

Yanacocha

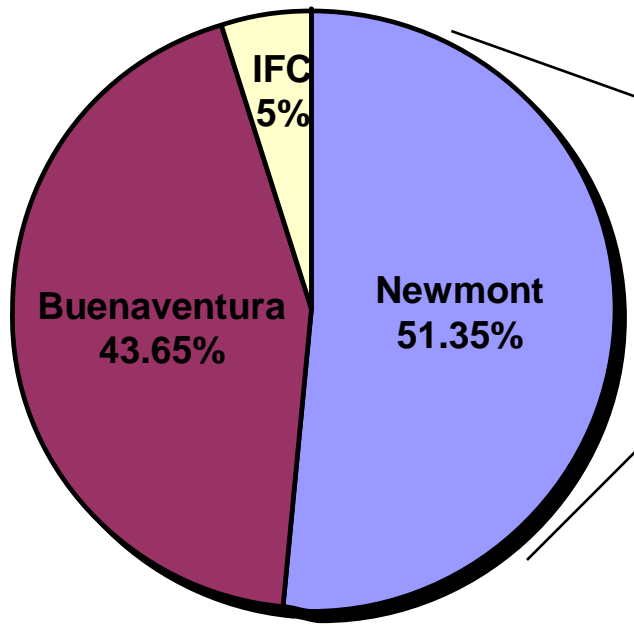
SIMEXMIN 2010 – IV BRAZILIAN SYMPOSIUM OF MINERAL EXPLORATION

Geologic Overview of the Yanacocha Mining District Cajamarca, Northern Peru

**Carlos Loayza – Jesus Reyes
Minera Yanacocha S.R.L.**

- ***Introduction***
- ***Regional Geology***
- ***District Geology***
- ***Deposit examples***

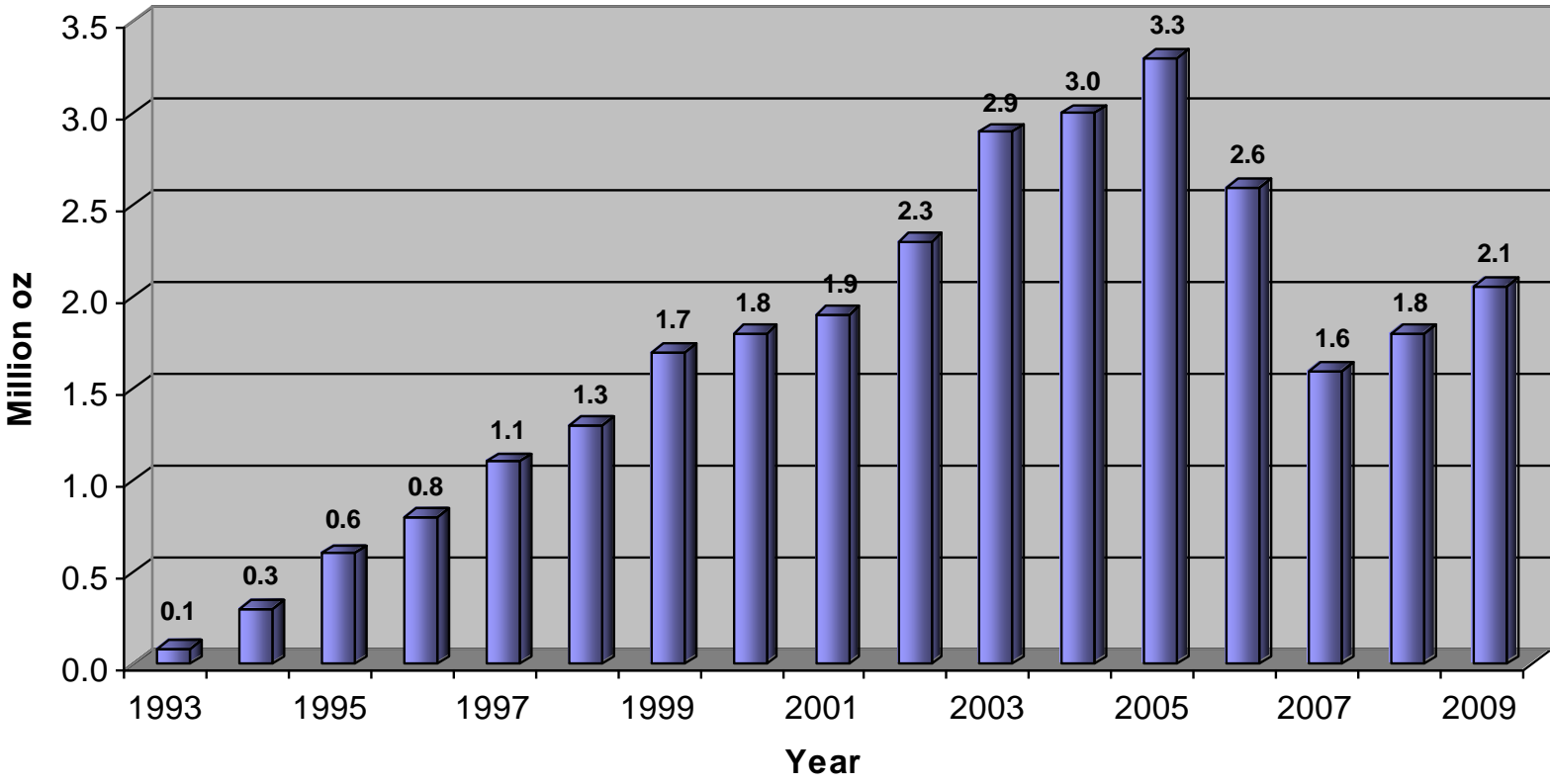
Location and Ownership



Production Profile



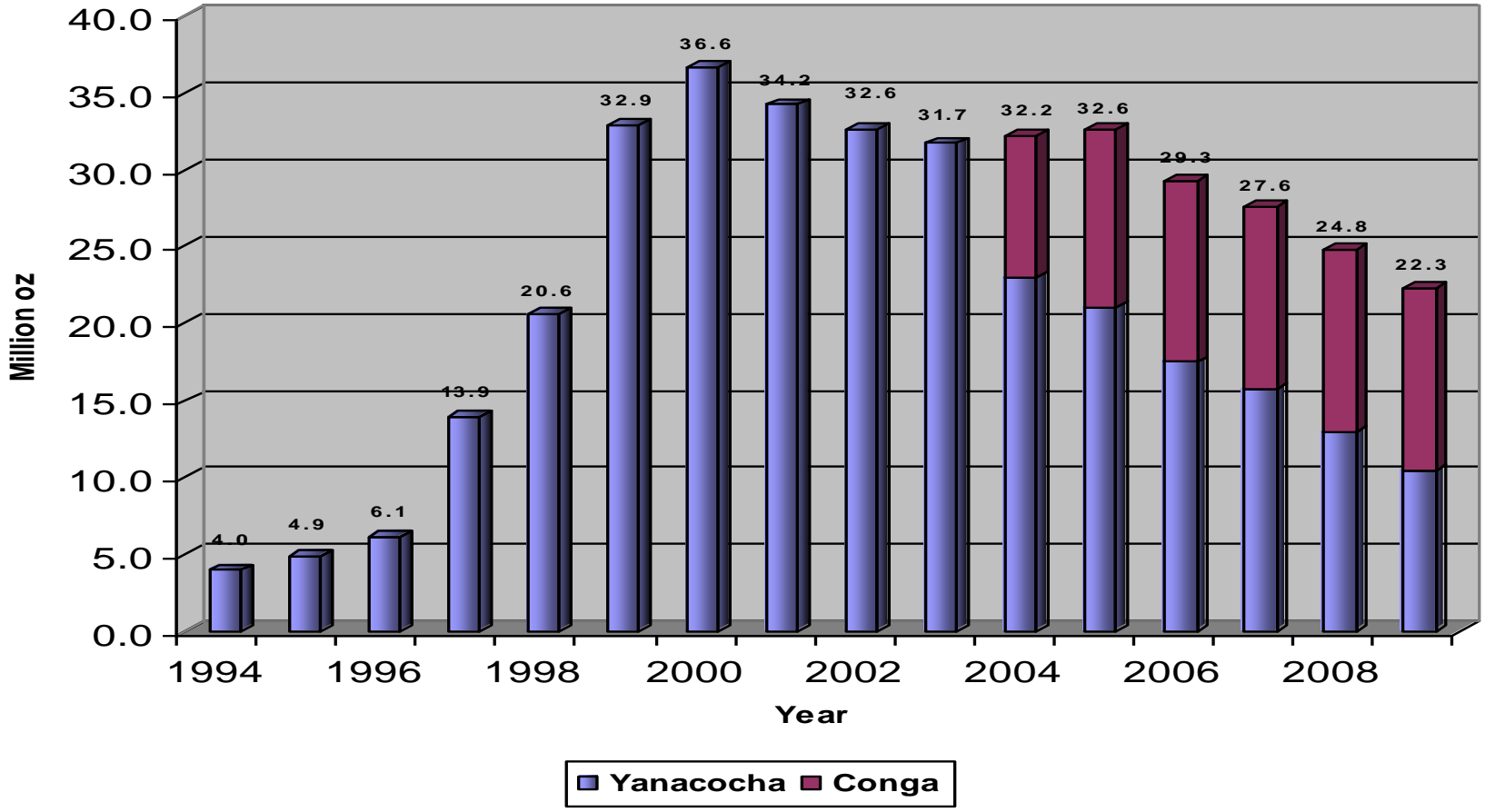
Production Profile - Million oz



Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Grade (g/t)	1.77	1.84	1.56	1.57	1.48	1.54	1.28	1.08	1.02	0.79	0.93	0.95	0.88	0.87	0.65	0.72	0.77
Total cash cost (\$/oz)	149	135	119	107	95	104	111	96	123	134	129	138	151	202	356	358	362

