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Landsat Linear Features and Mineral Occurrences in Alaska

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Abstract

In order to develop a better understanding of the regional structural controls of the metallic mineral deposits of Alaska, a detailed examination was made of the linear features and trends interpreted from Landsat imagery. In addition, local structural features and alteration zones were examined by ratio analysis of selected Landsat images. The linear trend analysis provided new regional structural data for previously proposed mineral deposit models and also provided new evidence for the extension of the existing models. Preliminary evidence also suggests linear intersection control of some types of mineral occurrences and that trend analysis may result in the definition of areas favorable for future mineral exploration. Ratio image analysis indicates that alteration zones and local structural features can be identified by use of Landsat imagery. Ratio image analysis for the definition of alteration zones must be used with caution, however, since the alteration associated with the various mineral deposits may not be differentiated by the technique.

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Introduction

The objective of this investigation is to examine the relationships between major linear trends and features interpreted from Landsat imagery and mapped structures and known major mineral occurrences. Although there have been several detailed examinations of Landsat imagery of specific areas of Alaska there has been no comprehensive examination of the entire state. Several detailed studies have been conducted of the relationships of linear trends and mineral occurrences in a particular mining district but no regional investigations of entire metallogenic provinces have been completed.

There are over three hundred major and several thousand minor metallic mineral occurrences known in Alaska. The state has been and is a major producer of gold and has produced significant quantities of copper, platinum, silver, chromium, antimony, tin, and tungsten. Recent mineral exploration and development has demonstrated that the mineral potential of Alaska is large but the costs of exploitation are also great. Rapid and low cost exploration techniques are required to economically assess the exploration potential of large inaccessible areas of the state. Remote sensing techniques in particular, Landsat imagery may be utilized to locate structures associated with major mineral occurrences thus reducing potential target areas, decreasing exploration costs, and increasing mineral discoveries.

The present investigation was conducted in two parts, first an interpretation of linear features for complete Landsat coverage of Alaska and second, ratio image analysis of specific major mineral occurrences to determine characteristic features of the alteration zones and local structures. The data for part one include a linear interpretation of 95 Landsat frames. These interpretations are included in Appendix I. These frames are keyed to a 1:1,000,000 scale base map of Alaska (Plates I-VI) (in pocket). The base maps also include the major mapped faults of Alaska and the location of 356 major mineral occurrences. These occurrences are briefly described in Table 2 of this report.

Part two of the investigation, the ratio image analysis, was subcontracted to Geo Spectra Corp., Ann Arbor, Michigan. Seven Landsat frames were selected for seven major mineral occurrence areas. Ratio data were output at 1:250,000 scale and the images were compared with all available geologic data for the area. Interpretative maps for each of the selected mineral occurrence areas are included as figures in the text of the report.

Previous Investigations

The localization and structural control of ore deposits and oil and gas fields have been discussed in the geologic literature as far back as the early twentieth century. Early works include Hulin (1929, 1948), McKinstry (1941, 1955), Newhouse et al. (1942) and Wisser (1951, 1960). Systematic structural analysis of tectonic provinces as an exploration tool were conducted by Billingsley and Locke (1941), Blanchet (1951), Kaufmann (1951), Mayo (1958), Weeks (1952), Klemme (1958), Hills (1947), Henson (1952), Wilson (1948, 1949) and Badgley (1959).

With the development of plate tectonic theory (Wilson, 1965) a uniform framework for regional structural controls of ore deposits became possible. Summary works on the relationships between plate tectonics and mineral deposits include Russell (1968), Dmitriev et al. (1971), Pereira and Dixon (1971), Mitchell and Garson (1972, 1976), Sawkins (1972, 1974), Sillitoe

(1972, 1972a, 1974, 1974a), Snelling (1972), Livingstone (1973), Marsh (1973), Mitchell (1973, 1974, 1975), Mitchell and Bell (1973), Tarling (1973), Watson (1973), Badham (1974), Corliss (1974), Harding (1974), Sangster (1974), Sato (1974) and Bonatti (1975, 1978).

With the advent of satellite imagery, large scale linear features, trends, and structures can be determined with a high degree of certainty. The use of Landsat imagery in mineral exploration has been discussed by: Saunders et al. (1973), Collins et al. (1974), Rowan et al. (1974), Sawatzky et al. (1975, 1975a), Richards and Walraven (1975), Halbouty (1976, 1980), Hodgson (1977), Kutina (1977), Ligget and Childs (1977), Lyon (1977), Salas (1977), Sawatzky and Raines (1977), Schmidt and Bernstein (1977), Shurr (1977), Birnie and Dykstra (1978), Carter (1978), Green et al. (1978), Misra (1978), Prelat et al. (1978), Punongbayan et al. (1978), Suwijanto (1978), Taranik et al. (1978) and Vincent et al. (1978).

Satellite imagery has been utilized in Alaska for the definition of major linear features by Lathram (1972), Lathram and Raynolds (1977), and Maurin and Lathram (1977). Several 1:250,000 scale quadrangle studies of linear features in mineral potential areas have been made by Albert and Steele (1976a, 1976b), Halbouty (1976, 1980), Albert (1978), Albert and Steele (1978), Albert et al. (1978), Steel and Albert (1978a, 1978b), Steele and Le Compte (1978) and Le Compte (1979). The use of Landsat imagery for resource evaluation has been discussed by Anderson et al. (1973), Stringer et al. (1975) and Albert and Chavez (1977).

Although none of these investigations attempted to examine the relationship between major linear and structural features and ore deposits on a regional scale, the studies did provide a framework for such an examination.

Procedure

Three hundred and fifty-six major mineral occurrences were plotted on a 1:1,000,000 scale base map of Alaska. Ninety-five low sun angle band 5, 6 and 7 Landsat images covering all of Alaska were selected and a linear interpretation was completed for each frame. The linear data was then digitized, computer processed, and histograms were created with class intervals of one degree for both the total number of linears and length weighted linears. The data were output in the form of a rose diagram along with plots of the individual linears for each frame. The output data are included in Appendix I.

The Landsat frame boundaries were plotted on the 1:1,000,000 scale base map and the rose diagrams were plotted at the center of each frame. In addition to the rose diagrams and mineral occurrences, the major mapped faults were plotted on the 1:1,000,000 scale map. The map is in six sheets, Plates I-VI in pocket.

Since the mineral deposit density for each frame was less than ten, no attempt was made to contour occurrence densities. Albert and Steele (1976a) have demonstrated that there are relationships between linear densities and mineral occurrences in highly mineralized areas, such as the McCarthy quadrangle, with approximately 100 mineral occurrences. Deposit densities would have to exceed 30 per frame or 100 per quadrangle on a regional basis to be statistically significant.

Low sun angle frames were utilized for linear interpretation as the low angles of incidence tend to enhance linear definition. Low sun angle enhancement can be achieved at no additional cost, whereas computer enhancement per frame costs approximately 1500 dollars. In order to test whether the low sun angle enhancement was effective as computer enhancement, the length weighted histograms for the McCarthy, Talkeetna, Ketchikan and Prince Rupert, Philip Smith Mountains and Chandalar areas were compared with the quadrangle interpretations of Albert and Steele (1976a), Steele and Albert (1978a, 1978b), Le Compte (1979) and Albert et al. (1978) respectively. Although the exact areas were not congruous due to the necessity to utilize different images, without exception the major trends identified by the previous workers were duplicated from the low sun angle images. For the McCarthy quadrangle, Albert and Steele (1976a) noted major trends at N 45 W, N 70 W, N 10-15 E, N 45-55 E, N 85-90 E while frame 70/17 (see Appendix and Plate II) indicates trends of N 45-55 W, N 75-80 W, N 0-10 E, N 15-20 E, N 35-40 E, and N 70-75 E. For the Talkeetna quadrangles, Steele and Albert (1978a) noted trends at N 0-10 W, N 30-35 W, N 40-45 W, N 65 W, N 80 W, N 90 W, N 10 E, N 20 E, N 40-45 E, N 60-65 E and N 90 E while frame 76/16 (see Appendix and Plate II) indicates trends of N 15 W, N 35 W, N 45-55 W, N 60-65 W, N 80 W, N 90 W, N 10 E, N 20 E, N 30 E, N 40-45 E, N 60 E and N 90 E. For the Ketchikan and Prince Rupert quadrangles, Steele and Albert (1978b) found trends at N 10 W, N 20-30 W, N 85 W, N 15 E, N 30 E, N 40 E, N 60 E and N 75 E while frame 58/21 (see Appendix and Plate III) indicates trends at N 0-10 W, N 25-30 W, N 40 W, N 25-30 E, N 40 E, N 60 E and N 75 E. For the Philip Smith Mountains quadrangle, Le Compte (1979) found trends at N 20 W, N 35 W, N 55 W, N 65-75 W, N 90 W, N 15-20 E, N 35-40 E, N 55-65 E, N 75 E and N 85 E. Albert et al. (1978) noted trends of N 35 W, N 50 W, N 65-70 W, N 80 W, N 15 E, N 25 E, N 55 E, N 60 E, N 75 E and N 85-90 E for the Chandalar quadrangle while frame 79/12 (see Appendix and Plate I) indicates trends of N 15 W, N 60 W, N 90 W, N 15 E, N 35 E, N 60 E, N 75 E and N 85 E. The low sun angle frames thus produced the same results at a cost savings of approximately 142,500 dollars if extrapolated for the entire area under investigation.

Seven Landsat frames were selected for ratio analysis in order to facilitate location of major ferric/ferrous alteration suites associated with major mineral occurrences. Mineral occurrences at high latitude or elevation were selected to minimize the effects of tundra or lichen cover. However, selection of the images was constrained by the long periods of snow cover at high latitude or elevation. The ratio analysis work was subcontracted to Geo Spectra Corporation, Ann Arbor, Michigan.

Linear Orientations and Tectonic Settings

Tectonic settings and mineral deposit models

With the development of the plate tectonic hypothesis (Wilson, 1965) a comprehensive model of the outer layer of the earth was formulated. The hypothesis states that the outer layer, or lithosphere, is divided into 12 major and over 30 minor rigid plates between 80 and 100 km thick that move in response to force fields generated in the earth's mantle. Seismicity, volcanism, orogeny, post orogenic uplift and mineralization are concentrated at the boundaries of these plates. The boundaries can be classified into three groups: constructive, destructive and conservative.

At constructive plate boundaries new lithosphere is created and consists of a layer of oceanic crust overlying upper mantle. The new lithosphere is created along an oceanic spreading ridge system in which material moves outward at right angles from the ridge axis at rates up to 10 cm/yr.

At destructive plate boundaries oceanic lithosphere is bent downward in a subduction or Benioff zone beneath another plate. At this junction above the Benioff zone a curved belt of active volcanoes is generated. This magmatic arc may be of the cordilleran type formed at the continental margin or it may be of the island arc type formed on oceanic crust.

At conservative plate boundaries two plates slide past each other along transform or strike-slip faults. Transform faults are generated at right angles to spreading ridges, offset the spreading centers, and may extend on to the continents.

The process of continental rifting, breakup and collision has been summarized by Burke and Wilson (1976). The sequence begins by doming of the continent over a mantle plume or hot spot, thinning of the lithosphere, development of a three armed rift pattern or triple junction and formation of new oceanic crust. Generally two of the rift arms remain active while the third arm fails. Upon closing of the ocean basin and completion of the cycle an island arc or Andean type magmatic belt is formed along the leading edge of the converging continent above the subduction zone. With the final closing of the ocean basin a folded mountain belt is formed and the original crustal suture is preserved as a major fault zone, often a strike-slip fault.

The significance of plate boundaries in the localization of ore deposits has been discussed by Mitchell and Garson (1976), Bonatti (1975, 1978) and others. Figure 1 (From Mitchell and Garson, 1976) is a schematic cross section through plate boundaries showing the tectonic settings and related mineral deposits. Figures 1A-1D correspond to constructive or tensional tectonic settings, Figures 1E through 1J correspond to destruction or compressional tectonic settings. Figures 1F and 1G contain minor tensional tectonic settings, notably incipient rifting associated with inter-arc or marginal basins. Conservative or transform fault tectonic settings are at

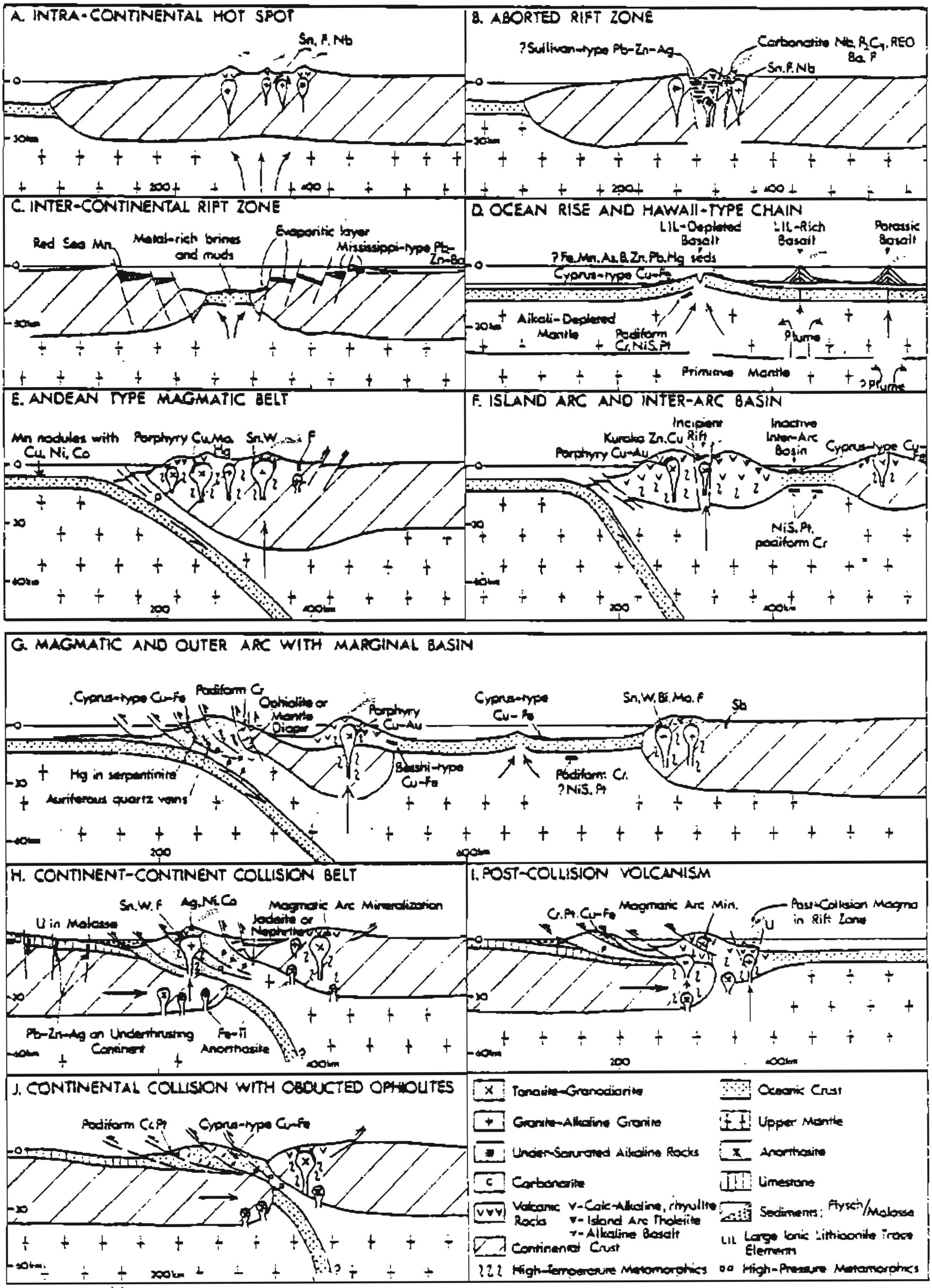

Figure 1. Schematic cross-section through plate boundary-related tectonic settings (From Mitchell and Garson, 1976).

right angles to the schematic sections. The schematic sections indicate the particular petrologic associations, elemental associations, and relative motions that define a particular tectonic setting. Table 1 gives examples of mineral deposits for each of the tectonic settings in Figure 1.

In addition to characteristic petrologic and elemental associations and plate dynamics, plate tectonic settings exhibit distinctive fracture patterns. From theoretical rock mechanics and experimentation it is known that a brittle material will develop a conjugate fracture pattern 45 degrees from the principle stress direction under a compressive load. Badgley (1959) has demonstrated that due to internal friction most lithologic materials will fail at 30 degrees from the principle stress direction rather than at the theoretical 45 degree angle. Under a tensional load the brittle material will fail at right angles to the principle stress direction. With the application of a shear load the material will fail parallel to the shear load direction.

Major fracture patterns thus can be used to additionally constrain models of plate tectonic settings. Orthogonal or right angle intersections are predominant in constructive or tensional tectonic settings; acute intersections dominant in destructive or compressional settings; and fracture patterns parallel to major transform faults in conservative settings.

Tensional tectonic settings and Alaskan mineral occurrences

The relationship of orthogonal fracture patterns and rift system related ore deposits was noted by Russell (1968). Scott (1980) has demonstrated that Landsat imagery can be utilized to define major orthogonal fracture patterns, and that the intersection of the major linears localize

Table 1. Plate tectonic settings for the formation and emplacement of ore bodies (From Mitchell and Garson, 1976).

PLATE TECTONIC SETTING		Formation	Emplacement	Exposure	TYPE	EXAMPLE: LOCALITY	EXAMPLE: AGE
OCEANFLOOR SPREADING RELATED	Intercontinental Hot Spots and Rift Zones	✓		✓	Tin-fluorite – niobium	Nigerian tin fields	Jurassic
		✓		✓	Carbonatite mineralization (Nb, Ce, P, Sr, Ba)	East African rift	Jurassic to present
		✓		✓	Benue-type lead deposits	Benue trough, Nigeria	Cretaceous (?)
		✓		✓	Sullivan-type marine sulphides	Sullivan mine, Br. Columbia	Proterozoic (?)
	Intercontinental Rift Zones	✓		✓	Metal-rich muds (Zn, Cu)	Red Sea deeps	Quaternary
		✓		✓	Mississippi Valley lead-zinc-barite	Red Sea coast, Saudi Arabia	Cenozoic
	Oceanic Rises and Ocean Floor	✓			Cyprus-type copper-lead-zinc massive sulphides	None exposed	
		✓			Podiform chromite	None exposed	
		✓			Nickel and platinum sulphides	None exposed	
		✓		✓	Manganese nodules	Pacific Ocean floor	Quaternary
SUBDUCTION RELATED	Island Arc Magmatic Belts	✓		✓	Porphyry copper – gold	Bougainville, Solomon Islands, Philippines	Late Cenozoic
		✓		✓	Mercury		Tertiary
		✓		✓	Kuroko-type zinc-copper-lead	Kosaka, Honshu, Vanua Levu	Miocene
		✓		✓	Auriferous quartz veins	Hauraki Peninsula, Fiji, N. Zealand	Late Tertiary Early Tertiary
		✓		✓	Gold tellurides and auriferous sulphides	Vatukoula, Fiji	Pliocene
		✓		✓	Besshi-type massive sulphides	Besshi, Japan	Early Mesozoic ?
		✓		✓	Native sulphur – pyrite	Japan	Quaternary
	Andean Type Magmatic Belts	✓		✓	Porphyry copper – molybdenum	Braden, Chile	
		✓		✓	Tin-tungsten-fluorite	Eastern Cordillera, Peru	Pliocene
	Back Arc Continental Margin Magmatic Belts	✓		✓	Tin-tungsten-fluorite	South China	Late Mesozoic
		✓		✓	Antimony	Eastern Burma	Late Mesozoic ?
	Back Arc Basins	✓			Resembles ocean rise and floor deposits	None exposed	
		✓		✓	Epithermal gold-silver veins	Basin and Range Province	Tertiary
	Outer Arcs	✓		✓	Auriferous quartz veins	? Chin Hills, Burma	Eocene
		✓		✓	Mercury	Coast Ranges, California	Late Mesozoic ?
			✓	✓	Ocean rise and ocean floor or back arc basin deposits	None exposed	
COLLISION RELATED	Continental Collision Magmatic Belts	✓		✓	Tin-tungsten-fluorite	Cornwall, Erzgebirge	Early Permian
		✓			Iron-titanium in anorthosites		
		✓		✓	Native silver nickel cobalt arsenide	Cornwall, Erzgebirge	Early Permian
		✓		✓	Gemstone deposits ?	Pakistan and Burma	Tertiary ?
	Continental Collision Tectonic Belts	✓		✓	Island arc magmatic belt deposits: Porphyry copper	Coed-y-Brenin, Wales	Paleozoic
					Island arc magmatic belt deposits: Mercury		
					Island arc magmatic belt deposits: Kuroko-type	Umm Samiuki, Egypt Buchans, Newfoundland	Proterozoic Paleozoic
					Island arc magmatic belt deposits: Auriferous quartz veins		
					Island arc magmatic belt deposits: Besshi-type sulphides		
					Island arc magmatic belt deposits: Iron-titanium in anorthosites	Grenville Province, Canada	Proterozoic
	Obducted Ophiolites		✓	✓	Ocean ridge and floor and back arc basin deposits: Cyprus-type sulphides	Cyprus ? Betts' Cove, Newfoundland	Cyprus – Late Mesozoic Betts' Cove – Lower Paleozoic
					Ocean ridge and floor and back arc basin deposits: Podiform chromite	Philippines	Late Mesozoic to Early Tertiary
					Ocean ridge and floor and back arc basin deposits: Nickel and plat. sulphides	Philippines	
					Ocean ridge and floor and back arc basin deposits: ? Manganese nodules	Semail nappe, Oman	Late Mesozoic
	Interior of Underthrusting Continents	✓		✓	Irish-type base metal deposits	Navan, Silvermines, Ireland	Early Carboniferous
		✓		✓	Stratabound uranium	Molasse facies sediments, Himalayas	Tertiary
	Post-collision Magmatic Belts	✓		✓	Uranium-rich alkaline rocks	Rome igneous province	Quaternary
TRANSFORM FAULTS	Oceanic Transform Faults	✓		✓	Metal-rich muds	Red Sea Deeps	Quaternary
		✓		✓	Hydrothermal base metal deposits (Zn–Pb–Ba–Sr)	Red Sea Coast	Miocene
		✓			Copper and nickel sulphides in ultramafic rocks	St John's Island, Red Sea Gabbro Akarem, Egypt	Proterozoic (?)
	Continental Transform Fractures	✓		✓	Carbonatite (Nb, P, Ce, Ba) mineralization	Angola	Mesozoic/Cenozoic
		✓		✓	Kimberlite diamonds	Angola	Mesozoic, Cenozoic
		✓		✓	Porphyry copper	N. America, Philippines	Mesozoic/Cenozoic

the occurrence of the incipient rift system related Kuroko type Zn-Cu-Pb-Ag deposits.

Table 2 includes a brief description of the major mineral occurrences in Alaska shown on Plates I through VI. From the petrologic and elemental associations and orthogonal linear features, rift system related mineral occurrences can be inferred in the Brooks Range, southeastern Alaska, the north flank of the Alaska Range, east central Alaska, the lower Kuskokwim River area and the Seward Peninsula. The occurrences on the Seward Peninsula and east central Alaska may be as old as the late Precambrian while the oldest occurrences, and also the best documented, are those in the Brooks Range. These span the Devonian through the Carboniferous.

Carboniferous active and aborted rift systems or aulocogens have been inferred or documented in the following areas of the circumarctic:

The Selwyn Basin (Templeman-Kluit, 1979; Carne, 1979); the Sverdrup Basin (Sweeney, 1977); Perry Land, northern Greenland and James Land, east Greenland (Haller, 1969); Spitzbergen (Sokolov et al., 1973); and eastern Siberia (Bazanov, et al., 1976; Fujita, 1978).

