

CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS
DOMINION OBSERVATORIES

PUBLICATIONS
OF THE
Dominion Observatory
OTTAWA

VOLUME XIX No. 3

Table of Russian Fault Plane Solutions

BY

A. E. SCHEIDECKER

EDMOND CLOUTIER, C.M.G., O.A., D.S.P.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1957

1061-1957

MINES

THE DOMINION OF CANADA
GOVERNMENT PUBLICATIONS

PUBLICATIONS
OF THE
DOMINION OF CANADA
OTTAWA

VOLUME 3 NO. 3

Types of Russian Mine Lodes

A. M. Gerasimov

EDWARD GOLDS, C.M.G., O.A.T.
GENERAL DIRECTOR AND CONTRACTOR TO THE GOVERNMENT
OTTAWA, 1921.

TABLE OF RUSSIAN FAULT PLANE SOLUTIONS

By

A. E. SCHEIDECKER

ABSTRACT

Presented here are Tables of Russian fault plane solutions as they were extracted from charts published in the Soviet Union. The notation and representation employed is the same as that used in earlier publications of this Observatory, so that western workers in the field may have access to these data.

When J. H. Hodgson joined the staff of the Dominion Observatory in 1949, he began a program to investigate the mechanics of faulting as shown by earthquakes. Making use of a method due originally to Byerly, and with the assistance of a series of student collaborators, Hodgson produced solutions for 86 earthquakes situated in various parts of the world. One of the chief results of this work was the recognition that faulting in earthquakes is, in the majority of cases, transcurrent, —a conclusion at variance with that postulated in most theories of mountain building.

In order to corroborate this conclusion, the Observatory made a survey of all available fault plane solutions (Scheidegger 1955). This summary included a restatement of the solutions obtained by Hodgson and his various coauthors, of the solutions already summarized by Honda and Masatuka, and of solutions by various other investigators. The solutions were reduced to a unified notation, and it was shown that these other solutions supported Hodgson's findings that strike-slip faulting predominated in tectonic earthquakes. The inclusion of the Japanese solutions in a summary of this sort was, in a way, special pleading, since the solutions were interpreted in terms of a fault plane mechanism rather than in terms of a focal mechanism which those authors themselves preferred.

During the same period a very active school of fault plane studies flourished in Russia under the direction of Dr. Keilis-Borok. The contribution of this school was particularly important because it kept an open mind on the question of focal mechanism. It found that a variety of such focal mechanisms do in fact exist, but that the vast majority of earthquakes are the result of simple faulting. The Russian school also developed a complete technique for the use of S and several of its derived phases.

The original intention was to make a complete evaluation of the Russian technique in English, but since the publication of a paper by Keilis-Borok (1956) in that language, this is no longer necessary. It was felt, however, that the publication of the Russian fault plane solutions in the notation employed earlier by the Observatory would be worth while, and accordingly this has been carried out in the attached tables. These solutions have never before been published in tabular form, but only on small charts with Russian explanations. The writer expresses sincere thanks to Dr. Keilis-Borok, who has drawn attention to and helped with the translation of the work done in Moscow.

Some of the solutions listed in the attached tables are slightly inconsistent in the light of the orthogonality condition, owing to the sometimes inaccurate reproduction of the charts on which these solutions had been published. Such solutions are marked with an asterisk, and the degree of inconsistency is given in a footnote. Apart from this, the notation and the make-up of the tables is identical to that in the earlier paper mentioned above (Scheidegger, 1955).

In all solutions, a denotes the fault plane and b the auxiliary plane. There is no ambiguity about this point since the Russian work is all based on S-readings.

Most of the earthquakes (viz. those in the Kazandzhik and Pamir Knot areas) listed in the attached tables are small shocks, detected by temporary field stations. The epicenters have been obtained from the published maps, and, in the Pamir Knot area, from correspondence with Dr. Keilis-Borok. The other earthquakes (in the Hindu-Kush and Japan-Bonin areas) appear to be larger shocks, and the primary data were presumably obtained from the Russian seismograph network. Their epicentres and other data are also given here as they were extracted from published Russian charts. The epicentres, in some instances, differ from those given by the United States Coast and Geodetic Survey by as much as 5° . It is considered that this is due to the way in which the Russian charts were drawn, i.e. the fault plane solutions were plotted right on the charts, which resulted in sometimes crowded conditions. This induced corresponding shifts to accommodate all the earthquakes. Also, in three cases (earthquakes of Nov. 4, 1946; May 3, 1949; July 11, 1949) there is a considerable discrepancy between the Russian fault plane solutions and those published by other workers in the field as listed in the earlier summary of fault plane work (Scheidegger 1955). The reason for this is not quite clear.

