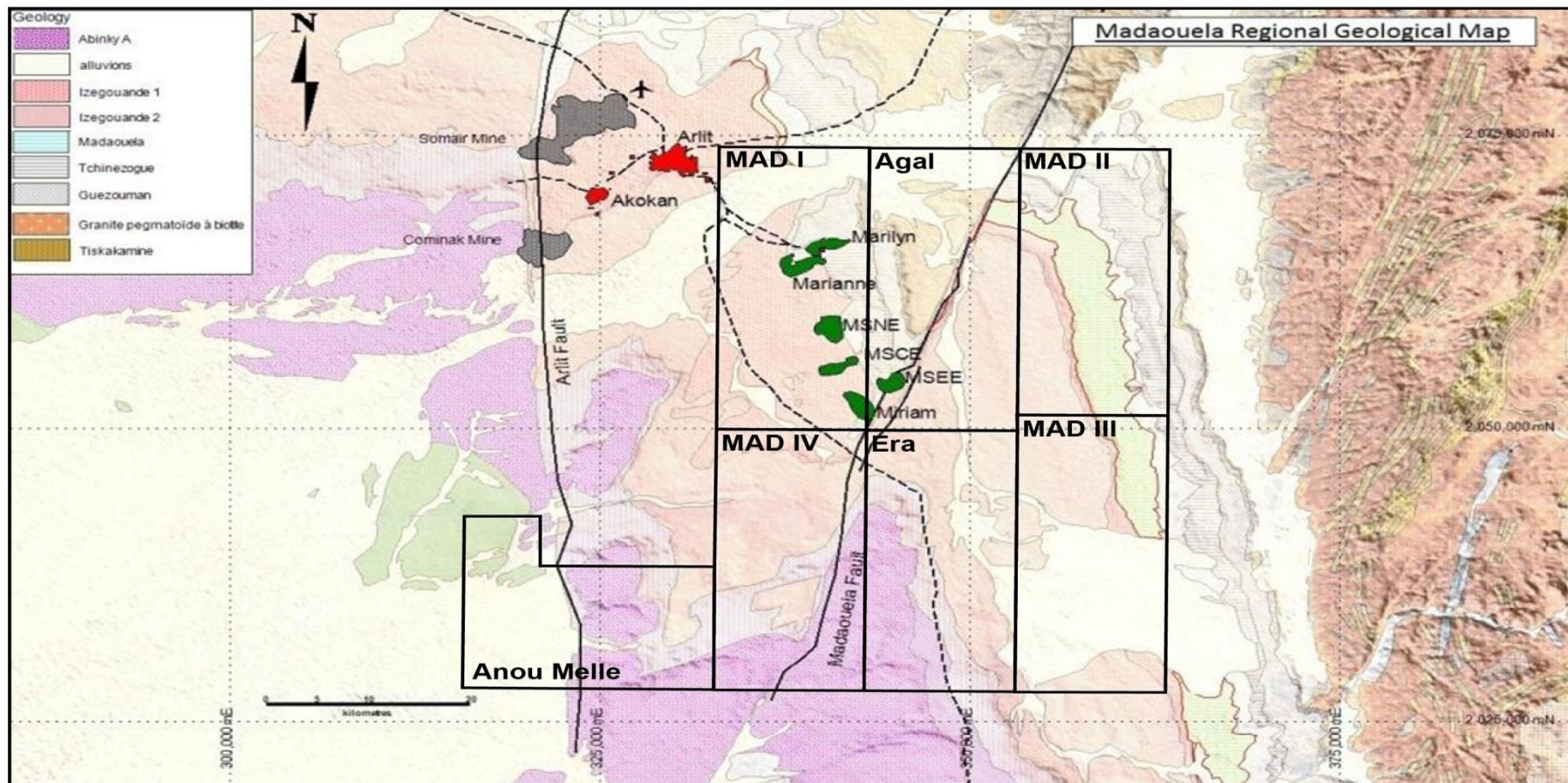
This presentation is focused on some of the exploration and development results of the 2010-Q1 2013 exploration drilling program which led to the discovery of new uranium mineralisation in the Tim Mersoi Basin.

The mineralisation is hosted either within the Guezouman (Mad1 South, Miriam) or within the Madaouela formation, which represents a transitional term between the reduced sediments of the Carboniferous period, and the continental red beds of the Permian era.

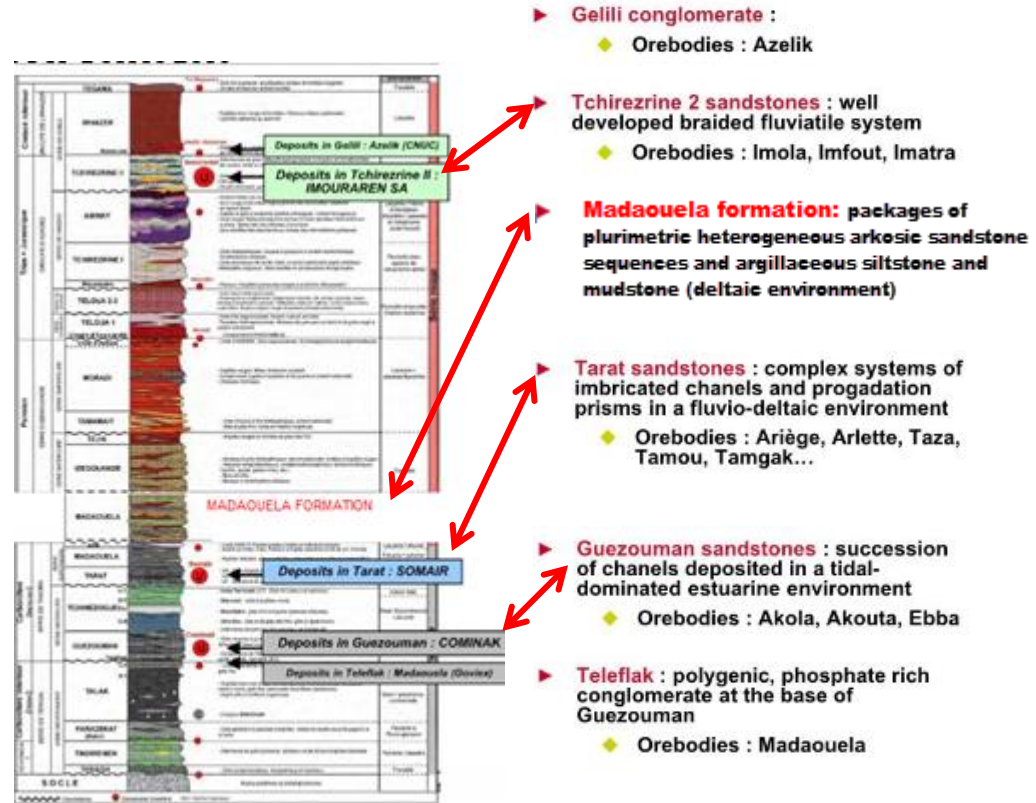
Key development points

- 2010-2011: NI 43-101 Technical Report on Resources and Preliminary Economic Assessment of Madaouela 1, conducted by SRK Consulting, processing tests SGS, Canada
- All main objectives of 2011- Q1 2013
 - Increase Inferred Resource and run active exploration drilling on the permits MAD2-MAD3 and MAD1, east of Madaouela Flexure
 - Development works to transfer Inferred Resource into Indicated Resource (100 m infill drilling) on MAD1 permit on the western flank of the Madaouela flexure
- 2012-Q1 2013 : Preparation of a PFS based on nearly 530,000 m development drilling (SRK supervision, Mintek lab (South Africa), Legeni) at Madaouela.

