NORDIC VOLCANOLOGICAL INSTITUTE 8002
UNIVERSITY OF ICELAND

# DISTANCE MEASUREMENTS IN THE KRAFLA-GJASTYKKI GEODIMETER NETWORK, MARCH 1978 TO MAY 1979

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## INTRODUCTION

The Nordic Volcanological Institute (N.V.I.) established a network of stations for precise distance measurements in the Krafla-Gjástykki area in North Iceland in early 1977. The purpose of this network was to observe ground movements caused by the volcano-tectonic episode which started in that area in 1975 (Björnsson et al., 1977).

When this distance measuring program of the N.V.I. was started, five rifting and/or subsidence events had already taken place and large scale ground movements had been observed (Tryggvason, 1980). Several more subsidence events have occurred since the program started, and efforts have been made to observe the network after each event.

The network of stations covers only a fraction of the Krafla fissure swarm. The choice of area of investigation was based on the location of ground rifting during the subsidence events in late 1976 and early 1977. The stations were placed along eight irregular lines crossing the fissure swarm. Each line was about 5 km long, reaching about one km outside the zone of intense faulting (the fissure swarm).

Addition of several stations in 1978 and 1979 to the west and north of the original network has extended the area of investigation to that shown on Fig. 1. The total area covered by the network of stations is now about 25 km long in N-S direction and about 7 km wide.

## THE NETWORK OF STATIONS (Fig. 1)

The first network of stations was constructed in February 1977 by Halldór Ólafsson and Sigurjón Sindrason of the N.V.I. The stations are identified by steel rods hammered into the volcanic rock until the top is about 5 cm above the rock surface. Another steel rod was placed about 1 m to the north of each station. It stands about one m high and is there for

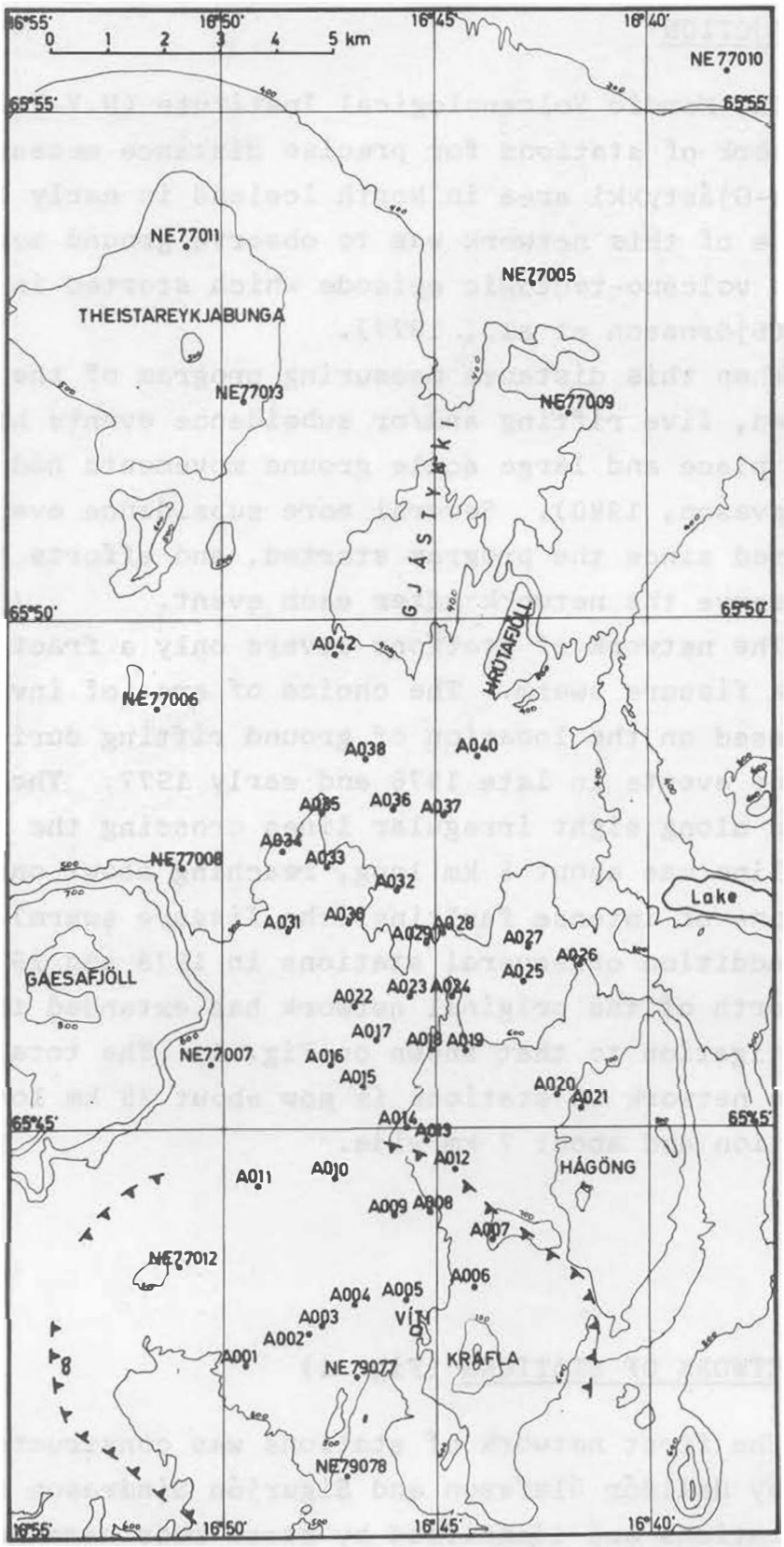


Fig. 1. The network of stations in the Krafla-Gjástykki area, North Iceland, for the distance measuring program of the Nordic Volcanological Institute, as of late 1979.

easier visual detection of the station. Each station was given a number and the letter A (A001, A002, .... A043). Three of the original stations (A039, A041, and A043) were never occupied, and are not shown on Fig. 1.

The station A003, on Leirhnjúkur was constructed by the National Energy Authority (N.E.A.) and consists of copper rod. It is identified by the N.E.A. as 5590 or LH. The station A024 on Sandmúli was placed close to the N.E.A. station 5593 or SM, and both stations have been used by the N.V.I. The station constructed by the N.V.I. and marked with a steel rod is in this report identified as A024A, while the N.E.A. station 5593 is here named A024B. The distance between the twin stations A024A and A024B is 2.535 m. The station A006 has been used by N.E.A. and then named "KN".

The stations added in 1978 and 1979 to the north and west of the original network are identified as NE77005 through NE77013. Most of them are made of copper rods, cemented in holes drilled in solid bedrock, but the stations NE77011 and NE77013 are made of steel rods as the stations A001 through A043. The station NE77012 was established by N.E.A. and it is identified by them as "HSH".

The coordinates, in the Iceland geodetic system (landsnet), of the N.E.A. stations 5590 (A003) and 5593 (A024B) were determined in 1974 as follows:

| | | | |
|---|---|---|---|
| 5593 | 586724.36 m N, | 442270.41 m W, | h=642.82 m |
| 5590 | 580671.66 m N, | 444516.86 m W, | h=593.30 m |

Measurements in September 1977, after the subsidence event of September 8 to 9, gave the approximate coordinates of the stations 5590 (A003), KN (A006), and HSH (NE77012) as follows (Gunnar Thorbargsson, personal communication):

| | | | |
|---|---|---|---|
| 5590 | 580671.1 m N, | 444516.7 m W, | h=591.72 m |
| KN | 581414.7 m N, | 441786.1 m W, | h=678.81 m |
| HSH | 581686.8 m N, | 447061.4 m W, | h=543.96 m |

The two stations, NE79077, and NE79078 were added in late 1979 to the south of the original network of stations.

They are shown on Fig. 1, but were not included in the measurements reported here.

## THE OBSERVATIONS

The first measurements of the Krafla-Gjástykki network were made in late February and early March 1977. The N.V.I. contracted the engineering firm Hnit to conduct the measurements with their own instruments, a distomat with a range of up to 2 km, and two theodolites (T2 and T16). The N.V.I. acquired their own instruments in the summer of 1977, a geodimeter model 6BL with a range of more than 20 km, and a theodolite model Wild T2. These instruments have been used in all subsequent distance measurements in the Krafla-Gjástykki area.

The procedure followed in the measurements in 1977 was to follow a zig-zag line with one backward and one forward measurement from each station. Beginning in March 1978, a new procedure was used. This implied the use of only a few geodimeter stations, with a number of measurements from each. Most of the stations were occupied only by reflectors. In addition to the distance measurements, the vertical angle from geodimeter station to reflector station is generally observed with a theodolite. This gives the elevation difference of the stations, and also a crude determination of vertical displacements of the stations.