Evidence for Carboniferous and Permian incipient rifting in the northern Brooks Range has been presented by Metz (1979) and Metz et al. (1979). The evidence includes sedimentary and igneous petrologic data, presence of high angle fault systems, gravity and magnetic data and mineral deposit associations. The model can be outlined as follows:

A. Regional doming of the Precambrian basement of northeastern Alaska and northwestern Yukon Territory and emplacement of Sn-W-Mo-F-U-P bearing granites between 430 - 405 m.y. B.P. over an intracontinental hot spot;

Table 2. Mineral occurrence descriptions keyed to Plates I, II, III, IV, V and VI

Plate Occur. Number	Occurrence Name 1)	Commodity 1)	Host Rock Type 2)	Host Rock Age 2)	Landsat Linear Orientation	Tectonic Setting	Comments 4)
I-1	Picnic Creek	Cu, Zn	Metamorphosed siliceous vol- canics	Devonian	N25E, N65W	F	
2	Walker Lake	Cu, Zn	Metamorphosed siliceous vol- canics	Devonian	N25E, N65W	F	
3	Unnamed	Sn, W	granite & quartz monzonite	Devonian	N25E, N65W	E	

Note: 1) Source of data primarily Hawley (1979)
2) Source of data, Beikman (1974)
3) See Figure 2 and Table 1; A) intra-continental hot spot, B) aborted rift zone, C) inter-continental rift zone, D) oceanic rise and Hawaii type chain, E) Andean type magmatic belt, F) island arc and inter-arc basin, G) magmatic and outer arc with marginal basin, H) continental-continental collision belt, I) post collision volcanism, J) continental collision with obducted ophiolites, K) transform fault related.
4) Source of data: see individual citations; placer production data, Robinson and Bundtzen (1979).

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-4	R-0	Cu, Zn	metamorphosed siliceous volcanics	Devonian	N25E, N65W	F	
5	Arrigetch Peaks	Cu, Zn, W, Sn	granite & quartz monzonite	Devonian	N25E, N65W	B	
6	Ann	Pb, Zn, Ag	metamorphosed siliceous volcanics and sediments	Devonian	N-S, N25E, N65W, E-W	F	
7	Abo	Zn, Pb, Ag	argillaceous limestone	Lower-Middle Paleozoic	N-S, N25E, N65W, E-W	C	
8	Unnamed	Cu, Pb, Zn	metamorphosed siliceous volcanics and sediments	Devonian	N-S, N25E, N65W, E-W	F	
9	Unnamed	Cu	metamorphosed siliceous volcanics and sediments	Devonian	N-S, N25E, N65W, E-W	F	
10	Wiseman District	Au	alluvial placers, greenschist facies metamorphic bedrock		N.A.		Past production
11	Unnamed	Cu	granite & quartz monzonite	Devonian	N10E, N35E, N55E, N75E, N65W, E-W	B	Past production 290,000 oz Au (Robinson & Bundtzen, 79)

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-12	Unnamed	Cu	granite & quartz monzonite	Devonian	N10E, N35E, N55E, N75E, N65W, E-W	B	
13	Unnamed	Mo, Cu	granite & quartz monzonite	Devonian	N10E, N35E, N55E, N75E, N65W, E-W	B	
14	Chandalar Dist.	Au	quartz vein in metasediment & metavolcanics	Lower-Paleozoic	N10E, N35E, N55E, N75E, N65W, E-W	G	
15	Unnamed	Cu	mafic volcanics	Missis-sippian	N-S, N10E, N25E, N50E, N70E, N10W, E-W	C	
16	Unnamed	Mo, W, Sn, U Pb, Zn	granite & quartz monzonite	Devonian	N-S, N10E, N25E, N50E, N70E, N10W, E-W	A	
17	Bonanza Creek	W	granite & quartz monzonite	Mesozoic	N25E, N60E, N75E, N65W	H	
18	Unnamed	Pb, Zn	granite & quartz monzonite	Mesozoic	N25E, N60E, N75E, N65W	H	
19	Unnamed	Cr	ultramafic complex	Mesozoic	N25E, N60E, N75E, N65W	I	
20	Unnamed	U	granite & quartz monzonite	Mesozoic	N25E, N60E, N75E, N65W	I	
21	Hog River	Au	alluvial placer		N.A.		Past production 201,000 oz Au

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-22	Utopia Creek	Au	alluvial placer		N.A.		Past production included in Hog River
23	Hot Springs Dist.	Au, Sn	alluvial placers, greenschist facies metamorphic bedrock		N.A.		Past production, 447,900 oz Au
24	Rampart Dist.	Au	alluvial placers, greenschist facies metamorphic bedrock		N.A.		Past production, 86,800 oz Au
25	Livengood Dist.	Au	Alluvial placers, greenschist facies metamorphic bedrock		N.A.		Past production, 375,000 oz Au
26	Unnamed	Ni	alluvial placers, greenschist facies metamorphic bedrock		N.A.		
27	Mo	Pb, Zn	carbonaceous shale & chert	Middle to Upper Paleozoic	N05E, N20E, N40E, N75E N40W, E-W	C	
28	Unnamed	Pb, Zn	carbonaceous shale & chert	Middle to Upper Paleozoic	N05E, N20E, N40E, N75E, N40W, E-W	C	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-29	Cache Mt.	U, Pb, Zn	granite & quartz monzonite	Mesozoic	N05E, N20E, N40E, N75E, N40W, E-W	H	
29a	Mt. Schwatka	Pb, Zn, Ag	limestone & shale	Middle to Upper Pale-ozoic	N05E, N20E, N40E, N75E, N40W, E-W	C	
29b	Mt. Prindle	U	syenite	Mesozoic	N05E, N20E, N40E, N75E, N40W, E-W	H	
30	Unnamed	W	?		N05E, N20E, N40E, N75E, N40W, E-W		
31	Unnamed	Sn, W, Au	granite & quartz monzonite	Mesozoic	N05E, N20E, N40E, N75E, N40W, E-W	H	
32	Circle District	Au	alluvial pla-cers, green schist facies metamorphic bedrock		N.A.		Past production, 730,000 oz Au
33	Nome Creek area	Au	alluvial pla-cers, green-schist facies metamorphic bedrock		N.A.		Past production, included in Circle
34	Woodchopper-Coal Creek area	Au	alluvial placer		N.A.		Past production, included in Circle

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-35	Unnamed	Pb, Zn	carbonaceous shale and limestone	Precambrian	N15E, N45E, N50W	C	
36	Casca VABM	Ag	carbonaceous shale and limestone	Precambrian	N15E, N45E, N50W	C	
37	Three Castle Mt.	Ag	carbonaceous shale and limestone	Precambrian	N15E, N45E, N50W	C	
38	Pleasant Creek	Ag	carbonaceous shale and limestone	Precambrian	N15E, N45E, N50W	C	
39	WGM Deer Creek	Mo, Ag	granitic rocks undifferentiated	Mesozoic	N15E, N45E, N50W	K	
40	Unnamed	Zn, Pb, Cu	mafic marine volcanics	Paleozoic	N15E, N45E, N50W	B	
41	Unnamed	Pb, Zn	mafic marine volcanics	Paleozoic	N20E, N50E, N45W, N65W, N85W	B	
42	Forty Mile Dist.	Au					Past production, 4000,000 oz Au
43	Mt. Veta Oscar	Ag	syenite	Jurassic	N20E, N50E, N45W, N65W, N85W	B	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-44	Unnamed	Pb, Zn	granitic rocks undifferentiated	Jurassic	N20E, N50E, N45W, N65W, N85W	B	
45	Twin Mt.	W	granitic rocks undifferentiated	Jurassic	N20E, N50E, N45W, N65W, N85W	B	
46	Pedro Dome - Cleary Summit - Gilmore Dome area	Au	alluvial placers		N.A.		Past production, 7,464,200 oz Au
47	Soo, Cleary Hill and Hi-Yu Mines	Au, Ag, Pb, Zn, Sb, W	quartz vein in greenschist facies metamorphics	Precambrian or Lower Paleozoic	N05E, N20E, N40E, N75E, N40W, E-w	H	Past lode production, 250,000 oz, Au average grade 1 oz per ton
48	Ester Dome area	Au	alluvial placers		N.A.	H	Past production, included in Pedro Dome
49	Ryan Lode and Grant mine	Au, Sb	quartz veins & shear zone in greenschist facies metamorphics	Precambrian or Lower Paleozoic	N05E, N20E, N40E, N75E, N40W, E-W	H	Surface and underground development work
50	Caribou Creek area	Au	alluvial placers		N.A.		Past production included in Richardson
51	Richardson Dist.	Au	alluvial placers		N.A.		Past production, 95,000 oz Au
52	Bonnifield Dist.	Au	alluvial placers		N.A.		Past production, 45,000 oz Au

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
I-53	Liberty Belle	Au	siliceous volcanics & sediments	Middle to Upper Paleozoic	N-S, N50E, N80E, N50W	F	
54	Poorman-Long Dist.	Au	alluvial placers		N.A.		Past production
55	Gold Hill Dist.	Au	alluvial placers		N.A.		Past production

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-1	Red Top	Ag	metasedimentary & metavolcanics	Precambrian or Lower Paleozoic	N-S, N55E, N85E, N45W	H	
2	Little Annie	Ag, Pb	metasedimentary & metavolcanics	Precambrian or Lower Paleozoic	N-S, N55E, N85E, N45W	H	
3	Banjo	Au, Ag, Pb	metasedimentary & metavolcanics	Precambrian or Lower Paleozoic	N-S, N55E, N85E, N45W	H	
4	Caribou Creek	Au	alluvial placers				
5	Stampede	Sb	metasedimentary & metavolcanics	Precambrian or Lower Paleozoic	N-S, N55E, N85E, N45W	H	
6	Unnamed	Zn	metamorphosed siliceous volcanics & sedimentary	Middle to Upper Paleozoic	N-S, N55E, N85E, N45W	F	
7	Unnamed	Zn, Pb, Ba	metamorphosed siliceous volcanics & sedimentary	Middle to Upper Paleozoic	N-S, N55E, N85E, N45W	F	
8	Sheep Creek	Zn, Pb, Ag, Au	metamorphosed siliceous volcanics & sedimentary	Middle to Upper Paleozoic	N-S, N55E, N85E, N45W	F	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-9	Anderson Mt.	Zn, Pb, Ag, Au	metamorphosed siliceous vol-canics & sedi-mentary	Middle to Up-per Paleozoic	N-S, N55E, N85E, N45W	F	
10	Virginia Creek	Zn, Pb, Ag, Au	metamorphosed siliceous vol-canics & sedi-mentary	Middle to Up-per Paleozoic	N-S, N55E, N85E, N45W	F	
11	Dry Creek	Au, Ag, Zn, Pb	metamorphosed siliceous vol-canics & sedi-mentary	Middle to Up-per Paleozoic	N-S, N55E, N85E, N45W	F	
12	Rock Candy	Zn, Pb, Cu	metamorphosed siliceous vol-canics & sedi-mentary	Middle to Up-per Paleozoic	N15E, N50E, E-W, N45W, N70W	F	
13	Mosquito	Cu, Mo	granite or quartz monzo-nite	Mesozoic	N20E, N50E, N45W, N65W	E	
14	Taurus	Cu, Mo	granite or quartz monzo-nite	Mesozoic/ Tertiary	N20E, E-W, N55W	E	
15	Bluff	Cu, Mo	granite or quartz monzo-	Mesozoic/ Tertiary	N20E, E-W, N55W	E	
16	Pushbush	Cu, Mo	granite or quartz monzo-nite	Mesozoic/ Tertiary	N20E, E-W N55W	E	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-17	Mt. Fairplay	U	syenite or peralkaline granite	Tertiary	N20E, E-W, N55W	I	
18	Peternie	Mo, Cu	granite to quartz monzonite	Mesozoic/ Tertiary	N20E, E-W N55W	E	
19	B.C.	Au	granodiorite to quartz diorite	Cretaceous	N20E, E-W, N55W	F	
20	Asarco	Cu, Mo	granite to quartz monzonite	Mesozoic	N20E, E-W N55W	E	
21	Dry Tok	Sb	metamorphosed sedimentary	Precambrian to Lower Paleozoic	N15E, N50E, E-W, N45W, N70W	G	
22	Tok	Zn, Pb, Cu, Ag	metamorphosed siliceous volcanics & sedimentary	Middle to Upper Paleozoic	N15E, N50E, E-W, N45W, N70W	F	
23	Rumble Creek	Zn, Pb, Cu, Ag	metamorphosed siliceous volcanics & sedimentary	Middle to Upper Paleozoic	N15E, N50E, E-W, N45W N70W	F	
24	Chistochina Dist.	Au	alluvial placer		N.A.		

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-25	Pass Creek Denali	Cu	mafic marine volcanics	Mesozoic	N15E, N45E, N60E, E-W, N35W	G	
26	Tammany Channel - Valdez Creek	Au	alluvial placer		N.A.		
27	Lichen	Cu	mafic marine volcanics	Upper Paleozoic	N25E, N45E, N70E, N45W, N75W	G	
28	Nim	Cu, Mo, Ag	granodiorite to quartz diorite	Tertiary	N-S, N55E, N85E, N45W	E	
29	Golden Zone	Au, Cu, Ag	granite to quartz mon-zonite	Tertiary	N-S, N55E, N85E, N45W	F	
30	Ohio Creek	Sn, W, Ag	granite to quartz mon-zonite	Tertiary	N05E, N20E, N40E, N65E, E-W, N45W, N65W	E	
31	Ready Cash	Pb, Ag, Sn	mafic volcanics	Permian/ Triassic	N05E, N20E, N40E, N65E, E-W, N45W, N65W	D	
32	Partin Creek	Au, Cu	mafic volcanics	Permian/ Triassic	N05E, N20E, N40E, N65E, E-W, N45W, N65W	D	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-33	Coal Creek	Sn	granite to quartz monzonite	Tertiary	N05E, N20E, N40E, N65E, E-W, N45W, N65W	E	
34	Portage Creek	Mo	granite to quartz monzonite	Tertiary	N05E, N20E, N40E, N65E, E-W, N45W, N65W	F	
35	Mt. Eielson	Zn, Pb	metamorphosed siliceous volcanics and sedimentary	Triassic/ Upper Paleozoic	N-S, N55E, N85E, N45W	F	
36	Twin Hills	Cu, Pb, Zn	metamorphosed siliceous volcanics and sedimentary	Triassic/ Upper Paleozoic	N-S, N55E, N85E, N45W	F	
37	Carlson Creek	Cu, Pb, Zn	metamorphosed siliceous volcanics and sedimentary	Triassic/ Upper Paleozoic	N05E, N20E, N40E, N65E, E-W, N45W, N65W	F	
38	Cache Creek	Au	alluvial placer		N.A.		
39	Peters Creek	Au	alluvial placer		N.A.		
40	Iron Creek	Cu	mafic marine volcanics	Pennsylvanian/ Permian	N05E, N20E, N40E, N65E, E-W, N45W, N65W	D	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-41	Indian	Ag, Pb	granite to quartz monzonite	Mesozoic	N15E, N50E, E-W, N45W, N70W	K	
42	Unnamed	Mo, Cu	granite to quartz monzonite	Mesozoic	N15E, N50E, E-W, N45W, N70W	K	
43	Silver Creek	Ag, Pb	granite to quartz monzonite	Mesozoic	N15E, N50E, E-W, N45W, N70W	K	
44	Unnamed	Au	granite to quartz monzonite	Mesozoic	N15E, N50E, E-W, N45W, N70W	K	
45	Monte Cristo Creek	Mo	granodiorite to quartz diorite	Mesozoic	N20E, E-W, N55W	K	
46	White Mt. Mine	Au	mafic marine volcanics	Mesozoic	N20E, E-W, N55W	D	
47	Orange Hill	Cu, Mo	granodiorite to quartz diorite	Tertiary	N20E, E-W, N55W	K	
48	Bond Creek	Cu, Mo	granodiorite to quartz diorite	Tertiary	N20E, E-W, N55W	K	
49	East Bond Creek	Mo, Cu	granodiorite to quartz diorite	Tertiary	N20E, E-W, N55W	K	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-50	Nabesna Glacier	Zn, Cu	mafic volcanics	Triassic	N20E, E-W, N55W	D	
51	Chisana Dist.	Au	alluvial placer		N.A.		
52	Carl Creek	Cu	granodiorite to quartz diorite	Cretaceous	N20E, E-W, N55W	K	
53	Horsfeld	Cu	granodiorite to quartz diorite	Cretaceous	N20E, E-W, N55W	K	
54	Baultoff	Cu	granodiorite to quartz diorite	Cretaceous	N20E, E-W, N55W	K	
55	Beaver Creek	Cu	granodiorite to quartz diorite	Tertiary	N20E, E-W, N55W	K	
56	Gold Cord	Au, W, Pb	granodiorite to quartz diorite	Tertiary	N25E, N45E, N70E, N45W, N75W	E	
57	Independence	Au, W, Pb, Zn	granodiorite to quartz diorite	Mesozoic ?	N25E, N45E, N70E, N45W, N75W	E	
58	War Baby - Lucky Shot	Au, W, Pb, Zn	granodiorite to quartz diorite	Mesozoic ?	N25E, N45E, N70E, N45W, N75W	E	
59	Eklutna	Cr	peridotite	Mesozoic	N25E, N50E, N75E, N85W	G	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-60	Bernard Mt.	Cr	dunite	Mesozoic	N-S, N55E, E-W, N40W, N55W	G	
61	Spirit Mt.	Ni, Co, Pt, Cu	Peridotite	Mesozoic	N-S, N20E, N75E, N60W, N85W	G	
62	Berg	Cu	mafic volcanics	Mesozoic	N-S, N20E, N75E, N60W, N85W	D	
63	London and Cape	Cu	mafic volcanics	Mesozoic	N-S, N20E, N75E, N60W, N85W	D	
64	Jumbo - Bonanza	Cu, Ag	limestone - mafic volcanic contact	Mesozoic	N-S, N20E, N75E, N60W, N85W	?	
65	Green Butte	Cu	mafic volcanics	Mesozoic	N-S, N20E, N75E, N60W, N85W	D	
66	Peavine	Cu	mafic volcanics	Mesozoic	N-S, N20E, N75E, N60W, N85W	D	
67	Nelson	Cu, Ag	mafic volcanics	Mesozoic	N-S, N20E, N75E, N60W, N85W	D	
68	Binocular	Cu, Ag	mafic volcanics	Mesozoic	N-S, N20E, N75E, N60W, N85W	D	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-69	Dan Creek	Au, Ag	alluvial placer		N.A.		
70	Chitita	Au	alluvial placer		N.A.		
71	Midas	Cu, Ag	mafic marine volcanics	Tertiary	N-S, N55E, E-W, N40W, N55W	D	
72	Cliff	Au	quartz veins in greywacke and argillite	Cretaceous	N-S, N55E, E-W, N40W, N55W	G	
73	Fidalgo - Alaska	Cu	mafic marine volcanics	Tertiary	N-S, N55E, E-W, N40W, N55W	D	
74	Threeman Mining Company	Cu	mafic marine volcanics	Tertiary	N-S, N55E, E-W, N40W, N55W	D	
75	Landlocked Bay Copper	Cu	marine mafic volcanics	Tertiary	N-S, N55E, E-W, N40W, N55W	D	
76	Ellamar	Cu, Au	marine mafic volcanics	Tertiary	N-S, N55E, E-W, N40W, N55W	D	
77	Rua Cove	Cu, Zn	marine mafic volcanics	Tertiary	N20E, N35E, N60E, N80E, N20W, N60W	D	
78	Ratoucke - Beatson	Cu, Au, Ag, Ni	marine mafic volcanics	Tertiary	N20E, N35E, N60E, N80E, N20W, N60W	D	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
II-79	Horeshoe Bay	Cu, Au, Ag, Pb	marine mafic volcanics	Tertiary	N20E, N35E, N60E, N80E, N20W, N60W	D	
80	Granite	Au	quartz veins in greywacke & argillite	Cretaceous	N25E, N50E, N75E, N85W	G	
81	Banner	Au	quartz veins in greywacke & argillite	Cretaceous	N25E, N50E, N75E, N85W	G	
82	Resurrection Creek	Au	quartz veins in greywacke & argillite	Cretaceous	N25E, N50E, N75E, N85W	G	
83	Lucky Strike	Au	quartz veins in greywacke & argillite	Cretaceous	N25E, N50E, N75E, N85W	G	
84	Gilpatrick	Au	quartz veins in greywacke & argillite	Cretaceous	N25E, N50E, N75E, N85W	G	
85	Goyne	Au	greywacke & argillite	Mesozoic	N20E, N35E, N65E, N25W, N65W	G	
86	Glass	Au	greywacke & argillite	Mesozoic	N20E, N35E, N65E, N25W, N65W	G	
87	Nukalaska	Au	greywacke & argillite	Mesozoic	N20E, N35E, N65E, N25W, N65W	G	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-1	Mt. Fairweather	Ni, Cu	mafic-ultramafic	Mesozoic	N20E, E-W, N15W, N40W, N60W	G	
2	Margerie Glacier	Cu, Au, W	mafic marine volcanics	Paleozoic	N20E, E-W N15W, N40W, N60W	G	Inferred tungsten reserved 32 million pounds
3	Orange Point	Zn, Cu	mafic marine volcanics	Paleozoic	N20E, E-W, N15W, N40W, N60W	G	
4	Leroy	Au, Cu	greywacke-argillite	Paleozoic	N20E, E-W, N15W, N40W, N60W	G	
5	Bruce Hills	Mo, Cu	quartz monzonite	Cretaceous	N20E, E-W, N15W, N40W, N60W	E	
6	Nunatak	Mo	quartz monzonite	Cretaceous	N20E, E-W, N15W, N40W, N60W	E	Large low-grade porphyry Mo deposit; reserves of 8.5 million tons of 0.125% MoS_2 or 91.5 million tons of 0.080% MoS_2.
7	Marmot	Pb, Zn, Cu, Ag, Ba	mafic marine volcanics	Paleozoic	N20E, N85E, N20W, N40W	F	Unit of 60% barite 48-80 feet thick with Ag values, a basal unit 2-8 feet thick of massive sulfide 2% Pb, 3% Zn, 1% Cu, 2-4 oz per ton Ag & 0.12 oz per ton Au.

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-8	Kensington	Au	mafic marine volcanics	Mesozoic & Paleozoic	N20E, E-W, N15W, N40W, N60W	G	
9	Jualin	Au	mafic marine volcanics	Mesozoic & Paleozoic	N20E, E-W, N15W, N40W, N60W	G	
10	William Henry Bay	U, Ti, Mo	syenite and peralkaline granite	Mesozoic	N20E, E-W, N15W, N40W N60W	I	Resources of several hundred million lbs of $U_3 O_8$ in porphyry type deposit.
11	Dundas Bay	Cu	granodiorite & quartz diorite	Cretaceous	N20E, E-W, N15W, N40W, N60W	E	
12	Brady Glacier	Ni, Cu, Co, Pt	gabbro	Mesozoic	N20E, E-W, N15W, N40W, N60W	G	In layer mafic-ultramafic intrusion; probable reserves of 200 to 300 million tons of 0.5% Ni (in sulfides) & 0.3% Cu; one of top two nickel reserves in the U.S.
13	Lituya Beaches	Au	beach placer		N.A.		
14	Takanis	Ni, Cu, Co	gabbro	Tertiary	N20E, E-W, N15W, N40W, N60W	H	Takanis, Bohemia Basin & Flapjack deposits in layered mafic-ultramafic complexes; in excess of 20.7 million tons of reserves of 0.33-0.51% Ni, 0.21-0.27% Cu, & up to 0.04% Co.