REFERENCES

- K56 — V. I. Keilis-Borok: "Methods and results of the investigations of earthquake mechanism." *Trav. Scient. Ass. Seismol.*, U. G. G. I. fasc. 19, pp. 383 - 394 (1956)
- KV54—В. И. Кейлис-Борок, А. В. Введенская: « Исследование напряжений в очагах хайтской эпицентральной зоны ». Труды геофиз. ин - та АН СССР № 25 (152), с. 113 - 123 (1954)
- KKK53—Д. А. Харин, В. И. Кейлис-Борок, С. Д. Коган: « К методике сейсмических наблюдений в эпицентральной зоне и их интерпретаций ». Труды геофиз. ин - та АН СССР № 21 (148) с. 27 - 48 (1953)
- K54 — С. Д. Коган: « К вопросу об изучении механизма глубоких землетрясений ». Докл. Акад. Наук СССР т. 99, с. 385 - 388 (1954)
- M55—Л. Н. Малиновская: « Динамическая характеристика очагов юго - западной Туркмении »
Изв. Акад. Наук СССР, Сер. геофиз., с. 31 - 34 (1955)
- S55 — A. E. Scheidegger: "The physics of orogenesis in the light of new seismological evidence." *Trans. Roy. Soc. Canada*, vol. 49, Sec. IV, pp. 65 - 93 (1955)
- V53a—А. В. Введенская: « К вопросу о динамической характеристике очагов удаленных землетрясений »
Труды геофиз. ин - та АН СССР № 20 (147), с. 37 - 46 (1953)
- V53b—А. В. Введенская: « О применении сетки Вульфа определении динамических параметров очагов землетрясений »
Труды геофиз. ин - та АН СССР № 20 (147) с. 47 - 50 (1953)

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS

Date and Time	Epicentre	Depth (in 0.0mR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference
Apr 20 1941 17:38:25	39.2°N 70.0°E	0.00	a b	S20°W N70°W	90°	sml	t-d	0.000	1.000	V53b
Nov 2 1946 18:28	41.0°N 76.0°E	0.00	a b	S60°W	70° 70°	21° 21°	-t -t	0.342 0.342	0.940 0.940	V53a
Nov 4 1946 21:48	39.5°N 54.7°E	0.00	a b	N62°W S04°E	74° 18°	81° 59°	dt st	0.951 0.276	0.309 0.961	M55 * (1)
Feb 6 1948	20°N 146°E	0.03	a b	N35°W S75°E	84° 12°	82° 50°	st dt	0.978 0.104	0.208 0.994	K54 * (2)
Feb 15 1948	19°N 145°E	0.03	a b	N36°W S26°E	67° 23°	86° 81°	dt st	0.920 0.391	0.391 0.920	K54
Mcch 23 1948	50°N 158°E	0.03	a b	N06°W S52°E	72° 24°	73° 47°	dp sp	0.914 0.309	0.407 0.951	K54
Aug 26 1948	33°N 138°E	0.01	a b	N53°W S83°E	56° 44°	61° 55°	st dt	0.719 0.559	0.695 0.829	K54 * (3)
Dec 15 1948	22°N 143°E	0.03	a b	N01°W S76°E	87° 30°	61° 15°	st dt	0.866 0.052	0.500 0.999	K54
Jan 2 1949 08:49.4	22°N 144°E	0.01	a b	N33°W S65°E	52° 41°	70° 65°	dp sp	0.755 0.616	0.656 0.788	K54
May 3 1949	49°N 158°E	0.02	a b	S44°E N15°E	74° 68°	38° 34°	sp dp	0.375 0.276	0.927 0.961	K54 * (4)
May 21 1949	34°N 140°E	0.00	a b	S38°W S82°E	72° 28°	66° 35°	sp dp	0.883 0.309	0.470 0.951	K54 * (5)
Jun 5 1949	40°N 129°E	0.08	a b	S02°W N70°E	68° 82°	23° 31°	sp dp	0.139 0.375	0.990 0.927	K54 * (6)

*Orthogonality condition not satisfied; error (1) 7°; (2) 3°; (3) 6°; (4) 21°; (5) 3°; (6) 17°.

