

# The Jinfeng Gold Deposit - geology and mine feasibility progress of a Chinese 'Carlin' analogy

# Sino Gold Limited

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- ⇒ Formed in 1995 as a 100% subsidiary of CNNC.
- ⇒ Listed on the ASX in 2002 (recently admitted to the ASX 300)
- ⇒ Low cost gold producer with surplus operating cash flow.
- ⇒ 80K oz/a from Jianchaling, with planned 200K oz/a operation at Jinfeng.
- ⇒ International operating standards including SHEC
- ⇒ Currently 2.9M oz in resource.
- ⇒ Strong institutional support including-
  - Gold Fields
  - Colonial First State
  - IFC





# Jinfeng Project

⇒ SGL Interest 82%

⇒ Largest undeveloped Au deposit

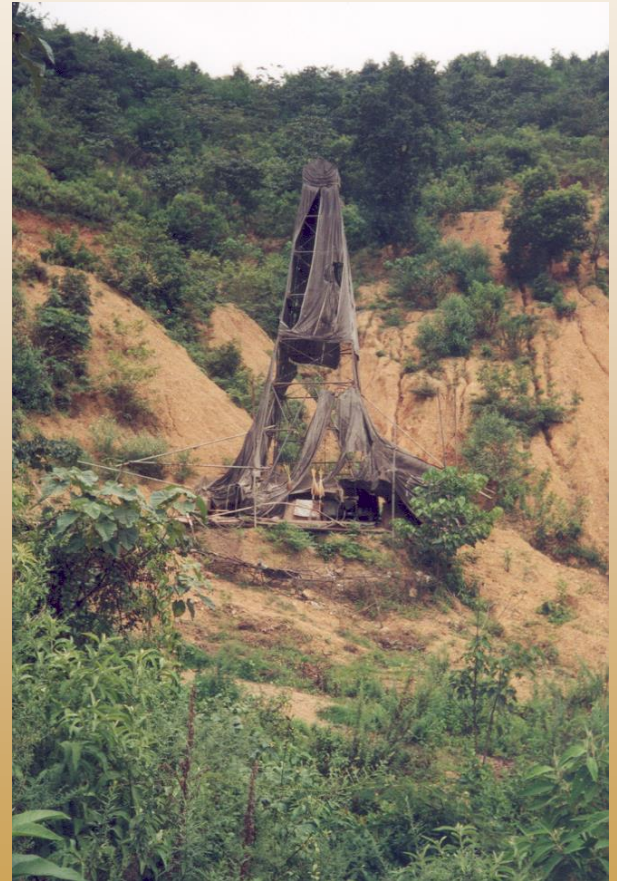


# Jinfeng History

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- ⇒ **Outcropping, formerly ancient Hg/As mine (Qing Dynasty), no recorded gold mining.**
- ⇒ **Early 1980's - nationally sponsored regional stream sampling - 14 gold anomalies, follow-up - 22 discrete prospects, including Jinfeng.**
- ⇒ **1986 to 1993 local exploration group (BGMR) completed 15,000m of diamond drilling and 8,000m of underground development.**

***Unusually well defined for a Chinese Au deposit***





# Jinfeng History

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- ⇒ **BGMR successfully defined >50 t Au. 1992 listed under the 892 national plan because of likely economic impact.**
- ⇒ **Exploration curtailed in 1993 due to lack of funding.**

***China wide***

- ⇒ **Offered to foreign parties who did little additional exploration.  
Relinquished in 1997.**

***Early in Chinese mine industry reformation***



# Jinfeng History

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- ⇒ **SGL identified project in 1999 and commenced negotiations.**
- ⇒ **JV contract signed in April 2001**
- ⇒ **Drilling commenced in Dec 2002.**
- ⇒ **Work completed by SGL to date includes –**
  - 17,500m of diamond drilling (mainly surface)**
  - 120m of new underground driving and 1200m of drive re-establishment**
  - 4700 soil samples (ridge and spur programme)**

