

APPLICATION OF SPONTANEOUS POTENTIAL PROFILES IN THE EXPLORATION OF GOLD-RICH EPITHERMAL LOW SULPHIDATION VEINS IN A HUMID REGION

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INTRODUCTION-1

Results obtained during exploration
of Au-rich quartz veins
in low mountain, humid environments
of the Colombian Andes, South America

soft slopes, ~2500mm rain/yr, black organic soil

Spontaneous Potential (S.P.) profiling
used to evaluate strike-slip duplex structures
and locate Au-rich veins
in extensive zones of a vein system

INTRODUCTION-2

Total field work = 6 days

- helped to model a deposit
- provided ideas on where to continue exploring with trenches

Similar exploration techniques may be applied to

- some epithermal base-metal deposits
- and greenstone belt-hosted mesothermal shear zones

INTRODUCTION-3

Techniques known and used
since early twentieth century

but commonly underestimated in modern
exploration activities.

In author's experience,
spontaneous potential profiling
produces excellent results
with small investment in
equipment and personnell

S.P. PROFILING-1

Oxidation of sulfides
in sulfide-bearing veins or fractures
generates small electric currents

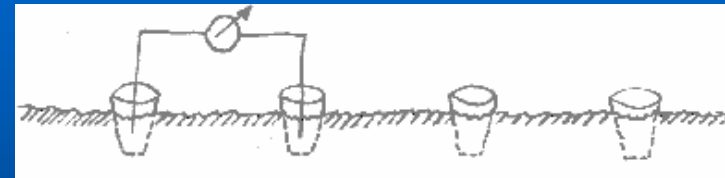
Sulfide-poor host rocks produce
a significant potential contrast

Spontaneous potential methods take
advantage of that contrast

S.P. PROFILING-2

zones with higher concentration of sulfides in oxidation produce potential anomalies that stand out well below the local base level.

Measuring techniques have to be adapted to climate.

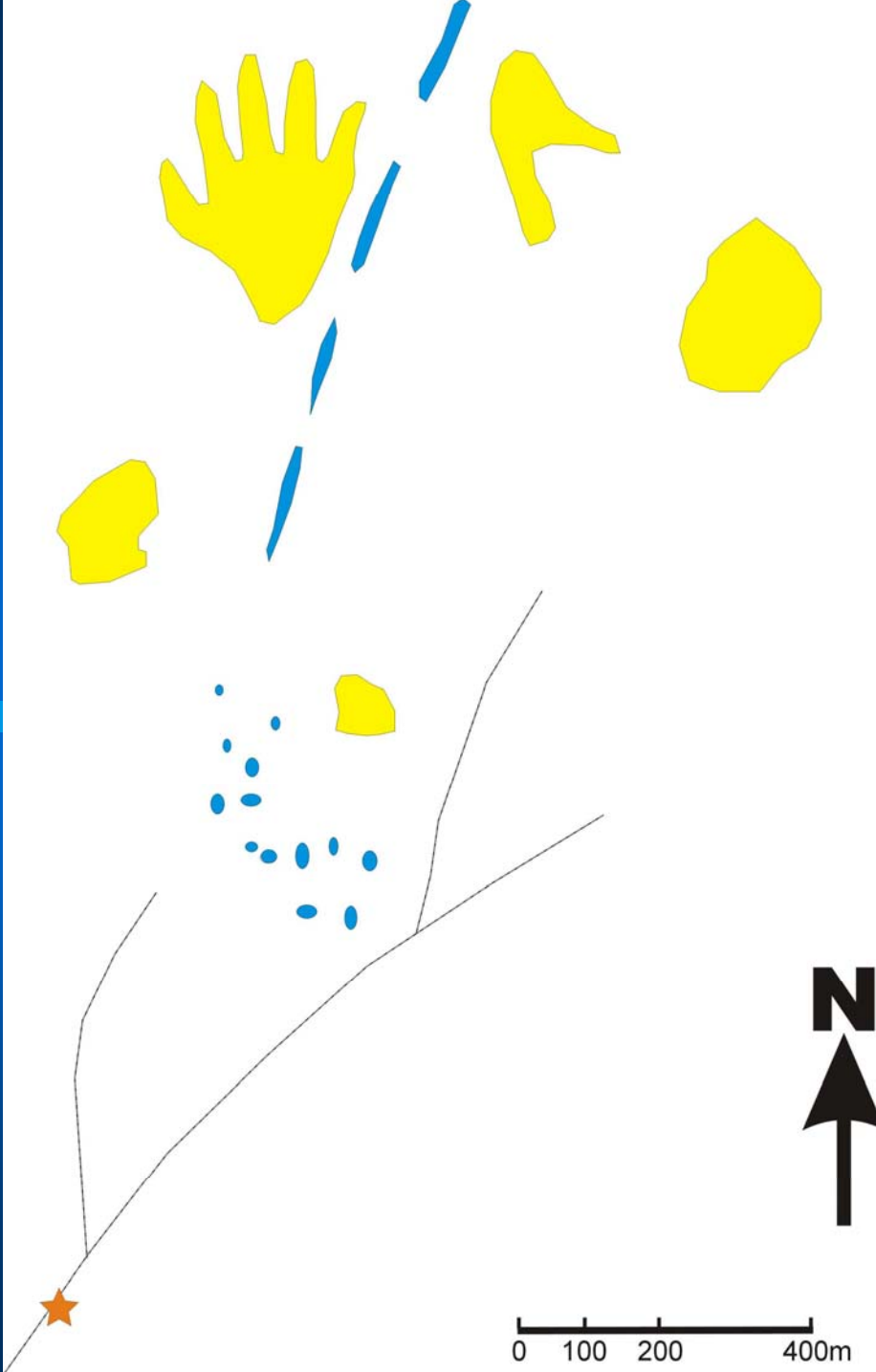


KNOWN GEOLOGY

PROSPECTIVE ZONE

- covered by soil + vegetation
- minor outcrops of pyroclastic rocks
- quartz ridges w/ features of epithermal metallic mineralization
- coarse quartz float

Old miner panned coarse Au from dry creek. That's only evidence of mineralization.



EXPLORATION PROCEDURE OVERVIEW-1

Effective response to spontaneous potential profiling was first tested.

