

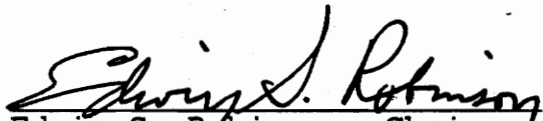
Geologic framework of gravity anomaly sources in the central
Piedmont of Virginia /

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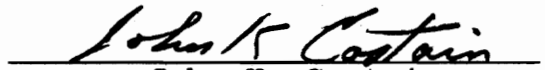
Mary Ruth Keller //

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in
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APPROVED:


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GEOLOGIC FRAMEWORK OF GRAVITY ANOMALIES IN THE CENTRAL
PIEDMONT OF VIRGINIA

BY

MARY RUTH KELLER

(Abstract)

Bouguer gravity anomalies at 1870 locations on the central Piedmont of Virginia from 37° 37'N to 37° 52'N and 77° 44' W to 78° 23'W display patterns of variation produced by upper crustal density contrasts and thickening of the crust in a WNW direction. No other deep sources are evident. Upper crustal density contrasts are associated with rock units known from geologic mapping. The subsurface distribution of these rock units interpreted from seismic reflection data was confirmed by measured variations in gravity. A two-dimensional model analysis indicates the following average in situ density values for the principal formations: Arvonian Formation-2.77 gm/cc, Columbia Granitoid-2.75 gm/cc (tonalite) and 2.73 gm/cc (pegmatite), Chopawamsic Volcanics-2.77 gm/cc (felsic units), and 2.79 gm/cc (mafic units), Catoclin/Lynchburg-2.815 gm/cc, Maidens Gneiss-2.775 gm/cc, Grenville Basement- 2.71 gm/cc. Gravity and seismic data are consistent with the existence of a major thrust fault at depths between 9 km and 16 km that separates Grenville Basement rocks from younger Catoclin/Lynchburg rocks. The slight eastward dip of this thrust fault beneath the western part of the area increases significantly east of 78° 05' W. Gravity anomalies suggest the existence of several mafic inclusions within the Columbia Granitoid that were not identified by geologic mapping.

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Introduction

Recognition during the past decade of large scale thrust faulting beneath the Piedmont of eastern North America has advanced our understanding of the structure and evolution of the Appalachian Mountain System. Recent seismicity studies suggest intraplate tectonic activity in parts of the Appalachian orogen at the present time. Thus the possible relation between older Appalachian structures and modern seismicity in the region is a major unsolved problem. This study addresses a part of the problem of the relation between structure and current seismicity in the central Virginia seismic zone by calculating a gravity profile over a density distribution based on a geologic-seismic reflection profile over part of the zone. Such gravity calculations provide a powerful and independent check on structure inferred from such studies.

An intensive program of geological and geophysical field and laboratory studies has been undertaken on the central Piedmont of Virginia to gain a clearer understanding of the pattern of thrusting and the geologic framework of modern seismicity. The principal rock units and other geologic formations are presented in Figure 1. Bedrock geologic mapping by Poland (1976) and interpretation by Glover, Mose, Poland, Bobbyarchick, and Bourland (1978) showed that the State Farm Gneiss, Sabot Amphibolite, and Maidens Gneiss are part of a Late Precambrian Grenville basement complex of granitoids, mafic volcanics, and feldspathic sediments. Smith, Milici, and Greenberg (1964) and Brown (1969) mapped the Columbia Granitoid and the Chopawamsic Volcanics and found that the Columbia intruded the Chopawamsic Volcanics about

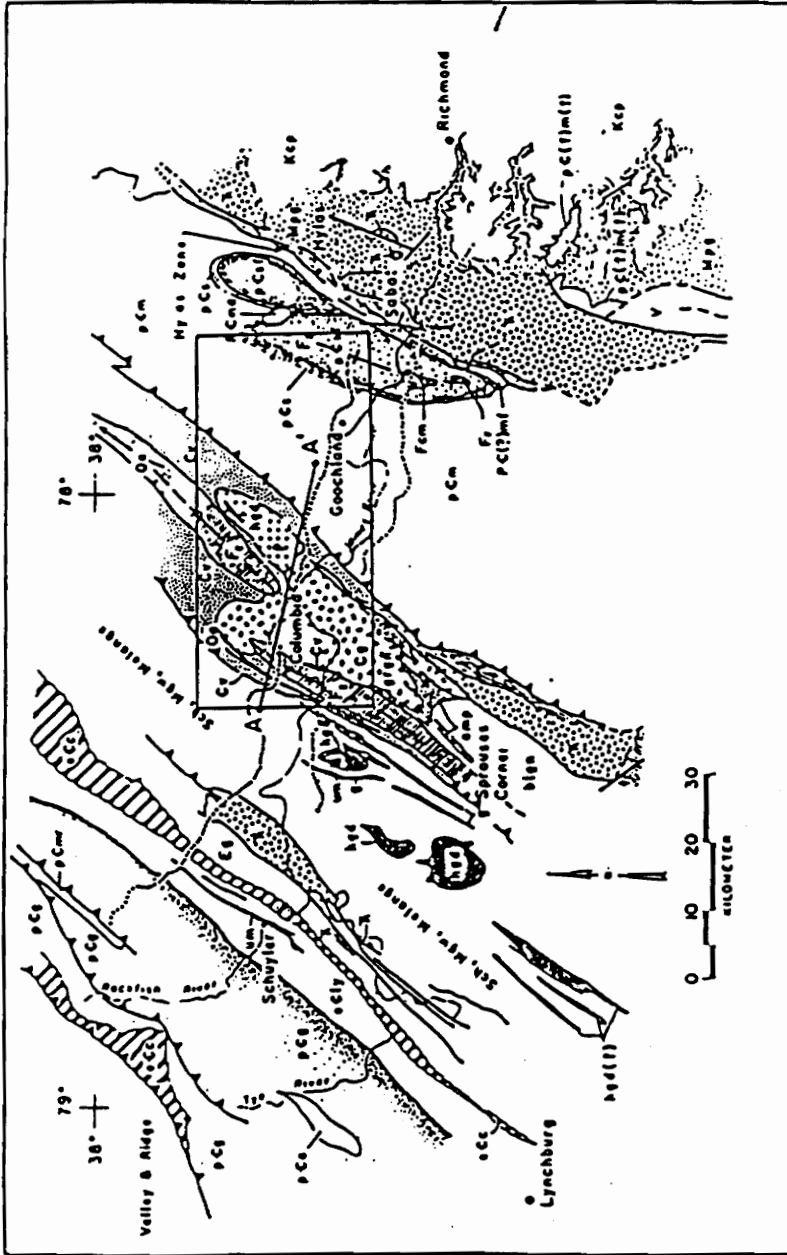


Figure 1. Geologic map of the central Piedmont of Virginia (Glover and Read, 1979)

EXPLANATION

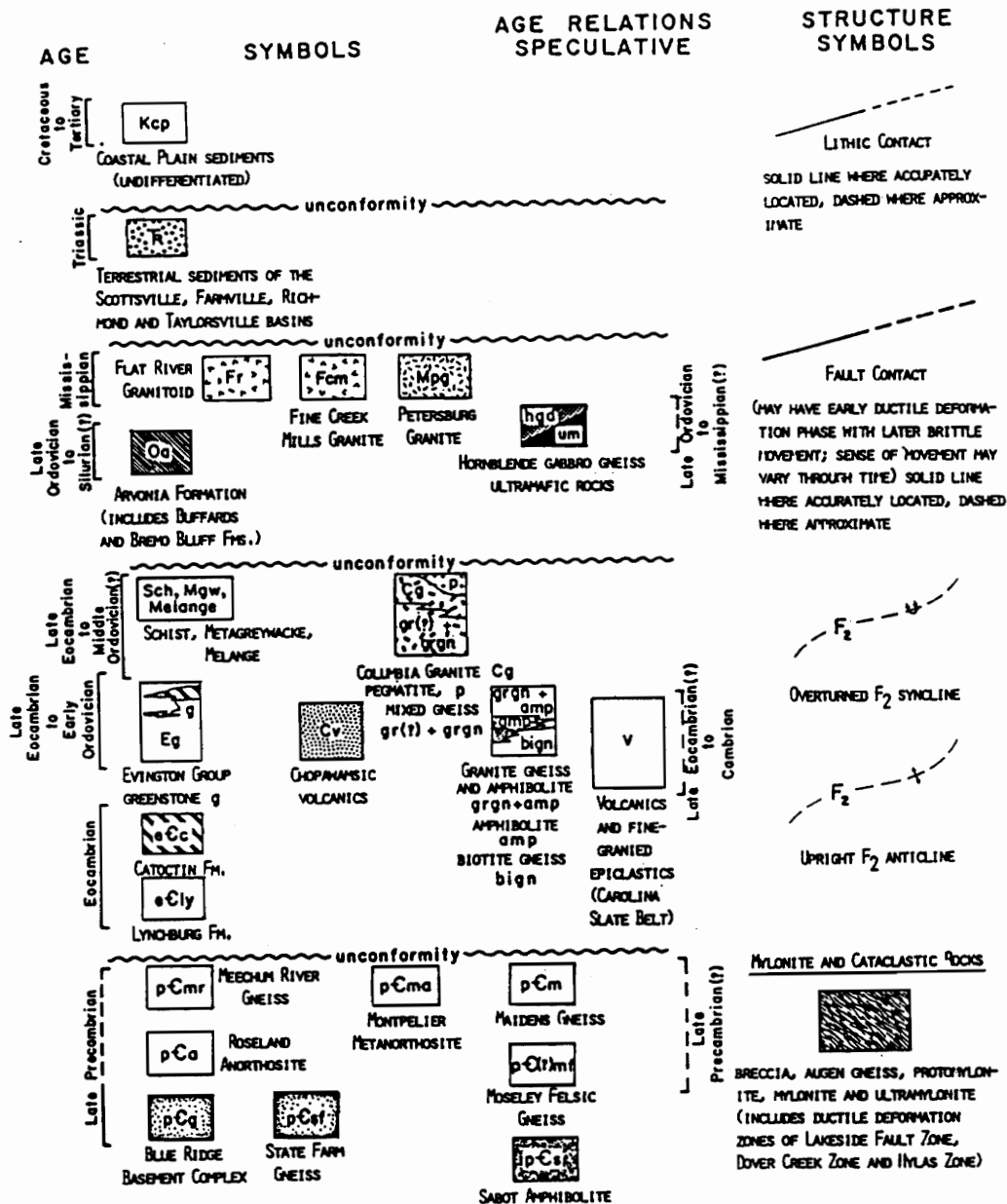


Figure 1. (continuation) Explanation for geologic map of the central Piedmont of Virginia (Glover and Read, 1979)

454 m.y. ago (Mose and Nagel, 1982). Bourland (1976) discovered the Lakeside Fault Zone along the eastern edge of the Chopawamsic Volcanics. Bobyarchick (1976) described the Hylas mylonite zone previously believed to be low grade volcanic rocks. Reilly (1980) used gravity and magnetic field data and geologic mapping to analyze the Sabot Amphibolite, and deduced that the Sabot is a sheetlike body overlying the State Farm Gneiss on the State Farm Antiform. Glover, Mose, Costain, Poland, and Reilly (1982) and Farrar (1982) placed the State Farm Gneiss, the Sabot Amphibolite, and the Maidens Gneiss in the Goochland Terrain, and suggested that the Taconic suture zone occurred at the eastern end of a schist-metagreywacke-melange sequence west of the Arvonian Syncline.

Geophysical surveys in the Piedmont, begun in 1978, have included earthquake studies (Bollinger, Viret, and Sibol, 1982, Bollinger, Glover, Costain, Sibol, and Coruh, 1983) and VIBROSEIS traverses (Glover, Costain, Bollinger, Coruh, and Sibol, in preparation). Some gravity measurements in this area are part of the larger survey of central Virginia reported by Johnson (1971, 1973), who also established a network of gravity base stations in Virginia (Johnson and Ziegler, 1972). Results of a more detailed gravity survey were presented by Reilly (1980), who also analysed magnetic field intensity data from this region. A much more extensive gravity survey that was begun in 1979 is the subject of the present report. Hypocentral locations, when combined with geologic and seismic reflection work indicate motion along old thrust faults (Glover, Costain, Bollinger, and Coruh, 1982).

This study is concerned with the interpretation of gravity data from 1870 stations situated between longitudes $77^{\circ} 44' 33''\text{W}$ and $78^{\circ} 23' \text{W}$ and latitudes $37^{\circ} 37' 21''\text{N}$ and $37^{\circ} 52' \text{N}$ (Figure 2). Published results of geologic mapping cited above and unpublished data of Lynn Glover and Stewart Farrar were used to interpret the seismic sections from which a geologic cross section was prepared (Glover, Costain, Bollinger, and Coruh, 1982). Densities taken from Reilly (1980) or interpreted from the literature were used to calculate a gravity profile over a two-dimensional model based on the geologic cross section.

Because the gravity study incorporates geologic and seismic data, each of those components will be discussed individually in this report. First, a structural setting and tectonic history introduces the lithologies exposed along the traverse. Second, the gravity survey techniques and data reduction formulas are discussed. Third, the regional and residual gravity fields are separated using a deterministic approach based on geologic information, rather than an arbitrary numerical filtering technique. Fourth, the VIBROSEIS traverse interpreted by Glover, Costain, Bollinger, Coruh, and Sibol (in preparation) is presented as a model to test. Finally, the geologic cross section and densities used to generate the calculated gravity field are justified.

Tectonic History and Structural Setting

Geological and VIBROSEIS studies (Glover, Costain, Coruh, and Ferrar, in press) in the Blue Ridge and Piedmont along the James River indicate the following sequence of events: 1) North American Grenville continental crust began rifting during the Eocambrian. 2) Rifting and isostatic adjustment during drift developed a continental hinge zone which is now preserved in the northern Virginia Blue Ridge. This hinge marked the transition from normal crustal thickness on the west to rift attenuated and transitional crust on the east. 3) The Lynchburg Group and Catoctin basalt were deposited during rifting mostly to the east of the hinge zone during the Eocambrian. The late rift(?) and drift related Cambro-Ordovician platform clastic carbonate sequence of the Valley and Ridge, and deeper water Evington Group clastics, and deep water carbonates and basalt of the eastern Blue Ridge and western Piedmont were deposited across the hinge zone during the Cambrian and Early Ordovician. 4) Eocambrian rifting was probably complete resulting in an ocean basin to the east of North America. 5) The Cambrian to Middle Ordovician was the time of closure of the ocean basin and formation of a subduction wedge (schist, metagreywacke, and melange just west of the Chopawamsic volcanics). 6) The closing continental block had Grenville Goochland terrain as basement overlain by Chopawamsic/ Carolina /Charlotte /Raleigh /Eastern Slate Belt volcanics. 7) The Taconic (Middle and Late Ordovician) collision with North America included initial decapitation of the North American hinge zone (Blue Ridge) and the beginning of emplacement of the Blue Ridge toward its present position, which was attained during

the middle and late Paleozoic Acadian and Alleghanian orogenies.

An alternative tectonic evolution (Farrar, Glover, and Costain, in press) differs from the evolution just discussed in that the volcanics presently overlying the Goochland terrane are in fault contact with it. Therefore, it is possible that the volcanics formed even further to the east and were not originally deposited on the Goochland terrane.

Gravity

Gravity observations were made at 1870 locations in the study area between 1979 and 1982. Excluding the northeast corner of the area, where no readings were made, the average coverage is 2 stations per square kilometer (Figure 2). Measurements were made with the LaCoste-Romberg gravity meters G-58 and G-68 at 1091 locations along main roads in the area. Here the positions and elevations were determined by spirit level transits with stations spaced every 200-400m. The closure errors, which were determined by reoccupation of base stations, were less than 1.5 feet. Additional measurements were then made along auxiliary roads and trails using LaCoste and Romberg gravity meter G-58 at 720 locations, and using Worden gravity meter No. 468 at 59 locations. Here the locations and elevations were determined by placing stations at bench marks, where elevations were known to an accuracy of 1 foot or less, or at prominent landmarks that could be located on 7 1/2 minute topographic sheets so that elevations could be interpolated from topographic contours to an accuracy of 5 to 10 feet or less.

Relative gravity values obtained from gravity meter readings were adjusted to the Virginia State Gravity Base Station values at Blacksburg and Goochland, Virginia (Johnson and Ziegler, 1972). These base stations were referred to the Potsdam standard. Daily reoccupation of selected stations indicated that systematic drift was negligible and that erratic drift was smaller than 0.2 mgal. Corrections for time dependent gravity variations due to the lunar-solar tidal force and the corresponding tidal distortion of the earth were made

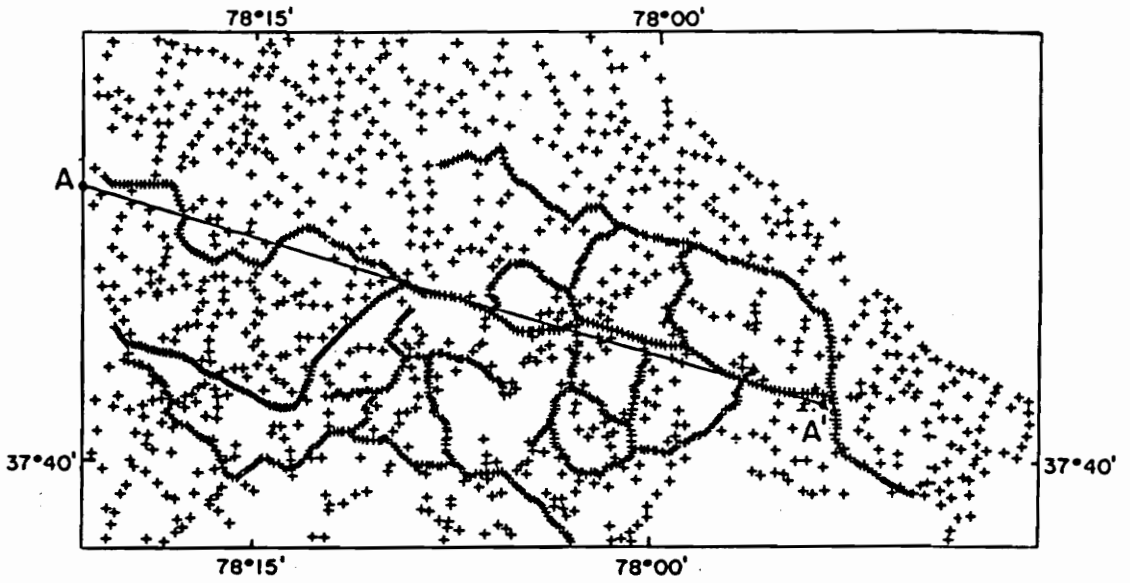


Figure 2. Location of gravity stations

using Longman's (1959) formulas and a solid earth tidal gravity factor of 1.16 (Robinson, 1974). The precision of the observed gravity values is estimated at ± 0.2 mgal.

Gravity data were reduced using the measured values of observed gravity (g_{obs}), elevations (h) in feet, and a standard density $\rho = 2.67$ gm/cc. Free air anomalies (Δg_{fa}) were obtained from the formula:

$$\Delta g_{fa} = g_{obs} - (g_t - 0.09406h)$$

and Bouguer anomalies (Δg_B) were computed from the formula:

$$\Delta g_B = g_{obs} - (g_t - 0.09406h + 0.01278\rho h)$$

where normal gravity values (g_t) were computed from the 1930 International Formula. Effects of the generally low topographic relief are less than 0.1 mgal so that terrain corrections were unnecessary. Accuracy of the gravity anomaly values is estimated to be ± 0.3 mgals for the 1091 locations along main roads where elevation precision is ± 1.5 foot. At other locations where the elevation uncertainty is larger than 5 feet, the precision of the Bouguer anomaly is estimated at ± 0.5 mgal. Values of observed gravity, Bouguer and free air anomalies, and the locations and elevations of the measurements are listed in the Appendix. Bouguer anomalies contoured at 1 mgal intervals are shown in Figure 3.

Regional and Local Anomalies

The Bouguer anomaly variation over the study area (Figure 3) includes anomalies of limited areal extent together with broader regional anomalies. Much attention has been given to methods for separating residual and regional anomalies. Arbitrary numerical schemes involving two-dimensional polynomial filtering or harmonic filtering have been partially successful for enhancing residual anomalies produced by upper crustal density contrasts. Unfortunately, these schemes cannot distinguish regional anomalies produced by deep sources from similarly broad anomalies related to upper crustal geology. To accomplish this requires independent information either about deep sources or upper crustal sources of regional anomalies.

The procedure followed in this study was to remove from the Bouguer anomaly field the gravity variation produced by change in crustal thickness using information published by James, Smith, and Steinhart (1968). Although it is not certain that this is the only deep source of gravity variation, the well known crust-mantle density contrast of more than 0.4 gm/cc insures that it is an important source to consider. Insofar as this information about crustal thickness is reliable, its effect on the gravity field can be removed in a deterministic way.

There is no other independent information about deep anomaly sources in this region. However, inferences about upper crustal sources can be based on bedrock geologic mapping and seismic reflection data. Before the possibility of other deep sources can be judged, it is necessary to ascertain the extent to which anomalies remaining after the removal of the crustal thickness effect can be attributed to

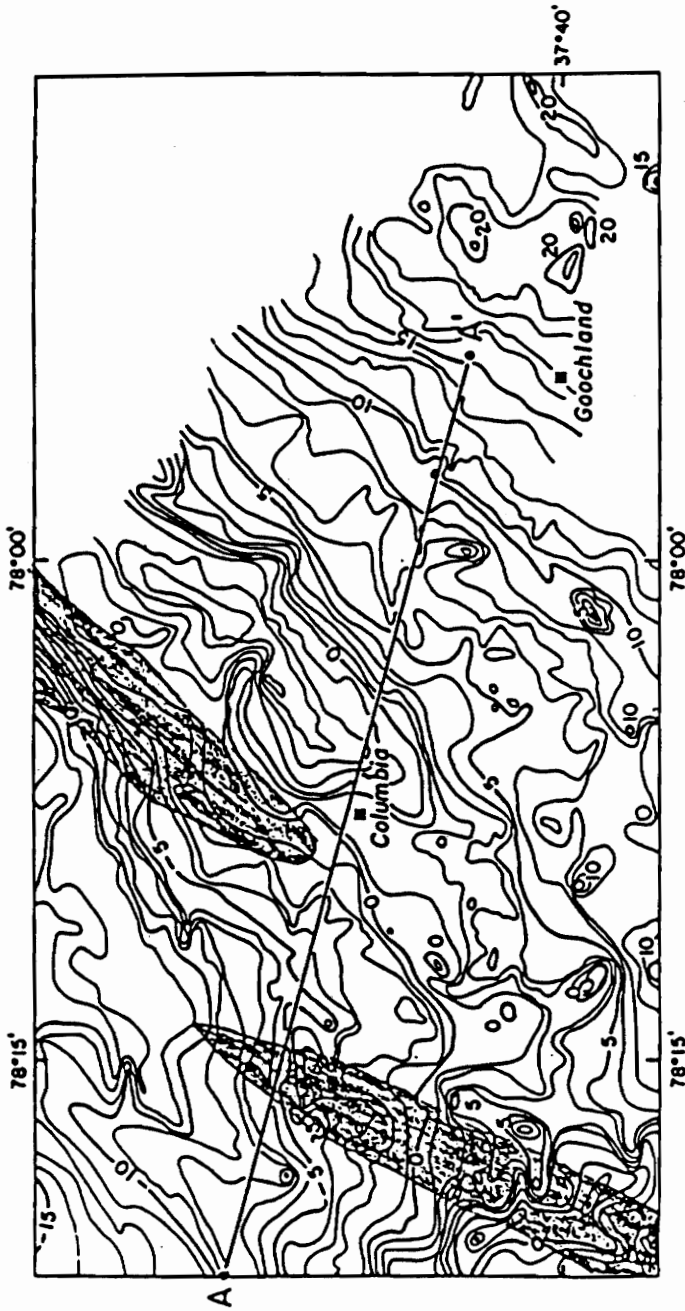


Figure 3. Bouguer anomaly map
(contour interval=1 mgal)
shaded area indicates the
major exposures of the
Arvonis Formation

upper crustal sources. This is discussed in the following sections.