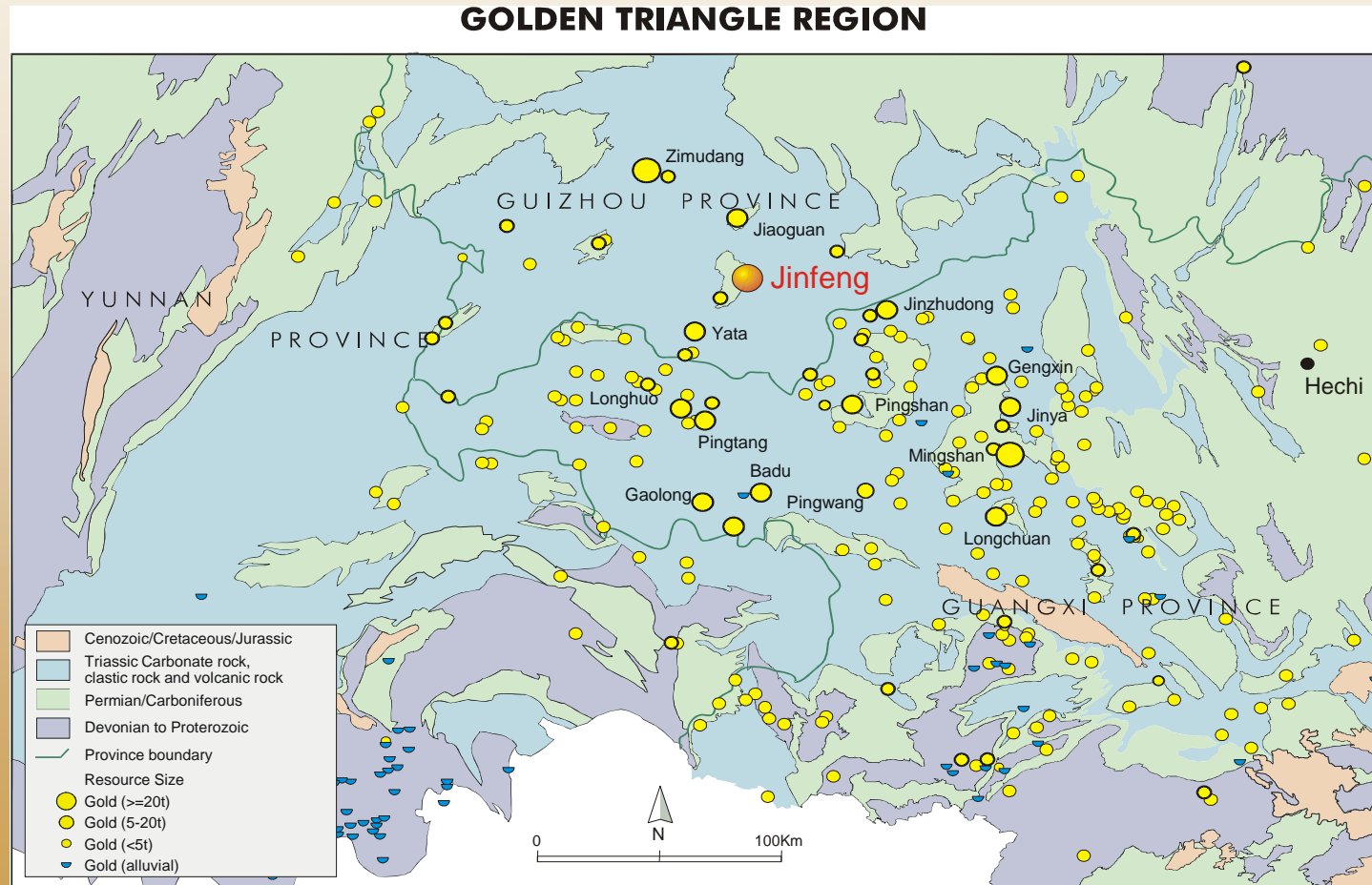
***Value proposition***





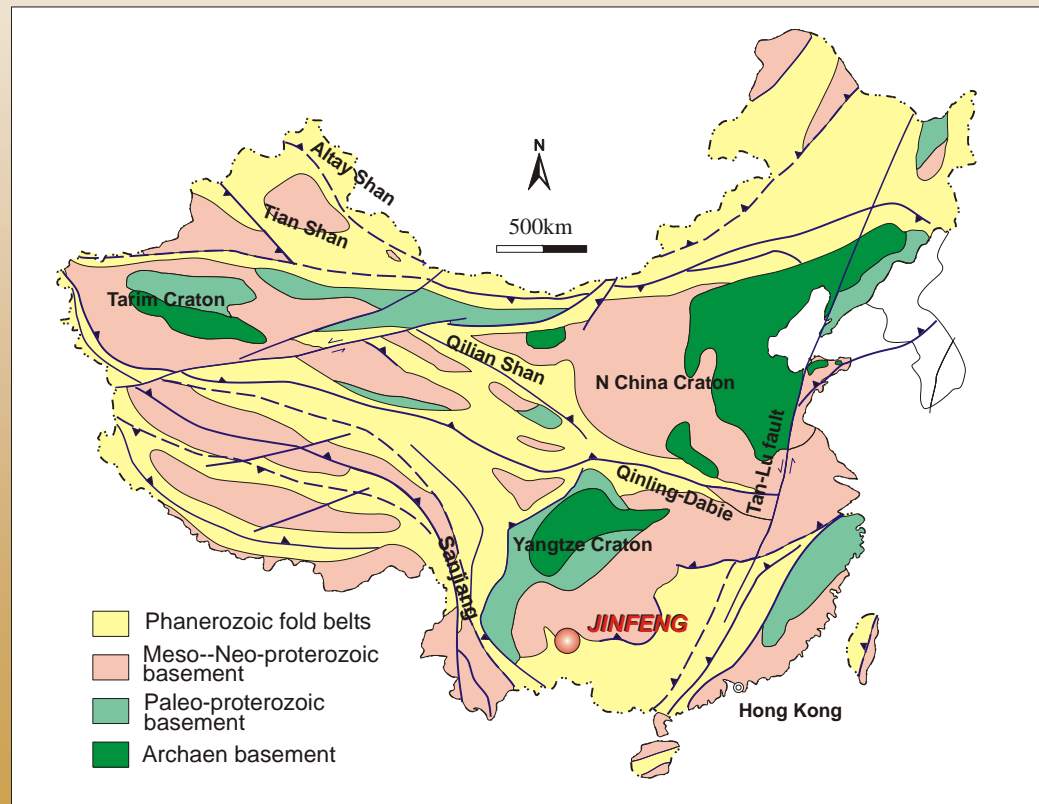
# Jinfeng Regional Geology

⇒ Golden Triangle – 100,000km<sup>2</sup>



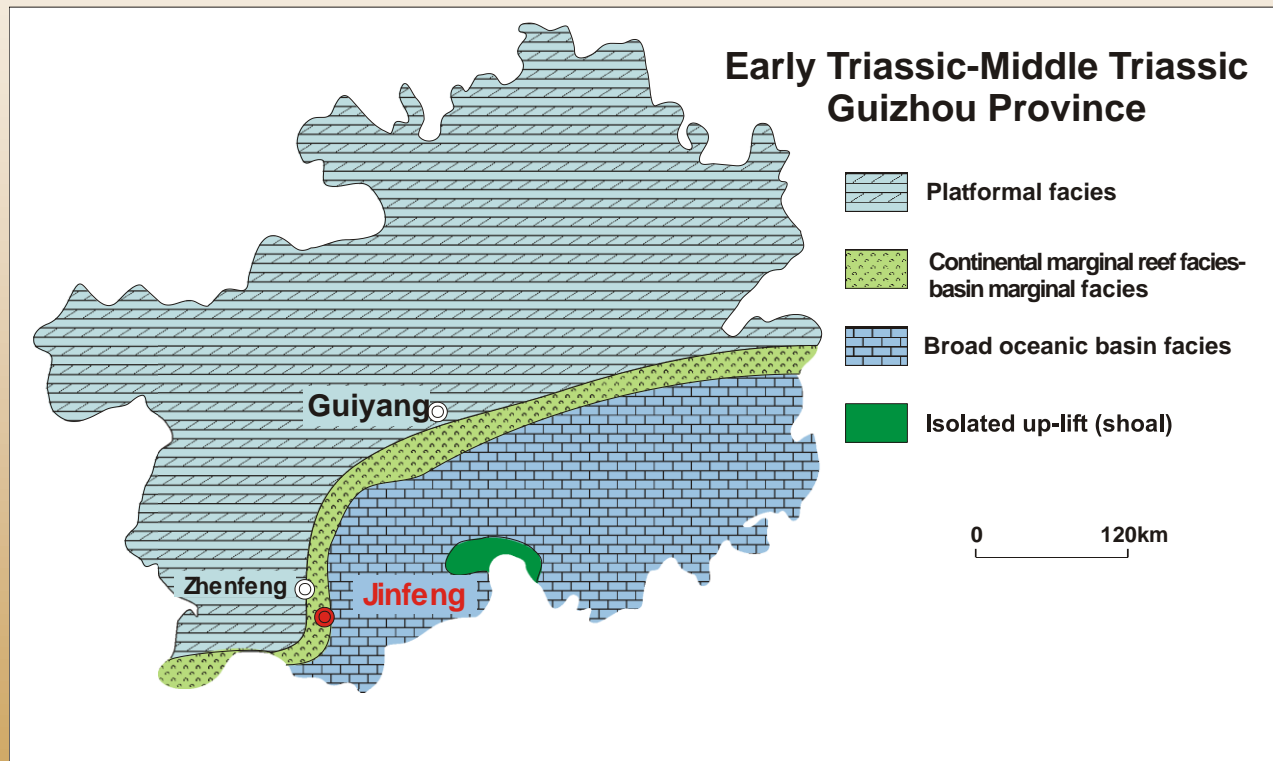
# Jinfeng Regional Geology

- ⇒ Youjian Basin – Carboniferous to Late Triassic sediments deposited on southern edge of Yangtze Craton
- ⇒ Crustal extension and rifting at end of Caledonian tectonic cycle



# Jinfeng Regional Geology

⇒ SE to NW and stratigraphically upwards from marine to continental dominant lithologies.



***Broad zones of transitional lithologies***



# Jinfeng Regional Geology

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⇒ **Compressional tectonics during Indosinian – Yangshanian (230 to 67Ma).**

- **Partial thrusting of sequence over craton edge**
- **Complex structural fabric that characterizes basin architecture**
- **Sparse intrusive activity**

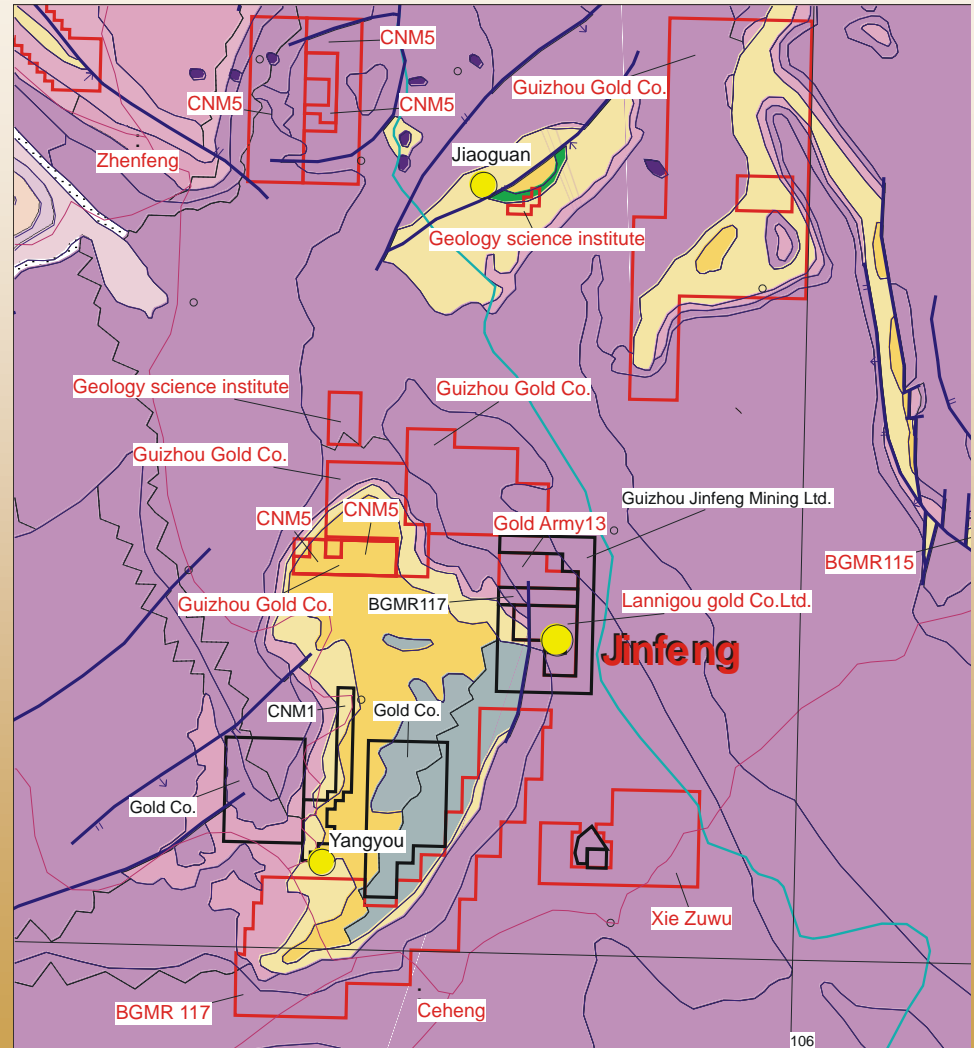
⇒ **Gold deposition approx. 140Ma (Yangshanian).**