*six field work days
+ evening interpretation*

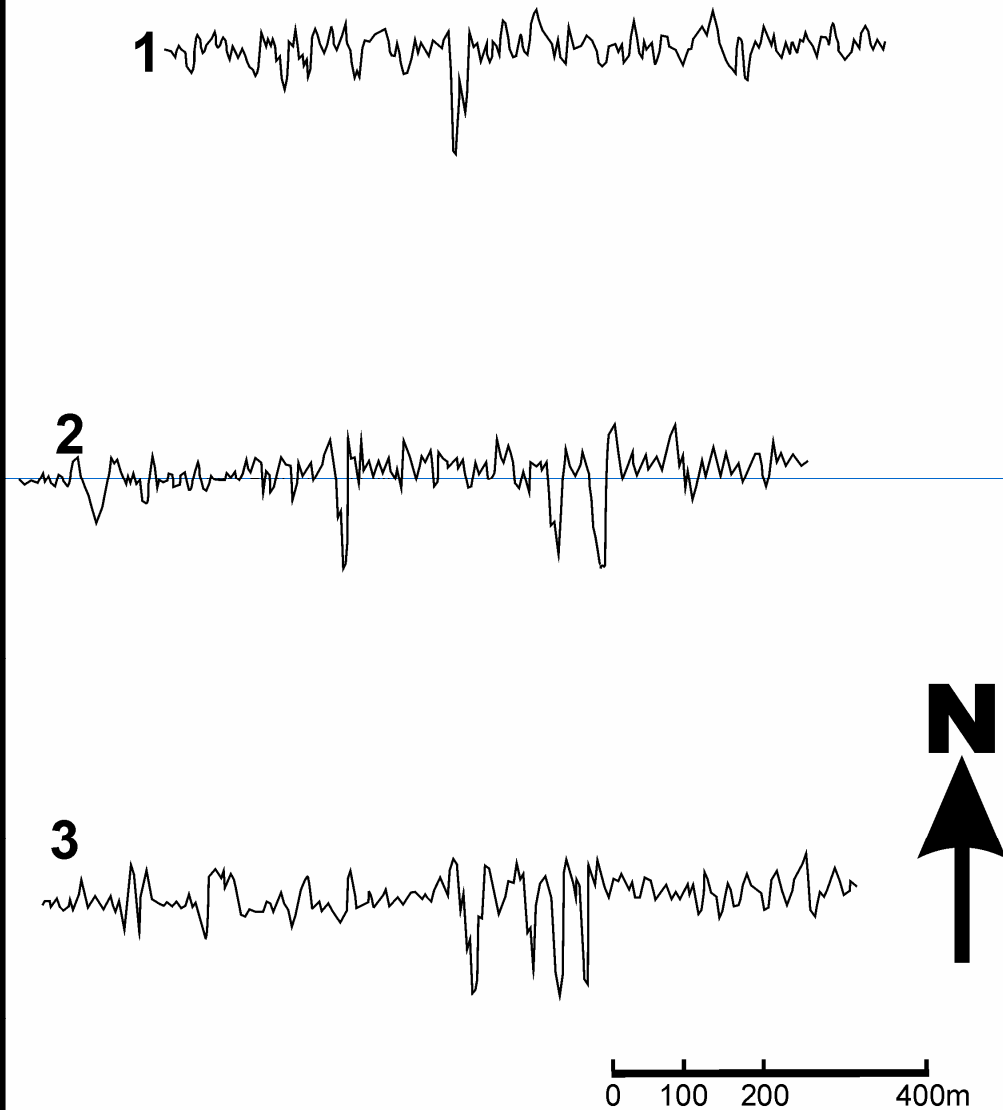
progressively provided information
to define series of
5 Au-mineralized qtz veins

EXPLORATION PROCEDURE OVERVIEW-2

Mineralized veins were emplaced in
distension zones around strike-slip
duplexes

Spontaneous potential profiles
helped to trace veins
from outcrop
into completely covered terrain