A total of 15 distance measuring expeditions were made to the Krafla-Gjástykki network from February 1977 to May 1979. The dates of these expeditions, and number of lines measured were as follows:

| | |
|---|---|
| February 26 to March 3, 1977 | 39 lines |
| July 19 to 21, 1977 | 14 " |
| August 14, 1977 | 4 " |
| October 23 to 26, 1977 | 8 " |

| | |
|---|---|
| November 25 to 30, 1977 | 16 lines |
| March 10 to 18, 1978 | 78 " |
| April 16 to 19, 1978 | 27 " |
| June 25 to 27, 1978 | 30 " |
| July 11, 1978 | 2 " |
| July 20 to 22, 1978 | 26 " |
| August 4 to 8, 1978 | 79 " |
| August 29 to 30, 1978 | 21 " |
| February 20 to March 3, 1979 | 52 " |
| May 11 to 12, 1979 | 11 " |
| May 19 to 28, 1979 | 33 " |

This is a total of 440 distance measurements, 81 in 1977, 263 in 1978 and 96 in early 1979. Four more measuring expeditions were made to this area in late 1979, but the results obtained during these measurements are not included in the present report.

All these measurements, except those of February and March 1977, have been made by the staff of the N.V.I. Eysteinn Tryggvason has measured about 300 lines in 7 expeditions, Karl Grönvold about 80 lines in 5 expeditions and Gudmundur E. Sigvaldason about 20 lines in 2 expeditions. Most of the scientific and technical staff members of N.V.I. have participated in one or more of the expeditions.

The air temperature and pressure is observed at the geodimeter stations, and usually also at the reflector stations. These temperature and pressure observations are used to correct the observed distances. Sometimes, especially if the wind is calm and sky is clear, the temperature along the direct line between geodimeter and reflector may differ significantly from that observed near ground at either station. This will cause errors in the reduced distances, which may amount to about 10 mm if conditions are very unfavourable.

The corrected distance between geodimeter and mirror is reduced down to the station markers using equations given by Tryggvason (1978). The elevation difference of the stations is calculated from the observed vertical angle,

theodolite and target heights above the markers and the corrected distance. The station elevation as calculated is inaccurate. It is based on the assumption that station A010 is at 600.00 m elevation. This was nearly correct elevation in early 1977, but the reference station has subsided, especially during the subsidence events of April 1977 and September 1977. The correct elevation of the station A010 in 1978 and 1979 is not known, but it probably lies between 597 and 598 m.

During most of the measuring expeditions only a portion of the network of stations was covered, most frequently the southern part. The whole network, or most of it, has been measured four times. First on February 26 to March 3, 1977, next in two expeditions on March 10 to 18 and April 16 to 19, 1978, and again in two expeditions on July 20 to 22 and August 4 to 8, 1978, and finally in two expeditions on February 20 to March 3 and May 11 to 12, 1979.

## THE RESULTS

The corrected distances obtained in 1978 and early 1979 are given in Table I in appendix. The results of the 1977 measurements have been reported earlier (Tryggvason, 1978). As the purpose of these distance measurements is to observe ground deformation, and changes in distances due to the ground deformation is only a very small fraction of the length, it is of utmost importance to keep observational errors as small as possible. It is also of utmost importance to know the probable errors of the observed distances in order to draw intelligent conclusions based on the observed distance changes. Estimates of the observational errors can be based on estimates of individual error components, such as errors in the temperature corrections, but these error components cannot be accurately estimated. Another

method is to correlate the observed distance between two markers at different times with some other measured quantity, such as tilt or observed distance between another pair of stations. Comparison of observed tilt at the Krafla power house and observed distances in the southern part of the Krafla-Gjástykki network shows a linear relation between these quantities. Taking the line A001-A002 as an example. The length of this line changed permanently in September 1977 (Tryggvason, 1980), so only the 7 measurements made after the subsidence event of September 1977 are considered. The observed line length correlates well with the readings of the water tube tiltmeter at the Krafla power house, with a coefficient of correlation $r^2 = 0.983$. The maximum change in line length is 302 mm and the corresponding change in the tiltmeter reading is 14.125 mm or 205 μ-rad. The standard deviation of the observed line length from the best linear trend is 12.8 mm.

If it can be assumed that an exact linear relation exists between the length of the line A001-A002 and the tilt at the Krafla power house, then this deviation is entirely caused by observational errors in distance and tilt measurements. The error in the tilt observations is small, certainly less than 0.1 mm, but the observed tilt may not correspond exactly to the regional tilt in the area of the power house. Thus the conclusion of these arguments is that the observational error in the length measurement on the line A001-A002 is less than 12.8 mm (standard error).

Similar study of the lines A002-A003, A003-A005, and A010-A012 for the period July 1978 to February 1979 (four distance observations), indicate that the error of observed distances is generally less than 5 mm, and that the linear relation between distances and tilt changes during some subsidence events.

The observational error certainly depends on the line length, although other factors contribute also. If the standard error S can be expressed as: $S = a + bL$, where a

and b are constants, and L is the length of the measured line, then the constant a should be less than 4 mm, and the constant b should not be greater than $2 \cdot 10^{-6}$.

If two distance observations of the same line differ more than three times the standard error of individual observation, then there is about 95% probability that actual length change occurred. According to the arguments above, this means that the observed distance difference D must be greater than 12 + 6L mm, where L is the line length in km, for the length change to be significant.

The results of the distance measurements in the Krafla-Gjástykki area are tabulated in appendix. Significant length changes were observed on most of the lines of repeated measurements. Distances between two stations can frequently be calculated from distance measurements involving other stations. Thus changes in distance between stations can occasionally be obtained even if it is not measured.

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APPENDIX

Table I. The corrected distance (slope distance) between station markers and calculated elevation difference of station markers as measured in 1978 and early 1979 in the Krafla-Gjástykki network of stations for precise distance measurements. The horizontal distance between stations at sea-level is also given.

Table II. Coordinates of stations in the Krafla-Gjástykki network of stations for precise distance measurements, calculated from observations in 1978. The coordinates are in a local net with origin at station A003, Leirhnjúkur, and fixed direction from A003 to A010. Calculations are based on sea-level distances and the curvature of the earth´s surface is ignored.

Table III. Calculated distances from station A024B, Sandmúli, when measurements were made from station A024A.

Table IV. Change in observed distance between stations from one measurement to the following one which covers the same stations.

TABLE IA

Measured distances in the Gjástykki network March 10 to 18, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A002 A001 | 1266.368 | -48.95 | 1265.309 |
| A002 A005 | 1849.800 | -28.39 | 1849.415 |
| A002 A006 | 3111.025 | 89.89 | 3109.415 |
| A003 A002 | 292.883 | -2.46 | 292.844 |
| A003 A004 | 682.021 | -44.24 | 680.525 |
| A003 A005 | 1565.894 | -31.04 | 1565.445 |
| A003 A006 | 2831.316 | 87.36 | 2829.686 |
| A003 A007 | 3443.248 | 134.33 | 3440.270 |
| A003 A008 | 2825.852 | -12.88 | 2825.564 |
| A003 A009 | 2393.508 | | 2393.225 |
| A003 A010 | 2690.803 | 5.90 | 2690.545 |
| A003 A012 | 3710.329 | 86.22 | 3708.962 |
| A003 NE77012 | 2740.276 | -48.73 | 2739.613 |
| A010 A001 | 3780.578 | -57.52 | 3779.803 |
| A010 A004 | 2337.062 | -50.16 | 2336.314 |
| A010 A005 | 2557.020 | -36.94 | 2556.521 |
| A010 A008 | 1812.853 | -18.51 | 1812.588 |
| A010 A009 | 1260.659 | -23.32 | 1260.328 |
| A010 A011 | 1389.978 | -60.44 | 1388.536 |
| A010 A012 | 2163.669 | 80.10 | 2161.981 |
| A010 A013 | 1770.153 | 25.84 | 1769.794 |
| A010 A014 | 1605.112 | 5.57 | 1604.951 |
| A010 A015 | 1730.835 | -54.87 | 1729.812 |
| A010 A016 | 2065.451 | -77.85 | 2063.802 |
| A010 NE77012 | 3206.973 | -53.44 | 3206.235 |
| A010 NE77007 | 3028.676 | -86.58 | 3027.180 |
| A012 A006 | 2162.469 | 1.28 | 2162.238 |
| A012 A007 | 1429.215 | 48.24 | 1428.241 |
| A012 A013 | 750.121 | -54.26 | 748.078 |

TABLE IA (continued)