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—Continued

Date and Time	Epicentre	Depth (in 0.0mR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference	
Jul 11 1949	34°N 134°E	0.00	a b	N62°E S81°W	61° 33°	80° 74°	—	0.839 0.285	0.545 0.959	K54	* (7)
Jul 14 1949	31°N 142°E	0.06	a b	N14°W S73°E	76° 26°	68° 34°	dp sp	0.899 0.242	0.438 0.973	K54	
Sep 10 1949 23:	39.0°N 70.7°E	0.00	a b		54° 64°	26° 36°	-p -p	0.428 0.588	0.899 0.809	KKK53	
Sep 15 1949 22:	39.0°N 70.5°E	0.00	a b		48° 47°	67° 66°	-p -p	0.682 0.699	0.731 0.743	KKK53	
Sep 24 1949 21:	40.0°N 70.5°E	0.00	a b		62° 33°	86° 84°	-t -t	0.839 0.470	0.545 0.883	KKK53	
Oct 2 1949 14:	39.2°N 70.5°E	0.00	a b		62° 32°	75° 64°	-t -t	0.848 0.470	0.530 0.883	KKK53	
Oct 14 1949 06:	39.0°N 70.6°E	0.00	a b		35° 58°	32° 59°	-p -p	0.530 0.819	0.848 0.573	KKK53	
Feb 23 1950	48°N 148°E	0.06	a b	N05°E S69°E	56° 80°	19° 37°	st dt	0.174 0.559	0.985 0.829	K54	* (8)
May 25 1950 18:35:01	12°N 142°E	0.01	a b	N54°E N50°W	72° 74°	21° 23°	dt st	0.276 0.309	0.961 0.951	K54	* (9)
May 26 1950 14:33:20	18°N 145°E	0.03	a b	N02°E S32°E	80° 14°	82° 57°	dp sp	0.970 0.174	0.242 0.985	K54	* (10)
Jun 5 1950	21°N 144°E	0.04	a b	S77°E N06°W	70° 72°	26° 27°	sp dp	0.309 0.342	0.951 0.940	K54	* (11)
Jul 13 1950	28°N 141°E	0.08	a b	N69°W S57°E	35° 55°	80° 83°	dt st	0.574 0.819	0.819 0.574	K54	

* Orthogonality condition not satisfied; error (7) 15°; (8) 7°; (9) 8°; (10) 2°; (11) 12°

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—Continued

Date and Time	Epicentre	Depth (in 0.0mR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference	
Oct 10 1950	36.5°N 70.6°E	0.02	a b	N45°E S38°W		lge lge	dp sp			K54	
Jan 6 1951 05:	36.6°N 70.9°E	0.05	a b	N27°W S33°W			sp dp			K54	
Jan 16 1951 08:	36.7°N 70.0°E	0.03	a b	N15°E S15°W		90° 90°	-p -p			K54	
Apr 16 1951	30°N 138°E	0.07	a b	N20°W S71°E	30° 70°	43° 67°	st dt	0.342 0.866	0.940 0.500	K54	
Jun 12 1951 22:	36.6°N 70.7°E	0.03	a b	N38°E S38°W		90° 90°	-p -p			K54	
Jul 10 1951 09:33	40°N 54°E	0.00	a b	S22°W N86°E	53° 60°	39° 44°		0.500 0.602	0.866 0.799	M55	
Jul 11 1951	28°N 142°E	0.07	a b	N36°W S80°E	65° 36°	66° 51°	dp sp	0.809 0.423	0.588 0.906	K54	* (12)
Jul 16 1951 19:31	39°N 55°E	0.00	a b	N72°W S06°W	60° 70°	23° 32°		0.342 0.500	0.340 0.866	M55	
Aug 7 1951 09:06	40°N 55°E	0.00	a b	N11°W S64°W	50° 65°	29° 42°		0.423 0.643	0.906 0.766	M55	* (13)
Aug 10 1951	46°N 143°E	0.05	a b	N21°W N88°E	80° 61°	33° 21°	dp sp	0.485 0.174	0.875 0.985	K54	* (14)
Aug 23 1951 04:27	40°N 54°E	0.00	a b	S01°E N02°W	70° 20°	90° 89°	dp sp	0.940 0.342	0.342 0.940	M55	
Sep 5 1951 00:05	40°N 54°E	0.00	a b	N15°E S85°W	59° 60°	36° 36°	sp dp	0.500 0.515	0.866 0.857	M55	