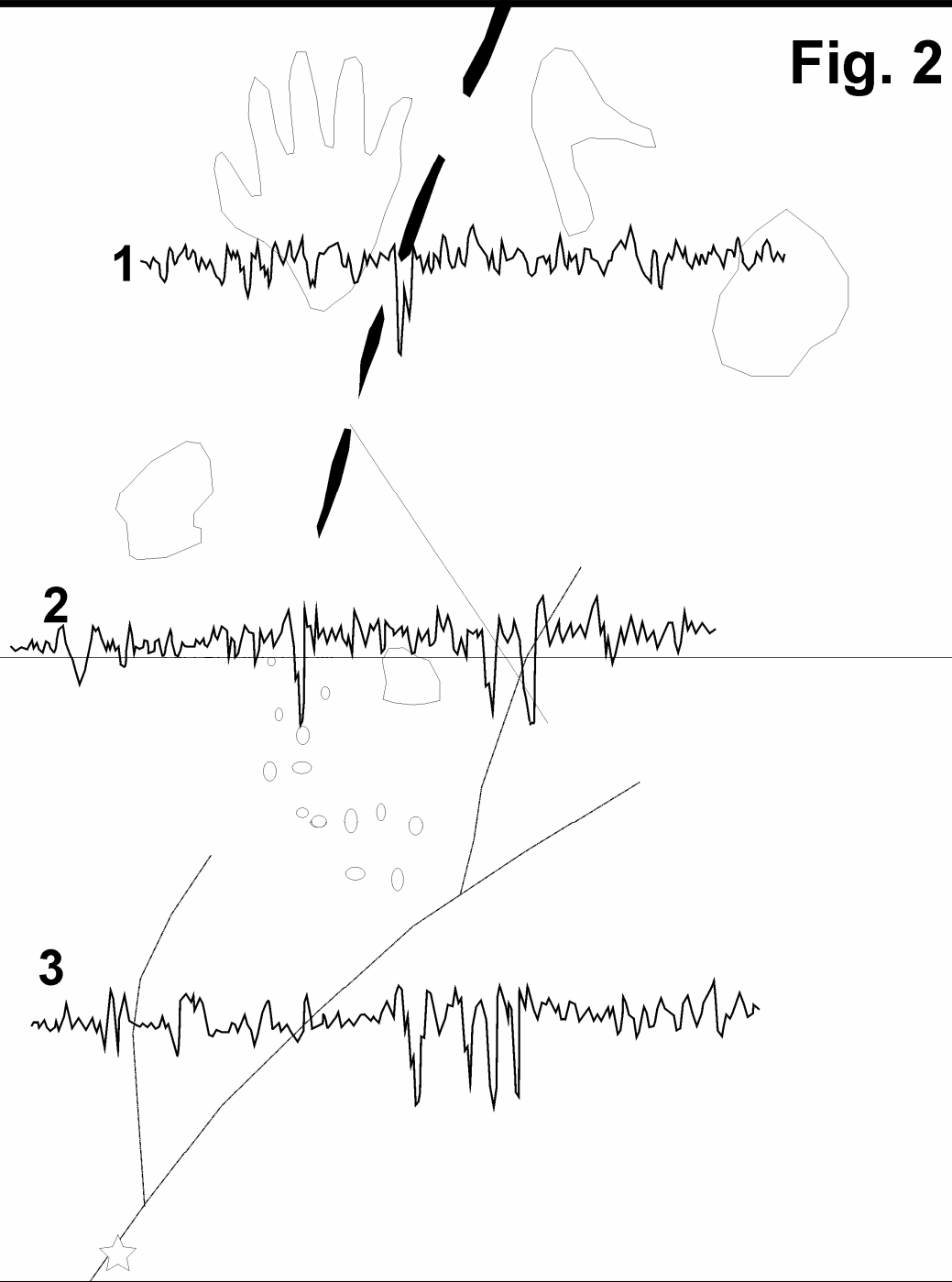
Fig. 2



EXPLORATION PROCEDURE-1

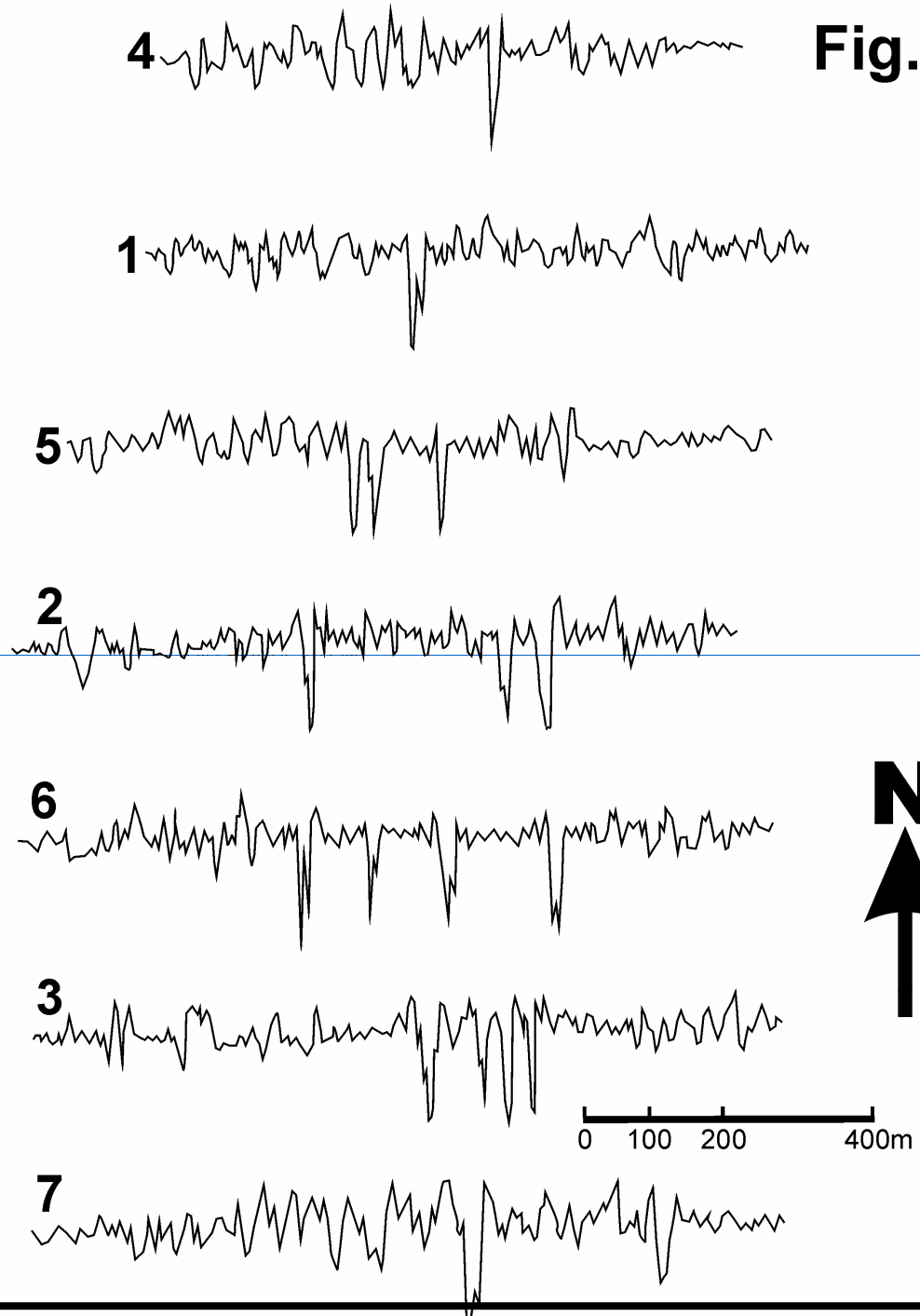
Profiles 1,2,3
obtained during the
first two days