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A012 A016 | 2924.122 | -157.98 | 2919.577 |
| A012 A019 | 2186.211 | -42.26 | 2185.577 |
| A012 A020 | 2285.824 | -5.37 | 2285.576 |
| A012 A021 | 2512.064 | 33.43 | 2511.567 |
| A012 A024B | 3182.748 | -34.29 | 3182.233 |
| A012 A030 | 4908.807 | -137.01 | 4906.421 |
| A012 A031 | 5292.881 | -165.79 | 5289.779 |
| A012 NE77008 | 7359.782 | -189.48 | 7356.670 |
| A016 A014 | 1733.747 | 83.38 | 1731.595 |
| A016 A015 | 710.882 | 23.13 | 710.449 |
| A016 A017 | 943.950 | 33.13 | 943.289 |
| A016 A018 | 1824.295 | 86.71 | 1822.072 |
| A016 A019 | 2430.192 | 115.72 | 2427.215 |
| A016 A022 | 1141.502 | 1.40 | 1141.408 |
| A016 A023 | 1881.668 | 53.92 | 1880.733 |
| A016 A024B | 2509.326 | 123.57 | 2506.049 |
| A016 A030 | 2632.695 | 20.79 | 2632.393 |
| A016 NE77007 | 2154.469 | -8.53 | 2154.278 |
| A019 A018 | 616.501 | -29.03 | 615.758 |
| A019 A020 | 1825.391 | 36.68 | 1824.832 |
| A019 A021 | 2308.009 | 75.84 | 2306.521 |
| A019 A024B | 1037.421 | 7.93 | 1037.286 |
| A019 A025 | 1647.103 | -75.96 | 1645.197 |
| A019 A026 | 2557.388 | 1.05 | 2557.132 |
| A019 A027 | 2202.352 | -104.56 | 2199.667 |
| A024B A013 | 2691.879 | -19.24 | 2691.537 |
| A024B A017 | 1565.933 | -90.49 | 1563.169 |
| A024B A018 | 1040.181 | -36.94 | 1039.423 |
| A024B A020 | 2622.282 | 29.03 | 2621.852 |
| A024B A021 | 3094.858 | 67.88 | 3093.785 |
| A024B A022 | 1755.419 | -122.19 | 1750.999 |
| A024B A023 | 750.182 | -69.67 | 746.867 |

TABLE IA (continued)

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A024B A024A | 2.535 | -0.11 | 2.532 |
| A024B A025 | 1336.618 | -83.84 | 1333.859 |
| A024B A026 | 2345.357 | -6.85 | 2345.112 |
| A024B A027 | 1631.431 | -112.48 | 1627.398 |
| A024B A028 | 1182.020 | -118.05 | 1176.003 |
| A024B A029 | 1094.405 | -95.35 | 1090.142 |
| A024B A030 | 2288.080 | -102.86 | 2285.557 |
| A024B A031 | 3164.572 | -132.09 | 3161.540 |
| A024B NE77007 | 4496.700 | -132.28 | 4494.349 |
| A024B NE77008 | 5367.974 | -154.84 | 5365.257 |
| A030 A031 | 1090.175 | | 1089.700 |
| A030 A035 | 2049.086 | | 2048.636 |
| A030 A042 | 4898.466 | | 4897.773 |
| A035 A028 | 3059.854 | 18.66 | 3059.549 |
| A035 A029 | 2995.672 | 41.39 | 2995.138 |
| A035 A033 | 994.091 | 14.36 | 993.886 |
| A035 A042 | 2905.801 | -20.08 | 2905.505 |

TABLE IB

Measured distances in the Gjástykki network April 16 to 19, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A003 A005 | 1566.020 | | 1565.572 |
| A003 A010 | 2690.880 | | 2690.622 |
| A003 A007 | 3443.377 | | 3440.400 |
| A003 NE77012 | 2740.387 | | 2739.724 |
| A024A A032 | 2172.188 | -148.35 | 2166.922 |
| A024A A034 | 4032.718 | -133.78 | 4030.143 |
| A024A A035 | 4069.933 | -136.74 | 4067.272 |
| A024A A037 | 3296.649 | -146.96 | 3293.080 |
| A024A A040 | 4384.390 | -157.61 | 4381.171 |
| A024A A042 | 6586.511 | -156.67 | 6584.064 |
| A024A NE77006 | 7453.804 | -198.59 | 7450.517 |
| A042 A033 | 3892.635 | 34.52 | 3892.162 |
| A042 A034 | 3729.787 | 23.56 | 3729.421 |
| A042 A036 | 3024.642 | -7.66 | 3024.403 |
| A042 A037 | 3533.638 | 9.77 | 3533.351 |
| A042 A038 | 2008.001 | -3.70 | 2007.844 |
| A042 A040 | 3182.949 | -0.82 | 3182.706 |
| A042 NE77006 | 3336.567 | -42.15 | 3336.057 |
| A042 NE77008 | 4773.363 | 1.54 | 4772.996 |
| NE77012 A001 | 2138.860 | | 2138.674 |
| NE77012 A011 | 2028.304 | -6.83 | 2028.120 |
| NE77012 NE77007 | 3739.246 | -32.28 | 3738.794 |
| NE77005 NE77009 | 2470.790 | | 2470.206 |
| NE77005 NE77011 | 6249.132 | 159.45 | 6246.623 |
| NE77010 NE77005 | 5204.235 | | 5203.287 |
| NE77010 NE77011 | 10172.986 | 241.78 | 10169.404 |
| NE77011 NE77009 | 7522.776 | -113.95 | 7521.314 |

TABLE IC

Measured distances in the Gjástykki network June 25 to 27, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A002 A001 | 1266.608 | -49.18 | 1265.540 |
| A002 A003 | 292.888 | 2.51 | 292.850 |
| A002 A005 | 1849.991 | -28.76 | 1849.600 |
| A002 A012 | 3990.828 | 87.97 | 3989.456 |
| A003 A004 | 682.166 | -44.37 | 680.653 |
| A003 A005 | 1566.116 | -31.24 | 1565.663 |
| A003 A010 | 2690.939 | 5.51 | 2690.682 |
| A003 A012 | 3710.463 | 85.64 | 3709.105 |
| A003 NE77012 | 2740.437 | -47.98 | 2739.772 |
| A010 A002 | 2878.295 | -8.05 | 2878.015 |
| A010 A004 | 2337.105 | -50.09 | 2336.360 |
| A010 A005 | 2557.122 | -36.71 | 2556.625 |
| A010 A006 | 3195.011 | 81.54 | 3193.648 |
| A010 A007 | 3037.209 | 128.55 | 3034.172 |
| A010 A008 | 1812.938 | -18.92 | 1812.673 |
| A010 A009 | 1260.678 | -23.19 | 1260.348 |
| A010 A011 | 1390.036 | -60.45 | 1388.598 |
| A010 A012 | 2163.730 | 80.17 | 2162.028 |
| A010 A013 | 1770.140 | 25.97 | 1769.780 |
| A010 A014 | 1605.091 | 5.66 | 1604.929 |
| A010 A015 | 1730.758 | -54.70 | 1729.738 |
| A012 A005 | 2543.437 | -116.83 | 2540.503 |
| A012 A006 | 2162.511 | 1.49 | 2162.280 |
| A012 A007 | 1429.267 | 48.39 | 1428.290 |
| A012 A008 | 906.428 | -98.91 | 900.916 |
| A012 A009 | 1371.953 | -103.35 | 1367.921 |
| A012 A013 | 750.141 | -54.28 | 748.101 |
| A012 A014 | 1191.645 | -74.53 | 1189.193 |
| A012 A015 | 2217.205 | -134.94 | 2212.885 |
| A012 A016 | 2924.141 | -158.08 | 2919.590 |

TABLE ID

Measured distances in the Gjástykki network July 11, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| NE77011 NE77005 | 6249.112 | | 6246.603 |
| NE77011 NE77009 | 7522.776 | | 7521.314 |

TABLE IE

Measured distances in the Gjástykki network July 20 to 22, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A002 A001 | 1266.412 | -49.07 | 1265.348 |
| A002 A003 | 292.823 | 2.48 | 292.785 |
| A002 A005 | 1849.772 | -28.53 | 1849.384 |
| A002 A006 | 3111.057 | 89.66 | 3109.453 |
| A003 A005 | 1565.947 | | 1565.498 |
| A003 A006 | 2831.332 | | 2829.704 |
| A012 A002 | 3990.643 | -88.56 | 3989.265 |
| A012 A003 | 3710.360 | -86.10 | 3708.991 |
| A012 A005 | 2543.465 | -117.10 | 2540.520 |
| A012 A006 | 2162.423 | 1.26 | 2162.192 |
| A012 A007 | 1429.205 | 48.26 | 1428.232 |
| A012 A008 | 906.464 | -99.01 | 900.952 |
| A012 A009 | 1372.006 | -103.52 | 1367.961 |
| A012 A010 | 2163.706 | -80.27 | 2162.000 |
| A012 A013 | 750.118 | -54.25 | 748.078 |
| A012 A014 | 1191.630 | -74.57 | 1189.175 |
| A012 A015 | 2217.200 | -134.90 | 2212.880 |
| A012 A016 | 2924.171 | -158.09 | 2919.619 |
| A012 A017 | 2747.885 | -124.92 | 2744.779 |
| A012 A018 | 2246.499 | -71.29 | 2245.141 |
| A012 A019 | 2186.128 | -42.26 | 2185.494 |
| A012 A020 | 2285.852 | -5.35 | 2285.603 |
| A012 A021 | 2512.102 | 33.50 | 2511.605 |
| A012 A022 | 3470.877 | -156.70 | 3467.011 |
| A012 A023 | 3251.650 | -104.14 | 3249.662 |
| A012 A024B | 3182.648 | -34.23 | 3182.134 |

