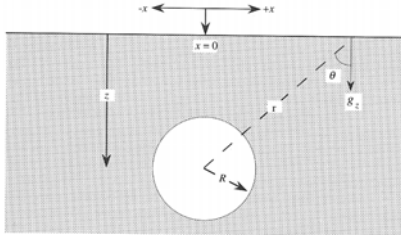


## Gravity From a Buried Sphere



**Figure 6-13** Notation used in derivation of the gravity effect of a buried sphere. The same notation is used for a traverse at right angle to the strike of a horizontal, infinitely long cylinder.

## Gravity from a Sphere

excess mass due to the sphere is equal to  $4\pi R^3 \rho_s / 3$ . Using Eq. 6-4 we see that the gravitational attraction of the sphere in the direction of  $r$  is

$$g_{\text{sphere}(r)} = \frac{Gm}{r^2} = \frac{G 4 \pi R^3 \rho_s}{3 r^3} = \frac{G 4 \pi R^3 \rho_s}{3 (x^2 + z^2)^{3/2}} \quad (6-33)$$

We seek the vertical component of  $g_{\text{sphere}(r)}$  because gravimeters respond only to gravity in the vertical direction. In general, unless noted otherwise, the component in the vertical direction  $g_z$  is implied. Therefore,

$$g_{\text{sphere}} = \frac{G 4 \pi R^3 \rho_s}{3 (x^2 + z^2)^{3/2}} \cos \theta = \frac{G 4 \pi R^3 \rho_s}{3} \frac{z}{(x^2 + z^2)^{5/2}} \quad (6-34)$$

Now that we have the required equation, let's study some attributes of gravity over a buried sphere. Table 6-6 uses Eq. 6-34 and allows us to directly compare gravity over two spheres, so we can vary parameters in each and observe the differences. In case you are interested in making similar computations for other equations we present, Eq. 6-35 illustrates units conversion, so  $g$  is in mGal when density is in g/cm<sup>3</sup>, distances are in meters, and  $G$  is in dyne • cm<sup>3</sup>/g<sup>2</sup>.

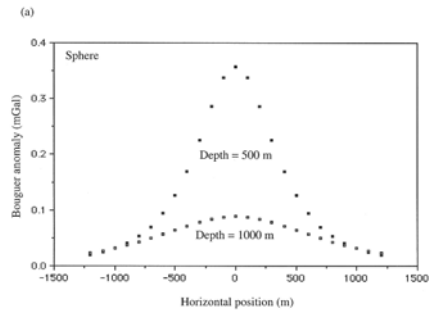
$$g(\text{mGal}) = 6.67 \times 10^{-8} \frac{\text{dyne} \cdot \text{cm}^3}{\text{g}^2} \cdot \frac{\text{g}}{\text{cm}^3} \cdot \frac{\text{m}}{1} \left( \frac{\text{g} \cdot \text{cm}^3/\text{s}^2}{\text{dyne}} \cdot \frac{100 \text{ cm}}{\text{m}} \cdot \frac{\text{gal}}{\text{cm}/\text{s}^2} \cdot \frac{1000 \text{ mGal}}{\text{Gal}} \right) \quad (6-35)$$

## Gravity over a Sphere

**TABLE 6-6** Gravity Over a Sphere

Sphere A		Sphere B	
Sphere radius (m)	200	Sphere radius (m)	200
Depth to sphere center (m)	500	Depth to sphere center (m)	1000
Density contrast (g/cm <sup>3</sup> )	0.4	Density contrast (g/cm <sup>3</sup> )	0.4
Horizontal increment	100	Horizontal increment	100
Horizontal Position (m)	Gravity (mGal)	Horizontal Position (m)	Gravity (mGal)
-1200	0.0201	-1200	0.0215
-1100	0.0251	-1100	0.0272
-1000	0.0320	-1000	0.0316
-900	0.0410	-900	0.0367
-800	0.0512	-800	0.0426
-700	0.0592	-700	0.0492
-600	0.0658	-600	0.0564
-500	0.1164	-500	0.0640
-400	0.1703	-400	0.0716
-300	0.2255	-300	0.0786
-200	0.2842	-200	0.0843
-100	0.3372	-100	0.0883
0	0.3576	0	0.0894
100	0.3372	100	0.0883
200	0.2842	200	0.0843
300	0.2255	300	0.0786
400	0.1703	400	0.0716
500	0.1164	500	0.0640
600	0.0658	600	0.0564
700	0.0592	700	0.0492
800	0.0512	800	0.0426
900	0.0410	900	0.0367
1000	0.0320	1000	0.0316
1100	0.0251	1100	0.0272
1200	0.0201	1200	0.0215