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-15	Bohemia Basin	Ni, Cu, Co, Pb, Zn, Au	gabbro	Tertiary	N20E, E-W, N15W, N40W, N60W	G	
16	Flapjack	Ni, Cu, Co	gabbro	Tertiary	N20E, E-W, N15W, N40W, N60W	G	Substantial reserves of Au mineralization (reserves containing 0.5 to 1 oz per ton Au partially blocked out); past production 10,000 to 15,000 oz Au; area contains significant Pb-Zn-Au sulfide occurrences.
17	Apex El Nido	Au, W	granite	Cretaceous	N20E, E-W, N15W, N40W, N60W	H	Past production between 10,000 & 50,000 oz Au.
18	Funter Bay	Ni, Cu	gabbro	?	N-S, N15E, N50E, N45W, N75W	?	In layered mafic-ultramafic intrusion; probable reserves of 8,000 tons of 1.54% Ni & 0.7% Cu & inferred reserves of several million tons of 0.2% Ni & 0.1% Cu.
19	Eagle River	Au	greywacke-argillite-greenstone	Mesozoic	N-S, N15E, N50E, N45W, N75W	G	
20	Smith & Heid	Au	greywacke-argillite-greenstone	Mosozoic	N-S, N15E, N50E, N45W, N75W	G	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-21	Alaska-Juneau	Au	greywacke-argillite-greenstone	Mesozoic	N-S, N15E, N50E, N45W, N75W		Past production of 3,832,000 oz Au from 88.5 million tons between 1893 & 1944.
22	Treadwell	Au	greywacke-argillite-greenstone	Mesozoic	N-S, N15E, N50E, N45W, N75W	G	Past production of 3,274,600 oz Au from 28.8 million tons between 1885 & 1922.
23	Greens Creek	Zn, Pb, Ag, Au	mafic marine volcanics	Devonian ?	N30E, N70E, E-W, N20W, N35W, N50W	F	Major stratiform massive sulfide with high precious metal content; 20 million oz of recoverable Ag and 200,000 oz of Au in 2.5 million tons of ore.
24	Pyrola	Zn, Pb, Ag	tuffaceous, siliceous shale	Devonian	N30E, N70E, E-W, N20W, N35W, N50W	F	
25	Mirror Harbor	Ni, Cu, Co	gabbro	Tertiary	N20E, E-W, N15W, N40W, N60W	H	Proven reserves 8,000 tons of 2% Ni, inferred reserves 1 million tons 0.3% Ni & 0.08% Co.
26	Chickagoff	Au	greywacke-argillite-greenstone	Mesozoic	N20E, E-W, N15W, N40W, N60W	G	
27	Hirst-Chickagoff	Au	greywacke-argillite-greenstone	Mesozoic	N20E, E-W, N15W, N40W, N60W	G	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-28	Sweetheart Ridge	Au, Cu, Zn	mafic marine volcanics	Mesozoic & Paleozoic	N30E, N70E, E-W, N20W, N35W, N50W	F	
29	Tracy Arm	Zn, Cu, Au	mafic marine volcanics	Mesozoic & Paleozoic	N30E, N70E, E-W, N20W, N35W, N50W	F	
30	Sumdum	Cu, Zn, Au	mafic marine volcanics	Mesozoic & Paleozoic	N30E, N70E, E-W, N20W, N35W, N50W	F	
31	Point Astley	Zn, Pb, Ag	mafic marine volcanics	Mesozoic & Paleozoic	N30E, N70E, E-W, N20W, N35W, N50W	F	
32	Warm Springs Bay	Cu, Mo	granodiorite and quartz diorite	Tertiary	N30E, N70E, E-W, N20W, N35W, N50W	E	
33	Red Bluff Bay	Cr	ultramafic complex	Mesozoic	N30E, N70E, E-W, N20W, N35W, N50W	G	High grade; 570 tons of more than 40% chrome, 29,000 tons of 18-35% chrome.
34	Snipe Bay	Ni, Cu	gabbro	Tertiary	N30E, N70E, E-W, N20W, N35W, N50W	G	
35	Taylor Creek	Pb, Zn	tuffaceous, siliceous shale	Devonian ?	N-S, N45E, N60E, N10W	C	
36	Ground Hog Basin	Zn, Pb	mafic marine volcanics	Mesozoic & Paleozoic	N50E, N10W, N30W	C	Values up to 8% Zn, 8% Pb, 29 oz Ag & 0.5 oz Au per ton.

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-37	Whistle Pig	Ag, Cu	mafic marine volcanics	Mesozoic & Paleozoic	N50E, N10W, N30W	B	
38	Glacier Basin	Zn, Pb	mafic marine volcanics	Mesozoic & Paleozoic	N50E, N10W, N30W	B	
39	North Bradfield River	Cu	granitic	Cretaceous	N50E, N10W, N30W	H	
40	Pitcher Island	U, Th	?	?	N50E, N10W, N30W	?	
41	Blashke Island	Cr, Ni, Co, Pt	ultramafic complex	Cretaceous	N50E, N10W, N30W	G	
42	Hecla	Cu, Pb, Zn, Ag	mafic marine volcanics	Mesozoic	N-S, N20E, N50E, N70E, E-W, N35W	F	
43	Cantu	Mo, Cu, Ag	granodiorite quartz diorite	Tertiary	N-S, N20E, N50E, N70E, E-W, N35W	G	
44	Riverside	W, Pb, Zn, Ag	granodiorite quartz diorite	Tertiary	N-S, N20E, N50E, N70E, E-W, N35W	G	Past production 3000 stu $W0_3$ (between 1941-1946).
45	Borroughs Bay	Mo	granodiorite quartz diorite	Tertiary	N-S, N20E, N50E, N70E, E-W, N35W	G	
46	Quartz Hill	Mo	granodiorite quartz diorite	Tertiary	N-S, N20E, N50E, N70E, E-W, N35W	G	1.5 billion tons at 0.136% M_oS_2 including 200 million tons at 0.20% M_oS_2.

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-47	Moth Bay	Zn, Cu	mafic marine volcanics	Mesozoic & Paleozoic	N-S, N20E, N50E, N70E, E-W, N35W	F	
48	Mamie - Stevenstown	Cu	granodiorite quartz diorite	Cretaceous & Jurassic	N50E, N10W N30W	E	
49	Rich Hill	Cu	granodiorite quartz diorite	Cretaceous & Jurassic	N50E, N10W, N30W	E	
50	Salt Chuck	Pt, Pb, Cu	gabbro	Paleozoic	N50E, N10W, N30W	G	Past production 16,000 oz Pd & minor Pt 1918-1921,1924-26, 1935-41. Inferred reserves 11,895 oz Pd.
51	Rush and Brown	Cu	granodiorite quartz diorite	Cretaceous	N50E, N10W, N30W	E	
52	Pin Peak	Cu, Mo	granodiorite quartz diorite	Cretaceous	N50E, N10W, N30W	E	
53	Flagstaff	Au	granodiorite quartz diorite	Cretaceous	N50E, N10W, N30W	E	
54	Dawson	Au	granodiorite quartz diorite	Cretaceous	N50E, N10W, N30W	E	
55	Noyes Island	Cu, Mo	granodiorite quartz diorite	Cretaceous	N50E, N10W, N30W	E	
56	Coronation Island	Pb, Zn, Cu	limestone	Silurian	N50E, N10W, N30W	C	
57	Baker Island	Mo	granodiorite quartz diorite	Tertiary	N50E, N10W, N30W	E	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
III-58	San Juan Bautista	Cu, Mo	granodiorite quartz diorite	Tertiary	N50E, N10W, N30W	E	
59	Big Harbor	Cu	granodiorite quartz diorite	Tertiary	N50E, N10W, N30W	E	
60	Khayum	Cu, Au, Ag	mafic marine volcanics	Lower Paleozoic	N50E, N10W, N30W	B	8% Cu, 0.25 oz Au & 2.25 oz Ag per ton.
61	Cholmondeley	Zn	mafic marine volcanics	Lower Paleozoic	N50E, N10W, N30W	B	
62	Niblack	Cu, Pb, Zn, Ag, Au	mafic marine volcanics	Lower Paleozoic	N50E, N10W, N30W	B	Past production 1.4 million pounds Cu 1,100 oz Au, 15,000 oz Ag.
63	Bokan Mt.	U	Syenite & peralkaline granite	Jurassic	N35E, N75E, N40W	H	Past production over 1 million pounds $U_3 O_8$
64	Metlakatla	Cu	granodiorite quartz diorite	Mesozoic	N50E, N10W, N30W	E	
65	Red River	Cu, Mo	granodiorite quartz diorite	Tertiary & Mesozoic	N-S, N20E, N50E, N70E, E-W, N35W	E	
66	Forrester Island	Cu, Mo	granodiorite quartz diorite	Mesozoic	N35E, N75E, N40W	E	
67	Jumbo	Cu	granodiorite quartz diorite	Cretaceous	N50E, N10W, N30W	E	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-1	Lik	Zn, Pb, Ag, Ba	carbonaceous shale, bituminous limestone and chert	Mississippian	N-S, N25E, N35E, N55E	C	(USBM, 1979)
2	Southeast Lik	Zn, Pb, Ag, Ba	carbonaceous shale, bituminous limestone and chert	Mississippian	N-S, N25E, N35E, N55E	C	
3	Red Dog	Zn, Pb, Ag, Ba	carbonaceous shale, bituminous limestone and chert	Mississippian	N-S, N25E, N35E, N55E	C	Inferred reserves in excess of 15 million tons of 15-20% Zn + + Pb & 3 oz per ton Ag (Tailleur, 1970; Metz and Robinson, 1979).
4	South Red Dog	Zn, Pb, Ag, Ba	carbonaceous shale, bituminous limestone	Mississippian	N-S, N25E, N35E, N55E	C	
5	Kugururok	Cr	mafic-ultramafic complex	Jurassic	N10E, N25E, N55E, N75E, E-W	J	(Anderson, 1947)
6	Misheguk Mt.	Cr	mafic-ultramafic complex	Jurassic	N10E, N25E, N55E, N75E, E-W	J	(USBM, 1979)
7	Ginny Creek	Zn, Pb, Ag	carbonaceous shale, bituminous limestone and chert	Devonian-Mississippian	N10E, N25E, N55E, N75E, E-W	C	(Mayfield et al., 1979)

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-8	Nimuiktuk River	Ba	carbonaceous shale, bituminous limestone and chert	Devonian-Mississippian	N10E, N25E, N55E, N75E, E-W	C	(Mayfield, et al., 1979)
9	Unnamed	Cr	mafic-ultramafic complex	Jurassic	N10E, N25E, N55E, N75E, E-W	J	(USBM, 1979)
10	Eskimo Venture	Cr	mafic-ultramafic complex	Jurassic	N10E, N25E, N55E, N75E, E-W	J	(USBM, 1979)
11	Drenchwater	Zn, Pb, Ag, Ba	carbonaceous shale, bituminous limestone and chert	Mississippian	N10E, N25E, N55E, N75E, E-W	C	60 x 150 ft exposure averages 3% Pb, 17% Zn and 3.3 oz per ton Ag (Nokleberg & Winkler, 1978).
12	Story Mt.	Zn, Pb, Ag	carbonaceous shale, bituminous limestone and chert	Mississippian	N10E, N25E, N55E, N75E, E-W	C	(USBM, 1979)
13	Kivliktok Mt.	Zn, Pb, Ag	carbonaceous shale, bituminous limestone and chert	Mississippian	N-S, N25E, N50E, N05W, N30W	C	(USBM, 1979)
14	Midas Cr	Au	alluvial placer	Mississippian	N.A.		
15	KAV	Cu, Ag	argillaceous limestone	Devonian	N-S, N25E, N50E, N05W, N30W	F	(USBM, 1979)

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-16	Shiskakshinovik Pass	Cu, Pb	argillaceous limestone	Devonian	N-S, N25E, N50E, N05W, N30W	F	(Smith, 1913; Anderson, 1947; USBM, 1979)
17	Unnamed	Cu, Pb	argillaceous limestone	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	
18	Horse Creek	Zn, Cu	siliceous vol-canics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	(Sickerman et al., 1976).
19	Cliff	Zn, Pb, Cu	siliceous vol-canics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	(USBM, 1979)
20	Smucker	Zn, Cu, Pb, Ag	siliceous vol-canics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	(USBM, 1979)
21	Sunshine Creek	Zn, Cu	siliceous vol-canics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	(Sickerman et al., 1976).
22	Dead Creek	Zn, Cu	siliceous vol-canics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	(Sickerman et al., 1976).
23	Arctic Camp	Cu, Zn, Pb, Ag	siliceous vol-canics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	F	Reserves 35-45 mil-lions tons; 5.5% Zn 4.5% Cu, 1% Pb (Wiltse, 1975; Sickerman et al.,

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-24	Bornite	Cu	marine volcaniclastics and sediments	Devonian	N20E, N35E N60E, N40W, N65W, E-W	C	(Sickerman et al., 1976).
25	Pardner Hill	Cu, Pb, Zn, Au, Ag	marine volcaniclastics and sediments	Devonian	N20E, N35E, N60E, N40W, N65W, E-W	C	(Sickerman et al, 1976).
26	Kobuk District	Au	alluvial placers		N.A.		Past production 22,000 oz Au.
27	Copper Creek	Cu, Pb, Zn, Ag	siliceous volcanics and sediments	Devonian	N25E, N60E, N35W	F	(USBM, 1979).
28	Omar	Zn	argillaceous limestone & dolomite	Devonian	N25E, N60E, N35W	F	(USBM, 1979).
29	Frost	Cu, Zn, Ba	argillaceous limestone & dolomite	Devonian	N25E, N60E, N35W	F	(USBM, 1979).
30	Klery Creek	Au	alluvial placer		N.A.		Past production: 32,000 oz Au (Robinson & Bundtzen, 79).
31	Cape Mt.	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	Mulligan (1966).
32	Cape Creek	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	Mulligan (1966).
33	Potato Mountain	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	Mulligan (1966).

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-34	Lost River	Sn, F	granite	Mesozoic	N10E, N20E, N50W, E-W	H	(Watts, Griffis & McQuat, 1972).
35	Ear Mountain	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	(Mulligan, 1959).
36	Kougarok - Taylor Creek area	Au	alluvial placer		N.A.		Past production 150, 400 oz Au (Robinson & Bundtzen, 1979).
37	Boulder Creek area	Au	alluvial placer		N.A.		
38	Dahl - Coffee Creek area	Au	alluvial placer		N.A.		
39	Hannum Lode	Pb, Ag	argillite & greenstone	Paleozoic ?	N25E, N45E, N65E, N65W	B	
40	Hannum Creek	Pb, Zn	argillite & greenstone	Paleozoic	N25E, N45E, N65E, N65W	B	
41	Inmachuk River	Pb, Ag	argillite & greenstone	Paleozoic	N25E, N45E, N65E, N65W	B	
42	Inmachuk	Au	alluvial placer		N.A.		Past production 277, 000 oz Au (Robinson & Bundtzen, 1979).
43	Independence	Ag, Au, Pb	siliceous vol-canics and sediments	Paleozoic	N25E, N45E, N65E, N65W	B	(Anderson, 1947).
44	Candle Creek	Au	alluvial placer		N.A.		Past production 179, 000 oz. Au (Robinson & Bundtzen, 1979).

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-45	Quartz Creek	Pb, Zn	mafic marine volcanics	Paleozoic	N25E, N45E, N65E, N65W	B	
46	Anzac Creek	U	syenite and peralkaline granite	Mesozoic	N25E, N45E, N65E, N65W	I	
47	Unnamed	U	syenite and peralkaline granite	Mesozoic	N25E, N45E, N65E, N65W	I	
48	Placer River	Mo, U	syenite and peralkaline granite	Mesozoic	N25E, N45E, N65E, N65W	I	
49	Unnamed	Mo, U	syenite and peralkaline granite	Mesozoic	N25E, N45E, N65E, N65W	I	
50	Unnamed	U	syenite and peralkaline granite	Mesozoic	N25E, N60E, N35W	I	
51	Unnamed	U	syenite and peralkaline granite	Mesozoic	N25E, N60E, N35W	I	
52	Unnamed	U	syenite and peralkaline granite	Mesozoic	N25E, N45E, N65E, N65W	I	
53	Purcell Mt.	U	quartz monzo- nite	Mesozoic	N25E, N45E, N65E, N65W	I	(Miller and Ferrians, 1968).
54	Dakli	Cu, Au, Ag	granodiorite quartz diorite	Mesozoic	N25E, N45E, N65E, N65W	E	(Miller and Ferrians, 1968).

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-55	Ungalik	Au	alluvial placer		N.A.		
56	BCU	U	syenite & per-alkaline granite	Cretaceous	N25E, N45E, N65E, N65W	I	
57	Windy Creek	Mo	syenite & per-alkaline granite	Cretaceous	N25E, N45E, N65E, N65W	I	
58	Omilak	Ag, Pb	metamorphosed mafic volcanics & sedimentary rocks	Precambrian ?	N25E, N45E, N65E, N65W	B	(Mulligan, 1962)
59	Kachauik	U, Th	syenite & per-alkaline granite	Cretaceous	N25E, N45E, N65E, N65W	I	
60	Council	Au	alluvial placer		N.A.		Past production, 588,000 oz Au
61	Bluff	Au	beach placer		N.A.		Past production, 90,200 oz Au
62	Big Hurrah	Au, W, Ag	carbonaceous shale	Precambrian ?	N20E, N65E, N40W	B	(Sainsbury, 1975)
63	Solomon	Au	alluvial placer		N.A.		Past production, 251,000 oz Au
64	Nome	Au	beach placer		N.A.		Past production, 3,606,000 oz Au reserves: 1 million oz Au (Robinson & Bundtzen, 1979)

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
IV-65	Aurora Creek	Zn, Pb, Cu	altered schist and dolomite	Paleozoic/ Precambrian	N20E, N65E, N40W	B	(Herreid, 1968)
66	Waterfall Creek	Sb, Cu, Au Pb, Ag	altered schist	Paleozoic/ Precambrian	N20E, N65E, N40W	B	(Mertie, 1918)
67	Bluestone River	Au	alluvial placer		N.A.		

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-1	Tolstoi-Innoleo	Au	alluvial placer		N.A.		
2	Cripple Creek Mts.	Au	alluvial placer		N.A.		
3	Opher area	Au	alluvial placer		N.A.		
4	Nixon Fork Mines	Au, Ag, Cu, Bi	granitic rocks undifferentiated	Tertiary/ Cretaceous	N35E, N55E, N70W	G	
5	Slate Creek	Sb	metamorphosed siliceous vol-canic rocks & sediments	Paleozoic/ Precambrian	N20E, N40E, N10W, N85W	G	
6	Greenback	Cu, Pl, Zn	granodiorite & quartz diorite	Tertiary	N20E, N40E, N10W, N85W	K	
7	Purkey	Sn	granite & quartz monzonite	Tertiary	N05E, N20E, N35E, N55E, N50W, N65W	K	
8	Purkey	Ag, U, Pb, W	granite & quartz monzonite	Tertiary	N05E, N20E, N35E, N55E, N50W, N65W	K	
9	Unnamed	Cr	mafic-ultramafic complex	?	N05E, N20E, N35E, N55E, N50W, N65W	G	
10	Unnamed	Cu	granodiorite & quartz diorite	Tertiary	N05E, N20E, N35E, N55E, N50W, N65W	G	
11	Unnamed	Cu, Au	granodiorite & quartz diorite	Tertiary	N05E, N20E, N35E, N55E, N50W, N65W	G	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-12	Shellabarger Pass	Zn, Cu	mafic marine volcanics	Tertiary	N05E, N20E, N35E, N55E, N50W, N05W	F	
13	Collinsville	Au	alluvial placer		N.A.		
14	Bowser Creek	Cu, Zn	argillaceous limestone & granitic rocks undifferentiated	Tertiary/ Cretaceous	N-S, N30E, N55E, N30W, N50W	B	
15	White Mt.	Hg	argillites/ granitic rocks	Tertiary	N-S, N30E, N55E, N30W, N50W	B	
16	Golden Horn	Au, Ag, W	gabbro & gra-nitic rocks undifferentiated	Tertiary	N20E, N35E, N55E, N70W	B	
17	Chicken Dome	Au	granitic rocks undifferentiated	Tertiary	N20E, N35E, N55E, N70W	B	
18	Flat District	Au	alluvial placer		N.A.		
19	DeCoursey Mt.	Hg, Sb	mafic marine volcanics	Cretaceous	N-S, N20E, N35E, N45E, N10W, N45W, N85W	D	
20	Marshall District	Au	alluvial placer		N.A.		
21	Nyac	Au	alluvial placer		N.A.		
22	Red Devil	Hg, Sb	siliceous volcanics	Tertiary/ Cretaceous	N20E, N35E, N55E, N70W	F	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-23	Jimmy Lake	Mo, Cu, Sn, Bi	granite & quartz monzonite	Tertiary	N-S, N30E, N55E, N30W, N50W	G	
24	Chill	Ag, Cu, Sn	granite & quartz monzonite	Tertiary	N-S, N30E, N55E, N30W, N50W	G	
25	Pass Lake	Mo	granite & quartz monzonite	Tertiary	N-S, N30E, N55E, N30W, N50W	G	
26	Another River	Mo	granite & quartz monzonite	Tertiary	N-S, N30E, N55E, N30W, N50W	G	
27	Hayes Glacier	Mo, Cu, Au	granodiorite quartz diorite	Mesozoic ?	N-S, N30E, N55E, N30W, N50W	G	
28	Mt. Estelle	Cu, Au, Pb	granodiorite quartz diorite	Mesozoic	N-S, N30E, N55E, N30W, N50W	G	
29	Trimble Glacier	Mo	granodiorite quartz diorite	Mesozoic	N05E, N20E, N45E, N80E, N25W, N40W	G	
30	Unnamed	Cu, Mo	marine mafic volcanics	Jurassic	N05E, N20E, N45E, N80E, N25W, N40W	K	
31	Unnamed	Cu, Mo	granodiorite quartz diorite	Tertiary	N05E, N20E, N45E, N80E, N25W, N40W	E	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-32	Unnamed	Mo	granodiorite quartz diorite	Tertiary	N05E, N20E, N45E, N80E, N25W, N40W	E	
33	Unnamed	Cu	granodiorite quartz diorite	Tertiary	N05E, N20E, N45E, N80E, N25W, N40W	E	
34	Unnamed	Pb, Zn, Ag, Ba	marine mafic volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	K	
35	Unnamed	Cu, Mo	granitic rocks undifferentiated	Tertiary/ Cretaceous	N15E, N35E N55E, N30W, N50W, E-W	E	
36	Tazimina	Cu	granitic rocks undifferentiated	Tertiary/ Cretaceous	N15E, N35E, N55E, N30W, N50W, E-W	E	
37	Kasna Creek	Cu	granitic rocks undifferentiated	Tertiary	N15E, N35E, N55E, N30W, N50W, E-W	E	
38	Tak II	Cu	granitic rocks undifferentiated	Tertiary	N15E, N35E, N55E, N30W, N50W, E-W	E	
39	Otter Lake	Cu	mafic marine volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	K	
40	Kijik Mt.	Cu, Au, Mo	mafic marine volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	K	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-41	Pass	Cu, Ag	mafic marine volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	K	
42	Cinnabar Creek	Hg	graywacke argillite	Mesozoic/ Paleozoic	N25E, N35E, N55W	B	
43	Cripple Creek	Au	alluvial placer		N.A.		
44	Marvel Creek	Au	alluvial placer		N.A.		
45	Golden Gate	Cu	granodiorite & quartz diorite	Tertiary/ Cretaceous	N20E, N35E, N45W	B	
46	Columbia Creek	Au	alluvial placer		N.A.		
47	Crooked Creek	Au	alluvial placer		N.A.		
48	Rainy Creek	Au	alluvial placer		N.A.		
49	Snow Gulch	Au	alluvial placer		N.A.		
50	Slate Creek	Au	alluvial placer		N.A.		
51	Goodnews Bay	Pt	alluvial placer ultramafic source ?		N.A.		
52	Unnamed	Fe, Ti, Pt	mafic-ultramafic complex	Mesozoic/ Paleozoic	N25E, N35E, N55W	G	
53	Millet	Cu	granodiorite quartz diorite	Tertiary	N15E, N35E, N55E, N30W N50W, E-W	E	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-54	Dutton	Cu	mafic marine volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	D	
55	Duryea	Cu	mafic marine volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	D	
56	Unnamed	Au, Ag, Cu	mafic marine volcanics	Jurassic	N15E, N35E, N55E, N30W, N50W, E-W	D	
57	Paint River	Cu	granitic rocks undifferentiated	Tertiary/ Cretaceous	N05E, N40E N65E, N55W N70W	F	
58	Battle Lake	Cu	mafic marine volcanics	Jurassic	N05E, N40E, N65E, N55W, N70W	D	
59	Unnamed	Cu, Mo	mafic marine volcanics	Jurassic	N05E, N40E, N65E, N55W, N70W	D	
60	Unnamed	Mo	granodiorite quartz diorite	Tertiary/ Cretaceous	N05E, N40E, N65E, N55W, N70W	F	
61	Rex	Cu, Mo	mafic marine volcanics	Jurassic	N-S, N15E, N65E, N50W, N65W	D	
62	Mike	Mo	granodiorite quartz diorite	Tertiary/ Cretaceous	N-S, N15E, N65E, N50W, N65W	F	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-63	Unnamed	Cu	granodiorite quartz diorite	Tertiary/ Cretaceous	N-S, N15E, N65E, N50W, N65W	F	
64	Weasel Mt.	Cu	granodiorite quartz diorite	Tertiary/ Cretaceous	N-S, N15E, N65E, N50W, N65W	F	
65	Bee Creek	Cu	mafic marine volcanics	Jurassic	N-S, N15E, N65E, N50W, N65W	D	
66	Braided Creek	Cu, Au	granodiorite quartz diorite	Jurassic	N-S, N15E, N65E, N50W, N65W	D	
67	Bearskin	Cu	granodiorite quartz diorite	Tertiary	N15E, N65E, N45W, N75W	F	
68	Mallard Duck Bay	Cu, Au	mafic marine volcanics	Jurassic	N15E, N65E, N45W, N75W	D	
69	Warner Bay	Cu, Mo	mafic marine volcanics	Jurassic	N15E, N65E, N45W, N75W	D	
70	Ivanof	Cu	mafic marine volcanics	Jurassic	N15E, N65E, N45W, N75W	D	
71	Unnamed	Cu	mafic marine volcanics	Jurassic	N15E, N65E, N45W, N75W	D	
72	Pyramid	Cu, Mo	mafic marine volcanics	Jurassic	N20E, N75E, N05W, N50W, N70W	D	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
V-73	Apollo	Au	granodiorite quartz diorite	Tertiary	N20E, N75E, N05W, N50W, N70W	F	
74	Old Harbor	Cu	graywacke argillite greenstone	Cretaceous	N15E, N35E, N50E, N70E, N20W, N60W	G	
75	Barling Bay	Au, Ag	graywacke argillite greenstone	Cretaceous	N15E, N35E, N50E, N70E, N20W, N60W	G	
76	Bear	Au	graywacke argillite greenstone	Cretaceous	N15E, N35E, N50E, N70E, N20W, N60W	G	
77	Cornelius Creek	W	granodiorite quartz diorite	Tertiary	N15E, N35E, N50E, N70E, N20W, N60W	F	
78	Baumann & Strickler	Au	graywacke argillite greenstone	Cretaceous	N15E, N35E, N50E, N70E, N20W, N60W	G	
79	Claim Point	Cr	mafic-ultramafic complex	Jurassic/ Cretaceous	N10E, N25E, N80E	G	
80	Red Mountain	Cr	mafic-ultramafic complex	Jurassic/ Cretaceous	N10E, N25E, N80E	G	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
VI-1	Poovookpuk Mt.	Cu, Mo, Ag	granite	Mesozoic	N10E, N20E, N45E, N60E, N30W	H	
2	Cape Mt.	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	Mulligan (1966).
3	Cape Creek	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	Mulligan (1966).
4	Potato Mountain	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	Mulligan (1966).
5	Lost River	Sn, F	granite	Mesozoic	N10E, N20E, N50W, E-W	H	(Watts, Griffis & McQuat, 1972).
6	Ear Mountain	Sn	granite	Mesozoic	N10E, N20E, N50W, E-W	H	(Mulligan, 1959).
7	Kougarok - Taylor Creek area	Au	alluvial placer		N.A.		Past production 150, 400 oz Au (Robinson & Bundtzen, 1979).
8	Boulder Creek area	Au	alluvial placer		N.A.		
9	Dahl - Coffee Creek area	Au	alluvial placer		N.A.		
10	Hannum Lode	Pb, Ag	argillite & greenstone	Paleozoic ?	N25E, N45E, N65E, N65W	B	
11	Hannum Creek	Pb, Zn	argillite & greenstone	Paleozoic	N25E, N45E, N65E, N65W	B	
12	Inmachuk River	Pb, Ag	argillite & greenstone	Paleozoic	N25E, N45E, N65E, N65W	B	