TABLE IF

Measured distances in the Gjástykki network August 4 to 8, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A002 A001 | 1266.494 | -49.12 | 1265.427 |
| A002 A005 | 1849.876 | -28.60 | 1849.488 |
| A002 A011 | 2842.324 | -52.32 | 2841.594 |
| A002 A012 | 3990.752 | 88.28 | 3989.371 |
| A003 A002 | 292.839 | -2.48 | 292.801 |
| A003 A004 | 682.093 | -44.28 | 680.595 |
| A003 A005 | 1566.023 | -31.03 | 1565.573 |
| A003 A012 | 3710.419 | 85.98 | 3709.051 |
| A003 NE77012 | 2740.381 | -47.88 | 2739.719 |
| A010 A001 | 3780.742 | -57.54 | 3779.967 |
| A010 A002 | 2878.191 | -8.37 | 2877.910 |
| A010 A003 | 2690.876 | -5.83 | 2690.618 |
| A010 A004 | 2337.090 | -50.04 | 2336.343 |
| A010 A005 | 2557.101 | -36.86 | 2556.602 |
| A010 A006 | 3194.938 | 81.41 | 3193.580 |
| A010 A007 | 3037.196 | 128.57 | 3034.158 |
| A010 A008 | 1812.939 | -18.75 | 1812.674 |
| A010 A009 | 1260.677 | -23.29 | 1260.346 |
| A010 A011 | 1390.030 | -60.39 | 1388.588 |
| A010 A012 | 2163.752 | 80.21 | 2162.047 |
| A010 A013 | 1770.169 | 25.98 | 1769.809 |
| A010 A014 | 1605.083 | 5.66 | 1604.922 |
| A010 A015 | 1730.796 | -54.70 | 1729.776 |
| A010 NE77012 | 3207.066 | -53.54 | 3206.330 |
| A010 NE77007 | 3028.750 | -86.58 | 3027.249 |
| A019 A010 | 3317.067 | -38.08 | 3316.528 |
| A019 A012 | 2186.158 | 42.26 | 2185.524 |
| A019 A018 | 616.550 | -29.07 | 615.806 |
| A019 A020 | 1825.394 | 36.81 | 1824.834 |

TABLE IF (continued)

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A019 A021 | 2308.007 | 75.68 | 2306.521 |
| A019 A025 | 1647.147 | -76.04 | 1645.238 |
| A019 A026 | 2557.446 | 1.09 | 2557.190 |
| A019 A027 | 2202.421 | -104.59 | 2199.736 |
| A024B A010 | 3945.887 | -45.92 | 3945.235 |
| A024B A012 | 3182.653 | 34.37 | 3182.137 |
| A024B A016 | 2509.488 | -123.81 | 2506.202 |
| A024B A017 | 1566.076 | -90.63 | 1563.304 |
| A024B A018 | 1040.186 | -36.88 | 1039.428 |
| A024B A019 | 1037.351 | -7.91 | 1037.217 |
| A024B A020 | 2622.170 | 29.10 | 2620.738 |
| A024B A021 | 3094.718 | 67.84 | 3093.646 |
| A024B A022 | 1755.713 | -122.30 | 1751.287 |
| A024B A023 | 750.189 | -69.69 | 746.876 |
| A024B A025 | 1336.615 | -83.86 | 1333.853 |
| A024B A026 | 2345.353 | -6.87 | 2345.107 |
| A024B A027 | 1631.475 | -112.45 | 1627.444 |
| A024B A028 | 1181.974 | -117.94 | 1175.962 |
| A024B A029 | 1094.307 | -95.28 | 1090.048 |
| A024B A031 | 3165.262 | -132.20 | 3162.213 |
| A030 A022 | 1557.575 | -19.20 | 1557.326 |
| A030 A023 | 1762.606 | 33.51 | 1762.134 |
| A030 A024B | 2288.651 | 103.09 | 2286.113 |
| A030 A029 | 1428.214 | 7.86 | 1428.070 |
| A030 A031 | 1090.363 | -29.05 | 1089.886 |
| A030 NE77007 | 3585.229 | -29.33 | 3584.813 |
| A030 NE77008 | 3145.119 | -52.35 | 3144.431 |
| A035 A024B | 4068.441 | 136.54 | 4065.781 |
| A035 A028 | 3060.657 | 18.48 | 3060.352 |
| A035 A029 | 2996.415 | 41.20 | 2995.883 |
| A035 A030 | 2049.097 | 33.42 | 2048.656 |

TABLE IF (continued)

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A035 A033 | 994.075 | 14.40 | 993.890 |
| A035 A034 | 1020.100 | 3.23 | 1020.013 |
| A035 A036 | 1275.210 | -27.74 | 1274.809 |
| A035 A037 | 2162.441 | -10.32 | 2162.245 |
| A035 A038 | 1249.129 | -24.38 | 1248.794 |
| A035 A040 | 2962.485 | -21.10 | 2962.178 |
| A035 NE77006 | 3529.649 | -62.53 | 3528.832 |
| A035 NE77008 | 2714.634 | -18.87 | 2714.356 |
| A042 A024B | 6584.508 | 156.44 | 6582.042 |
| A042 A030 | 4898.560 | 53.38 | 4897.873 |
| A042 A033 | 3892.605 | 34.43 | 3892.144 |
| A042 A034 | 3729.731 | 23.39 | 3729.365 |
| A042 A035 | 2905.789 | 20.11 | 2905.492 |
| A042 A036 | 3025.086 | -7.73 | 3024.846 |
| A042 A037 | 3534.330 | 9.65 | 3534.043 |
| A042 A038 | 2008.173 | -4.32 | 2008.016 |
| A042 A040 | 3183.900 | -1.11 | 3183.656 |
| A042 NE77006 | 3336.287 | -42.37 | 3335.771 |
| A042 NE77008 | 4773.225 | 1.27 | 4772.859 |

TABLE IG

Measured distances in the Gjástykki network August 29 to 30, 1978.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A002 A001 | 1266.569 | -49.17 | 1265.502 |
| A002 A005 | 1849.948 | -28.64 | 1849.560 |
| A002 A006 | 3111.252 | 89.62 | 3109.652 |
| A003 A002 | 292.868 | -2.48 | 292.830 |
| A003 A004 | 682.139 | -44.29 | 680.643 |
| A003 A005 | 1566.063 | -31.10 | 1565.612 |
| A003 A006 | 2831.526 | 87.10 | 2829.904 |
| A003 A007 | 3443.422 | 134.10 | 3440.451 |
| A003 A008 | 2825.980 | -13.14 | 2825.690 |
| A003 A009 | 2393.710 | -17.66 | 2393.426 |
| A003 A010 | 2690.906 | 5.56 | 2690.649 |
| A003 NE77012 | 2740.409 | -47.83 | 2739.746 |
| A012 A002 | 3990.778 | -88.39 | 3989.402 |
| A012 A003 | 3710.445 | -85.80 | 3709.082 |
| A012 A004 | 3068.029 | -130.03 | 3064.977 |
| A012 A005 | 2543.459 | -116.88 | 2540.523 |
| A012 A006 | 2162.483 | 1.19 | 2162.252 |
| A012 A007 | 1429.257 | 48.39 | 1428.282 |
| A012 A008 | 906.459 | -98.98 | 900.952 |
| A012 A009 | 1372.003 | -103.43 | 1367.963 |
| A012 A010 | 2163.766 | -80.18 | 2162.062 |

TABLE IH

Measured distances in the Gjástykki network February 20 to March 3, 1979.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A002 A001 | 1266.670 | -49.12 | 1265.605 |
| A002 A003 | 292.894 | 2.50 | 292.856 |
| A005 A002 | 1850.038 | 28.69 | 1849.649 |
| A005 A003 | 1566.175 | 31.19 | 1565.724 |
| A005 A004 | 929.590 | -13.21 | 929.415 |
| A005 A006 | 1273.584 | 118.17 | 1267.961 |
| A005 A007 | 1927.207 | 165.18 | 1919.922 |
| A005 A008 | 1629.582 | 17.92 | 1659.338 |
| A005 A009 | 1564.069 | 13.46 | 1563.872 |
| A005 A010 | 2557.213 | 36.58 | 2556.718 |
| A005 A012 | 2543.433 | 116.80 | 2540.501 |
| A005 A013 | 2934.566 | 62.53 | 2933.627 |
| A010 A001 | 3781.057 | -57.13 | 3780.287 |
| A010 A004 | 2337.157 | -49.84 | 2336.416 |
| A010 A006 | 3195.108 | 81.67 | 3193.745 |
| A010 A007 | 3037.326 | 128.57 | 3034.287 |
| A010 A008 | 1813.004 | -18.78 | 1812.740 |
| A010 A009 | 1260.716 | -23.11 | 1260.388 |
| A010 A011 | 1390.063 | -60.44 | 1388.622 |
| A010 A012 | 2163.798 | 80.27 | 2162.093 |
| A010 A013 | 1770.179 | 25.95 | 1769.819 |
| A010 A014 | 1605.078 | 5.69 | 1604.917 |
| A010 A015 | 1730.754 | -54.71 | 1729.734 |
| A010 A016 | 2065.378 | -77.93 | 2063.726 |
| A010 A022 | 3146.966 | -76.45 | 3145.757 |
| A010 A030 | 4685.126 | -56.88 | 4684.352 |
| A010 NE77007 | 3028.752 | -86.62 | 3027.256 |
| A010 NE77012 | 3207.210 | -53.37 | 3206.478 |

