

2.4 Critique of Methodology

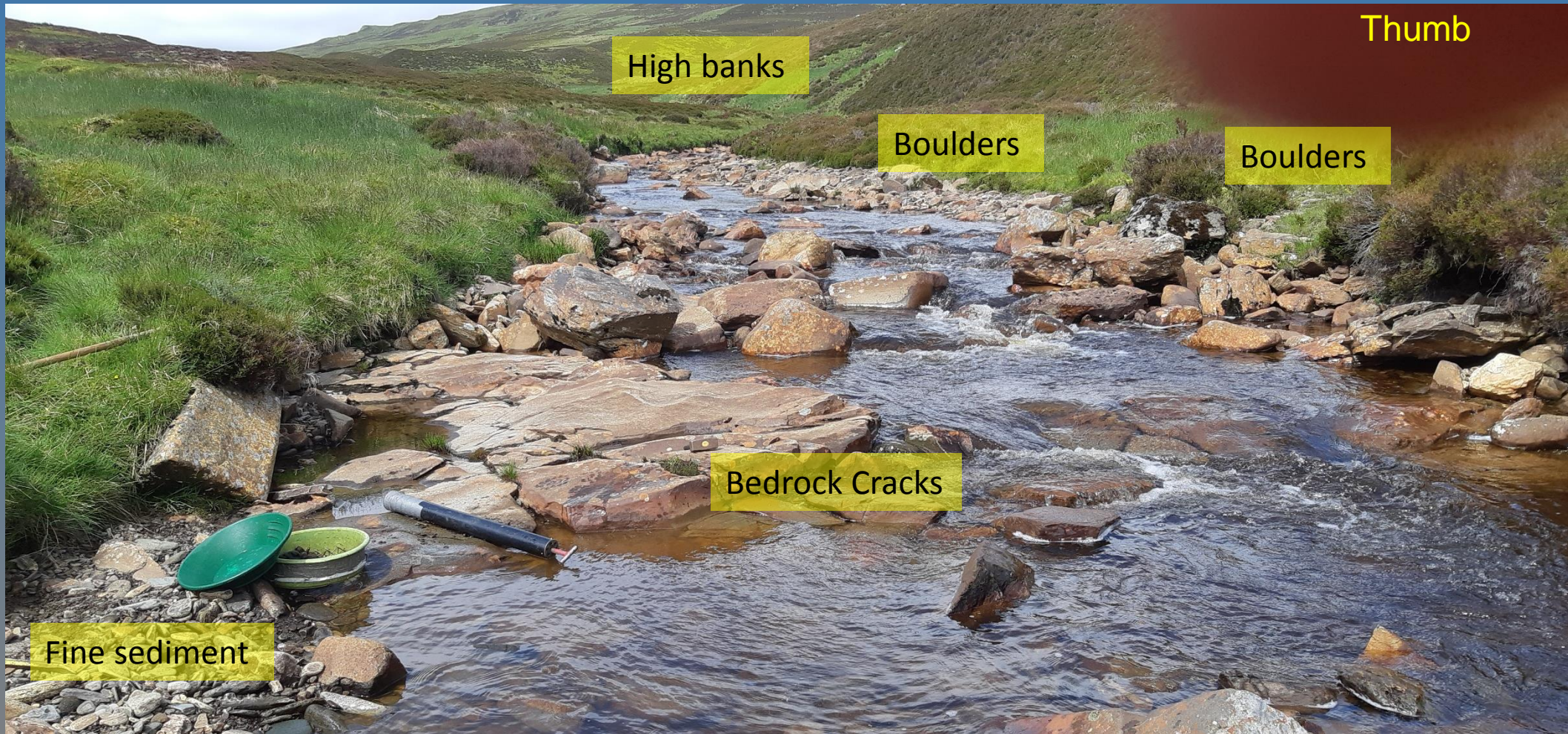
OR

What could possibly go wrong during gold particle studies ???

What could possibly go wrong:

Using gold abundance/size/morphology as an indication of distance to source

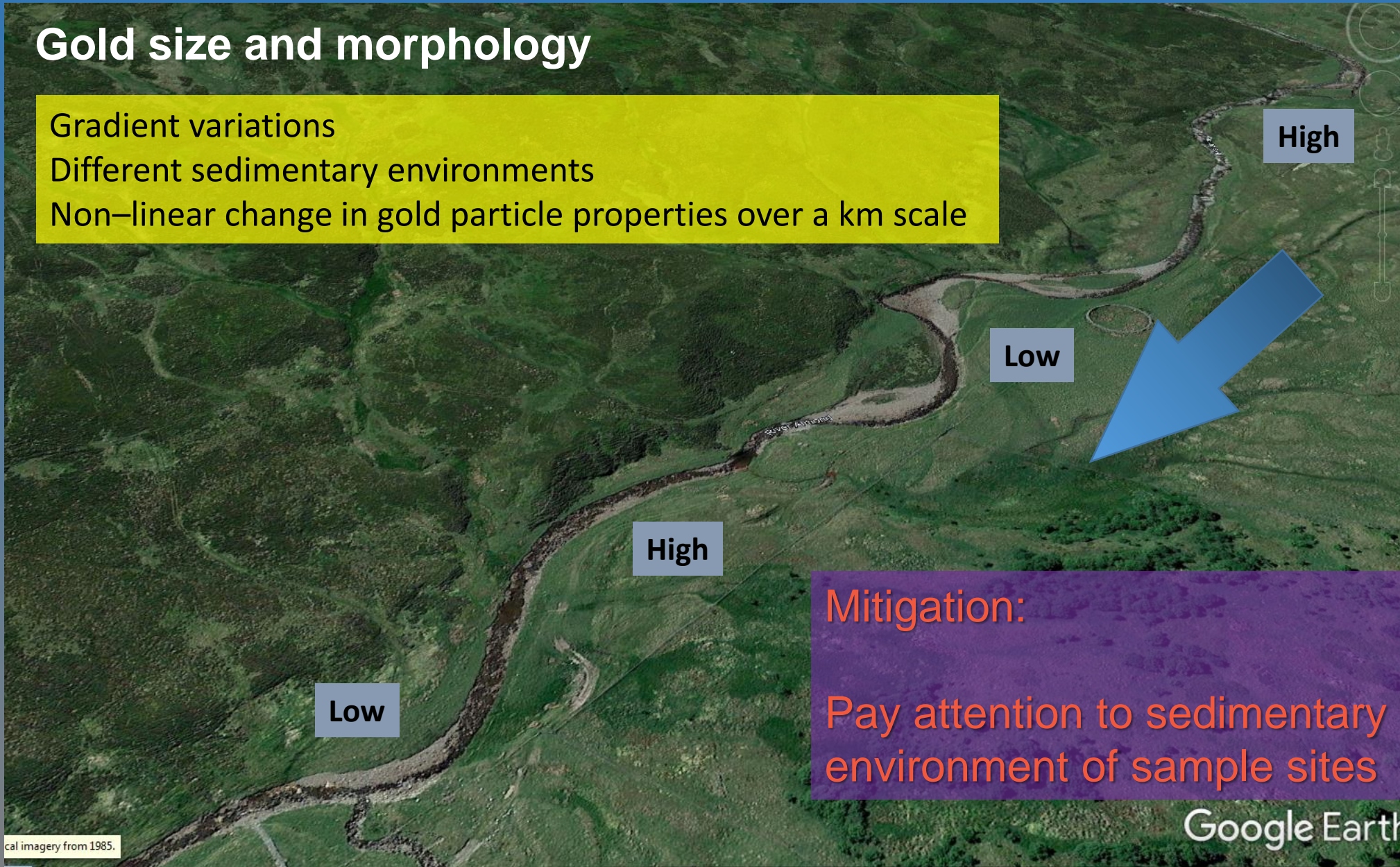
All of these parameters are a function of sedimentary environment...



What could possibly go wrong:

Gold size and morphology

Gradient variations
Different sedimentary environments
Non-linear change in gold particle properties over a km scale



Mitigation:

Pay attention to sedimentary environment of sample sites

Google Earth

What could possibly go wrong:

Correlation with stream sediment geochemistry



In this heavily glaciated terrane, there is placer gold but no corresponding geochemical response from sediments

Probably because the gold has been liberated, weathered, and worked by first fluvio-glacial and then modern drainage: i.e. any ore mineral markers have decomposed or been physically removed.

This is an advantage of gold – chemically inert and resistant to physical transport

Just because there is no associated geochemical anomaly or distinctive heavy minerals, does not mean that there is no bedrock gold mineralization.

What could possibly go wrong:

Difficult to characterize the compositional profile of a sample population-
no particles!

A sufficient number of gold particles can be difficult to find.

This means that we need to spend a lot of time looking for it:
problematic on an exploration budget.

Collecting gold in different environments is an acquired skill
that requires extensive experience.