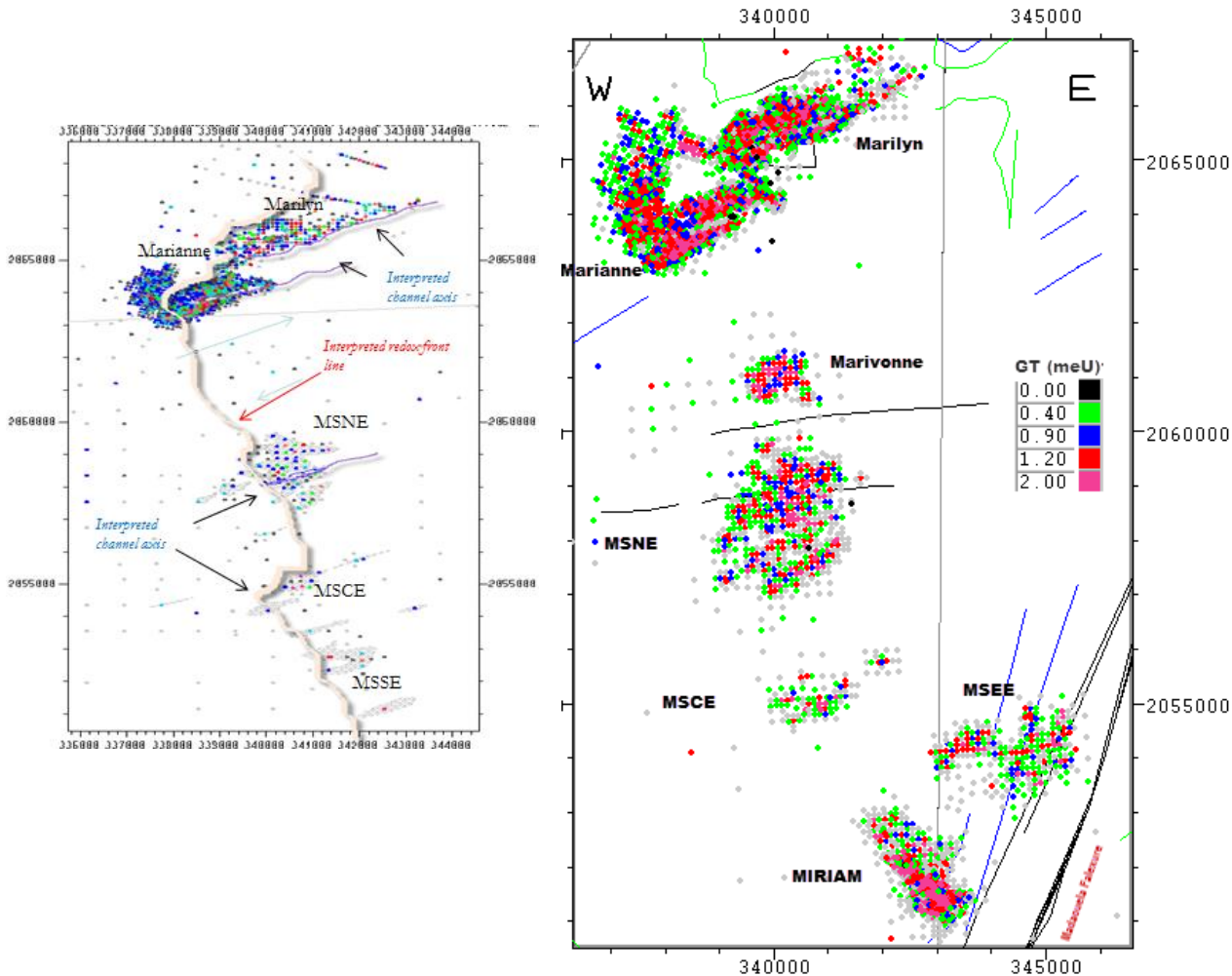
Madaouela & Anou Mélé tenements



Lithostratigraphic position of main uraniumiferous deposits in Tim Mersoï Basin



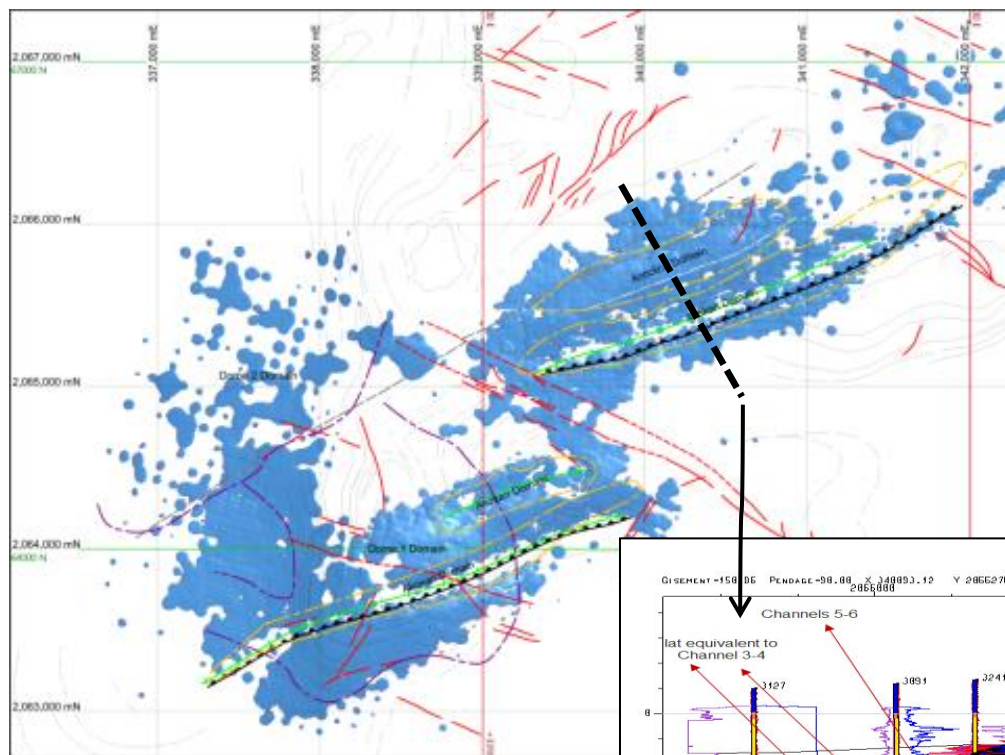
From Marianne-Marilyn to Miriam



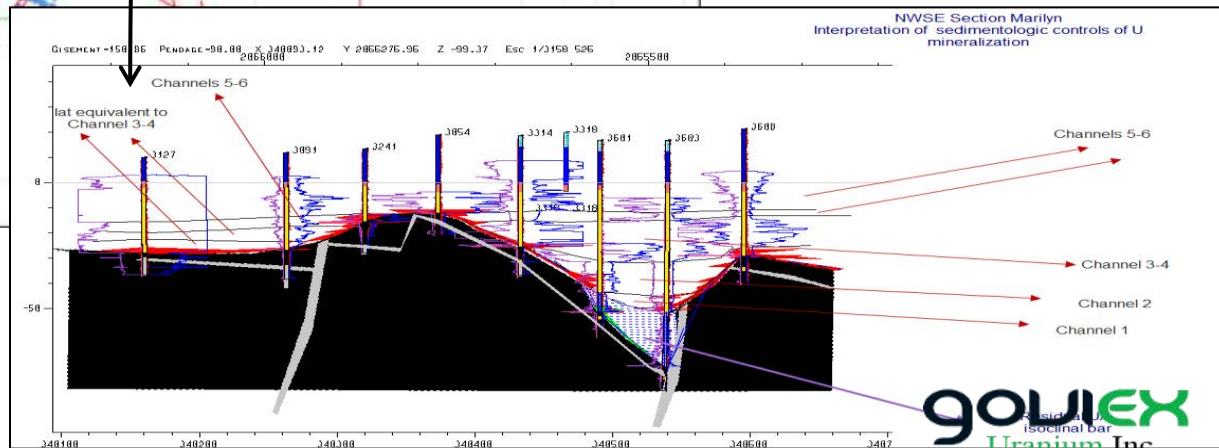
- Marianne Marilyn complete 50 m grid
- Madaouela South drilling on a 100 m grid (Inferred Resource) with the idea to link a suspected redox “band”
- Miriam partly drilled at centre 50 m grid

Carpet-like deposits

Plan view of structural domains relative to the Leapfrog 0.025 ppm U grade shell for Marianne-Marilynn U grade shell for Marianne-Marilynn



All Madaouela deposits are “carpet-like” deposits, U mineralisation in coarse- to medium-grained Guez sandstone at unconformity contact with reducing Talak marine to deltaic claystone



The Miriam case

- The Miriam deposit was discovered at the 400 m-200 m grids while drilling the interpreted redox halo which supported all known deposits in the Madaouela region.
- GNSA geologists had suggested that at a certain stage it should be possible to encounter redox front of the Akouta model, on the basis of redox observations on MSNE and first exploration results on the sector called Mad South.
- At the 400 m grid, no rich intersections were recorded, but the scintillometric logs, and chips colours clearly mimic the possibility for a local redox front, albeit at low grade.
- At the 200 m grid, the mineralisation at cut-off 200 ppm showed interesting continuities, an average depth lower than 100 m and some rich intercepts – suggesting the possibility of a low grade open pittable deposit

The Miriam case

Drilling continued at centre 200 m and local 100 m grid. The geological global potential did not vary, although the mineable mineralisation, developed at 100 m grid was smaller than the original contour.

In March 2012, the situation was as follows:

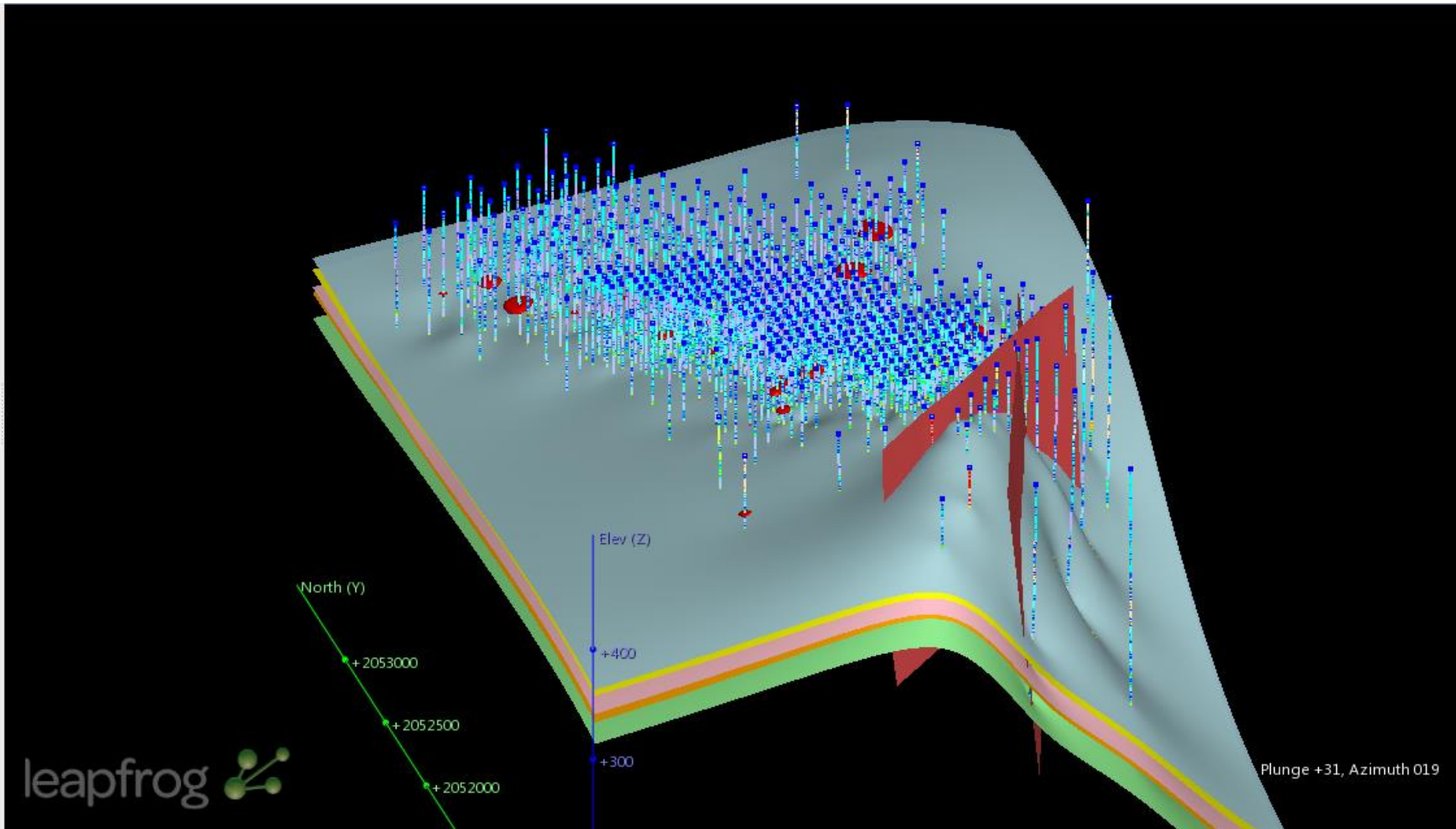
- Completion of 100 m grid
- 3D Geological model based on sequential stratigraphic control, and guided by the two main stratigraphic surfaces: the base of the Guezouman sandstones and the TM paleohorizontal level of the Tchinezogue
- 3D estimation carried out by SRK (UC)
- Pit optimisation (SRK) defined a project which was too small to justify its integration within the planned PFS which focused on UG mining.

Resource – August 2012

Classification	Tons (Mt)	Grade (kg/t eU ₃ O ₈)	eU ₃ O ₈ (t)	eU ₃ O ₈ (Mlb)
Miriam				
Indicated -0.47 kg/t eU ₃ O ₈ c-o	12.16	1.0	11959	26.36
Inferred	0.40	1.1	424	0.93

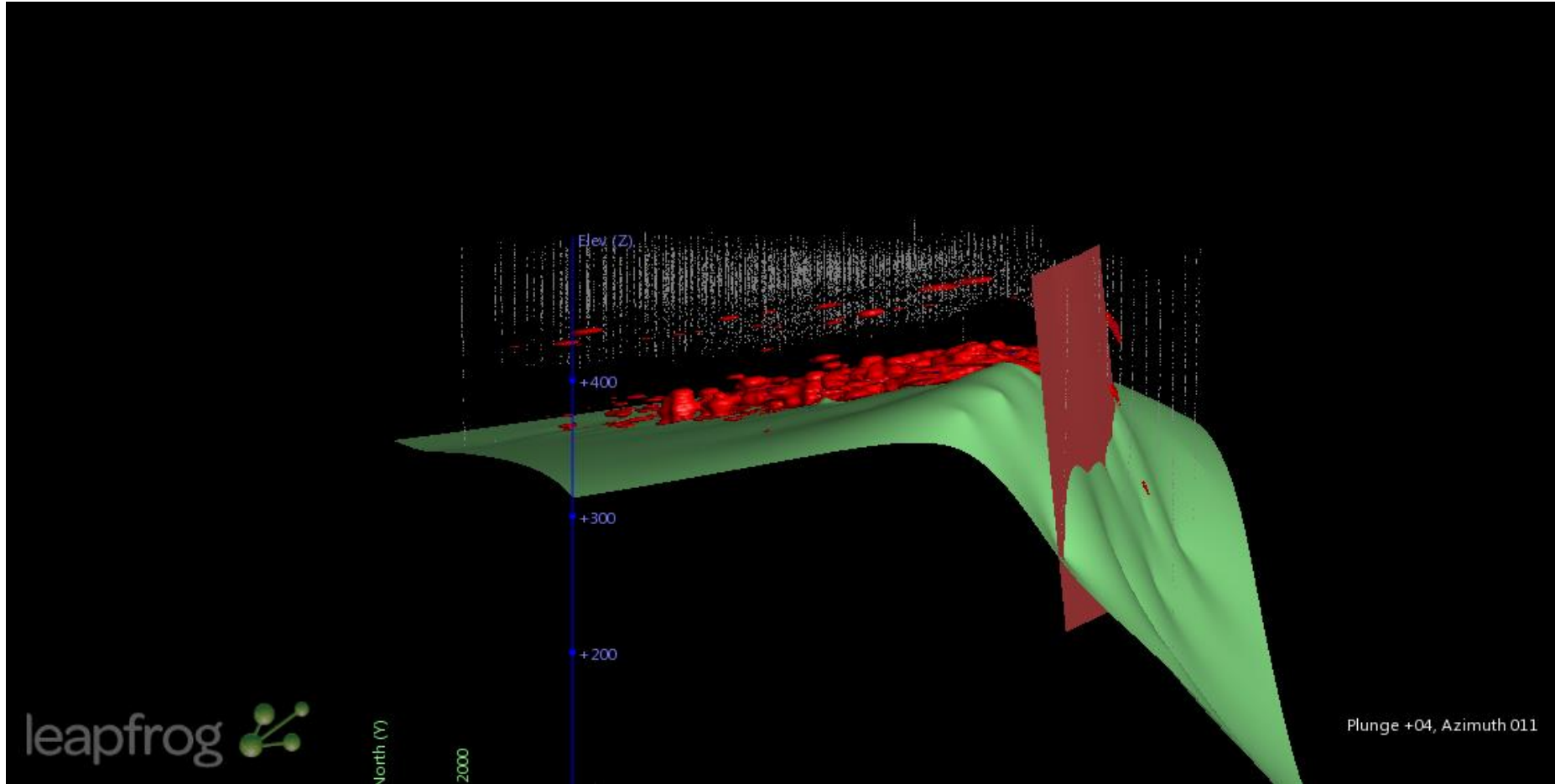
Cut-off 0.4 kg/t eU or 0.47 kg/t eU₃O₈

NI 43-101-complaint procedures and computations implemented for data acquisition, validation and resource estimates.



leapfrog

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The Miriam case – September 2012