*Orthogonality condition not satisfied; error (12) 3°; (13) 5°; (14) 11°

TABLE OF RUSSIAN FAULT PLANE SOLUTIONS

105

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—Continued

Date and Time	Epicentre	Depth (in 0.0nR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference	
Sep 7 1951 13:38	40°N 55°E	0.00	a b	S42°E S59°W	62° 70°	23° 30°		0.342 0.470	0.940 0.883	M55	
Sep 9 1951 04:03	40°N 54°E	0.00	a b	N12°E S59°E	70° 60°	35° 27°	st dt	0.500 0.342	0.866 0.940	M55	* (15)
Sep 11 1951 01:11	39°N 55°E	0.00	a b	N67°W S16°W	90°	07°	sp dp	0.000	1.000	M55	
Sep 24 1951 00:24	40°N 54°E	0.00	a b	S39°W N37°W	80° 65°	28° 17°		0.423 0.174	0.906 0.985	M55	* (16)
Oct 4 1951 05:	36.6°N 70.6°E	0.03	a b	N06°E S31°W		lge	dp sp			K54	
Oct 13 1951 06:58	40°N 55°E	0.00	a b	N44°E S32°E	70° 60°	33° 24°	st dt	0.500 0.342	0.866 0.940	M55	
Oct 22 1951 12:04	40°N 55°E	0.00	a b	N77°E S84°W	45° 45°	85° 85°	dt st	0.707 0.707	0.707 0.707	M55	
Mch 4 1952 01:22:41	42°N 142°E	0.00	a b	N11°W S72°E	76° 28°	66° 32°		0.883 0.242	0.470 0.970	K54	
Mch 7 1952	42°N 145°E	0.01	a b	N11°E S63°E	90° 20°	71° 16°	s- d-	0.940 0.000	0.342 1.000	K54	* (17)
Mch 9 1952 17:03:43	42°N 143°E	0.00	a b	N15°W S71°E	76° 26°	69° 36°	st dt	0.899 0.242	0.438 0.970	K54	
May 28 1952 07:	37.0°N 70.9°E	0.03	a b	S59°W S57°E			sp dp			K54	
May 28 1952 07:59:09	34°N 136°E	0.05	a b	N20°E S54°E	88° 48°	44° 16°	dp sp	0.669 0.035	0.743 0.999	K54	* (18)

*Orthogonality condition not satisfied; error (15) 5°; (16) 8°; (17) 5°; (18) 11°

PUBLICATIONS OF THE DOMINION OBSERVATORY

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—Continued

Date and Time	Epicentre	Depth (in 0.0mR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference	
Jun 2 1952 11:30	40°N 54°E	0.00	a b	N40°E S17°E	60° 55°	47° 43°	st dt	0.574 0.500	0.819 0.866	M55	* (19)
Jun 2 1952 19:	37.8°N 71.9°E	0.03	a b	S33°E N33°W		90° 90°	-p -p			K54	
Jun 3 1952 11:	36.8°N 70.6°E	0.03	a b	N47°E S47°W		90° 90°	-p -p			K54	
Jun 8 1952 18:31	39°N 55°E	0.00	a b	N13°W S39°E	35° 60°	68° 75°	st dt	0.500 0.819	0.866 0.574	M55	* (20)
Jun 25 1952 23:41	39°N 55°E	0.00	a b	N52°W S07°E	15° 80°	46° 79°	sp dp	0.174 0.966	0.985 0.259	M55	
Jul 5 1952 17:	37.0°N 71.1°E	0.03	a b	N61°E S26°W			dp sp			K54	
Jul 15 1952 22:15	39°N 55°E	0.00	a b	N60°W S05°W	25° 80°	27° 67°	sp dp	0.174 0.906	0.985 0.423	M55	
Jul 22 1952 19:58	39°N 56°E	0.00	a b	S88°W S73°E	60° 35°	79° 74°	dt st	0.819 0.500	0.574 0.866	M55	* (21)
Jul 23 1952 08:45	40°N 54°E	0.00	a b	S34°W N48°W	87° 20°	70° 08°		0.940 0.052	0.342 0.999	M55	
Aug 11 1952 14:08	38.7°N 70.5°E	0.00	a b	N00°E S56°W	22° 23°	71° 72°	dt st	0.920 0.927	0.391 0.375	KV54	
Aug 18 1952 23:16	39.0°N 70.1°E	0.00	a b	N09°W S71°E	44° 60°	41° 53°	st dt	0.500 0.719	0.866 0.695	KV54	* (22)
Aug 24 1952 17:14	39°N 55°E	0.00	a b	S07°E N42°E	55° 50°	55° 52°	sp dp	0.643 0.576	0.766 0.819	M55	