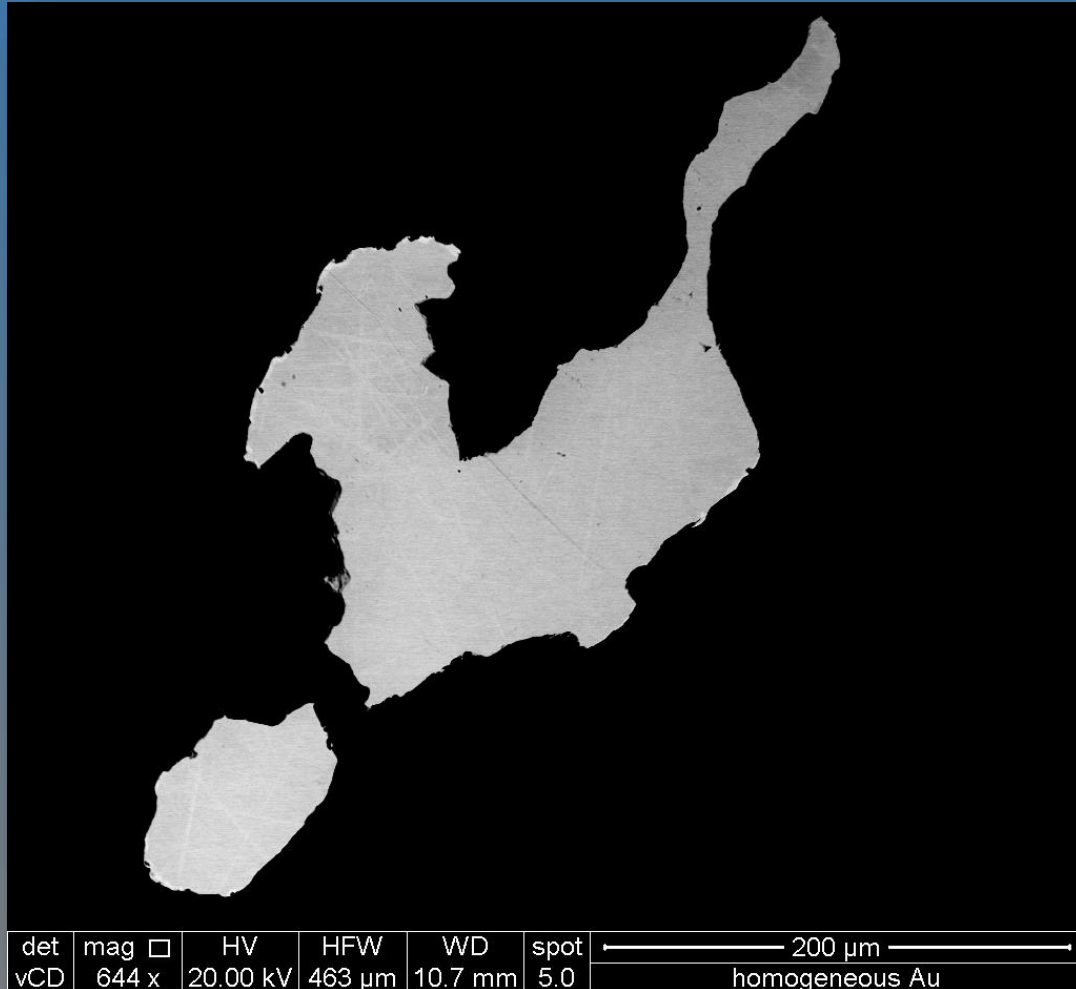


Mitigation:

use specialised field techniques appropriate for specific fluvial settings

What could possibly go wrong:

Difficult to characterize the compositional profile of a sample population:
No signature!



All the gold is featureless, it has no inclusions...

EMPA may detect only Au and Ag in populations of gold from hypogene sources...

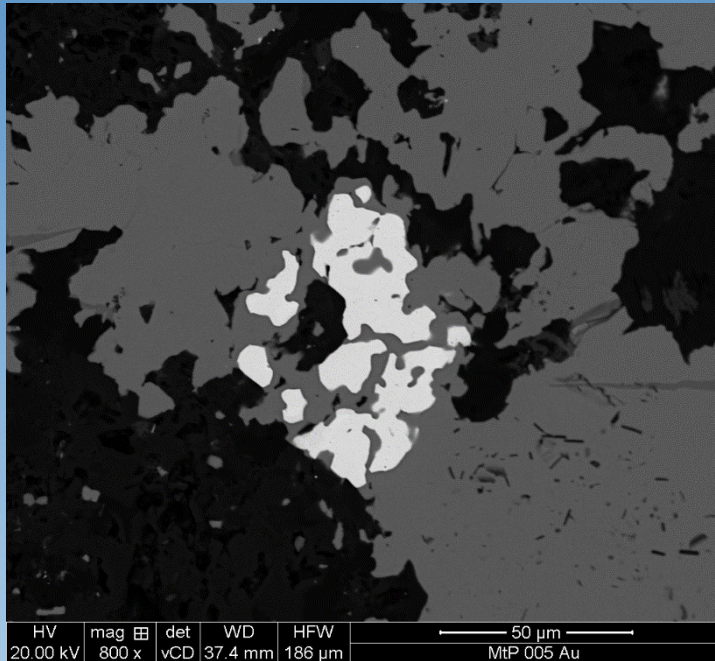
We are investigating application of LA-ICP-MS to extend the discriminant range, both generically and on a study by study basis.