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
VI-13	Inmachuk	Au	alluvial placer		N.A.		Past production 277,000 oz Au (Robinson & Bundtzen, 1979).
14	Independence	Ag, Au, Pb	siliceous volcanics and sediments	Paleozoic	N25E, N45E, N65E, N65W	B	(Anderson, 1947).
15	Candle Creek	Au	alluvial placer		N.A.		Past production 179,000 oz. Au (Robinson & Bundtzen, 1979).
16	BCU	U	syenite & peralkaline granite	Cretaceous	N25E, N45E, N65E, N65W	I	
17	Windy Creek	Mo	syenite & peralkaline granite	Cretaceous	N25E, N45E, N65E, N65W	I	
18	Omilak	Ag, Pb	metamorphosed mafic volcanics & sedimentary rocks	Precambrian ?	N25E, N45E, N65E, N65W	B	(Mulligan, 1962)
19	Kachauik	U, Th	syenite & peralkaline granite	Cretaceous	N25E, N45E, N65E, N65W	I	
20	Council	Au	alluvial placer		N.A.		Past production, 588,000 oz Au
21	Bluff	Au	beach placer		N.A.		Past production 90,200 oz Au
22	Big Hurrah	Au, W, Ag	carbonaceous shale	Precambrian ?	N20E, N65E, N40W	B	(Sainsbury, 1975)
23	Solomon	Au	alluvial placer		N.A.		Past production, 251,000 oz Au

Table 2 (continued)

Plate Occur. Number	Occurrence Name	Commodity	Host Rock Type	Host Rock Age	Landsat Linear Orientation	Tectonic Setting	Comments
VI-24	Nome	Au	beach placer		N.A.		Past production, 3,606,000 oz Au reserves: 1 million oz Au (Robinson & Bundtzen, 1979)
25	Aurora Creek	Zn, Pb, Cu	altered schist and dolomite	Paleozoic/ Precambrian	N20E, N65E, N40W	B	(Herreid, 1968)
26	Waterfall Creek	Sb, Cu, Au Pb, Ag	altered schist	Paleozoic/ Precambrian		B	(Mertie, 1918)
27	Bluestone River	Au	alluvial placer		N.A.		

B. Development of tensional structures, local basins, extrusion of basic volcanics and deposition of Zn-Pb-Ba mineralization in eastern Selwyn Basin, during the Upper Devonian and Lower Mississippian;

C. Deposition of continental clastics in Alaska from the northerly and easterly highland during the Upper Devonian and Lower Mississippian;

D. Transgression onto the continental margin from the south and formation of a stable continental shelf in Alaska during the Mississippian;

E. Graben formation and evaporate deposition in Alaska and in the Sverdrup Basin during the Late Mississippian;

F. Basic and felsic volcanism and deposition of Zn-Pb-Ba-rich muds and cherts in Alaska during the Late Mississippian;

G. Continued deposition of barium-rich sediments in the Permo-Triassic and phosphates and uranium rich sediments in Alaska during the Triassic;

H. Clastic deposition in the grabens and broad down warping in the continental margins from the Permian through the Cretaceous in the arctic rim, and the formation of the Colville geosyncline in Alaska;

I. Closing of the rift arms in Alaska and Yukon Territory and rifting of the Novosibirsk plate away from the Canadian Arctic Islands during the Jurassic;

J. Continent-to-continent collision in Alaska and Yukon Territory during the Cretaceous and formation of the Brooks Range in Alaska.

Linear data from the current investigation generally supports the above model. Examination of Landsat frames 74/12, 75/11 and 76/12 (see Plate I) generally indicates a radical fracture pattern over northeastern Alaska.

Inspection of Landsat frames 81/11 and 83/11 confirm the presence of an unnamed linear feature previously identified by Albert (1978). This major linear feature trends N 65 E and extends for over 300 km from the confluence of the Oolamnagavik and Colville Rivers to Mikkelsen Bay. This trend is parallel to the gravity and magnetic anomaly evidence for the above model, as well as parallel to the spreading axis of the proposed rift system. The above linear feature is here designated the Colville Lineament.

Orthogonal to the Colville Lineament is a linear trend N 25 W. This major trend is apparently controlling the large tributaries to the Colville River and may be controlling the orientation of the lakes on the north slope of Alaska. Maurin (1977) noted the northeast tectonic trend but did not note the northwest trend parallel to the mean lake orientation.

Albert (1978) noted that the Umiat, East Umiat and Gubik gas fields and the Prudhoe Bay oil field were located along this northeast structure, however, the existence of the northwest trend was not noted. The intersection of these major trends, and not simply the Colville Lineament, may be a partial control for the oil and gas resources of northern Alaska.

The metallic mineral resources of northern Alaska may also be controlled by the intersection of the northeast and northwest trends. Landsat frame 79/12 shows two areas of intense northeast linears. One area is located just below the center of the frame and another in the northwest corner of the frame. An intense northwest trend forms a diagonal at the center of the frame. On frame 79/12/1, eleven Cu-Pb-Zn-Ag-Au mineral occurrences (see also Plate I) have been plotted as well as one Mo-Sn-W mineral occurrence. Generally, these occurrences are located along the southerly northeast trend but within the limits of the intense northwest trends. If the intersection of the trends is localizing mineralization, then additional mineral occurrences would be expected to occur at the intersection of the northerly northeast trend with the intense northwest trend.

Geochemical sampling on a one mile grid over a thousand square mile area on the northerly northeast trend (Metz and Robinson, unpublished USBM contract report) resulted in the definition of 14 anomalous areas. These areas are shown on 79/12/2. Those anomalies are all within the intersection of the northerly northeast trend with the intense northwesterly trend.

Other areas with orthogonal linear features and with mineralogical or petrologic associations that indicate tensional tectonic environments include: Kotzebue Sound-Northern Seward Peninsula; Eastern Seward Peninsula-Nulato; Lower Kuskokwin River-Tikchik Lakes; Cook Inlet; Nenana-Wood River; Coal Creek-Eagle; Haines-Skagway; and Kupreanof-Admiralty Islands. Evidences in these areas are less well defined than those for the Brooks Range event and can not be discussed in detail.

The Kotzebue Sound-Northern Seward Peninsula area may represent reactivation of the Brooks Range aulocogen during the Cretaceous and Tertiary. Radial fracture patterns in the Selawik Basin, the presence of Cretaceous, Tertiary and Recent alkaline volcanics, and numerous uranium occurrences within the basin suggest reactivation of tensional tectonics or possibly the formation of a new triple junction. The northwest linear trend is parallel with the axis of the Hope Basin described by Grantz et al. (1975), while the northeast trend is parallel with the Colville Lineament. The third trend to the south is parallel to the Chiroskey Fault. The Eastern Seward Peninsula-Nulato trend is associated with major Cretaceous and Tertiary siliceous volcanics (see frames 88/13, 84/14, 84/15).

The Lower Kuskokwin-Tikchik Lakes area shows a strong northerly and a marked east-west trend (see frames 80/18 and 80/19). The age of this event is in question, but Devonian and Mississippian age limestones in the McGrath-Lime Hills area are unconformably overlain by pillow basalts and cherts that would indicate formation of new oceanic crust on stable platform sediments (Wyatt Gilbert, Alaska Division of Geological and Geophysical Surveys, personal communication). Recent whole rock analyses of plutonic rocks from the area indicate the presence of peralkaline granites (Thomas Bundtzen, ADGGS, personal communication).

The Cook Inlet petroleum province is a well documented Tertiary graben structure that formed as an inter-arc basin above a northwesterly dipping subduction zone. Orthogonal trends are very apparent in frames 75/19 and 75/20.

Relatively small Tertiary basins occur along the Tintina and Denali strike-slip fault systems. Strike-slip motions often result in secondary tensional features and the Nenana-Wood River area, frame 76/15, and the Coal Creek-Eagle area, frame 72/14, may be good examples of such a mechanism in Alaska.

In the Haines-Skagway area and in the Petersburg area of southeastern Alaska, Kuroko type Zn-Pb-Ag-Ba deposits occur in Paleozoic marine volcanic rocks. Linear trends are exceedingly complex but orthogonal sets are present (see frame 64-18).

On Kupreanof and Admiralty Islands a small Tertiary basin contains both felsic and mafic volcanic rocks. The linear pattern again is complex but a major linear trend is parallel to the long axis of the basin and a less well developed trend is orthogonal to the first (see frame 60/21 and 62/20).

Compressional tectonic settings and Alaskan mineral occurrences

Oblique fracture patterns and linear features would be expected in areas of the earth's crust that have experienced compressional tectonic events. The most recent example of compressional tectonics is the Aleutian Island Arc, while the Alaska-Aleutian Range Batholith, the East Alaska Range Batholith and the Coast Ranges Batholith represent Mesozoic compressional events.

The two most important types of mineral occurrences associated with compressional plate boundaries are porphyry copper, copper-molybdenum deposits and obducted mafic-ultramafic complexes containing chromite, platinum, nickel, cobalt and copper. From Table 2 and Plates II and V it is apparent that most of the porphyry deposits in Alaska are Cretaceous or Tertiary in age and are associated with either the Aleutian Arc, the Alaska-Aleutian Range Batholith, the East Alaska Range Batholith the Wrangell Mountains, or the Coast Range Batholith. The major obducted ophiolites are Mesozoic in age and are widespread in Alaska; however most of the Ni-Cu-Co sulfide complexes are in southeastern Alaska.

Examination of the linear features of the Aleutian Arc and the Alaska Aleutian Range Batholith (see frames 78/18, 78/19, 78/21) indicate trends that are considerbly different from those of the Cook Inlet area (see frames 75/19, 75/20) to the east and the Lower Kuskokwim area (see frames 80/18, 80/19) to the west. There is a marked change in linear orientation across the Mulchatna Fault. Frames 78/18, 78/19, and 80/21 show no orthogonal trends. Frame 78/18 has trends at N 60 E and N 40 W. Bisecting the acute angel would indicate a principle stress direction of N 80 W. Similarly N 85 W and N 70 W principle stress directions can be inferred from frames 78/19 and 80/21 respectively. These stress directions are comparable with Pacific plate motions proposed by Atwater (1970).

The determination of relationships between linear trend intersections and mineral occurrences could not be accomplished directly; however radial fracture patterns were noted for most of the active volcanoes in the Aleutian Arc and many of the porphyry deposits exhibited similar patterns.

The Chugach Mountains which are composed of Cretaceous age rocks that were probably accreted to the continental margin in the Tertiary have oblique fracture patterns that could be used to estimate plate motion in the Tertiary. As with the estimates for the Aleutian Arc, the solutions are not unique. Similar calculations were made for frames 60/22, 62/20 and 64/19 in southeastern Alaska. Principle stress directions from N 40-60 E were determined for frames 60/22, 62/20 and 64/19.

Conservative tectonic settings and Alaskan mineral occurrences

Transform faults define conservative plate boundaries. The shear stress field of the transform system would be expected to produce a major linear trend parallel to the transform. Examination of the major strike-slip faults in Alaska (see Plates I-VI) and the corresponding Landsat images confirms this hypothesis.

Porphyry copper and copper molybdenum deposits, diamond bearing kimberlite pipes, rare earth carbonatites, copper-nickel sulfide bearing mafic-ultramafic complexes and Kuroko type massive sulfide deposits are often associated with transform fault systems. With the exception of kimberlite pipes and major carbonatite complexes all of these types of mineral occurrences have been reported in Alaska and have been discussed previously.

All of the mapped strike-slip faults in Alaska were readily visible on the low sun angle imagery; however linear intersection control of major mineral occurrences along the faults could not be verified with the low level of deposit density.

Tectonic model of Alaska from linear and mineral deposit data

The development of a tectonic model for northern Alaska has been discussed previously. The model extended in time from the Devonian through Triassic. The linear data reviewed to date generally support the model, however the model can not easily be extended to southern and southeastern Alaska due to the complexities of continental accretion and the lack of regional geologic and mineral deposit data.

The previously stated model will be restated and extended to include generalizations on southern Alaska:

A. Regional doming of the Precambrian basement of northeastern Alaska and northwestern Yukon Territory and emplacement of Sn-W-Mo-F-U-P-bearing granites between 430 - 405 m.y. B.P. over an intracontinental hot spot;

B. Development of tensional structures, local basins, extrusion of basic volcanics and deposition of Zn-Pb-Ba mineralization in eastern Selwyn Basin, during the Upper Devonian and Lower Mississippian;

C. Deposition of continental clastics in Alaska from the northerly and easterly highland during the Upper Devonian and Lower Mississippian;

D. Transgression onto the continental margin from the south and formation of a stable continental shelf in Alaska during the Mississippian;

E. Graben formation and evaporate deposition in Alaska and in the Sverdrup Basin during the Late Mississippian;

F. Basic and felsic volcanism and deposition of Zn-Pb-Ba-rich muds and cherts in Alaska during the Late Mississippian;

G. Continued deposition of barium-rich sediments in the Permo-Triassic and phosphates and uranium rich sediments in Alaska during the Triassic;

H. Clastic deposition in the grabens and broad down warping in the continental margins from the Permian through the Cretaceous in the arctic rim, and the formation of the Colville geosyncline in Alaska;

I. Closing of the rift arms in Alaska and Yukon Territory and rifting of the Novosibirsk plate away from the Canadian Arctic Islands during the Jurassic;

J. Continent-to-continent collision in Alaska and Yukon Territory during the Cretaceous and formation of the Brooks Range in Alaska.

K. During the Mesozoic the rifted continental margin including the Yukon-Tanana Upland Schist Terrane in Alaska, which is bounded on the north by the Tintina Fault and on the south by the Denali Fault, and the Yukon Crystalline Terrane in the Yukon Territory, converged on the North American plate. By the late Cretaceous this collisional event was complete and clastic wedges were forming on the north and south flanks of the Brooks Range;

L. During the Mesozoic, island arcs began to develop outboard of the continental margin and during the Tertiary accreted to the margin. The Coast, Alaska and Aleutian Ranges Batholiths were implaced during the Cretaceous and Tertiary;

M. Strike-slip motion along the Denali and Tintina Faults during the middle Tertiary resulted in small graben structures that were filed with continental clastics;

N. West by northwest motion and subduction of the proto-Pacific plate resulted in the formation of a marginal basin, the Cook Inlet graben;

O. Major uplifts of the Alaska Range began in the Pliocene;

P. Continued west by northwest movement and subduction of the Pacific plate has resulted in recent volcanism in the Wrangell Mountains and Aleutian arc.

The various tectonic settings are shown schematically on Figure 3.

Ratio Image Results

Ratio image analyses were conducted by Geo Spectra Corp., Ann Arbor Michigan. A band 5/7 black and white ratio image, scale 1:250,000 was selected for coverage of four major mineral occurrence areas in th DeLong Mountains of the western Brooks Range. The occurrences include Red Dog

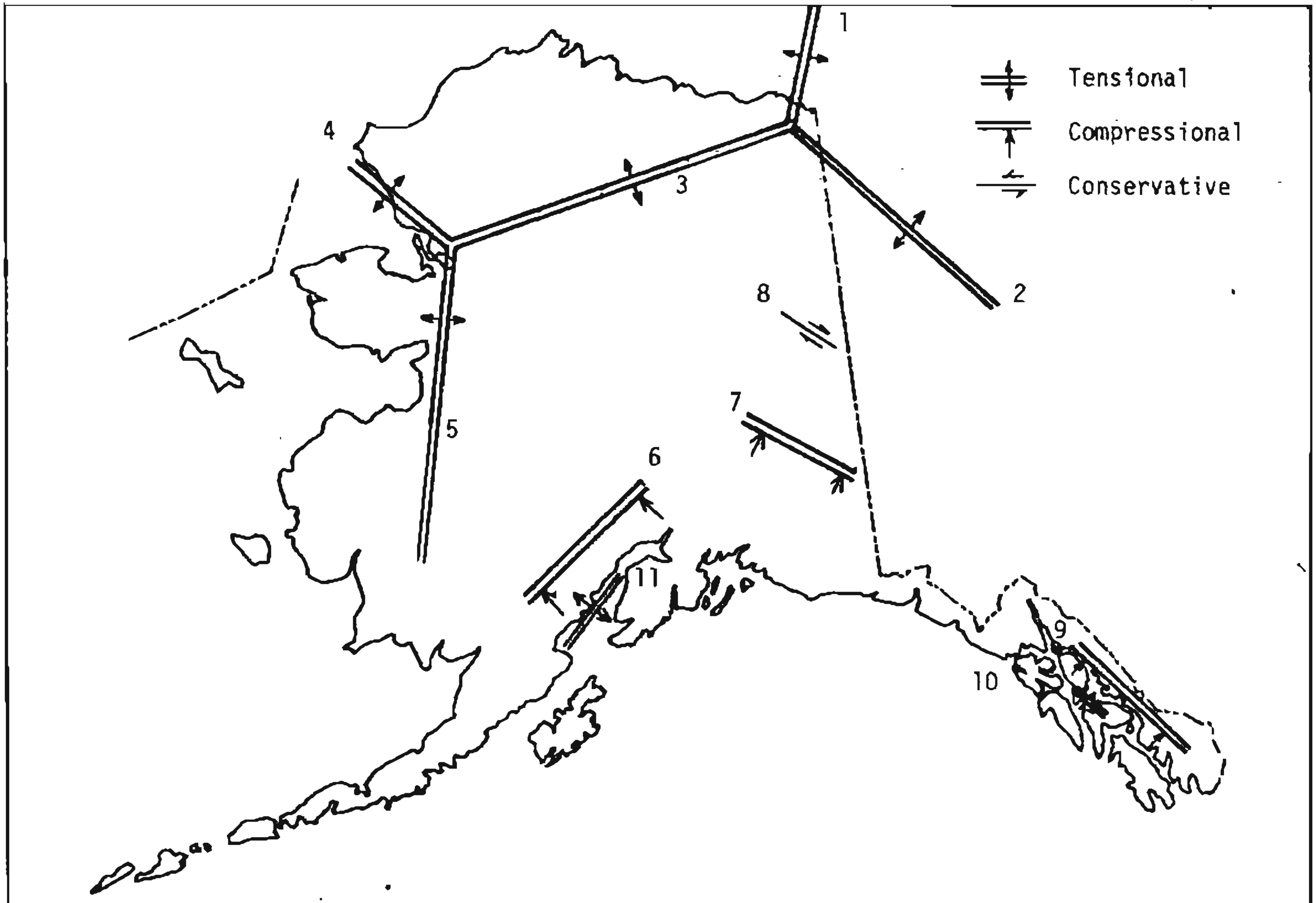

Figure 2. Schematic diagram of tensional, compressional & conservative tectonic settings in AK. (1, Sverdrup Basin, 2, Selwyn Basin, 3, Brooks Range aulacogen, 4, Hope Basin, 5, Nulato-Lower Kuskokwin aulacogen, 6, Alaska-Aleutian Range Batholith, 8, Tintina Fault, 9, Coast Range Batholith, 10, Unnamed Tertiary graben and 11, Cook Inlet graben)

Creek, Ginny Creek, Nimiuktuk River and Drenchwater Creek. The mineral occurrences are shown on Plate IV and are listed in Table 2 as IV-3, IV-7, IV-8 and IV-11 respectively. The Red Dog Creek Zn-Pb-Ag-Ba mineral occurrence is hosted in a black chert and shale unit of the Tupik Formation of the Lisburne Group (Metz and Robinson, 1979). The Ginny Creek Zn-Pb-Ag mineral occurrence is in a carbonaceous shale and sandstone of the Lower Mississippian or Upper Devonian Noatak Sandstone. The Nimiuktuk River barite mineral occurrence is associated with upper Mississippian black chert and shale, and Upper Mississippian latites or andesites (Mayfield et al., 1979). The Drenchwater Creek Zn-Pb-Ag-Ba mineral occurrence is in a chert, carbonaceous shale, and tuffaceous unit of Upper Mississippian age (Nokleberg and Winkler, 1978). At all four occurrences there are major color anomalies associated with limonitic alteration.

Ratio analysis of Landsat data from these four areas was completed to determine if color anomalies associated with the mineral occurrences could be detected and if those anomalies contained a characteristic reflectance pattern. Figures 3, 4, 5 and 6 are maps of the four areas, three of which indicate major limonitic alteration. However, the alteration is not associated with the Zn-Pb-Ag-Ba occurrences but with large mafic-ultramafic complexes. Two of these complexes, Misheguk Mountain and Siniktinneyak Mountain, contain major chromite mineralization. One minor color anomaly is associated with the Nimiuktuk River barite occurrence.

