Glass Earth Gold LIMITED

A science driven gold exploration company

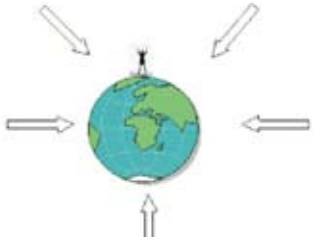
GRAVITY

INTRODUCTION

Gravity surveys measure the variations in the gravitational pull of the earth. These variations are a result of local changes in rock density, and therefore dependant on the type of rocks beneath the surface.
The variation in crustal density and cover are what appear on a gravity anomaly map. The anomaly map looks at the difference between the value of gravity measured at a particular place and the value that was predicted to be in that place. Dense rocks such as mantle rocks and ores will have a greater force of gravity than other less dense rocks that have less mass.
Glass Earth uses gravity surveys to help with locating different rock types and structural features such as faults and fractures. These help us determine the possible location of ores and mineral deposits.

GRAVITY

Gravity is a result of forces of attraction between two objects. The bigger the mass of an object, the greater its attractive force.
The mass of the earth is so much greater than that of a human that the force of attraction makes it difficult for the human to jump away from that force. A human does have his/her own force of attraction / gravitational pull, but due to our relatively small mass this is not seen to affect anything around us.



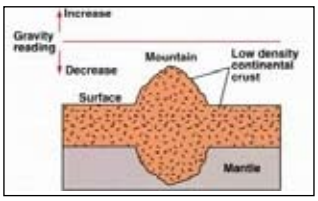
Forces of gravity act down on a person, making it an effort to jump up away from the gravity pull

Above: Cessna Grand Caravan
Below: gradiometry equipment on board

FLYING A GRAVITY SURVEY

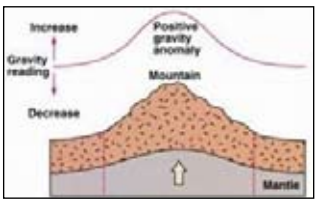
The survey carried out by Glass Earth in the North Island in 2005 used a Cessna Grand Caravan to carry gradiometers, the instruments used to measure gravity fluctuations.
The plane must fly at a set height over the ground at all times to get accurate readings. When the aircraft approaches a hill, it must ideally climb to remain at the set height above the ground and then drop down into the valley afterwards.
In the case of Glass Earth's 2005 surveys, the plane followed the contours of the ground 90m up in the air, flying in lines 450m apart across the survey area.

Uniform gravity reading



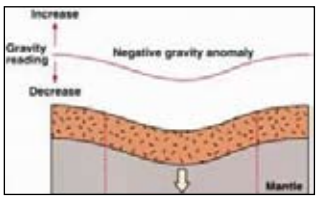
When everything is in balance, the gravity readings are uniform.
But if something is pushing up from below, or down from above, the gravity readings will be abnormal.

Positive gravity anomaly



A positive gravity anomaly means that something like magma is pushing the crust upwards.

Negative gravity anomaly



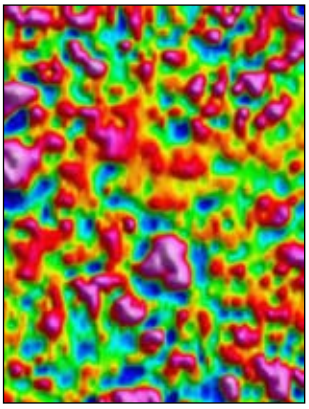
A negative gravity anomaly means something is pulling or pushing the crust downwards. Negative gravity anomalies are also found when there is a pocket of dense rock within the crust. This denser rock will have a stronger gravitational attraction.

THE SCIENCE

The instruments used to collect gravity data pick up series of natural effects along with the gravity effects the geologist is looking for. The data is processed in such a way that these natural effects are removed and the gravity changes left are correct. For example, Terrain Effects: the gravity reading at the top of a hill would be greater than that at the bottom of a valley due to extra gravitational attraction in the adjacent valley walls. Terrain Correction removes this effect and the gravity reading left is thus more accurate.

The data is presented in a coloured map with high gravity values showing in red through to low gravity (or lower than predicted 'background' gravity) showing in blue and the incremental scale running between these two end colours.

The wavelength and amplitude of the gravity anomalies give geoscientists an idea of the size and depth of the geological structures causing these anomalies. Deposits of very dense and heavy minerals will also affect gravity at a given point and produce an anomaly above normal background levels.



The red shows high gravity areas such as basalts while the blue indicates areas of lower gravity