# Jinfeng Local Geology

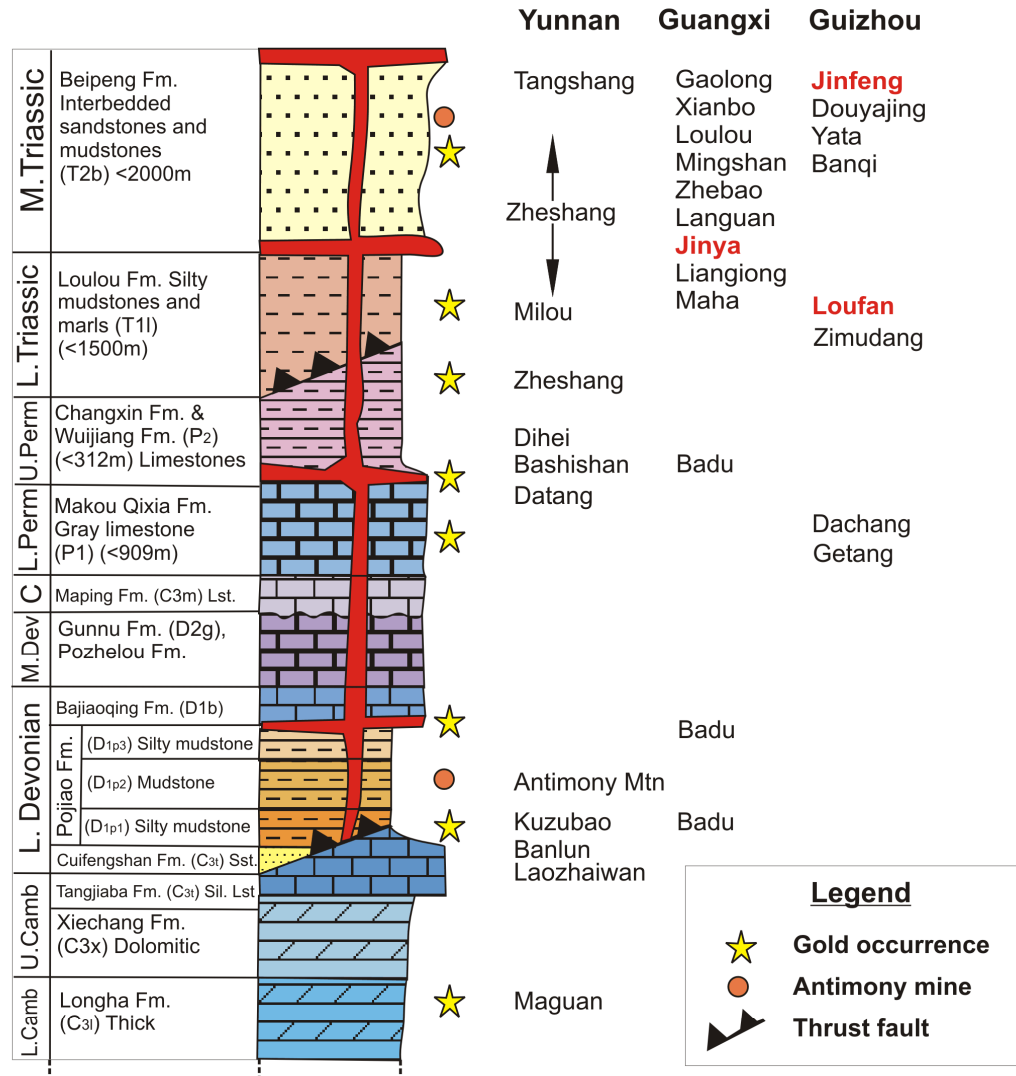
- ⇒ Eastern margin of Laizhishan Anticline.
- ⇒ Permian limestones overlain by Triassic turbidites.
- ⇒ Abundant transitional facies – more calcareous with depth?

## Geology and Tenements around Jinfeng



# Jinfeng Geology

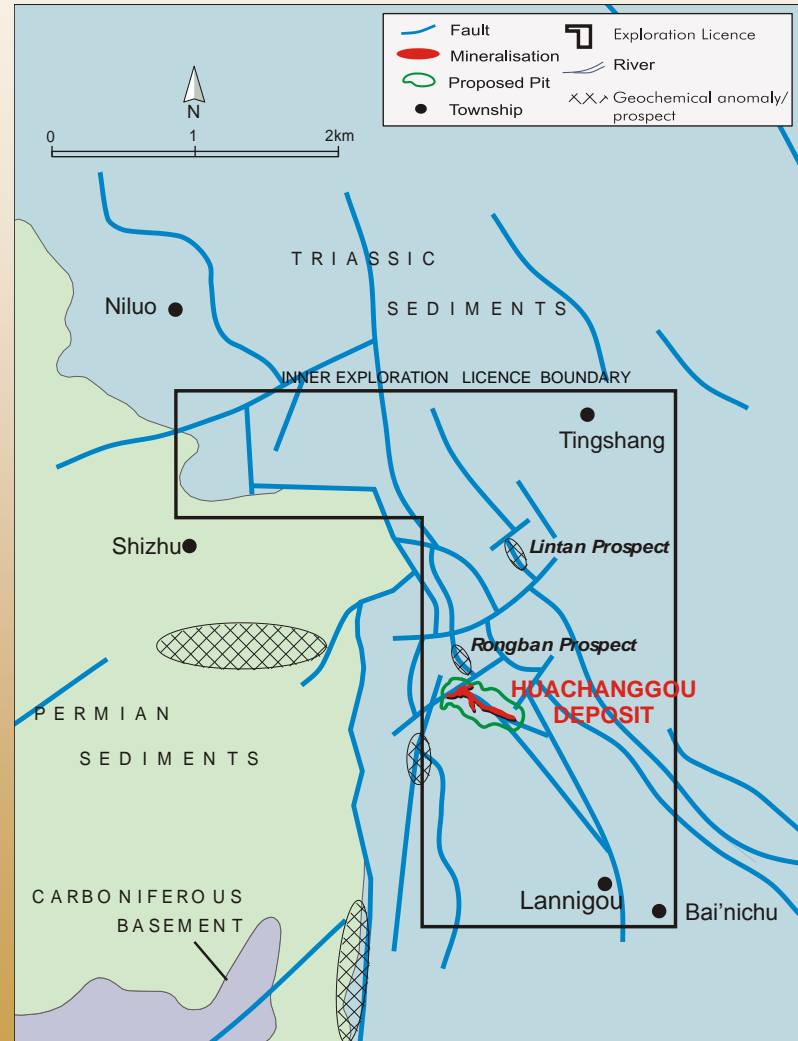
## Stratigraphy and Mineralization of South West China



# Jinfeng Local Geology

- ⇒ Three main zones of mineralization.
- ⇒ All within 1 km of Permian contact.
- ⇒ Anomalism and mineralization within Permian as well.
- ⇒ All known significant mineralization on WNW/NW and NS/NE oriented faults.