TABLE IH (continued)

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| NE77012 A001 | 2139.010 | -3.66 | 2138.825 |
| NE77012 A003 | 2740.500 | 47.80 | 2739.836 |
| NE77012 A011 | 2027.913 | -7.15 | 2027.728 |
| NE77012 NE77007 | 3739.205 | -33.02 | 3738.749 |
| A030 A012 | 4909.123 | 137.96 | 4906.717 |
| A030 A017 | 2215.046 | 10.87 | 2214.819 |
| A030 A018 | 2754.995 | 66.31 | 2753.949 |
| A030 A019 | 3154.553 | 95.46 | 3152.817 |
| A030 A022 | 1557.543 | -19.12 | 1557.297 |
| A030 A023 | 1762.630 | 33.48 | 2762.158 |
| A030 A024B | 2288.740 | 103.21 | 2286.196 |
| A030 A027 | 3240.386 | -9.00 | 3240.100 |
| A030 A028 | 1691.561 | -14.74 | 1691.355 |
| A030 A029 | 1428.234 | 7.90 | 1428.090 |
| A030 A031 | 1090.372 | -28.93 | 1089.898 |
| A030 A035 | 2049.099 | -33.41 | 2048.658 |
| A030 A037 | 2574.613 | -43.76 | 2574.031 |
| A030 A040 | 3794.800 | -54.28 | 3794.104 |
| A030 NE77007 | 3585.280 | -28.53 | 3584.868 |
| A030 NE77008 | 3145.230 | -51.44 | 3144.554 |
| A035 A024B | 4068.492 | 136.77 | 4065.826 |
| A035 A034 | 1020.110 | 3.34 | 1020.023 |
| A035 A040 | 2962.512 | -21.04 | 2962.206 |
| A035 NE77008 | 2714.734 | -18.06 | 2714.462 |

TABLE II

Measured distances in the Gjástykki network May 11 to 12, 1979.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A042 A040 | 3183.962 | -0.92 | 3183.718 |
| A042 NE77005 | 7658.177 | -83.30 | 7657.186 |
| A042 NE77006 | 3336.460 | -42.14 | 3335.946 |
| A042 NE77009 | 6089.454 | -37.42 | 6088.890 |
| NE77011 NE77005 | 6251.655 | -159.45 | 6249.145 |
| NE77011 NE77009 | 7525.166 | -114.01 | 7523.708 |
| NE77013 A042 | 4905.655 | -51.82 | 4904.987 |
| NE77013 NE77005 | 5601.665 | -134.90 | 5599.624 |
| NE77013 NE77006 | 5842.001 | -94.37 | 5840.790 |
| NE77013 NE77009 | 5829.792 | -89.04 | 5828.658 |
| NE77013 NE77011 | 3034.139 | 24.54 | 3033.776 |

TABLE IJ

Measured distances in the Gjástykki network May 19 to 28, 1979.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A024B A010 | 3945.882 | -46.08 | 3945.228 |
| A024B A012 | 3182.667 | 34.23 | 3182.152 |
| A024B A020 | 2622.252 | 29.12 | 2621.819 |
| A024B A027 | 1631.498 | -112.44 | 2627.469 |
| A024B A030 | 2288.731 | -103.20 | 2286.186 |
| A024B A035 | 4068.539 | -136.64 | 4065.874 |
| A024B NE77007 | 4497.110 | -132.52 | 4494.749 |
| A030 A027 | 3240.393 | -9.15 | 3240.107 |
| A030 A028 | 1691.542 | -14.74 | 1691.337 |
| A030 A037 | 2574.593 | -43.67 | 2574.012 |
| A030 NE77008 | 3145.238 | -51.76 | 3144.556 |
| A035 A028 | 3060.728 | 18.82 | 3060.423 |
| A035 A030 | 2049.097 | 33.49 | 2048.656 |
| A035 A040 | 2962.581 | -20.94 | 2962.276 |
| A035 NE77006 | 3529.917 | -62.23 | 3529.105 |
| A035 NE77008 | 2714.780 | -18.62 | 2714.504 |
| A042 A035 | 2905.720 | 19.94 | 2905.424 |
| A042 A037 | 3534.546 | 9.69 | 3534.260 |
| A042 A040 | 3184.360 | -0.99 | 3184.116 |
| A042 NE77006 | 3336.346 | -42.34 | 3335.834 |
| A042 NE77009 | 6090.337 | -37.26 | 6089.773 |
| NE77005 A042 | 7658.448 | | 7657.459 |
| NE77005 NE77009 | 2470.690 | 45.99 | 2470.100 |
| NE77005 NE77010 | 5204.559 | -79.70 | 5203.606 |
| NE77011 NE77005 | 6252.150 | -159.30 | 6249.646 |
| NE77011 NE77009 | 7526.226 | -113.49 | 7524.769 |
| NE77011 NE77010 | 10175.895 | -241.71 | 10172.310 |
| NE77011 NE77013 | 3033.994 | -24.33 | 3033.633 |

TABLE IJ (continued)

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| NE77013 A042 | 4905.972 | -51.87 | 4905.302 |
| NE77013 NE77005 | 5602.349 | -134.85 | 5600.308 |
| NE77013 NE77006 | 5842.195 | -94.06 | 5840.984 |
| NE77013 NE77009 | 5831.248 | -89.25 | 5830.112 |
| NE77013 NE77010 | 10531.351 | -217.62 | 10528.388 |

TABLE IIA

Coordinates of bench marks in the Gjástykki network as measured March 10 to 18 and April 16 to 19, 1978.

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A001 | -1298.931 | -859.060 | 542.53 |
| A002 | -232.620 | -177.893 | 591.49 |
| A003 | 0.000 | 0.000 | 594.10 |
| A004 | 537.816 | 416.975 | 549.88 |
| A005 | 1451.587 | 586.098 | 563.10 |
| A006 | 2669.671 | 938.086 | 681.44 |
| A007 | 2910.633 | 1834.031 | 728.43 |
| A008 | 1750.014 | 2218.392 | 581.38 |
| A009 | 1120.964 | 2114.466 | 576.68 |
| A010 | 0.000 | 2690.545 | 600.00 |
| A011 | -1363.654 | 2428.859 | 539.48 |
| A012 | 2134.660 | 3033.088 | 680.13 |
| A013 | 1564.663 | 3517.572 | 625.86 |
| A014 | 1194.992 | 3761.929 | 605.55 |
| A015 | 377.835 | 4378.588 | 545.20 |
| A016 | -233.145 | 4741.136 | 522.15 |
| A017 | 546.677 | 5271.864 | 555.28 |
| A018 | 1531.296 | 5195.737 | 608.85 |
| A019 | 2146.638 | 5218.632 | 637.87 |
| A020 | 3844.489 | 4549.814 | 674.71 |
| A021 | 4279.323 | 4340.152 | 713.64 |
| A022 | 92.812 | 5835.005 | 523.57 |
| A023 | 1065.090 | 6101.907 | 576.09 |
| A024B | 1805.699 | 6198.279 | 645.78 |
| A024A | 1806.027 | 6195.768 | 645.67 |
| A025 | 3087.141 | 6568.500 | 561.92 |
| A026 | 4026.227 | 6952.445 | 638.92 |

TABLE IIA (continued)

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A027 | 3080.030 | 7210.447 | 533.30 |
| A028 | 1535.237 | 7342.768 | 527.73 |
| A029 | 1252.917 | 7137.858 | 550.44 |
| A030 | -155.229 | 7372.370 | 542.99 |
| A031 | -1216.686 | 7125.853 | 514.02 |
| A033 | -649.147 | 8333.905 | 523.52 |
| A034 | -1469.503 | 8543.638 | 512.32 |
| A035 | -803.072 | 9315.875 | 509.07 |
| A036 | 458.195 | 9493.352 | 481.43 |
| A037 | 1353.405 | 9457.568 | 498.78 |
| A038 | -109.491 | 10354.020 | 485.39 |
| A040 | 1876.414 | 10576.356 | 488.16 |
| A042 | -848.382 | 12220.964 | 489.09 |
| NE77006 | -3932.070 | 10947.992 | 447.01 |
| NE77007 | -2379.919 | 4561.316 | 513.62 |
| NE77008 | -3219.359 | 8078.389 | 490.74 |
| NE77012 | -2610.960 | 829.678 | 546.22 |
| Jónstindur | -5242.454 | 5471.518 | 885.42 |

TABLE IIB

Coordinates of bench marks in the Gjástykki network as measured June 25 to 27, 1978.