Reserves

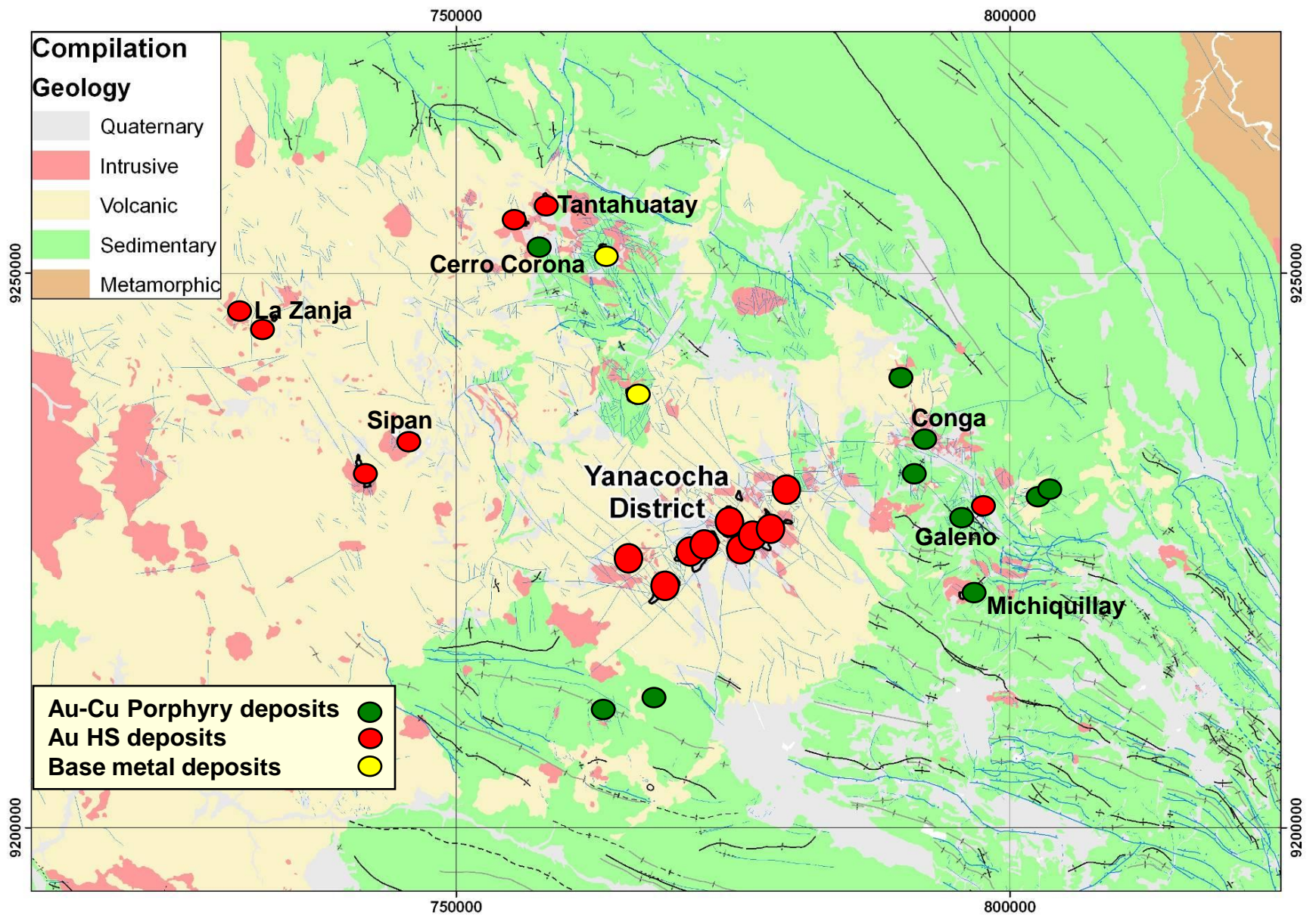
Reserve Million oz



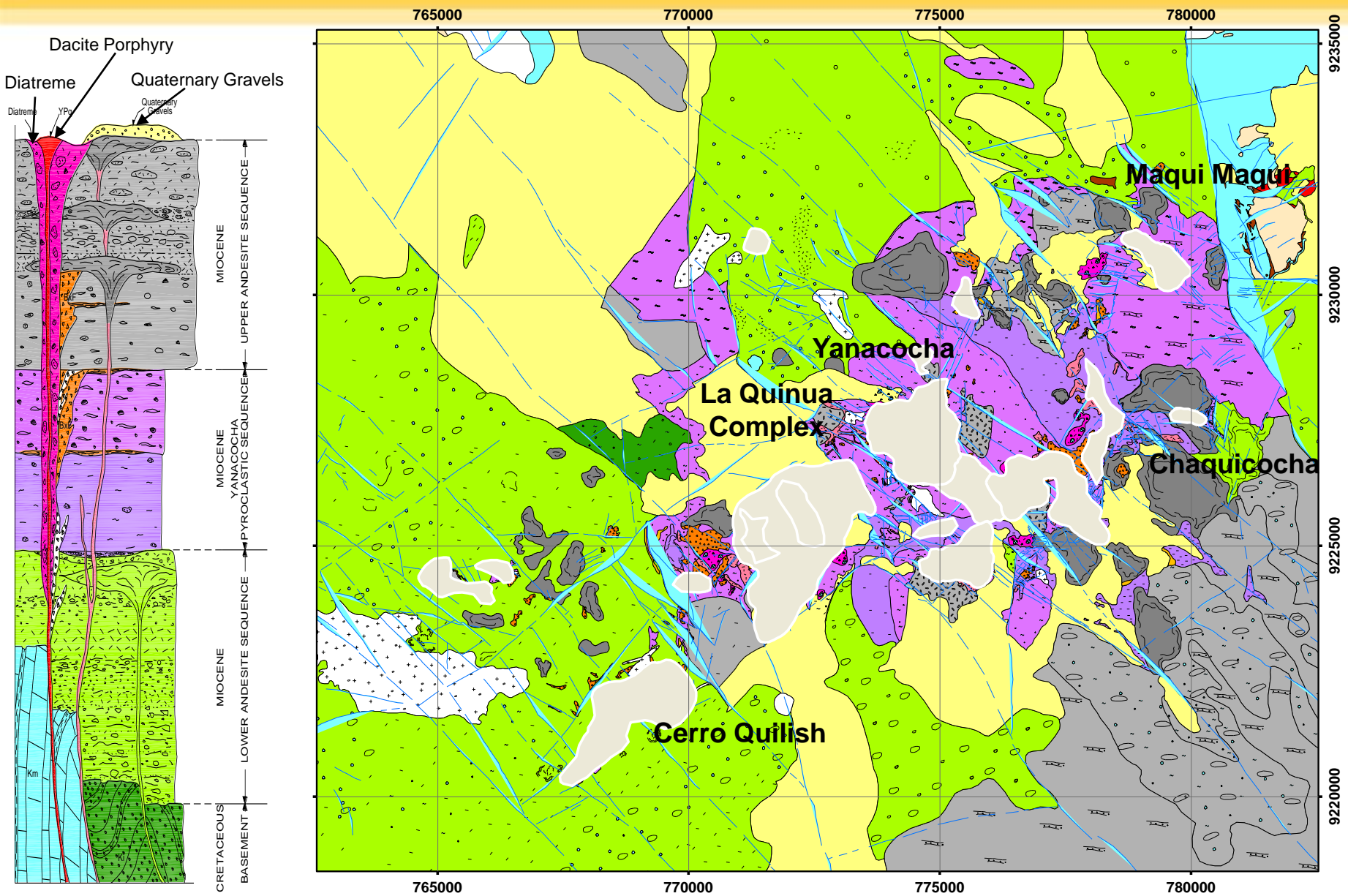
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Gold price (\$)	400	400	400	400	350	325	300	300	300	325	375	400	500	575	725	800