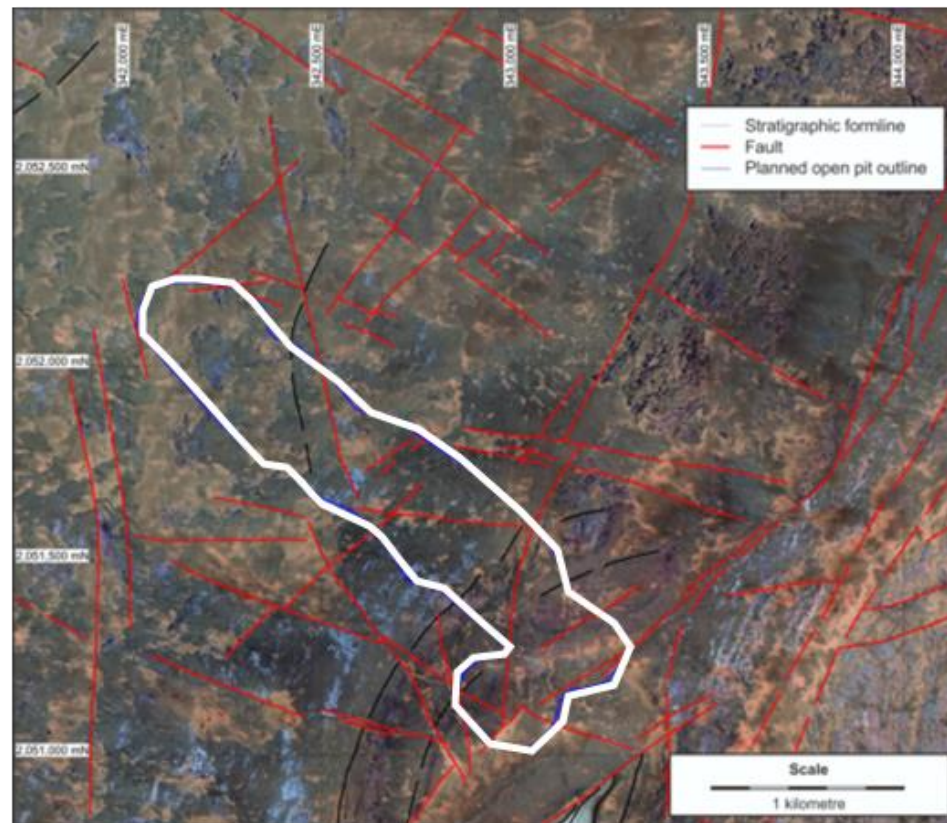
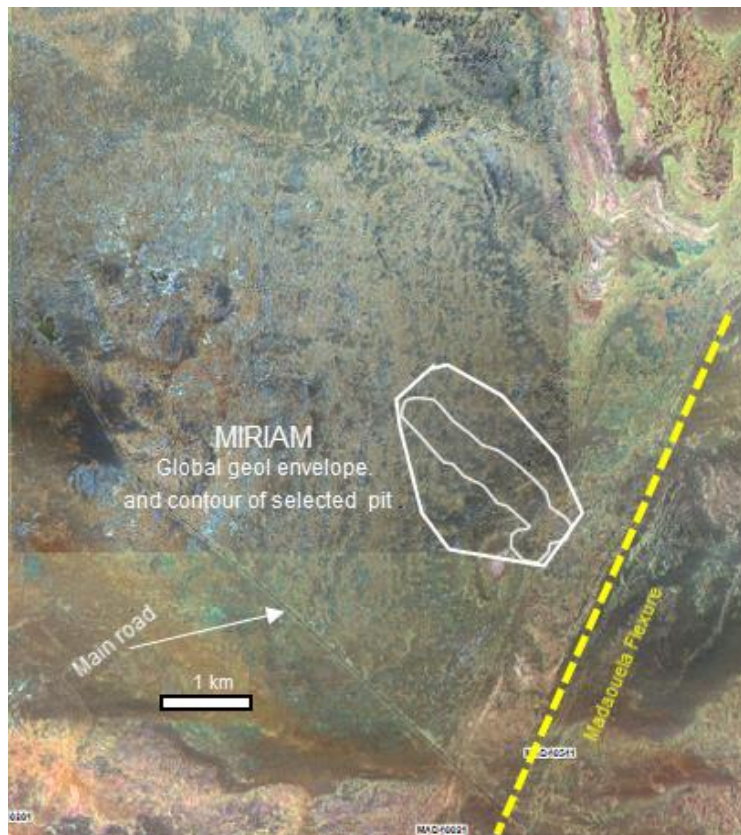
- Grade and spatial distribution of impacts at 200 m to 100 m grid were not acceptable for UG mining
- Pit optimisation failed at 100 m grid

But:

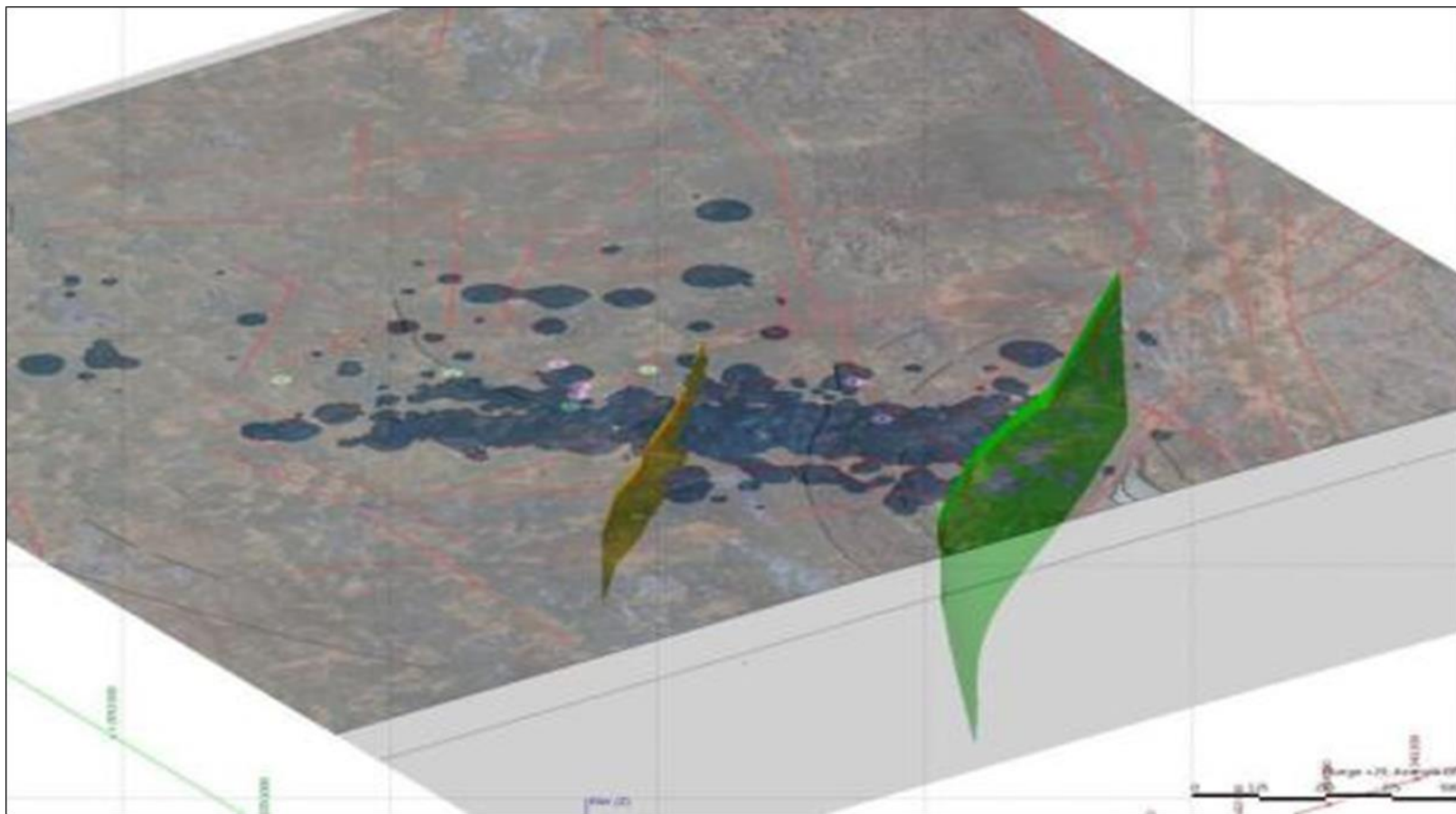
- Mineralisation related to reduced bottom sets of interpreted sedimentary units
- Presence of a vertical redox front confirmed, which needed to be sampled and correctly delineated
- Possible discrete structural control, although no faults are observed.

Plan view of stratigraphic formlines and structures interpreted at Miriam (relative to ASTER and QuickBird imagery)

No surface marking of the structures controlling the mineralisation



Miriam faults shown relative to topography with QuickBird drupe and Leapfrog 400 ppm U grade shell



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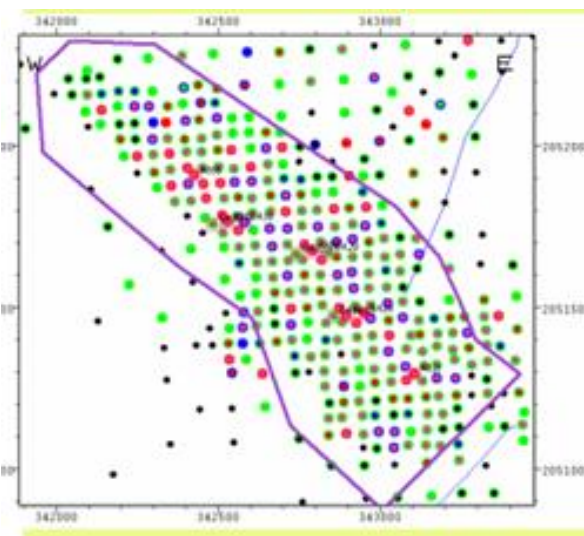
The Miriam case Q4 2012-2013

In these conditions, the following conclusions were reached:

- That we were dealing with a ‘real” orebody of a new type
- That the geological model based on planar stratigraphic control could not reflect the complexity of the deposit
- That the **only possible solution** was to extend drilling at a 50 m grid, with local centred 50 m cell if necessary
- That vertical and inclined core drilling were needed for modeling, ore sampling and geotechnical assessment.

October coring to sample redox front

CORE HOLE	FROM	TO	Th (m)	GxTh (m*eU‰)	G (eU‰)
MSNE4817_5	87.6	112.8	25.2	65.7	2.61
MSNE4818_5	92	97.6	5.6	5.56	0.99
MSNE4818_5	98.6	109.4	10.8	23.38	2.16
MSNE4819_5	79.2	84.2	5	8.61	1.72
MSNE4819_5	84.8	97.4	12.6	22.64	1.8
MSNE4819_5	102.6	103.6	1	1.03	1.03
MSNE4820_5	73.8	93.2	19.4	53.86	2.78
MSNE4821_5	68.2	74.8	6.6	38.53	5.84
MSNE4821_5	77.2	86.4	9.2	9.4	1.02



Geological Model

Step 1 Sectional model: seam contours of mineralisation based on:

- Sequential interpretation core strati model
- Resistivity and gamma logs
- Rock chips description and redox interpretations.

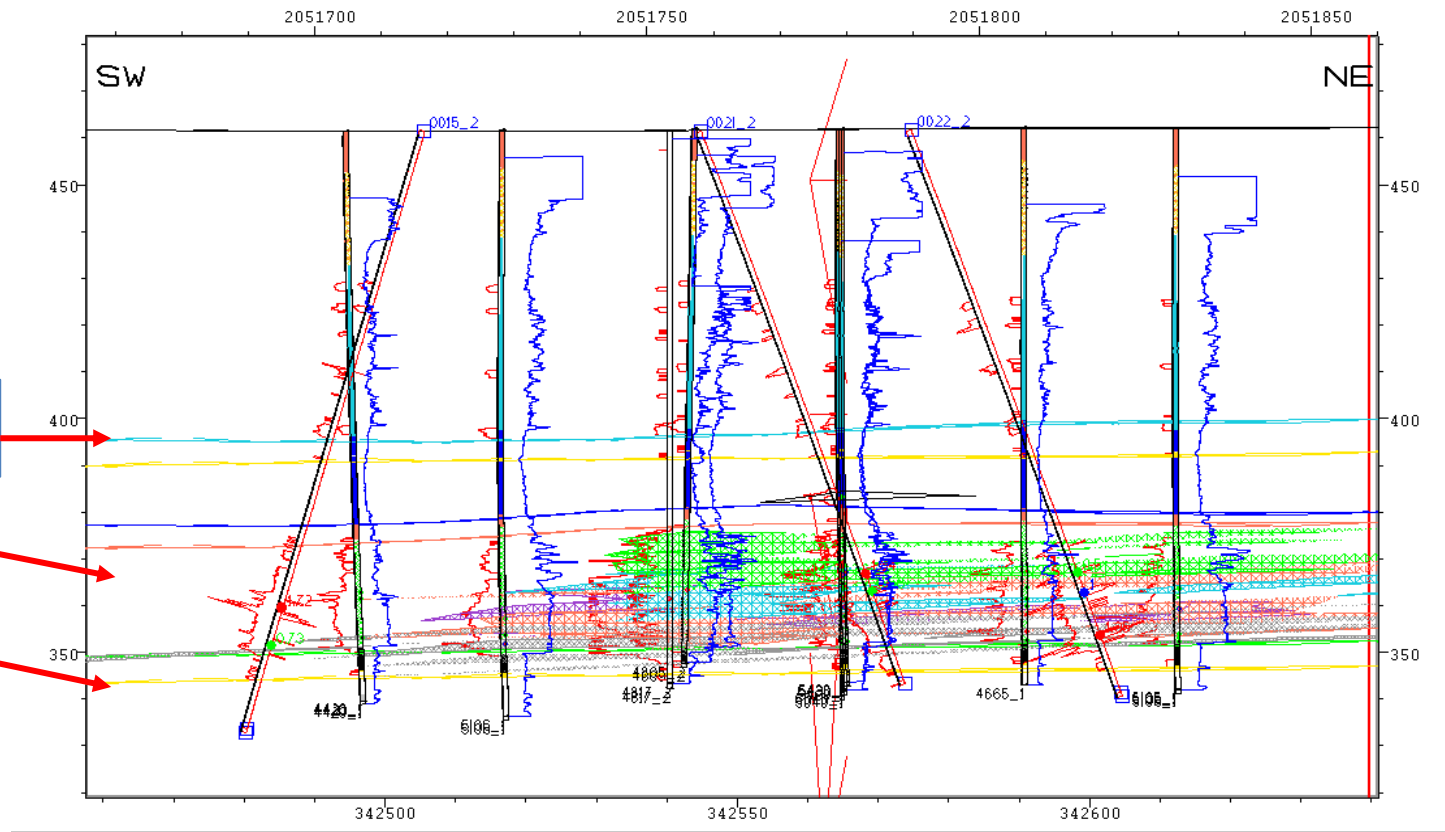
Stratigraphic surfaces:

- Basal reducing contact Guez/Talak
- Top reducing surface of TM paleohorizontal unit (within Blue Grey of Tchinezogue).