## Gravity over a Sphere




---

---

---

---

---

---

---

---

## Gravity Effect of a Horizontal Cylinder

Figure 6-13 equals  $\pi R^2$ , substituting into Eq. 6-20 gives us, for gravity in the direction of  $r$ ,

$$g_{\text{cylinder}(r)} = \frac{G 2 \pi R^2 \rho_c}{r} \quad (6-36)$$

Thus, the equation for the vertical component becomes

$$g_{\text{cylinder}} = \frac{G 2 \pi R^2 \rho_c}{r} \cos \theta = \frac{G 2 \pi R^2 \rho_c z}{r^2}$$

and

$$g_{\text{cylinder}} = G 2 \pi R^2 \rho_c \frac{z}{(x^2 + z^2)} \quad (6-37)$$

---

---

---

---

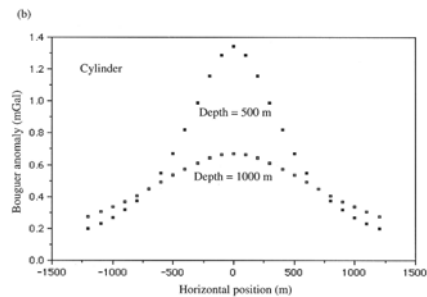
---

---

---

---

## Gravity of a Horizontal Cylinder




---

---

---

---

---

---

---

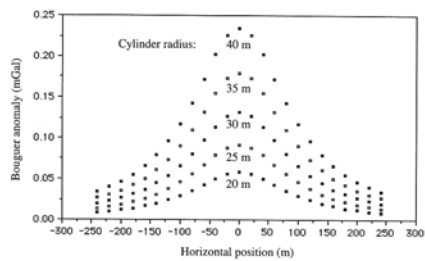
---

## Gravity Over Horizontal Cylinder

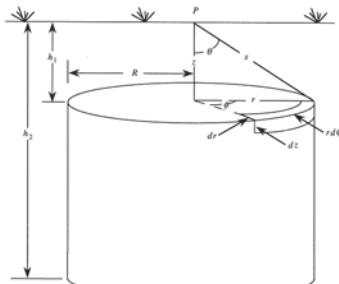
TABLE 6-7 Gravity Over a Horizontal Cylinder

Cylinder A		Cylinder B	
Cylinder radius (m)	200	Cylinder radius (m)	1000
Depth to cylinder center (m)	500	Depth to cylinder center (m)	1000
Horizontal position (m)	0.0	Horizontal position (m)	0.0
Horizontal increment	100	Horizontal increment	100
Horizontal Position (m)	Gravity (N/m <sup>3</sup> )	Horizontal Position (m)	Gravity (N/m <sup>3</sup> )
-1200	0.9884	-1200	0.7248
-1100	0.2296	-1100	0.3034
-1000	0.2842	-1000	0.3333
-900	0.3163	-900	0.3705
-800	0.3767	-800	0.4000
-700	0.4331	-700	0.4000
-600	0.5496	-600	0.4910
-500	0.6376	-500	0.5564
-400	0.6787	-400	0.5781
-300	0.6864	-300	0.5833
-200	1.1564	-200	0.6468
-100	1.2895	-100	0.6469
0	1.3411	0	0.6705
100	1.2895	100	0.6839
200	1.1564	200	0.6468
300	0.9861	300	0.6132
400	0.8177	400	0.5781
500	0.6705	500	0.5364
600	0.5496	600	0.4910
700	0.4331	700	0.4000
800	0.3767	800	0.4000
900	0.3163	900	0.3705
1000	0.2842	1000	0.3333
1100	0.2296	1100	0.3034
1200	0.1864	1200	0.2748

### Horizontal Cylinder - Radius



## Vertical Cylinder



## Vertical Cylinder

$$\Delta g_{\text{vertical cylinder}(z)} = \frac{G\rho_c dz (rd\phi) dr}{s^3} \quad (6-38)$$

$$\Delta g_{\text{vertical cylinder}} = \frac{G\rho_c dz (rd\phi) dr}{s^3} \cos\theta = \frac{G\rho_c dz (rd\phi) dr}{s^3} z$$

and

$$\Delta g_{\text{vertical cylinder}} = \frac{G\rho_c (zdz)(rdr)d\phi}{(r^2 + z^2)^{3/2}} \quad (6-39)$$