- **Pre-Inca mining (mercury)**
- **1968** *Nippon Mining - 13 holes (Cu)*
- **1969 - 1971** *BGS regional stream sediment survey*
- **1981** *Cedimin (BRGM) follow-up of BGS Pb and Ag anomalies*
- **1983** *Newmont visited the area for first time*
- **1984** *Joint Venture signed with Cedimin / Buenaventura*
- **1985** *Drilling - low grade Ag resource + narrow Au*
- **1986 - 1995** *Discovery of Yanacocha Sur + Norte, Carachugo, Maqui Maqui, San José, Encajon, Cerro Quilish and Cerro Negro.*
- **1993** *Carachugo production*
- **1996 - 1998** *Discovery of La Quinoa, El Tapado and Chaquicocha Sur Deposits*
- **1999 - 2000** *Discovery of Corimayo (blind oxide) Deposit*
- **2000** *Begin Exploration of District-Scale Au-Cu Sulfide Potential*
- **2001-2003** *New models of Exploration, discovery of Chaquicocha Alta, and Antonio.*
- **2004** *Discovery of Cerro Negro Deep Oxide and Giuliana Deposits*
- **2005** *Focus in Chaquicocha high grade sulfide*
- **2006** *Focus in Yanacocha verde, Au-Cu sulfide mineralization.*
- **2008 - 2009** *Discovery of Crater (Cu-Au mineralization), re-assessment gravel deposits.*

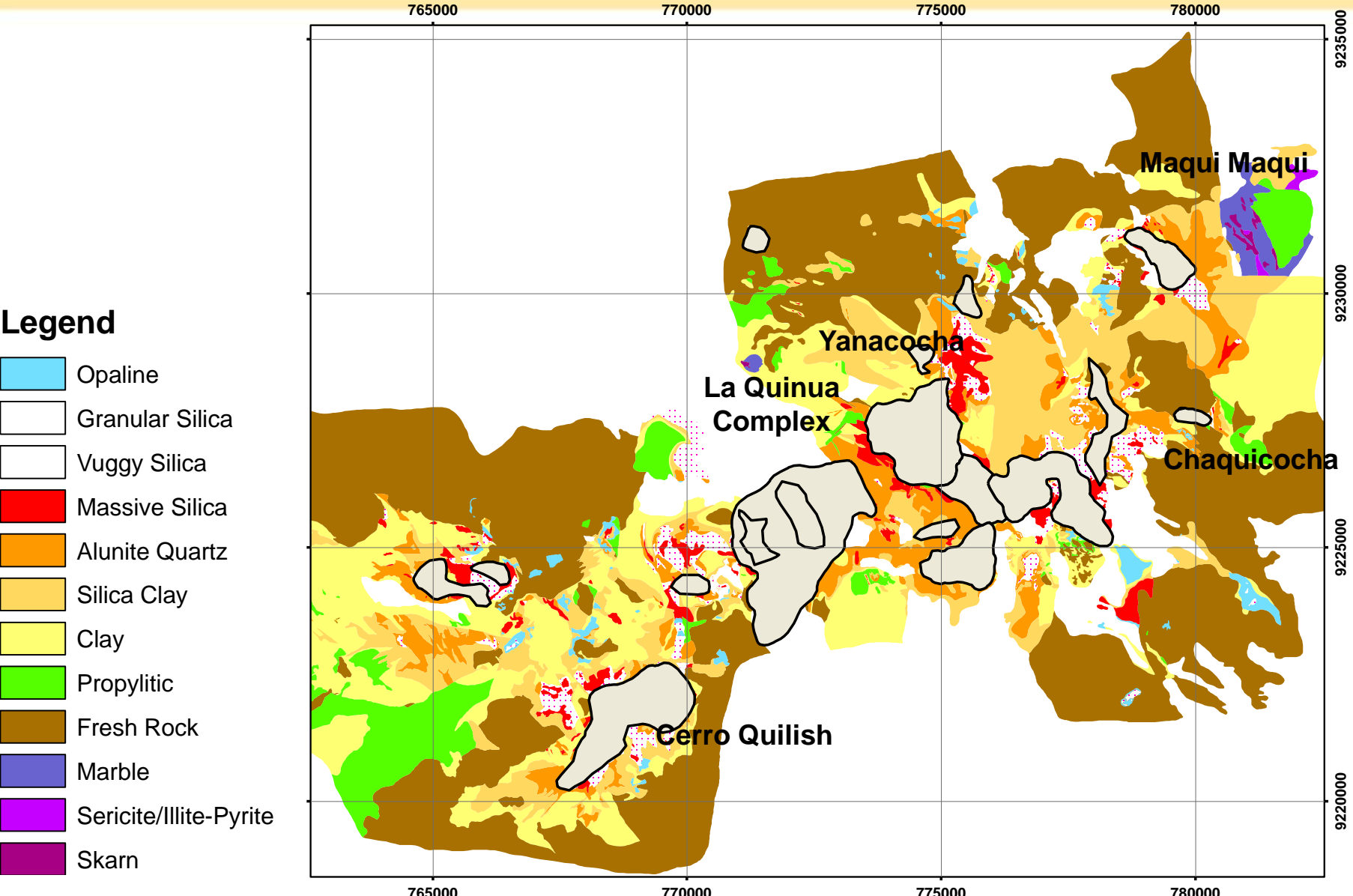
Regional Geology



District Geology - Lithology



District Geology - Alteration

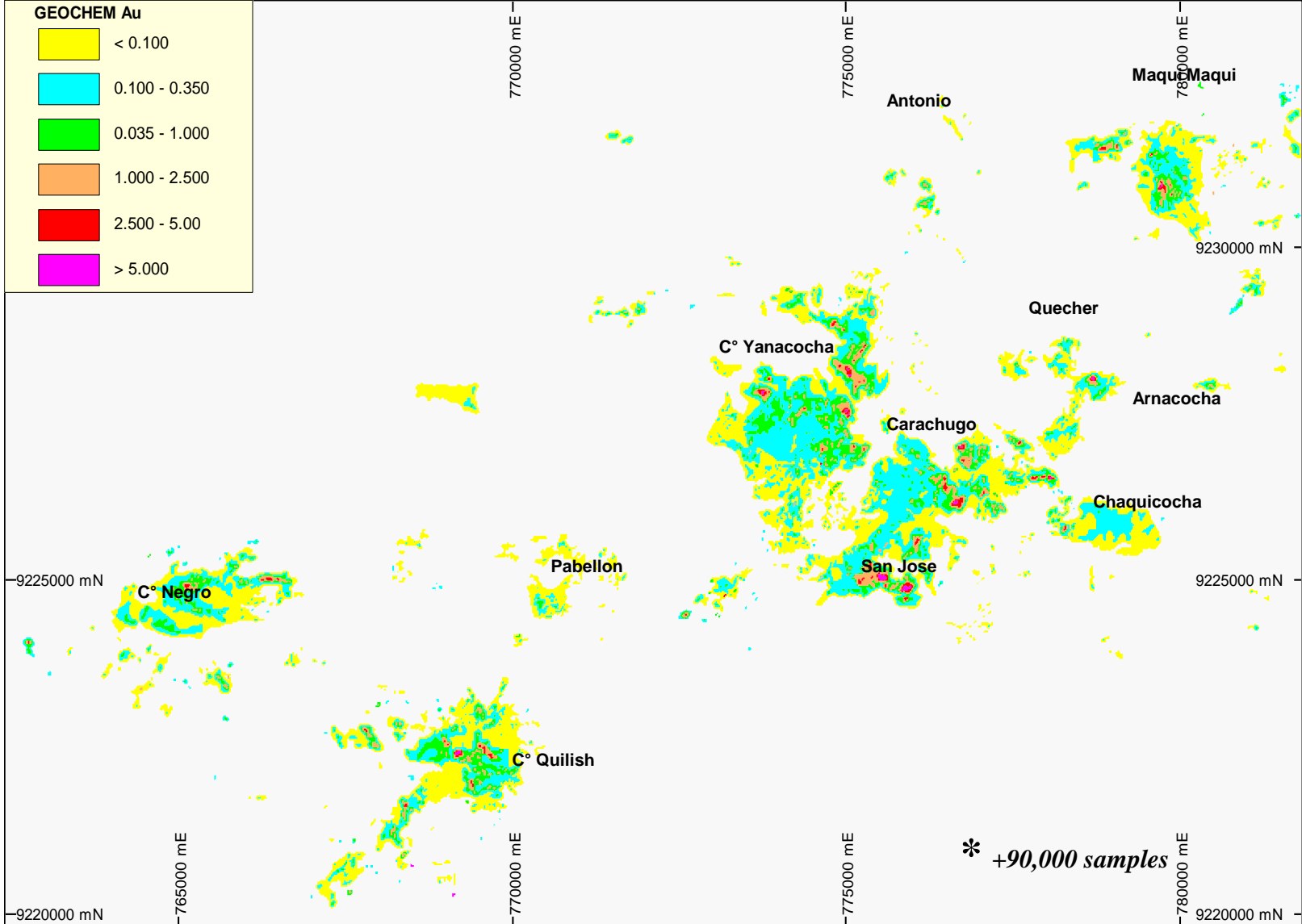


Legend

- Opaline
- Granular Silica
- Vuggy Silica
- Massive Silica
- Alunite Quartz
- Silica Clay
- Clay
- Propylitic
- Fresh Rock
- Marble
- Sericite/Illite-Pyrite
- Skarn