Figures 3 through 6 indicate that major ferric/ferrous oxide alteration zones can be detected. The alteration zones associated with the mafic-ultramafic complexes are hundreds of square miles in extent. The color anomalies associated with the Zn-Pb-Ag-Ba occurrences are only a few

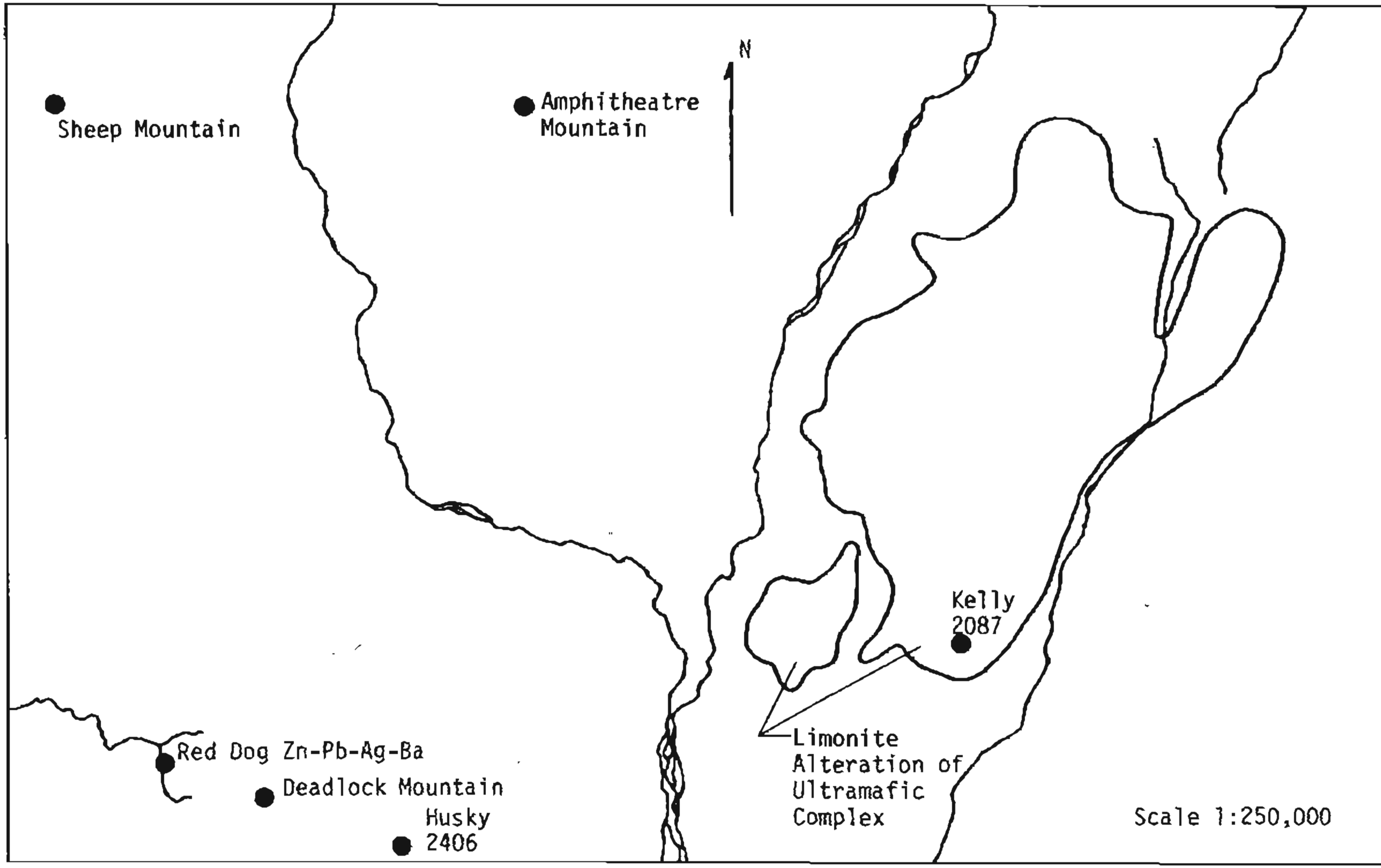

Figure 3. Limonite color anomalies, Red Dog Creek area.

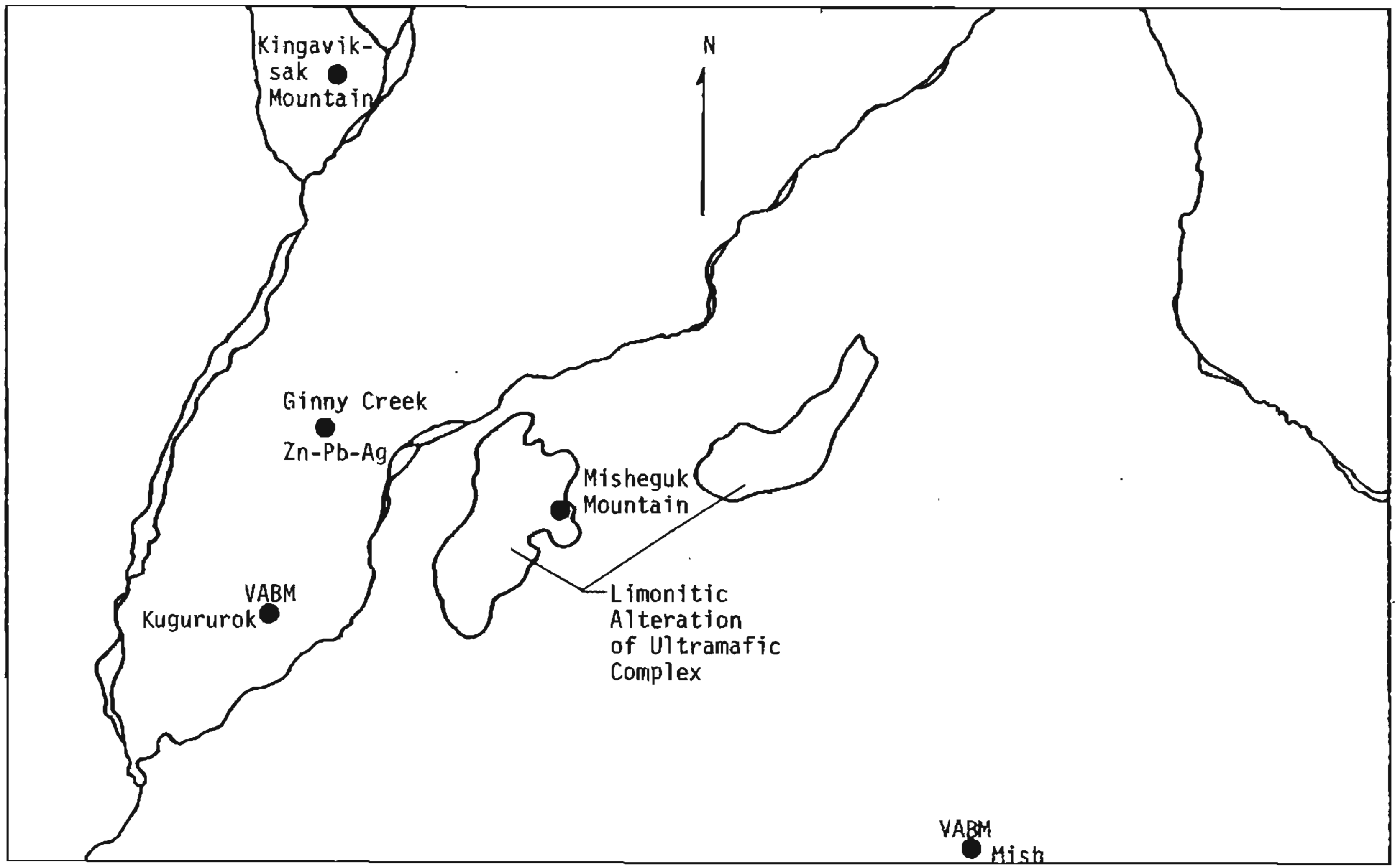

Figure 4. Limonite color anomalies Ginny Creek area.

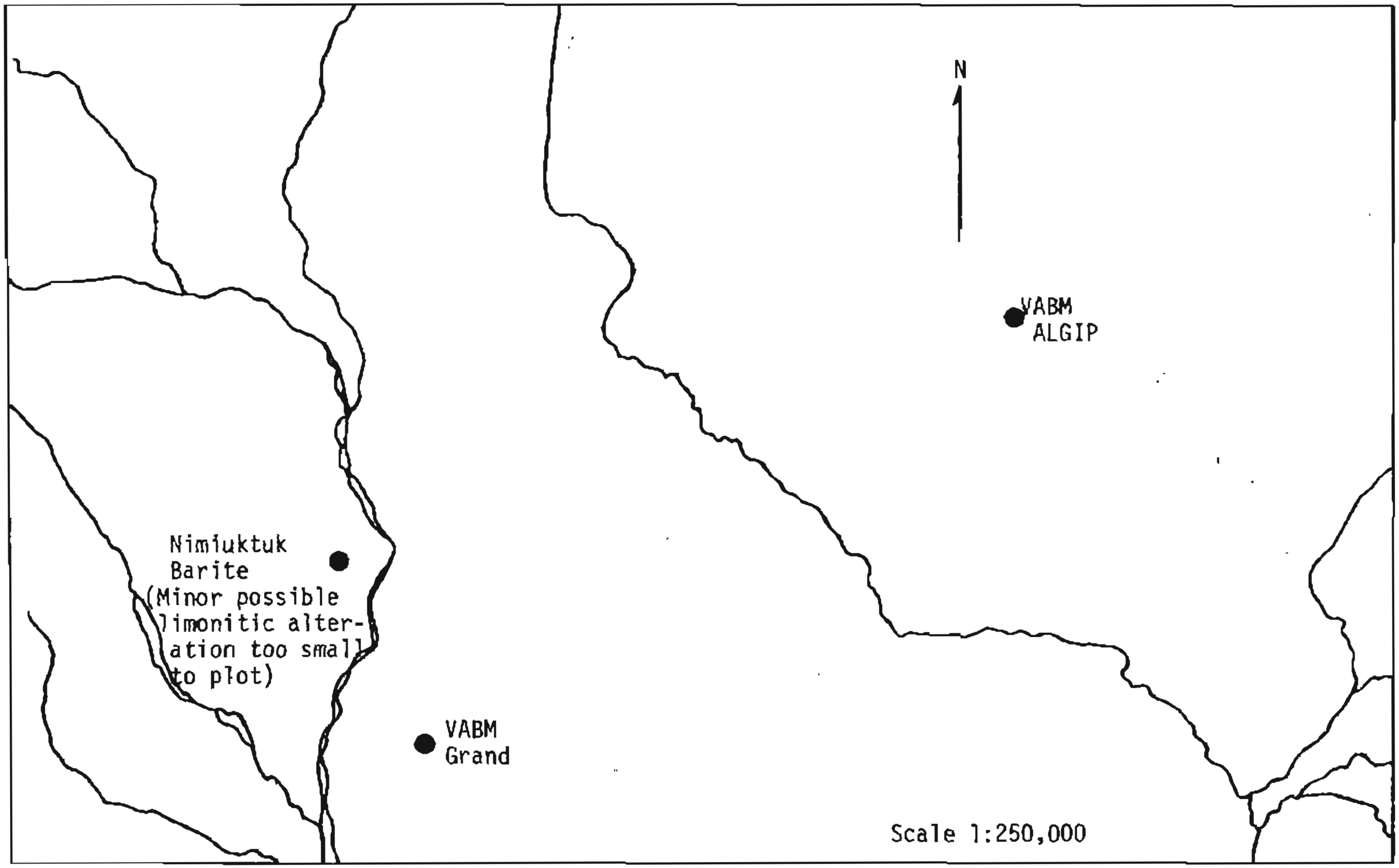

Figure 5. Limonite color anomalies Nimiuktuk River area.

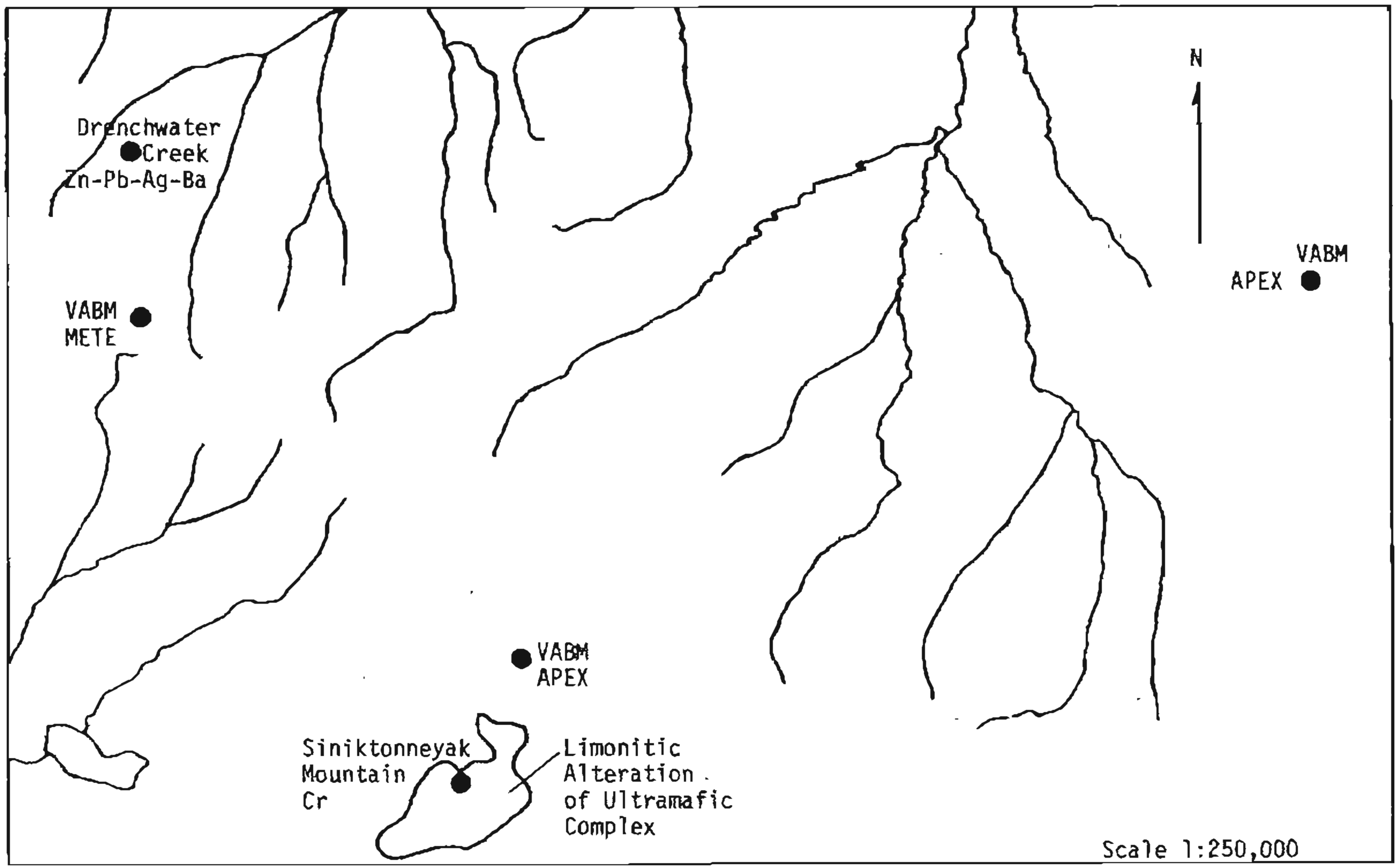

Figure 6. Limonitic color anomalies Drenchwater Creek area.

square miles in area; thus at a 1:250,000 scale the anomalies will be difficult to detect. The Nimiuktuk River barite occurrence contains a minor alteration zone that appears identical on the ratio image to the alteration zones of the major mafic-ultramafic complexes. From these limited data it appears that both types of mineral occurrences contain color anomalies that have identical response in the range of the ratio analysis and thus can be identified but may not be differentiated by this technique. This factor should be carefully assessed in the utilization of the technique in mineral exploration.

Conclusions

The conclusions to the investigation can be outlined as follows:

A. Low sun angle enhanced Landsat imagery can be a low cost and effective method of analysis of major geologic features and trends in Alaska;

B. Linear trends can assist in the development of large scale structural models for the genesis and control of major mineralization;

C. Preliminary evidence indicates that the intersection of major trends of linear features are significant in the location of petroleum, gas and some types of metallic mineral resources;

D. Ratio image analysis can be an effective method of defining alteration zones associated with major mineral occurrences, however no distinction between alteration zones for different deposit types can be made.

Recommendations for Future Investigations

Future areas of investigation should include but must not be limited to the following:

1. Compilation and location of all known mineral occurrences in Alaska, contouring the density of the mineral occurrences, and contouring the density of linear intersections;
2. Statistical testing of oriented data to determine the significant deviations from uniformity in each of the rose diagrams produced to date;
3. Determination of significant deviations in linear trends across major mapped faults such as the Tintina, Denali, Kaltag, Mulchatna, Farewell, Iditarod-Nixon Fork, Border Ranges, Lake Clark, Castle Mountain, Fairweather, Peril Strait and Chatham Strait, to enhance determination of the faults as major plate boundaries and borders of metallogenic terranes.

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APPENDIX I

Individual Landsat Frames, Linear Features and Rose Diagrams

LANDSAT E-1392-19145-7 02 PATH/ROW 58/21

Center Coor.

55° 48′ N

129° 59′ W

1:1,000,000

Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

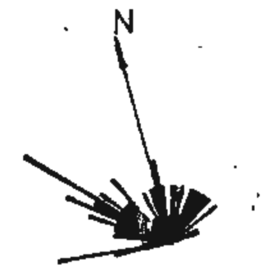
LANDSAT E-30609-19020-7 PATH/ROW 58/22

Center Coor.

54° 18′ N

130° 28′ W

1:1,000,000



Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

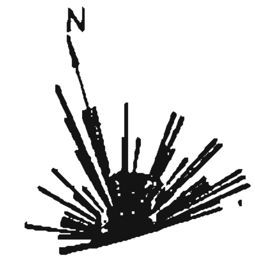
LANDSAT E-1592-19215-7 01 PATH/ROW 60/20

Center Coor.

57° 20′ N

131° 45′ W

1:1,000,000



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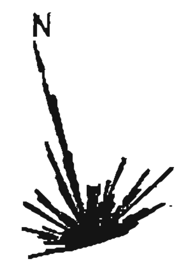
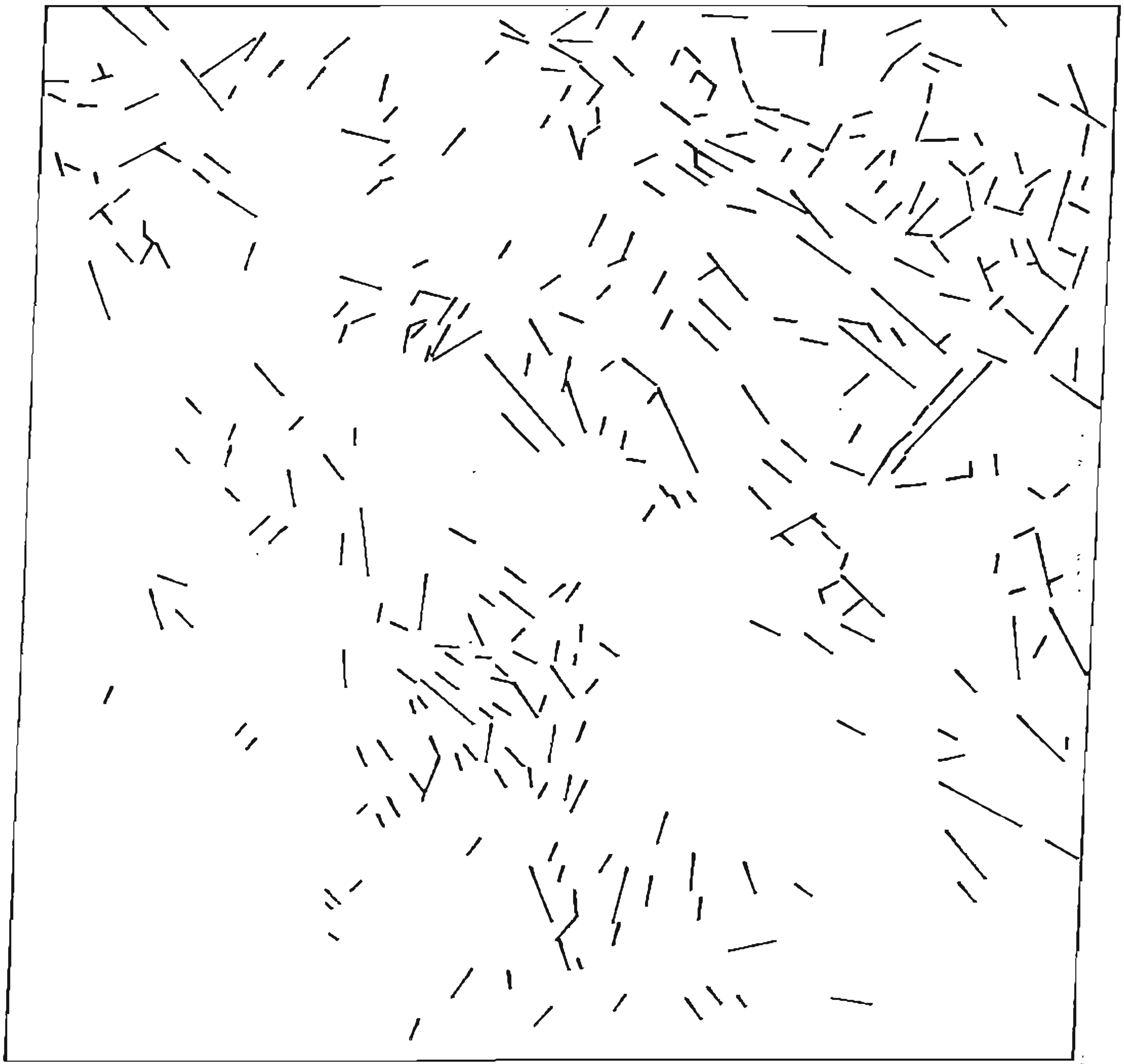
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1592-19221-7 01 PATH/ROW 60/21

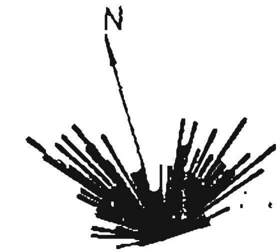


Center Coor.