James, Smith, and Steinhart (1968) analysed seismic reflection data covering the middle Atlantic states using a seismic time-term technique to determine crustal thickness. This technique utilizes P-wave travel times from numerous sources to numerous detectors that, ideally, are uniformly distributed over the area of interest. A least squares analysis of these data yields crustal thickness values at locations common to several source-detector combinations. The crustal thickness map in Figure 4 was prepared from analysis of 860 travel time observations.

Because of the less than ideal source-detector distribution available for this survey, and the simplifying assumptions about P-wave speeds in the crust and upper mantle, independent confirmations of the results are important for establishing confidence in this crustal thickness model. James, Smith, and Steinhart (1968) prepared a map of gravity variations (Figure 5) that would be produced by these changes in crustal thickness. This map duplicates the basic linear pattern observed on the Bouguer anomaly map of the central Atlantic states, but does not reproduce some regional patterns which may or may not be related to crustal thickness.

In a more detailed gravity survey of the New River District in Southwestern Virginia Sears and Robinson (1971) observed that linear Bouguer anomalies did not parallel either the ENE trending Appalachian structure or the NNE regional anomaly indicated in Figure 5 for this area. However, a quadratic polynomial fitted by least squares to the Bouguer anomaly data indicated a similar NNE trending regional anomaly. Subtraction of this quadratic polynomial surface from the Boug-

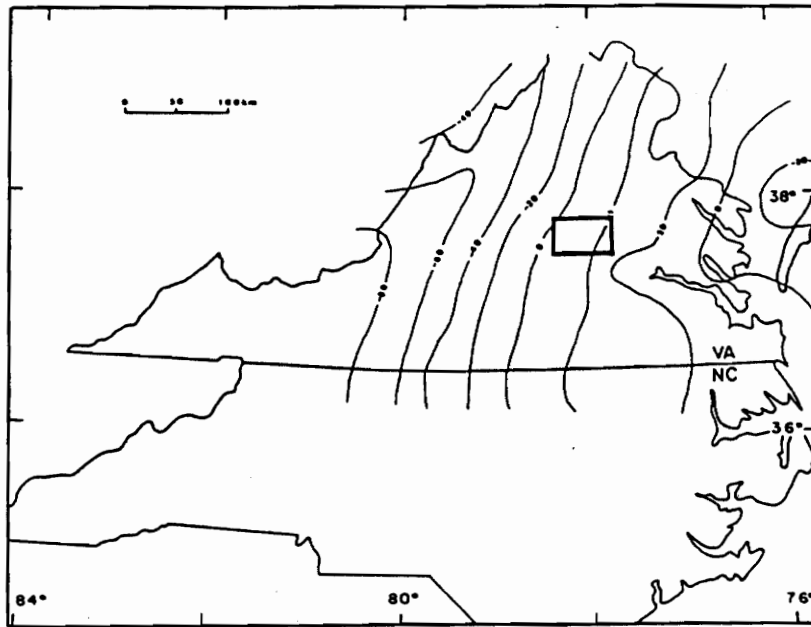


Figure 4. Crustal thickness model of
James, Smith, and Steinhart
(1968)
(contour interval= 5 km)

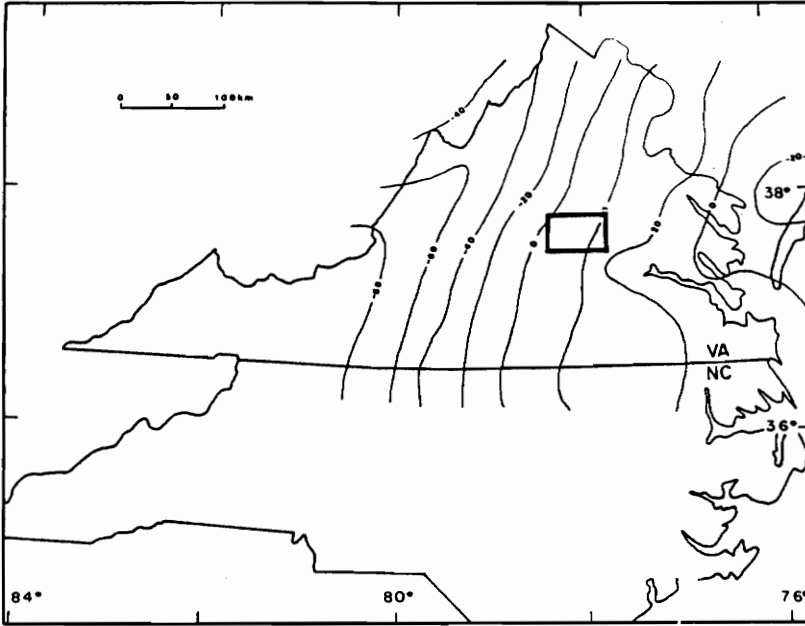


Figure 5. Gravity field calculated over the crustal model of James, Smith, and Steinhart (1968)
(contour interval= 20 mgal)

uer anomaly field produced residual gravity anomalies parallel to Appalachian structures. The result strongly suggests that James, Smith, and Steinhart correctly determined crustal thickness in the area. Here the pattern of Bouguer anomaly variation is a combination of gravity variations related to crustal thickness and to upper crustal Appalachian structures.

Reilly (1980) used the crustal model of James, Smith, and Steinhart to calculate regional gravity variation over his study area on the central Virginia Piedmont. After removing this crustal thickness effect from the Bouguer anomaly field he obtained a residual gravity field that could be attributed completely to upper crustal anomaly sources evident from bedrock geologic mapping.

Further local confirmation of the crustal model was reported by Bollinger, Chapman, and Moore, (1980) from an analysis of seismic waves reflected from the base of the crust beneath the Blue Ridge in central Virginia. Wide angle reflections from quarry blasts in Bath County, Va. were detected at stations situated on the Piedmont at distances of between 120 km and 170 km. The crustal thickness of approximately 40 km indicated by those reflections is close to the value of 41 km read from the map in Figure 4, and the westward dip of the base of the crust is confirmed.

Results of a seismic refraction survey are also presented by Bollinger, Chapman, and Moore (1980). P-waves were recorded from quarry blasts on tripartate seismometer arrays situated in Giles County, Va. Using 2 and 3 layer crustal models the depth to the base of the crust was determined to be 49 and 51 km. James, Smith

and Steinhart had calculated a crustal thickness of approximately 50 km in the area.

In the present study the aim is to remove from the Bouguer anomaly field just that effect known to be produced by change in crustal thickness. The measurements of James, Smith, and Steinhart are the only source of information suitable for this purpose. Although the precision of their map of crustal thickness over this particular area of study cannot be assessed, the independent information from the other local studies described above suggest that Figure 4 describes a reasonably accurate model of crustal thickness.

The gravity map (Figure 5) originally prepared by James, Smith, and Steinhart indicates uniform variation of gravity related to crustal thickness in the area of the present study. The 24 mgal decrease in gravity in a WNW direction across the area can be adequately represented by a plane surface. The equation of that plane, calculated from gravity values inside the rectangle of Figure 5, expresses gravity (Δg_r) related to crustal thickness:

$\Delta g_r(x,y) = 0.00012063x - 0.000084828y - 201.14$ where x and y are north and east state grid coordinates in feet.

A FORTRAN program was prepared to calculate the regional at each gravity site, and to subtract this value from the corresponding Bouguer anomaly to obtain a residual gravity anomaly (Δg_L) at each site:

$$\Delta g_L = \Delta g_B - \Delta g_r$$

The residual gravity anomalies are contoured at one milligal intervals in Figure 6. These values range between -19 mgal and +2 mgal, and indicate patterns of variation related to sources other than

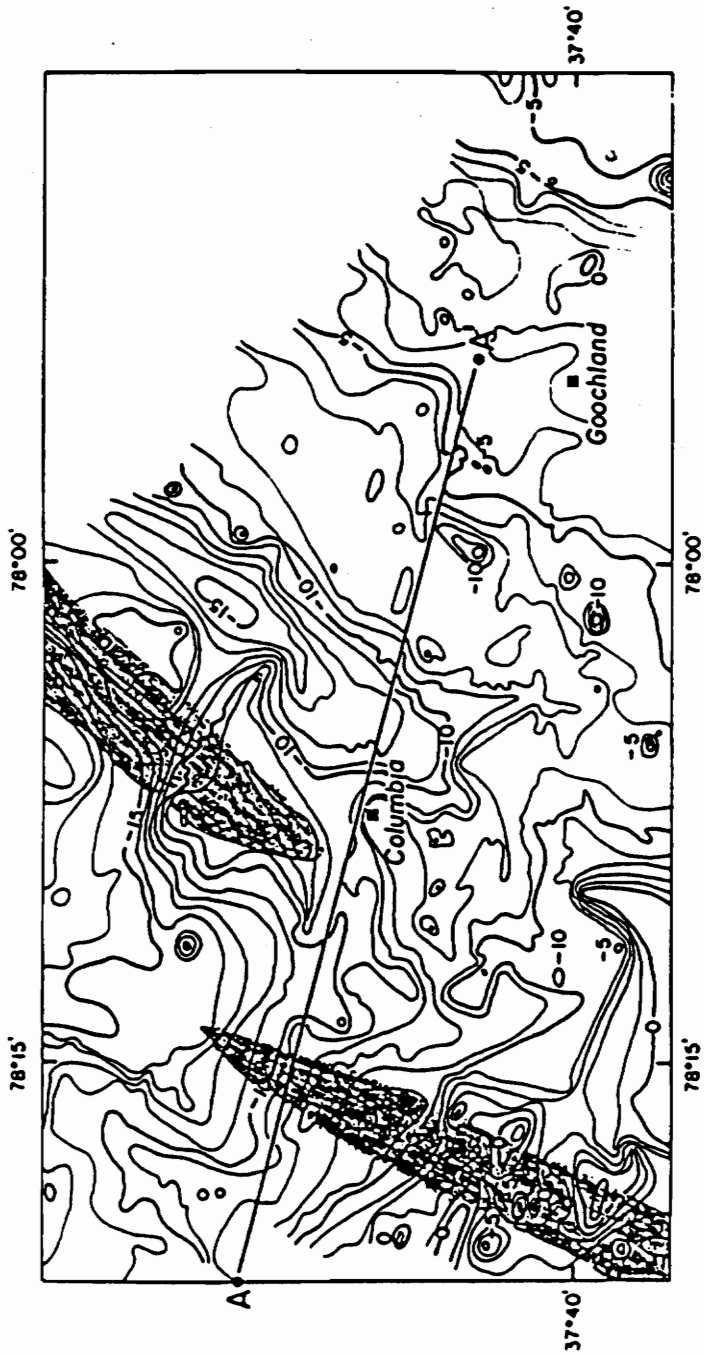


Figure 6. Local anomaly map
 (contour interval= 1 mgal)
 shaded area indicates
 the major exposures of
 the Arvonian Formation

changes in crustal thickness.

Seismic Reflection Survey

A seismic reflection survey was completed along a 40 km section of Route 6 in Goochland, County Virginia (Figure 7). Multifold VIBROSEIS data were acquired during the spring of 1980 by personnel of the Virginia Tech Regional Geophysics Laboratory. The survey was done with ETL 10-geophone (10 Hz) MINMAX linear receiver arrays using nominal 35m and 70m group spacings. A Failing Y-1100 vibrator was used to produce source arrays consisting of the sums of 16 sweeps evenly spaced over the receiver group spacing. Data were recorded with a Geosource MDS-10 48-channel digital system equipped with an SMM-1 field summing unit and a DC-2400 field correlator.

Common depth point stacking procedures were used to obtain a seismic record section from VIBROSEIS data. Stacking velocities were determined by well-known methods of velocity analysis. Reflections were enhanced by VIBROSEIS whitening (Coruh and Costain, 1983), autostatic band pass filtering, and wave equation migration. Processing was done on a VAX 11/780 computer using Digicon Disco software. Clear reflections were used by Glover, Costain, Bollinger, Coruh, and Sibol (in preparation) to prepare the seismic-geologic cross section in Figure 7. Faults and contacts between different rock units shown on this cross section were interpreted from the patterns of reflections and information obtained by surface geologic mapping. A discontinuous, reflection at about 3 sec increasing in dip from subhorizontal beneath the Blue Ridge to steeper dips at the eastern end of the profile (Figure 7) was interpreted to be the sole thrust between the autochthonous Grenville basement rocks and the overlying allochthonous Paleo-

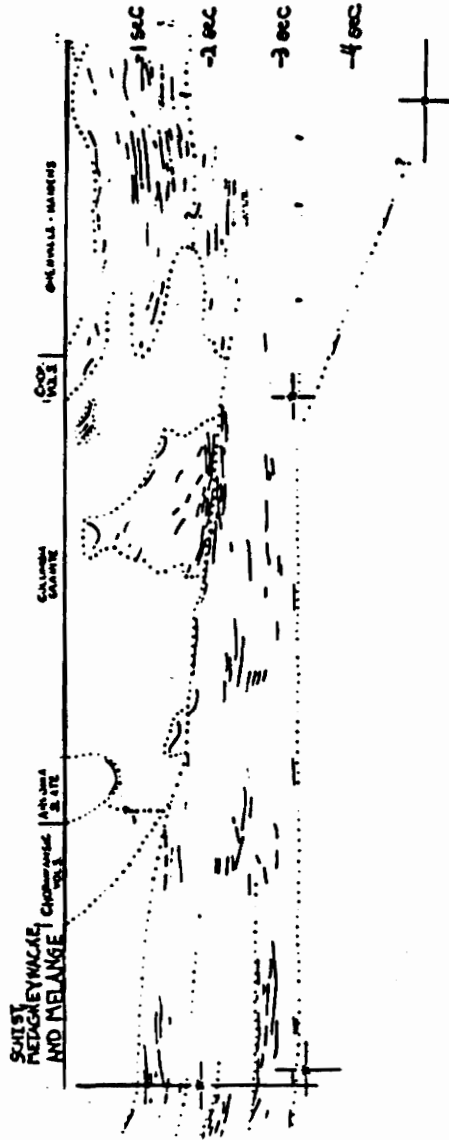


Figure 7. Line drawing of reflections for VIBROSEIS line NSF 3; dotted lines are inferred contacts or faults; stars are earthquake hypocenters with vertical and horizontal error bars shown (from Glover, Costain, Bollinger, Coruh, and Sibol, in preparation)

zoic rocks and rift related volcanics that crop out northwest of the survey area. A reflection at 1 sec dipping to the east was interpreted as marking the thrust contact between the rift facies Catoctin/Lynchburg and the overlying continental margin volcanics. A fault mapped at the surface between the melange and the Chopawamsic volcanics may be a splay off this fault. The Spotsylvania Lineament (Glover, Mose, Costain, Poland, and Reilly, 1982) was represented on the section by a arcuate reflection at about 0.4 sec in eastern end of the section. Surface geology guided the interpretation of the remaining areas of the profile where the reflections were not as distinct. An arcuate reflection beneath the Arvonian Syncline was interpreted to originate from folded reflectors in the synclinal structure.

A major conclusion from the VIBROSEIS traverse is that the highest crustal reflectivity is associated with metamorphosed basalts and sandstones of the rift-related Catoctin formation, or the metamorphosed felsic and mafic volcanics of the Chopawamsic. These are also the principal lithotectonic facies that contribute significantly to the gravity anomalies.

Earthquakes reported by Bollinger, Glover, Costain, Sibol, and Coruh (1983) that occurred within about 2 km of the seismic reflection profile and had a vertical location error of less than 7 km were projected to the plane of the traverse and plotted in Figure 7. The dimensions of the error ellipses that are computed as part of the hypocentral determination process, and the depths to the hypocenters were converted from length to time using a velocity of 6 km/sec, and plotted on the section (Glover, Costain, Bollinger, Coruh, 1982). All

the earthquakes, within their error ranges, plot close to the faults interpreted on the section.

Interpretation of gravity anomalies described in the next section involved preparation of a two-dimensional model of subsurface density distribution (Figure 9). The shapes of the units in this model were determined by converting the time section (Figure 7) to a depth section using velocity data from Table 1. Points located on faults and contacts were then projected along strike from the irregular profile of Route 6 to the straight profile A-A' as shown in Figure 8.

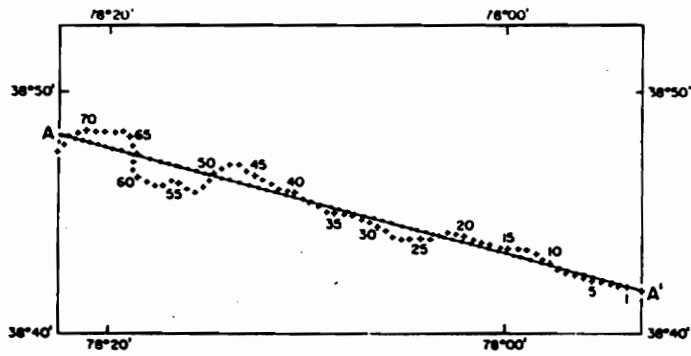


Figure 8. Map of VIBROSEIS line NSF 3 showing
the projection of the vibrator
stations to the traverse
(+ - vibrator stations)

Upper Crustal Anomaly Interpretation

Some residual gravity anomaly features in Figure 6 can be associated qualitatively with density contrasts in the rock units shown in Figure 1. Information about rock density in this area is based on measurements of representative specimens reported by Reilly (1980), and values calculated from modal analyses of Bourland (1976). Otherwise, where such data were not available, density values typical of the lithologies present were taken from Birch (1942), Clark (1966), and Touloukian, Judd, and Roy (1981). Density information used in this study is summarized in Table 1.

The highest residual gravity anomalies seen in Figure 6 are observed along the southern border of the area near $78^{\circ} 10' W$ where a mafic member of the Chopawamsic volcanics is exposed in the Lakeside Fault Zone. In this the mafic volcanic rock density probably exceeds 2.8 gm/cc. Similar mafic members of the Chopawamsic volcanics are exposed along the WNW trending linear high anomaly northwest of the town of Columbia near $37^{\circ}47' N$ and $78^{\circ}03' W$. Another high gravity anomaly located in the southwest corner of the area appears to be associated with mafic rocks of the Arvonian Formation in which density probably exceeds 2.75 gm/cc. Relatively high residual gravity values also occur over the Arvonian Formation exposed in the area extending in a northeasterly direction from Columbia. Relatively low gravity values occur over the Columbia Granitoid in a broad area near $37^{\circ}48' N$ and $78^{\circ}13' W$. Another prominent low residual anomaly is situated over the northwest trending pegmatite member of the Columbia Granitoid near $37^{\circ} 48' N$ and $78^{\circ} W$. In the southwest corner of the area

Table 1. Seismic velocities and densities of central Piedmont formations

Formation Name	Seismic Velocity ^S (km/s)		Density (gm/cc)	
	Proposed	Calculated	Proposed	Calculated
Arvonnia Fm.	6	6	2.64-2.82 ^{3,5}	2.77
Columbia Granite	5.5	5.5	2.66-2.79 ²	2.73 , 2.75
Chopawamsic Volcanics				
felsic	6	6.0-6.2	2.66-2.899 ¹	2.77
mafic	7	6.4	2.68-2.96 ³	2.79
Schist, Metagreywacke, and Melange	5.5	5.5	2.70-2.93 ³	2.76
Catoctin/ Lynchburg	6.5	6.5	2.72-3.12 ⁴	2.815
Haidens Gneiss	6	6	2.70-2.93 ³	2.775
Grenville Basement	6	6	2.65-2.75 ⁴	2.71

1. Birch, 1942
2. Bourland, 1976 (modal analyses)
3. Clark, 1966
4. Reilly, 1980 (direct measurement)
5. Touloukian, 1981

the high residual gravity anomaly is over the Sabot Amphibolite, in which density exceeds 2.8 gm/cc (Reilly, 1980).

A quantitative analysis of the residual gravity data was undertaken to determine the subsurface density distribution along Profile A-A' in Figure 6. Residual gravity variation along the profile is illustrated in two ways in Figure 9. The dashed line connects gravity values at points in Figure 6 where contour lines intersect the profile. Residual gravity values at observation sites (Figure 2) within a distance of 1 km were projected onto the profile to obtain the points plotted in Figure 9.

In Figure 9, the observed residual gravity variation along profile A-A' is compared with the variation of gravity over a two-dimensional model of upper crustal density distribution. Gravity over the model was computed using the method of Talwani, Worzel, and Landisman (1959). The different units in this model correspond to the lithologic units on the seismic section in Figure 7. Because this two-dimensional model was prepared from seismic reflection data and information obtained from bedrock geologic mapping, this is an unusually good opportunity to investigate the in situ densities of the rock units involved. Furthermore, this is an excellent opportunity to utilize gravity data to obtain an independent confirmation of the geologic interpretation of the seismic data as presented in Figure 7.

The procedure used was to compile a two-dimensional model with volume units that conform in shape to the true geometry of the rock units shown on the seismic section. The boundaries of each unit in Figure 9 are described by points that plot close to the true geometry

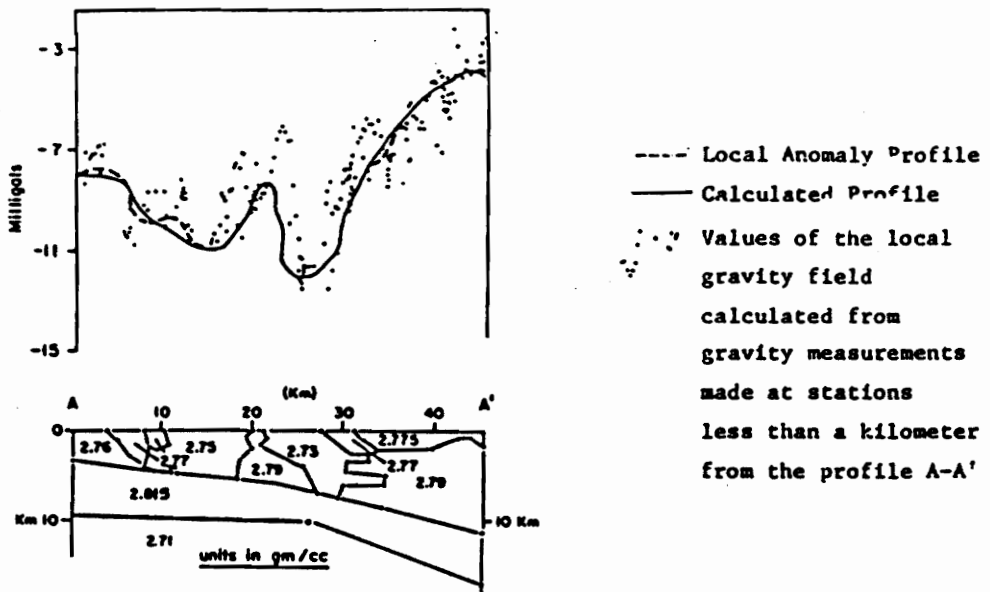


Figure 9. Structural cross section in density units and corresponding gravity profile compared with local anomaly profile and values of the local field calculated from gravity measured at stations less than 1 kilometer from the profile line

of the contact lines on the seismic section. This geometry was retained while density values were adjusted by trial and error. For each trial choice of densities the gravity variations over the model were recomputed for comparison with the known variations of residual gravity.

The gravity variation computed using the densities indicated in Figure 9 reproduces the measured variation within the limits imposed by the precision of the observations. Mean deviation between the measured (dashed line) and computed (solid line) profiles is 0.32 mgal. Alteration of these density values by more than 0.01 gm/cc increases the mean deviation between these profiles. This analysis indicates that residual gravity anomaly variation along profile A-A' can be explained in terms of upper crustal density contrasts consistent with the density values of the lithologic units shown on the VIBROSEIS section in Figure 7. Bouguer anomaly variation (Figure 3) along this profile, then, is the result of upper crustal density contrasts and a uniform change in crustal thickness. No other deep anomaly sources are indicated.