Fig. 2



**SP PROFILES
ON TOP OF
GEOLOGY**

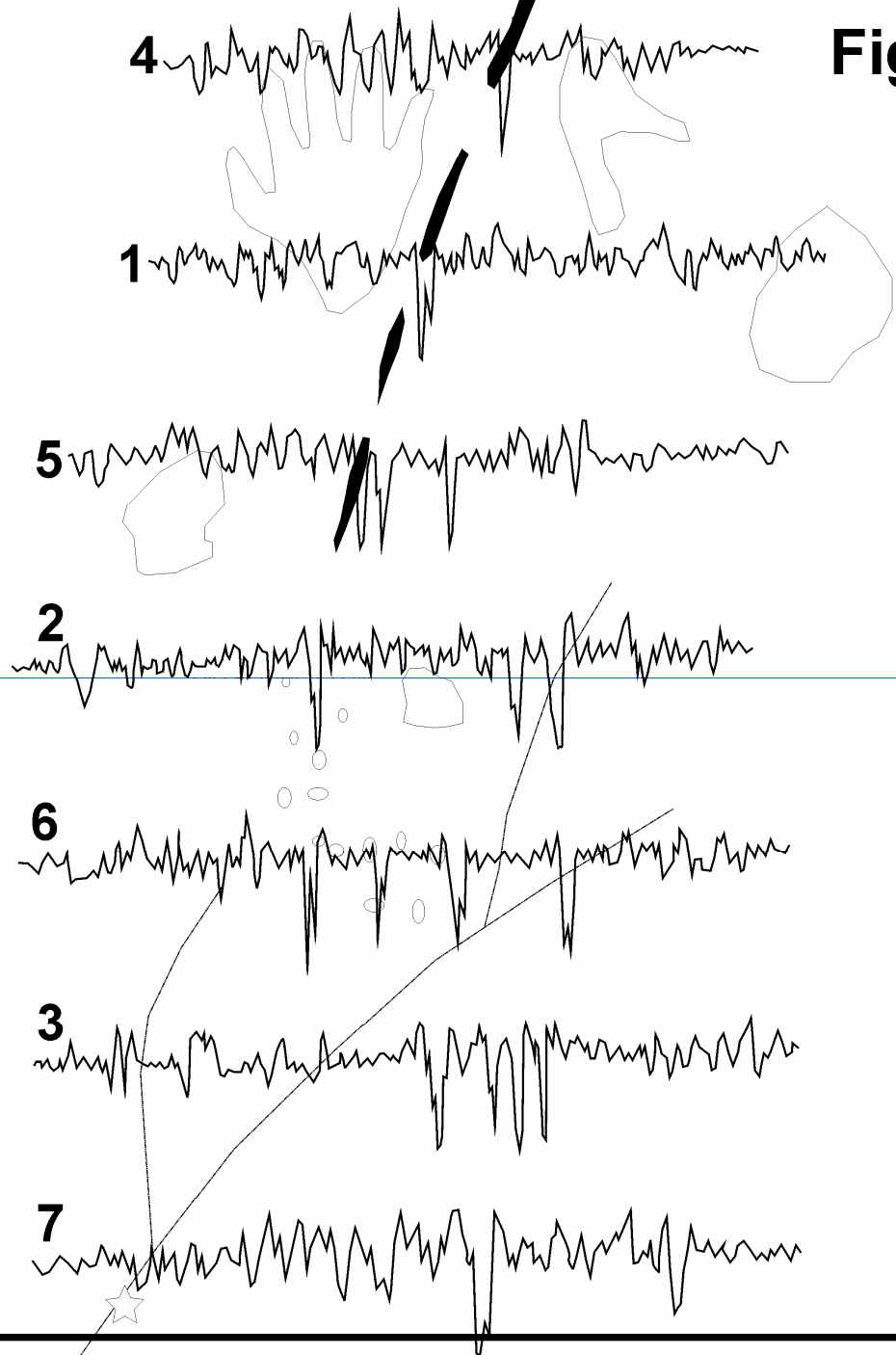
Fig. 3



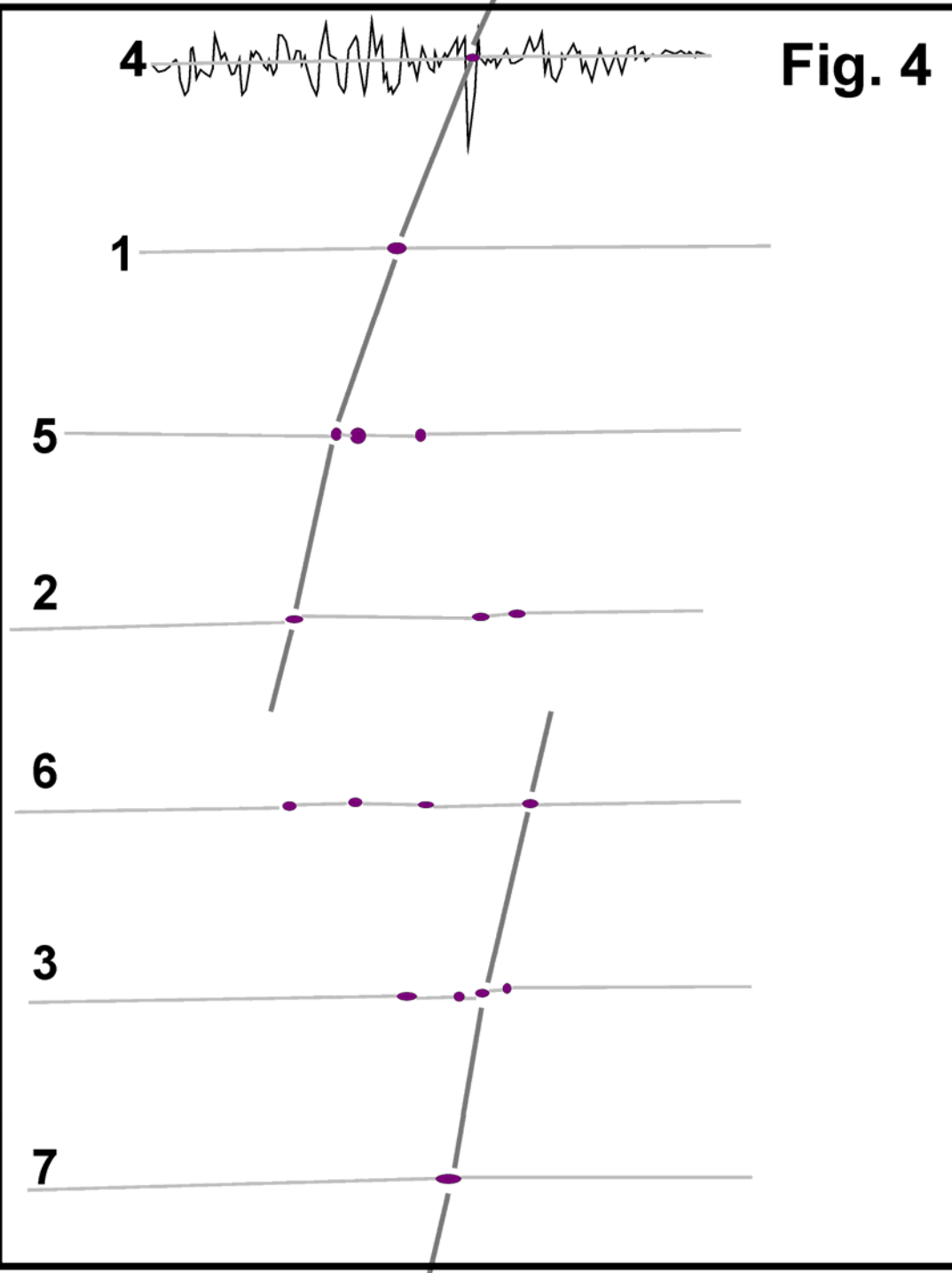
EXPLORATION PROCEDURE-2

Two more field
days produced
profiles 4,5,6,7

Fig. 3



**SP PROFILES
ON TOP OF