55° 57′ N

132° 36′ W

1:1,000,000



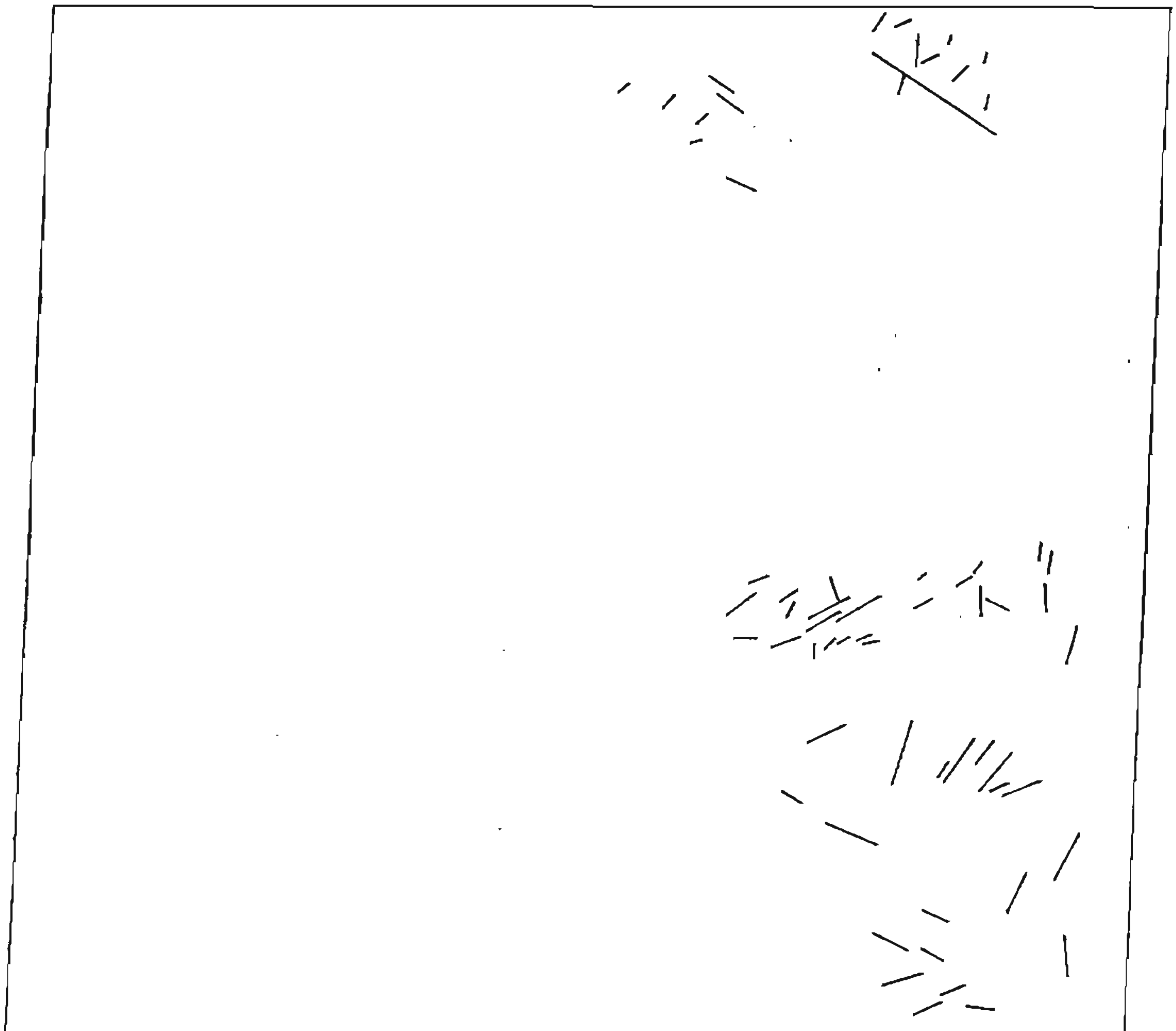
Linear Count

1 Degree/Cell

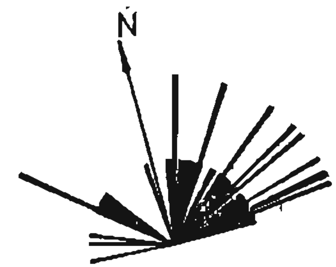
Linear Lengths

1 Degree/Cell

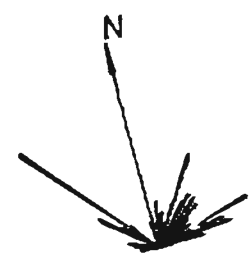
LANDSAT E-30611-19133-7 PATH/ROW 60/22



Center Coor.
54° 18′ N
133° 20′ W
1:1,000,000



Linear Count
1 Degree/Cell



Linear Lengths
1 Degree/Cell

LANDSAT E-1198-19380-7 01 PATH/ROW 62/18

Center Coor.

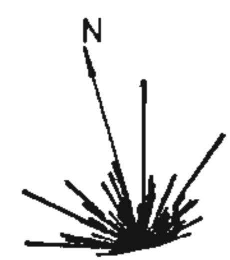
58° 43′ N

133° 37′ W

1:1,000,000

Linear Count

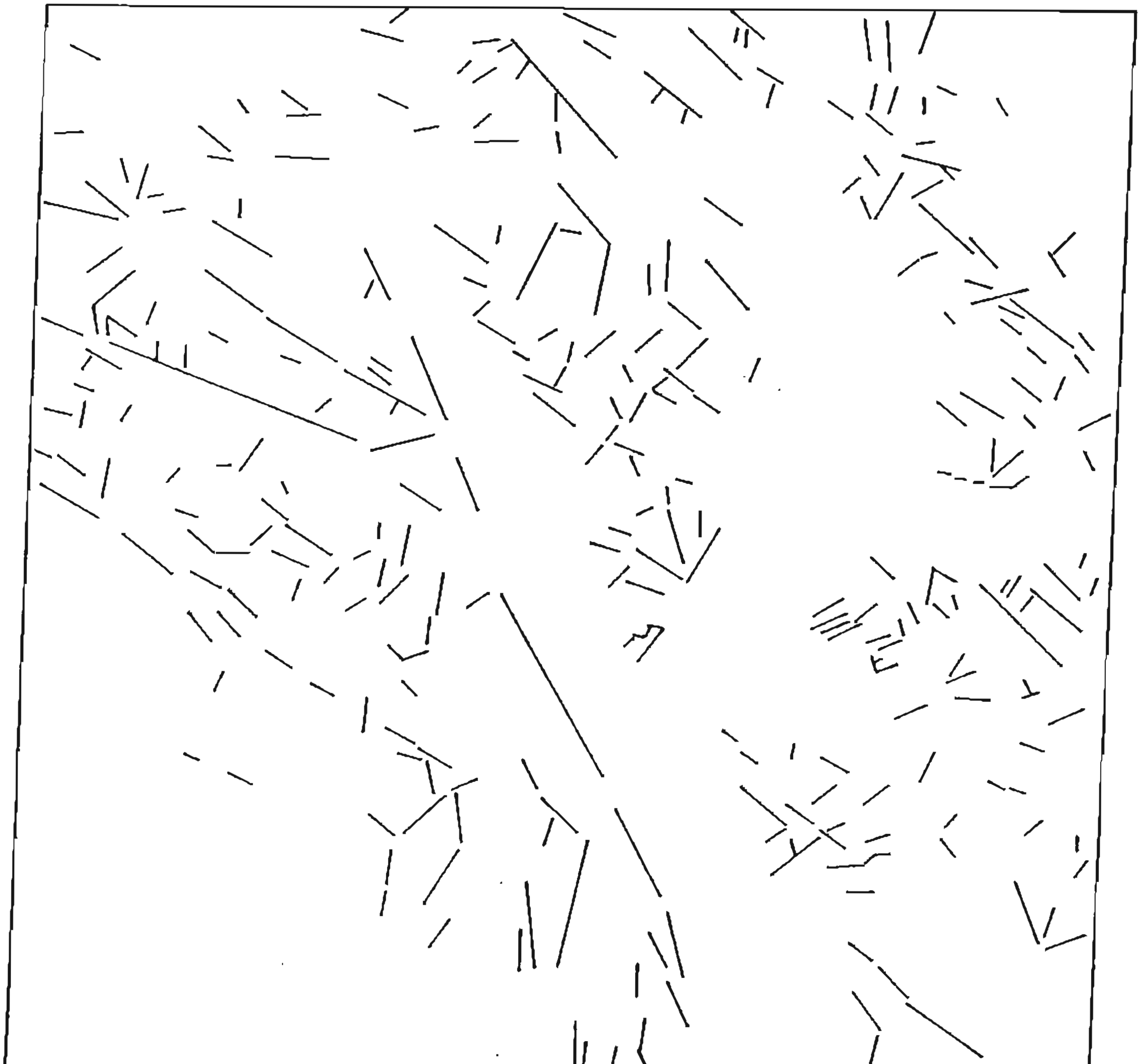
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1468-19354-7 01 PATH/ROW 62/20



Center Coor.

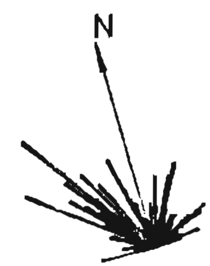
57° 15′ N

134° 35′ W

1:1,000,000

Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-21492-19255-7 PATH/ROW 64/18

Center Coor.

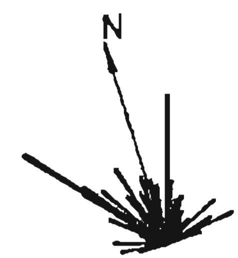
59° 47′ N

135° 30′ W

1:1,000,000

Linear Count

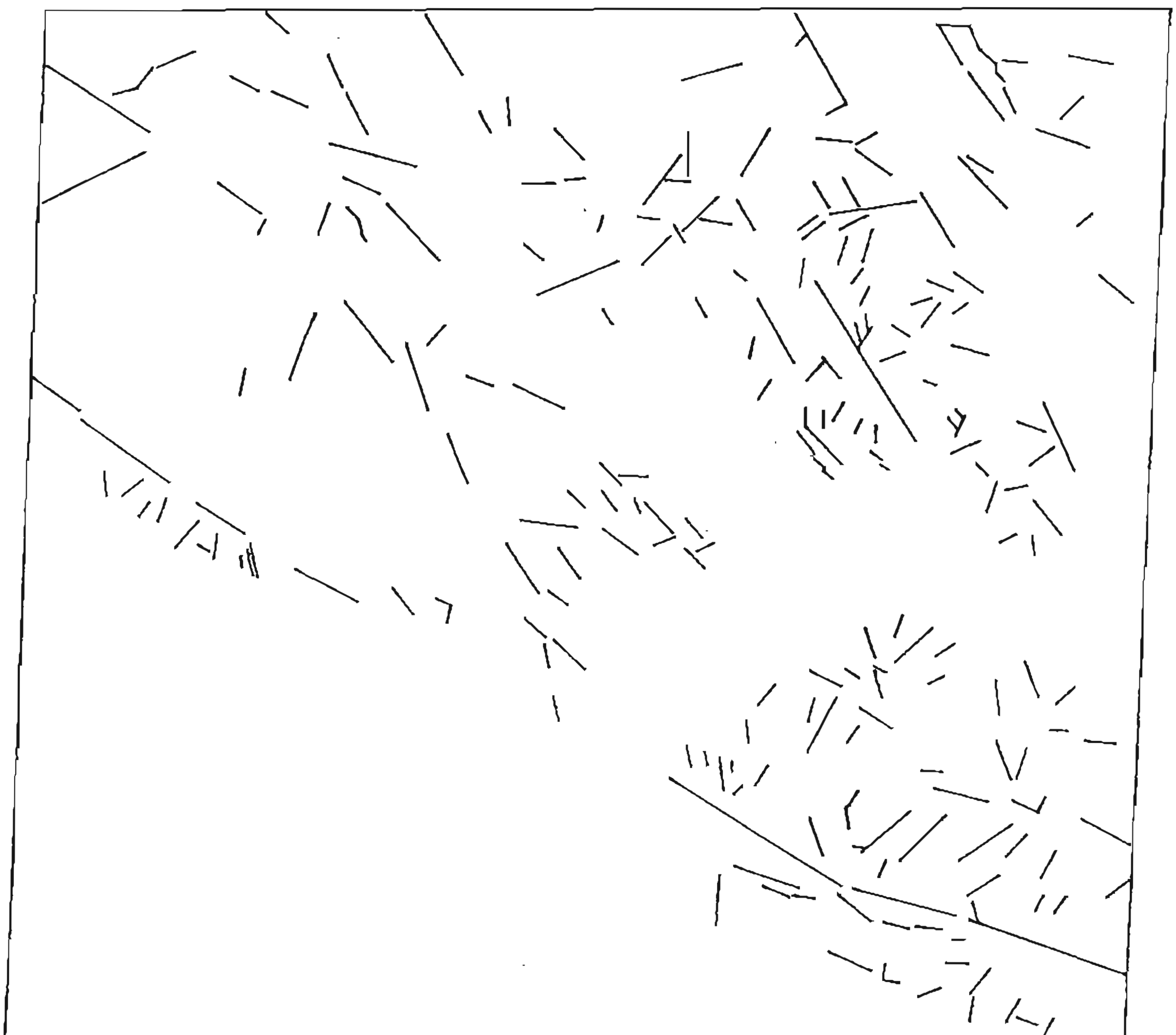
1 Degree/Cell



Linear Lengths

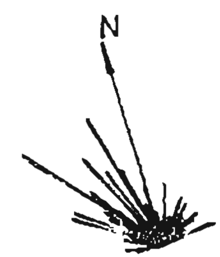
1 Degree/Cell

LANDSAT E-21492-19262-7 PATH/ROW 64/19



Center Coor.
58° 26′ N
136° 28′ W
1:1,000,000

Linear Count
1 Degree/Cell



Linear Lengths
1 Degree/Cell

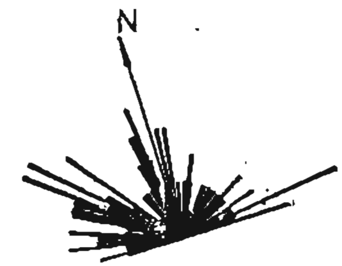
LANDSAT E-21494-19372-7 PATH/ROW 66/18

Center Coor.

59° 49′ N

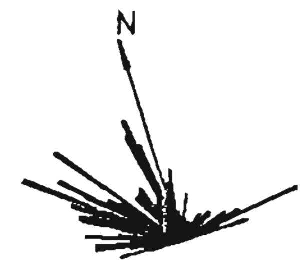
138° 24′ W

1:1,000,000



Linear Count

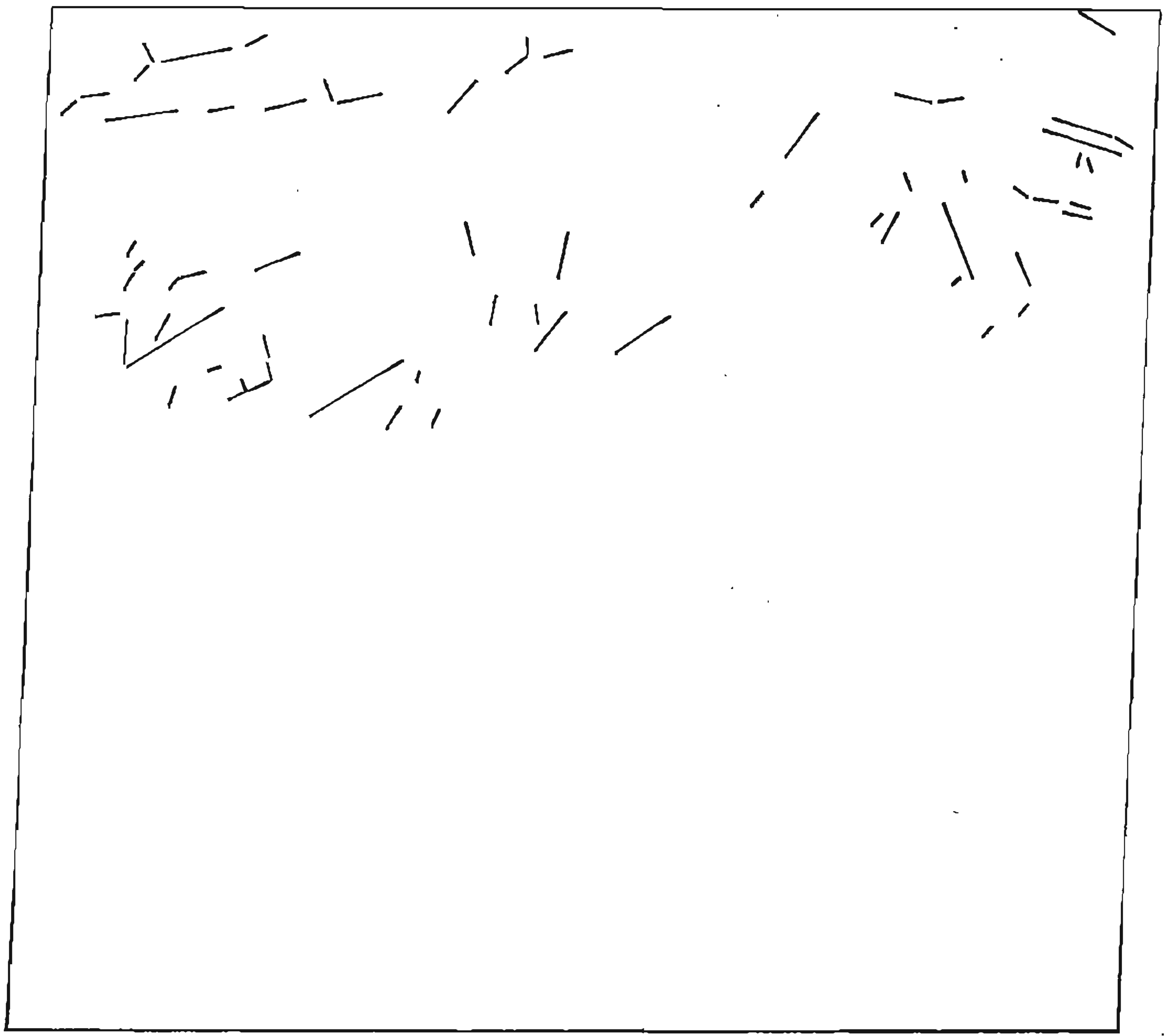
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30349-20005-7 PATH/ROW 68/18

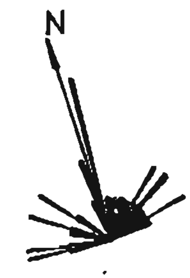


Center Coor.

59° 51′ N

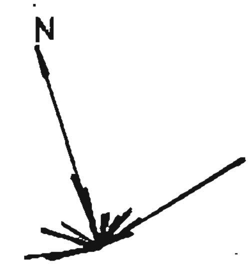
141° 18′ W

1:1,000,000



Linear Count

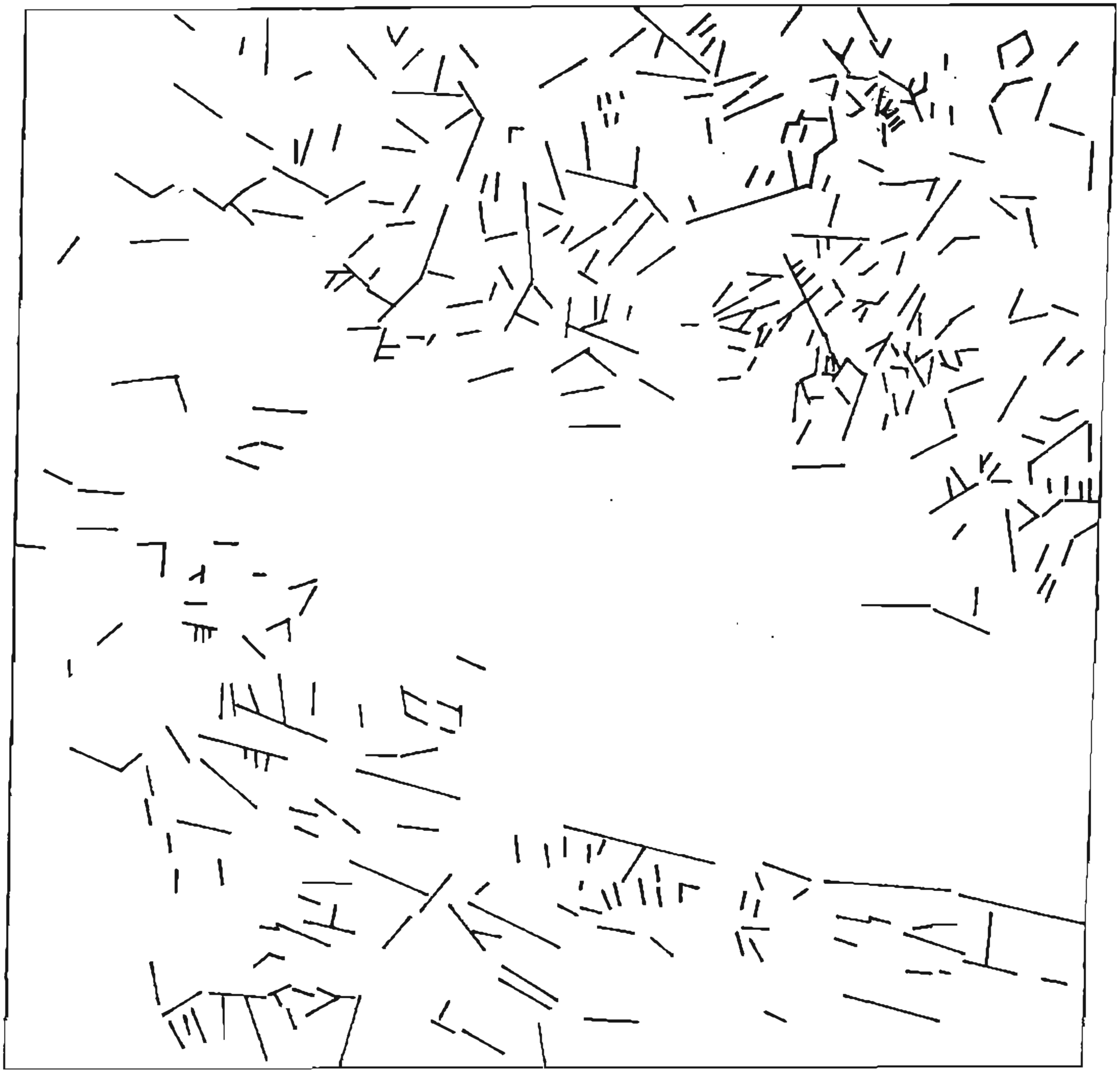
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1584-20174-7 02 PATH/ROW 70/16



Center Coor.

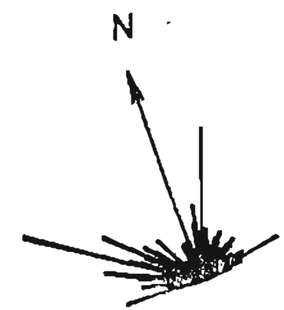
62° 54′ N

141° 52′ W

1:1,000,000

Linear Count

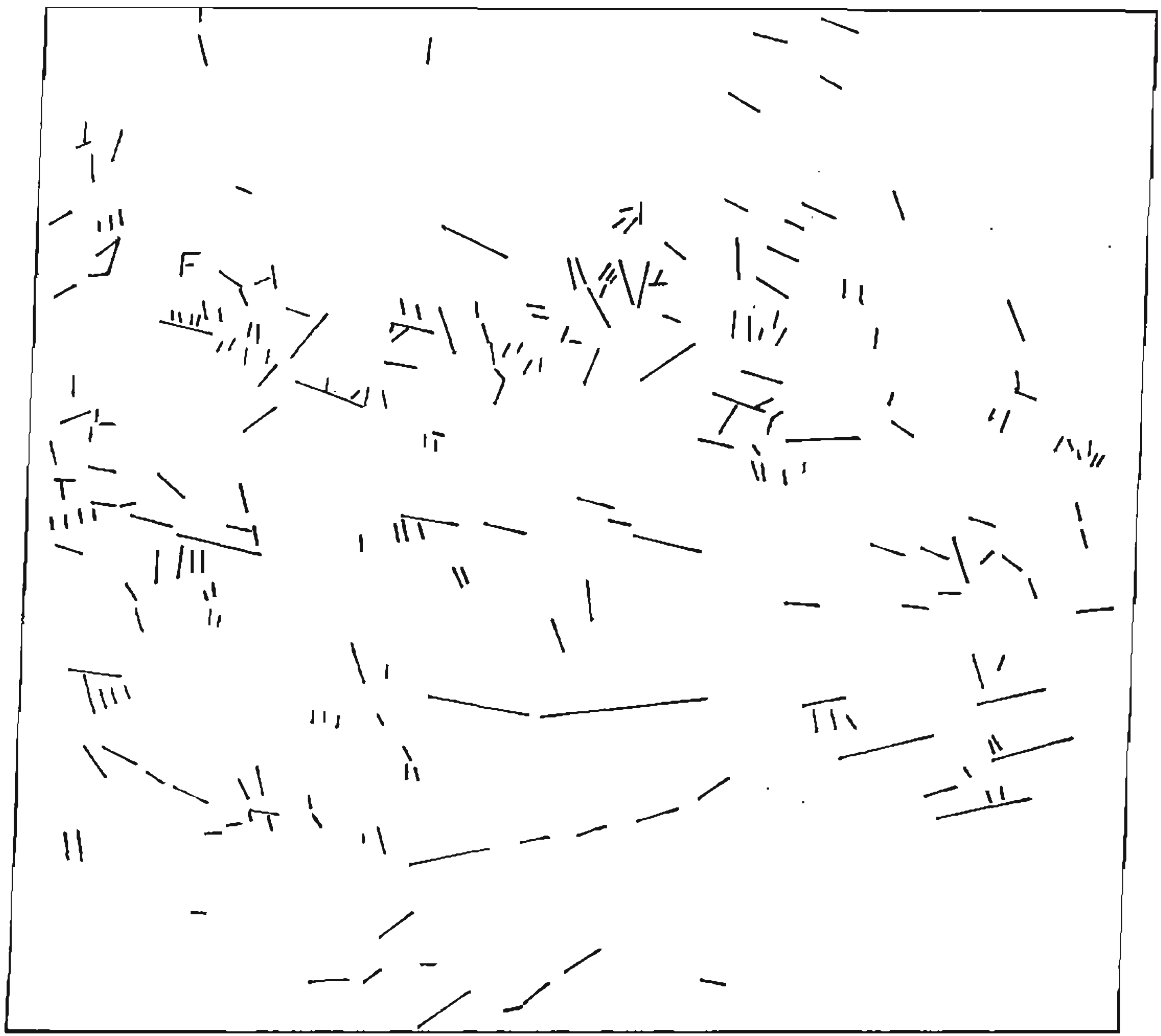
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30351-20120-7 PATH/ROW 70/17



Center Coor.