The density information in Table 1 is based, in part, on specimens collected from outcrops. The densities assigned to units of the two-dimensional model (Figure 9) can be viewed as average in-situ values that represent the combination of mafic and felsic members that make up each of these formations. The Arvonja Formation was represented by an in-situ density of 2.77 gm/cc, which is typical for a formation composed of slate, 2.76 gm/cc, and chlorite schists, 2.82 gm/cc. The in-situ densities used for the Columbia Granitoid are somewhat higher than would be expected, being 2.73 gm/cc for the pegmatite, rather

than 2.67 gm/cc, and 2.75 gm/cc for the tonalite, rather than 2.71 gm/cc, because of the mafic inclusions commonly found in the formation, that are interpreted to be mafic Chopawamsic volcanics (Glover, personal communication). The Chopawamsic Volcanics were found to have a fairly uniform density (2.77 gm/cc-2.79 gm/cc), despite the range in lithologies. The measured density of the Catoclin/Lynchburg, 2.815 gm/cc, suggests that both metasediments and basalts are present. The melange has a density of 2.76 gm/cc, which is an average based on the densities of the lithologies present (Clark, 1966, Brown, 1979) in the schist, metagreywacke, and melange. The density of the Maidens Gneiss, 2.775 gm/cc, although typical of biotite gneisses and schists, is higher than Reilly's measured values, 2.61 gm/cc-2.76 gm/cc, (1980) because less dense, more felsic components resist erosion and survive to be sampled. The density chosen for the Grenville basement, 2.71 gm/cc, is the same as Reilly's value.

An important feature of residual gravity variation along Profile A-A' is the apparent combination of residual and regional anomalies. This is illustrated more clearly in Figure 10 where profiles of gravity variation over each of the units of the two-dimensional model are shown separately. Especially significant are the contributions of Unit 2 and Unit 6. The gravity over Unit 2 decreases monotonically over the profile. Unit 2, which represents the Catoclin/Lynchburg, is bounded above and below by thrust faults which must dip eastward to produce this gravity variation. The gravity over Unit 6 increases gradually over most of the section, then more strongly over the east end of the section. Unit 6, which represents the Chopawamsic Volcanics beneath the Mai-

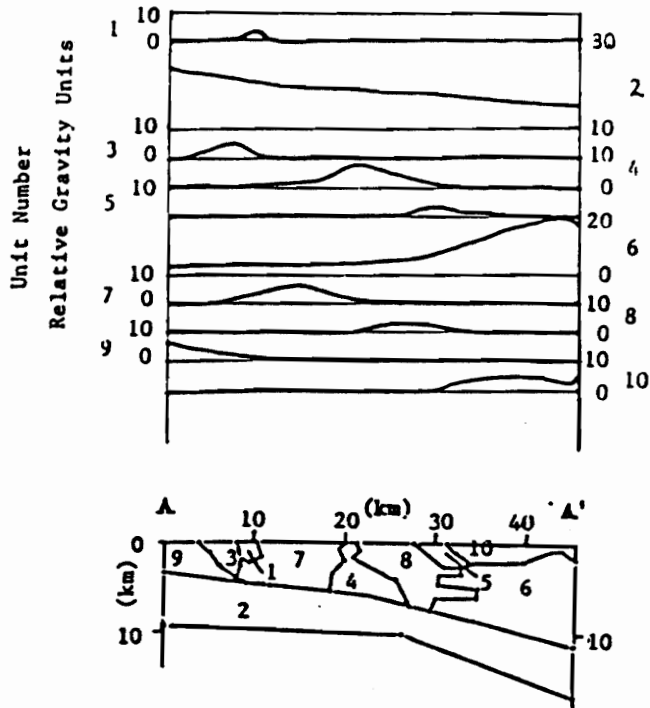


Figure 10. Relative gravity over individual units, calculated using densities given below

Unit Number	Formation Name	Density (gm/cc)
1	Arvonis Formation	2.77
2	Catoctin/Lynchburg	2.815
3	Chopawamsic Volcanics	2.77
4	" "	2.79
5	" "	2.77
6	" "	2.79
7	Columbia Granitoid	2.75
8	" "	2.73
9	Schist, Metagreywacke, and Melange	2.76
10	Maidens Gneiss	2.775

dens Gneiss, must thicken to the east to produce this gravity variation. If an arbitrary numerical filtering scheme had been used to separate the residual and regional anomalies from the Bouguer anomaly field, the effects of Units 2 and 6 would have been combined with the crustal thickness effect. Because the alternate procedure of separating the crustal thickness effect in a deterministic way was followed, it was possible to obtain a gravimetric constraint on the inclination of the sole fault in the region. The two-dimensional model analysis clearly indicates that the inclination of the eastward dipping sole thrust increases significantly along profile A-A' close to longitude 78 W. This confirms the interpretation of deep seismic reflections along which earthquake hypocenters were located (Figure 7).

Conclusions

The patterns of Bouguer gravity anomaly variation over this area of the central Piedmont of Virginia are produced by upper crustal density contrasts and WNW thickening of the crust. No other deep anomaly sources are evident.

The upper crustal density contrasts are associated with rock units known from bedrock geologic mapping (Figure 1). An interpretation of the subsurface distribution of these rock units based on seismic reflection data (Figure 7) was confirmed by gravity anomaly variation (Figure 9).

A prominent structure identified in this interpretation is the sole thrust that separates the Grenville basement rocks from younger rocks of the Catoclin and Lynchburg Formations. Gravity anomaly variation and seismic reflections suggest that the eastward dip of this thrust increases significantly beneath the area east of $78^{\circ} 05' W$. Earthquake hypocenters plot close to this thrust.

Typical of thick sections of Chopawamsic Volcanics are a succession of seismic reflectors probably associated with acoustic impedance contrasts between mafic and felsic units. However, it is difficult to distinguish the mafic from the felsic units on the basis of seismic reflections. Because of the small density contrast of 0.02 gm/cc between these units, they cannot be distinguished by gravity data either. A much larger density contrast exists between mafic and felsic units within the Columbia Granitoid. Consequently, many more mafic inclusions in this formation are evident from the gravity data than could be identified from the geologic mapping by Smith, Milici, and Greenberg

(1964), and Brown (1969).

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APPENDIX

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
6.2	290.0	37.6485	77.8367	979974.31	29.34	19.46
6.3	292.0	37.6490	77.8389	979974.94	30.15	20.20
6.4	293.0	37.6498	77.8411	979974.81	29.18	19.20
6.5	293.5	37.6505	77.8427	979975.25	29.66	19.67
6.6	283.0	37.6511	77.8440	979976.00	29.43	19.79
6.7	268.0	37.6517	77.8451	979977.25	29.27	20.14
6.8	260.5	37.6522	77.8465	979977.69	29.00	20.12
6.9	254.0	37.6529	77.8481	979979.56	30.26	21.61
6.10	235.4	37.6536	77.8498	979979.94	28.89	20.87
6.11	229.7	37.6543	77.8512	979980.69	29.10	21.28
6.12	243.1	37.6551	77.8528	979980.44	30.11	21.83
6.13	272.8	37.6559	77.8545	979979.12	31.59	22.30
6.14	301.0	37.6567	77.8562	979976.81	31.93	21.68
6.1	270.0	37.6485	77.8348	979975.44	28.58	19.38
6.15	327.0	37.6582	77.8590	979975.00	32.57	21.42
6.16	318.1	37.6595	77.8615	979975.50	32.23	21.39
6.17	298.9	37.6612	77.8645	979977.25	31.24	21.05
6.18	279.7	37.6622	77.8669	979977.69	29.87	20.34
6.19	301.0	37.6628	77.8697	979976.12	30.31	20.05
6.20	304.0	37.6637	77.8714	979975.56	30.03	19.67
6.21	287.0	37.6648	77.8731	979976.69	29.55	19.78
6.22	281.8	37.6666	77.8763	979976.75	29.13	19.53
6.23	262.7	37.6675	77.8792	979978.12	28.71	19.76
6.24	229.6	37.6694	77.8818	979980.37	27.84	20.02
6.25	259.6	37.6717	77.8829	979978.25	27.60	18.76
6.26	269.5	37.6740	77.8842	979977.44	27.72	18.54
6.27	271.0	37.6762	77.8862	979977.37	27.80	18.57
6.28	275.7	37.6785	77.8859	979977.00	27.87	18.47
6.29	262.3	37.6815	77.8851	979978.12	26.79	17.86
6.30	268.1	37.6833	77.8855	979977.81	27.03	17.89
6.31	252.0	37.6856	77.8856	979978.75	26.45	17.86
6.32	245.1	37.6882	77.8858	979979.37	26.43	18.08
6.33	261.5	37.6904	77.8863	979978.37	26.97	18.06
6.34	273.0	37.6939	77.8875	979977.69	26.42	17.12
6.35	262.2	37.6955	77.8898	979978.75	26.47	17.54
6.36	258.7	37.6973	77.8927	979978.81	26.20	17.39
6.37	277.3	37.6985	77.8948	979977.19	26.33	16.88
6.38	289.4	37.6988	77.8981	979975.94	26.22	16.36
6.39	276.6	37.6990	77.9016	979976.37	25.45	16.03
6.40	259.0	37.6991	77.9048	979976.81	24.23	15.41
6.41	235.0	37.6993	77.9079	979977.56	22.73	14.72
6.42	223.9	37.6994	77.9135	979977.94	22.06	14.43
6.43	206.6	37.6996	77.9167	979978.75	21.24	14.20

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX		FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
			LONG DEG	OBSERVED GRAVITY		
6.44	162.9	37.6999	77.9199	979981.44	19.82	14.27
6.45	153.3	37.7004	77.9231	979981.94	19.42	14.19
6.46	177.5	37.7008	77.9263	979980.00	19.76	13.71
6.47	206.2	37.7013	77.9289	979978.31	20.77	13.74
6.48	228.0	37.7021	77.9321	979978.00	22.50	14.74
6.49	235.9	37.7029	77.9346	979977.19	21.50	13.46
6.50	239.3	37.7038	77.9382	979976.12	20.75	12.60
6.51	248.7	37.7046	77.9412	979974.44	19.95	11.48
6.52	268.4	37.7052	77.9437	979974.75	22.12	12.97
6.53	262.0	37.7061	77.9472	979974.81	21.58	12.65
6.54	252.2	37.7070	77.9499	979975.50	21.34	12.75
6.55	249.9	37.7080	77.9537	979975.69	21.31	12.80
6.56	254.7	37.7087	77.9565	979974.81	20.89	12.21
6.57	241.4	37.7095	77.9590	979975.56	20.39	12.17
6.58	203.9	37.7106	77.9618	979977.62	18.93	11.98
6.59	178.0	37.7118	77.9639	979978.56	17.43	11.36
6.60	203.7	37.7131	77.9667	979976.69	17.97	11.03
6.61	207.2	37.7147	77.9697	979976.12	16.80	9.74
6.62	215.3	37.7158	77.9718	979975.81	17.25	9.91
6.63	235.3	37.7175	77.9748	979974.19	17.50	9.49
6.64	240.5	37.7189	77.9775	979974.12	17.93	9.74
6.65	247.3	37.7204	77.9804	979973.69	18.13	9.71
6.66	278.5	37.7220	77.9835	979972.19	19.57	10.08
6.67	326.3	37.7229	77.9862	979969.06	20.94	9.82
6.68	322.0	37.7232	77.9881	979968.56	20.03	9.06
6.69	327.2	37.7231	77.9889	979968.00	19.96	8.81
6.70	315.2	37.7232	77.9920	979968.69	19.52	8.78
6.71	296.0	37.7232	77.9950	979969.69	18.71	8.63
6.72	241.5	37.7233	77.9985	979973.00	16.90	8.67
6.73	270.2	37.7239	78.0016	979971.00	17.60	8.39
6.74	298.8	37.7242	78.0045	979969.06	17.41	7.23
6.75	306.9	37.7250	78.0075	979968.44	17.55	7.09
6.76	323.0	37.7259	78.0110	979967.19	17.81	6.81
6.77	308.1	37.7266	78.0136	979968.12	17.35	6.85
6.78	303.5	37.7271	78.0163	979968.50	17.29	6.95
6.79	276.1	37.7281	78.0195	979970.50	16.72	7.31
6.80	234.5	37.7288	78.0225	979973.50	15.80	7.81
6.81	216.0	37.7298	78.0266	979973.94	14.50	7.14
6.82	257.0	37.7305	78.0296	979971.69	16.11	7.35
6.83	286.6	37.7314	78.0331	979969.75	16.95	7.19
6.84	293.9	37.7320	78.0359	979969.44	17.33	7.31
6.85	294.1	37.7328	78.0395	979968.87	16.78	6.76
6.86	303.7	37.7336	78.0428	979967.81	16.62	6.28

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
6.87	320.2	37.7343	78.0458	979966.50	16.86	5.95
6.88	301.0	37.7351	78.0491	979967.06	14.68	4.43
6.89	318.3	37.7356	78.0518	979965.44	14.68	3.84
6.90	335.0	37.7360	78.0528	979964.50	15.32	3.90
6.91	339.7	37.7358	78.0550	979963.87	15.13	3.56
6.92	346.3	37.7351	78.0569	979963.12	15.01	3.21
6.93	345.4	37.7345	78.0586	979963.06	15.80	4.03
6.94	329.5	37.7336	78.0609	979964.37	15.61	4.39
6.95	320.7	37.7329	78.0631	979964.81	15.22	4.30
6.96	313.6	37.7322	78.0652	979964.69	14.43	3.75
BM4	376.0	37.7759	77.8976	979971.94	23.80	10.99
BM5	338.0	37.7833	77.8866	979974.44	21.85	10.33
BM6	347.0	37.7663	77.8828	979974.44	24.51	12.69
BM7	386.0	37.7825	77.9043	979970.62	22.55	9.40
BM13	411.0	37.8438	77.9979	979962.06	10.71	-3.29
BM12	337.0	37.8327	77.9826	979968.69	11.32	-0.16
BM11	265.0	37.8267	77.9731	979973.87	10.67	1.64
BM10	229.0	37.8230	77.9682	979972.94	6.35	-1.45
BM9	322.0	37.8029	77.9379	979972.62	16.66	5.69
BM8	394.0	37.7945	77.9256	979968.81	20.55	7.13
BM4	376.0	37.7759	77.8976	979972.00	22.87	10.06
6.97	314.7	37.7312	78.0681	979963.94	13.78	3.06
6.98	309.5	37.7311	78.0713	979963.75	13.11	2.56
6.99	303.4	37.7314	78.0745	979964.06	12.85	2.51
.100	284.0	37.7313	78.0786	979964.81	11.77	2.10
.101	275.5	37.7312	78.0812	979966.50	12.66	3.27
.102	246.1	37.7310	78.0850	979967.75	11.14	2.76
.103	238.3	37.7309	78.0866	979967.69	10.35	2.23
.104	224.6	37.7307	78.0882	979966.87	8.25	0.60
.105	259.8	37.7306	78.0918	979963.81	8.50	-0.36
.106	294.4	37.7310	78.0949	979961.37	9.31	-0.72
.107	325.4	37.7320	78.0978	979959.56	10.41	-0.67
.108	335.1	37.7335	78.1000	979958.87	10.64	-0.78
.109	329.4	37.7350	78.1023	979959.62	9.92	-1.31
.110	322.6	37.7365	78.1050	979960.25	9.90	-1.09
.111	316.3	37.7377	78.1078	979960.50	9.56	-1.22
.112	309.9	37.7390	78.1107	979960.81	9.27	-1.29
.113	303.7	37.7400	78.1133	979961.31	9.19	-1.16
.114	297.6	37.7414	78.1163	979962.31	9.61	-0.53
.115	288.4	37.7425	78.1194	979963.62	10.06	0.23
.116	260.1	37.7433	78.1230	979966.37	10.15	1.29
.117	233.0	37.7448	78.1258	979969.62	10.85	2.91
.118	223.7	37.7458	78.1289	979970.94	10.35	2.73

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
.119	220.0	37.7471	78.1323	979971.37	10.44	2.94
.120	216.1	37.7476	78.1356	979971.69	10.39	3.02
.121	215.2	37.7482	78.1383	979971.44	10.05	2.72
.122	214.3	37.7485	78.1421	979971.06	9.59	2.29
.123	213.4	37.7489	78.1456	979970.25	8.69	1.42
.124	212.9	37.7493	78.1484	979969.62	8.02	0.77
.125	211.6	37.7496	78.1514	979969.12	7.40	0.19
.126	212.9	37.7498	78.1548	979968.75	7.15	-0.11
.127	201.4	37.7500	78.1570	979969.12	6.44	-0.42
.128	203.7	37.7509	78.1591	979968.87	6.41	-0.53
.129	207.8	37.7522	78.1607	979968.37	6.29	-0.79
.130	232.3	37.7539	78.1645	979966.62	6.85	-1.07
.131	232.2	37.7545	78.1660	979966.19	6.40	-1.51
.132	207.8	37.7551	78.1679	979967.62	5.54	-1.54
.133	222.9	37.7555	78.1701	979966.44	5.78	-1.82
.134	217.3	37.7564	78.1716	979967.69	5.56	-1.84
.135	209.6	37.7584	78.1747	979967.87	5.02	-2.12
.136	224.8	37.7602	78.1769	979967.87	6.45	-1.20
.137	239.4	37.7618	78.1792	979968.19	8.14	-0.02
.138	218.3	37.7633	78.1812	979969.37	7.34	-0.09
.139	213.0	37.7641	78.1830	979969.00	6.47	-0.79
5.1	274.0	37.7644	78.1841	979977.81	21.02	11.68
5.2	287.7	37.6941	77.8874	979976.81	26.93	17.13
5.3	274.5	37.6964	77.8877	979978.31	27.19	17.84
5.4	308.7	37.6996	77.8888	979976.19	28.28	17.76
5.5	310.9	37.7022	77.8894	979975.94	28.24	17.65
5.6	308.8	37.7042	77.8898	979976.06	27.23	16.71
5.7	308.8	37.7065	77.8896	979976.12	27.29	16.77
5.8	308.3	37.7088	77.8891	979976.62	27.74	17.24
5.9	305.9	37.7116	77.8881	979976.62	27.52	17.10
5.10	313.7	37.7131	77.8880	979976.00	27.63	16.94
5.11	313.4	37.7154	77.8883	979976.06	26.72	16.05
5.12	315.4	37.7170	77.8882	979976.12	26.97	16.23
5.13	309.3	37.7199	77.8893	979976.81	27.09	16.55
5.14	317.3	37.7219	77.8894	979976.50	27.53	16.72
5.15	320.2	37.7245	77.8886	979976.37	26.74	15.83
5.16	319.8	37.7264	77.8889	979976.12	26.45	15.56
5.17	317.4	37.7275	77.8899	979976.44	26.54	15.72
5.18	322.0	37.7302	77.8906	979976.12	26.66	15.69
5.19	323.7	37.7327	77.8913	979975.81	26.50	15.48
5.20	337.7	37.7351	77.8920	979974.75	25.82	14.32
5.21	334.1	37.7363	77.8922	979974.81	25.55	14.16
5.22	324.0	37.7383	77.8935	979975.31	25.10	14.06

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
5.23	325.6	37.7391	77.8947	979974.87	24.81	13.72
5.24	329.0	37.7394	77.8979	979974.00	24.25	13.04
5.25	341.0	37.7404	77.9008	979973.31	24.69	13.08
5.26	334.1	37.7417	77.9026	979973.94	24.67	13.29
5.27	342.3	37.7438	77.9045	979972.87	24.38	12.72
5.28	347.0	37.7451	77.9063	979972.69	24.63	12.81
5.29	358.5	37.7469	77.9079	979971.69	23.78	11.56
5.30	358.0	37.7482	77.9093	979971.94	23.98	11.78
5.31	357.7	37.7507	77.9109	979971.37	23.39	11.20
5.32	370.0	37.7531	77.9131	979970.25	23.42	10.82
5.33	351.7	37.7539	77.9150	979971.56	23.01	11.03
5.34	337.6	37.7550	77.9167	979972.44	22.56	11.06
5.35	319.4	37.7562	77.9187	979973.69	21.16	10.28
5.36	317.9	37.7575	77.9207	979973.37	20.71	9.88
5.37	312.2	37.7580	77.9228	979973.44	20.24	9.60
5.38	306.5	37.7584	77.9251	979973.37	19.64	9.20
5.39	293.9	37.7594	77.9279	979974.12	19.20	9.19
5.40	281.6	37.7597	77.9311	979974.69	18.61	9.01
5.41	286.6	37.7597	77.9327	979974.06	18.45	8.69
5.42	279.0	37.7604	77.9344	979974.31	17.99	8.48
5.43	240.7	37.7609	77.9371	979976.69	16.76	8.56
5.44	243.5	37.7619	77.9399	979976.06	16.40	8.10
5.45	267.0	37.7627	77.9436	979974.75	17.30	8.20
5.46	256.7	37.7629	77.9449	979975.25	16.83	8.08
5.47	225.3	37.7635	77.9476	979978.31	16.94	9.26
5.48	246.5	37.7644	77.9511	979976.87	17.49	9.10
5.49	238.9	37.7648	77.9529	979977.56	17.47	9.33
5.50	283.4	37.7651	77.9547	979973.06	17.15	7.50
5.51	296.2	37.7650	77.9585	979972.06	17.36	7.26
5.52	320.6	37.7653	77.9601	979970.50	18.09	7.17
5.53	314.0	37.7664	77.9621	979971.44	18.41	7.71
5.54	299.0	37.7676	77.9641	979972.75	17.37	7.18
5.55	295.7	37.7681	77.9655	979972.94	17.25	7.17
5.56	304.5	37.7688	77.9685	979972.44	17.57	7.20
5.57	311.8	37.7700	77.9715	979971.56	17.39	6.76
5.58	320.1	37.7710	77.9739	979971.06	17.67	6.76
5.59	320.2	37.7718	77.9756	979970.31	16.93	6.02
5.60	342.0	37.7722	77.9781	979969.44	18.10	6.45
5.61	340.9	37.7725	77.9800	979969.56	18.12	6.51
5.62	338.7	37.7730	77.9820	979969.56	17.92	6.38
5.63	314.7	37.7738	77.9841	979971.50	17.60	6.87
5.64	285.7	37.7740	77.9870	979972.94	16.31	6.57
5.65	270.6	37.7739	77.9900	979973.62	15.57	6.35

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
5.66	300.4	37.7739	77.9917	979971.25	16.00	5.77
5.67	303.1	37.7744	77.9935	979970.56	15.57	5.24
5.68	293.1	37.7744	77.9954	979971.87	15.94	5.95
5.69	259.7	37.7744	77.9967	979973.81	14.74	5.89
5.70	283.9	37.7744	77.9983	979971.81	15.01	5.34
5.71	316.9	37.8175	78.1251	979969.50	12.12	1.32
5.72	318.7	37.8180	78.1272	979969.12	11.91	1.05
5.73	345.9	37.8178	78.1288	979966.87	12.22	0.43
5.74	348.3	37.8171	78.1313	979966.12	11.69	-0.17
5.75	357.9	37.8163	78.1337	979965.37	11.85	-0.35
5.76	367.0	37.8152	78.1368	979964.69	12.01	-0.49
5.77	379.8	37.8142	78.1400	979963.69	12.22	-0.72
5.78	361.0	37.8136	78.1424	979964.56	11.33	-0.97
5.79	350.9	37.8133	78.1447	979964.81	10.63	-1.33
5.80	358.2	37.7761	78.0008	979963.62	13.81	1.61
5.81	358.7	37.7765	78.0033	979963.06	13.30	1.08
5.82	370.6	37.7765	78.0058	979961.56	12.92	0.29
5.84	365.1	37.7775	78.0108	979960.94	10.90	-1.54
5.85	354.9	37.7781	78.0132	979961.50	10.50	-1.59
5.86	345.6	37.7788	78.0164	979962.00	10.13	-1.65
5.87	332.0	37.7793	78.0181	979962.81	9.66	-1.65
5.88	317.5	37.7803	78.0202	979963.06	8.55	-2.27
5.89	335.0	37.7811	78.0222	979961.75	8.88	-2.53
5.90	325.0	37.7821	78.0253	979962.12	8.31	-2.76
5.91	330.0	37.7825	78.0267	979961.75	8.41	-2.83
5.92	328.5	37.7831	78.0290	979961.69	8.21	-2.99
5.93	316.9	37.7826	78.0292	979962.37	7.80	-2.99
5.94	308.9	37.7839	78.0309	979962.62	7.30	-3.22
5.95	270.4	37.7859	78.0336	979964.75	5.80	-3.41
5.96	233.0	37.7876	78.0360	979966.75	4.29	-3.65
5.97	254.8	37.7890	78.0376	979965.19	3.84	-4.84
5.98	284.1	37.7914	78.0396	979963.75	5.16	-4.52
5.99	300.1	37.7924	78.0412	979963.19	6.10	-4.13
.100	313.9	37.7917	78.0439	979962.75	6.96	-3.74
.101	337.0	37.7915	78.0472	979961.81	8.19	-3.29
.102	353.7	37.7914	78.0499	979961.25	9.20	-2.85
.103	359.3	37.7895	78.0526	979961.19	9.67	-2.58
.104	343.9	37.7878	78.0550	979963.37	11.34	-0.37
.105	335.4	37.7859	78.0574	979965.06	12.23	0.80
.106	352.1	37.7847	78.0591	979964.87	13.61	1.62
.107	370.0	37.7860	78.0619	979964.12	14.55	1.94
.108	377.0	37.7880	78.0640	979963.94	15.02	2.17
.109	363.3	37.7897	78.0663	979965.94	14.79	2.41