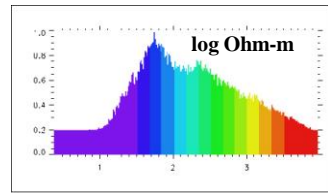
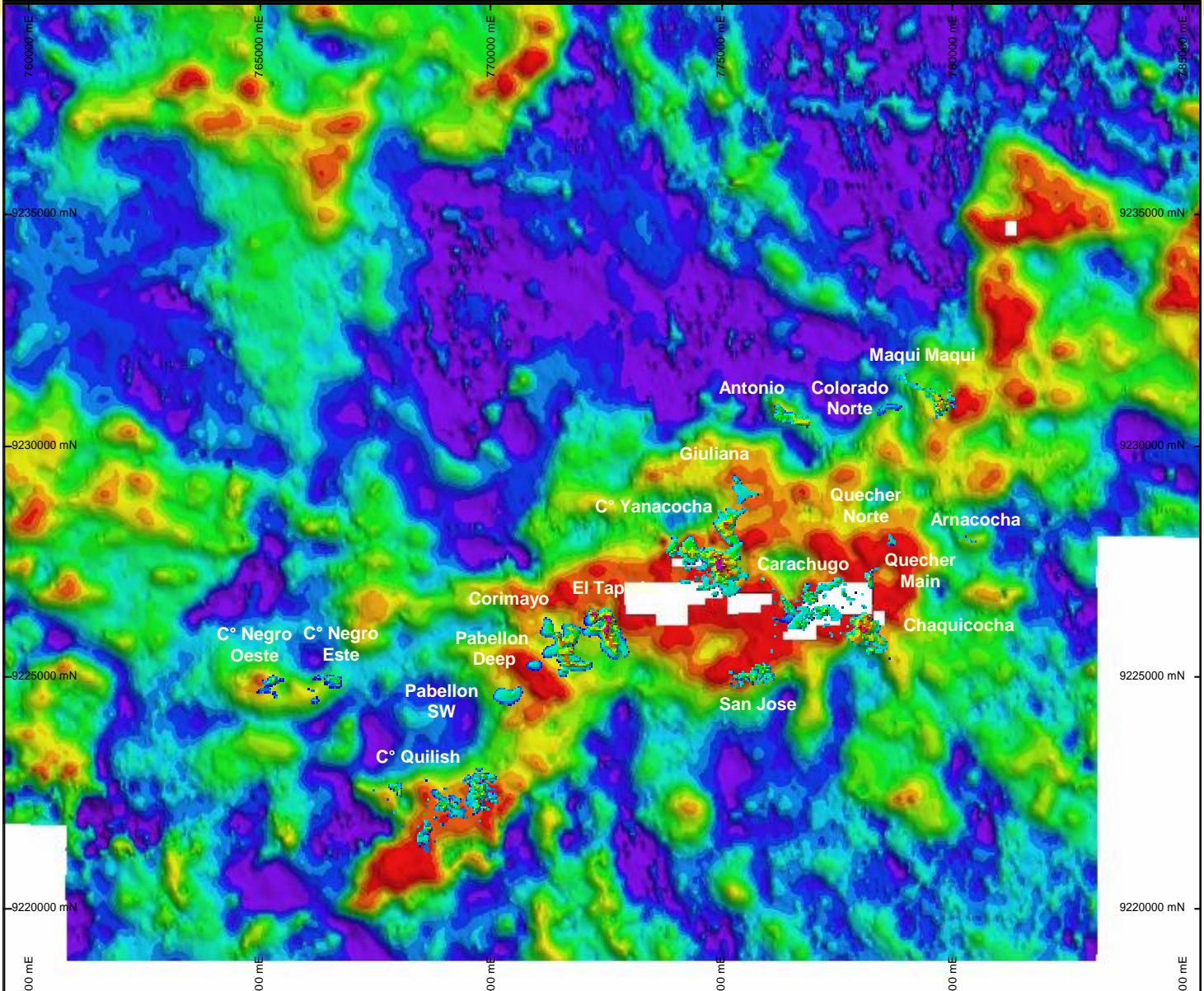
District Geology