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A001 | -1299.067 | -859.282 | 542.82 |
| A002 | -232.607 | -177.918 | 592.00 |
| A003 | 0.000 | 0.000 | 594.50 |
| A004 | 537.894 | 417.084 | 550.02 |
| A005 | 1451.769 | 586.234 | 563.29 |
| A006 | 2669.875 | 938.210 | 681.60 |
| A007 | 2910.810 | 1834.303 | 728.55 |
| A008 | 1750.102 | 2218.532 | 581.16 |
| A009 | 1121.042 | 2114.710 | 576.81 |
| A010 | 0.000 | 2690.682 | 600.00 |
| A011 | -1363.697 | 2428.893 | 539.55 |
| A012 | 2134.720 | 3033.220 | 680.16 |
| A013 | 1564.672 | 3517.679 | 625.92 |
| A014 | 1195.013 | 3762.009 | 605.64 |
| A015 | 377.826 | 4378.650 | 545.26 |
| A016 | -233.195 | 4741.140 | 522.08 |
| NE77012 | -2611.119 | 829.702 | 546.52 |

TABLE IIC

Coordinates of bench marks in the Gjástykki network as measured July 20 to 22, 1978.

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A001 | -1298.894 | -859.077 | 542.63 |
| A002 | -232.563 | -177.869 | 591.70 |
| A003 | 0.000 | 0.000 | 594.18 |
| A005 | 1451.634 | 586.128 | 563.17 |
| A006 | 2669.682 | 938.139 | 681.44 |
| A007[x] | 2910.713 | 1834.081 | 728.53 |
| A008[x] | 1750.034 | 2218.391 | 581.26 |
| A009[x] | 1121.008 | 2114.538 | 576.75 |
| A010 | 0.000 | 2690.581 | 600.00 |
| A012 | 2134.695 | 3033.100 | 680.27 |
| A013[x] | 1564.701 | 3517.584 | 626.02 |
| A014[x] | 1195.018 | 3761.895 | 605.70 |
| A015[x] | 377.965 | 4378.735 | 545.37 |
| A016[x] | -233.012 | 4741.356 | 522.18 |
| A017[x] | 546.769 | 5271.916 | 555.35 |
| A018[x] | 1531.413 | 5195.669 | 608.98 |
| A019[x] | 2146.739 | 5218.560 | 638.01 |
| A020[x] | 3844.547 | 4549.802 | 674.92 |
| A021[x] | 4279.371 | 4340.205 | 713.77 |
| A022[x] | 92.875 | 5835.086 | 523.57 |
| A023[x] | 1065.558 | 6101.852 | 576.13 |
| A024B[x] | 1805.933 | 6198.204 | 646.04 |
| Jónstindur | -5242.918 | 5472.043 | 884.81 |

x) Coordinates based on one distance measurement from A012 and theodolite observation for the azimuth from A012.

TABLE IID

Coordinates of bench marks in the Gjástykki network as measured August 4 to 10, 1978.

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A001 | -1298.964 | -859.148 | 542.50 |
| A002 | -232.578 | -177.879 | 591.65 |
| A003 | 0.000 | 0.000 | 594.20 |
| A004 | 537.862 | 417.030 | 549.94 |
| A005 | 1451.703 | 586.153 | 563.12 |
| A006 | 2669.831 | 938.205 | 681.41 |
| A007 | 2910.760 | 1834.120 | 728.57 |
| A008 | 1750.092 | 2218.427 | 581.25 |
| A009 | 1121.022 | 2114.614 | 576.71 |
| A010 | 0.000 | 2690.618 | 600.00 |
| A011 | -1363.697 | 2428.887 | 539.47 |
| A012 | 2134.743 | 3033.139 | 680.26 |
| A013 | 1564.718 | 3517.590 | 625.98 |
| A014 | 1195.041 | 3761.903 | 605.66 |
| A015 | 377.888 | 4378.613 | 545.30 |
| A016 | -233.149 | 4741.141 | 522.11 |
| A017 | 546.684 | 5271.862 | 555.29 |
| A018 | 1531.397 | 5195.716 | 609.00 |
| A019 | 2146.743 | 5218.631 | 638.03 |
| A020 | 3844.617 | 4549.834 | 674.93 |
| A021 | 4279.455 | 4340.206 | 713.74 |
| A022 | 92.741 | 5835.004 | 523.60 |
| A023 | 1065.322 | 6101.790 | 576.26 |
| A024B | 1805.944 | 6198.245 | 645.92 |
| A025 | 3087.377 | 6568.459 | 562.02 |
| A026 | 4026.473 | 6952.378 | 639.08 |
| A027 | 3080.305 | 7210.443 | 533.46 |

TABLE IID (continued)

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A028 | 1535.412 | 7342.712 | 527.92 |
| A029 | 1253.025 | 7137.662 | 550.63 |
| A030 | -155.601 | 7372.405 | 542.78 |
| A031 | -1217.200 | 7125.708 | 513.72 |
| A033 | -650.049 | 8333.851 | 523.80 |
| A034 | -1470.476 | 8543.590 | 512.69 |
| A035 | -803.990 | 9315.747 | 509.39 |
| A036 | 458.381 | 9493.378 | 481.64 |
| A037 | 1353.600 | 9457.545 | 499.04 |
| A038 | -110.026 | 10353.966 | 485.03 |
| A040 | 1876.569 | 10576.343 | 488.28 |
| A042 | -849.448 | 12220.883 | 489.37 |
| NE77006 | -3932.732 | 10947.811 | 446.39 |
| NE77007 | -2380.104 | 4561.271 | 513.44 |
| NE77008 | -3219.812 | 8078.210 | 490.53 |
| NE77012 | -2611.058 | 829.723 | 546.39 |
| Jónstindur | -5242.29 | 5471.29 | 884.77 |
| Hrútafjöll | 2191.17 | 12513.55 | 598.12 |

TABLE IIE

Coordinates of bench marks in the Gjástykki network as measured August 29 to 30, 1978.

| Station | X (east), m | Y (north), m | Elevation, m |
|---|---|---|---|
| A001 | -1299.011 | -859.261 | 542.71 |
| A002 | -232.592 | -177.906 | 591.88 |
| A003 | 0.000 | 0.000 | 594.41 |
| A004 | 537.932 | 417.018 | 550.15 |
| A005 | 1451.744 | 586.179 | 563.30 |
| A006 | 2669.868 | 938.174 | 681.47 |
| A007 | 2910.799 | 1834.107 | 728.56 |
| A008 | 1750.189 | 2218.414 | 581.26 |
| A009 | 1121.009 | 2114.669 | 576.77 |
| A010 | 0.000 | 2690.649 | 600.00 |
| A012 | 2134.758 | 3033.167 | 680.22 |
| NE77012 | -2611.076 | 829.756 | 546.58 |
| Jónstindur | -5242.34 | 5471.45 | 885.60 |

TABLE III

Calculated distances from bench mark A024B when measurements were made from A024A.

| Stations | Slope distance m | Elevation difference m | Sea-level distance m |
|---|---|---|---|
| A. November 25, 1977 | | | |
| A024B A023 | 750.171 | -69.82 | 746.855 |
| A024B A025 | 1336.602 | -83.94 | 1333.843 |
| B. April 16, 1978 | | | |
| A024B A034 | 4030.987 | -133.89 | 4028.412 |
| A024B A035 | 4067.794 | -136.85 | 4065.128 |
| A024B A037 | 3294.114 | -147.07 | 3290.538 |
| A024B A040 | 4381.855 | -157.72 | 4378.630 |
| A024B A042 | 6584.078 | -156.78 | 6581.628 |
| A024B NE77006 | 7451.948 | -198.70 | 7448.658 |

TABLE IV

Observed differences in slope distance between stations ($\Delta$ L) and in elevation differences of stations ($\Delta$ h) between two geodimeter observations. Positive values of $\Delta$ L mean that last observation gave greater distance than first observation. Positive values of $\Delta$ h mean that last station appears to have been uplifted relative to first station.