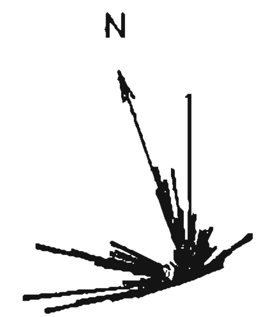
61° 14′ N

143° 07′ W

1:1,000,000

Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

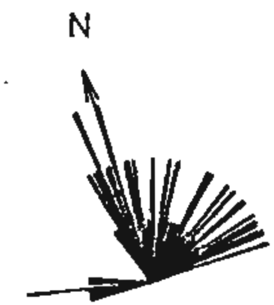
LANDSAT E-2 976-19452-7 PATH/ROW 70/18

Center Coor.

60° 09′ N

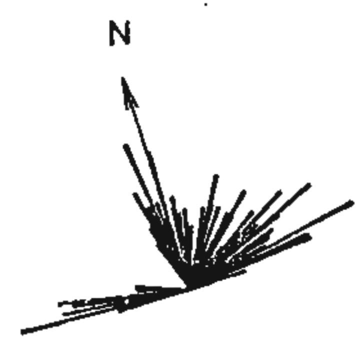
144° 18′ W

1:1,000,000



Linear Count

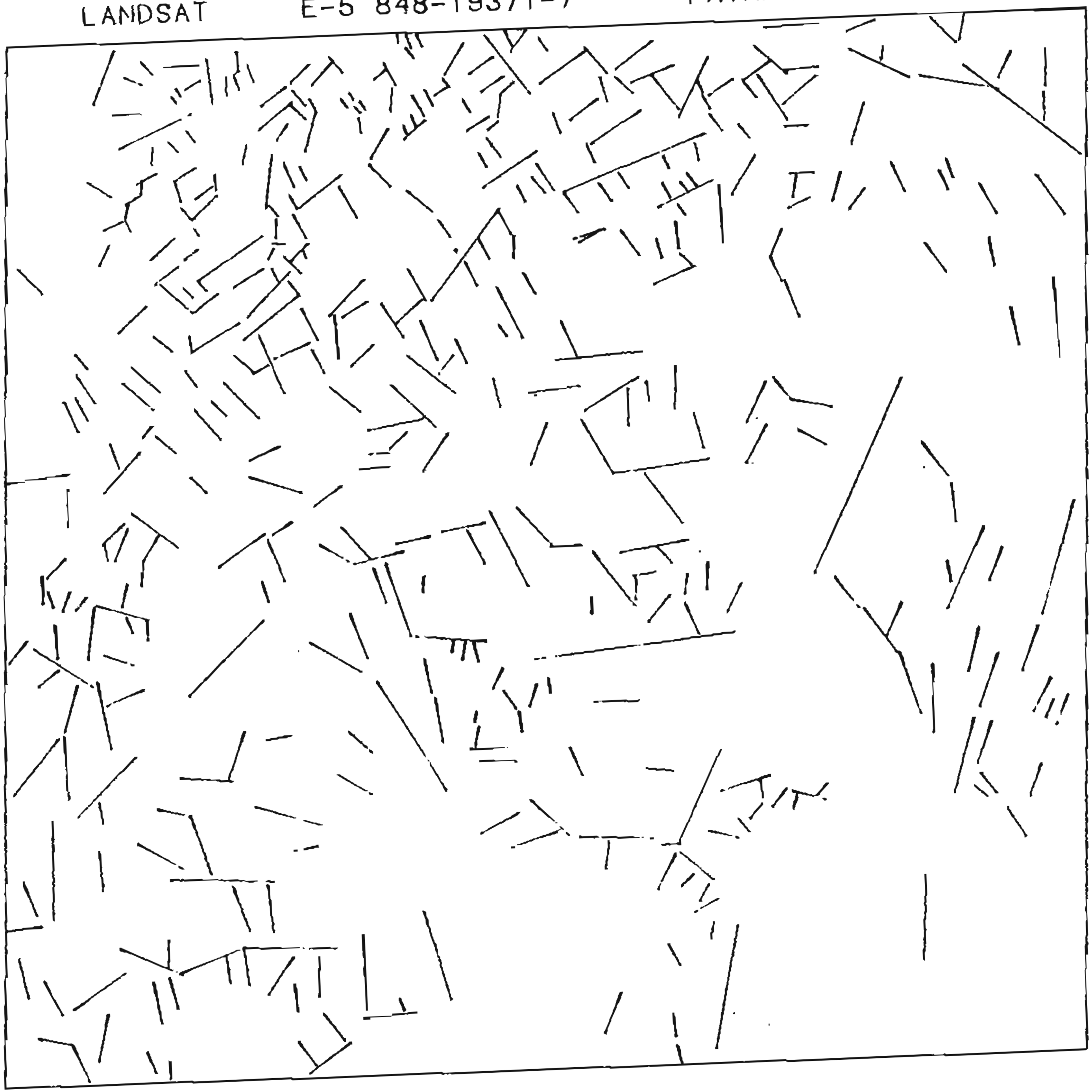
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-5 848-19371-7 PATH/ROW 72/12



Center Coor.

68° 12′ N

146° 55′ W

1:1,000,000

Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1586-20275-6 02 PATH/ROW 72/13a

Center Coor.

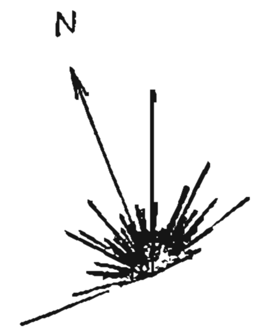
66° 58′ N

140° 38′ W

1:1,000,000

Linear Count

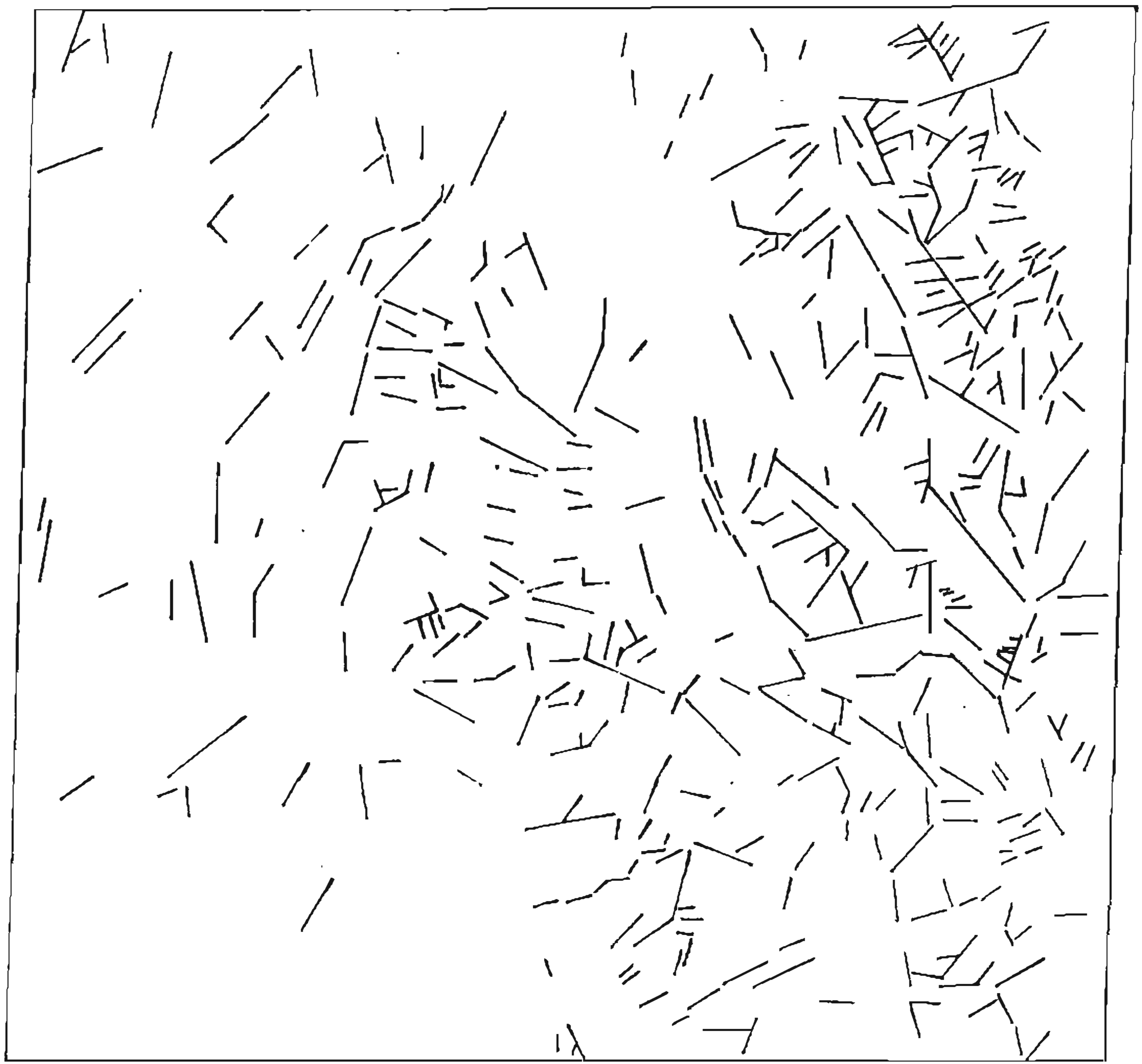
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-21320-20023-7 PATH/ROW 72/13 b

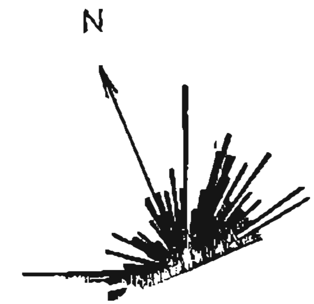


Center Coor.

66° 34′ N

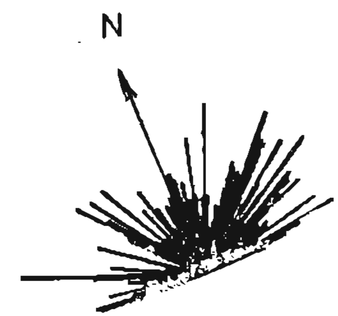
140° 46′ W

1:1,000,000



Linear Count

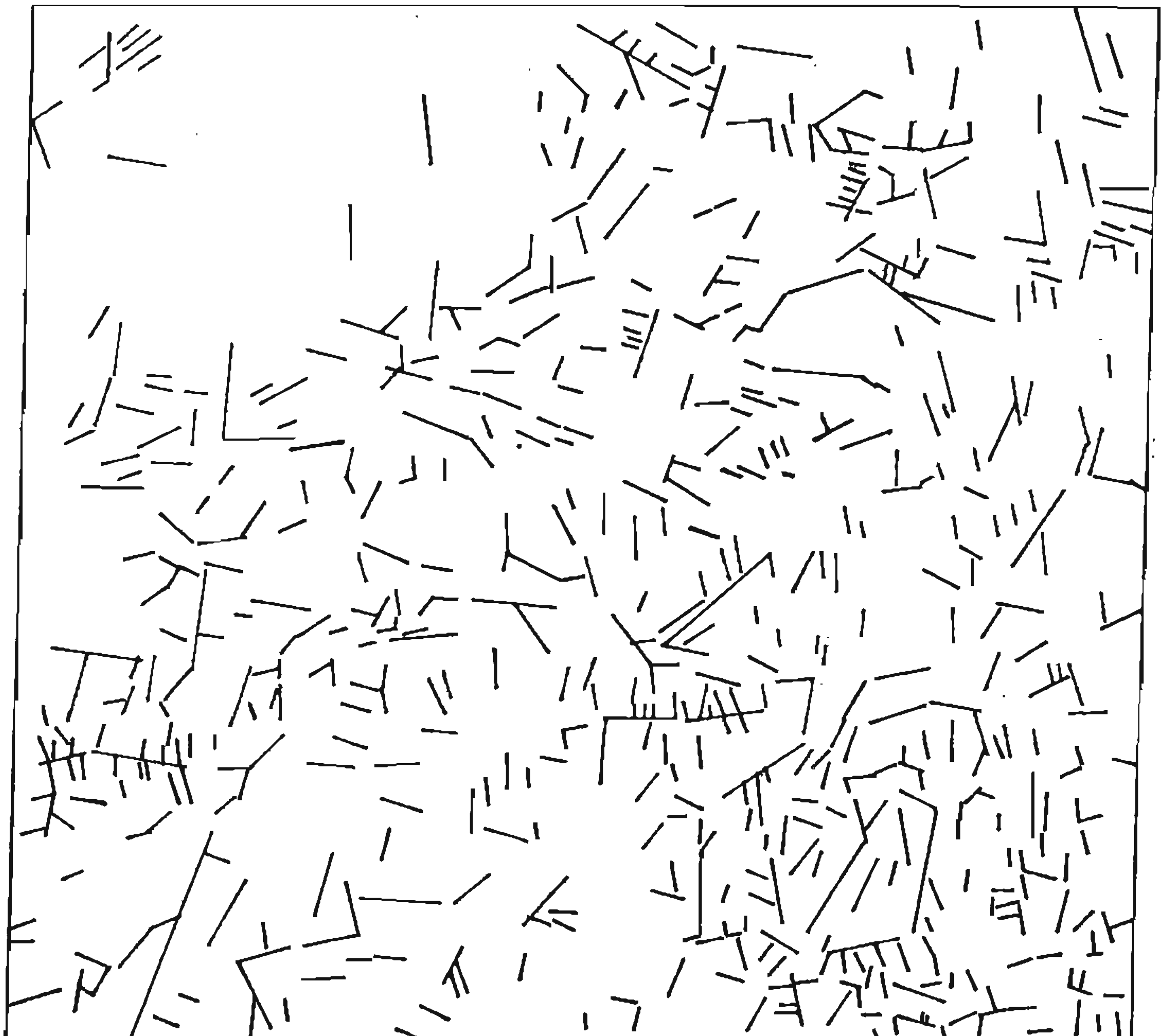
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30353-20221-7 PATH/ROW 72/14



Center Coor.

65° 14′ N

142° 14′ W

1:1,000,000

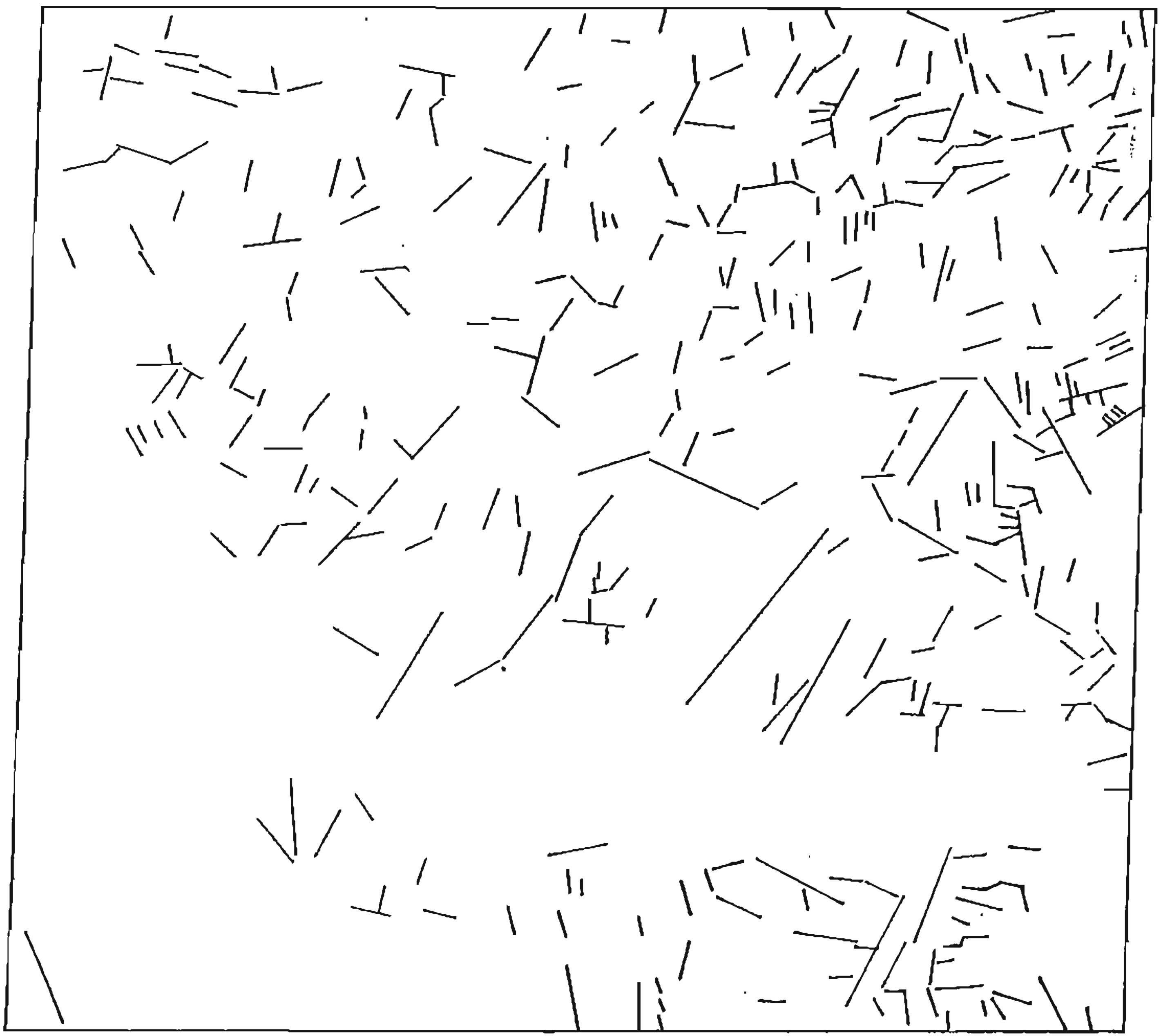
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-30353-20223-7 PATH/ROW 72/15

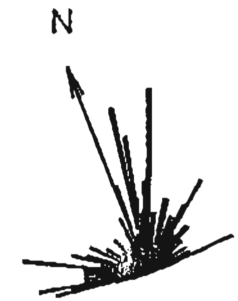


Center Coor:

63° 53′ N

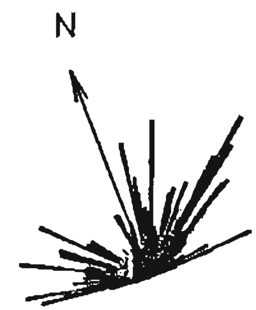
143° 35′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

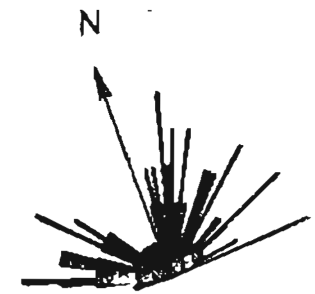
LANDSAT E-1586-20290-5 02 PATH/ROW 72/16

Center Coor.

62° 55′ N

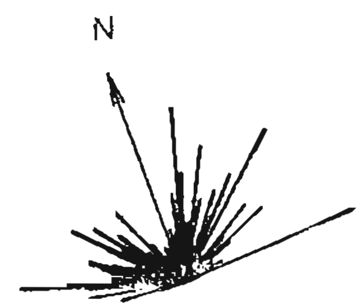
144° 47′ W

1:1,000,000



Linear Count

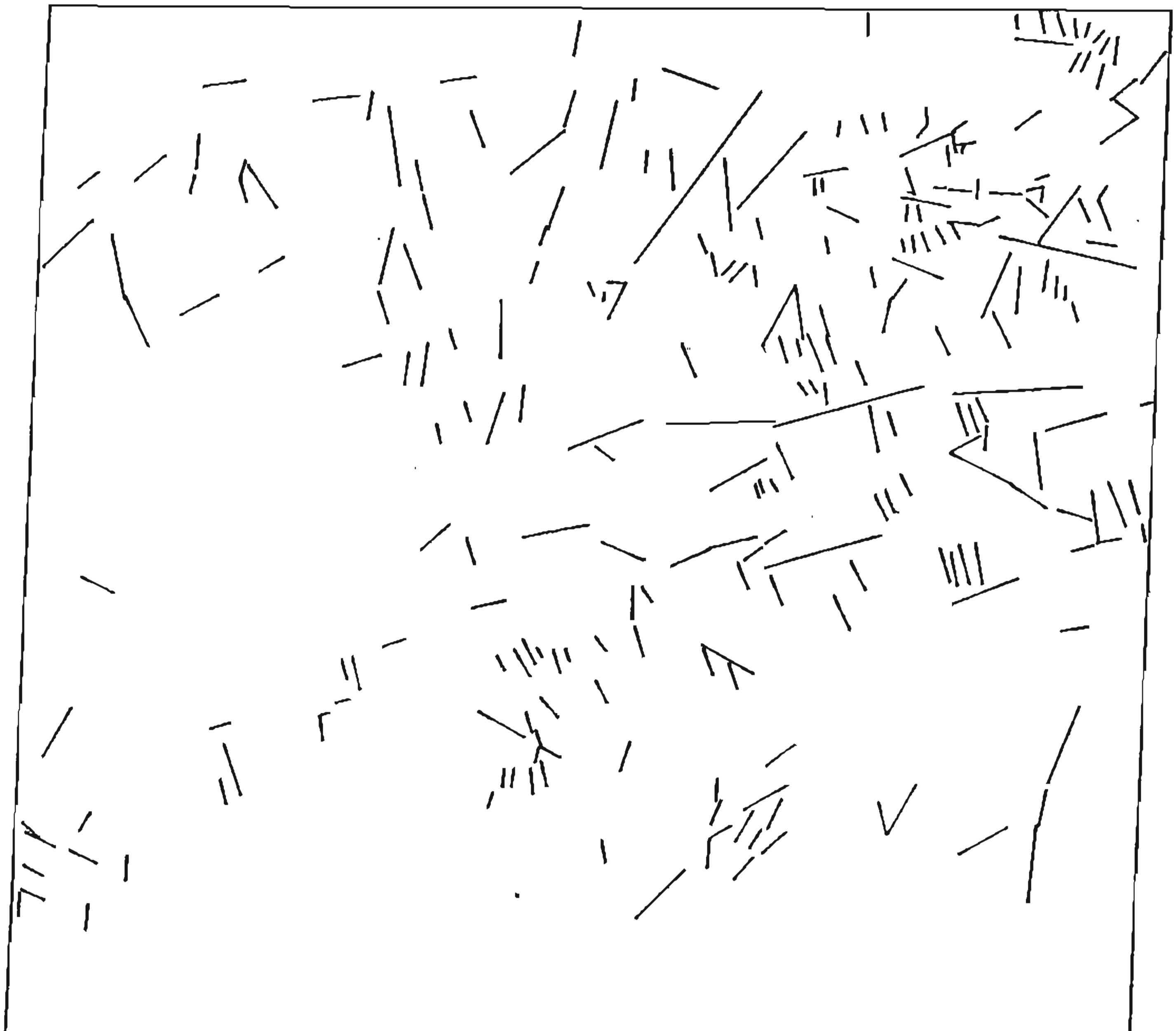
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30353-20232-7 PATH/ROW 72/17



Center Coor.