GEOLOGY**

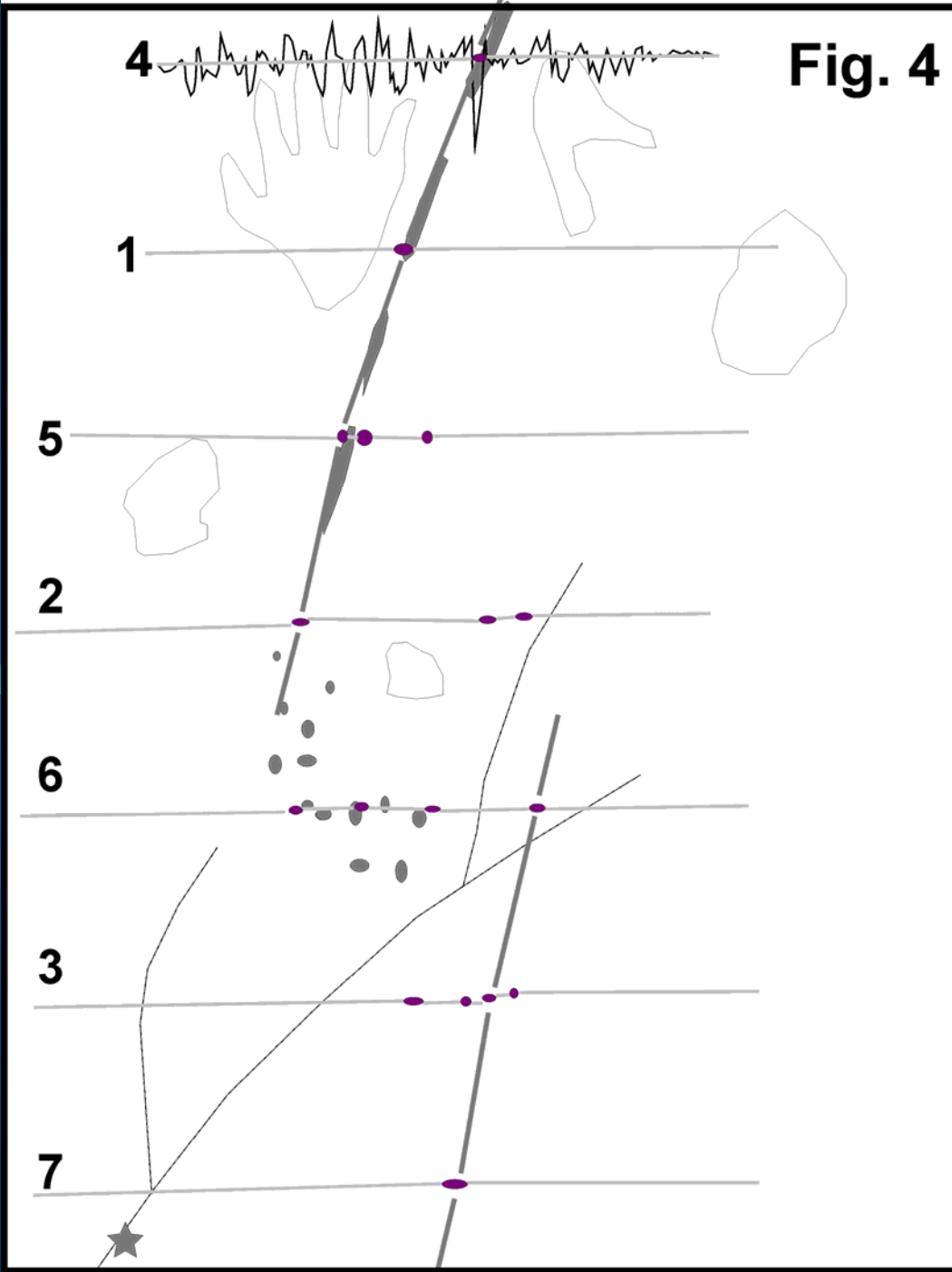


COLOR CODING
to interpret
anomalies
and non-anoma-
lous ground

red dots =
detected anomalies

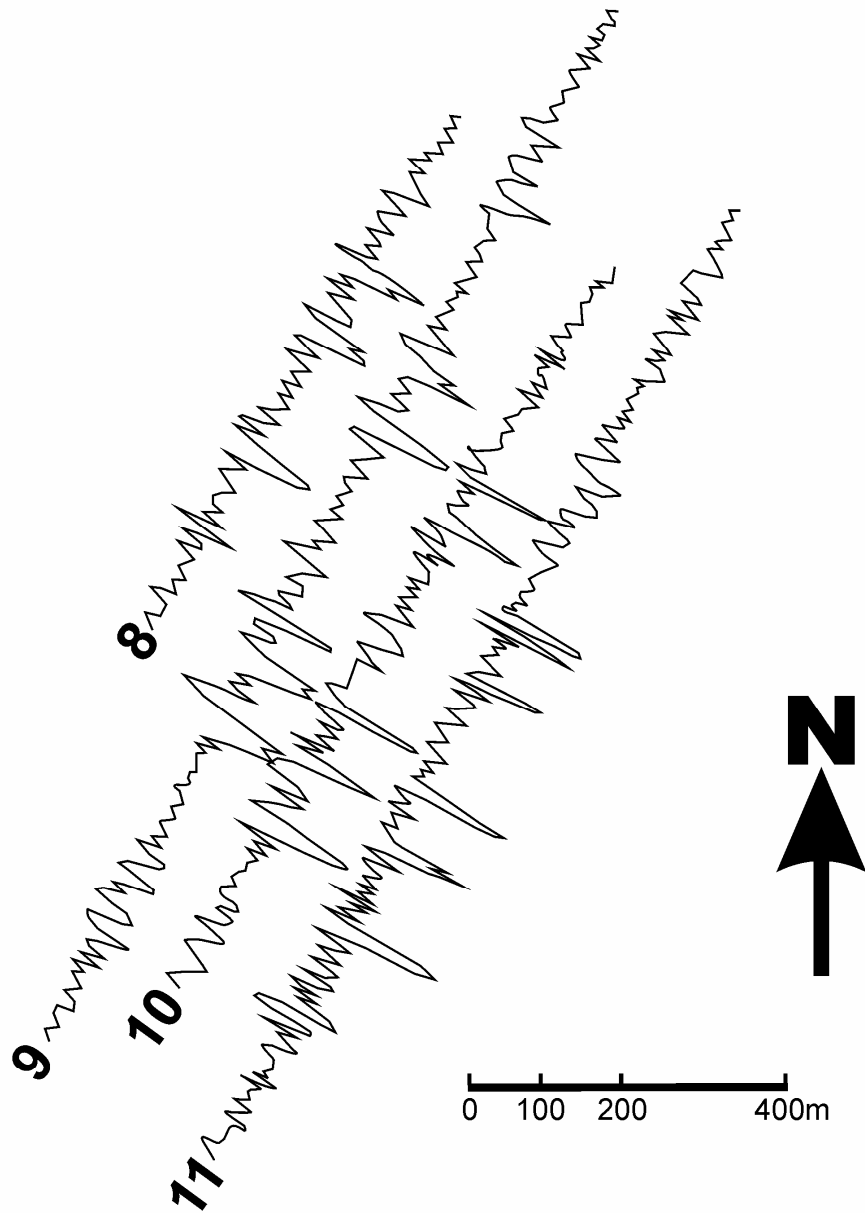
gray lines =
zones w/o
anomalies