Jinfeng Geology and Prospect Location





# Jinfeng Local Geology

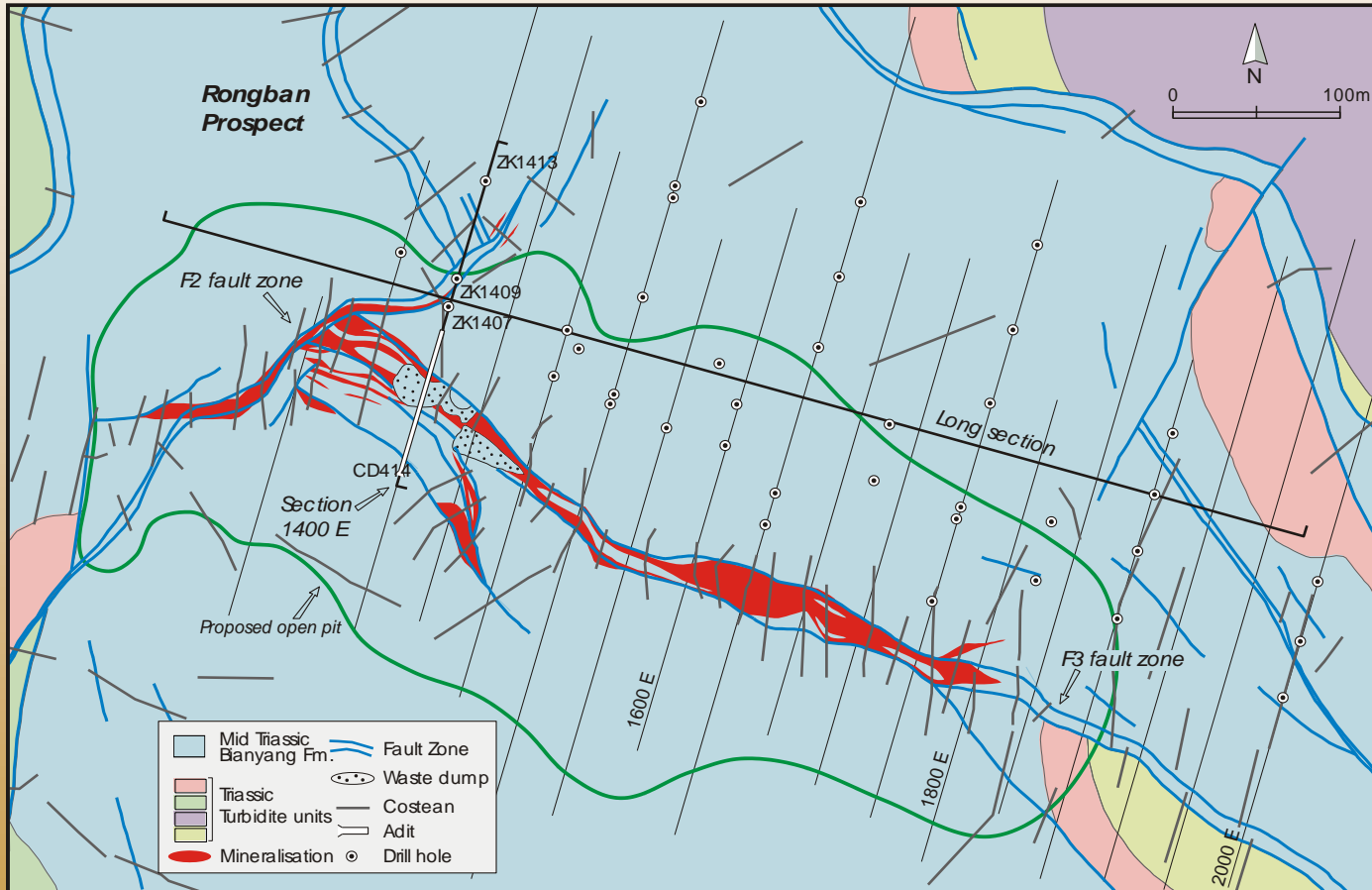
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# Jinfeng Local Geology

⇒ Main deposit - located on F3/F2 – dextral reverse movement



PLAN OF THE JINFENG PROJECT HUANGCHANGGOU DEPOSIT



# Jinfeng Local Geology

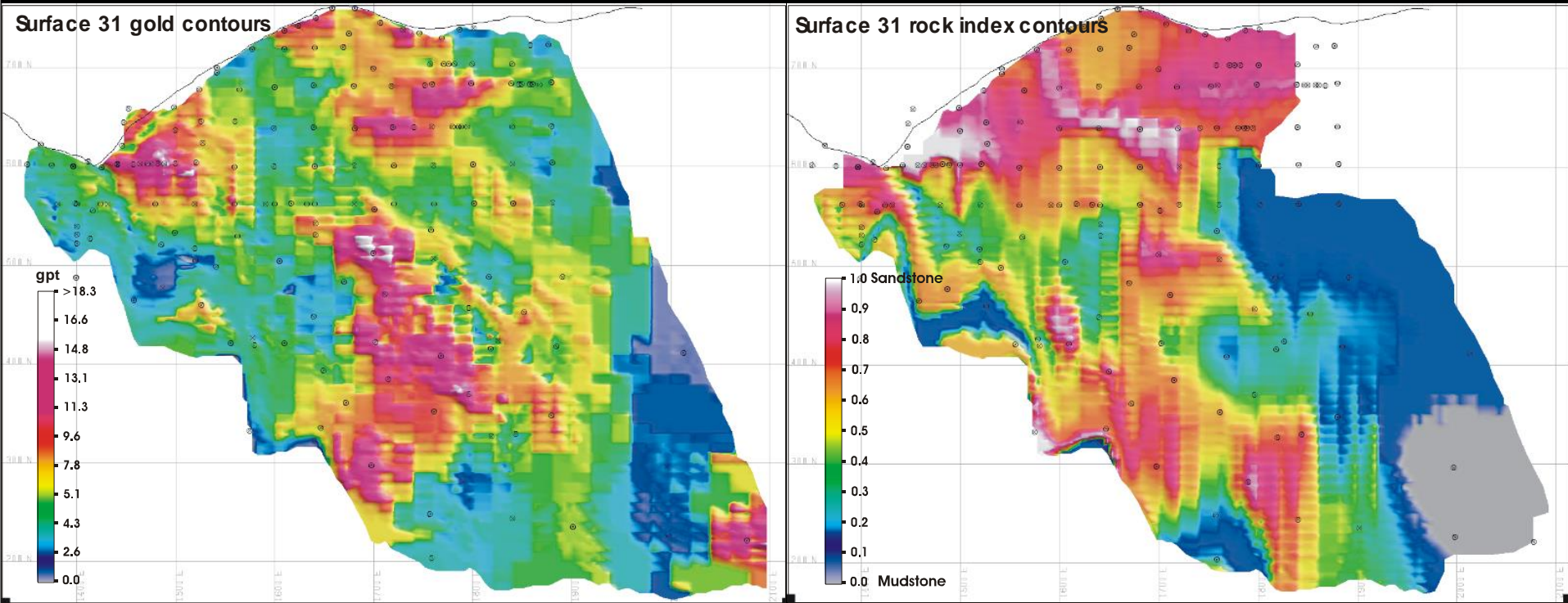
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- ⇒ **Steeply east plunging ore zones in sympathy with F2/F3 and splay intersections.**
- ⇒ **Complex internal geology (host lithologies/structural and alteration overprint).**
- ⇒ **550m strike length, 11m wide, up to 30m thick.**
- ⇒ **Strong correlation between higher grades and thicker zones.**
- ⇒ **Important high grade controls include structural intersections (notably F2/F3) and coarser grained calcareous units.**
- ⇒ **Fine grained lithologies are poor hosts, generally thinner and lower grade.**