Next we determine the gravitational attraction of the cylinder by using the volume element to sweep out a thin ring, then a thin disc, and finally the cylinder. Equation 6-40 gives the formula for this integration.

$$g_{\text{vertical cylinder}} = \int_{h_1}^{h_2} dz \int_0^R dr \int_0^{2\pi} \frac{G\rho_c (z)(r)}{(r^2 + z^2)^{3/2}} d\phi \quad (6-40)$$

The result of this integration is Eq. 6-41.

$$g_{\text{vertical cylinder}} = G2\pi\rho_c \left( h_2 - h_1 + \sqrt{R^2 + h_1^2} - \sqrt{R^2 + h_2^2} \right) \quad (6-41)$$

Note that this equation gives gravity only at a point above the cylinder axis and is not valid for determining gravity at points away from the axis.

---

---

---

---

---

---

---

---

---

---

## Vertical Cylinder -> Terrain

There are some other interesting results that arise from this derivation. When evaluating the integral from 0 to  $R$ , if we assume  $R$  goes to infinity, the result is an equation for an infinite slab (the Bouguer correction). Hence, we could have used this approach to determine the Bouguer correction. In addition, if we have a large cylinder with radius  $R_1$  and a smaller cylinder (with radius  $R_2$ ) with an axis coincident with the larger cylinder and with coincident top and bottom, we can determine the effect of a ring by subtracting the effect of the smaller cylinder from the larger. Let  $P$  be on the top of the cylinder, so that  $h_1 = 0$ , and let the bottom of the cylinder be a distance  $z$  from the top, then

$$g_{\text{ring}} = G2\pi\rho \left[ \left( z + \sqrt{R_1^2 - \sqrt{R_1^2 + z^2}} \right) - \left( z + \sqrt{R_2^2 - \sqrt{R_2^2 + z^2}} \right) \right]$$

and

$$g_{\text{ring}} = G2\pi\rho \left( R_1 - R_2 - \sqrt{R_1^2 + z^2} + \sqrt{R_2^2 + z^2} \right) \quad (6-42)$$

Equation 6-42 is the terrain correction.

---

---

---

---

---

---

---

---

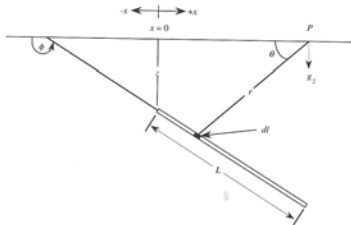
---

---

## Inclined Rod

In the case of a vertical rod (inclination =  $90^\circ$ ), the equation becomes less complex and is

$$g_{\text{vertical rod}} = G\rho_c R^2 \left( \frac{1}{(z^2 + x^2)^{3/2}} - \frac{1}{((z+L)^2 + x^2)^{3/2}} \right) \quad (6-43)$$




---

---

---

---

---

---

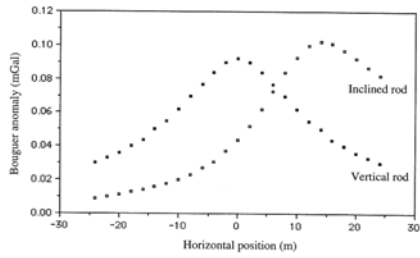
---

---

---

---

## Inclined Rod



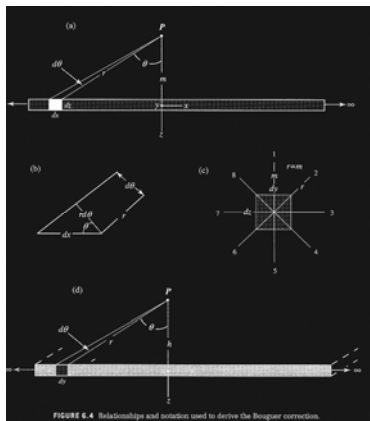
## Inclined Rod

**TABLE 6.8 Gravity Over Inclined and Vertical Rods**

Inclined Rod		Vertical Rod	
Rod radius (m)	1	Rod radius (m)	1
Depth to rod top (m)	10	Depth to rod top (m)	100
Rod length (m)	100	Rod length (m)	100
Rod inclination (degrees)	135	Rod inclination (degrees)	vertical
Density contrast (g/cm <sup>3</sup> )	0.4	Density contrast (g/cm <sup>3</sup> )	0.4
Horizontal increment (m)	2	Horizontal increment (m)	2

