Ground Mineralisation

Ground mineralisation refers to how magnetic the ground is. This does not necessarily mean that mineralised ground has its own magnetic field, but it does mean that particles or grains in the soil will produce a magnetic response and/or be attracted to a magnet.

Ground across the world varies a great deal in its levels of mineralisation. Geologically new ground that has been created through glacial scraping or the erosion of mountains during the last Ice Age, is usually weakly mineralised. Old grounds that have been at the surface for a long time often have high levels of mineralisation. This is due to the action of water causing iron compounds to migrate to the surface. Highly mineralised soils can often be recognised by their red colour.

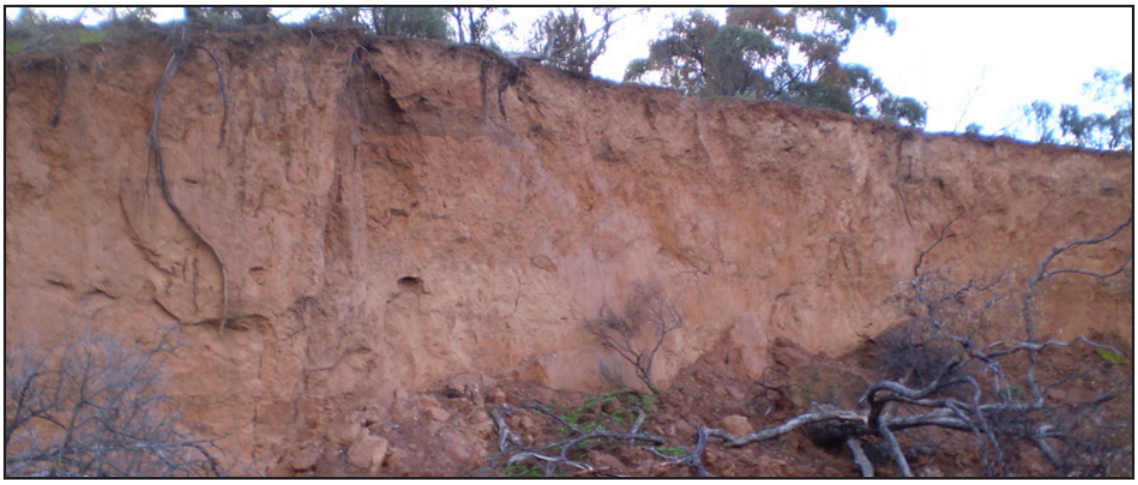

Figure 1. Red soil indicating a high level of mineralisation

Just like targets, mineralised ground produces its own electromagnetic field in response to the detector's electromagnetic field. This field has two components, an X signal and an R signals (see KBA 01 Basic Metal Detector Operation), however mineralised ground, due to its large volume produces a much stronger X signal than either the X or R signal from a deeply buried target.

The proportion of X and R signals produced by mineralised ground varies randomly from one location to another, although over short distances they remain reasonably stable.

Ground	Highly mineralised	Mildly mineralised	Neutral
R signal	30,000	200	80
X signal	600,000	20,000	800
R/X%	0.5%	1%	10%

Figure 2. Proportional X and R signals from different ground types

Due to the ground's large X signal, accurate metal detection relies on being able to detect the R signal from a target, but, as shown in figure 2, the ground's R signal can vary substantially.

Minelab's ground balancing and ground tracking technologies balance out the affects of highly mineralised and variable ground to achieve greater detection depth and sensitivity.