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
.110	372.0	37.7907	78.0685	979965.06	14.73	2.06
.111	375.5	37.7913	78.0705	979964.06	14.06	1.27
.112	426.3	37.7917	78.0725	979961.37	16.15	1.63
.113	449.0	37.7919	78.0736	979960.19	17.10	1.80
.114	429.4	37.7926	78.0753	979961.06	16.13	1.50
.115	421.3	37.7945	78.0777	979961.25	15.56	1.21
.116	412.2	37.7963	78.0802	979961.81	15.27	1.22
.117	425.0	37.7982	78.0827	979960.56	15.22	0.74
.118	431.4	37.7990	78.0835	979959.94	14.26	-0.44
.119	435.3	37.8003	78.0848	979959.69	14.38	-0.46
.120	443.2	37.8012	78.0865	979959.12	14.56	-0.54
.121	461.3	37.8028	78.0894	979957.50	14.63	-1.08
.122	453.4	37.8038	78.0918	979958.37	14.76	-0.68
.123	468.0	37.8040	78.0932	979957.00	14.76	-1.18
.124	458.0	37.8046	78.0951	979957.50	14.32	-1.28
.125	458.0	37.8058	78.0966	979957.44	14.26	-1.34
.126	448.6	37.8081	78.0985	979958.06	14.00	-1.28
.127	439.2	37.8106	78.1005	979958.50	12.62	-2.35
.128	439.2	37.8115	78.1012	979958.56	12.68	-2.28
.129	437.0	37.8134	78.1032	979958.94	12.85	-2.04
.130	412.5	37.8161	78.1041	979960.31	11.92	-2.14
.131	421.2	37.8188	78.1050	979959.19	11.61	-2.74
.132	418.4	37.8200	78.1054	979959.37	11.54	-2.72
.133	415.6	37.8214	78.1065	979959.37	10.34	-3.82
.134	422.0	37.8195	78.1091	979959.00	11.50	-2.88
.135	415.7	37.8187	78.1103	979959.69	11.59	-2.57
.136	374.4	37.8179	78.1123	979962.37	10.40	-2.36
.137	311.6	37.8157	78.1147	979966.50	8.62	-2.00
.138	261.4	37.8152	78.1160	979969.19	6.58	-2.32
.139	254.9	37.8149	78.1189	979969.69	6.47	-2.21
.140	248.0	37.8159	78.1224	979969.50	5.64	-2.81
7.2	343.4	37.7514	78.0645	979960.44	11.11	-0.59
7.3	343.0	37.7517	78.0667	979960.37	11.01	-0.68
7.4	338.3	37.7519	78.0685	979960.50	10.69	-0.84
7.5	327.7	37.7526	78.0707	979960.87	10.07	-1.10
7.6	310.3	37.7546	78.0725	979961.62	9.18	-1.39
7.7	315.2	37.7552	78.0738	979961.62	9.64	-1.10
7.8	330.5	37.7558	78.0764	979960.75	10.21	-1.05
7.9	334.4	37.7569	78.0784	979960.87	9.76	-1.63
7.10	349.0	37.7578	78.0798	979959.81	10.07	-1.82
7.11	354.1	37.7603	78.0810	979959.06	9.80	-2.26
7.12	349.0	37.7607	78.0814	979959.44	9.70	-2.19
7.13	307.8	37.7620	78.0844	979961.56	7.95	-2.54

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
7.14	259.4	37.7632	78.0859	979964.44	6.27	-2.57
7.15	214.6	37.7639	78.0885	979967.00	4.62	-2.69
7.16	212.8	37.7642	78.0904	979967.06	4.51	-2.74
7.17	230.7	37.7643	78.0913	979965.87	5.01	-2.85
7.18	235.0	37.7643	78.0928	979965.56	5.10	-2.91
7.19	242.5	37.7643	78.0941	979965.06	5.31	-2.96
7.20	218.4	37.7636	78.0956	979966.50	4.48	-2.96
7.21	214.6	37.7641	78.0970	979966.75	4.37	-2.94
7.22	252.1	37.7638	78.0995	979964.37	5.52	-3.07
7.23	265.8	37.7635	78.1006	979963.62	6.06	-3.00
7.24	273.8	37.7625	78.1014	979963.06	6.25	-3.08
7.25	294.2	37.7619	78.1026	979961.31	6.42	-3.61
7.26	300.8	37.7614	78.1030	979961.06	6.79	-3.46
7.27	292.7	37.7599	78.1060	979961.87	6.84	-3.13
7.28	297.6	37.7588	78.1068	979961.44	6.86	-3.28
7.29	291.0	37.7570	78.1083	979961.81	6.62	-3.30
7.30	296.9	37.7546	78.1108	979961.56	7.86	-2.26
7.31	289.8	37.7530	78.1123	979961.94	7.57	-2.31
7.32	260.9	37.7514	78.1127	979964.00	6.91	-1.98
7.33	234.6	37.7490	78.1134	979965.37	5.81	-2.18
7.35	220.8	37.7479	78.1125	979967.06	6.20	-1.32
7.36	209.5	37.7479	78.1109	979966.81	4.89	-2.25
7.37	197.8	37.7469	78.1099	979967.31	4.29	-2.45
7.38	198.9	37.7449	78.1089	979967.25	5.27	-1.51
7.39	209.3	37.7436	78.1088	979966.50	5.50	-1.63
7.40	229.6	37.7426	78.1092	979965.44	6.34	-1.48
7.41	247.4	37.7411	78.1102	979964.19	6.77	-1.66
7.42	287.6	37.7404	78.1123	979961.31	7.67	-2.13
7.44	340.0	37.7360	78.0545	979963.19	14.48	2.89
7.45	332.1	37.7373	78.0557	979963.75	14.29	2.98
7.46	321.9	37.7388	78.0567	979964.06	13.65	2.68
7.47	325.3	37.7404	78.0578	979963.56	13.47	2.39
7.48	351.4	37.7426	78.0590	979961.50	13.86	1.89
7.49	342.0	37.7441	78.0595	979962.06	13.54	1.89
7.50	347.0	37.7461	78.0595	979961.31	12.32	0.50
7.51	348.5	37.7478	78.0606	979960.94	12.09	0.21
7.1	359.9	37.7495	78.0623	979960.00	12.22	-0.04
52	360.5	37.7495	78.0623	979960.12	12.40	0.12
53	365.4	37.7520	78.0604	979959.94	12.68	0.23
54	345.4	37.7543	78.0586	979961.25	12.11	0.34
55	343.3	37.7556	78.0574	979961.44	12.10	0.40
56	347.6	37.7568	78.0572	979960.87	11.00	-0.84
57	348.0	37.7584	78.0568	979960.75	10.92	-0.94

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX		FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
			LONG DEG	OBSERVED GRAVITY		
58	351.6	37.7597	78.0562	979960.56	11.07	-0.91
59	360.8	37.7607	78.0552	979960.06	11.43	-0.86
60	361.5	37.7618	78.0537	979960.19	11.62	-0.69
61	365.2	37.7639	78.0545	979959.50	11.28	-1.16
62	363.8	37.7648	78.0538	979959.31	10.96	-1.43
63	366.7	37.7656	78.0531	979959.06	10.99	-1.51
64	344.9	37.7667	78.0520	979960.87	10.75	-1.00
65	360.7	37.7687	78.0500	979959.81	10.23	-2.05
66	349.5	37.7707	78.0486	979960.75	10.12	-1.79
67	363.3	37.7715	78.0482	979989.81	10.48	-1.90
68	363.1	37.7731	78.0473	979959.81	10.46	-1.91
69	356.3	37.7742	78.0464	979960.44	10.45	-1.69
70	352.7	37.7756	78.0450	979960.75	10.42	-1.60
71	346.1	37.7762	78.0440	979959.19	8.24	-3.55
72	360.0	37.7768	78.0422	979960.31	10.67	-1.60
73	359.2	37.7772	78.0412	979960.44	10.72	-1.52
74	367.7	37.7774	78.0395	979959.81	10.89	-1.63
75	364.4	37.7776	78.0366	979960.31	10.21	-2.21
76	371.0	37.7781	78.0352	979959.87	10.39	-2.25
77	369.2	37.7797	78.0320	979960.44	10.78	-1.79
78	363.7	37.7808	78.0306	979960.81	10.64	-1.75
79	363.9	37.7826	78.0296	979960.87	10.72	-1.67
80	333.0	37.7234	77.9882	979967.25	19.75	8.41
81	341.4	37.7247	77.9869	979966.81	19.17	7.54
82	343.2	37.7257	77.9868	979966.87	19.40	7.71
83	341.2	37.7273	77.9874	979967.00	19.34	7.71
84	336.6	37.7299	77.9872	979967.19	19.09	7.63
85	337.8	37.7304	77.9879	979966.87	18.89	7.38
86	335.6	37.7309	77.9894	979967.06	18.87	7.44
87	347.5	37.7321	77.9920	979966.06	18.99	7.15
88	351.0	37.7342	77.9937	979966.00	19.26	7.30
89	344.3	37.7351	77.9950	979966.31	18.00	6.27
90	350.3	37.7363	77.9959	979966.06	18.32	6.38
91	352.4	37.7373	77.9961	979966.25	18.70	6.70
92	358.2	37.7386	77.9957	979965.87	18.87	6.67
93	338.4	37.7404	77.9951	979967.19	18.32	6.80
94	344.0	37.7426	77.9944	979967.06	18.73	7.01
95	343.0	37.7442	77.9933	979967.37	18.94	7.26
96	334.3	37.7457	77.9910	979968.31	18.13	6.74
97	353.4	37.7479	77.9907	979966.94	18.55	6.51
98	347.9	37.7484	77.9896	979967.44	18.53	6.68
99	358.3	37.7484	77.9889	979966.75	18.82	6.61
100	350.4	37.7503	77.9883	979967.31	18.64	6.70

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
101	346.9	37.7523	77.9866	979967.62	18.62	6.81
102	342.0	37.7535	77.9845	979968.19	18.73	7.07
103	343.3	37.7543	77.9841	979968.06	18.72	7.03
104	347.1	37.7556	77.9836	979967.94	18.96	7.13
105	340.4	37.7584	77.9849	979968.75	18.20	6.60
106	329.2	37.7597	77.9860	979969.50	17.90	6.68
107	335.2	37.7620	77.9872	979969.19	18.15	6.73
108	335.6	37.7638	77.9879	979969.12	18.12	6.69
109	333.5	37.7667	77.9886	979969.19	17.99	6.63
110	337.3	37.7691	77.9868	979969.19	17.41	5.92
111	334.6	37.7693	77.9845	979969.69	17.65	6.26
112	330.8	37.7709	77.9817	979970.06	17.67	6.40
113	342.1	37.7724	77.9800	979969.00	17.67	6.02
106	329.2	37.7597	77.9860	979969.62	18.02	6.81
114	202.0	37.6743	78.0852	979969.06	13.00	6.12
115	227.6	37.6758	78.0840	979967.56	13.90	6.15
116	254.6	37.6767	78.0830	979966.00	14.88	6.21
117	294.8	37.6782	78.0816	979961.81	14.47	4.43
118	309.5	37.6788	78.0810	979961.00	15.04	4.50
119	314.3	37.6800	78.0793	979960.75	15.25	4.54
120	326.2	37.6806	78.0788	979960.06	15.68	4.56
121	320.1	37.6815	78.0782	979960.75	14.85	3.95
122	342.3	37.6826	78.0768	979959.25	15.44	3.78
123	349.2	37.6839	78.0754	979960.12	16.97	5.07
124	352.0	37.6848	78.0733	979959.94	17.04	5.05
125	357.9	37.6859	78.0735	979959.69	17.35	5.15
126	359.1	37.6871	78.0736	979959.69	17.46	5.22
127	361.7	37.6888	78.0727	979959.50	17.52	5.19
128	352.4	37.6901	78.0716	979960.00	17.14	5.14
129	355.1	37.6920	78.0706	979960.44	17.83	5.73
130	360.4	37.6938	78.0708	979960.06	17.02	4.74
131	360.2	37.6957	78.0709	979960.19	17.13	4.85
132	353.5	37.6970	78.0700	979960.75	17.06	5.01
133	370.5	37.6989	78.0679	979959.75	17.66	5.03
134	348.7	37.7007	78.0643	979961.50	17.36	5.48
135	349.1	37.7023	78.0610	979961.50	17.39	5.50
136	364.0	37.7033	78.0601	979960.62	16.98	4.58
137	347.3	37.7054	78.0599	979962.06	16.85	5.02
138	347.5	37.7082	78.0597	979962.19	16.99	5.15
139	344.2	37.7100	78.0597	979962.50	17.00	5.27
140	350.7	37.7115	78.0600	979962.31	17.42	5.47
141	338.2	37.7132	78.0589	979963.50	17.43	5.91
142	331.5	37.7151	78.0579	979964.37	16.74	5.44

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
143	339.7	37.7170	78.0576	979964.25	17.38	5.81
144	322.4	37.7186	78.0570	979966.00	17.51	6.52
145	325.1	37.7203	78.0565	979966.06	17.82	6.75
146	330.9	37.7236	78.0558	979965.50	17.81	6.53
147	345.9	37.7253	78.0557	979964.37	17.16	5.37
148	349.0	37.7286	78.0564	979963.75	16.82	4.93
149	343.1	37.7304	78.0570	979963.81	16.33	4.64
150	355.9	37.7323	78.0566	979962.75	16.47	4.35
151	356.9	37.7334	78.0564	979962.56	16.38	4.22
152	343.1	37.7354	78.0562	979963.31	14.89	3.20
153	365.9	37.7027	78.0596	979960.62	18.10	5.63
154	360.9	37.7022	78.0585	979961.31	18.32	6.02
155	362.7	37.7014	78.0571	979961.06	18.24	5.88
156	361.3	37.7009	78.0564	979961.31	18.35	6.04
157	355.9	37.7005	78.0547	979961.81	18.35	6.22
158	364.8	37.7003	78.0524	979961.06	18.43	6.00
159	353.0	37.6992	78.0502	979962.00	18.26	6.23
160	348.4	37.6984	78.0482	979962.25	18.08	6.21
161	352.0	37.6979	78.0477	979962.12	18.29	6.30
162	352.5	37.6969	78.0462	979961.94	18.15	6.14
163	336.8	37.6965	78.0447	979963.12	17.86	6.39
164	334.8	37.6962	78.0428	979963.25	17.80	6.39
165	334.4	37.6956	78.0414	979963.31	17.82	6.43
166	330.9	37.6937	78.0397	979963.25	17.43	6.16
167	323.5	37.6914	78.0397	979964.00	18.42	7.40
168	340.1	37.6896	78.0385	979962.87	18.86	7.27
169	337.0	37.6885	78.0360	979963.06	18.76	7.27
170	345.8	37.6879	78.0351	979962.62	19.15	7.36
171	337.9	37.6875	78.0335	979963.19	18.97	7.45
172	328.9	37.6866	78.0312	979963.94	18.87	7.66
173	345.7	37.6853	78.0289	979963.06	19.57	7.80
174	341.0	37.6853	78.0268	979963.62	19.69	8.08
175	347.2	37.6847	78.0246	979963.37	20.03	8.20
176	346.7	37.6840	78.0220	979963.44	20.04	8.23
BM14	326.0	37.7405	77.8454	979979.25	29.22	18.11
15	316.0	37.7318	77.8377	979979.12	29.09	18.33
16	298.0	37.7221	77.8287	979980.44	29.65	19.50
17	232.0	37.7123	77.8128	979983.62	27.57	19.66
18	313.0	37.7101	77.8053	979977.81	29.37	18.71
19	336.0	37.7021	77.7808	979974.56	29.22	17.78
20	414.0	37.6966	77.7669	979968.69	30.68	16.58
21	382.0	37.6944	77.7604	979970.69	29.68	16.66
22	290.0	37.7044	77.8099	979979.25	28.65	18.77

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX		FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
			LONG DEG	OBSERVED GRAVITY		
23	241.0	37.6989	77.8320	979982.87	28.60	20.39
24	216.0	37.6992	77.8408	979985.25	28.63	21.27
25	322.0	37.6988	77.8590	979977.62	30.97	20.00
26	264.0	37.6965	77.8720	979980.12	28.02	19.02
27	276.0	37.6982	77.8888	979978.12	27.14	17.74
177	315.0	37.6590	78.0407	979963.44	19.87	9.14
178	303.5	37.6610	78.0382	979965.12	19.54	9.20
179	322.9	37.6632	78.0367	979963.87	20.12	9.12
180	323.5	37.6636	78.0339	979964.19	20.49	9.46
181	325.1	37.6640	78.0325	979964.25	20.70	9.62
182	332.1	37.6645	78.0300	979963.81	20.92	9.61
183	333.5	37.6652	78.0280	979963.87	21.11	9.75
184	321.0	37.6662	78.0255	979964.94	21.00	10.06
185	324.4	37.6671	78.0241	979964.81	21.20	10.14
186	324.2	37.6676	78.0217	979965.00	21.36	10.32
187	328.4	37.6683	78.0204	979964.87	21.63	10.45
188	339.6	37.6698	78.0198	979964.06	21.88	10.31
189	349.1	37.6709	78.0199	979963.50	21.27	9.38
190	324.4	37.6733	78.0200	979965.44	20.88	9.83
191	333.6	37.6758	78.0202	979964.56	20.87	9.51
192	342.5	37.6788	78.0204	979963.87	21.02	9.35
193	334.2	37.6811	78.0210	979964.50	20.87	9.48
194	347.0	37.6836	78.0223	979963.37	20.01	8.19
195	327.6	37.6866	78.0213	979964.94	19.75	8.59
196	332.7	37.6890	78.0206	979963.94	19.23	7.89
197	324.0	37.6915	78.0199	979965.87	20.35	9.31
198	303.6	37.6944	78.0192	979967.44	19.05	8.71
199	302.4	37.6972	78.0181	979967.37	18.88	8.57
200	296.9	37.6984	78.0178	979967.81	18.80	8.68
201	275.0	37.7002	78.0181	979969.25	18.17	8.81
202	257.8	37.7017	78.0187	979970.31	17.62	8.84
203	213.8	37.7034	78.0185	979973.06	15.29	8.01
204	198.7	37.7040	78.0175	979974.00	14.81	8.04
205	203.7	37.7049	78.0161	979973.81	15.09	8.15
206	239.0	37.7063	78.0151	979971.31	15.91	7.77
207	263.2	37.7083	78.0146	979969.75	16.63	7.66
208	279.2	37.7104	78.0143	979969.00	17.38	7.87
209	289.5	37.7126	78.0137	979968.62	17.98	8.11
210	299.1	37.7137	78.0130	979967.94	17.25	7.06
211	296.5	37.7150	78.0117	979968.19	17.26	7.16
212	309.3	37.7165	78.0108	979967.25	17.53	6.99
213	315.6	37.7186	78.0110	979967.00	17.87	7.12
214	319.4	37.7206	78.0115	979965.75	16.98	6.09

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
215	318.9	37.7220	78.0122	979966.12	17.30	6.44
216	317.1	37.7243	78.0114	979966.44	16.51	5.71
217	320.8	37.7258	78.0114	979966.62	17.04	6.12
218	334.3	37.6728	78.0200	979964.75	21.13	9.74
219	333.6	37.6724	78.0176	979964.75	21.06	9.70
220	314.0	37.6718	78.0142	979966.37	20.84	10.14
221	300.4	37.6717	78.0119	979967.50	20.69	10.45
222	291.4	37.6718	78.0092	979968.31	20.65	10.73
223	307.6	37.6714	78.0060	979967.37	21.24	10.76
224	315.2	37.6710	78.0040	979967.06	21.64	10.90
225	292.6	37.6705	78.0003	979968.87	22.27	12.30
226	284.6	37.6698	77.9987	979969.50	22.14	12.44
227	291.0	37.6703	77.9958	979969.19	22.43	12.52
228	300.3	37.6709	77.9942	979968.25	21.43	11.20
229	299.6	37.6713	77.9930	979968.62	21.74	11.53
230	296.8	37.6727	77.9916	979969.31	22.16	12.05
231	313.1	37.6742	77.9906	979967.94	22.32	11.65
232	299.6	37.6747	77.9886	979969.06	22.18	11.97
233	299.6	37.6750	77.9862	979969.00	22.11	11.91
234	301.0	37.6752	77.9853	979968.69	21.93	11.68
235	300.9	37.6760	77.9830	979969.06	22.30	12.05
236	293.4	37.6778	77.9808	979970.06	22.59	12.60
237	287.5	37.6782	77.9788	979971.31	23.29	13.49
238	286.6	37.6784	77.9770	979970.37	22.27	12.50
239	283.0	37.6789	77.9753	979970.69	22.24	12.60
240	258.3	37.6798	77.9722	979972.75	21.98	13.18
241	249.6	37.6807	77.9710	979973.19	21.60	13.09
242	255.6	37.6821	77.9695	979972.81	20.85	12.14
243	248.3	37.6836	77.9672	979973.56	20.91	12.45
244	249.0	37.6845	77.9660	979973.31	20.73	12.25
245	212.5	37.6860	77.9644	979976.19	20.17	12.93
246	211.7	37.6873	77.9632	979975.87	19.78	12.57
247	190.8	37.6887	77.9617	979977.50	19.44	12.94
248	165.4	37.6915	77.9587	979979.19	18.74	13.11
249	164.6	37.6921	77.9566	979979.25	17.79	12.18
250	166.7	37.6927	77.9548	979979.12	17.86	12.19
251	198.8	37.6933	77.9528	979977.31	19.07	12.30
252	206.9	37.6940	77.9520	979976.62	19.15	12.10
253	206.3	37.6957	77.9513	979976.81	19.28	12.25
254	245.1	37.6976	77.9511	979974.12	20.24	11.89
255	241.6	37.6991	77.9521	979974.56	20.35	12.12
256	240.6	37.6999	77.9518	979974.62	20.31	12.12
257	248.4	37.7017	77.9501	979974.50	20.92	12.46