Au Contours Surface Geochemistry - Structures



District Geology

Newtem Airborne EM Survey – Resistivity Depth Slice 100m

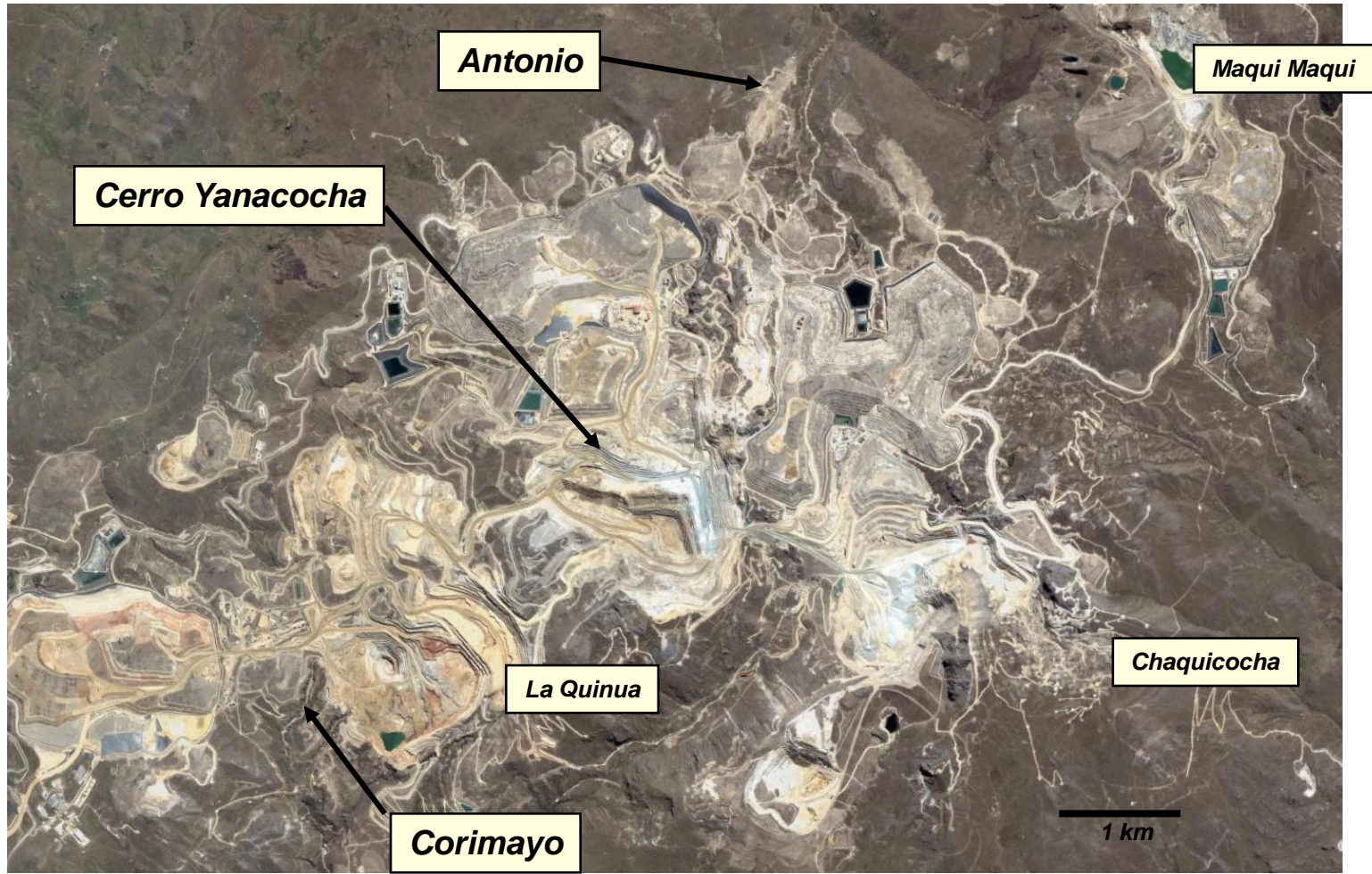


Deposit Examples

Exploration Concepts

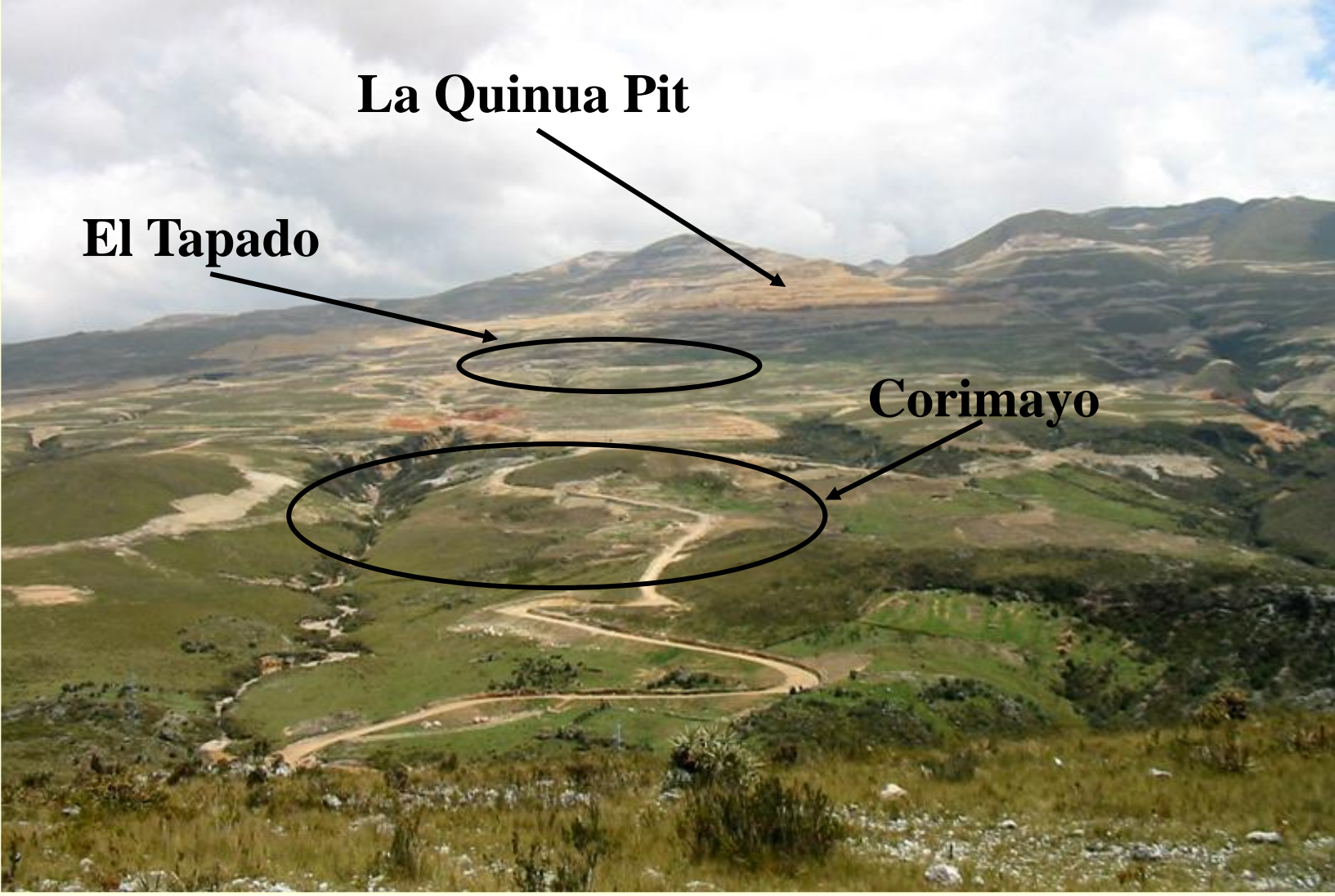
- ***Favorable pyroclastic unit.***
- ***Multi-events of breccia and intrusions.***
- ***Structural Traps Beneath and Marginal to: Flow Dome Complexes; Diatremes; Late-stage, High-level Intrusives.***
- ***Mineralization beneath fresh Andesite Cap Unit.***
- ***Potential Au-Cu sulfide mineralization below oxides.***
- ***Examples:***
 - Corimayo***
 - Antonio***
 - Cerro Yanacocha***