thick lines join
known anomalies



**SP PROFILES
ON TOP OF
GEOLOGY**

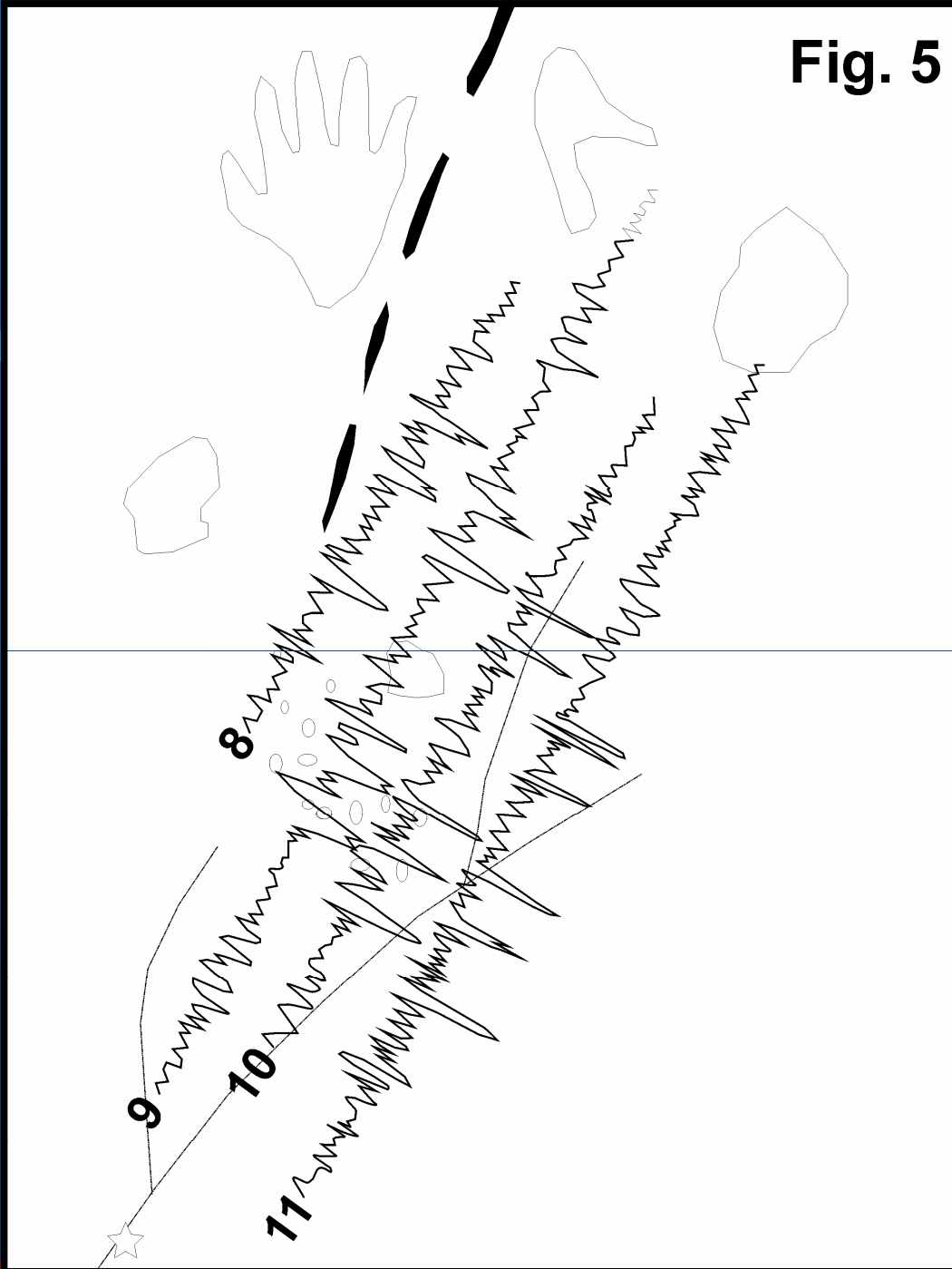
Fig. 5



EXPLORATION PROCEDURE-3

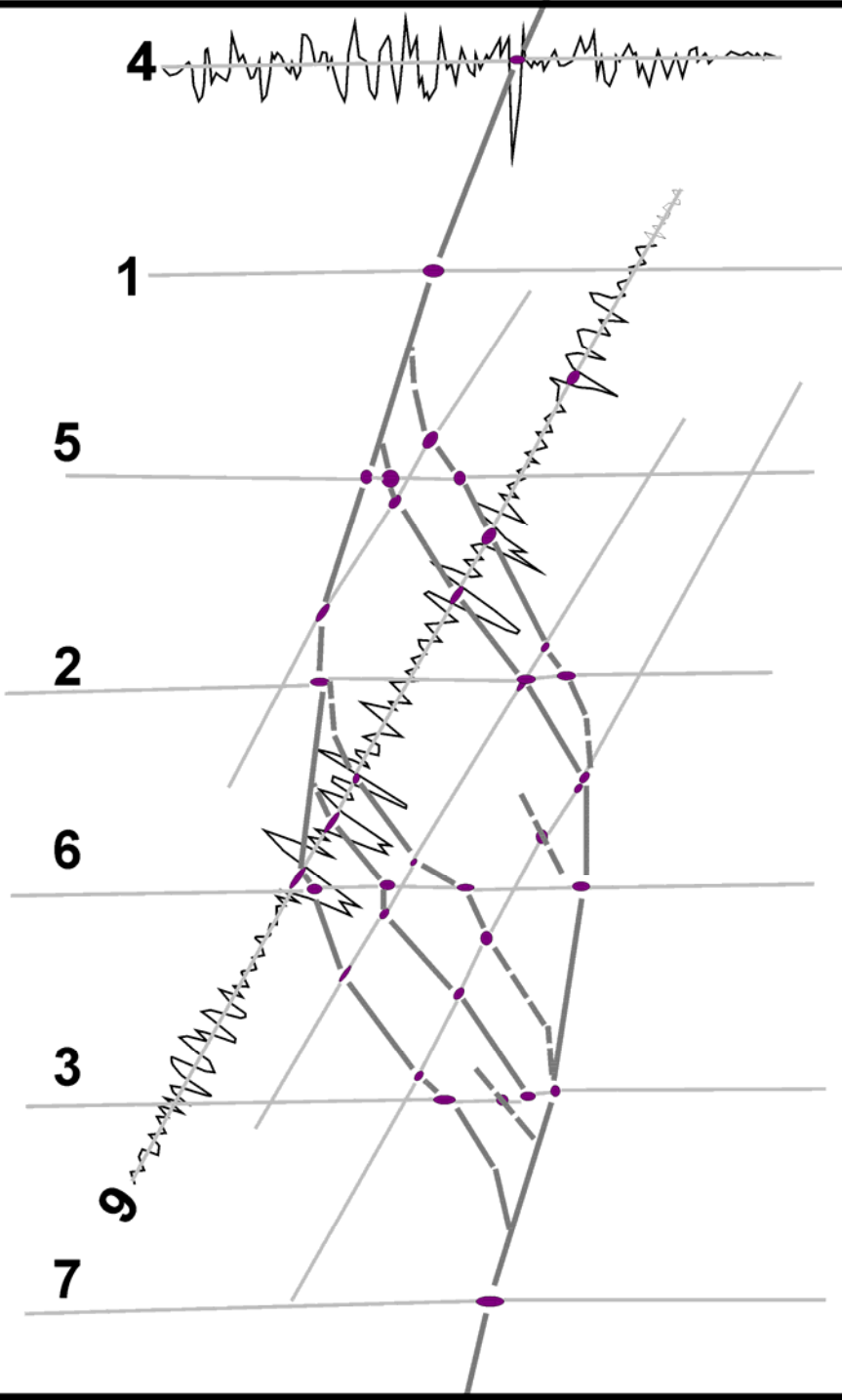
Two additional days
produced profiles
8, 9, 10, 11