| Time of observations | Stations | | $\Delta$ L (cm) | $\Delta$ h (cm) |
|---|---|---|---|---|
| Febr. 26 - March 3, 1977 | A001 | A002 | 30.3 | -56 |
| and | A002 | A003 | -5.5 | 25 |
| July 19 - 21, 1977 | A003 | A004 | 26.0 | 15 |
| | A004 | A005 | 12.6 | 13 |
| | A005 | A006 | -1.2 | -21 |
| | A006 | A007 | 0.8 | 6 |
| | A007 | A012 | -1.6 | 3 |
| | A008 | A009 | -1.7 | |
| | A009 | A010 | 67.4 | -55 |
| | A010 | A011 | 25.8 | 53 |
| | A012 | A013 | -5.9 | -3 |
| | A013 | A014 | -6.5 | 3 |
| | A014 | A015 | 47.4 | -67 |
| | A015 | A016 | 35.5 | 44 |
| Febr. 26 - March 3, 1977 | A007 | A008 | -8.0 | -2 |
| and | | | | |
| Oct. 23 - 26, 1977 | | | | |
| Febr. 26 - March 3, 1977 | A016 | A017 | 8.3 | -66 |
| and | A016 | A022 | 8.6 | -23 |
| Nov. 25 - 30, 1977 | A017 | A018 | 117.6 | 80 |
| | A018 | A019 | -0.8 | -2 |
| | A019 | A020 | -2.6 | |
| | A022 | A023 | 56.8 | 7 |
| | A023 | A024B | 2.4 | 14 |
| | A024B | A025 | -2.8 | -10 |
| | A025 | A026 | -3.5 | -34 |

TABLE IV (continued)

| Time of observations | Stations | | $\Delta L$ (cm) | $\Delta h$ (cm) |
|---|---|---|---|---|
| Febr. 26 - March 3, 1977 | A030 | A031 | 1.2 | |
| and | | | | |
| March 10 - 18, 1978 | | | | |
| Febr. 26 - March 3, 1977 | A029 | A030 | 92.8 | -40 |
| and | A030 | A031 | 20.0 | 28 |
| August 4 - 8, 1978 | A034 | A035 | -2.0 | 0 |
| | A035 | A036 | 112.4 | -8 |
| | A035 | A038 | 22.0 | -53 |
| July 19 - 21, 1977 | A001 | A002 | 4.3 | 9 |
| and | A002 | A003 | 1.7 | -1 |
| August 14, 1977 | A003 | A004 | 1.8 | 9 |
| | A004 | A005 | 2.0 | -8 |
| July 19 - 21, 1977 | A005 | A006 | -8.7 | (-48) |
| and | A006 | A007 | 0.8 | (33) |
| Oct. 23 - 26, 1977 | A007 | A012 | 3.0 | -1 |
| July 19 - 21, 1977 | A008 | A009 | 3.0 | |
| and | A009 | A010 | 70.6 | -31 |
| Nov. 25 - 30, 1977 | A010 | A011 | 25.9 | 28 |
| | A012 | A013 | 1.8 | -4 |
| | A013 | A014 | 1.3 | -5 |
| | A014 | A015 | 36.5 | -25 |
| | A015 | A016 | 35.5 | 30 |
| August 14, 1977 | A001 | A002 | 41.0 | |
| and | A002 | A003 | 4.1 | 24 |
| Oct. 23 - 26, 1977 | A003 | A004 | 28.8 | 28 |
| | A004 | A005 | 6.6 | (52) |
| Oct. 23 - 26, 1977 | A001 | A002 | -16.4 | |
| and | A002 | A003 | -1.5 | 6 |
| March 10 - 18, 1978 | A003 | A004 | -12.0 | 4 |
| | A007 | A012 | -3.6 | 5 |

TABLE IV (continued)

| Time of observations | Stations | | ΔL (cm) | Δh (cm) |
|---|---|---|---|---|
| Nov. 25 - 30, 1977 | A009 | A010 | -7.1 | 0 |
| and | A010 | A011 | -9.7 | 2 |
| March 10 - 18, 1978 | A012 | A013 | -2.6 | 5 |
| | A015 | A016 | -6.3 | 2 |
| | A016 | A017 | -3.8 | -2 |
| | A016 | A022 | 1.1 | -3 |
| | A018 | A019 | -4.0 | -4 |
| | A019 | A020 | -1.9 | |
| | A023 | A024B | 1.1 | -15 |
| | A024B | A025 | 1.6 | 10 |
| March 10 - 18, 1978 | A003 | A005 | 12.6 | |
| and | A003 | A007 | 12.9 | |
| April 16 - 19, 1978 | A003 | A010 | 7.7 | |
| | A003 | NE77012 | 11.1 | |
| March 10 - 18, 1978 | A002 | A001 | 24.0 | -23 |
| and | A002 | A005 | 19.1 | -37 |
| June 25 - 27, 1978 | A003 | A002 | 0.5 | -5 |
| | A003 | A004 | 14.5 | -13 |
| | A003 | A005 | 22.2 | -20 |
| | A003 | A010 | 13.6 | -39 |
| | A003 | A012 | 13.4 | -58 |
| | A003 | NE77012 | 16.1 | (75) |
| | A010 | A004 | 4.3 | 7 |
| | A010 | A005 | 10.2 | 23 |
| | A010 | A008 | 8.5 | -41 |
| | A010 | A009 | 2.2 | 13 |
| | A010 | A011 | 5.8 | -1 |
| | A010 | A012 | 6.1 | 7 |
| | A010 | A013 | -1.3 | 13 |
| | A010 | A014 | -2.1 | 9 |
| | A010 | A015 | -7.7 | 17 |
| | A012 | A006 | 4.2 | 21 |
| | A012 | A007 | 5.2 | 15 |
| | A012 | A013 | 2.0 | -2 |
| | A012 | A016 | 1.9 | -10 |

TABLE IV (continued)

| Time of observations | Stations | ΔL (cm) | Δh (cm) |
|---|---|---|---|
| March 10 - 18, 1978 | A002 A006 | 3.2 | -23 |
| and | A003 A006 | 1.6 | |
| July 20 - 22, 1978 | A012 A019 | -8.3 | 0 |
| | A012 A020 | 2.8 | 2 |
| | A012 A021 | 3.8 | 7 |
| | A012 A024B | -10.0 | 6 |
| March 10 - 18, 1978 | A010 A001 | 16.4 | -2 |
| and | A010 NE77012 | 9.3 | -10 |
| August 4 - 8, 1978 | A010 NE77007 | 7.4 | 0 |
| | A019 A018 | 4.9 | -4 |
| | A019 A020 | 0.3 | 13 |
| | A019 A021 | -0.2 | -16 |
| | A019 A024B | -7.0 | -2 |
| | A019 A025 | 4.4 | -8 |
| | A019 A026 | 5.8 | 4 |
| | A019 A027 | 6.9 | -3 |
| | A024B A017 | 14.3 | -14 |
| | A024B A018 | 0.5 | 6 |
| | A024B A020 | -11.2 | 7 |
| | A024B A021 | -14.0 | -4 |
| | A024B A022 | 29.4 | -11 |
| | A024B A023 | 0.7 | -2 |
| | A024B A025 | -0.3 | -2 |
| | A024B A026 | -0.4 | -2 |
| | A024B A027 | 4.4 | 3 |
| | A024B A028 | -3.6 | 11 |
| | A024B A029 | -9.8 | 7 |
| | A024B A030 | 57.1 | -23 |
| | A024B A031 | 69.0 | -11 |
| | A030 A031 | 18.8 | |
| | A030 A035 | 1.1 | |
| | A030 A042 | 9.4 | |
| | A035 A028 | 80.3 | -18 |
| | A035 A029 | 74.3 | -19 |
| | A035 A033 | -1.6 | 4 |
| | A035 A042 | -1.2 | -3 |

TABLE IV (continued)

| Time of observations | Stations | | ΔL (cm) | Δh (cm) |
|---|---|---|---|---|
| March 10 - 18, 1978 | A003 | A007 | 17.4 | -23 |
| and | A003 | A008 | 12.8 | -26 |
| August 29 - 30, 1978 | A003 | A009 | 20.2 | |
| April 16 - 19, 1978 | A003 | A005 | 9.6 | |
| and | A003 | A010 | 5.6 | |
| June 25 - 27, 1978 | A003 | NE77012 | 5.0 | |
| April 16 - 19, 1978 | A024B | A035 | 64.7 | 31 |
| and | A024B | A042 | 43.0 | 34 |
| August 4 - 8, 1978 | A042 | A033 | -3.0 | -9 |
| | A042 | A034 | -5.6 | -17 |
| | A042 | A036 | 44.4 | -7 |
| | A042 | A037 | 64.7 | -12 |
| | A042 | A038 | 17.2 | -62 |
| | A042 | A040 | 95.1 | -29 |
| | A042 | NE77006 | -28.0 | -22 |
| | A042 | NE77008 | -13.8 | -27 |
| April 16 - 19, 1978 | NE77011 | NE77005 | -2.0 | |
| and | NE77011 | NE77009 | 0.0 | |
| July 11, 1978 | | | | |
| April 16 - 19, 1978 | NE77012 | A001 | 15.0 | |
| and | NE77012 | A011 | -39.1 | -32 |
| Febr. 20 - March 3, 1979 | NE77012 | NE77007 | -4.1 | -74 |
| April 16 - 19, 1978 | A042 | A040 | 101.3 | -10 |
| and | A042 | NE77006 | -10.7 | 1 |
| May 11 - 12, 1979 | NE77011 | NE77005 | 252.3 | 0 |
| | NE77011 | NE77009 | 239.0 | 6 |
| April 16 - 19, 1978 | NE77005 | NE77009 | -10.0 | |
| and | NE77005 | NE77010 | 32.4 | |
| May 18 - 28, 1979 | NE77005 | NE77011 | 301.8 | -15 |
| | NE77011 | NE77009 | 345.0 | -46 |
| | NE77011 | NE77010 | 290.9 | 7 |