Horizontal Position (m)	Gravity (mGal)	Horizontal Position (m)	Gravity (mGal)
-24	0.009	-24	0.030
-22	0.009	-22	0.031
-20	0.011	-20	0.036
-18	0.013	-18	0.040
-16	0.014	-16	0.044
-14	0.016	-14	0.050
-12	0.018	-12	0.055
-10	0.020	-10	0.062
-8	0.023	-8	0.070
-6	0.027	-6	0.077
-4	0.031	-4	0.084
-2	0.037	-2	0.090
0	0.044	0	0.092
2	0.052	2	0.099
4	0.062	4	0.104
6	0.073	6	0.111
8	0.084	8	0.119
10	0.095	10	0.126
12	0.106	12	0.133
14	0.116	14	0.139
16	0.126	16	0.144
18	0.137	18	0.149
20	0.147	20	0.156
22	0.157	22	0.163
24	0.167	24	0.170



## Gravity Due to an Infinite Rod

The attraction of a thin rod is the sum of all these components, so we write

$$g = \int_{-\infty}^{+\infty} \frac{G(\rho dy dz)}{r^2} \cos \theta. \quad (6.18)$$

Before evaluating the integral, we note that  $r = m/\cos \theta$ . Also (see Figure 6.4(b)), because the length of arc for a small angle  $d\theta$  equals the radius  $r$  times the change in angle  $d\theta$ , it is straightforward to demonstrate that  $dx = r d\theta/\cos \theta$ . Using these relationships, we show that

$$\frac{G(\rho dy dz)}{r^2} \cos \theta = \frac{G(\rho dy dz) r d\theta \cos \theta (\cos \theta)^2}{m^2 \cos \theta} = \frac{G(\rho dy dz) r m d\theta \cos \theta (\cos \theta)^2}{m^2 \cos \theta \cos \theta} = \frac{G(\rho dy dz)}{m} \cos \theta d\theta.$$

Using this result, we adjust Equation 6.18 so that

$$g = \int_{-\frac{\pi}{2}}^{+\frac{\pi}{2}} \frac{G(\rho dy dz)}{m} \cos \theta d\theta \quad (6.19)$$

which evaluates to

$$g = \frac{2G\rho dy dz}{m}. \quad (6.20)$$

Equation 6.20 gives us  $g$  at  $P$  over a thin rod as illustrated in Figure 6.4(a).

---

---

---

---

---

---

---

---

---

---

## Gravity Due to an Infinite Slab

The next step in our derivation is to sweep out a thin sheet using a thin rod (that is, use Equation 6.20 to calculate  $g$  over a thin sheet). Figure 6.4(c) is an end view of our thin rod. If lines 1, 2, 3, 4, 5, 6, 7, and 8 are of equal length, then  $g$  is the same at the end of every line. Line 1 is equivalent to  $m$  in our original diagram, and we will refer to line 2 as  $r$ . Clearly  $m = r$  and  $g$  is the same at positions 1 and 2. This gives us the same view of the thin rod as we see in Figure 6.4(d), where line 2 now is labeled as  $r$ . Because we know  $g$  due to the thin rod (Equation 6.20), we use this to write

$$\Delta g_r = \frac{2G(\rho dy dz)}{r}. \quad (6.21)$$

The next several steps mimic exactly those that we just listed, so following the same procedure we can say that

$$\Delta g_z = \frac{2G(\rho dy dz)}{r} \cos \theta \quad (6.22)$$

$$g = \int_{-\frac{\pi}{2}}^{+\frac{\pi}{2}} 2G(\rho dz) d\theta \quad (6.23)$$

and

$$g = 2\pi G(\rho dz). \quad (6.24)$$

---

---

---

---

---

---

---

---

---

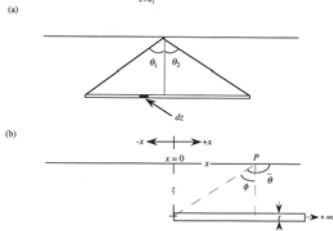
---

## Horizontal Sheet

### Gravity Effect of a Horizontal Sheet

When deriving the Bouguer effect, we created a thin slab by moving a thin rod from  $+\infty$  to  $-\infty$  (integrating from  $x/2$  to  $-x/2$ ; see Eq. 6-23). If instead we integrate from  $\theta_1$  to  $\theta_2$  (see Fig. 6-19(a)), we have

