

Name

Student #.....

GLY 264: Introduction to Geophysics

Practical 1. Gravity Anomaly

Different gravity readings are obtained at the base station each time it is reoccupied. These discrepancies are termed tidal and instrumental drift variations that need corrections. The variations in the gravity field are estimated by using linear interpolation between the base stations. NB! Both the observed and the interpolated readings are identical at the base stations, and if not then something is wrong.

Gravity Observations and Field Reductions				
Station #	Time	Instrument Readings	Interpolated Readings	Variations
BS ₁	12:01	2901.373		
S ₂	12:27	2901.518		
S ₃	12:35	2901.661		
S ₄	12:45	2901.827		
BS ₅	12:57	2901.845		

Table (1), Readings at the gravity station indicate how the gravitational field varies with respect to the readings observed at the base station.

Column 1 is simply the daily reading number i.e. the first, second, or fifth gravity reading of the day. Column 2 lists the time of day at which the measurement was taken and recorded. Column 3 represents the raw instrument reading.

1. Using the given time and instrument reading in table 1, compute the interpolated reading with the aid of employing the formula provided below. [6]

$$\text{Interpolated Reading} = \text{OG}_{A1} = (\text{OG}_{A5} - \text{OG}_{A1}) [(T_n - T_1) / (T_5 - T_1)] + \text{OG}_{A1}$$

OG = Observed Gravity, T = Time and n = 1, ..., 5

2. Determine the variations between the observed and interpolated readings by finding the difference between them. [5]
3. Reduced Gravity:
 - a. Display the results graphically by plotting the drift corrected readings (Relative Gravity) against the station numbers (Station #). [4]

One check to make sure that the corrections have been applied correctly is to look at the gravity observed at the base station. After application of the corrections, all of the gravity readings at the base station should all be zero. The uncorrected observations show a trend of increasing gravitational acceleration toward higher station number. After correction, this trend no longer exists. The apparent trend in the uncorrected observations is a result of tides and instrument drift.