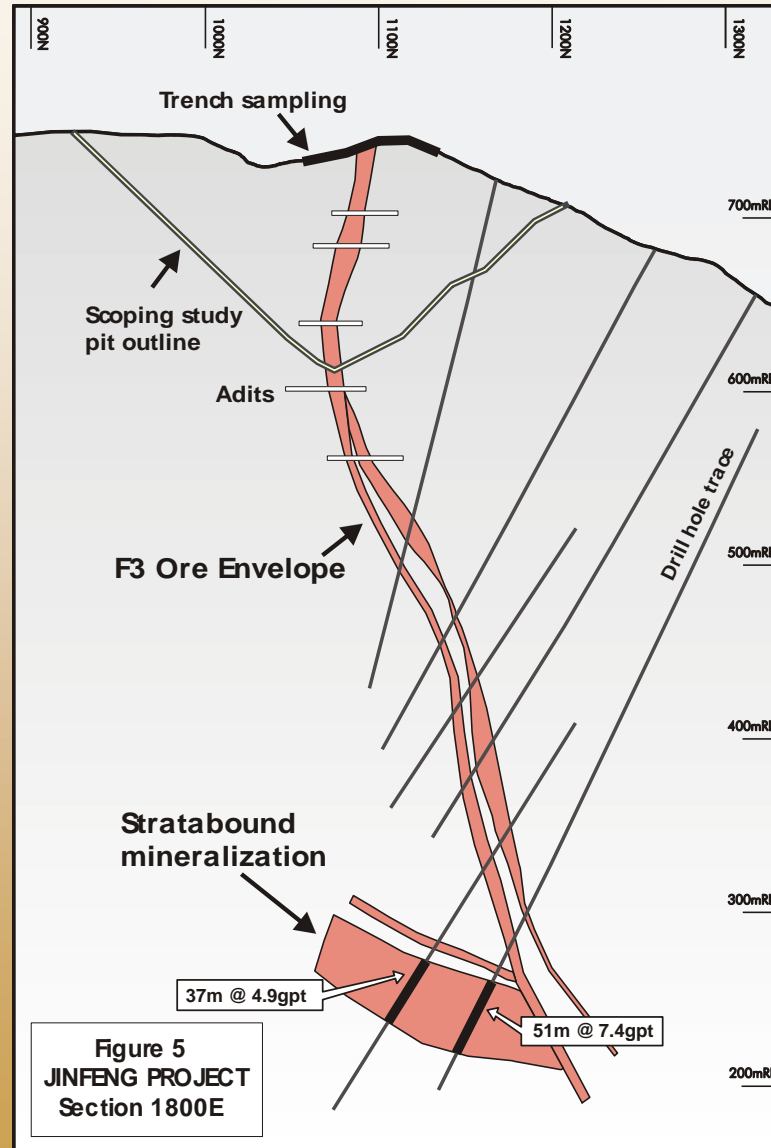
***Fluid-reaction induced porosity***



# Jinfeng Local Geology



# Jinfeng Local Geology



# Jinfeng Local Geology

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- ⇒ **Gold mineralization – finely disseminated pyrite, arsenical pyrite, arsenopyrite+- chalcopyrite.**
- ⇒ **Gold – submicron particles (<0.2 micron) mainly within arsenical pyrite rims to pyrite.**
- ⇒ **Overprinted by coarsely disseminated, stockwork and crackle-veined orpiment, realgar, cinnabar, and stibnite. Often spatially related to high grade blocks.**
- ⇒ **Alteration – silicification, dolomitization, argillation and carbonation.**
- ⇒ **Intense silicification associated with coarser arenites and proximity to feeder structures.**
- ⇒ **Highly anomalous in Hg (116ppm), As (0.5%), Sb (113ppm), Tl and to a lesser degree, Cu and Zn.**