Deposit Examples



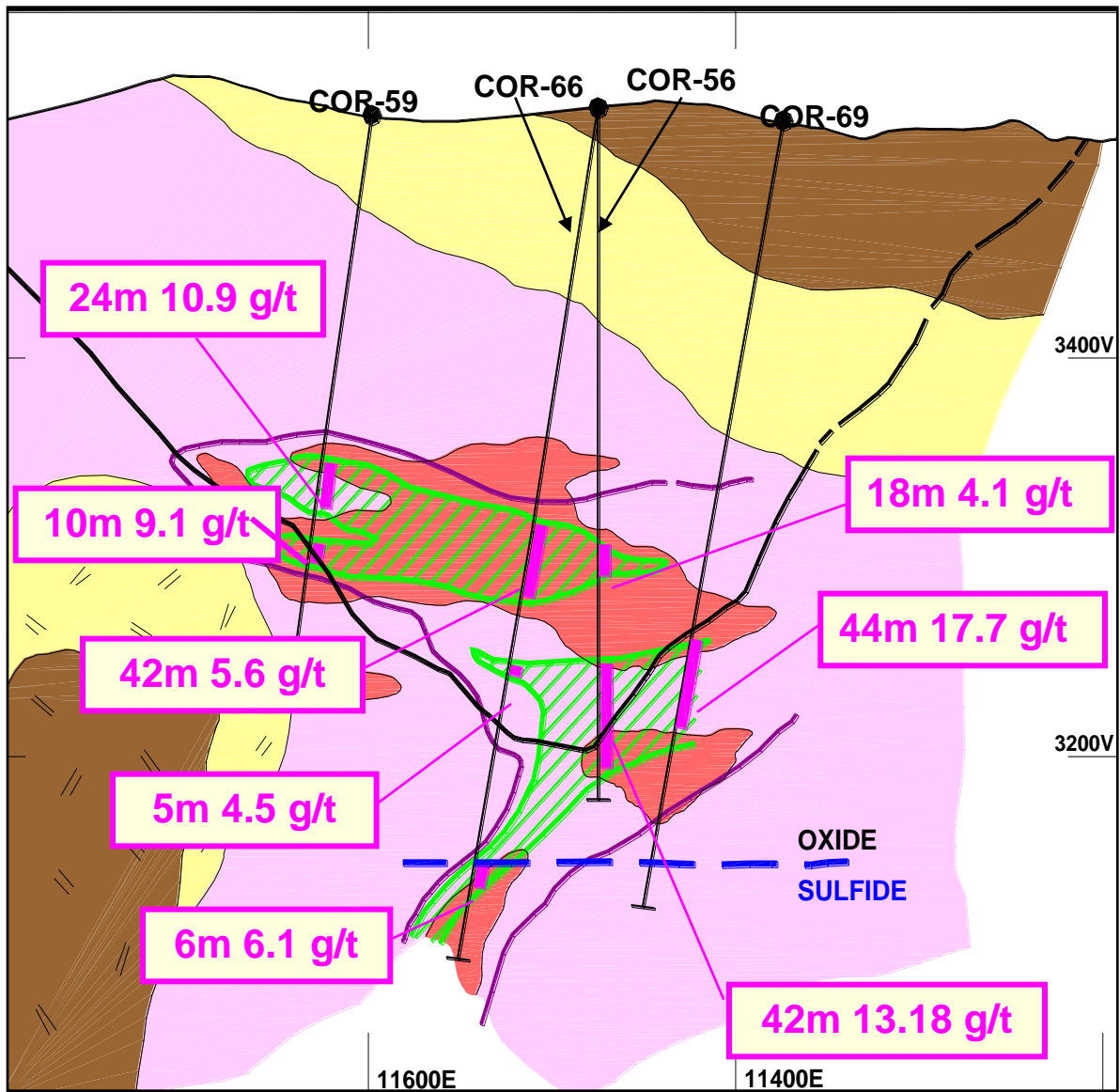
Deposit Examples

Corimayo Deposit



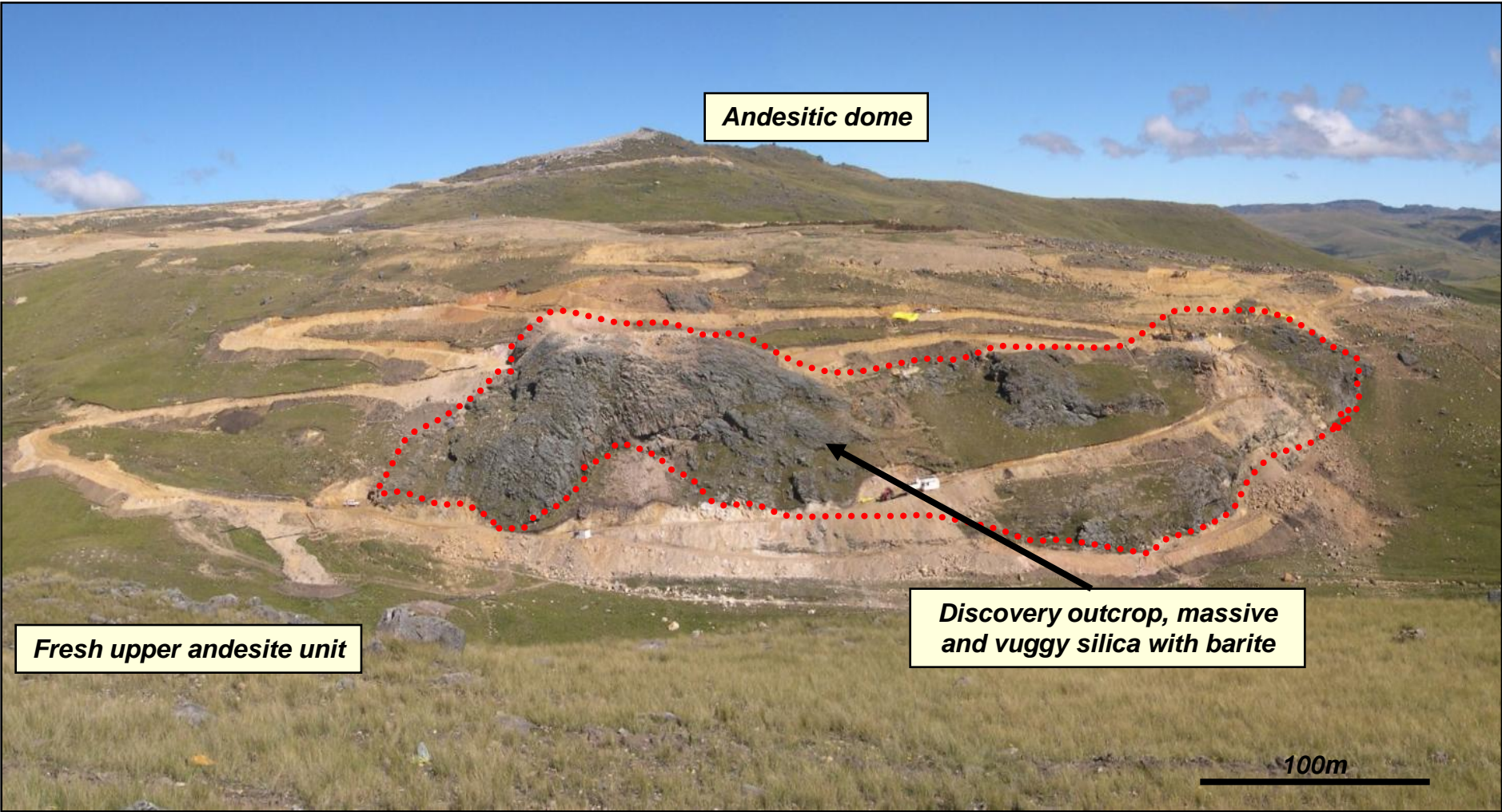
Deposit Examples

Corimayo Deposit – Schematic Section 25250



Deposit Examples

Antonio Deposit



Andesitic dome

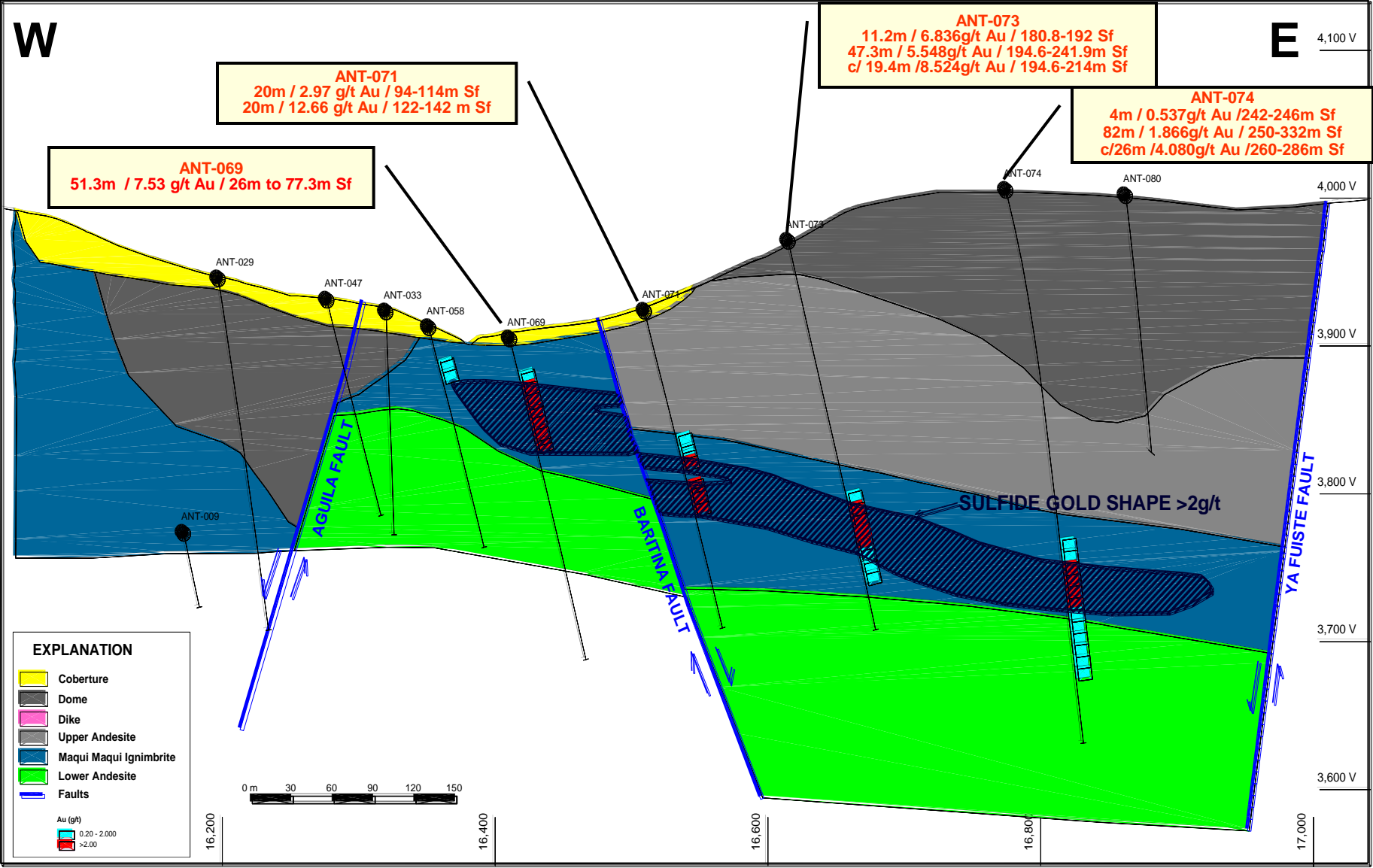
Fresh upper andesite unit

Discovery outcrop, massive and vuggy silica with barite

100m

Deposit Examples