TM paleohorizontal surface

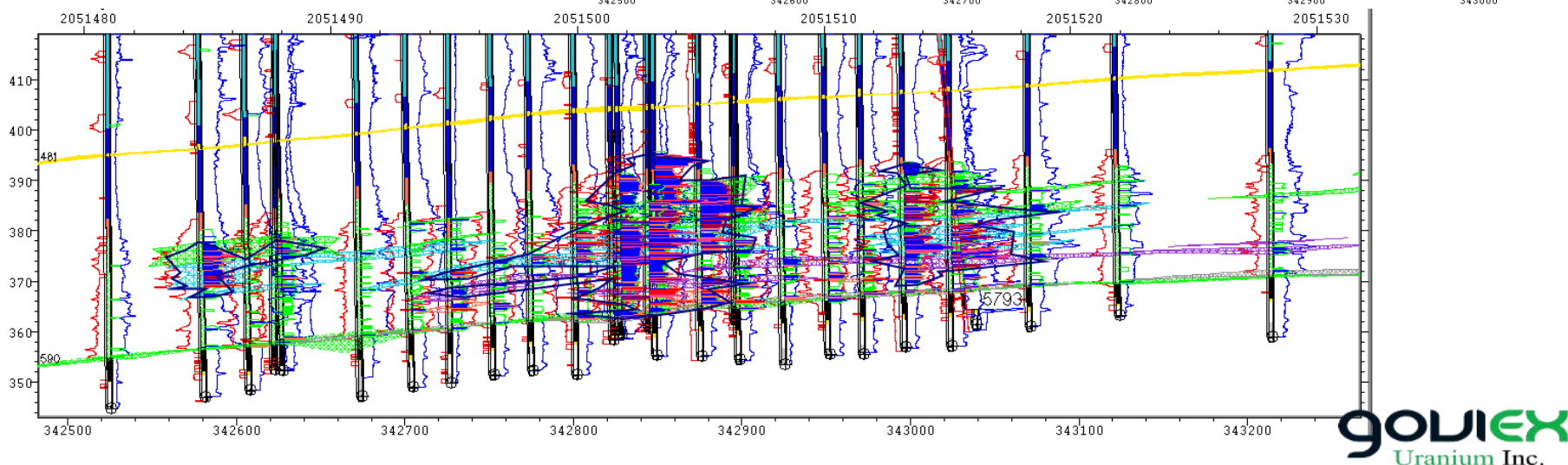
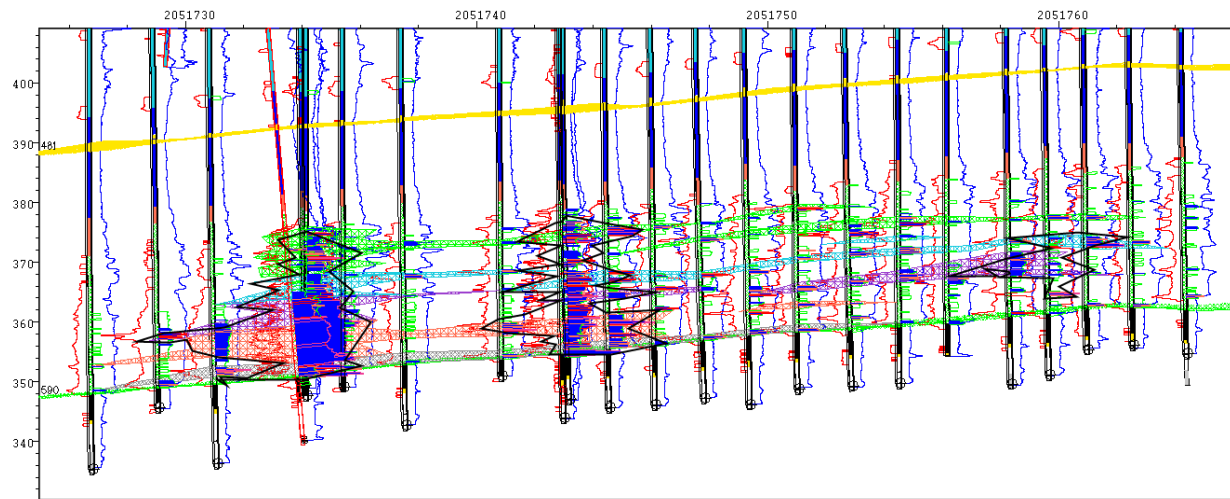
Interpreted 'pseudo seams'

Guez basal surface



Combining sequences and mineralisation (intervals at eU 200, 400 and 1,000 ppm)

The rich zones are related to the intersection of discrete expansion faulting with favorable sedimentology units, resulting in the “Christmas tree” aspect of the high grade zones





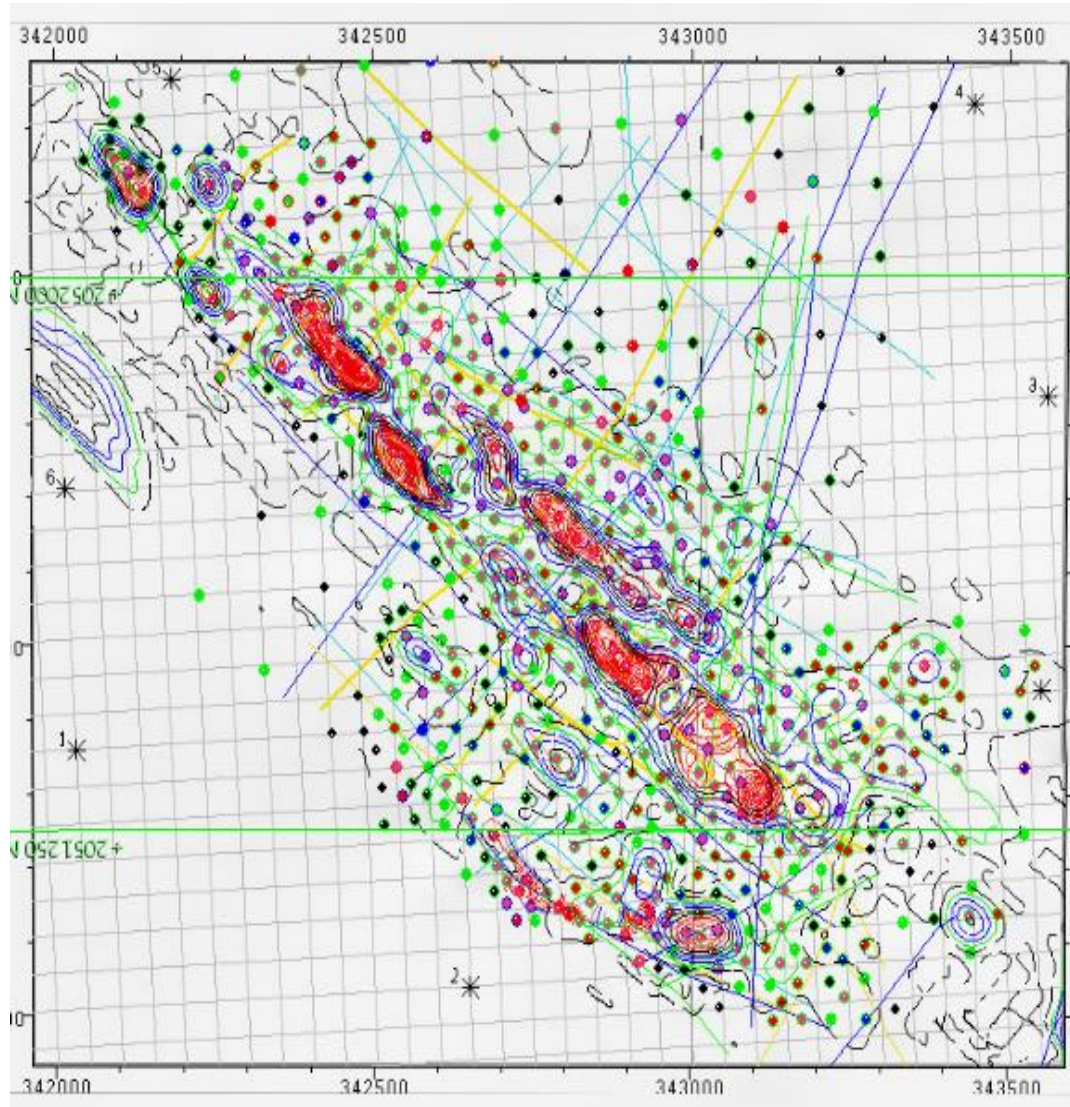
CORE OBSERVATIONS

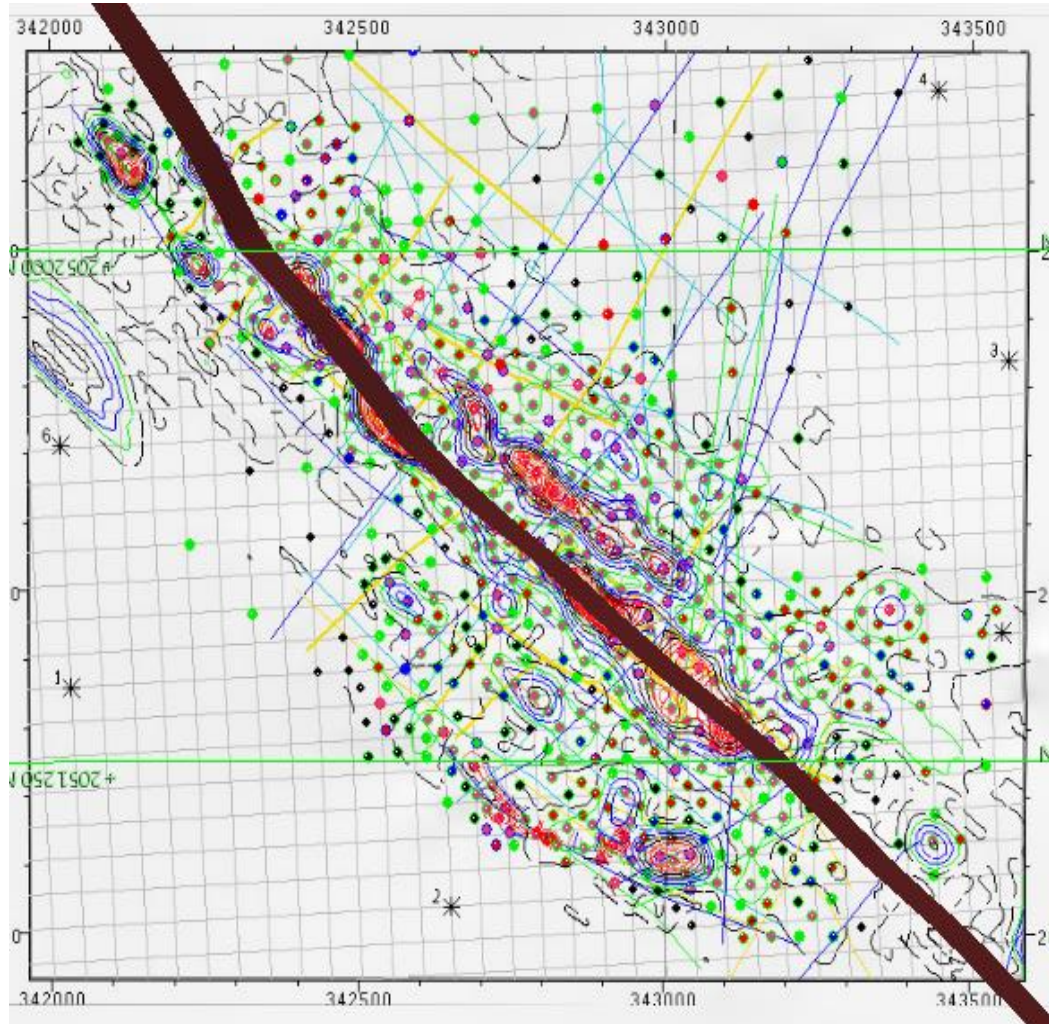
fluid circulation associated to joints may explain the vertical expansion of the mineralization