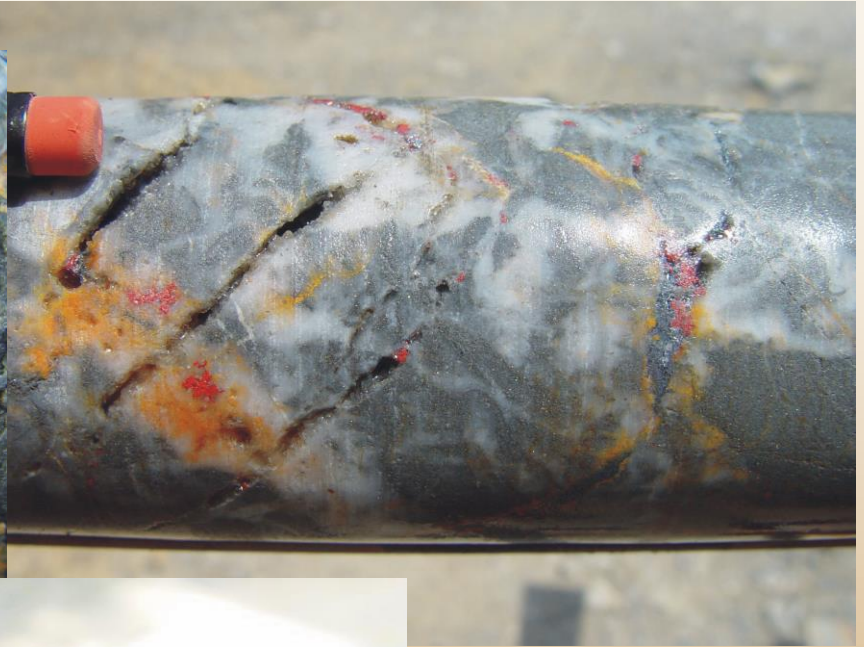
# Jinfeng Local Geology



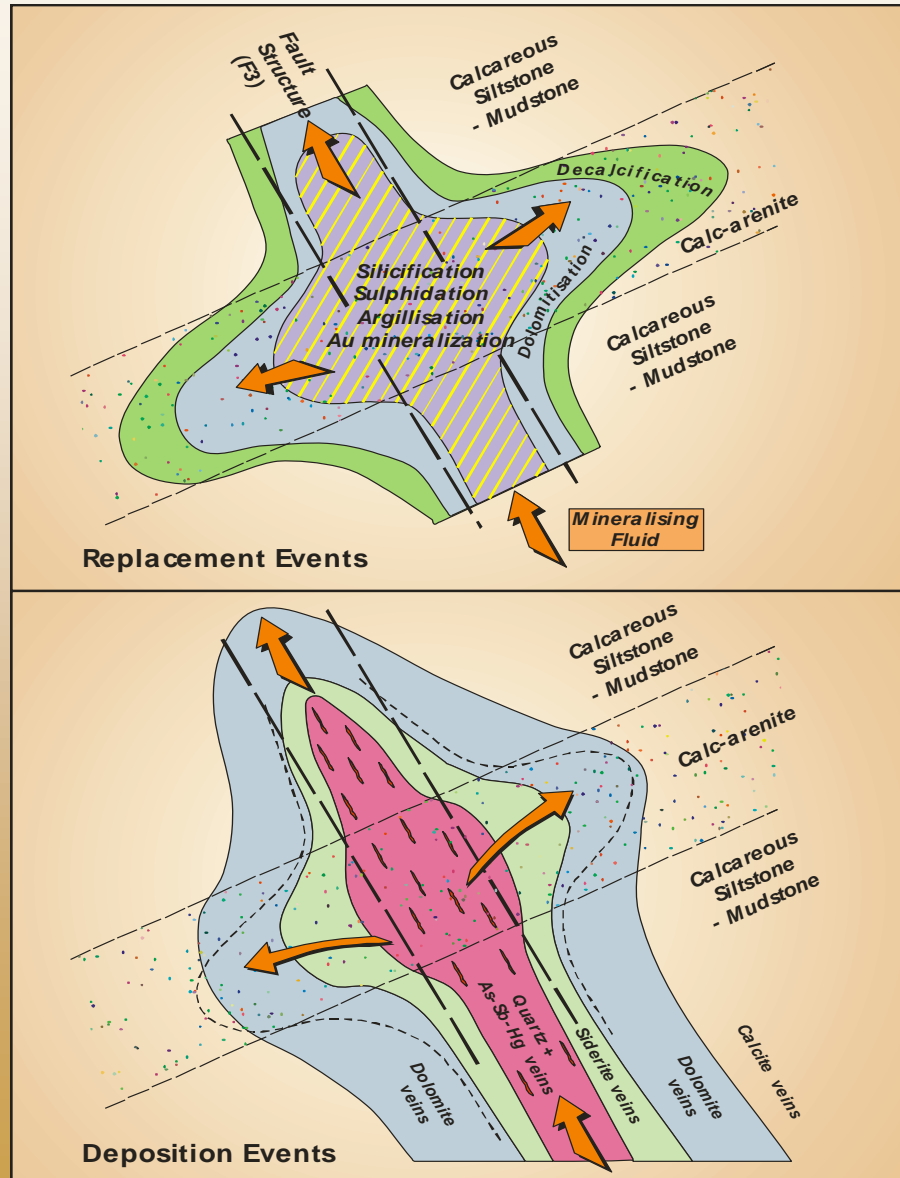


# Jinfeng Local Geology

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# Jinfeng Geology



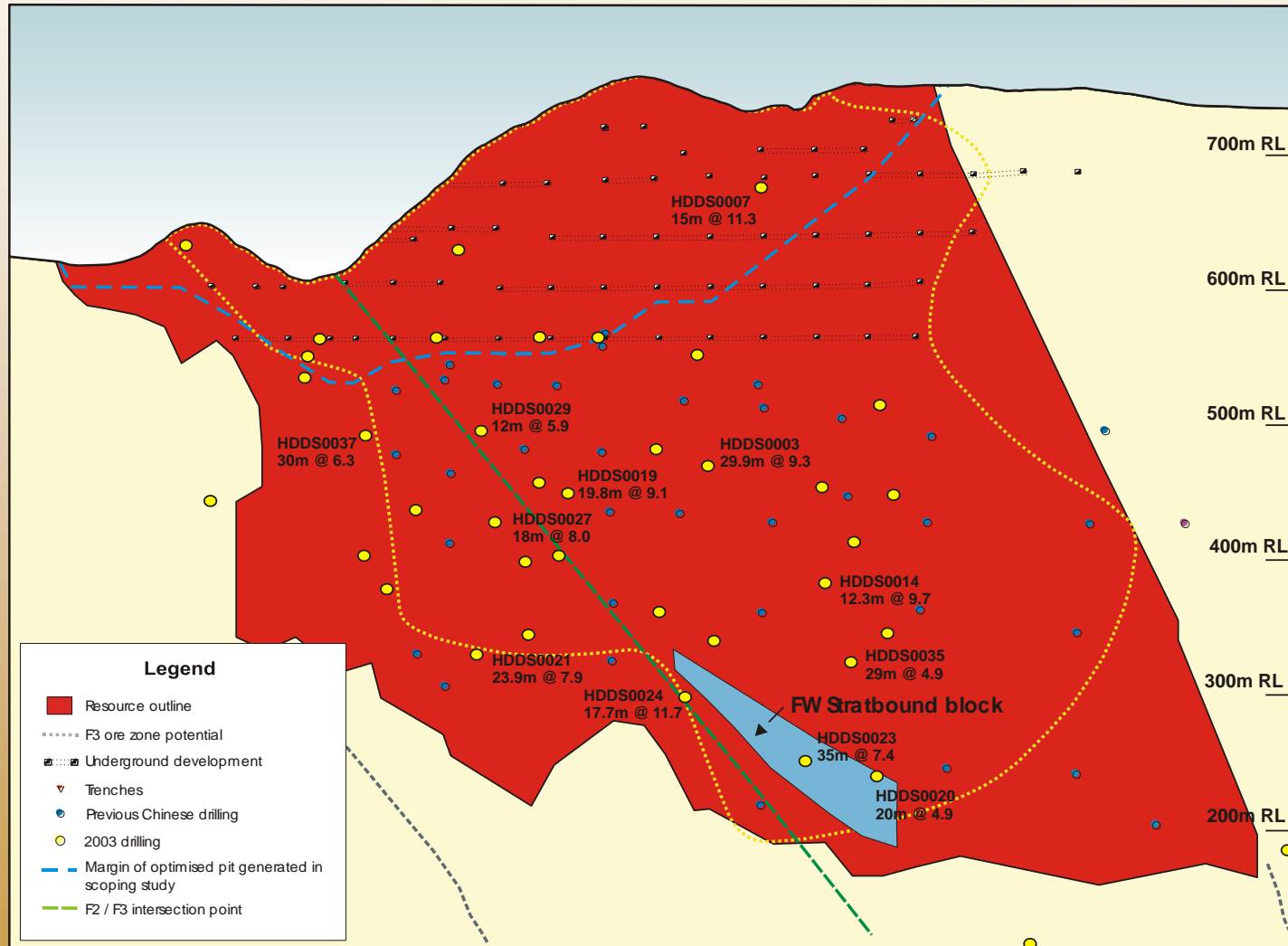
Replacement and Deposition Events at Huachanggou orebody





# Jinfeng Resource Estimate

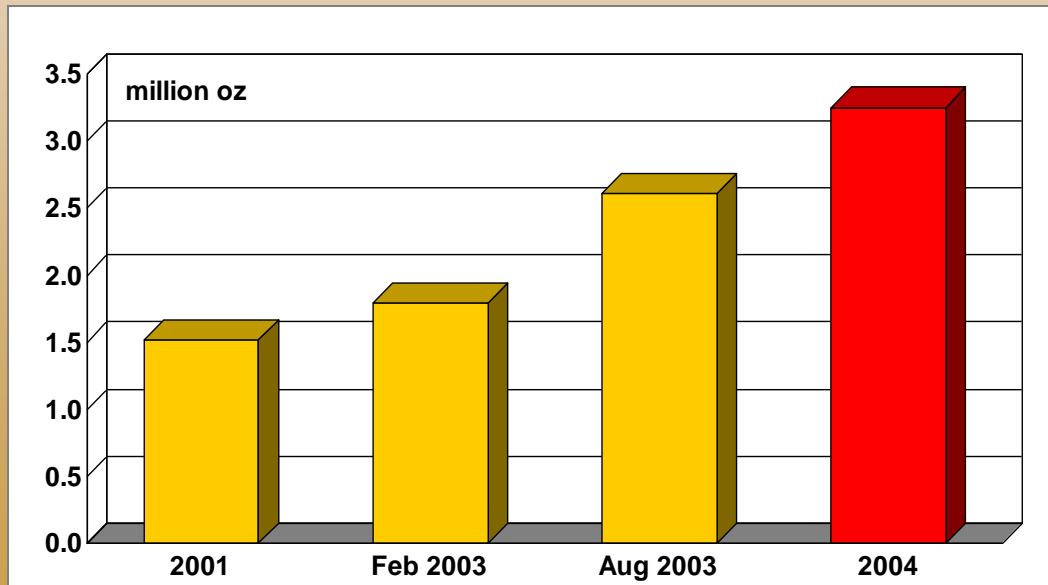
## Selected intersections from the Huangchanggou deposit - Jinfeng Gold Project



# Jinfeng Resource Estimate

## Huangchanggou Resource Comparisons

Date	Tonnes	Grade (gpt Au)	Ounces (M oz)
Jan. 2000	6.9	6.9	1.5
Jan. 2003	9.1	6.1	1.8
Aug. 2003	14.1	5.8	2.6