*Orthogonality condition not satisfied; error (19) 6°; (20) 6°; (21) 3°; (22) 15°

TABLE OF RUSSIAN FAULT PLANE SOLUTIONS

107

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—Continued

Date and Time	Epicentre	Depth (in 0.0nR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference	
Aug 27 1952 17:42	39.0°N 71.0°E	0.00	a b	N17°W S52°E	71° 16°	81° 57°	dp sp	0.961 0.326	0.276 0.946	KV54	* (23)
Aug 28 1952 00:50	38.9°N 70.6°E	0.00	a b	N87°W N32°E	20° 79°	33° 73°	dp sp	0.191 0.940	0.982 0.342	KV54	
Aug 31 1952 12:26	39.3°N 70.6°E	0.00	a b	N42°E S38°W	21° 62°	86° 89°	-t -t	0.470 0.934	0.883 0.358	KV54	* (24)
Sep 2 1952 18:48	40°N 56°E	0.00	a b	N86°W N21°E	50° 70°	26° 43°	st dt	0.342 0.643	0.940 0.766	M55	
Sep 3 1952 17:58	39.2°N 70.7°E	0.00	a b	S54°W N62°E	82° 08°	89° 82°	sp dp	0.990 0.139	0.139 0.990	KV54	
Sep 4 1952 11:56	39.1°N 71.1°E	0.00	a b	S05°W N44°E	60° 40°	61° 49°	dt st	0.766 0.500	0.643 0.866	KV54	* (25)
Sep 5 1952 02:36	38.8°N 70.2°E	0.00	a b	N55°W N70°E	26° 75°	39° 69°	st dt	0.259 0.899	0.966 0.438	KV54	
Sep 5 1952 13:47	38.9°N 70.4°E	0.00	a b	N47°W S46°E	40° 45°	89° 89°	-p -p	0.707 0.766	0.707 0.643	KV54	* (26)
Sep 5 1952 16:17	38.9°N 69.9°E	0.00	a b	N85°W N18°E	10° 88°	13° 80°	dp sp	0.035 0.985	0.999 0.174	KV54	* (27)
Sep 5 1952 17:14	38.8°N 70.5°E	0.00	a b	N34°W N70°E	20° 86°	14° 71°	dp sp	0.070 0.940	0.998 0.342	KV54	
Sep 6 1952 03:26	39.1°N 70.8°E	0.00	a b	N06°W S13°E	14° 77°	83° 88°	-t -t	0.225 0.970	0.974 0.242	KV54	
Sep 6 1952 11:27	39.1°N 70.7°E	0.00	a b	S81°W N03°E	70° 47°	44° 23°	dp sp	0.682 0.342	0.731 0.940	KV54	* (28)

*Orthogonality condition not satisfied; error (23) 6°; (24) 7°; (25) 3°; (26) 5°; (27) 8°; (28) 5°