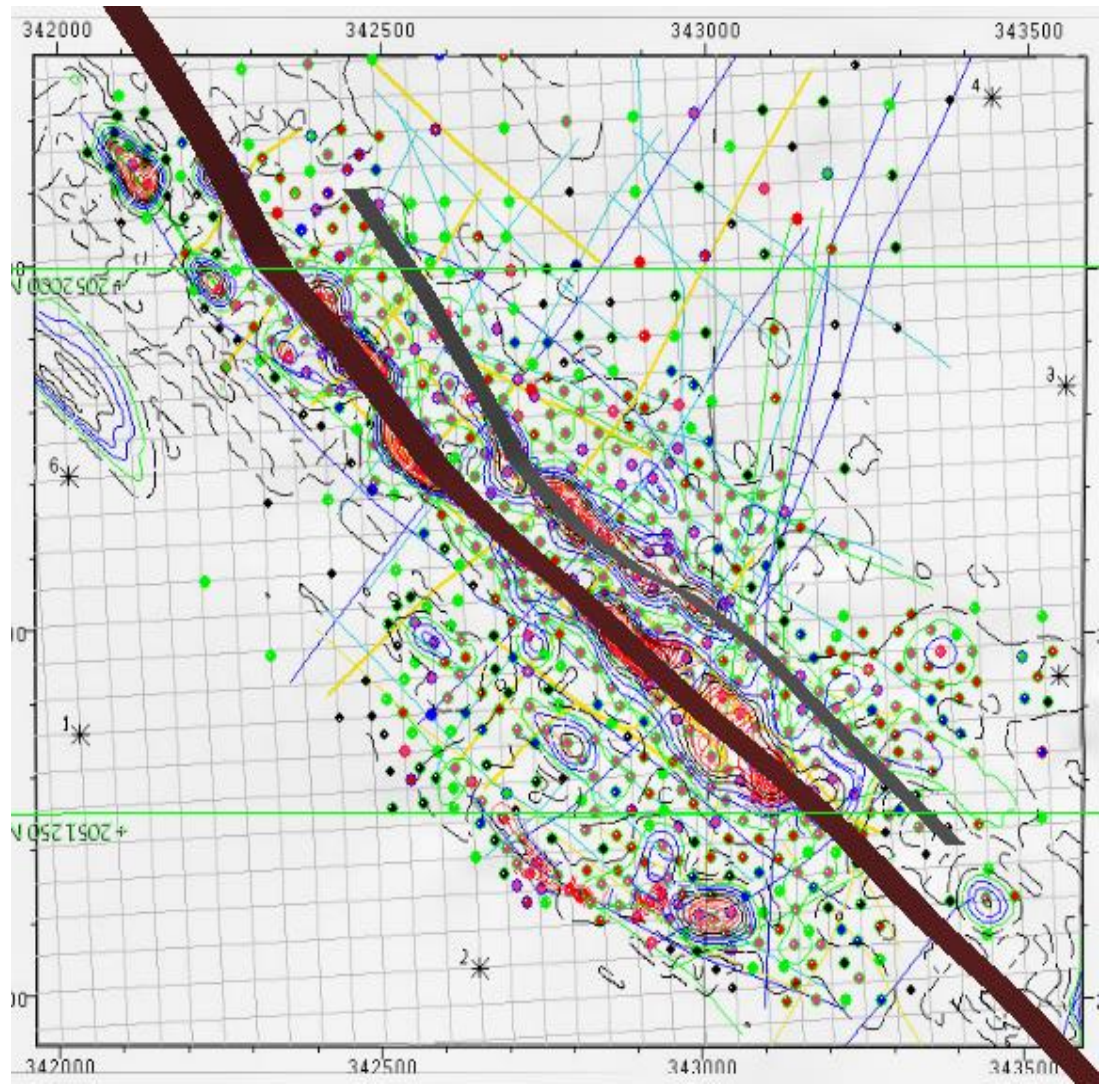
Geological Model

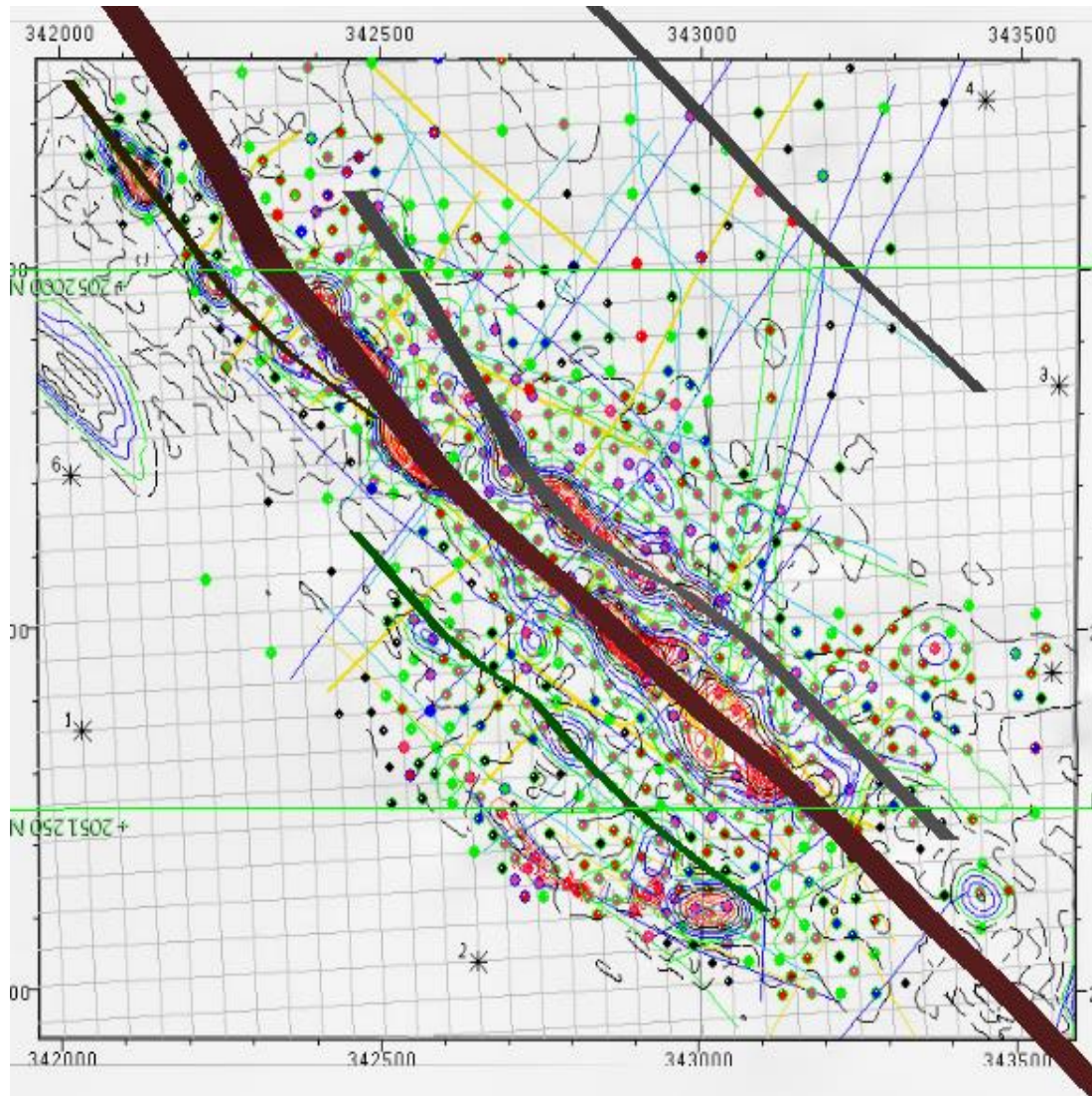
- Step 2 Vertical coalescent mineralisation: related to a redox front associated with discrete structures:
 - Trends defined using isopach of cumulated Mineralised Thickness (Th) and Accumulation ($\text{Grade} \times \text{Th}$)
 - Plots of main joints and faults recorded on core holes (vertical and inclined) using acoustic and televiewer survey
 - Geotechnical logs on oriented cores