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
258	257.5	37.7033	77.9491	979974.00	20.34	11.57
259	266.7	37.7049	77.9483	979973.75	20.96	11.87
260	262.0	37.7060	77.9474	979974.50	21.26	12.34
261	267.9	37.7072	77.9466	979973.37	20.69	11.57
262	281.1	37.7083	77.9453	979972.56	21.12	11.55
263	293.1	37.7088	77.9434	979971.81	21.50	11.52
264	308.0	37.7097	77.9416	979971.06	22.15	11.66
265	302.5	37.7101	77.9395	979971.69	22.26	11.96
266	306.7	37.7112	77.9399	979971.44	22.41	11.96
267	295.0	37.7120	77.9406	979972.37	22.24	12.19
1	333.0	37.6260	78.0597	979961.12	22.00	10.66
2	328.8	37.6277	78.0607	979961.50	21.98	10.78
3	330.1	37.6295	78.0621	979961.19	20.86	9.61
4	334.7	37.6306	78.0644	979960.62	20.73	9.32
5	318.5	37.6334	78.0670	979961.44	20.02	9.16
6	309.6	37.6346	78.0694	979962.25	19.99	9.44
7	301.5	37.6357	78.0713	979962.81	19.79	9.52
8	298.1	37.6367	78.0730	979963.00	19.66	9.50
9	285.2	37.6389	78.0747	979963.69	18.26	8.54
10	274.3	37.6408	78.0760	979964.62	18.17	8.83
11	267.3	37.6428	78.0775	979964.75	17.64	8.53
12	246.2	37.6444	78.0791	979966.06	16.97	8.58
13	233.1	37.6457	78.0804	979966.56	16.23	8.29
14	216.7	37.6465	78.0820	979967.44	15.57	8.18
15	199.9	37.6471	78.0838	979968.50	15.05	8.24
16	213.1	37.6477	78.0860	979967.75	15.54	8.28
17	232.6	37.6484	78.0877	979966.50	16.12	8.20
18	266.3	37.6502	78.0899	979964.25	16.11	7.03
19	278.8	37.6519	78.0921	979963.31	16.34	6.85
20	282.3	37.6530	78.0936	979963.37	16.74	7.12
21	290.2	37.6543	78.0957	979962.81	16.92	7.03
22	301.8	37.6558	78.0975	979962.12	17.32	7.04
23	322.3	37.6578	78.1003	979960.81	17.94	6.96
24	333.5	37.6592	78.1017	979960.12	18.30	6.94
25	318.8	37.6612	78.1047	979961.31	17.17	6.31
26	225.3	37.6610	78.1071	979960.56	7.63	-0.05
27	226.0	37.6607	78.1104	979960.62	7.75	0.05
28	339.5	37.6606	78.1132	979959.75	17.55	5.99
29	330.5	37.6605	78.1151	979960.44	17.39	6.13
30	342.7	37.6603	78.1175	979959.56	17.67	5.99
31	340.1	37.6602	78.1187	979959.81	17.67	6.09
32	346.1	37.6603	78.1218	979959.94	18.36	6.57
33	356.2	37.6588	78.1252	979959.31	19.62	7.49

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
34	343.6	37.6596	78.1276	979960.19	19.31	7.61
35	336.8	37.6607	78.1292	979960.75	18.30	6.82
36	323.4	37.6630	78.1314	979961.75	18.04	7.02
37	317.6	37.6642	78.1327	979962.50	18.24	7.42
38	333.6	37.6656	78.1358	979961.75	19.00	7.63
39	325.0	37.6660	78.1368	979962.56	19.00	7.93
40	317.8	37.6659	78.1378	979963.31	19.08	8.25
41	308.2	37.6648	78.1410	979963.69	18.55	8.05
42	274.5	37.6643	78.1441	979965.94	17.63	8.28
43	239.0	37.6641	78.1465	979968.06	16.41	8.27
44	232.0	37.6647	78.1495	979967.44	15.13	7.23
45	263.1	37.6648	78.1518	979965.19	15.81	6.84
46	282.3	37.6648	78.1535	979964.56	16.99	7.37
47	270.0	37.6650	78.1567	979964.87	16.14	6.94
48	252.8	37.6650	78.1593	979965.81	15.46	6.85
49	249.0	37.6650	78.1604	979965.87	15.17	6.68
50	227.0	37.6648	78.1617	979967.37	14.60	6.86
51	202.6	37.6660	78.1638	979968.69	13.62	6.71
52	204.3	37.6675	78.1662	979968.37	13.46	6.50
53	216.4	37.6692	78.1684	979967.50	13.73	6.35
54	218.0	37.6704	78.1704	979967.75	14.13	6.70
55	245.0	37.6721	78.1720	979965.75	13.73	5.38
56	257.2	37.6740	78.1740	979965.06	14.19	5.43
57	300.0	37.6756	78.1761	979962.56	15.71	5.49
58	328.0	37.6774	78.1789	979960.50	16.28	5.11
59	324.0	37.6777	78.1798	979960.81	16.22	5.18
60	326.3	37.6779	78.1816	979960.56	16.19	5.07
61	333.3	37.6775	78.1832	979960.06	16.35	4.99
62	326.3	37.6771	78.1850	979960.50	16.12	5.01
63	330.9	37.6771	78.1884	979960.12	16.18	4.91
64	345.5	37.6772	78.1925	979959.06	16.49	4.72
65	357.4	37.6773	78.1953	979958.00	16.55	4.37
66	371.2	37.6778	78.1979	979956.94	16.78	4.14
67	406.3	37.6782	78.2007	979954.56	17.71	3.87
68	391.6	37.6789	78.2020	979955.56	17.33	3.99
70	399.8	37.6816	78.2051	979955.56	17.16	3.54
71	383.8	37.6818	78.2080	979956.44	16.53	3.46
72	378.4	37.6816	78.2098	979956.81	16.40	3.51
73	371.5	37.6815	78.2120	979957.37	16.31	3.66
74	372.0	37.6812	78.2145	979957.06	16.98	4.31
75	374.7	37.6809	78.2169	979956.87	17.05	4.29
76	380.0	37.6800	78.2190	979956.69	17.36	4.42
77	372.3	37.6795	78.2200	979956.62	16.58	3.89

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX		FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
			LONG DEG	OBSERVED GRAVITY		
78	354.9	37.6787	78.2212	979957.87	16.19	4.10
79	343.6	37.6772	78.2226	979958.56	15.81	4.11
80	330.8	37.6758	78.2242	979959.31	15.36	4.09
81	344.4	37.6750	78.2257	979958.19	15.51	3.78
82	347.3	37.6734	78.2287	979957.81	15.41	3.58
83	328.1	37.6722	78.2306	979959.00	14.79	3.62
84	336.8	37.6706	78.2312	979957.75	15.30	3.82
85	351.5	37.6695	78.2321	979956.69	15.62	3.64
86	345.6	37.6679	78.2344	979956.69	15.06	3.29
87	355.3	37.6664	78.2364	979955.44	14.73	2.62
88	357.5	37.6654	78.2380	979955.50	15.00	2.82
89	376.3	37.6639	78.2401	979954.31	15.58	2.76
90	383.8	37.6637	78.2416	979953.81	15.78	2.71
91	393.9	37.6637	78.2432	979953.00	15.92	2.50
92	390.7	37.6633	78.2446	979953.31	15.93	2.62
93	390.5	37.6632	78.2464	979953.44	16.04	2.73
94	387.2	37.6637	78.2484	979953.31	15.60	2.41
95	369.2	37.6656	78.2511	979954.62	15.22	2.64
96	359.0	37.6662	78.2547	979955.94	15.57	3.34
97	365.6	37.6673	78.2574	979955.12	15.38	2.93
98	386.5	37.6684	78.2591	979953.94	16.16	2.99
99	409.9	37.6685	78.2621	979952.06	16.49	2.52
100	428.6	37.6680	78.2641	979951.12	17.31	2.71
101	406.2	37.6663	78.2657	979952.44	16.51	2.67
102	415.0	37.6651	78.2675	979952.06	16.97	2.83
103	417.0	37.6638	78.2697	979951.94	17.03	2.82
104	417.0	37.6631	78.2714	979952.19	17.28	3.07
105	421.0	37.6624	78.2732	979952.12	17.59	3.25
106	424.8	37.6604	78.2761	979952.37	18.20	3.73
107	424.0	37.6595	78.2777	979952.56	19.25	4.80
108	420.0	37.6590	78.2789	979953.06	19.37	5.06
109	415.1	37.6593	78.2816	979953.50	19.35	5.21
110	423.1	37.6602	78.2848	979952.81	18.48	4.06
111	416.8	37.6615	78.2860	979953.31	18.39	4.19
112	436.8	37.6641	78.2877	979951.62	18.58	3.70
113	429.4	37.6663	78.2885	979952.12	18.38	3.75
114	425.8	37.6681	78.2896	979952.37	18.29	3.79
69	402.9	37.6808	78.2035	979955.06	17.89	4.16
116	413.4	37.6725	78.2926	979953.31	17.13	3.04
117	411.3	37.6749	78.2946	979954.69	18.31	4.29
118	411.3	37.6771	78.2946	979955.00	18.62	4.61
119	416.5	37.6780	78.2944	979954.37	18.48	4.29
120	398.0	37.6778	78.2970	979956.44	18.80	5.25

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
121	385.0	37.6779	78.2987	979957.81	18.96	5.84
122	372.8	37.6784	78.3008	979959.69	19.69	6.98
123	354.0	37.6792	78.3028	979961.12	19.35	7.29
124	335.4	37.6805	78.3049	979962.31	18.79	7.37
125	279.3	37.6820	78.3076	979965.50	15.77	6.25
126	265.0	37.6836	78.3098	979966.12	15.05	6.02
127	274.1	37.6846	78.3116	979965.12	14.90	5.56
128	348.1	37.6854	78.3153	979959.62	16.36	4.50
129	366.3	37.6862	78.3181	979958.31	16.76	4.28
130	377.5	37.6871	78.3193	979957.69	17.19	4.33
131	389.8	37.6884	78.3213	979957.25	17.91	4.63
132	395.7	37.6902	78.3235	979956.37	17.59	4.11
133	402.2	37.6915	78.3260	979955.94	17.76	4.06
134	412.3	37.6933	78.3244	979955.37	17.21	3.17
135	406.0	37.6954	78.3222	979955.44	16.68	2.85
136	401.9	37.6964	78.3227	979955.56	16.42	2.73
137	391.8	37.6979	78.3227	979956.37	16.28	2.94
138	393.6	37.6997	78.3238	979956.37	16.45	3.04
139	369.4	37.7013	78.3258	979957.81	15.62	3.03
140	372.8	37.7024	78.3267	979957.44	15.56	2.86
141	371.0	37.7047	78.3270	979957.56	14.58	1.94
142	357.6	37.7061	78.3278	979958.44	14.19	2.01
143	353.4	37.7075	78.3289	979958.44	13.80	1.76
144	332.0	37.7077	78.3306	979959.50	12.85	1.54
145	310.1	37.7089	78.3317	979961.12	12.41	1.85
146	277.5	37.7095	78.3330	979963.19	11.41	1.96
147	240.1	37.7098	78.3345	979965.19	9.89	1.71
149	239.2	37.7126	78.3365	979965.25	9.87	1.72
150	241.5	37.7138	78.3374	979965.06	8.96	0.73
151	269.8	37.7148	78.3412	979963.25	9.81	0.62
152	278.8	37.7153	78.3436	979962.75	10.16	0.66
153	301.5	37.7160	78.3467	979961.37	10.92	0.65
154	327.1	37.7170	78.3507	979960.25	12.20	1.06
155	347.2	37.7176	78.3532	979959.37	13.21	1.39
115	431.2	37.6698	78.2901	979952.25	18.68	3.99
140	215.3	37.7644	78.1881	979968.87	6.56	-0.77
141	235.2	37.7647	78.1903	979967.44	6.99	-1.02
142	245.0	37.7657	78.1927	979965.87	6.35	-1.99
143	267.7	37.7662	78.1957	979964.31	6.93	-2.19
144	316.4	37.7668	78.1988	979961.19	7.44	-3.34
145	310.1	37.7675	78.2003	979962.12	7.79	-2.78
146	310.1	37.7689	78.2016	979962.19	7.85	-2.71
147	332.1	37.7710	78.2035	979960.87	8.61	-2.71

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX			
			LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
148	343.0	37.7720	78.2051	979958.87	7.63	-4.05
149	385.1	37.7729	78.2086	979955.56	8.28	-4.84
150	377.4	37.7735	78.2112	979955.62	7.62	-5.24
151	357.6	37.7743	78.2141	979957.06	7.19	-4.99
152	373.7	37.7751	78.2155	979955.87	7.52	-5.21
153	380.6	37.7778	78.2206	979955.25	6.67	-6.30
154	370.4	37.7800	78.2245	979956.31	6.77	-5.85
155	358.3	37.7817	78.2277	979956.87	6.20	-6.01
156	351.9	37.7821	78.2303	979957.31	6.03	-5.96
157	365.4	37.7822	78.2323	979956.00	5.99	-6.46
158	388.4	37.7816	78.2356	979954.69	6.84	-6.39
159	385.5	37.7804	78.2387	979955.56	7.44	-5.69
160	380.4	37.7793	78.2415	979955.44	6.84	-6.12
161	354.8	37.7783	78.2440	979957.50	6.49	-5.60
162	378.4	37.7772	78.2467	979956.19	8.27	-4.62
163	378.4	37.7766	78.2485	979956.37	8.46	-4.43
164	371.5	37.7759	78.2504	979956.94	8.38	-4.28
165	389.7	37.7744	78.2516	979955.44	8.59	-4.69
166	375.5	37.7724	78.2533	979956.56	8.38	-4.42
167	395.4	37.7705	78.2549	979955.19	8.87	-4.60
168	381.5	37.7689	78.2562	979956.69	9.07	-3.93
169	387.0	37.7671	78.2577	979956.31	9.21	-3.98
170	384.9	37.7654	78.2597	979956.50	10.14	-2.98
171	362.8	37.7642	78.2617	979957.94	9.49	-2.87
172	360.5	37.7636	78.2624	979958.12	9.47	-2.82
173	319.1	37.7645	78.2654	979960.87	8.32	-2.55
174	334.2	37.7651	78.2682	979960.25	9.12	-2.27
175	370.6	37.7659	78.2714	979957.94	10.23	-2.40
176	413.1	37.7671	78.2751	979955.12	10.47	-3.60
177	439.3	37.7683	78.2774	979953.44	11.25	-3.72
178	464.1	37.7698	78.2795	979951.62	11.77	-4.04
179	467.5	37.7705	78.2823	979951.25	11.72	-4.21
180	460.9	37.7695	78.2861	979951.75	11.60	-4.11
181	453.4	37.7680	78.2885	979952.44	11.58	-3.87
182	447.0	37.7668	78.2909	979952.75	11.29	-3.94
183	441.4	37.7662	78.2928	979953.19	12.14	-2.90
184	437.3	37.7663	78.2955	979953.69	12.25	-2.65
185	432.3	37.7673	78.2982	979954.06	11.22	-3.51
186	427.5	37.7685	78.3008	979954.19	10.89	-3.67
187	405.7	37.7694	78.3033	979955.31	9.97	-3.86
188	413.3	37.7702	78.3054	979954.31	9.68	-4.40
189	425.1	37.7709	78.3074	979953.25	9.73	-4.75
190	450.5	37.7719	78.3095	979952.44	11.30	-4.04

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
191	443.1	37.7729	78.3112	979951.87	10.05	-5.05
192	436.9	37.7742	78.3125	979952.12	9.71	-5.17
193	436.9	37.7760	78.3141	979951.81	9.40	-5.48
194	440.0	37.7779	78.3161	979950.62	7.63	-7.36
195	461.1	37.7797	78.3173	979949.37	8.36	-7.35
196	477.8	37.7817	78.3171	979948.37	8.93	-7.34
197	488.9	37.7835	78.3160	979947.44	9.04	-7.62
198	489.2	37.7849	78.3150	979947.56	9.19	-7.47
199	486.9	37.7867	78.3140	979947.75	9.17	-7.42
200	480.6	37.7887	78.3138	979948.06	7.95	-8.43
201	474.5	37.7910	78.3146	979948.12	7.44	-8.73
202	474.1	37.7938	78.3163	979947.81	7.09	-9.07
203	475.4	37.7961	78.3177	979947.69	7.08	-9.11
204	483.4	37.7984	78.3187	979947.25	7.40	-9.07
205	480.1	37.8010	78.3199	979947.87	6.78	-9.58
206	467.7	37.8027	78.3209	979949.75	7.48	-8.45
207	454.0	37.8039	78.3227	979952.25	8.70	-6.77
208	462.3	37.8027	78.3208	979952.87	10.10	-5.65
209	471.5	37.8041	78.3257	979952.31	10.40	-5.66
210	481.9	37.8041	78.3283	979951.19	10.26	-6.16
211	495.2	37.8042	78.3315	979950.50	10.82	-6.05
212	510.0	37.8040	78.3344	979949.37	11.09	-6.29
213	519.0	37.8041	78.3370	979948.31	10.87	-6.81
214	501.1	37.8040	78.3403	979949.50	10.38	-6.70
215	461.6	37.8040	78.3427	979951.94	9.10	-6.63
216	474.5	37.8039	78.3457	979950.62	9.00	-7.17
217	465.5	37.8040	78.3488	979951.44	8.97	-6.89
218	471.5	37.8040	78.3512	979950.94	9.03	-7.03
219	497.0	37.8040	78.3538	979949.06	9.55	-7.38
220	507.5	37.8040	78.3567	979948.31	9.79	-7.50
221	500.8	37.8041	78.3593	979948.56	9.41	-7.65
222	500.7	37.8039	78.3615	979948.37	9.21	-7.85
223	494.2	37.8050	78.3632	979948.19	8.41	-8.42
224	491.6	37.8063	78.3646	979948.19	8.17	-8.58
225	480.5	37.8068	78.3649	979948.75	7.69	-8.68
226	476.0	37.8080	78.3666	979948.56	7.08	-9.14
2	205.3	37.7517	78.1624	979968.87	6.56	-0.44
3	206.3	37.7528	78.1646	979968.81	6.59	-0.44
4	207.0	37.7537	78.1668	979969.50	7.34	0.29
5	207.3	37.7539	78.1691	979968.31	6.18	-0.88
6	207.2	37.7536	78.1704	979968.12	5.99	-1.07
7	206.9	37.7523	78.1736	979967.81	5.65	-1.40
9	206.6	37.7513	78.1758	979967.81	5.62	-1.42

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
10	206.1	37.7503	78.1785	979967.81	5.57	-1.45
11	205.5	37.7493	78.1811	979967.75	5.45	-1.55
12	205.2	37.7482	78.1837	979967.50	5.17	-1.82
13	205.7	37.7468	78.1858	979967.44	5.16	-1.85
14	206.2	37.7454	78.1880	979967.31	5.08	-1.95
15	207.1	37.7438	78.1903	979967.50	6.29	-0.77
16	207.9	37.7424	78.1924	979967.69	6.55	-0.53
17	208.4	37.7409	78.1946	979967.87	6.79	-0.31
18	208.8	37.7394	78.1967	979968.00	6.95	-0.16
19	209.1	37.7379	78.1989	979968.06	7.04	-0.08
20	209.0	37.7364	78.2010	979968.19	7.16	0.03
21	208.8	37.7349	78.2031	979968.19	7.14	0.02
22	208.8	37.7335	78.2056	979968.12	8.01	0.90
23	208.6	37.7324	78.2075	979968.00	7.87	0.76
24	209.3	37.7311	78.2092	979967.75	7.68	0.55
25	210.2	37.7298	78.2107	979967.75	7.77	0.61
26	210.7	37.7286	78.2124	979967.56	7.63	0.45
27	211.3	37.7274	78.2140	979967.31	7.43	0.24
28	211.2	37.7260	78.2157	979967.12	7.24	0.04
29	211.1	37.7249	78.2172	979966.81	6.92	-0.28
30	211.6	37.7237	78.2190	979966.56	7.65	0.44
31	212.0	37.7224	78.2207	979966.44	7.56	0.34
32	212.6	37.7210	78.2221	979966.37	7.56	0.31
33	212.9	37.7196	78.2235	979966.31	7.52	0.27
34	212.5	37.7183	78.2251	979966.31	7.48	0.24
35	211.9	37.7170	78.2267	979966.62	7.74	0.52
36	211.7	37.7157	78.2279	979966.87	7.97	0.76
37	208.9	37.7138	78.2291	979967.81	8.65	1.53
38	210.0	37.7118	78.2301	979967.87	9.75	2.59
39	210.0	37.7097	78.2307	979968.00	9.87	2.72
40	212.0	37.7077	78.2313	979967.94	10.00	2.78
41	213.5	37.7063	78.2318	979967.62	9.83	2.55
42	214.0	37.7047	78.2329	979967.50	9.75	2.46
43	214.2	37.7031	78.2339	979967.19	9.46	2.16
44	214.3	37.7015	78.2350	979966.56	9.78	2.48
45	214.7	37.6999	78.2360	979966.62	9.88	2.56
46	215.5	37.6984	78.2370	979966.31	9.64	2.30
47	216.0	37.6969	78.2379	979965.81	9.19	1.83
48	216.3	37.6956	78.2389	979965.75	9.15	1.79
49	217.0	37.6947	78.2402	979965.31	8.78	1.39
50	217.5	37.6942	78.2417	979965.00	8.52	1.11
51	218.0	37.6939	78.2438	979964.75	8.31	0.89
52	218.2	37.6937	78.2459	979964.62	8.21	0.77

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX		FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
			LONG DEG	OBSERVED GRAVITY		
53	218.9	37.6934	78.2480	979964.56	8.21	0.75
54	219.4	37.6934	78.2498	979964.37	8.07	0.60
55	220.1	37.6935	78.2512	979964.25	8.01	0.51
56	220.8	37.6940	78.2529	979964.12	7.95	0.43
57	221.6	37.6944	78.2547	979964.06	7.97	0.42
58	221.8	37.6948	78.2566	979964.00	7.92	0.37
59	222.4	37.6951	78.2579	979964.25	8.23	0.65
60	222.7	37.6957	78.2597	979964.25	8.26	0.67
61	223.3	37.6964	78.2612	979964.44	8.50	0.89
62	223.6	37.6969	78.2625	979964.50	8.59	0.97
63	224.2	37.6977	78.2644	979964.62	8.77	1.13
64	224.6	37.6985	78.2659	979964.75	8.94	1.28
65	225.1	37.6992	78.2675	979964.94	9.17	1.50
66	225.1	37.7000	78.2691	979964.94	9.17	1.50
67	225.0	37.7007	78.2708	979965.06	9.29	1.62
68	224.7	37.7013	78.2724	979965.37	9.57	1.91
69	224.1	37.7019	78.2742	979965.69	9.83	2.19
70	224.1	37.7025	78.2759	979965.94	10.08	2.44
71	224.3	37.7031	78.2777	979966.06	9.28	1.64
72	224.4	37.7037	78.2793	979966.44	9.67	2.02
73	224.6	37.7044	78.2810	979966.94	10.19	2.53
74	225.1	37.7052	78.2826	979967.50	10.79	3.13
75	225.9	37.7059	78.2843	979968.37	11.74	4.05
76	226.2	37.7067	78.2859	979969.31	12.71	5.00
77	226.4	37.7075	78.2875	979969.25	12.67	4.95
78	227.1	37.7082	78.2891	979969.37	12.86	5.12
79	226.9	37.7089	78.2908	979969.31	12.78	5.05
80	226.6	37.7094	78.2927	979969.25	12.69	4.97
81	226.5	37.7098	78.2946	979969.81	13.24	5.52
82	226.3	37.7103	78.2964	979969.81	13.22	5.51
84	227.0	37.7116	78.3001	979967.06	10.54	2.80
85	227.4	37.7126	78.3018	979966.19	9.70	1.95
86	228.8	37.7138	78.3040	979965.94	8.64	0.85
87	230.2	37.7150	78.3055	979965.75	8.59	0.74
88	231.3	37.7162	78.3071	979965.56	8.50	0.62
89	232.7	37.7169	78.3088	979965.50	8.57	0.64
90	233.9	37.7180	78.3111	979965.50	8.68	0.72
91	234.5	37.7186	78.3130	979965.69	8.93	0.94
92	234.7	37.7192	78.3148	979965.69	8.95	0.95
93	235.0	37.7199	78.3171	979965.62	8.91	0.91
94	235.2	37.7204	78.3193	979965.44	8.74	0.73
95	235.7	37.7207	78.3215	979965.44	8.79	0.76
96	236.3	37.7210	78.3236	979965.50	8.91	0.86