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—Continued

Date and Time	Epicentre	Depth (in 0.0mR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horis. Compon.	Reference	
Sep 6 1952 15:30	38.9°N 70.8°E	0.00	a b	S70°W N12°E	46° 65°	40° 52°	st dt	0.438 0.695	0.899 0.719	KV54	
Sep 7 1952 13:27	39.2°N 71.1°E	0.00	a b	N34°E S75°E	61° 40°	61° 49°	dp sp	0.766 0.485	0.643 0.875	KV54	* (29)
Sep 10 1952 01:43	39.1°N 71.1°E	0.00	a b	S15°E N43°W	60° 40°	73° 67°	dp sp	0.766 0.500	0.643 0.866	KV54	* (30)
Sep 10 1952 19:28	39.1°N 70.7°E	0.00	a b	S57°W N02°E	22° 78°	33° 71°	st dt	0.208 0.937	0.978 0.375	KV54	
Sep 14 1952 21:51	39.1°N 71.0°E	0.00	a b	N51°W N54°W	27° 80°	23° 65°	dt st	0.174 0.891	0.985 0.454	KV54	
Sep 17 1952 05:03	39.2°N 70.5°E	0.00	a b	N29°E N79°W	74° 49°	44° 24°	dt st	0.656 0.276	0.755 0.961	KV54	
Sep 19 1952 00:35	38.9°N 70.9°E	0.00	a b	N55°E N60°W	25° 75°	29° 68°	st dt	0.259 0.906	0.966 0.423	KV54	
Sep 19 1952 11:01	38.9°N 70.4°E	0.00	a b	S20°W N51°W	85° 10°	80° 20°	dp sp	0.985 0.087	0.174 0.996	KV54	
Sep 22 1952 02:30	39.1°N 71.0°E	0.00	a b	N59°E S31°W	18° 72°	63° 82°	st dt	0.309 0.951	0.951 0.309	KV54	* (31)
Sep 24 1952 12:37	39.1°N 70.7°E	0.00	a b	S08°W N38°E	65° 27°	77° 63°	dt st	0.891 0.423	0.454 0.906	KV54	
Sep 26 1952 20:01	39.2°N 70.7°E	0.00	a b	N12°W S58°W	76° 20°	76° 47°	dt st	0.940 0.242	0.342 0.970	KV54	* (32)
Sep 26 1952 20:19	38.9°N 70.3°E	0.00	a b	N75°E N64°W	80° 17°	79° 50°	sp dp	0.956 0.174	0.292 0.985	KV54	* (33)

*Orthogonality condition not satisfied; error (29) 9°; (30) 6°; (31) 2°; (32) 7°; (33) 3°

TABLE OF RUSSIAN FAULT PLANE SOLUTIONS

109

TABLE OF RUSSIAN FAULT PLANE DETERMINATIONS—*Concluded*

Date and Time	Epicentre	Depth (in 0.0mR)	Solution	Dip direction	Dip	Slip Angle	Fault Type	Vertical Compon.	Horiz. Compon.	Reference	
Sep 26 1952 21:48	39.1°N 70.5°E	0.00	a b	S18°E N02°E	14° 76°	90° 90°	sp dp	0.242 0.970	0.970 0.212	KV54	
Sep 27 1952 08:10	38.9°N 70.7°E	0.00	a b	S36°E S76°W	60° 70°	24° 33°	dp sp	0.342 0.500	0.940 0.866	KV54	* (34)
Sep 29 1952 03:44	39.0°N 70.7°E	0.00	a b	N57°W S19°E	57° 38°	68° 59°	sp dp	0.788 0.545	0.619 0.839	KV54	
Oct 3 1952 19:58	39.1°N 70.9°E	0.00	a b	N11°W S43°E	22° 70°	64° 80°	st dt	0.342 0.927	0.940 0.375	KV54	
Oct 4 1952 17:03	39.1°N 70.9°E	0.00	a b	N48°W N56°E	27° 75°	20° 64°	dp sp	0.259 0.891	0.966 0.454	KV54	* (35)
Oct 5 1952 10:40	39.2°N 70.5°E	0.00	a b	N45°E S00°E	21° 75°	46° 75°	dp sp	0.259 0.934	0.966 0.358	KV54	
Oct 6 1952 22:47	39.1°N 71.1°E	0.00	a b	S36°E N57°W	25° 70°	55° 75°	dp sp	0.342 0.906	0.940 0.423	KV54	* (36)
Oct 7 1952 19:24	39.2°N 70.7°E	0.00	a b	N60°E S20°W	28° 82°	18° 63°		0.139 0.883	0.990 0.470	KV54	* (37)

*Orthogonality condition not satisfied; error (34) 8°; (35) 7°; (36) 4°; (37) 14°