$$g = \int_{\theta_1}^{+\theta_2} 2G(\rho dz) d\theta \quad (6-44)$$




---

---

---

---

---

---

---

---

---

---

## Horizontal Sheet

and

$$g = 2G\rho_s (d; \bar{\theta}) \quad (6-45)$$

where  $\bar{\theta}$  represents the included angle in radians. If we keep the slab thin with respect to its depth, we can write

$$g_{\text{truncated slab}} = 2G\rho_s f(\bar{\theta}) \quad (6-46)$$

where  $t$  is the thickness of the truncated slab (Fig. 6-19(a)). Our goal in this section is to derive a relationship for a semi-infinite slab (Fig. 6-19(b)). For this case the included angle  $\bar{\theta}$  is equal to  $\pi/2 + \tan^{-1}(x/z)$  and we therefore have

$$g_{\text{semi-infinite}} = 2G\rho_s f\left(\frac{\pi}{2} + \tan^{-1} \frac{x}{z}\right) \quad (6-47)$$

This approximation is within 2 percent if  $z \geq t$  (Telford et al. 1990, p. 40). Table 6-9 uses

## Horizontal Sheet

TABLE 6-9 Gravity Over Semi-Infinite Sheets

Sheet A		Sheet B	
Depth to sheet (m)	4	Depth to sheet (m)	6
Sheet thickness (m)	1	Sheet thickness (m)	1
Density contrast (g/cm <sup>3</sup> )	0.4	Density contrast (g/cm <sup>3</sup> )	0.4
Horizontal increment (m)	2	Horizontal increment (m)	2

Horizontal Position (m)	Gravity (mGal)	Horizontal Position (m)	Gravity (mGal)
24	0.0009	-24	0.0009
22	0.0010	-22	0.0009
20	0.0011	-20	0.0009
18	0.0012	-18	0.0009
16	0.0013	-16	0.0009
14	0.0015	-14	0.0009
12	0.0017	-12	0.0009
10	0.0020	-10	0.0010
8	0.0025	-8	0.0013
6	0.0031	-6	0.0018
4	0.0042	-4	0.0029
2	0.0059	-2	0.0057
0	0.0084	0	0.0084
-2	0.0109	2	0.0071
-4	0.0136	4	0.0059
-6	0.0156	6	0.0049
-8	0.0163	8	0.0042
-10	0.0167	10	0.0036
-12	0.0169	12	0.0031
-14	0.0165	14	0.0028
-16	0.0157	16	0.0025
-18	0.0150	18	0.0022
-20	0.0143	20	0.0020
-22	0.0138	22	0.0019
-24	0.0133	24	0.0017

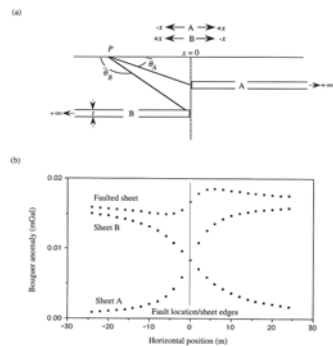
## Faulted Horizontal Sheet

The equation for the faulted horizontal sheet is

$$g_{\text{faulted sheet}} = 2G\rho_s f\left[\pi + \tan^{-1}\left(\frac{x}{z_1} + \cot \phi\right) - \tan^{-1}\left(\frac{x}{z_2} + \cot \phi\right)\right] \quad (6-48)$$

where  $x$  is the horizontal position of the measurement location,  $t$  is sheet thickness,  $\phi$  is fault inclination,  $z_1$  is depth to upthrown block, and  $z_2$  is depth to downthrown block. Note that the relative positions of the faulted sheet are constant (i.e., the upthrown block is always

## Faulted Horizontal Sheet



## Faulted Horizontal Sheet

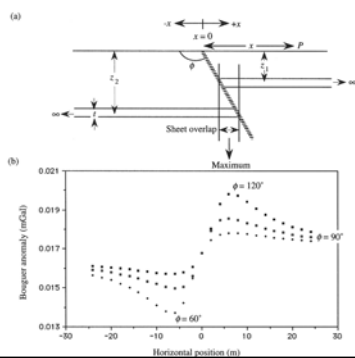
**TABLE 6-10 Gravity Over a Faulted Horizontal Sheet**