Antonio Deposit - Section 30500N



Deposit Examples

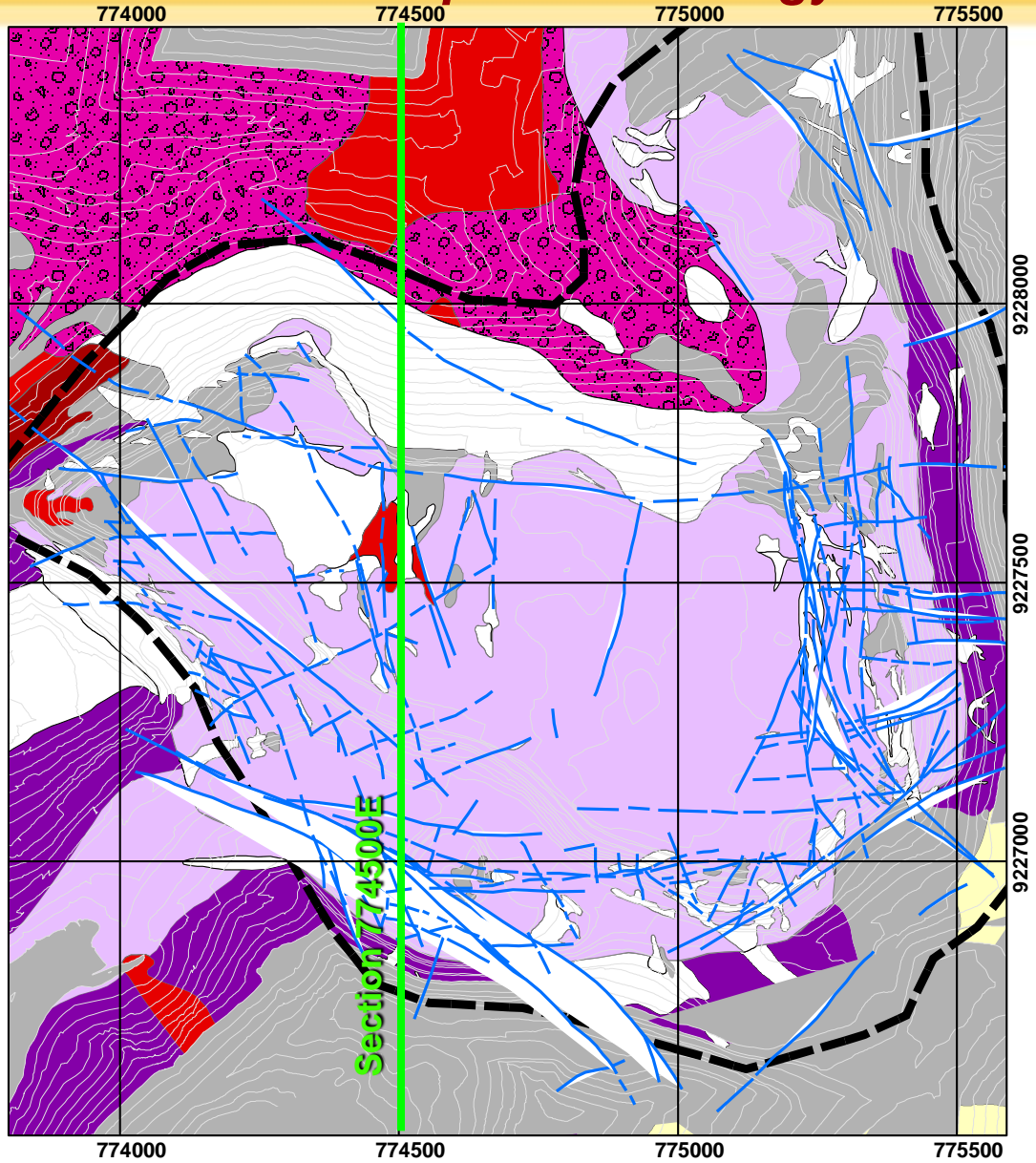
Yanacocha

Cerro Yanacocha Deposit











Deposit Examples

Cerro Yanacocha Deposit - Lithology



Geology Bench 3802

Legend

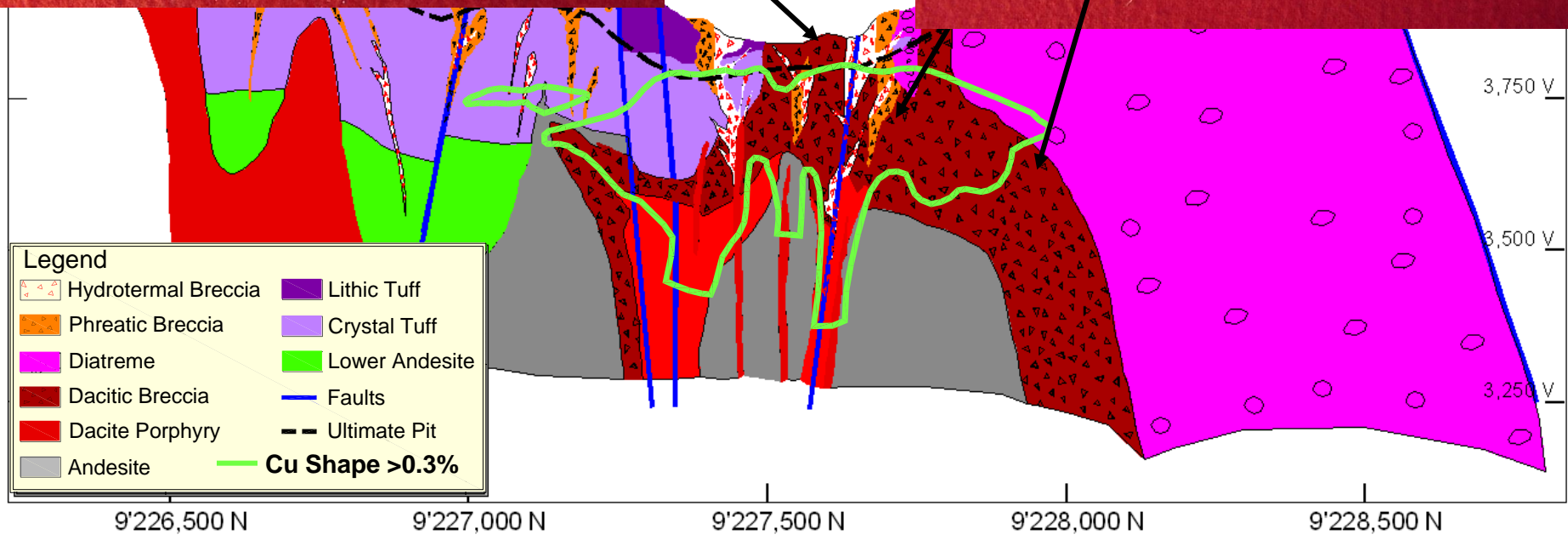
-  Cover
-  Dacite Porphyry
-  Dacitic Breccia
-  Andesite
-  Hydrothermal Breccia
-  Phreatic Breccia
-  Diatreme
-  Lithic Tuff
-  Crystal Tuff
-  Ultimate Pit