TABLE IV (continued)

| Time of observations | Stations | | ΔL (cm) | Δh (cm) |
|---|---|---|---|---|
| June 25 - 27, 1978 | A002 | A001 | -19.6 | 11 |
| and | A002 | A003 | -6.5 | -3 |
| July 20 - 22, 1978 | A002 | A005 | -21.9 | 23 |
| | A003 | A005 | -16.9 | |
| | A003 | A012 | -10.3 | 46 |
| | A012 | A002 | -18.5 | -59 |
| | A012 | A005 | 2.8 | -27 |
| | A012 | A006 | -8.8 | -23 |
| | A012 | A007 | -6.2 | -13 |
| | A012 | A008 | 3.6 | -10 |
| | A012 | A009 | 5.3 | -17 |
| | A012 | A010 | -2.4 | -10 |
| | A012 | A013 | -2.3 | 3 |
| | A012 | A014 | -1.5 | -4 |
| | A012 | A015 | -0.5 | 4 |
| | A012 | A016 | 3.0 | -1 |
| June 25 - 27, 1978 | A003 | A004 | -7.3 | 9 |
| and | A003 | A010 | -6.3 | 32 |
| August 4 - 8, 1978 | A003 | NE77012 | -5.6 | -10 |
| | A010 | A002 | -10.4 | -32 |
| | A010 | A004 | -1.5 | 5 |
| | A010 | A005 | -2.1 | -15 |
| | A010 | A006 | -7.3 | -13 |
| | A010 | A007 | -1.3 | 2 |
| | A010 | A008 | 0.1 | 17 |
| | A010 | A009 | -0.1 | -10 |
| | A010 | A011 | -0.6 | 6 |
| | A010 | A013 | 2.9 | 1 |
| | A010 | A014 | -0.8 | 0 |
| | A010 | A015 | 3.8 | 0 |
| July 11, 1978 | NE77011 | NE77005 | 254.3 | |
| and | NE77011 | NE77009 | 239.0 | |
| May 11 - 12, 1979 | | | | |

TABLE IV (continued)

| Time of observations | Stations | | ΔL (cm) | Δh (cm) |
|---|---|---|---|---|
| July 20 - 22, 1978 | A002 | A001 | 8.2 | -5 |
| and | A002 | A003 | 1.6 | 0 |
| August 4 - 8, 1978 | A002 | A005 | 10.4 | -7 |
| | A002 | A012 | 10.9 | -28 |
| | A003 | A005 | 7.6 | |
| | A003 | A012 | 5.9 | -12 |
| | A012 | A010 | 4.6 | 6 |
| | A012 | A019 | 3.0 | 0 |
| | A012 | A024B | 0.5 | -14 |
| July 20 - 22, 1978 | A002 | A006 | 19.5 | -4 |
| and | A003 | A006 | 19.4 | |
| August 29 - 30, 1978 | A012 | A005 | -0.6 | 22 |
| | A012 | A006 | 6.0 | -7 |
| | A012 | A007 | 5.2 | 13 |
| | A012 | A008 | -0.5 | 3 |
| | A012 | A009 | -0.3 | 9 |
| | A012 | A010 | 6.0 | -9 |
| August 4 - 8, 1978 | A002 | A001 | 7.5 | -5 |
| and | A002 | A003 | 2.9 | 0 |
| August 29 - 30, 1978 | A002 | A005 | 7.2 | -4 |
| | A002 | A012 | 2.6 | 11 |
| | A003 | A004 | 4.6 | -1 |
| | A003 | A005 | 4.0 | -7 |
| | A003 | A010 | 3.0 | -27 |
| | A003 | A012 | 2.6 | -18 |
| | A003 | NE77012 | 2.8 | 5 |
| August 4 - 8, 1978 | A010 | A001 | 31.5 | 41 |
| and | A010 | A004 | 6.7 | 20 |
| Febr. 20 - March 3, 1979 | A010 | A005 | 11.2 | 28 |
| | A010 | A006 | 17.0 | 26 |
| | A010 | A007 | 13.0 | 0 |
| | A010 | A008 | 6.5 | -3 |
| | A010 | A009 | 3.9 | 18 |

TABLE IV (continued)

| Time of observations | Stations | | ΔL (cm) | Δh (cm) |
|---|---|---|---|---|
| August 4 - 8, 1978 | A010 | A011 | 14.9 | -5 |
| and | A010 | A013 | 1.0 | -3 |
| Febr. 20 - March 3, 1979 (cont.) | A010 | A014 | -0.5 | 3 |
| | A010 | A015 | -4.2 | -1 |
| | A010 | NE77007 | 0.2 | -4 |
| | A010 | NE77012 | 14.4 | 17 |
| | A030 | A022 | -3.2 | 8 |
| | A030 | A023 | 2.4 | -3 |
| | A030 | A024B | 8.9 | 12 |
| | A030 | A029 | 2.0 | 4 |
| | A030 | A031 | 0.9 | 12 |
| | A030 | A035 | 0.2 | 1 |
| | A030 | NE77007 | 5.1 | 80 |
| | A030 | NE77008 | 11.1 | 91 |
| | A035 | A024B | 5.1 | 23 |
| | A035 | A034 | 1.0 | 11 |
| | A035 | A040 | 2.7 | 6 |
| | A035 | NE77008 | 10.0 | 81 |
| August 4 - 8, 1978 | A042 | A040 | 6.2 | 19 |
| and | A042 | NE77006 | 17.3 | 23 |
| May 11 - 12, 1979 | | | | |
| August 4 - 8, 1978 | A024B | A010 | -0.5 | -16 |
| and | A024B | A012 | 1.4 | -14 |
| May 19 - 28, 1979 | A024B | A020 | 8.2 | 2 |
| | A024B | A027 | 2.3 | 1 |
| | A035 | A028 | 7.1 | 34 |
| | A035 | A030 | 0.0 | 7 |
| | A035 | A040 | 9.6 | 16 |
| | A035 | NE77006 | -26.8 | 30 |
| | A035 | NE77008 | 14.6 | 25 |
| | A042 | A035 | -6.9 | -17 |
| | A042 | A037 | 21.6 | 4 |
| | A042 | A040 | 46.0 | 12 |
| | A042 | NE77006 | 5.9 | 3 |

TABLE IV (continued)

| Time of observations | Stations | | ΔL (cm) | Δh (cm) |
|---|---|---|---|---|
| August 29 - 30, 1978 | A002 | A001 | 10.1 | 5 |
| and | A002 | A003 | 2.6 | 2 |
| Febr. 20 - March 3, 1979 | A002 | A005 | 9.0 | -5 |
| | A003 | NE77012 | 9.1 | 3 |
| | A005 | A003 | 11.2 | 9 |
| | A005 | A012 | -2.6 | -8 |
| | A010 | A012 | 3.2 | 9 |
| Febr. 20 - March 3, 1979 | A030 | A024B | -0.9 | -1 |
| and | A030 | A027 | 0.7 | -15 |
| May 18 - 28, 1979 | A030 | A028 | -1.9 | 0 |
| | A030 | A035 | -0.2 | -8 |
| | A030 | A037 | -2.0 | 9 |
| | A030 | NE77008 | 0.8 | -32 |
| | A035 | A024B | 4.7 | -13 |
| | A035 | A040 | 6.9 | 10 |
| | A035 | NE77008 | 4.6 | -56 |
| May 11 - 12, 1979 | A042 | A040 | 39.8 | -7 |
| and | A042 | NE77005 | 27.1 | |
| May 19 - 28, 1979 | A042 | NE77006 | -11.4 | -20 |
| | A042 | NE77009 | 88.3 | 16 |
| | NE77011 | NE77005 | 49.5 | -15 |
| | NE77011 | NE77009 | 106.0 | 52 |
| | NE77011 | NE77013 | -14.5 | 21 |
| | NE77013 | A042 | 31.7 | -5 |
| | NE77013 | NE77005 | 68.4 | 5 |
| | NE77013 | NE77006 | 19.4 | 31 |
| | NE77013 | NE77009 | 145.6 | -21 |