

Name

Student #.....

GLY 264: Introduction to Geophysics

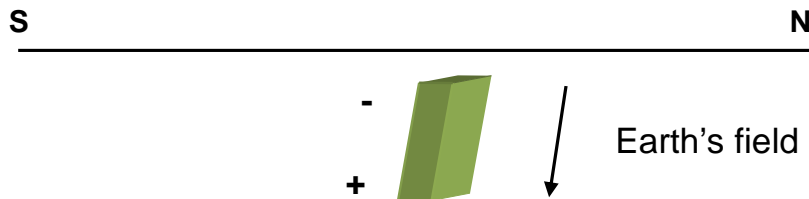
Practical 4. Magnetic Anomaly of Simply Shaped Bodies

An anomaly of a dipole magnetic geological body depends on:

- a. The causative body producing that anomaly
- b. The magnetic properties of the causative body plus the neighbouring bodies
- c. The orientation of source and the latitude at which the anomaly occurs
 - I. Orientation refers to the direction of magnetisation of the body and its strength
 - II. The Earth's field taken into account
- d. The shape of the target
- e. The depth of the target

Dipole Fields

1. Find the separate magnetic fields and then add them together; and draw the anomaly produced by thin dyke as illustrated below.



Deducing a magnetic anomaly

Because the Earth's field varies with latitude, then anomaly varies with latitude. Thus the size and shape of an anomaly depends largely on latitudes. The profiles at poles are same in all directions. Conversely, the anomaly at the equator and the poles is symmetrical.

Depth of a dipole magnetic geological body

The shallower the geological body, the sharper, shorter wavelength, narrower and larger the anomaly. In contrast, the deeper the causative body, the less sharp, longer wavelength, wider and smaller the anomaly.

2. By using Peter's half-slope technique, find the depth of a thin dyke striking in the direction of S-N at the latitude of 55° N.

- Find the gradient of the steepest part of the anomaly and draw a tangent line to it.
- Find the half steep gradient on either side of the steepest tangent drawn in 1 above; call these tangents **A** and **B** at point **a** and **b**.
- Draw extension lines through **a** and **b**, perpendicular to the zero line of the anomaly.
- Measure the separation (S) between the extension lines.
- The depth (d), to the top of the geological body is given approximately by depth $d \sim 1.6 \cdot S$