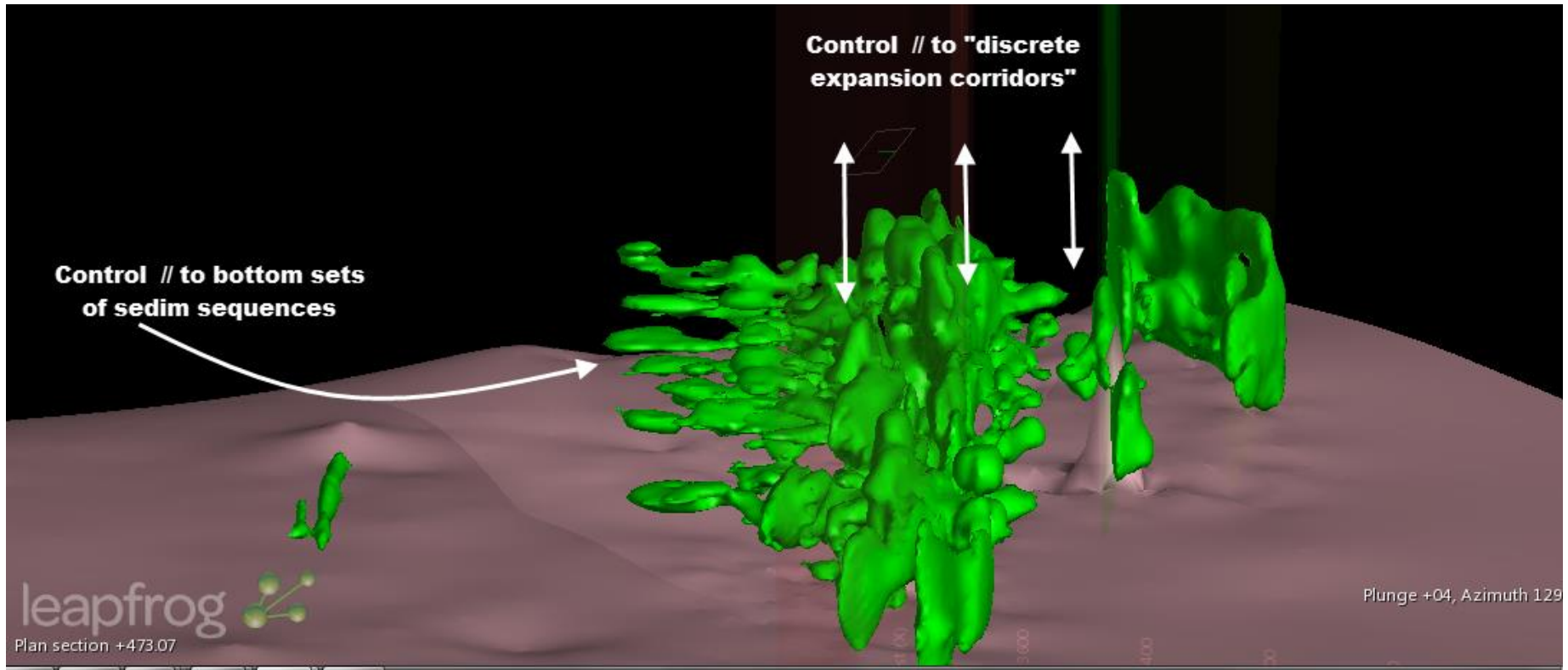
Drilling situation – 31 January 2013

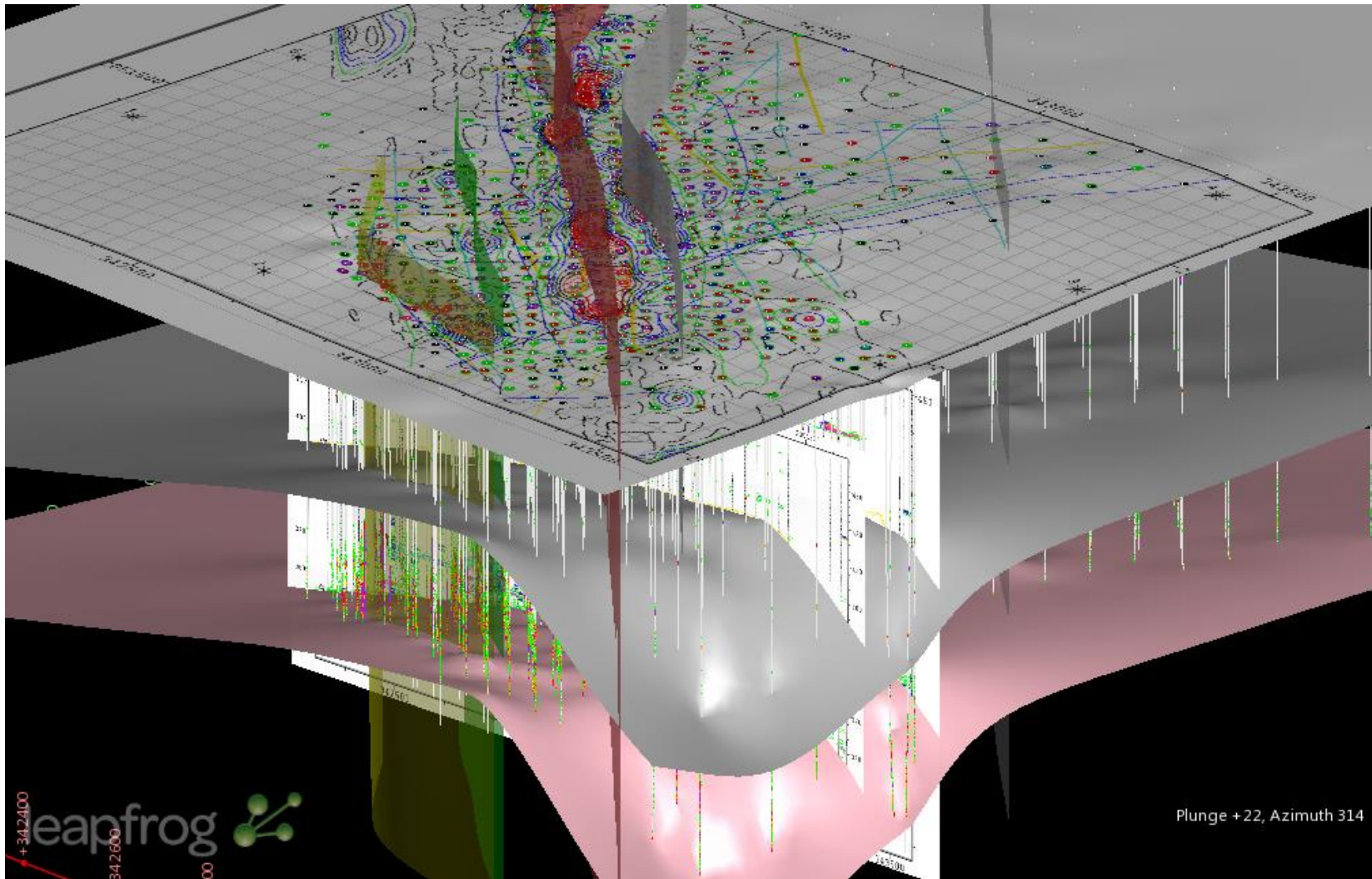






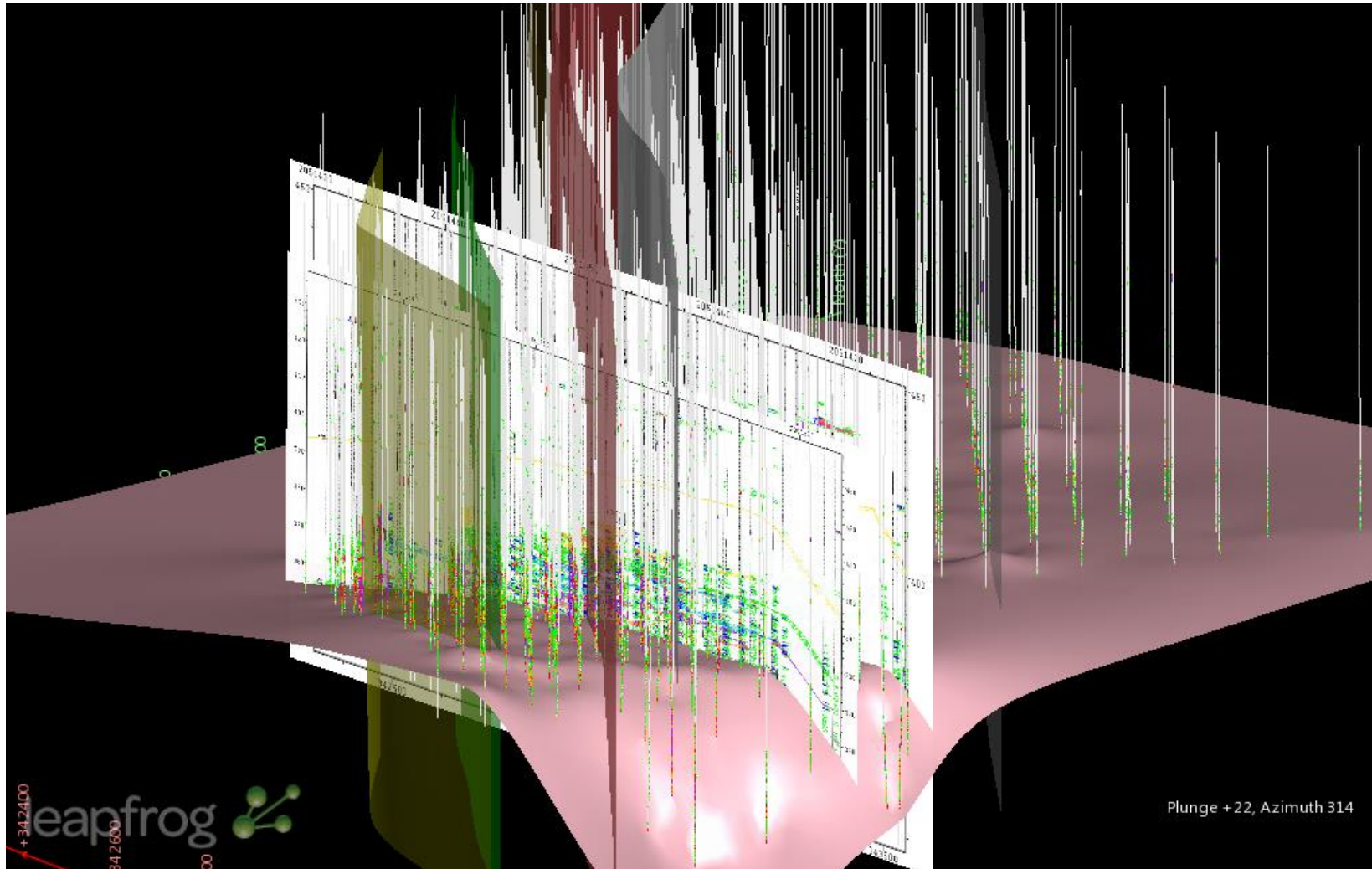






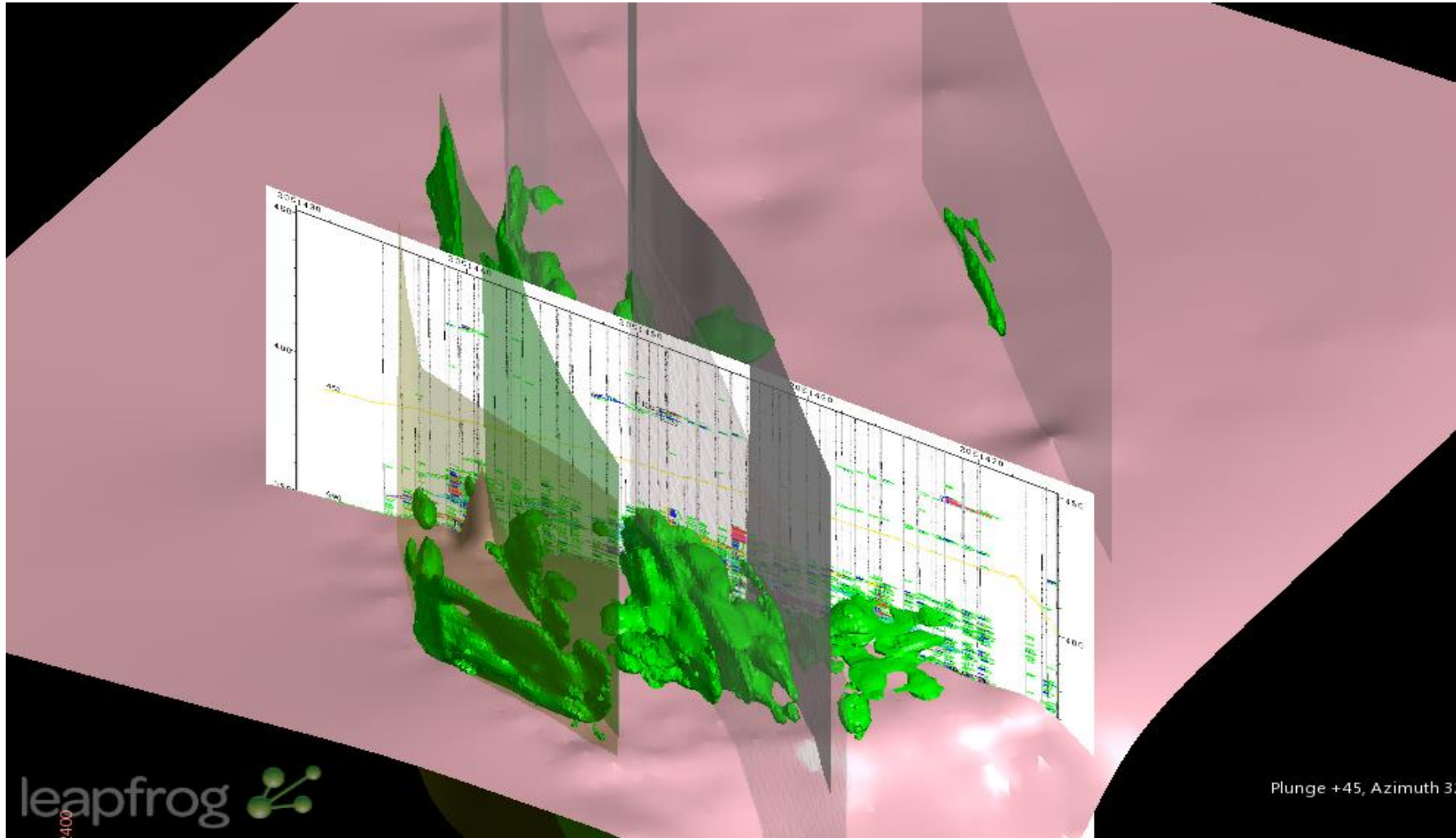
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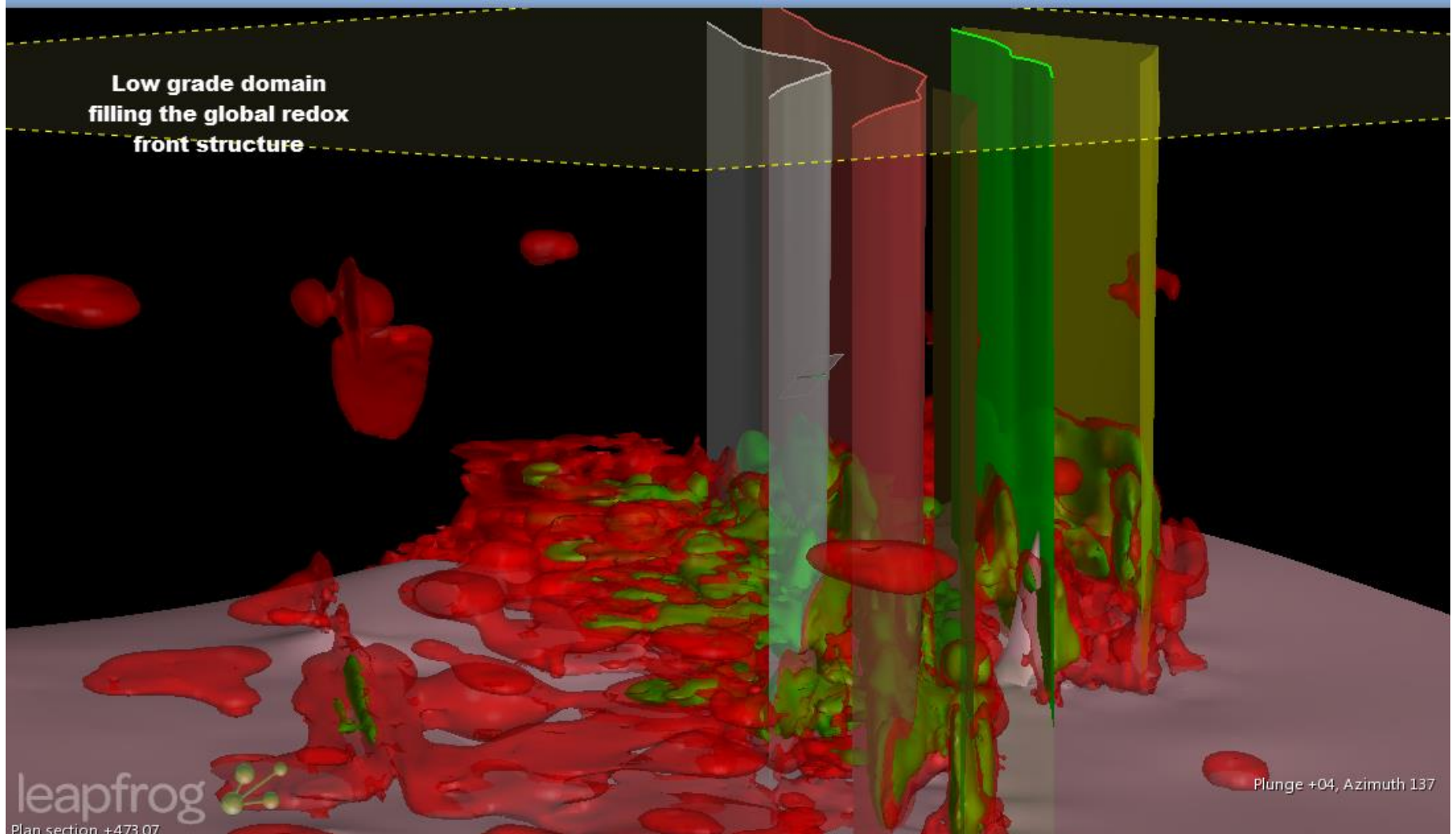
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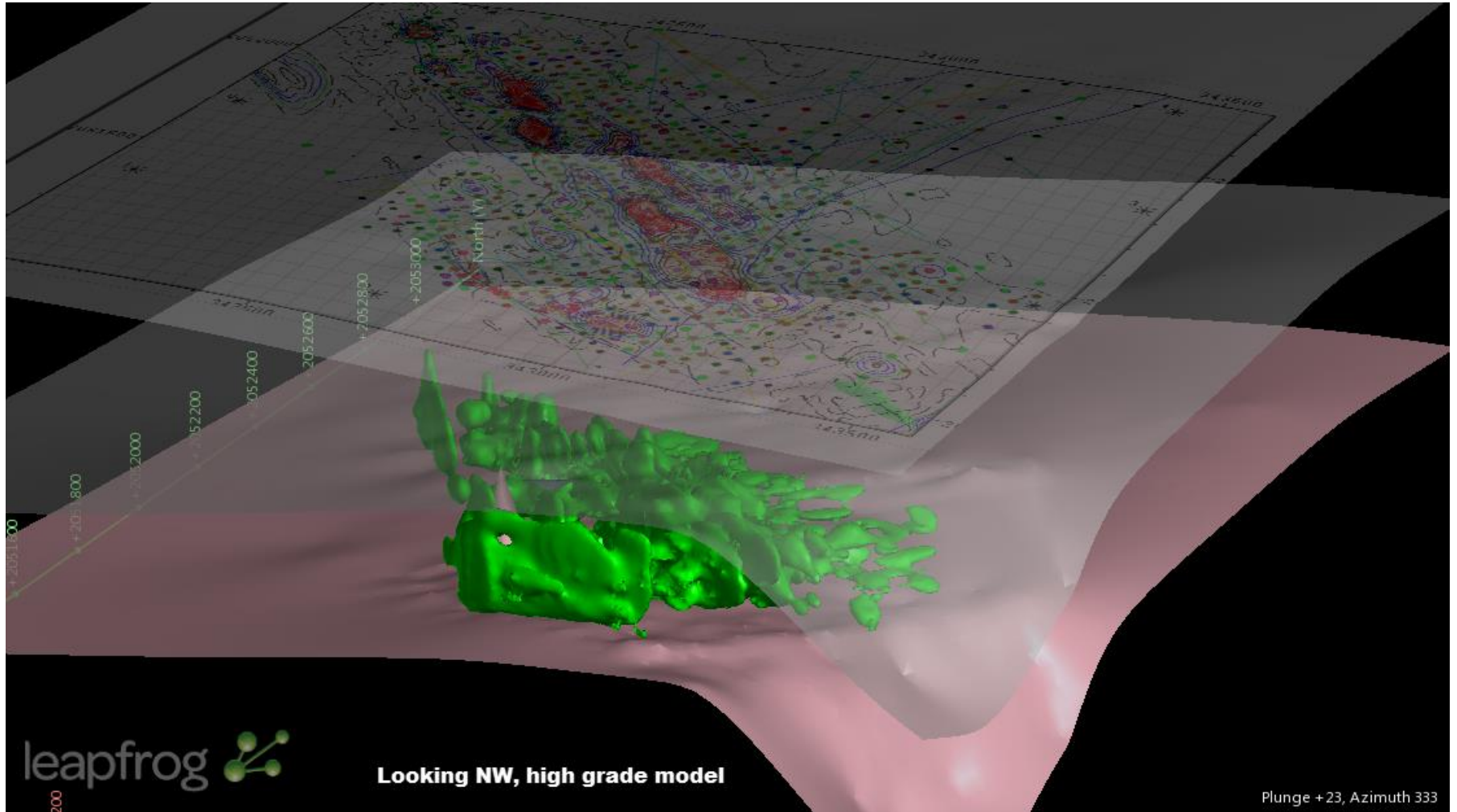
Plunge +45, Azimuth 3