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
97	236.3	37.7212	78.3257	979965.25	8.66	0.61
98	236.4	37.7214	78.3278	979965.12	8.54	0.49
99	236.7	37.7217	78.3299	979965.06	8.51	0.45
100	237.2	37.7219	78.3320	979964.94	8.43	0.35
101	237.5	37.7223	78.3338	979964.81	8.34	0.24
102	237.3	37.7227	78.3358	979965.19	8.69	0.61
103	238.0	37.7232	78.3378	979965.06	8.63	0.52
104	238.6	37.7238	78.3399	979965.06	8.69	0.56
105	239.1	37.7242	78.3419	979965.31	8.05	-0.10
106	239.5	37.7247	78.3439	979965.50	8.27	0.11
107	238.5	37.7250	78.3456	979965.50	8.18	0.05
108	238.5	37.7252	78.3473	979965.56	8.24	0.12
109	237.5	37.7254	78.3490	979966.19	8.77	0.68
110	237.7	37.7257	78.3507	979966.62	9.23	1.13
111	238.2	37.7262	78.3524	979966.94	9.59	1.47
112	236.8	37.7273	78.3537	979967.37	9.89	1.83
113	237.0	37.7285	78.3547	979968.31	10.85	2.78
114	237.7	37.7298	78.3557	979968.69	11.29	3.19
115	238.2	37.7309	78.3566	979968.81	11.46	3.35
116	239.1	37.7321	78.3577	979968.25	10.99	2.84
117	239.8	37.7331	78.3583	979969.31	12.11	3.94
118	240.4	37.7337	78.3596	979969.00	11.86	3.67
83	226.6	37.7108	78.2982	979967.81	11.25	3.53
119	378.0	37.7175	78.1682	979957.81	14.55	1.67
120	381.1	37.7182	78.1656	979957.81	14.84	1.86
121	368.0	37.7185	78.1646	979958.25	14.05	1.51
122	341.9	37.7187	78.1605	979960.31	13.65	2.01
123	362.3	37.7185	78.1588	979958.94	14.20	1.85
124	345.2	37.7182	78.1562	979960.81	14.46	2.70
125	334.5	37.7193	78.1523	979962.19	14.83	3.44
126	327.6	37.7202	78.1493	979962.44	14.43	3.27
127	337.4	37.7201	78.1465	979960.81	13.73	2.24
128	331.3	37.7202	78.1455	979960.94	13.28	2.00
129	333.9	37.7204	78.1444	979960.62	13.21	1.84
130	341.1	37.7203	78.1432	979959.87	13.14	1.52
131	349.0	37.7192	78.1406	979958.44	12.45	0.56
132	343.5	37.7187	78.1386	979958.12	11.62	-0.09
133	347.8	37.7179	78.1356	979958.25	12.15	0.30
134	352.7	37.7171	78.1340	979958.12	12.48	0.47
135	349.5	37.7172	78.1331	979958.19	12.24	0.34
136	338.5	37.7173	78.1322	979958.69	11.71	0.18
137	336.8	37.7172	78.1312	979958.81	11.67	0.20
138	331.3	37.7174	78.1303	979959.69	12.03	0.75

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	APPENDIX		FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
			LONG DEG	OBSERVED GRAVITY		
139	314.4	37.7172	78.1277	979959.56	10.32	-0.39
140	309.6	37.7169	78.1263	979960.87	11.18	0.63
141	301.5	37.7158	78.1245	979961.06	10.60	0.33
142	298.0	37.7147	78.1224	979961.37	10.59	0.44
143	303.7	37.7140	78.1203	979961.62	11.37	1.03
144	310.7	37.7135	78.1185	979961.44	11.84	1.26
145	316.3	37.7127	78.1172	979961.25	13.12	2.35
146	311.0	37.7112	78.1153	979961.87	13.25	2.65
147	309.1	37.7101	78.1141	979962.69	13.88	3.35
148	314.3	37.7085	78.1133	979962.81	14.50	3.79
149	318.2	37.7075	78.1112	979962.75	14.80	3.96
150	314.0	37.7067	78.1079	979963.44	15.09	4.39
151	334.4	37.7062	78.1063	979962.00	15.57	4.18
152	360.7	37.7053	78.1054	979960.31	16.36	4.07
153	359.6	37.7039	78.1047	979960.56	16.51	4.25
154	352.8	37.7026	78.1045	979960.87	17.12	5.10
155	349.9	37.7009	78.1046	979961.50	17.47	5.55
156	358.7	37.7000	78.1041	979960.94	17.73	5.51
157	367.0	37.6990	78.1035	979960.12	17.70	5.20
158	401.8	37.6812	78.2023	979955.06	17.79	4.10
159	399.2	37.6830	78.2005	979955.12	16.67	3.07
160	368.1	37.6842	78.1982	979957.31	15.93	3.39
161	384.6	37.6852	78.1956	979956.19	16.36	3.25
162	372.6	37.6861	78.1944	979957.12	16.17	3.47
163	378.3	37.6876	78.1931	979956.87	16.45	3.56
164	370.7	37.6906	78.1925	979957.37	16.24	3.61
165	384.2	37.6922	78.1936	979956.56	15.76	2.67
166	378.7	37.6935	78.1934	979956.81	15.49	2.59
167	362.3	37.6946	78.1926	979957.56	14.70	2.35
168	318.3	37.6967	78.1908	979960.62	13.62	2.78
169	314.0	37.6976	78.1896	979960.94	13.53	2.83
170	326.8	37.6984	78.1887	979960.06	13.86	2.73
171	358.3	37.7008	78.1871	979957.94	14.70	2.49
172	363.4	37.7014	78.1866	979957.62	14.86	2.48
173	363.8	37.7016	78.1856	979957.75	15.03	2.63
174	369.1	37.7023	78.1829	979957.69	15.46	2.89
175	357.7	37.7030	78.1797	979958.56	14.33	2.14
176	373.1	37.7037	78.1784	979957.44	14.65	1.94
178	364.1	37.7076	78.1744	979958.25	14.62	2.21
179	361.3	37.7097	78.1735	979958.06	14.17	1.86
180	371.7	37.7116	78.1720	979957.25	14.33	1.67
181	379.2	37.7140	78.1698	979957.25	14.10	1.18
182	382.6	37.7162	78.1685	979957.06	14.23	1.20

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
183	384.2	37.7193	78.1691	979957.94	15.26	2.17
184	374.0	37.7211	78.1720	979959.62	15.99	3.24
185	381.7	37.7223	78.1736	979958.75	15.83	2.83
186	385.0	37.7232	78.1743	979958.25	15.64	2.53
187	395.7	37.7246	78.1761	979957.00	14.46	0.98
188	389.0	37.7261	78.1783	979957.62	14.46	1.21
189	370.5	37.7277	78.1785	979958.75	13.84	1.22
190	364.4	37.7301	78.1760	979959.94	14.46	2.04
191	368.6	37.7307	78.1750	979959.81	14.73	2.17
192	362.7	37.7314	78.1734	979960.06	14.42	2.07
193	358.4	37.7323	78.1730	979960.31	14.27	2.06
194	345.2	37.7347	78.1723	979961.19	13.90	2.14
195	352.6	37.7364	78.1710	979961.44	13.91	1.90
196	344.3	37.7376	78.1699	979961.12	12.82	1.09
197	335.3	37.7384	78.1682	979961.75	12.60	1.17
198	326.2	37.7395	78.1669	979962.31	12.30	1.19
199	316.4	37.7405	78.1656	979963.12	12.19	1.41
200	307.2	37.7417	78.1648	979963.50	11.70	1.24
177	388.5	37.7056	78.1759	979956.31	14.97	1.74
201	334.5	37.6653	78.1354	979961.62	18.96	7.56
202	327.8	37.6659	78.1357	979962.19	18.89	7.72
203	320.7	37.6676	78.1370	979962.62	18.66	7.73
204	319.2	37.6693	78.1387	979963.12	19.02	8.14
205	305.4	37.6703	78.1401	979963.69	18.28	7.88
206	301.6	37.6709	78.1409	979963.94	17.24	6.96
207	307.9	37.6724	78.1409	979962.69	16.58	6.09
208	283.8	37.6749	78.1413	979964.31	15.94	6.27
209	269.3	37.6770	78.1413	979964.94	15.20	6.03
210	251.8	37.6778	78.1406	979966.06	14.68	6.10
211	255.8	37.6784	78.1404	979965.87	14.87	6.15
212	234.8	37.6813	78.1407	979967.19	14.21	6.21
213	225.9	37.6830	78.1409	979967.62	12.87	5.17
214	193.1	37.6848	78.1412	979969.25	11.41	4.83
215	186.5	37.6860	78.1418	979969.75	11.29	4.94
216	188.0	37.6868	78.1425	979969.06	10.74	4.34
217	187.7	37.6879	78.1435	979969.06	10.71	4.32
218	186.2	37.6889	78.1461	979969.12	10.64	4.29
219	191.8	37.6906	78.1490	979968.56	10.60	4.07
220	196.6	37.6913	78.1493	979968.44	10.93	4.23
221	206.1	37.6922	78.1491	979968.81	11.26	4.24
222	221.5	37.6932	78.1489	979966.56	10.46	2.91
223	263.5	37.6941	78.1491	979964.12	11.97	2.99
224	266.6	37.6945	78.1492	979963.87	12.01	2.93

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
225	262.6	37.6960	78.1499	979964.31	12.07	3.12
226	265.6	37.6972	78.1505	979964.19	12.23	3.18
227	287.0	37.6983	78.1513	979962.81	12.87	3.09
228	312.9	37.6991	78.1518	979960.62	13.11	2.45
229	317.1	37.7007	78.1521	979961.50	14.38	3.58
230	330.8	37.7034	78.1520	979959.87	13.11	1.84
231	333.2	37.7053	78.1524	979960.00	13.46	2.11
232	331.4	37.7067	78.1531	979960.31	13.60	2.31
233	326.6	37.7081	78.1528	979960.81	13.65	2.53
234	321.6	37.7092	78.1529	979961.37	13.74	2.79
235	329.6	37.7106	78.1526	979961.25	14.37	3.14
236	324.1	37.7113	78.1527	979961.81	14.42	3.38
237	320.3	37.7123	78.1518	979961.81	14.06	3.15
238	326.8	37.7136	78.1527	979961.69	13.61	2.48
239	328.2	37.7148	78.1525	979961.44	13.49	2.31
240	321.5	37.7158	78.1525	979962.12	13.55	2.59
241	315.2	37.7169	78.1522	979962.62	13.46	2.72
242	312.4	37.7178	78.1518	979962.81	13.38	2.74
243	322.0	37.7192	78.1508	979962.56	14.03	3.06
244	326.4	37.7198	78.1509	979961.81	13.70	2.58
245	315.0	37.6590	78.0405	979963.69	20.12	9.39
246	290.6	37.6600	78.0422	979965.19	18.39	8.49
247	265.7	37.6605	78.0442	979966.37	17.24	8.19
248	221.7	37.6607	78.0467	979969.25	15.97	8.42
249	210.9	37.6597	78.0500	979969.31	15.96	8.77
250	245.7	37.6607	78.0520	979967.25	16.23	7.86
251	265.3	37.6609	78.0536	979965.69	16.51	7.47
252	297.9	37.6612	78.0559	979963.37	17.27	7.12
253	324.7	37.6616	78.0579	979961.75	18.16	7.10
254	351.9	37.6628	78.0603	979959.94	18.91	6.92
255	355.1	37.6639	78.0613	979959.56	18.83	6.73
256	347.6	37.6649	78.0622	979960.25	18.82	6.97
257	331.6	37.6670	78.0634	979961.31	18.37	7.08
258	324.0	37.6683	78.0637	979961.56	17.91	6.87
259	336.6	37.6696	78.0656	979960.56	18.09	6.63
260	319.1	37.6720	78.0669	979961.62	16.57	5.70
261	327.8	37.6732	78.0698	979961.00	16.77	5.60
262	321.9	37.6750	78.0707	979961.44	16.65	5.68
263	317.7	37.6774	78.0710	979962.00	16.82	5.99
264	330.7	37.6798	78.0713	979961.12	17.16	5.90
265	337.3	37.6817	78.0727	979961.06	16.78	5.29
266	353.3	37.6840	78.0729	979960.19	17.41	5.38
267	384.0	37.7007	78.2136	979957.19	16.36	3.28

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
268	376.4	37.7011	78.2121	979957.06	15.52	2.70
269	378.0	37.7008	78.2099	979957.44	16.05	3.17
270	395.3	37.6993	78.2084	979956.50	16.74	3.27
271	394.4	37.6987	78.2060	979956.56	16.72	3.28
272	402.5	37.6991	78.2045	979955.94	16.85	3.14
273	410.0	37.7006	78.2030	979955.19	16.81	2.84
274	397.4	37.7012	78.2019	979956.00	16.44	2.90
275	403.5	37.7014	78.1997	979955.62	16.63	2.89
276	392.3	37.7008	78.1984	979956.56	16.52	3.15
277	393.0	37.7006	78.1973	979956.44	16.46	3.07
278	386.6	37.7011	78.1964	979956.69	16.11	2.94
279	380.8	37.7016	78.1956	979957.25	16.12	3.15
280	393.7	37.7020	78.1935	979956.44	16.53	3.11
281	378.8	37.7020	78.1925	979957.00	15.69	2.78
282	373.4	37.7015	78.1914	979957.19	15.37	2.64
283	371.1	37.7012	78.1894	979957.00	14.96	2.32
1001.	358.0	37.6915	77.7724	979972.75	30.42	17.35
1002.	371.0	37.6887	77.7604	979971.87	30.77	17.26
1003.	353.0	37.6827	77.7598	979973.44	30.64	17.74
1004.	355.0	37.6770	77.7618	979974.94	33.26	20.30
1005.	339.0	37.6719	77.7649	979975.12	31.94	19.52
1006.	327.0	37.6663	77.7682	979974.87	31.50	19.49
1007.	253.0	37.6690	77.7771	979979.00	28.67	19.18
1008.	322.0	37.6697	77.7885	979974.44	30.60	18.75
1009.	339.0	37.6733	77.7952	979973.37	30.19	17.77
1010.	329.0	37.6804	77.7930	979974.75	30.63	18.55
1011.	349.0	37.6868	77.7904	979973.62	30.45	17.69
1012.	240.0	37.6968	77.8010	979980.69	26.32	17.27
1013.	344.0	37.6941	77.7858	979974.37	29.79	17.20
1014.	344.0	37.6989	77.7829	979974.44	29.85	17.26
1015.	260.0	37.7060	77.7900	979980.31	26.89	17.16
1016.	291.0	37.7088	77.7980	979978.81	28.30	17.52
1017.	312.0	37.6792	77.8012	979974.75	29.03	17.53
1018.	278.0	37.6856	77.8079	979978.06	28.21	17.87
1019.	263.0	37.6930	77.8200	979981.00	28.80	18.97
1020.	280.0	37.6861	77.8173	979979.56	29.90	19.49
1021.	240.0	37.6837	77.8262	979979.37	25.95	16.90
1022.	209.0	37.6767	77.8245	979982.62	27.22	19.23
1023.	217.0	37.6798	77.8401	979982.75	28.10	19.83
1024.	232.0	37.6628	77.8452	979980.31	28.01	19.23
1025.	221.0	37.6682	77.8451	979981.37	28.03	19.63
1026.	306.0	37.6918	77.8634	979977.75	30.53	19.23
1027.	301.0	37.6956	77.8497	979979.62	31.00	19.87

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1028.	243.0	37.6963	77.8335	979981.94	27.85	18.70
1029.	261.0	37.7017	77.8171	979982.00	29.61	19.85
1030.	247.0	37.7152	77.8214	979983.25	27.67	18.38
1031.	358.0	37.7447	77.8511	979976.81	29.79	16.73
1032.	363.0	37.7479	77.8584	979975.12	27.64	14.40
1033.	360.0	37.7445	77.8668	979975.25	28.42	15.28
1034.	340.0	37.7378	77.8672	979976.56	27.85	15.40
1035.	311.0	37.7324	77.8738	979978.25	27.75	16.28
1036.	333.0	37.7236	77.8625	979978.00	30.50	18.29
1037.	349.0	37.7289	77.8533	979977.44	30.51	17.75
1038.	322.0	37.7332	77.8520	979979.87	30.41	18.57
1039.	341.0	37.7389	77.8528	979978.31	29.69	17.21
1040.	281.0	37.7197	77.8264	979981.25	28.86	18.42
1041.	215.0	37.7163	77.8345	979985.56	26.97	18.77
1042.	268.0	37.7090	77.8318	979980.87	28.20	18.20
1043.	302.0	37.7103	77.8420	979980.06	30.59	19.43
1044.	264.0	37.7059	77.8464	979982.37	29.33	19.46
1045.	282.0	37.7027	77.8371	979981.12	30.71	20.23
1046.	284.0	37.7176	77.8454	979980.50	28.40	17.85
1047.	324.0	37.7179	77.8518	979978.94	30.60	18.69
1048.	312.0	37.7262	77.8458	979980.37	29.97	18.47
1049.	316.0	37.7107	77.8581	979978.50	30.34	18.71
1050.	292.0	37.7039	77.8695	979978.94	28.52	17.71
1051.	321.0	37.7021	77.8607	979977.94	31.19	19.38
1052.	299.0	37.6987	77.8689	979978.12	29.31	18.25
1053.	311.0	37.6859	77.8669	979977.44	30.69	19.22
1054.	296.0	37.6803	77.8711	979977.37	30.15	19.20
1055.	247.0	37.6768	77.8641	979980.12	28.29	19.01
1056.	178.0	37.6706	77.8575	979984.37	26.99	20.06
1057.	312.0	37.6705	77.8055	979973.75	28.97	17.47
1058.	293.0	37.6729	77.8118	979975.06	27.56	16.70
1059.	268.0	37.6644	77.8146	979975.94	27.02	17.02
1060.	329.0	37.6662	77.7950	979973.50	30.32	18.24
1061.	308.0	37.6631	77.7968	979974.69	29.53	18.17
1062.	290.0	37.6593	77.7899	979976.06	30.15	19.40
1063.	161.0	37.6525	77.8301	979982.81	24.77	18.41
1064.	162.0	37.6476	77.8273	979980.69	23.67	17.28
1065.	212.0	37.6538	77.8255	979978.44	25.19	17.09
1066.	271.0	37.6613	77.8223	979976.94	28.30	18.20
1067.	170.0	37.6501	77.8191	979981.25	24.05	17.39
1068.	270.0	37.6546	77.8134	979975.37	27.58	17.51
1069.	260.0	37.6430	77.8183	979975.37	27.58	17.85
1070.	269.0	37.6465	77.8117	979975.62	28.67	18.64

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1071.	219.0	37.6490	77.8487	979980.12	28.47	20.14
1072.	261.0	37.6520	77.8429	979976.87	28.23	18.47
1073.	316.0	37.6634	77.8671	979975.37	30.97	19.33
1074.	224.0	37.6637	77.8561	979982.50	29.44	20.94
1075.	286.0	37.6305	77.8123	979972.81	28.33	17.72
1076.	282.0	37.6257	77.8135	979969.50	25.58	15.11
1077.	306.0	37.6367	77.8071	979973.62	31.03	19.73
1078.	332.0	37.6376	77.7989	979972.25	32.10	19.92
1079.	313.0	37.6479	77.7997	979974.31	31.50	19.96
1080.	320.0	37.6554	77.7999	979973.94	30.84	19.07
1081.	301.0	37.6568	77.8041	979974.56	29.68	18.56
1082.	182.0	37.6713	77.8805	979982.87	24.93	17.86
1083.	163.0	37.6692	77.8858	979984.00	25.20	18.78
1084.	184.0	37.6624	77.8946	979981.06	24.24	17.10
1085.	228.0	37.6655	77.9054	979978.81	26.13	17.49
1086.	276.0	37.6657	77.9128	979975.19	27.02	16.75
1087.	286.0	37.6710	77.9258	979974.06	25.90	15.28
1088.	291.0	37.6770	77.9326	979973.56	25.87	15.08
1089.	281.0	37.6792	77.9405	979972.69	24.05	13.61
1090.	256.0	37.6855	77.9263	979976.00	24.08	14.48
1091.	235.0	37.6815	77.9147	979977.94	24.04	15.16
1092.	262.0	37.6592	77.9203	979975.56	27.01	17.22
1093.	214.0	37.6600	77.9259	979978.50	24.50	16.34
1094.	308.0	37.6585	77.9358	979971.25	27.03	15.67
1095.	313.0	37.6607	77.9415	979970.75	26.06	14.53
1096.	189.0	37.6559	77.9172	979980.44	25.02	17.72
1097.	306.0	37.6505	77.9077	979973.44	29.03	17.73
1098.	315.0	37.6490	77.9017	979972.87	30.25	18.65
1099.	296.0	37.6508	77.8935	979973.87	28.52	17.57
1100.	264.0	37.6489	77.8808	979976.62	29.20	19.34
1101.	240.0	37.6860	77.8929	979979.06	25.63	16.59
1102.	209.0	37.6892	77.8916	979981.12	24.78	16.79
1103.	287.0	37.6814	77.8996	979974.94	25.93	15.28
1104.	163.0	37.6905	77.9081	979982.37	21.70	15.28
1105.	228.0	37.6940	77.9066	979979.12	23.63	14.99
1106.	291.0	37.7018	77.8997	979975.62	26.05	15.27
1107.	281.0	37.7115	77.9154	979974.62	23.18	12.73
1108.	292.0	37.7200	77.9115	979974.31	22.96	12.14
1109.	307.0	37.7247	77.9108	979973.75	22.87	11.54
1110.	311.0	37.7314	77.9067	979974.31	23.81	12.34
1111.	333.0	37.7353	77.9063	979973.31	23.94	11.73
1112.	277.0	37.7478	77.9016	979977.31	21.74	11.43
1113.	230.0	37.7256	77.8786	979982.69	24.57	15.86

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1114.	296.0	37.7177	77.8970	979976.37	25.40	14.45
1115.	281.0	37.7171	77.8834	979978.56	26.18	15.73
1116.	211.0	37.6971	77.8763	979983.31	26.22	18.16
1117.	171.0	37.6940	77.9240	979982.25	21.39	14.70
1118.	275.0	37.7061	77.9339	979974.62	22.61	12.37
1119.	230.0	37.6806	77.9615	979975.25	21.82	13.11
1120.	161.0	37.6770	77.9518	979980.00	20.08	13.72
1121.	198.0	37.6909	77.9898	979975.37	18.00	10.38
1122.	289.0	37.6834	77.9858	979969.81	20.99	10.28
1123.	252.0	37.6838	77.9912	979971.81	19.51	10.06
1124.	246.0	37.6783	77.9921	979972.25	20.32	11.07
1125.	278.0	37.6754	77.9968	979970.06	21.14	10.80
1126.	303.0	37.6641	77.9948	979968.44	22.81	11.62
1127.	275.0	37.6671	77.9857	979971.00	22.74	12.50
1128.	309.0	37.6560	77.9953	979968.37	24.25	12.85
1129.	320.0	37.7189	77.9850	979968.37	19.66	7.88
1130.	308.0	37.7147	77.9877	979969.06	19.22	7.85
1131.	260.0	37.7058	77.9924	979970.69	17.26	7.54
1132.	255.0	37.7169	77.9943	979971.06	16.23	6.67
1133.	320.0	37.7287	77.9936	979967.81	18.16	6.38
1134.	341.0	37.7343	77.9996	979966.81	19.13	6.64
1135.	330.0	37.7418	77.9981	979967.50	17.85	5.73
1136.	329.0	37.7444	77.9809	979968.31	18.57	6.49
1137.	313.0	37.7412	77.9751	979969.50	18.25	6.71
1138.	286.0	37.7373	77.9671	979971.50	17.71	7.10
1139.	186.0	37.7376	77.9562	979978.37	15.18	7.97
1140.	295.0	37.7391	77.9393	979973.06	20.12	9.20
1141.	298.0	37.7428	77.9396	979972.50	19.84	8.82
1142.	313.0	37.7492	77.9353	979972.06	19.87	8.34
1143.	288.0	37.7342	77.9382	979973.12	20.46	9.78
1144.	292.0	37.7331	77.9443	979972.44	20.15	9.33
1145.	299.0	37.7309	77.9392	979972.12	20.49	9.44
1146.	239.0	37.7254	77.9230	979975.69	18.41	9.40
1147.	276.0	37.7174	77.9474	979973.31	20.46	10.18
1148.	280.0	37.7142	77.9535	979972.56	20.08	9.67
1149.	240.0	37.7120	77.9479	979974.00	18.70	9.65
1150.	335.0	37.7360	78.0526	979964.69	15.51	3.22
1151.	260.0	37.6382	78.0098	979967.75	20.83	11.10
1152.	332.0	37.6343	78.0160	979963.75	23.60	11.42
1153.	300.0	37.6308	78.0209	979966.37	23.21	12.12
1154.	305.0	37.6262	78.0200	979965.44	23.68	12.42
1155.	302.0	37.6276	78.0265	979965.50	23.46	12.31
1156.	304.0	37.6266	78.0333	979964.81	22.96	11.74