BUT we do have a problem where extreme flattening of particles eradicates both the original alloy composition and the inclusion suite. (Stewart et al. 2017)

What could possibly go wrong:

Difficult to characterize the compositional profile of a sample population:
Gold too small!

Size cut off for panning: around 60 μm



Porphyries: Potassic (ore) stage Au exsolved from Cu-Fe sulphides- max size 20 μm

None of this gold is accumulated in, or collectable form placers

Gold in local placers is derived from late stage veins- compositionally distinct

Need to understand this subtlety to interpret compositional profiles of gold in placers surrounding porphyries

Polished block ore,
Mt Polley porphyry BC

What could possibly go wrong:

Supposing we are wrong about gold growth in placers ?

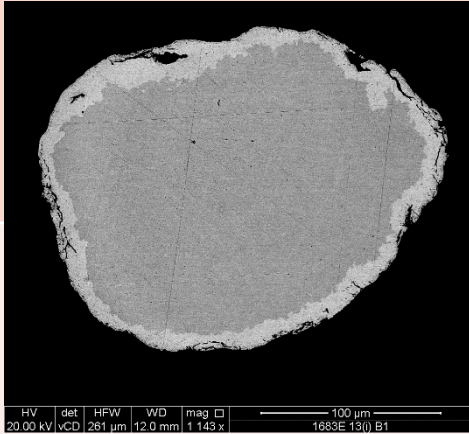
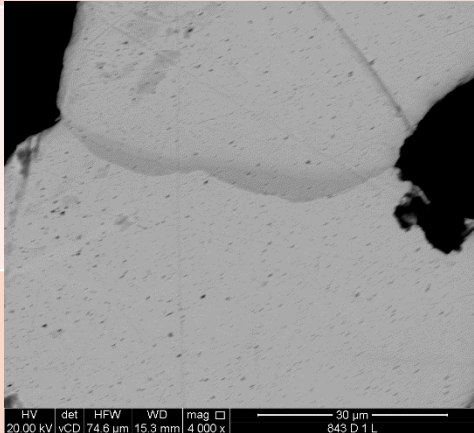
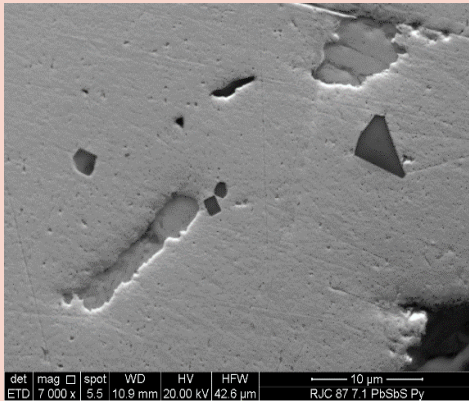
Substantial additions to gold in the fluvial setting would indeed remove the compositional link between lode and placer gold particles.

We looked at a paper that advocated gold growth/transformation in Finland last week- here I want to give a wider treatment of why we remain unconvinced that 'new' gold is an important component of the placer inventory.

What could possibly go wrong:

Supposing we are wrong about gold growth?

If gold were 'growing' in surface environments...

What we would expect to see:	Observed ?	What we would <u>not</u> see:
Rims of different thicknesses on different (equant) particles		 <p>HV det HFW WD mag □ 20.00 kV vCD 261 μm 12.0 mm 1 143 x 100 μm 1683E 13(0) B1</p>
		 <p>HV det HFW WD mag □ 20.00 kV vCD 74.6 μm 15.3 mm 4 000 x 30 μm 843 D 1 L</p>
		 <p>det mag □ spot WD HV HFW ETD 7 000 x 5.5 10.9 mm 20.00 kV 42.6 μm 10 μm RJC 87 7.1 PbSbS Py</p>

Lets not dwell on the negative !

Gold particles studies are widely undervalued

They can provide valuable information at an early stage in the exploration process and are not expensive in the context of exploration

They will work better in some instances than in others: *just like any exploration technique*

'I had no idea you could get so much information from gold particles!'

(quote from a senior exploration geologist in Namibia)