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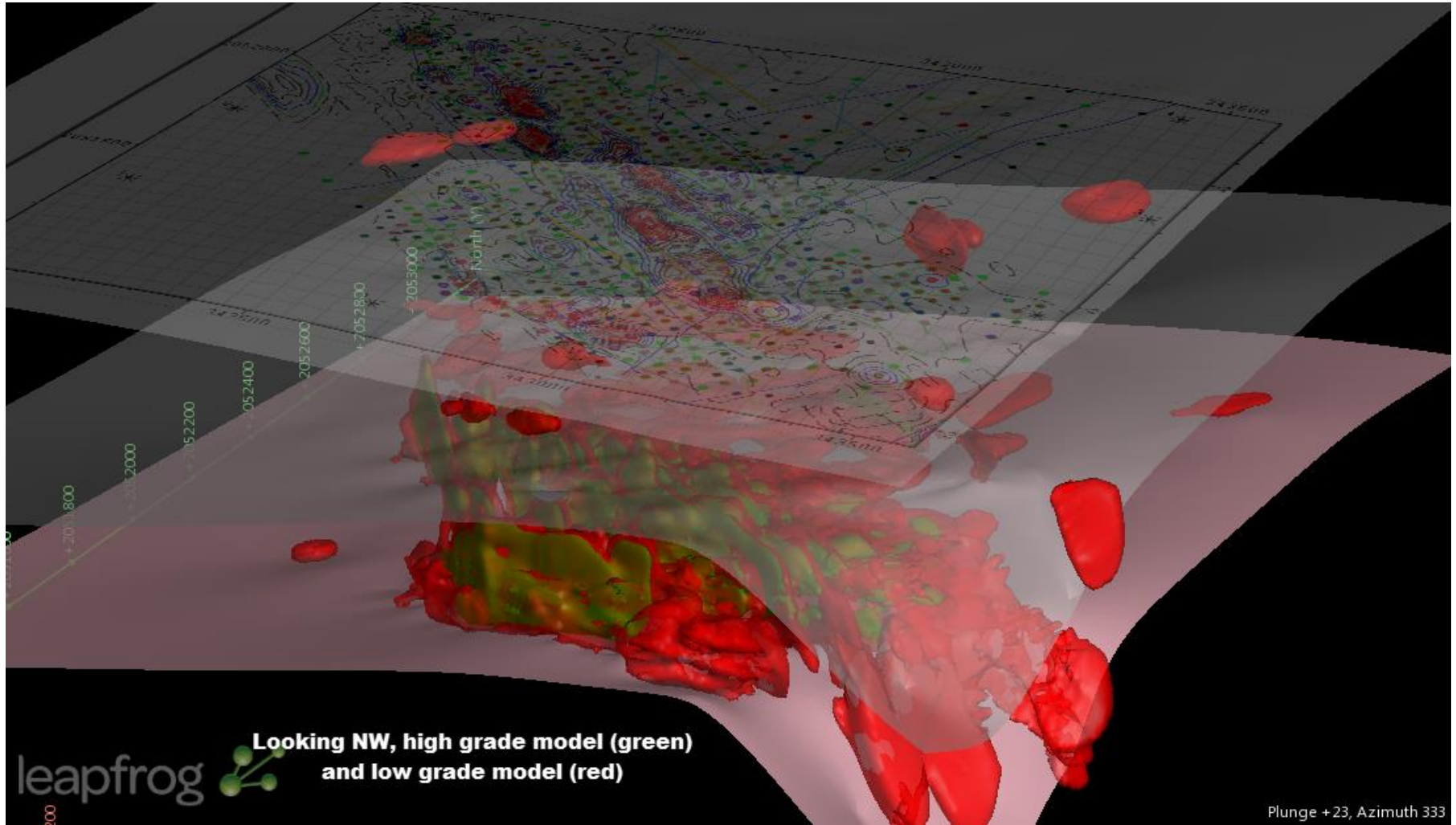
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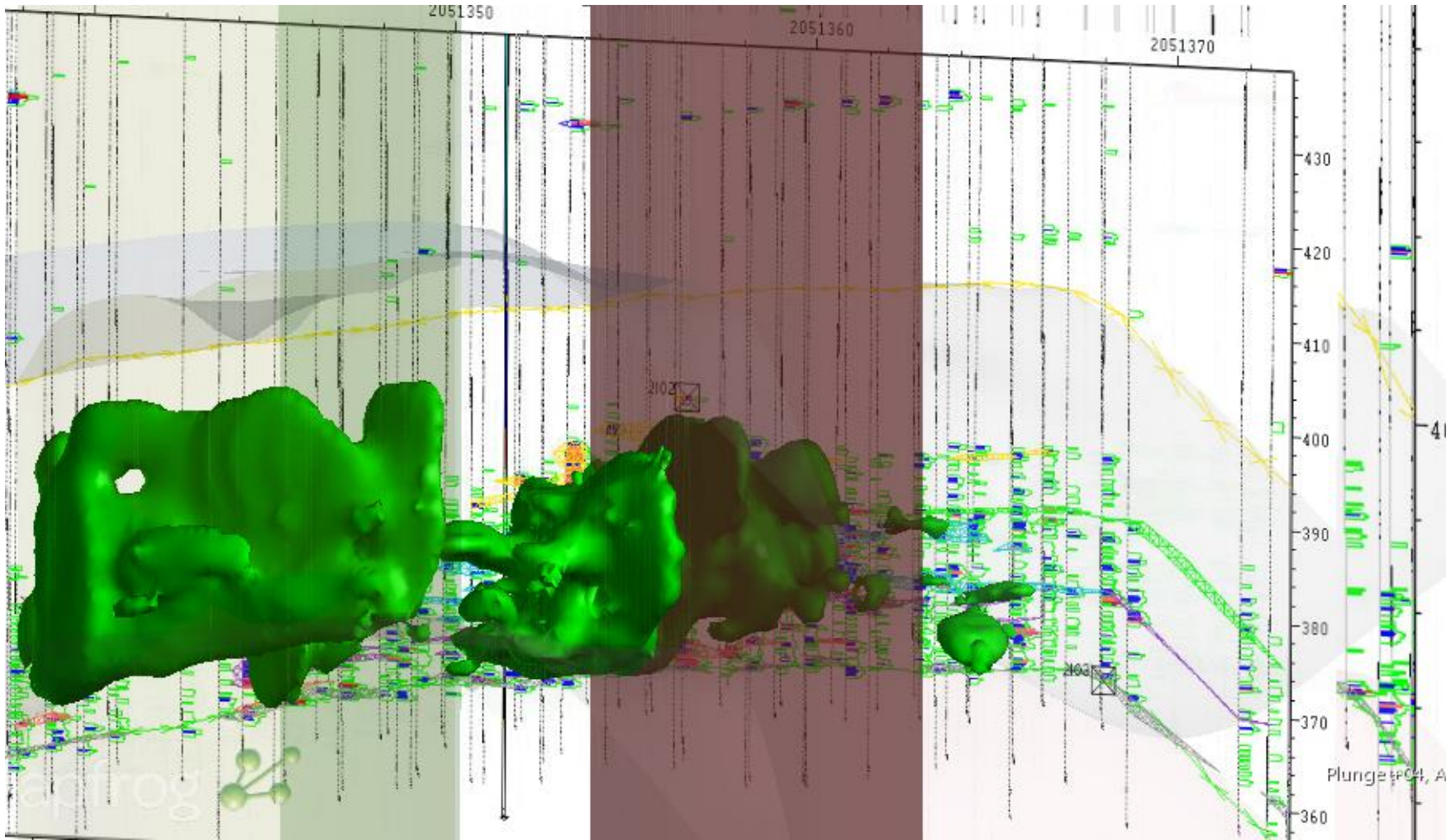