Depth to disjunctive sheet (m)	8
Depth to uppermost sheet (m)	4
Sheet thickness (m)	1
Fault inclination (degrees)	90
Gravity constant (mGal)	4.4
Horizontal increment (m)	2

Horizontal Position (m)	Gravity (mGal)
-24	0.0039
-22	0.0039
-20	0.0039
-18	0.0037
-16	0.0036
-14	0.0035
-12	0.0033
-10	0.0032
-8	0.0030
-6	0.0028
-4	0.0026
-2	0.0024
0	0.0022
2	0.0020
4	0.0018
6	0.0016
8	0.0015
10	0.0013
12	0.0012
14	0.0010
16	0.0009
18	0.0007
20	0.0005
22	0.0003
24	0.0001

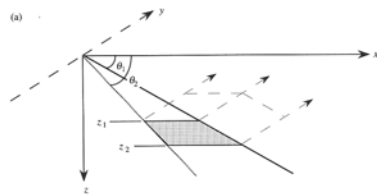
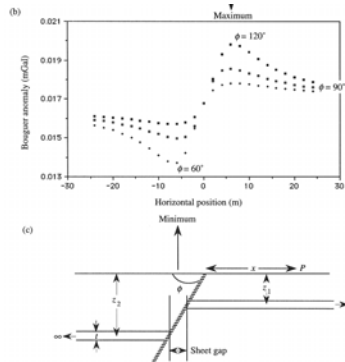
## Reverse Fault





(b) Plot of Bouguer anomaly (mGal) vs. Horizontal position (m) for three different dip angles:  $\phi = 60^\circ$ ,  $\phi = 90^\circ$ , and  $\phi = 120^\circ$ . The plot shows a peak labeled "Maximum" and a trough labeled "Minimum".

(c) Schematic diagram of the experimental setup showing a horizontal surface, a vertical axis, a dip angle  $\phi$ , a horizontal distance  $x$ , a vertical distance  $z$ , and a "Sheet gap".



lowing a procedure much like we employed to determine the Bouguer correction, the semi-infinite sheet, and the vertical cylinder. If we have a small cell of infinite length in the  $y$ -dimension with side lengths  $dz$  and  $d\theta$ , the gravity effect of such a cell is easily determined by integration. Thus, we have

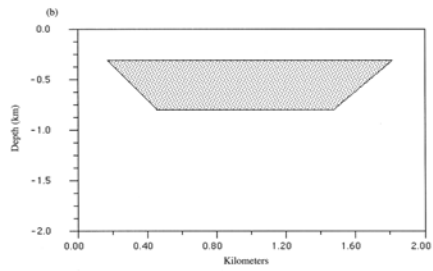
$$g_{\text{ext}} = 2G\rho_c \int_{\theta_1}^{\theta_2} d\theta \int_{z_1}^{z_2} dz \quad (6-49)$$

$$g_{cell} = 2G\rho_c(\theta_2 - \theta_1)(z_2 - z_1) \quad (6-50)$$

The notation is defined in Figure 6-22(a). All we need now do is to represent a polygon such as that illustrated by Figure 6-22(b) as an accumulation of such cells. If a polygon has  $n$  such cells, then the gravity effect of the polygon is