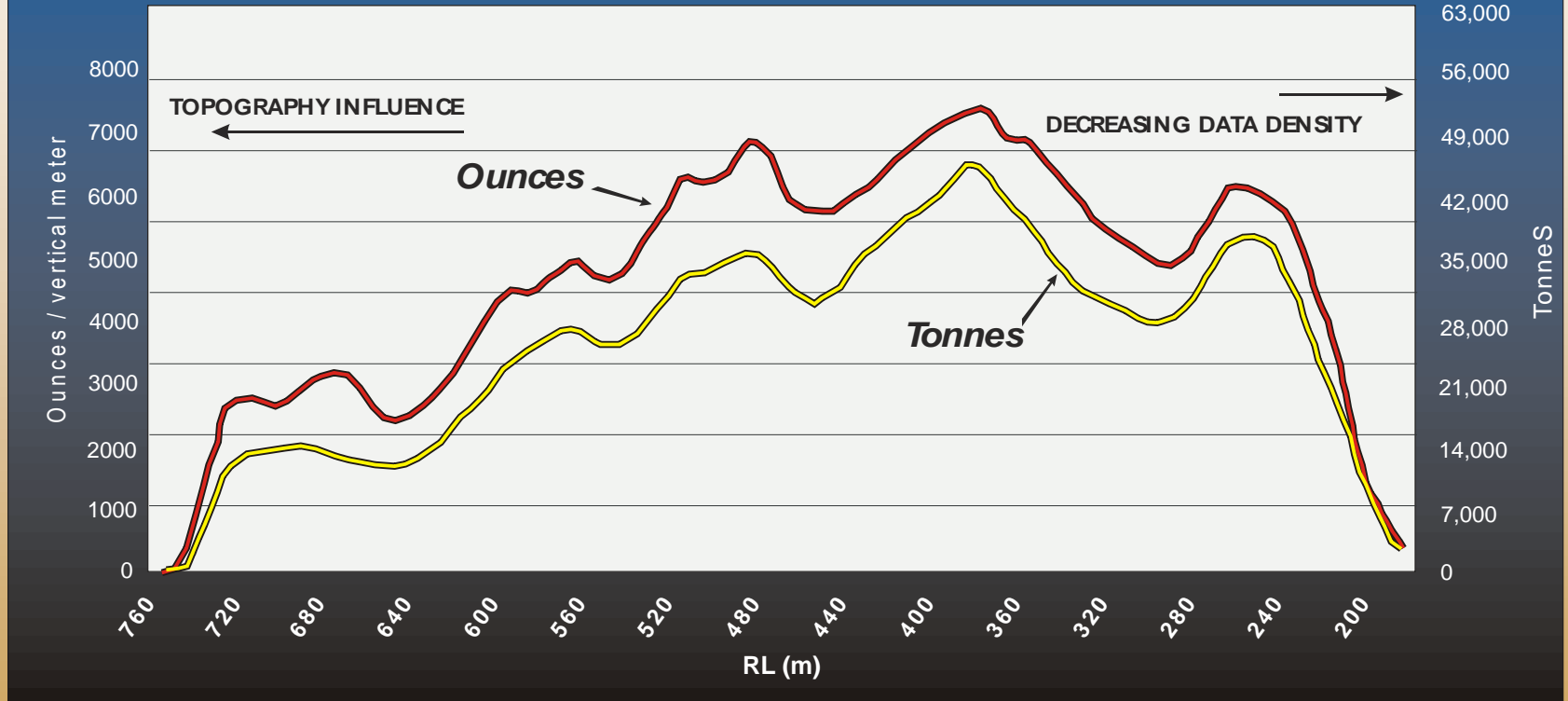


**Worldwide, only 15 gold deposits of >3 million ounce size not held by majors**



# Jinfeng Geology

## JINFENG PROJECT (Huachanggou Deposit) Tonnes and Ounces per vertical meter

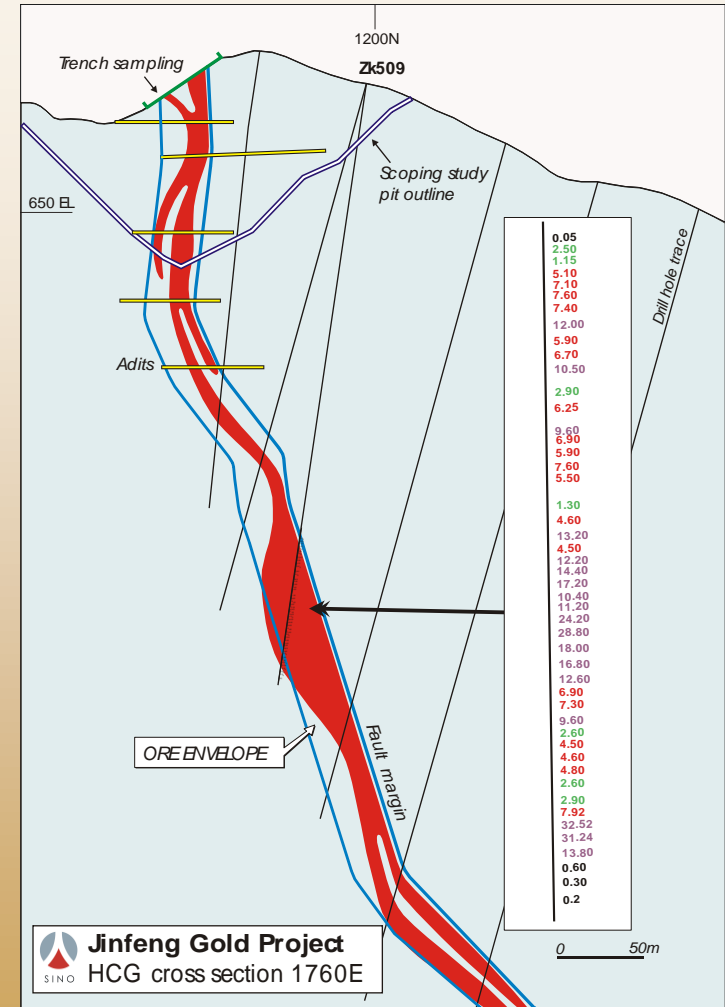


# Jinfeng Resource Estimate



## Characteristics

- Excellent continuity
- Good assay repeatability
- Samples are relatively good local estimators of ore zone grade
- Low nugget
- Low CV – 0.8
- Single population, low skewness
- Moderate correlation between S and Au
- Poorer correlation between Au and As, Sb and Hg



# Jinfeng – Comparison to Carlin

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## Key Similarities

Host Lithologies	Siliclastics and transitional calcareous facies
Mineralization styles	Structurally controlled and stratabound
Gold habit and sulphides	Submicron within As pyrite, pyrite and arsenopyrite
Alteration	Silicification, argillization, decalcification and C
Associated gangue mineralogy	Orpiment, realgar, cinnabar and stibnite + carbon
Associated elements	High As, Hg, Sb, Tl, Ba. High Au/Ag ratios
Gold Transport Mechanism	Bisulphide
Basic Fluid Chemistry	Moderate pH (5-6), <6% NaCl
Isotopes	Similar Isotopic signatures - $S^{0/00}{}^{34}$ and $O^{0/00}{}^{18}$

## Key Differences

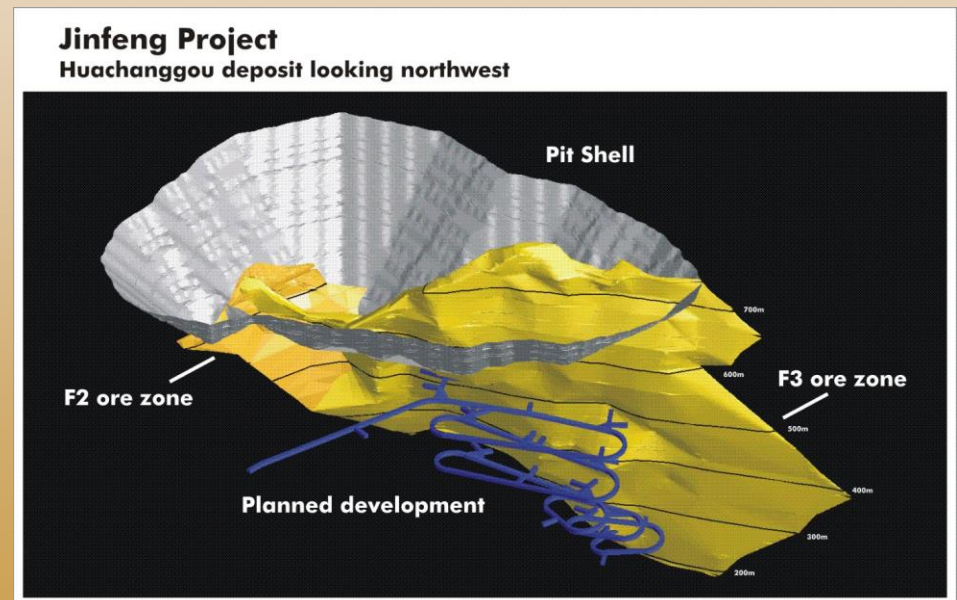
Fluid type	Metamorphic input at Carlin
Temperature and depth of formation	150° - 250° C and 2-5km at Carlin, vs 250° C and 1.5-2.5km at Jinfeng
Intrusives and other mineralization	None at Jinfeng

***Structural architecture, fluid chemistry and availability of reactive rocks***



# Jinfeng – Mine Development Plan

- ⇒ Bankable mine feasibility study in progress. Completion late 2003.
- ⇒ To date, 17,500 meters of drilling completed (8,000m into resource definition).
- ⇒ Original target of 1.0Moz into reserves, likely to be larger given resource base (targeting 3.0Moz by year end).
- ⇒ Production rate of about 1.2Mt for 200,000oz/a.  
Largest gold mine in China.
- ⇒ 4-5 year pit life, underground start in year 2.
- ⇒ Traditional crush/grind/float with onsite concentrate oxidation (likely Biox).