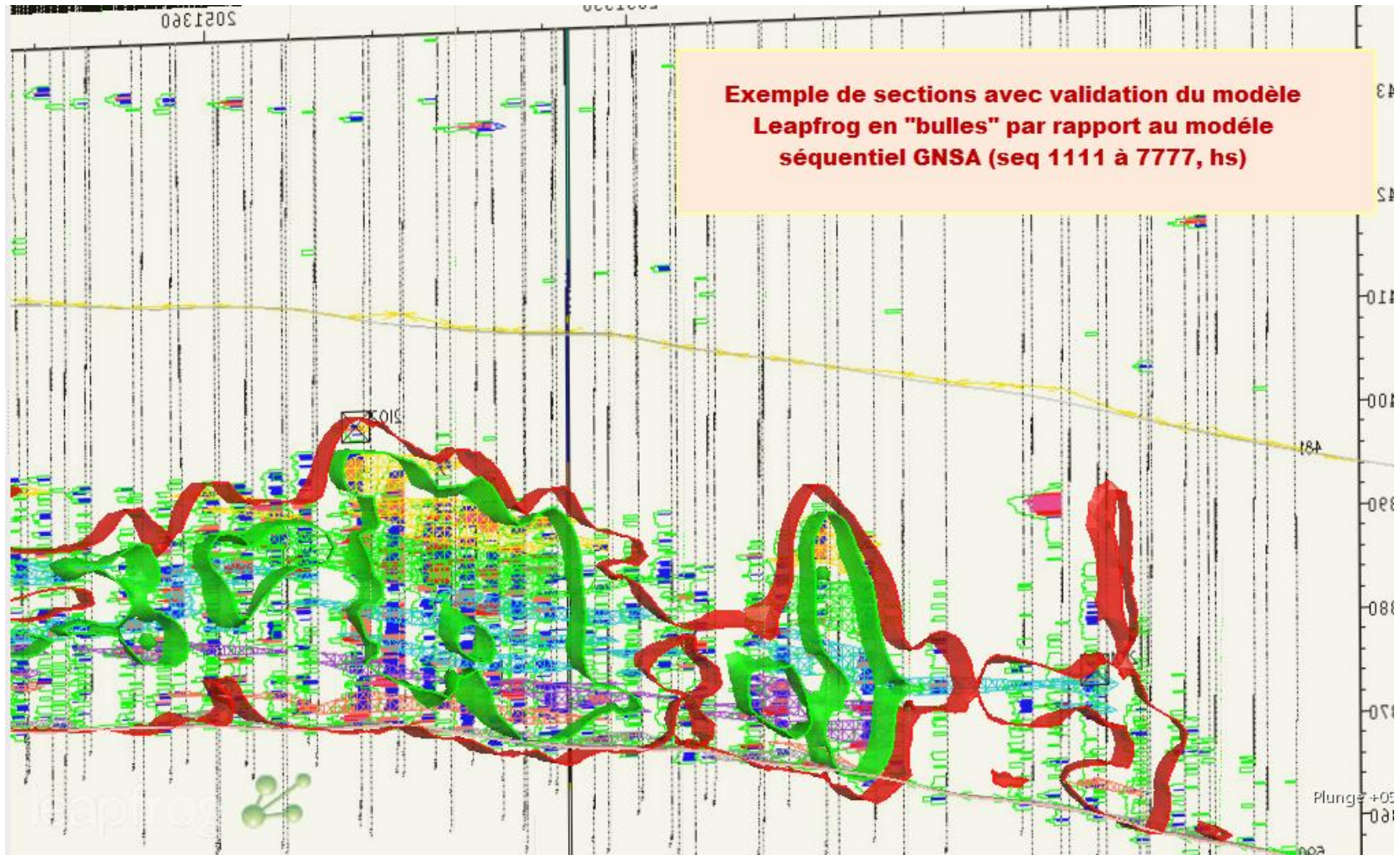
Looking NW, high grade model

Plunge +23, Azimuth 333





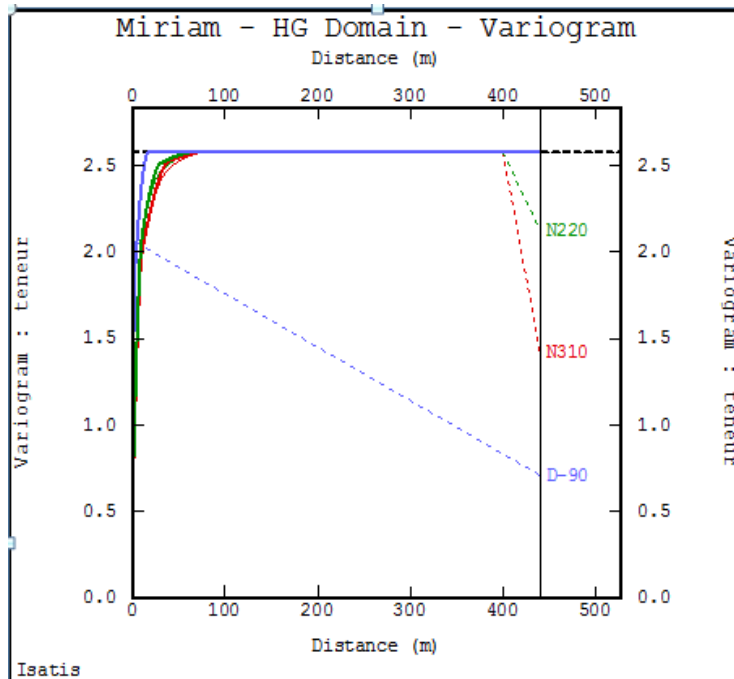




Miriam: 3D Estimation (SRK D Guibal)

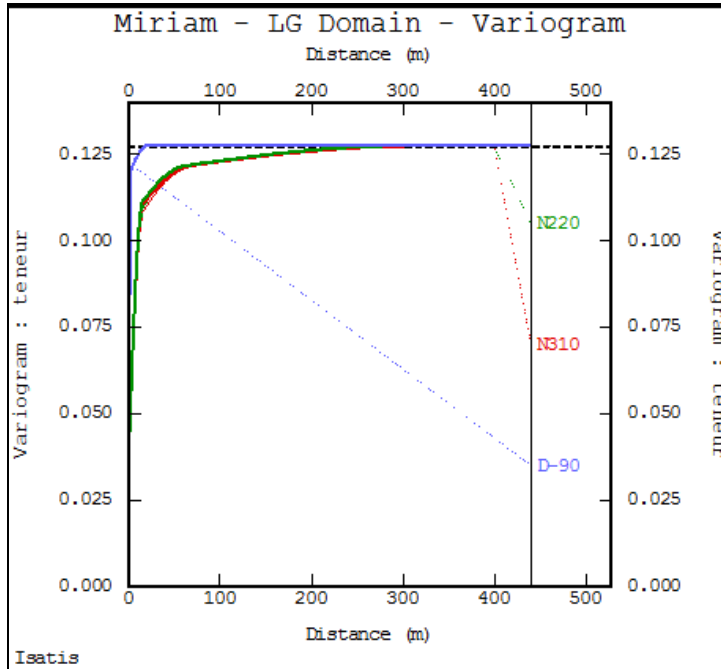
- Data: Drilling density varying from 100 m x 100 m to 30 m x 30 m (50 m grid centres) – 803 drillholes
- 20 cm composites flagged based on interpretation of mineralisation by GoviEx and remodelled in 3D by SRK using Leapfrog 3D (P Gleeson)
- 2 grade shells: 400 ppm eU (high-grade corridors)
200 ppm eU (background mineralisation)
- The JORC Classified Resources are defined at a 400 ppm eU cut-off (approximately 0.047% eU₃O₈ - selective mining unit (SMU) of 5 m x 5 m x 0.4 m is assumed)

Variography HG Domain



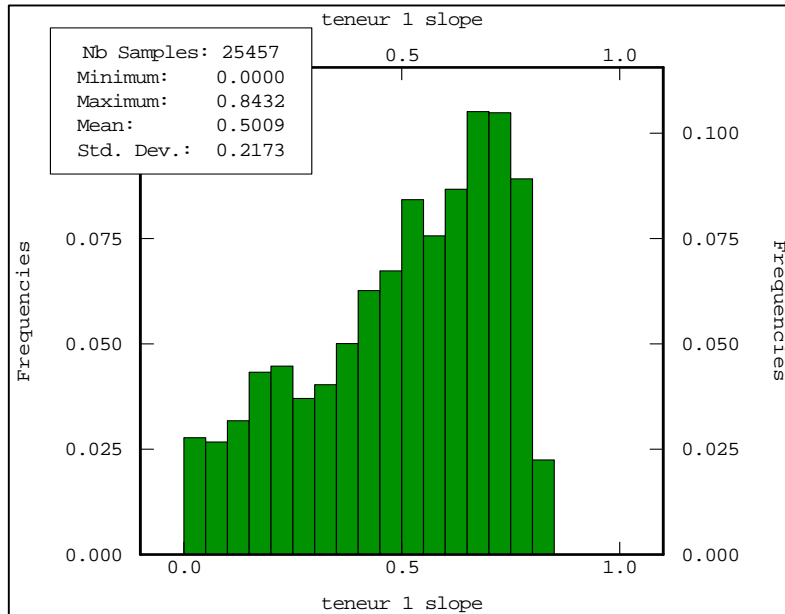
- eU variability requires Gaussian transformation and back-transformation
- Short-range structure predominant
- Some longer range structures, N310, but less than 100 m

Variography LG Domain



- eU variability requires Gaussian transformation and back-transformation
- Short-range structures predominant
- Some longer range structures, N310 up to 250 m (less variability than HG Domain)

Block Kriging



- 25 m x 25 m x 0.4 m blocks rotated by 47° to align with the data grid
- Ordinary Kriging
- Anisotropic Neighbourhood (150 m x 5 m x 75)
- Up to 32 data per kriging
- Top-cuts (10 kg/t eU in HG, 5kg/t eU in LG domain for data >2 m away from a block)
- 25457 (HG) and 85499 (LG) blocks are estimated
- Kriging quality reasonable as seen from the regression slope
- Significant smoothing effect

Estimation method: Uniform Conditioning

- 25 m x 25 m x 0.4 m blocks are the smallest blocks which can be estimated with a reasonable quality because of the drilling density and the variography (high nugget effect)
- In Open Pit mining, high selectivity assumption based on radiometric grade control: SMU 5 m x 5 m x 0.4 m
- Classical Uniform Conditioning estimation
- Classification: Ordinary kriging works reasonably well, and the current drilling density makes the interpretation of the continuity of the mineralisation and its modelling reasonable
- Based on similar deposits nearby, a 25 m spacing is considered sufficient to define Measured Resources.

Localised Uniform Conditioning

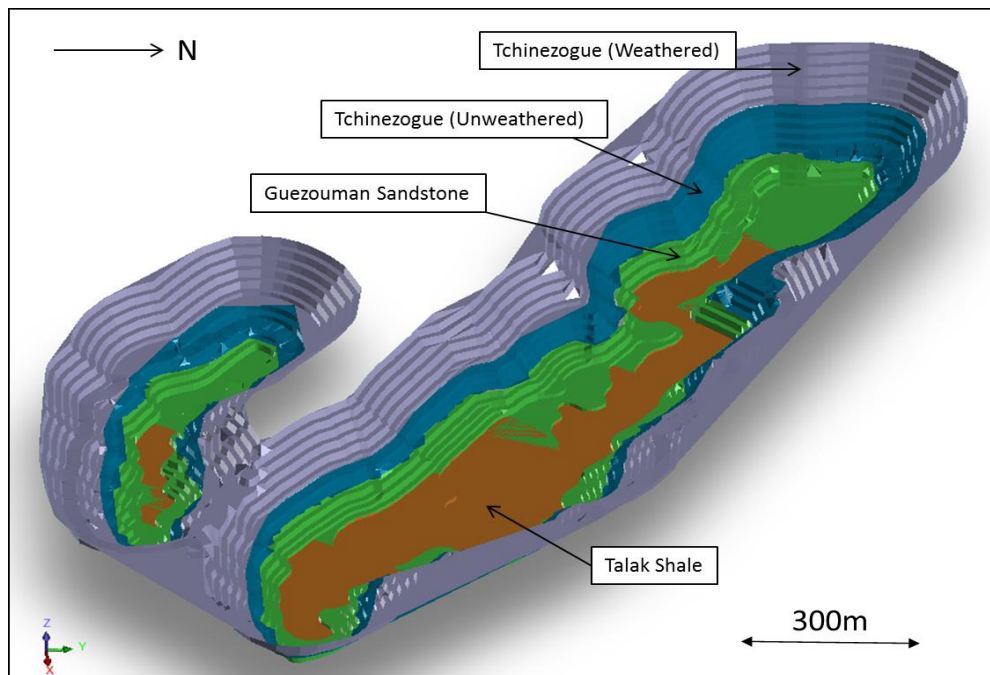
- A limitation of the traditional UC method is that the pit geometry is dictated by the large blocks 25 m x 25 m
- To assist pit definition, it is possible to localise the results of the UC (this procedure is essentially an *ad hoc* technique to facilitate pit optimisation)
- Procedure (after Marat Abzalov):
 - Define a 5 m x 5 m x 0.4 m BM coincident with the original UC panels' BM
 - Perform an OK of eU within this BM using the same parameters as the one used for the OK performed prior to UC
 - Within each 25 m x 25 m panel, rank the SMUs by increasing value of this OK
 - Assign a grade to the ranked SMUs in the panel (defined by the grade-tonnage curve of the SMUs, as estimated by UC).

Resources – March 2013 (SRK)

MIRIAM

Classification	Tons (Mt)	Grade (kg/t eU ₃ O ₈)	eU ₃ O ₈ (t)	eU ₃ O ₈ (Mlb)
Marianne/Marilyn				
Indicated	12.09	1.58	19,145	42.21
Inferred	2.05	1.40	4,285	9.45
Miriam (Open Pit option)				
Measured	9.62	1.08	10,397	22.92
Indicated	2.68	0.79	2,112	4.66
Inferred	0.58	1.33	773	1.70
MSNE				
Indicated	5.05	1.61	8,111	17.88
Inferred	0.10	1.34	131	0.29
MARYVONNE				
Indicated	1.23	1.79	2,195	4.84
Inferred	0.42	1.66	703	1.55
MSCE				
Inferred	0.72	1.81	1,308	2.88
MSEE				
Inferred	1.45	1.64	2,373	5.23
LA BANANE				
Indicated	1.57	1.64	2,589	5.71
Inferred	1.15	1.18	1,358	2.99
Total Measured	9.62	1.08	10,397	22.92
Total Indicated	22.63	1.51	34,153	75.30
Total Inferred	7.47	1.46	10,931	24.10

Cut-off 0.4 kg/t eU or 0.47 kg/t eU₃O₈



Deposit	Cut-Off	Uranium Metal			Uranium Oxide		
		(Mt)	eU (kg/t)	eU (t)	U ₃ O ₈ (kg/t)	U ₃ O ₈ (t)	U ₃ O ₈ (Mlb)
Miriam	0.41	6.4	0.98	6300	1.16	7,400	16,38

Cut-off 0.41 kg/t eU

Open Pit Mineral Reserves are reported within a designed pit shell at a cut-off grade of 0.41 kg/t eU. Cut-off grades are based on a price of USD70 per pound of U₃O₈ (USD181.98/kg eU) and uranium recoveries of 84.4%, without considering revenues from other metals. Note Mineral Reserves are based on both Measured and Indicated Resources.

Thank you