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1157.	291.0	37.6338	78.0342	979965.75	21.74	10.96
1158.	309.0	37.6387	78.0630	979962.81	19.62	8.23
1159.	281.0	37.6413	78.0574	979964.81	18.99	8.55
1160.	293.0	37.6424	78.0647	979964.31	19.62	8.77
1161.	211.0	37.6476	78.0658	979968.69	16.28	8.22
1162.	258.0	37.6437	78.0711	979966.00	18.01	8.35
1163.	272.0	37.6473	78.0707	979964.75	18.08	7.94
1164.	250.0	37.6504	78.0763	979964.44	14.76	5.37
1165.	298.0	37.6600	78.0891	979962.50	16.40	5.38
1166.	294.0	37.6646	78.0926	979962.87	16.40	5.51
1167.	232.0	37.6663	78.0882	979966.81	14.51	5.73
1168.	311.0	37.6618	78.0953	979961.87	17.00	5.53
1169.	229.0	37.6506	78.1051	979966.31	14.66	5.99
1170.	291.0	37.6492	78.1112	979962.44	17.55	6.77
1171.	358.0	37.6348	78.1072	979958.06	20.36	7.29
1172.	310.0	37.6299	78.0985	979960.44	18.22	6.79
1173.	337.0	37.6330	78.1018	979962.69	23.01	10.65
1174.	355.0	37.6303	78.1156	979957.94	19.95	6.98
1175.	302.0	37.6659	78.1086	979962.31	16.59	5.43
1176.	312.0	37.6653	78.1151	979961.81	17.03	5.53
1177.	310.0	37.6575	78.1142	979961.50	17.47	6.04
1178.	300.0	37.6538	78.1196	979961.94	16.96	5.87
1179.	285.0	37.6695	78.1146	979963.75	16.43	5.85
1180.	243.0	37.6772	78.1169	979967.75	15.54	6.39
1181.	347.0	37.6999	78.0997	979961.25	16.95	4.25
1182.	291.0	37.7025	78.0961	979963.94	14.37	3.58
1183.	308.0	37.7056	78.0986	979963.62	14.72	3.35
1184.	300.0	37.7137	78.1119	979962.94	12.34	1.25
1185.	208.0	37.7241	78.1196	979967.75	7.56	-0.40
1186.	305.0	37.7210	78.1239	979961.12	11.00	-0.26
1187.	278.0	37.6497	78.0035	979970.37	23.33	12.99
1188.	174.0	37.6433	78.0097	979975.25	19.36	12.57
1189.	297.0	37.6568	78.0173	979967.12	21.87	10.88
1190.	302.0	37.6639	78.0151	979965.50	19.78	8.62
1191.	291.0	37.6626	78.0254	979967.12	20.37	9.58
1192.	301.0	37.6677	78.0311	979966.06	20.25	9.12
1193.	287.0	37.6532	78.0352	979960.69	14.49	3.84
1194.	188.0	37.6550	78.0445	979971.25	15.74	8.47
1195.	185.0	37.6564	78.0547	979970.69	14.90	7.73
1196.	173.0	37.6509	78.0568	979971.50	14.58	7.82
1197.	189.0	37.6597	78.0660	979970.31	14.90	7.59
1198.	299.0	37.6678	78.0679	979963.56	17.56	6.50
1199.	197.0	37.6706	78.0777	979969.06	13.46	5.88

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1200.	183.0	37.6715	78.0849	979969.44	11.59	4.48
1201.	197.0	37.6759	78.0876	979969.25	12.71	5.13
1202.	333.0	37.7043	78.0667	979962.81	16.25	4.04
1203.	382.0	37.7042	78.0517	979959.94	17.99	4.10
1204.	334.0	37.6901	78.0582	979962.00	17.41	5.16
1205.	348.0	37.6947	78.0568	979961.69	17.48	4.75
1206.	320.0	37.6850	78.0379	979964.37	18.47	6.70
1207.	292.0	37.6821	78.0455	979965.06	16.52	5.71
1208.	230.0	37.6781	78.0488	979968.69	15.26	6.55
1209.	289.0	37.6814	78.0552	979964.44	15.62	4.90
1210.	319.0	37.6802	78.0321	979964.81	19.75	8.01
1211.	269.0	37.6732	78.0342	979966.75	16.99	6.95
1212.	315.0	37.6781	78.0362	979964.37	18.94	7.33
1213.	310.0	37.6868	78.0117	979966.62	19.78	8.35
1214.	304.0	37.6897	78.0253	979966.31	18.90	7.68
1215.	220.0	37.6953	78.0111	979972.56	16.31	7.95
1216.	286.0	37.6936	78.0050	979969.31	19.27	8.66
1217.	262.0	37.7014	78.0037	979966.75	14.45	4.66
1218.	261.0	37.7112	78.0065	979969.87	16.55	6.78
1219.	274.0	37.7271	78.0338	979969.31	15.33	5.13
1220.	296.0	37.7360	78.0360	979969.06	16.21	5.26
1221.	249.0	37.7278	78.0418	979971.37	15.04	5.69
1222.	261.0	37.7211	78.0368	979969.56	15.30	5.53
1223.	293.0	37.7248	78.0408	979969.94	17.74	6.89
1224.	298.0	37.7385	78.0410	979968.56	15.90	4.88
1225.	263.0	37.7445	78.0403	979970.31	14.36	4.53
1226.	262.0	37.7420	78.0336	979971.56	15.51	5.72
1227.	252.0	37.7483	78.0309	979972.06	14.14	4.68
1228.	294.0	37.7490	78.0233	979970.37	16.40	5.51
1229.	259.0	37.7468	78.0484	979969.12	11.86	2.16
1230.	338.0	37.7437	78.0544	979963.56	14.66	2.28
1231.	301.0	37.7472	78.0696	979963.31	10.00	-1.13
1232.	321.0	37.7398	78.0660	979963.56	13.06	1.26
1233.	287.0	37.7398	78.0747	979964.06	10.37	-0.28
1234.	193.0	37.7388	78.0803	979968.81	6.28	-1.17
1235.	237.0	37.7363	78.0690	979968.06	9.66	0.72
1236.	257.0	37.7175	78.0487	979969.50	14.86	5.23
1237.	310.0	37.7173	78.0726	979964.81	15.15	3.72
1238.	281.0	37.7157	78.0828	979964.81	12.43	1.98
1239.	272.0	37.7216	78.0611	979968.94	15.71	5.57
1240.	180.0	37.7152	78.0908	979970.06	8.18	1.18
1241.	221.0	37.7179	78.0876	979968.25	10.22	1.82
1242.	223.0	37.7216	78.0799	979969.00	11.16	2.69

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1243.	219.0	37.7239	78.0744	979969.37	11.16	2.83
1244.	205.0	37.7281	78.0854	979968.44	7.97	0.11
1245.	199.0	37.7251	78.1177	979967.69	6.65	-1.00
1246.	196.0	37.7330	78.1164	979967.75	6.43	-1.11
1247.	197.0	37.7368	78.1155	979967.75	5.59	-1.99
1248.	283.0	37.7482	78.1256	979965.06	10.05	-0.46
1249.	331.0	37.7020	78.1468	979959.56	13.75	1.61
1250.	251.0	37.6987	78.1595	979966.00	12.67	3.25
1251.	294.0	37.6931	78.1610	979963.87	14.59	3.70
1252.	318.0	37.6911	78.1666	979961.00	14.91	3.20
1253.	324.0	37.7086	78.1473	979959.81	12.41	0.50
1254.	328.0	37.7254	78.1398	979961.00	12.10	0.05
1255.	291.0	37.7114	78.1348	979961.81	11.30	0.52
1256.	340.0	37.7252	78.1591	979962.00	14.23	1.77
1257.	329.0	37.7292	78.1569	979962.87	14.07	1.99
1258.	308.0	37.7327	78.1606	979964.06	13.28	1.92
1259.	352.0	37.7228	78.1648	979960.12	14.42	1.55
1260.	373.0	37.7253	78.1679	979959.62	14.95	1.38
1261.	371.0	37.7217	78.1824	979958.62	14.70	1.19
1262.	204.0	37.7458	78.1702	979968.25	5.81	-2.01
1263.	346.0	37.7133	78.1638	979959.00	13.66	1.01
1264.	292.0	37.7077	78.1617	979963.44	13.02	2.21
1265.	323.0	37.6941	78.1864	979960.19	13.63	1.75
1266.	352.0	37.6824	78.1884	979958.56	15.67	2.80
1267.	341.0	37.6685	78.1970	979959.62	17.57	5.08
1268.	324.0	37.6813	78.1757	979960.31	15.72	3.81
1269.	308.0	37.6904	78.1720	979961.00	13.97	2.60
1270.	217.0	37.6853	78.1716	979967.00	11.41	3.14
1271.	343.0	37.8635	78.2784	979961.37	1.76	-10.80
1272.	251.0	37.6650	78.1770	979965.87	15.36	5.93
1273.	240.0	37.6738	78.1659	979967.31	14.82	5.77
1274.	271.0	37.6618	78.1583	979964.94	16.30	6.20
1275.	289.0	37.6604	78.1540	979965.00	18.05	7.34
1276.	381.0	37.7089	78.1938	979956.31	14.27	0.42
1277.	376.0	37.7150	78.2108	979955.31	11.86	-1.82
1278.	280.0	37.7231	78.1907	979963.69	11.21	0.80
1279.	358.0	37.7233	78.1984	979959.12	13.98	0.91
1280.	361.0	37.7210	78.2042	979957.37	12.51	-0.66
1281.	353.0	37.7094	78.2207	979957.19	12.51	-0.39
1282.	368.0	37.7055	78.2176	979957.37	14.11	0.70
1283.	346.0	37.6986	78.2159	979959.44	15.04	2.38
1284.	341.0	37.6994	78.2204	979960.56	15.69	3.21
1285.	337.0	37.6907	78.2184	979960.87	16.57	4.22

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1286.	355.0	37.6844	78.2182	979957.44	14.82	1.86
1287.	287.0	37.6848	78.2386	979959.56	10.55	-0.09
1288.	409.0	37.6781	78.2475	979952.00	15.40	0.60
1289.	349.0	37.6721	78.2435	979955.94	13.70	0.94
1290.	368.0	37.6674	78.2431	979954.25	14.73	1.33
1291.	403.0	37.6597	78.2420	979952.75	17.46	2.86
1292.	319.0	37.7478	78.1936	979960.19	8.56	-3.18
1293.	221.0	37.7470	78.2053	979966.25	5.41	-2.99
1294.	352.0	37.7444	78.2368	979957.56	9.98	-2.88
1295.	410.0	37.7488	78.2405	979953.81	10.75	-4.09
1296.	402.0	37.7461	78.2480	979954.31	10.49	-4.07
1297.	356.0	37.7442	78.2284	979957.94	10.73	-2.27
1298.	348.0	37.7436	78.2189	979958.06	10.10	-2.62
1299.	316.0	37.7378	78.2065	979961.06	10.09	-1.54
1300.	329.0	37.7331	78.2152	979959.75	10.94	-1.14
1301.	391.0	37.7283	78.2216	979954.37	11.40	-2.79
1302.	401.0	37.7282	78.2314	979953.31	11.27	-3.26
1303.	411.0	37.7287	78.2375	979952.25	11.15	-3.72
1304.	404.0	37.7222	78.2372	979952.44	11.62	-3.01
1305.	387.0	37.7197	78.2465	979954.31	11.90	-2.16
1306.	316.0	37.7137	78.2334	979959.94	10.84	-0.79
1307.	201.0	37.6971	78.2324	979967.50	9.47	1.75
1308.	329.0	37.7012	78.2427	979958.75	12.75	0.67
1309.	355.0	37.7057	78.2478	979957.56	13.07	0.11
1310.	257.0	37.6806	78.2560	979961.19	10.29	0.67
1311.	348.0	37.6841	78.2501	979956.31	13.04	0.31
1312.	306.0	37.6844	78.2546	979959.31	12.09	0.80
1313.	384.0	37.6554	78.2731	979955.25	18.18	4.22
1314.	326.0	37.6522	78.2677	979959.62	17.10	5.12
1315.	428.0	37.6543	78.2887	979952.87	19.94	4.49
1316.	377.0	37.6752	78.2796	979954.81	15.21	1.49
1317.	393.0	37.6695	78.2803	979953.56	16.40	2.14
1318.	389.0	37.6631	78.2934	979954.87	17.33	3.21
1319.	385.0	37.6677	78.2856	979954.25	16.33	2.35
1320.	325.0	37.6837	78.3212	979960.81	15.38	3.43
1321.	403.0	37.6863	78.3284	979955.44	17.34	2.74
1322.	373.0	37.6893	78.3407	979957.00	16.08	2.50
1323.	395.0	37.6975	78.3347	979956.19	16.40	2.07
1324.	250.0	37.6952	78.3414	979964.12	10.70	1.31
1325.	370.0	37.6984	78.3287	979957.31	15.17	1.70
1326.	282.0	37.7059	78.3352	979965.94	14.58	4.11
1327.	235.0	37.7207	78.3507	979966.12	9.41	0.54
1328.	317.0	37.7140	78.3632	979964.06	15.06	3.39

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1329.	388.0	37.6939	78.3134	979957.06	16.61	2.53
1330.	398.0	37.6965	78.3178	979956.44	16.93	2.50
1331.	386.0	37.6995	78.3133	979956.87	16.24	2.22
1332.	371.0	37.6967	78.3059	979959.12	17.08	3.57
1333.	393.0	37.7006	78.3084	979956.81	16.83	2.58
1334.	386.0	37.7040	78.3044	979957.31	15.74	1.72
1335.	335.0	37.7056	78.2999	979961.06	14.69	2.41
1336.	219.0	37.7031	78.2933	979969.62	12.35	4.01
1337.	231.0	37.7001	78.2853	979966.56	11.35	2.61
1338.	297.0	37.6993	78.2918	979964.94	15.93	4.94
1339.	350.0	37.6939	78.2915	979960.37	16.35	3.56
1340.	312.0	37.6895	78.2993	979964.00	17.34	5.84
1341.	386.0	37.6883	78.2921	979957.06	17.36	3.34
1342.	244.0	37.7176	78.3017	979964.56	8.70	-0.49
1343.	444.0	37.7273	78.2974	979952.75	14.76	-1.24
1344.	421.0	37.7217	78.2973	979954.50	15.28	0.07
1345.	359.0	37.7166	78.2964	979958.81	13.76	0.66
1346.	232.0	37.7120	78.2883	979968.62	12.57	3.79
1347.	358.0	37.7133	78.2806	979960.06	15.86	2.79
1348.	362.0	37.7132	78.2747	979958.50	14.67	1.47
1349.	389.0	37.7089	78.2723	979955.56	14.27	0.15
1350.	369.0	37.7022	78.2613	979955.81	13.58	0.14
1351.	453.0	37.7150	78.2653	979951.37	15.16	-1.14
1352.	402.0	37.7241	78.2682	979955.50	13.56	-1.01
1353.	408.0	37.7309	78.2729	979955.50	14.12	-0.65
1354.	404.0	37.7350	78.2672	979954.87	12.18	-2.45
1355.	325.0	37.7272	78.2648	979959.81	10.63	-1.32
1356.	437.0	37.7194	78.2616	979952.25	14.54	-1.22
1357.	416.0	37.7076	78.2532	979952.81	14.06	-0.98
1358.	406.0	37.7125	78.2563	979953.56	13.87	-0.83
1359.	413.0	37.7191	78.2501	979952.87	12.90	-2.04
1360.	333.0	37.7338	78.2952	979959.31	10.88	-1.34
1361.	424.0	37.7400	78.2916	979954.00	13.19	-2.13
1362.	464.0	37.7467	78.2880	979951.62	13.64	-3.04
1363.	351.0	37.7403	78.2826	979959.44	11.76	-1.07
1364.	428.0	37.7396	78.2625	979953.87	13.44	-2.01
1365.	425.0	37.7409	78.2655	979954.19	13.47	-1.88
1366.	407.0	37.7445	78.2526	979954.44	12.03	-2.71
1367.	368.0	37.7477	78.2636	979957.69	10.67	-2.74
1368.	422.0	37.7458	78.3011	979953.06	11.12	-4.12
1369.	372.0	37.7418	78.3050	979956.56	10.86	-2.68
1370.	421.0	37.7351	78.3053	979953.12	12.03	-3.18
1371.	403.0	37.7339	78.3118	979955.19	13.34	-1.26

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1372.	366.0	37.7326	78.3184	979957.50	12.17	-1.17
1373.	342.0	37.7284	78.3279	979958.31	10.73	-1.80
1374.	362.0	37.7269	78.3203	979957.37	11.67	-1.53
1375.	446.0	37.7490	78.3319	979951.94	12.26	-3.81
1376.	268.0	37.7471	78.3528	979964.94	8.52	-1.48
1377.	386.0	37.7420	78.3594	979958.25	13.86	-0.16
1378.	363.0	37.7304	78.3495	979958.25	12.64	-0.60
1379.	373.0	37.7370	78.3539	979959.44	13.83	0.25
1380.	406.0	37.7473	78.3633	979956.19	12.74	-1.96
1381.	343.0	37.7744	78.2600	979958.50	7.26	-5.30
1382.	299.0	37.7588	78.2527	979961.06	6.62	-4.44
1383.	382.0	37.7597	78.2665	979956.06	9.43	-4.46
1384.	319.0	37.7516	78.2675	979960.50	8.88	-2.86
1385.	376.0	37.7559	78.2702	979957.25	10.99	-2.69
1386.	406.0	37.7557	78.2787	979956.00	12.56	-2.14
1387.	461.0	37.7513	78.2875	979951.56	13.29	-3.28
1388.	465.0	37.7585	78.2881	979951.37	12.54	-4.17
1389.	476.0	37.7585	78.2934	979949.75	11.95	-5.13
1390.	336.0	37.7543	78.3125	979958.69	8.66	-3.66
1391.	421.0	37.7517	78.3029	979953.69	11.66	-3.56
1392.	444.0	37.7564	78.3009	979951.62	10.82	-5.18
1393.	422.0	37.7748	78.2753	979953.81	10.00	-5.25
1394.	390.0	37.7802	78.2708	979955.69	7.99	-6.17
1395.	352.0	37.7850	78.2696	979957.44	6.17	-6.70
1396.	325.0	37.7806	78.2845	979960.00	6.19	-5.75
1397.	361.0	37.7741	78.2935	979958.44	8.89	-4.28
1398.	349.0	37.7789	78.2944	979958.25	6.70	-6.06
1399.	363.0	37.7871	78.2969	979956.56	6.33	-6.91
1400.	470.0	37.7963	78.3020	979949.06	7.95	-8.93
1401.	506.0	37.7921	78.3078	979946.81	9.09	-9.02
1402.	390.0	37.7870	78.2916	979954.94	7.24	-6.92
1403.	373.0	37.7948	78.2891	979955.69	5.45	-8.12
1404.	342.0	37.7937	78.2666	979957.62	4.48	-8.05
1405.	329.0	37.7980	78.2584	979957.87	3.50	-8.58
1406.	295.0	37.7945	78.2522	979960.25	2.68	-8.24
1407.	329.0	37.8163	78.2555	979957.12	0.88	-11.20
1408.	330.0	37.8196	78.2598	979956.62	0.47	-11.64
1409.	359.0	37.8211	78.2670	979956.31	1.95	-11.15
1410.	342.0	37.8265	78.2616	979957.06	1.10	-11.42
1411.	379.0	37.7599	78.3147	979955.81	8.89	-4.89
1412.	401.0	37.7784	78.3278	979952.62	5.96	-8.57
1413.	479.0	37.7728	78.3249	979945.25	6.80	-10.39
1414.	476.0	37.7679	78.3261	979949.75	11.02	-6.07

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1415.	462.0	37.7641	78.3278	979950.44	11.32	-5.29
1416.	409.0	37.7522	78.3221	979954.19	11.03	-3.78
1417.	442.0	37.7571	78.3300	979952.25	11.26	-4.67
1418.	447.0	37.7507	78.3320	979952.06	12.48	-3.62
1419.	423.0	37.7552	78.3363	979953.94	12.09	-3.19
1420.	410.0	37.7508	78.3431	979955.56	12.50	-2.34
1421.	420.0	37.7610	78.3361	979953.19	10.12	-5.06
1422.	296.0	37.7619	78.3448	979961.06	6.34	-4.62
1423.	457.0	37.7682	78.3552	979952.69	12.17	-4.27
1424.	442.0	37.7728	78.3613	979954.12	12.19	-3.74
1425.	451.0	37.7624	78.3698	979953.44	13.29	-2.95
1426.	373.0	37.7540	78.3602	979957.87	11.33	-2.25
1427.	451.0	37.7538	78.3680	979953.37	14.16	-2.07
1428.	487.0	37.7819	78.3582	979950.44	11.86	-5.60
1429.	487.0	37.7881	78.3553	979950.44	10.92	-6.54
1430.	425.0	37.7834	78.3382	979952.37	7.97	-7.38
1431.	433.0	37.7913	78.3372	979953.06	8.47	-7.15
1432.	523.0	37.7942	78.3490	979947.81	11.69	-7.00
1433.	508.0	37.8004	78.3488	979948.81	10.34	-7.84
1434.	501.0	37.7987	78.3688	979948.44	10.24	-7.70
1435.	460.0	37.7937	78.3737	979950.81	8.76	-7.78
1436.	468.0	37.8119	78.3733	979948.81	5.64	-11.18
1437.	500.0	37.8086	78.3332	979949.75	10.52	-7.38
1438.	480.0	37.8159	78.3324	979950.94	8.89	-8.33
1439.	469.0	37.8223	78.3301	979951.69	7.67	-9.18
1440.	475.0	37.8274	78.3291	979951.56	8.11	-8.94
1441.	408.0	37.8413	78.3359	979954.87	4.18	-10.59
1442.	437.0	37.8340	78.3317	979953.25	5.29	-10.47
1443.	408.0	37.8281	78.3455	979954.06	4.31	-10.46
1444.	363.0	37.8358	78.3429	979956.37	1.45	-11.79
1445.	433.0	37.8315	78.3617	979951.50	3.16	-12.46
1446.	408.0	37.8370	78.3525	979953.19	2.50	-12.27
1447.	398.0	37.8410	78.3594	979954.06	2.43	-12.00
1448.	452.0	37.8477	78.3644	979950.37	2.88	-13.39
1449.	454.0	37.8478	78.3710	979950.25	2.95	-13.39
1450.	439.0	37.8561	78.3709	979951.56	1.91	-13.92
1451.	298.0	37.8674	78.3653	979960.62	-3.22	-14.25
1452.	394.0	37.8738	78.3615	979955.06	-0.70	-14.99
1453.	396.0	37.8458	78.3509	979954.31	1.55	-12.81
1454.	434.0	37.8499	78.3574	979951.87	2.69	-12.97
1455.	452.0	37.8339	78.3249	979953.00	6.45	-9.82
1456.	431.0	37.8426	78.3247	979954.19	4.72	-10.83
1457.	371.0	37.8529	78.3183	979957.75	1.70	-11.81