$$g_{\text{polygon}} = 2G\rho_c n \Delta\theta \Delta z \quad (6.51)$$

## Polygon



---

---

---

---

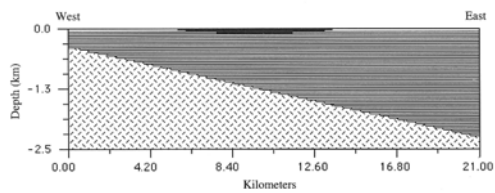
---

---

---

---

## Regional/Residual



---

---

---

---

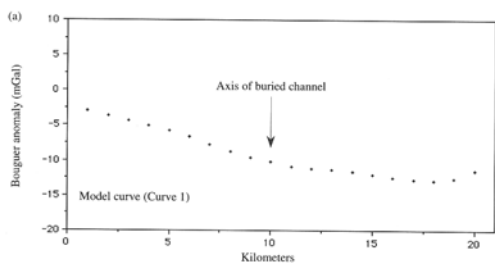
---

---

---

---

## Regional/Residual



---

---

---

---

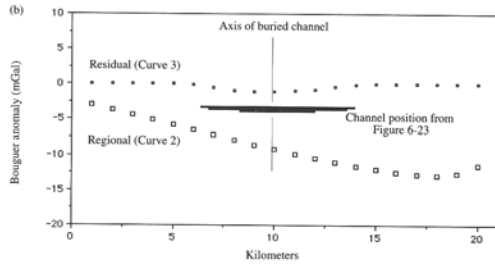
---

---

---

---

## Regional/Residual




---

---

---

---

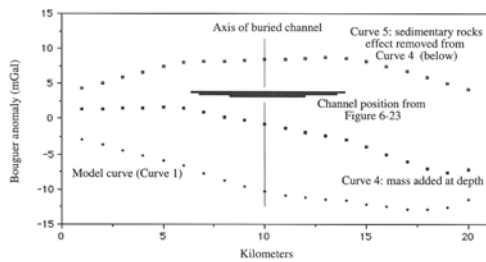
---

---

---

---

## Regional/Residual




---

---

---

---

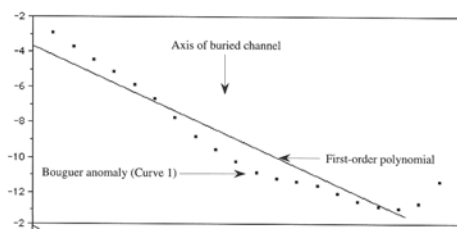
---

---

---

---

## Regional/Residual




---

---

---

---

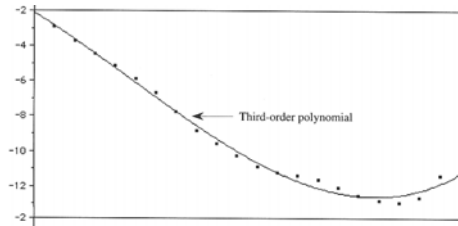
---

---

---

---

## Regional/Residual



---

---

---

---

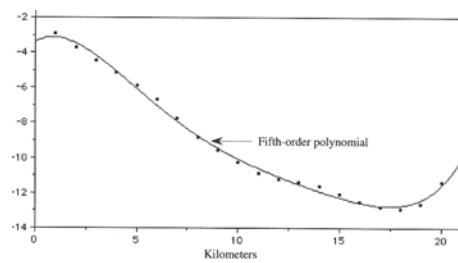
---

---

---

---

## Regional/Residual



---

---

---

---

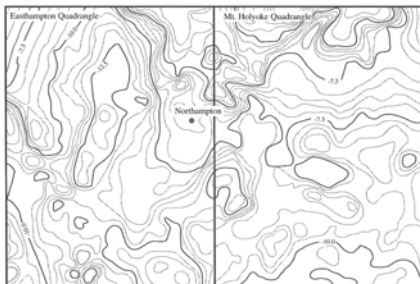
---

---

---

---

## Regional/Residual



---

---

---

---

---

---

---

---

# Regional/Residual

A contour map of the Northampton area, divided into two quadrangles by a vertical line. The left half is labeled 'Easthampton Quadrangle' and the right half is labeled 'Mt. Holyoke Quadrangle'. The map shows magnetic intensity contours with values of 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 86




# Upward Continuation

The graph displays the upward continuation of a Bouguer anomaly curve. The y-axis represents the Bouguer anomaly in mGal, ranging from -14 to -2. The x-axis represents the distance in Kilometers, ranging from 0 to 20. The data points show a decreasing trend, with a vertical arrow indicating the 'Axis of buried channel' at approximately 10 km. Two other vertical arrows indicate 'Up 2 km' and 'Up 1 km' at approximately 13 km and 17 km, respectively. A label 'Bouguer anomaly (Curve 1)' points to the data points at approximately 10 km.



# Upward Continuation



The image is a topographic map segment. It features contour lines representing elevation. A vertical line runs through the center of the map, separating two quadrangles: 'Northampton Quadrangle' on the left and 'Mt. Holyoke Quadrangle' on the right. A point labeled 'Northampton' is marked with a black dot on the vertical line. Contour lines are labeled with values such as 100, 150, and 200. The map is enclosed in a rectangular border.