Fractured silicified fragment



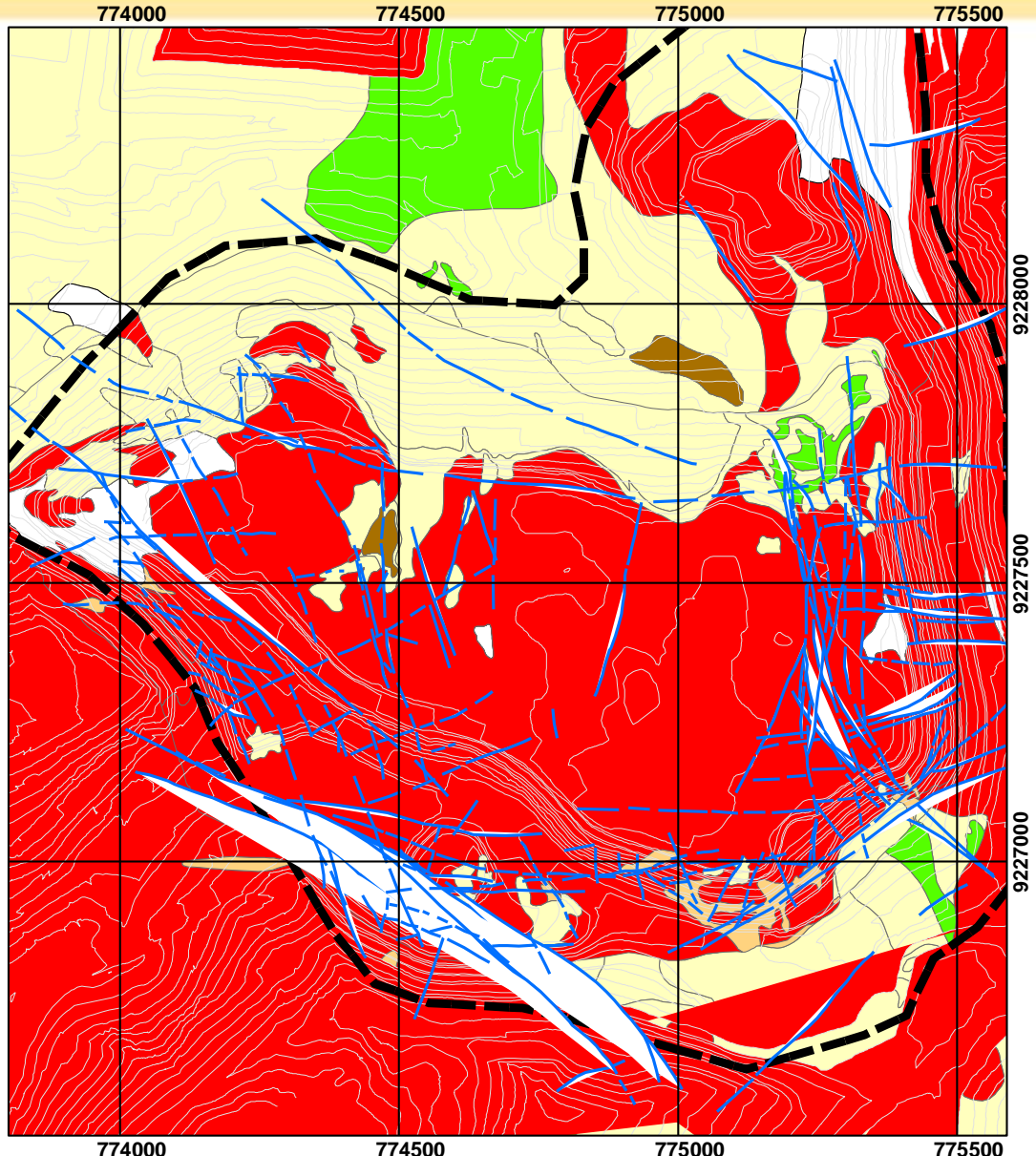
silicified fragments

S
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Deposit Examples

Cerro Yanacocha Deposit - Alteration

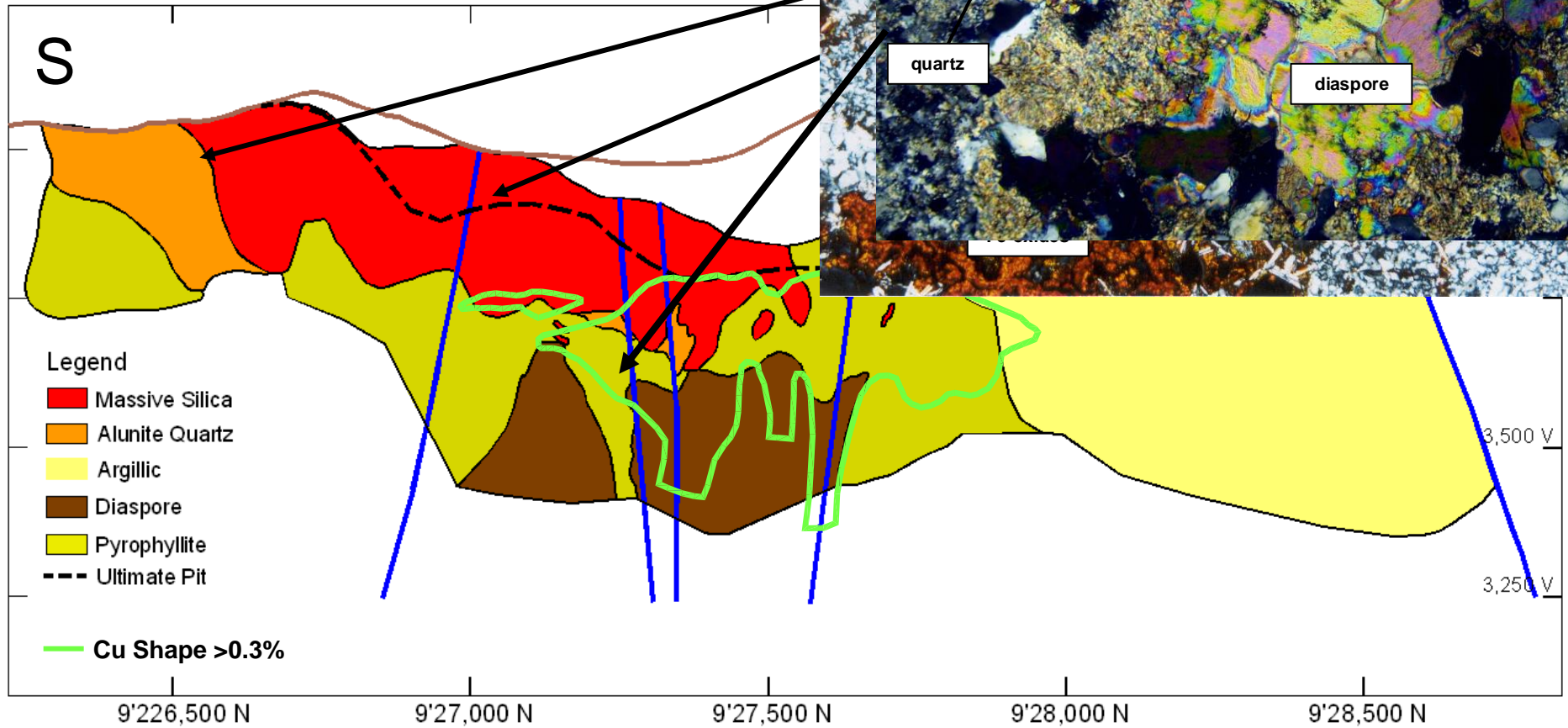


Legend

- Granular Silica
- Vuggy Silica
- Massive Silica
- Alunite Quartz
- Clay
- Propylitic
- Fresh Rock
- Ultimate Pit

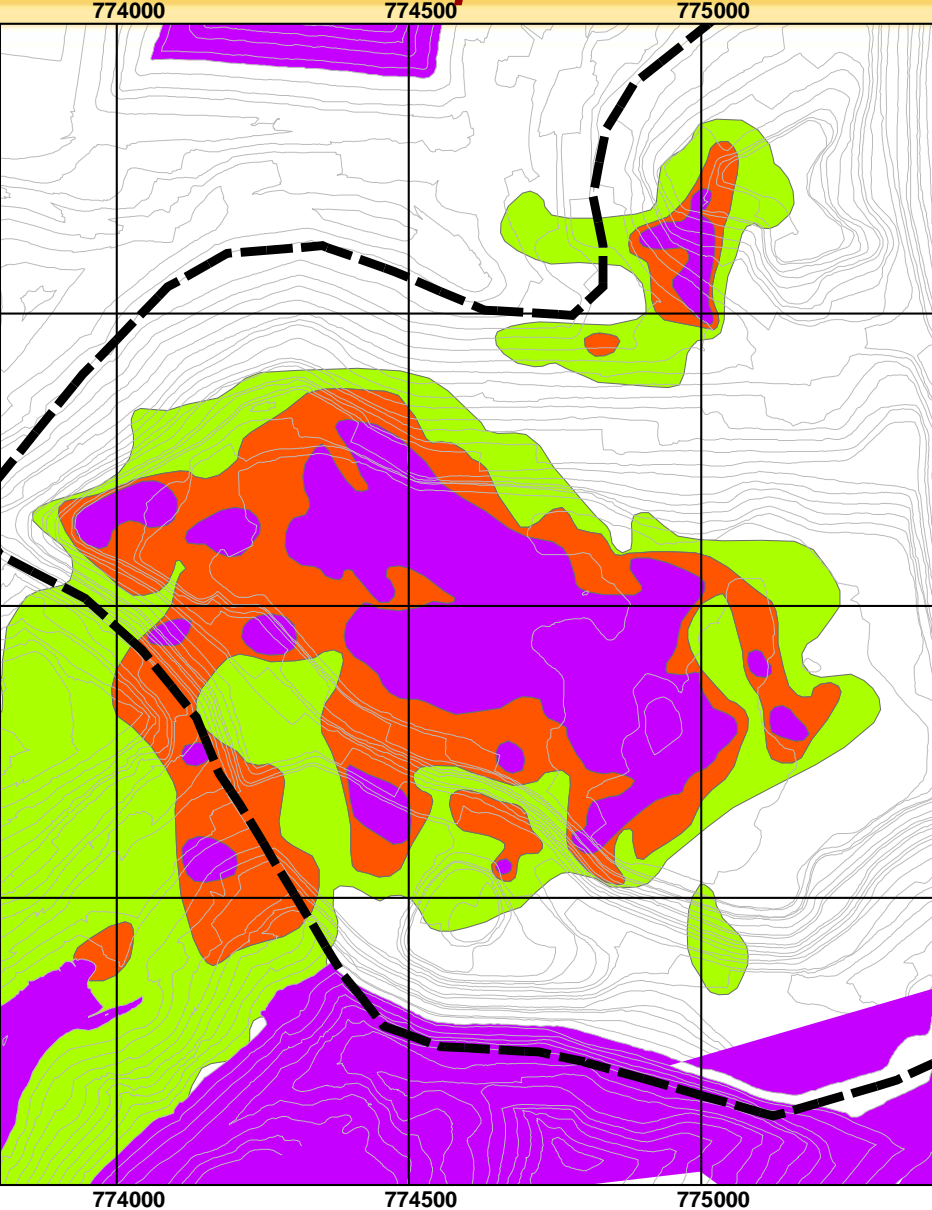
Deposit Examples

Cerro Yanacocha Deposit – Alteration S







Deposit Examples

Cerro Yanacocha Deposit – Cu Minerali.



Legend

-  Shape Cu 0.3%
-  Shape Cu 0.5%
-  Shape Cu 1.0%
-  Ultimate Pit

Summary & Conclusions

- ***At Regional scale, the Yanacocha District located in the intersection of NE structural corridor and the NW Andean trend.***
- ***At District scale: 1) the presence of favorable permeable rocks (Yanacocha pyroclastic rocks) that favor the fluid flow and mineralization, 2) the multiple events of breccias and high level intrusions, and 3) the structural setting, were key to the formation of multiple high sulfidation centers with several overprinted events of mineralization.***
- ***At deposit scale, feeders conduct the fluids along the favorable horizons (Antonio), the border of dome and diatremes serves as traps for high grade mineralization (Corimayo), multiple breccia events and intrusion favor a long-lived system where cohesive Cu-Au mineralization in sulfides occur below the oxides (Cerro Yanacocha).***