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1458.	383.0	37.8501	78.3309	979956.31	2.33	-11.59
1459.	263.0	37.8588	78.3297	979963.00	-3.20	-13.03
1460.	387.0	37.8661	78.3267	979955.75	0.27	-13.78
1461.	407.0	37.8726	78.3225	979955.06	1.46	-13.27
1462.	279.0	37.8745	78.3311	979961.62	-4.95	-15.32
1463.	361.0	37.8631	78.3163	979958.06	0.14	-13.03
1464.	386.0	37.8699	78.3125	979956.87	1.30	-12.72
1465.	398.0	37.8694	78.3053	979956.56	2.12	-12.31
1466.	394.0	37.8694	78.2950	979958.12	3.30	-10.99
1467.	372.0	37.8661	78.2874	979960.19	3.30	-10.25
1468.	255.0	37.8572	78.2682	979965.06	-1.89	-11.45
1469.	341.0	37.8493	78.2775	979960.62	2.69	-9.79
1470.	308.0	37.8452	78.2819	979962.56	1.53	-9.84
1471.	399.0	37.8408	78.2918	979956.75	5.21	-9.25
1472.	437.0	37.8342	78.2982	979954.00	6.04	-9.72
1473.	429.0	37.8279	78.3045	979954.69	6.91	-8.58
1474.	427.0	37.8236	78.3087	979954.19	6.22	-9.20
1475.	442.0	37.8176	78.3143	979953.87	8.26	-7.67
1476.	436.0	37.8122	78.3164	979954.44	8.25	-7.47
1477.	433.0	37.8150	78.3075	979952.00	5.53	-10.09
1478.	437.0	37.8212	78.2919	979951.06	4.04	-11.72
1479.	410.0	37.8242	78.2829	979953.25	3.68	-11.15
1480.	354.0	37.8197	78.2774	979955.94	2.04	-10.89
1481.	415.0	37.8143	78.2825	979952.25	4.09	-10.92
1482.	364.0	37.8088	78.2695	979956.06	4.04	-9.23
1483.	402.0	37.8234	78.2730	979953.00	2.68	-11.88
1484.	413.0	37.8289	78.2726	979952.81	3.53	-11.41
1485.	433.0	37.8333	78.2688	979951.50	3.16	-12.46
1486.	407.0	37.8319	78.2815	979952.94	2.15	-12.58
1487.	395.0	37.8357	78.2741	979957.37	5.46	-8.87
1488.	263.0	37.8421	78.2730	979962.06	-3.20	-13.03
1489.	300.0	37.8424	78.2668	979959.87	-1.91	-13.00
1490.	321.0	37.8494	78.2721	979960.31	0.50	-11.31
1491.	342.0	37.8490	78.2889	979961.06	3.23	-9.30
1492.	372.0	37.8490	78.2973	979959.31	4.30	-9.25
1493.	398.0	37.8435	78.3096	979957.31	4.74	-9.69
1494.	403.0	37.8383	78.3134	979956.81	5.65	-8.95
1495.	321.0	37.8613	78.2647	979961.25	0.50	-11.31
1496.	430.0	37.8692	78.2618	979956.87	5.44	-10.08
1497.	292.0	37.8726	78.2568	979964.19	-0.23	-11.04
1498.	379.0	37.8573	78.2582	979956.06	0.77	-13.01
1499.	397.0	37.8615	78.2549	979955.56	1.96	-12.43
1500.	373.0	37.8686	78.2533	979957.62	0.83	-12.75

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1501.	413.0	37.8549	78.2471	979953.50	1.40	-13.54
1502.	293.0	37.8524	78.2401	979961.00	-2.38	-13.23
1503.	392.0	37.8560	78.2283	979956.25	2.18	-12.05
1504.	388.0	37.8626	78.2287	979956.25	1.80	-12.29
1505.	413.0	37.8746	78.2444	979955.00	1.03	-13.91
1506.	422.0	37.8740	78.2113	979954.81	1.69	-13.56
1507.	390.0	37.8736	78.1995	979956.87	0.74	-13.42
1508.	409.0	37.8680	78.2132	979954.44	1.03	-13.78
1509.	361.0	37.8605	78.2158	979958.19	1.20	-11.97
1510.	403.0	37.8613	78.2041	979955.44	2.40	-12.20
1511.	428.0	37.8540	78.2108	979954.37	3.69	-11.76
1512.	397.0	37.8473	78.2112	979954.50	1.84	-12.56
1513.	386.0	37.8460	78.2220	979956.31	2.61	-11.41
1514.	252.0	37.8448	78.2299	979963.81	-2.49	-11.94
1515.	343.0	37.8479	78.2365	979958.56	0.82	-11.74
1516.	339.0	37.8373	78.2377	979957.94	0.76	-11.66
1517.	363.0	37.8418	78.2458	979957.00	1.14	-12.10
1518.	323.0	37.8333	78.2445	979958.75	0.06	-11.81
1519.	366.0	37.8396	78.2122	979956.06	1.42	-11.92
1520.	369.0	37.8350	78.2148	979956.06	1.70	-11.74
1521.	336.0	37.8284	78.2135	979957.50	0.97	-11.34
1522.	322.0	37.8191	78.2156	979958.50	1.59	-10.25
1523.	333.0	37.8096	78.2213	979957.50	1.63	-10.59
1524.	216.0	37.8275	78.2280	979964.62	-3.19	-11.42
1525.	250.0	37.8217	78.2376	979962.62	-1.99	-11.38
1526.	286.0	37.8075	78.2490	979959.81	0.46	-10.15
1527.	236.0	37.8021	78.2390	979963.75	-0.31	-9.22
1528.	328.0	37.7895	78.2381	979958.81	4.35	-7.70
1529.	269.0	37.7950	78.2303	979962.25	2.24	-7.80
1530.	294.0	37.7556	78.2475	979958.37	4.40	-6.49
1531.	391.0	37.7504	78.2355	979955.81	10.96	-3.23
1532.	363.0	37.7552	78.2269	979957.37	9.89	-3.35
1533.	332.0	37.7541	78.2033	979959.69	9.29	-2.90
1534.	369.0	37.7545	78.1909	979957.37	10.45	-2.99
1535.	308.0	37.7559	78.1829	979960.75	8.09	-3.27
1536.	368.0	37.7617	78.2005	979957.56	9.61	-3.80
1537.	347.0	37.7671	78.2144	979959.00	8.13	-4.56
1538.	339.0	37.7856	78.2162	979957.62	5.13	-7.29
1539.	299.0	37.7924	78.2067	979960.50	3.31	-7.75
1540.	368.0	37.7723	78.1971	979957.94	9.05	-4.36
1541.	336.0	37.7745	78.1885	979959.75	7.85	-4.47
1542.	315.0	37.7816	78.1937	979961.37	6.62	-4.98
1543.	227.0	37.7596	78.1665	979968.56	7.35	-1.26

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1544.	301.0	37.7739	78.1648	979964.37	9.18	-1.94
1545.	379.0	37.7724	78.1559	979962.37	14.52	0.74
1546.	383.0	37.8239	78.1747	979957.94	5.83	-8.09
1547.	355.0	37.7813	78.1402	979964.62	13.64	0.67
1548.	373.0	37.7740	78.1468	979963.31	14.89	1.31
1549.	360.0	37.7823	78.1636	979960.06	9.54	-3.59
1550.	375.0	37.7800	78.1527	979961.69	12.58	-1.07
1551.	407.0	37.7913	78.1532	979960.25	13.21	-1.52
1552.	360.0	37.7899	78.1631	979961.81	10.36	-2.78
1553.	369.0	37.7979	78.1645	979961.31	10.70	-2.74
1554.	352.0	37.7994	78.1769	979960.56	7.42	-5.45
1555.	359.0	37.8048	78.1680	979963.06	10.57	-2.53
1556.	358.0	37.8111	78.1667	979962.37	8.86	-4.21
1557.	365.0	37.8174	78.1704	979960.94	8.08	-5.23
1558.	371.0	37.8187	78.1834	979957.69	5.39	-8.12
1559.	382.0	37.8281	78.1811	979957.25	5.05	-8.83
1560.	398.0	37.8345	78.1889	979955.50	3.87	-10.56
1561.	378.0	37.8286	78.1926	979957.25	4.67	-9.07
1562.	361.0	37.8207	78.1973	979957.50	3.33	-9.84
1563.	310.0	37.8166	78.2042	979963.56	5.53	-5.90
1564.	314.0	37.8072	78.2091	979959.00	2.28	-9.29
1565.	339.0	37.8112	78.1964	979958.44	3.13	-9.29
1566.	295.0	37.8042	78.1971	979961.37	2.87	-8.05
1567.	381.0	37.8378	78.2001	979955.31	2.08	-11.77
1568.	392.0	37.8412	78.1936	979955.06	1.75	-12.47
1569.	364.0	37.7635	78.1542	979963.12	14.79	1.52
1570.	326.0	37.7583	78.1498	979963.31	11.41	-0.57
1571.	350.0	37.7651	78.1369	979963.50	13.85	1.06
1572.	217.0	37.7715	78.1253	979972.62	9.53	1.27
1573.	263.0	37.7708	78.1328	979969.75	10.98	1.15
1574.	377.0	37.7989	78.1504	979962.75	11.95	-1.76
1575.	254.0	37.8049	78.1525	979970.50	8.14	-1.39
1576.	358.0	37.8127	78.1533	979962.00	8.48	-4.59
1577.	362.0	37.8440	78.1815	979958.00	2.04	-11.16
1578.	392.0	37.8510	78.1883	979955.12	1.99	-12.23
1579.	426.0	37.8555	78.1970	979952.94	2.06	-13.32
1580.	386.0	37.8606	78.1910	979955.75	1.11	-12.91
1581.	329.0	37.8658	78.1846	979960.00	-0.93	-13.01
1582.	357.0	37.8679	78.1803	979959.37	1.07	-11.96
1583.	386.0	37.8731	78.1820	979957.19	1.61	-12.41
1584.	313.0	37.8736	78.1701	979961.81	-1.56	-13.10
1585.	381.0	37.8610	78.1701	979957.00	1.89	-11.96
1586.	271.0	37.8549	78.1658	979964.37	-1.08	-11.18

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1587.	331.0	37.8427	78.1644	979959.56	0.69	-11.46
1588.	251.0	37.8303	78.1577	979968.12	3.61	-5.82
1589.	319.0	37.8383	78.1574	979962.31	3.25	-8.49
1590.	349.0	37.8484	78.1583	979960.12	2.95	-9.81
1591.	334.0	37.8509	78.1463	979961.25	2.66	-9.59
1592.	361.0	37.8527	78.1556	979959.50	2.51	-10.66
1593.	402.0	37.8654	78.1432	979956.87	2.81	-11.76
1594.	281.0	37.8630	78.1279	979962.56	-2.89	-13.33
1595.	417.0	37.8729	78.1344	979955.25	2.59	-12.49
1596.	332.0	37.8388	78.1446	979962.25	4.41	-7.77
1597.	363.0	37.8312	78.1288	979961.94	7.01	-6.22
1598.	373.0	37.8386	78.1298	979959.56	5.58	-8.00
1599.	345.0	37.8444	78.1381	979961.06	3.51	-9.12
1600.	331.0	37.8478	78.1317	979962.00	3.13	-9.02
1601.	403.0	37.8524	78.1169	979956.06	3.03	-11.57
1602.	400.0	37.8587	78.1024	979956.00	2.68	-11.82
1603.	396.0	37.8583	78.1103	979956.12	2.43	-11.93
1604.	317.0	37.8657	78.1078	979960.62	-1.44	-13.11
1605.	324.0	37.8725	78.1053	979960.25	-1.15	-13.06
1606.	370.0	37.8599	78.1239	979956.81	0.67	-12.80
1607.	425.0	37.8470	78.1071	979956.62	6.59	-8.76
1608.	436.0	37.8349	78.1115	979956.87	8.82	-6.91
1609.	377.0	37.8254	78.0824	979964.06	11.39	-2.32
1610.	462.0	37.8321	78.1006	979956.44	10.82	-5.79
1611.	409.0	37.8291	78.1223	979959.00	9.34	-5.46
1612.	425.0	37.8082	78.1208	979959.69	13.41	-1.94
1613.	360.0	37.7954	78.1199	979963.94	12.48	-0.65
1614.	274.0	37.7848	78.1224	979969.87	11.27	1.06
1615.	348.0	37.7823	78.1075	979963.81	12.17	-0.56
1616.	399.0	37.7941	78.1057	979963.56	15.77	1.31
1617.	349.0	37.7981	78.1011	979966.50	14.01	1.25
1618.	351.0	37.7763	78.1122	979962.81	12.32	-0.51
1619.	278.0	37.7699	78.1184	979966.12	8.77	-1.57
1620.	303.0	37.7661	78.1070	979962.50	8.43	-2.76
1621.	313.0	37.7720	78.1020	979962.31	8.25	-3.29
1622.	261.0	37.7625	78.1111	979965.25	7.23	-2.53
1623.	311.0	37.7546	78.0395	979966.06	13.69	2.22
1624.	240.0	37.7609	78.0306	979971.19	11.20	2.15
1625.	321.0	37.7590	78.0187	979967.87	15.50	3.69
1626.	303.0	37.7513	78.0223	979969.75	16.62	5.43
1627.	253.0	37.7547	78.0112	979973.75	15.92	6.43
1628.	227.0	37.7584	78.0049	979975.25	14.04	5.43
1629.	261.0	37.7674	78.0096	979972.31	13.36	3.60

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1630.	342.0	37.7722	78.0192	979966.00	14.66	2.14
1631.	340.0	37.7801	78.0517	979961.25	8.85	-3.60
1632.	286.0	37.7811	78.0642	979963.37	5.90	-4.72
1633.	336.0	37.7858	78.0745	979961.25	8.47	-3.84
1634.	336.0	37.7803	78.0813	979960.75	7.97	-4.34
1635.	305.0	37.7710	78.0909	979962.31	7.50	-3.76
1636.	313.0	37.8018	78.0655	979965.94	9.12	-2.41
1637.	336.0	37.8091	78.0564	979963.94	9.29	-3.03
1638.	376.0	37.8169	78.0627	979964.81	12.99	-0.69
1639.	401.0	37.8223	78.0725	979964.06	13.65	-0.88
1640.	258.0	37.8211	78.0530	979972.06	8.20	-1.46
1641.	292.0	37.8191	78.0436	979972.31	12.59	1.77
1642.	339.0	37.8291	78.0481	979968.69	12.44	0.02
1643.	268.0	37.8279	78.0383	979972.31	9.39	-0.61
1644.	403.0	37.8379	78.0471	979965.94	14.78	0.18
1645.	410.0	37.8493	78.0490	979965.06	13.62	-1.22
1646.	445.0	37.8568	78.0579	979959.56	10.47	-5.56
1647.	504.0	37.8751	78.0481	979956.31	10.90	-7.14
1648.	442.0	37.8710	78.0830	979954.75	4.44	-11.49
1649.	426.0	37.8625	78.0792	979957.56	6.69	-8.70
1650.	474.0	37.8470	78.0900	979956.06	10.64	-6.38
1651.	493.0	37.8560	78.0745	979955.19	10.61	-7.05
1652.	446.0	37.8493	78.0714	979959.37	11.32	-4.75
1653.	370.0	37.8429	78.0686	979966.25	11.05	-2.43
1654.	362.0	37.8377	78.0644	979967.06	12.04	-1.16
1655.	360.0	37.8302	78.0685	979966.06	11.79	-1.34
1656.	357.0	37.8293	78.0290	979965.19	10.64	-2.40
1657.	339.0	37.8338	78.0250	979967.62	10.44	-1.98
1658.	384.0	37.8425	78.0274	979966.94	13.05	-0.90
1659.	315.0	37.8366	78.0345	979971.50	12.06	0.46
1660.	408.0	37.8502	78.0321	979966.19	14.56	-0.21
1661.	419.0	37.8602	78.0339	979965.25	13.72	-1.43
1662.	448.0	37.8685	78.0367	979964.25	14.51	-1.63
1663.	280.0	37.7975	78.0396	979965.19	6.21	-4.20
1664.	356.0	37.8055	78.0344	979961.44	8.67	-4.33
1665.	319.0	37.8008	78.0485	979963.81	7.56	-4.18
1666.	384.0	37.7914	78.0231	979960.31	11.11	-2.84
1667.	377.0	37.7997	78.0202	979961.75	10.95	-2.76
1668.	352.0	37.8006	78.0117	979963.56	10.42	-2.45
1669.	377.0	37.8101	78.0173	979961.69	9.95	-3.76
1670.	381.0	37.8114	78.0286	979960.81	9.46	-4.39
1671.	390.0	37.8163	78.0133	979961.50	10.99	-3.17
1672.	361.0	37.8098	78.0057	979963.75	10.51	-2.66

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1673.	338.0	37.8205	78.0239	979963.81	7.47	-4.91
1674.	387.0	37.8224	78.0089	979962.06	10.33	-3.72
1675.	323.0	37.8259	78.0182	979965.50	7.75	-4.12
1676.	403.0	37.8606	78.0265	979966.00	12.96	-1.64
1677.	413.0	37.8659	78.0119	979966.25	13.22	-1.73
1678.	392.0	37.8549	78.0018	979967.06	12.99	-1.23
1679.	401.0	37.8384	77.9973	979962.06	10.71	-3.82
1680.	394.0	37.8318	77.9970	979962.87	10.87	-3.43
1681.	291.0	37.7611	77.9934	979971.69	16.49	5.71
1682.	341.0	37.7789	77.9799	979970.06	17.76	5.27
1683.	235.0	37.7752	77.9601	979977.56	16.16	7.29
1684.	340.0	37.7866	77.9897	979968.31	15.91	3.46
1685.	399.0	37.7912	77.9969	979967.37	19.59	5.12
1686.	356.0	37.7955	77.9899	979966.75	14.92	1.92
1687.	357.0	37.8031	77.9898	979967.31	14.64	1.60
1688.	334.0	37.8022	77.9808	979969.44	14.60	2.35
1689.	343.0	37.8040	77.9989	979966.06	12.07	-0.49
1690.	371.0	37.8103	77.9893	979966.12	13.83	0.32
1691.	395.0	37.8253	78.0000	979963.00	12.02	-2.30
1692.	378.0	37.8187	77.9881	979965.37	13.74	-0.01
1693.	326.0	37.8172	77.9794	979970.31	13.78	1.81
1694.	325.0	37.8161	77.9720	979970.87	14.25	2.31
1695.	230.0	37.8145	77.9623	979977.44	11.88	3.17
1696.	271.0	37.8002	77.9536	979974.75	13.99	3.88
1697.	315.0	37.8110	77.9497	979974.00	16.44	4.83
1698.	251.0	37.8068	77.9434	979977.50	14.86	5.43
1699.	362.0	37.8019	77.9275	979971.00	18.79	5.59
1700.	376.0	37.7926	77.9080	979970.94	20.99	7.31
1701.	346.0	37.7859	77.9320	979971.94	20.10	7.44
1702.	299.0	37.7779	77.9280	979974.87	18.62	7.56
1703.	333.0	37.7831	77.9240	979973.25	20.19	7.98
1704.	361.0	37.7895	77.9175	979971.62	20.26	7.09
1705.	329.0	37.7840	77.9175	979973.50	20.07	7.99
1706.	321.0	37.7770	77.9157	979973.81	20.50	8.69
1707.	369.0	37.7773	77.9051	979972.06	23.27	9.82
1708.	377.0	37.7649	77.8877	979972.62	25.52	11.80
1709.	311.0	37.7547	77.8800	979977.87	25.50	14.03
1710.	365.0	37.7721	77.8988	979972.75	23.58	10.27
1711.	362.0	37.7649	77.9036	979972.37	23.86	10.65
1712.	374.0	37.7596	77.9084	979971.12	23.74	10.12
1713.	324.0	37.7926	77.9719	979971.19	16.35	4.44
1714.	308.0	37.7958	77.9669	979972.31	15.97	4.60
1715.	292.0	37.7893	77.9670	979973.44	15.59	4.77

STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	APPENDIX		
				OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
1716.	210.0	37.7861	77.9602	979978.75	14.12	6.10
1717.	299.0	37.7820	77.9535	979973.94	17.68	6.63
1718.	291.0	37.7750	77.9467	979973.75	17.62	6.83
1719.	295.0	37.7672	77.9421	979973.50	17.74	6.82
1720.	226.0	37.7657	77.9309	979978.19	16.88	8.31
2001.	391.0	37.6803	78.3378	979949.75	11.46	-1.87
2002.	422.0	37.6814	78.3460	979952.62	16.31	1.92
2003.	353.0	37.6928	78.3501	979954.62	10.89	-1.15
2004.	397.0	37.6998	78.3573	979949.94	10.34	-3.20
2005.	422.0	37.6944	78.3606	979949.81	12.56	-1.83
2006.	430.0	37.6825	78.3708	979951.69	16.13	1.46
2007.	422.0	37.6714	78.3748	979950.56	15.19	0.80
2008.	410.0	37.6977	78.3725	979951.94	13.56	-0.42
2009.	439.0	37.6682	78.3492	979948.25	15.41	0.44
2010.	380.0	37.6637	78.3674	979954.25	15.86	2.90
2011.	419.0	37.6440	78.3647	979946.87	14.03	-0.26
2012.	435.0	37.6758	78.3388	979955.75	21.60	6.76
2013.	424.0	37.6729	78.3344	979952.37	17.19	2.73
2014.	381.0	37.6716	78.3223	979953.69	14.46	1.46
2015.	458.0	37.6647	78.3470	979947.94	16.89	1.27
2016.	455.0	37.6620	78.3392	979948.69	17.35	1.84
2017.	411.0	37.6565	78.3313	979948.25	13.72	-0.30
2018.	351.0	37.6504	78.3253	979951.44	11.26	-0.71
2019.	410.0	37.6486	78.3198	979946.44	12.75	-1.23
2020.	460.0	37.6345	78.3147	979945.12	17.01	1.32
2021.	475.0	37.6321	78.3194	979945.87	19.17	2.97
2022.	452.0	37.6274	78.3267	979945.44	17.51	2.10
2023.	471.0	37.6556	78.3519	979942.87	13.98	-2.08
2024.	502.0	37.6512	78.3556	979945.50	19.52	2.40
2025.	491.0	37.6360	78.3617	979946.56	21.36	4.62
2026.	510.0	37.6292	78.3647	979945.12	21.71	4.32
2027.	505.0	37.6417	78.3594	979945.37	20.62	3.40
2028.	382.0	37.6288	78.3383	979951.00	15.55	2.52
2029.	382.0	37.6616	78.3044	979953.06	14.86	1.84
2030.	422.0	37.6507	78.2913	979951.81	18.31	3.92
2031.	431.0	37.6482	78.2960	979951.81	20.10	5.40
2032.	389.0	37.6425	78.2911	979955.87	20.21	6.94
2033.	322.0	37.6364	78.2836	979959.31	18.22	7.24
2034.	390.0	37.6514	78.3071	979952.19	15.68	2.38
2035.	419.0	37.6457	78.2966	979952.69	19.84	5.55
2036.	448.0	37.6391	78.3093	979950.87	20.76	5.48
2037.	443.0	37.6382	78.3179	979950.19	20.47	5.37
2038.	410.0	37.6683	78.2294	979948.12	12.56	-1.42

APPENDIX						
STATION NUMBER	ELEV (FT)	LATITUDE DEGREES	LONG DEG	OBSERVED GRAVITY	FREE AIR ANOMALY MGALS	BOUGUER ANOMALY MGALS
2039.	365.0	37.6686	78.2227	979952.81	13.01	0.57
2040.	343.0	37.6503	78.2198	979957.06	16.13	4.44
2041.	351.0	37.6455	78.2174	979951.81	12.57	0.60
2042.	344.0	37.6424	78.2180	979959.25	19.35	7.62
2043.	230.0	37.6293	78.2206	979968.12	18.38	10.54
2044.	215.0	37.6295	78.2285	979968.37	17.22	9.89
2045.	372.0	37.6274	78.1421	979956.31	20.86	8.17
2046.	373.0	37.6337	78.1400	979956.69	20.39	7.67
2047.	382.0	37.6324	78.1323	979955.69	20.24	7.21
2048.	379.0	37.6367	78.1390	979956.31	20.58	7.66
2049.	350.0	37.6372	78.1452	979957.19	18.73	6.79
2050.	332.0	37.6419	78.1517	979959.87	18.85	7.53
2051.	309.0	37.6488	78.1533	979961.94	18.75	8.21
2052.	318.0	37.6427	78.1568	979961.37	19.03	8.19
2053.	359.0	37.6479	78.1378	979958.31	19.82	7.58
2054.	356.0	37.6447	78.1376	979958.25	19.48	7.34
2055.	362.0	37.6566	78.1296	979957.87	18.73	6.39
2056.	360.0	37.6618	78.1788	979964.12	23.86	11.58
2057.	290.0	37.6519	78.1926	979963.19	17.27	7.38
2058.	303.0	37.6506	78.2001	979962.56	17.87	7.54
2059.	339.0	37.6459	78.2079	979960.19	19.82	8.26

Vita

Mary Ruth Keller was born in Independence, Missouri on August 29, 1960. She graduated from Dixie Hollins High School in June of 1978. She earned a Summa Cum Laude Bachelor of Science degree in Geophysics from Virginia Polytechnic Institute and State University on June 12, 1982. In the same month of the same year, she began her graduate studies at Virginia Polytechnic Institute and State University in exploration geophysics. She will begin work with Computer Sciences Corporation in Silver Spring, Maryland in July of 1983.

Mary Ruth Keller