Fig. 5

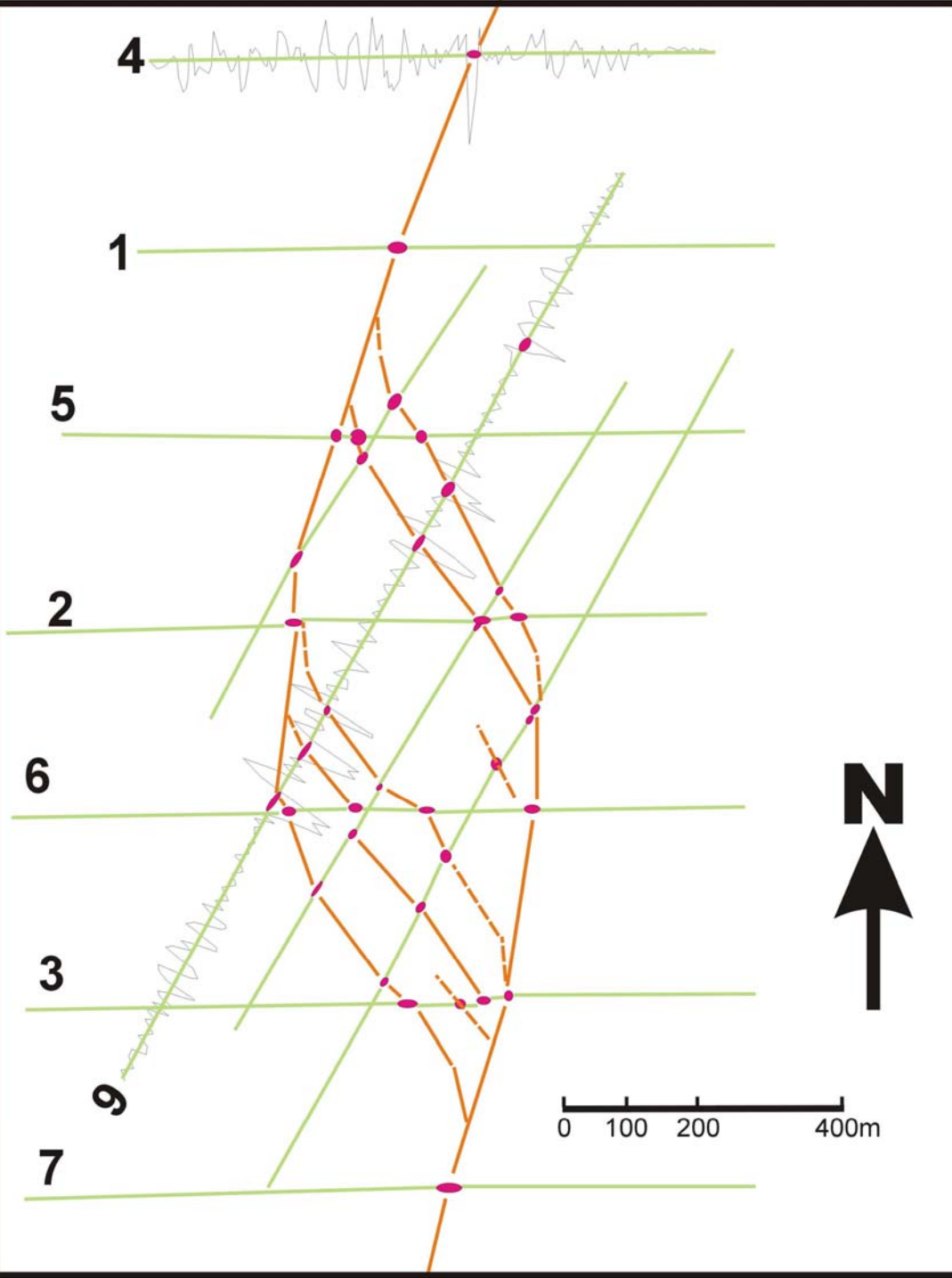


**SP PROFILES
ON TOP OF
GEOLOGY**

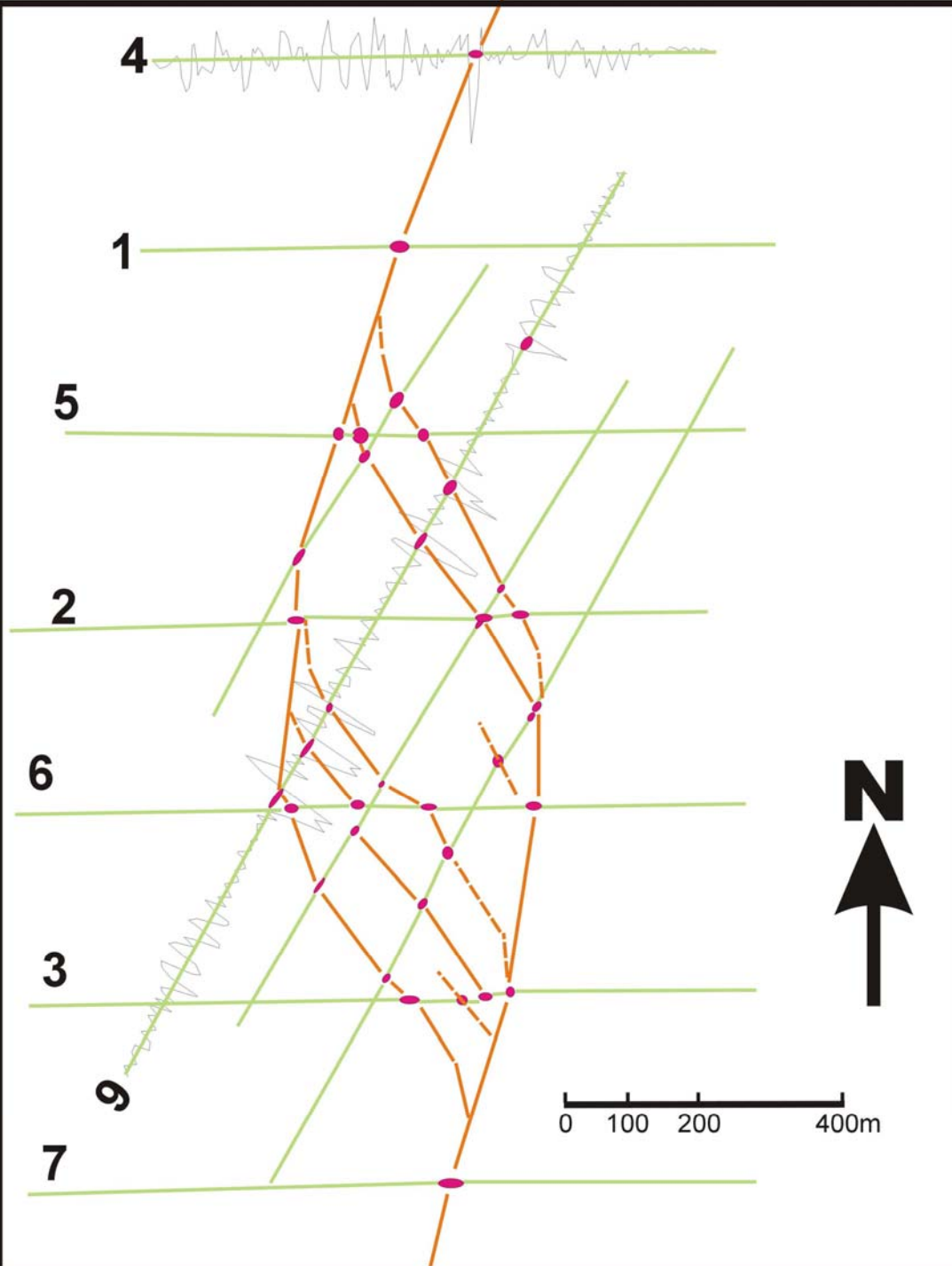
Fig. 6



**INTERPRETED
S.P.
ANOMALIES**



INTERPRETED
S.P.
ANOMALIES



Color coding

to interpret
anomalies
and non-anoma-
lous ground

red dots =
detected anomalies

green lines =
zones w/o
anomalies

orange lines join
known anomalies

EXPLORATION PROCEDURE-5

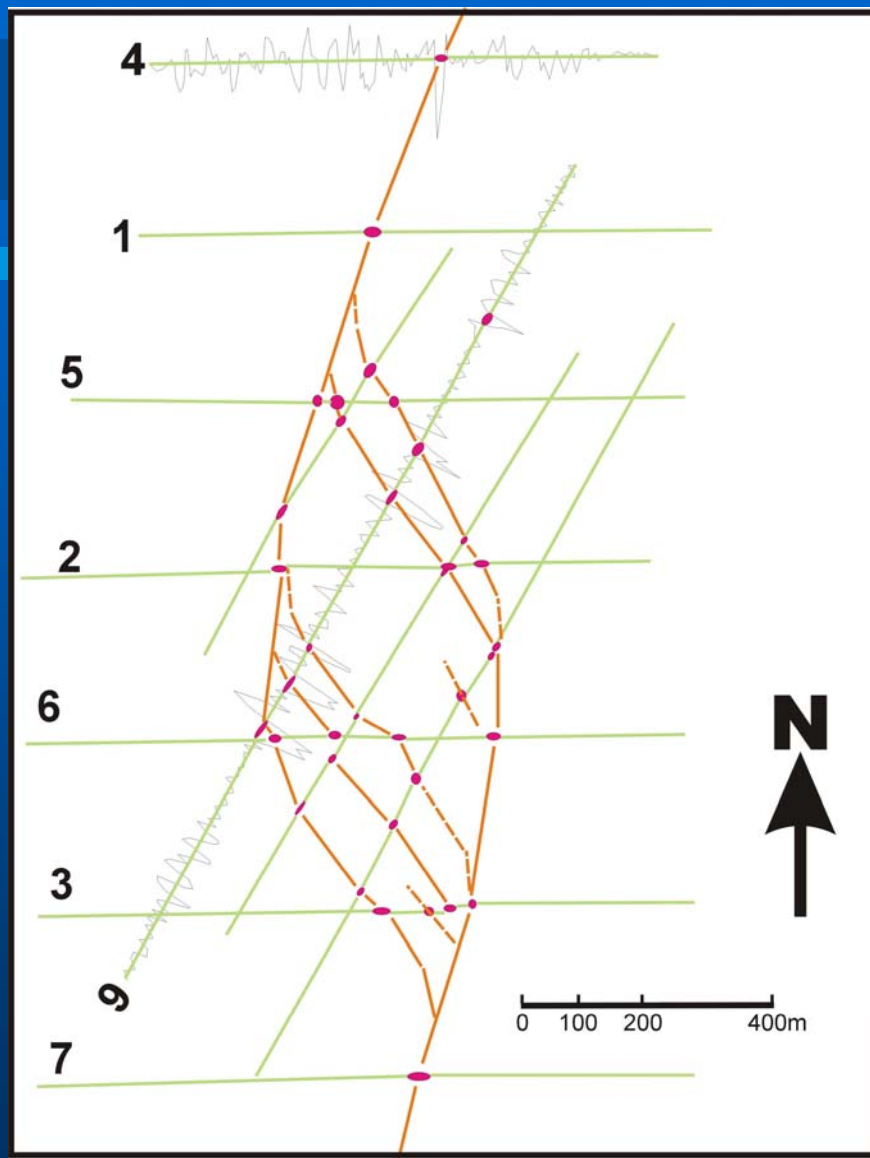
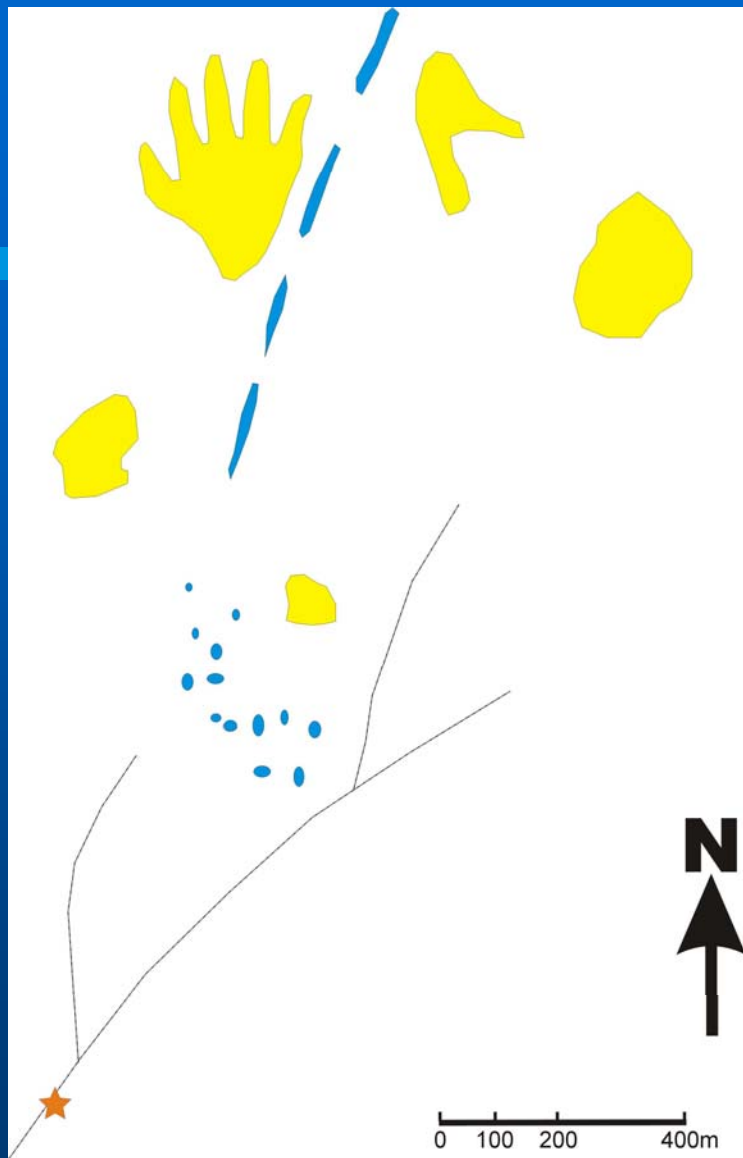
Information
from the
green lines = valuable

defined zones w/o anomalies
delimited bodies w/o oxidizing sulfides

EXPLORATION PROCEDURE-6

Profile orientation was important

better results obtained when profiles intersect potentially-mineralized structures at right angles



CONCLUSIONS-1

The structure defined by trenching was very similar to that delineated with S.P. profiling.

5 mineralized veins, each 400 meters long were discovered.

NW-SE mineralized structures proved to be Au bearing (7gAu/ton average grade).

CONCLUSIONS-2

Other structures did not carry economic quantities of gold.

Rich ore shoots occur at intersection of duplex corners (grades over 50 gAu/ton).

Project currently under evaluation.

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