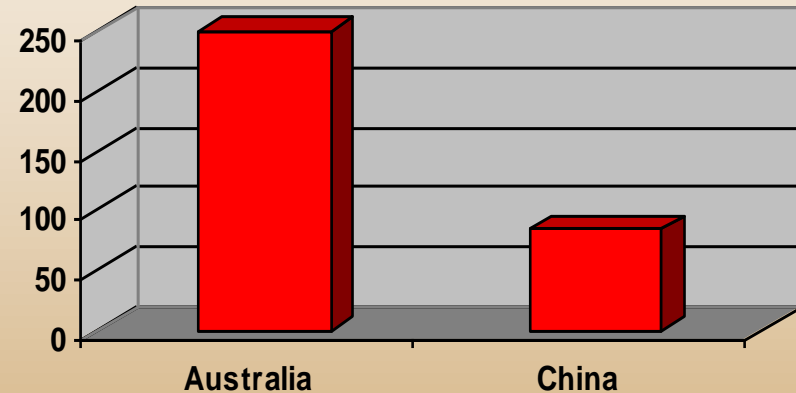


# Jinfeng – Mine Development Plan

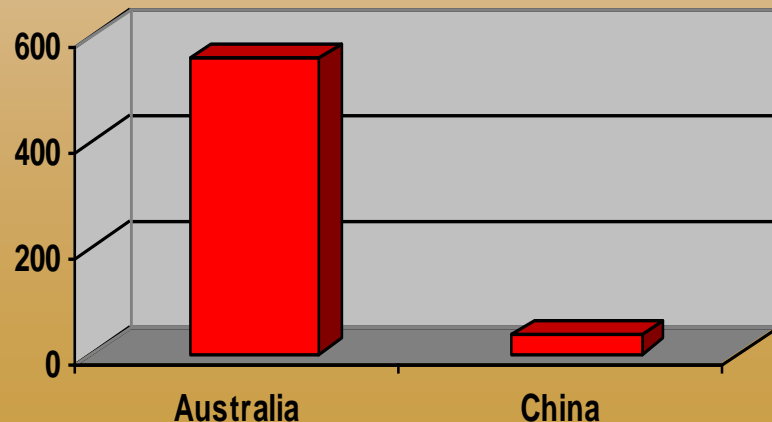
- ⇒ Initial metallurgical recoveries - +83%.
- ⇒ Development decision expected late 2003, construction commencing early 2004.
- ⇒ Production early 2005.
- ⇒ Capital cost estimated approximately US\$50 million.
- ⇒ Targeted operating cost of <US\$165/oz.

***China Cost Advantage***

Reinforced Concrete

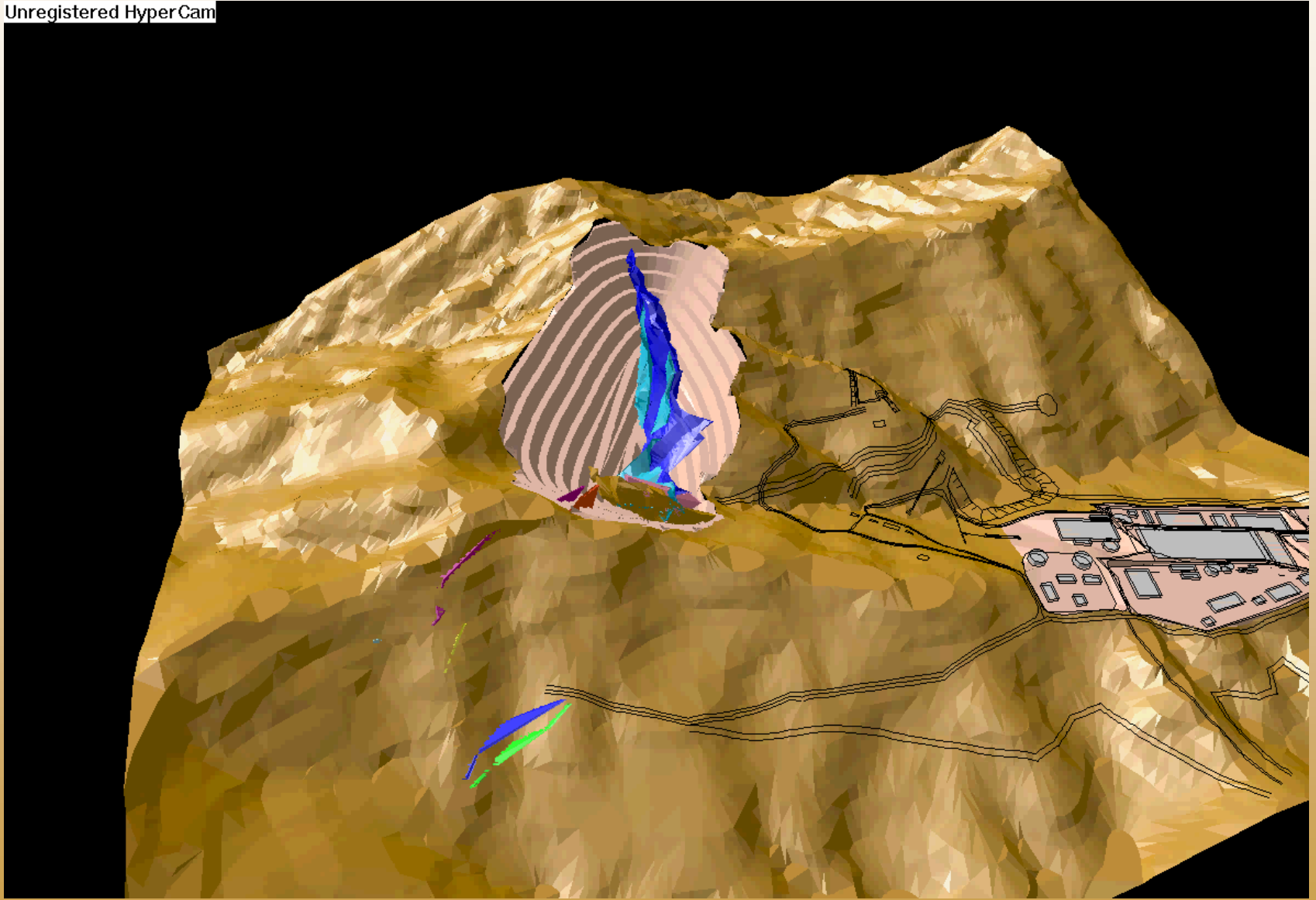


1.5m x 1.5m rise



# Jinfeng Resource Estimate

Unregistered HyperCam





# Jinfeng – Summary (why are we excited?)

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- ⇒ Large sediment hosted gold deposit with strong affinities to Carlin.
- ⇒ Underexplored region (as for most of China). Strong upside, multi-million ounce potential.
- ⇒ Abundance of key host lithologies and fertile structures.
- ⇒ Simple exploration model.
- ⇒ Likely low operating and capex costs.
- ⇒ SGL – 6 years of mine construction/operating experience in China – confidence in development.

***Should ensure profitable long-life operation.***

***Underpin growth of Sino Gold***