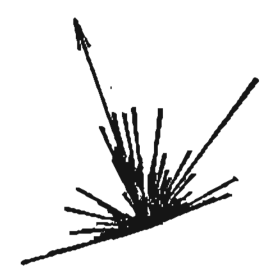
61° 11′ N

145° 56′ W

1:1,000,000

Linear Count

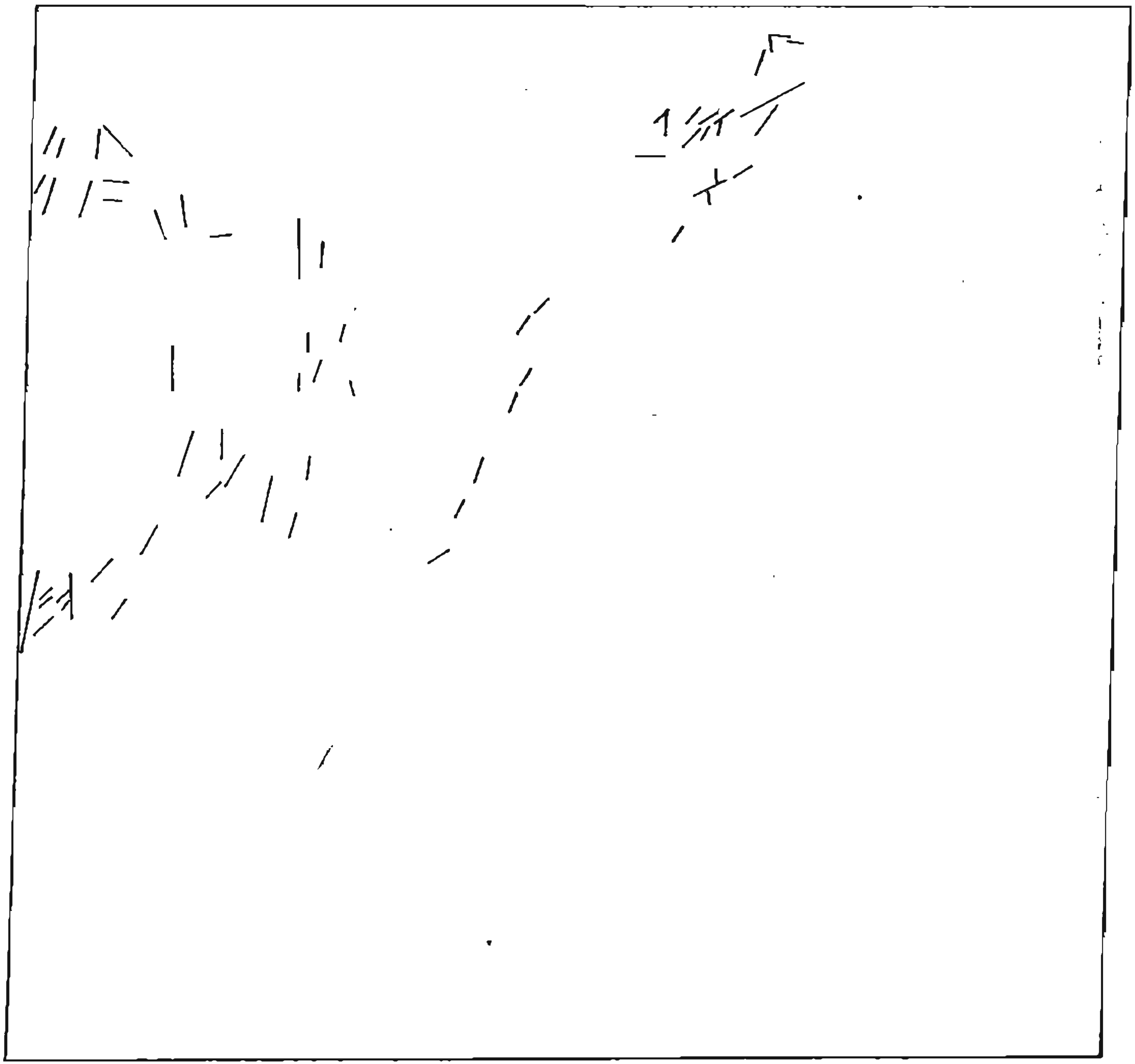
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-2402-20194-5 01 PATH/ROW 72/18

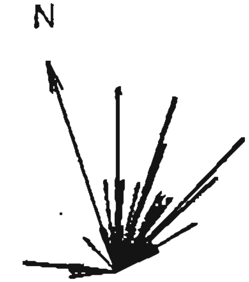


Center Coor.

59° 51′ N

147° 15′ W

1:1,000,000



Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

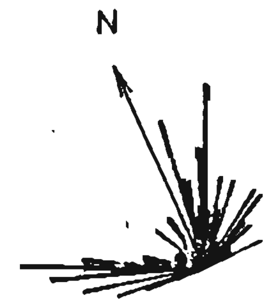
LANDSAT E-2 962-20063-7 PATH/ROW 74/12

Center Coor.

68° 14′ N

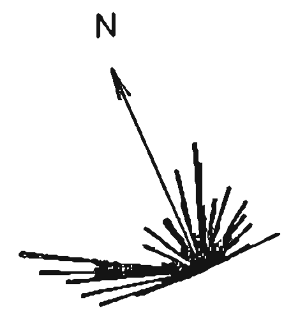
142° 09′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

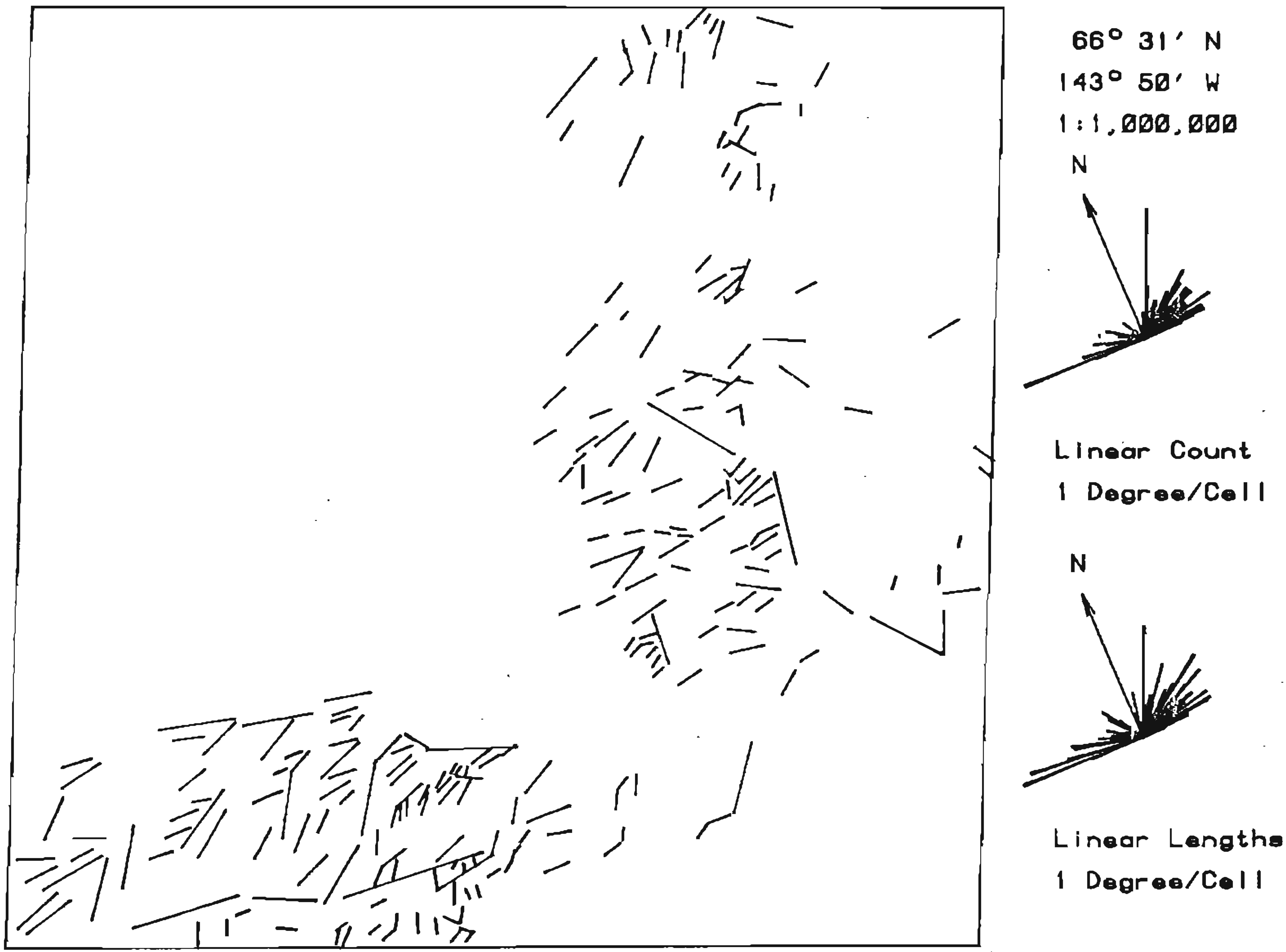
LANDSAT E-1102-20441-7 01 PATH/ROW 74/13

Center Coor.

66° 31′ N

143° 50′ W

1:1,000,000



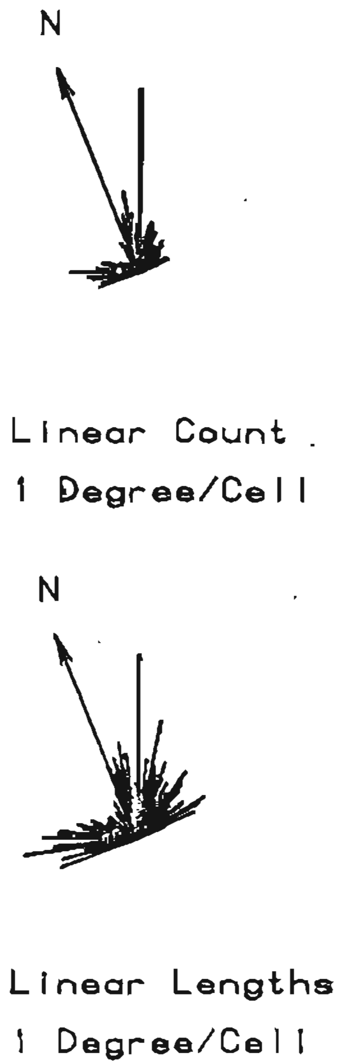
LANDSAT E-21484-20211-7 PATH/ROW 74/14

Center Coor.

65° 11′ N

145° 35′ W

1:1,000,000



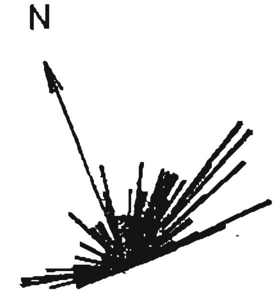
LANDSAT E-21304-20140-7 PATH/ROW 74/15

Center Coor.

63° 51′ N

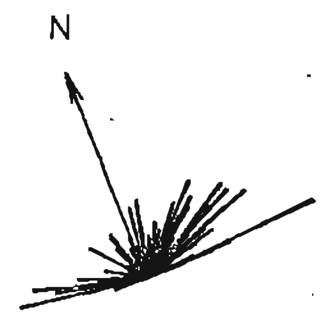
146° 26′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

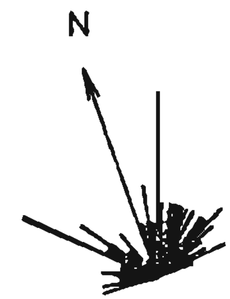
LANDSAT E-1102-20452-7 01 PATH/ROW 74/16

Center Coor.

62° 29′ N

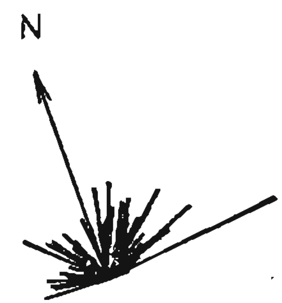
147° 52′ W

1:1,000,000



Linear Count

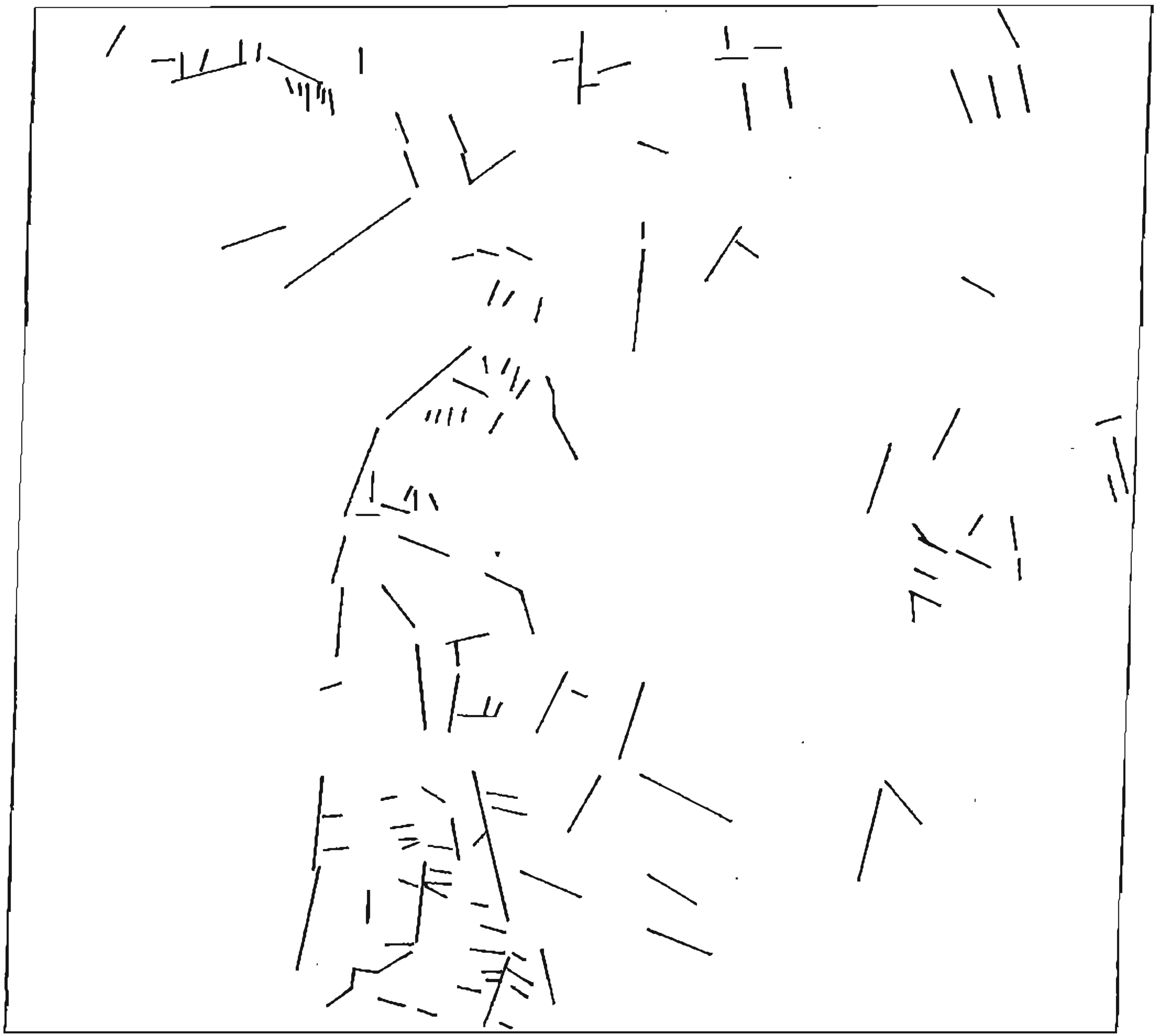
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30355-20345-7 PATH/ROW 74/17



Center Coor.

61° 13′ N

148° 52′ W

1:1,000,000

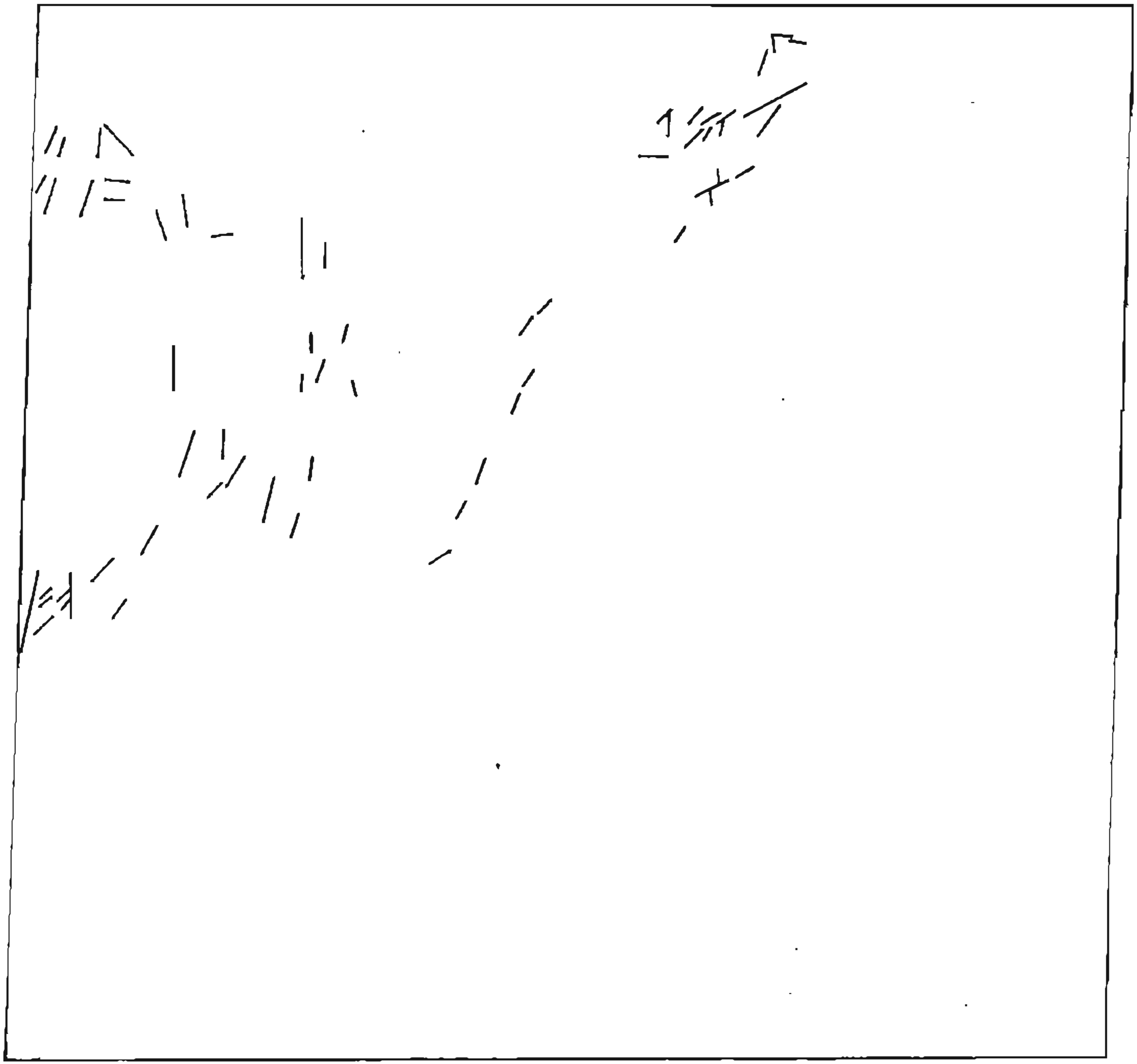
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-2402-20194-5 01 PATH/ROW 74/18

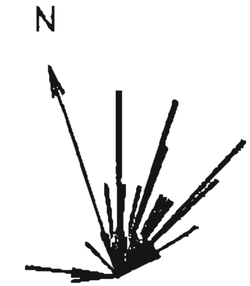


Center Coor.

59° 53′ N

147° 15′ W

1:1,000,000



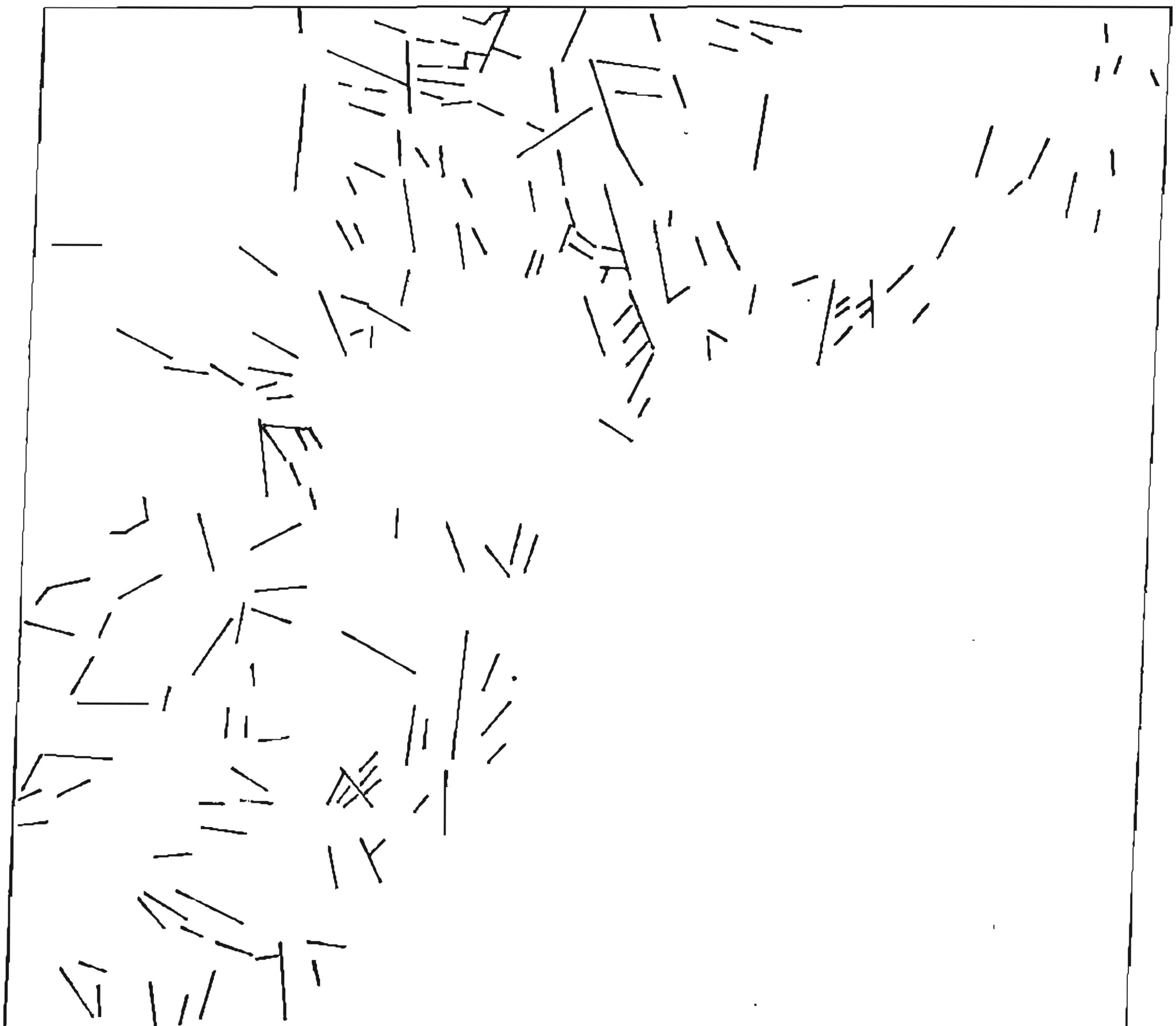
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-21484-20225-7 PATH/ROW 74/18

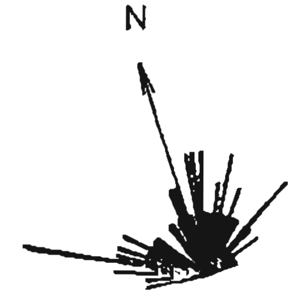


Center Coor..

59° 46′ N

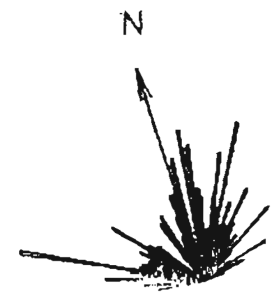
149° 49′ W

1:1,000,000



Linear Count

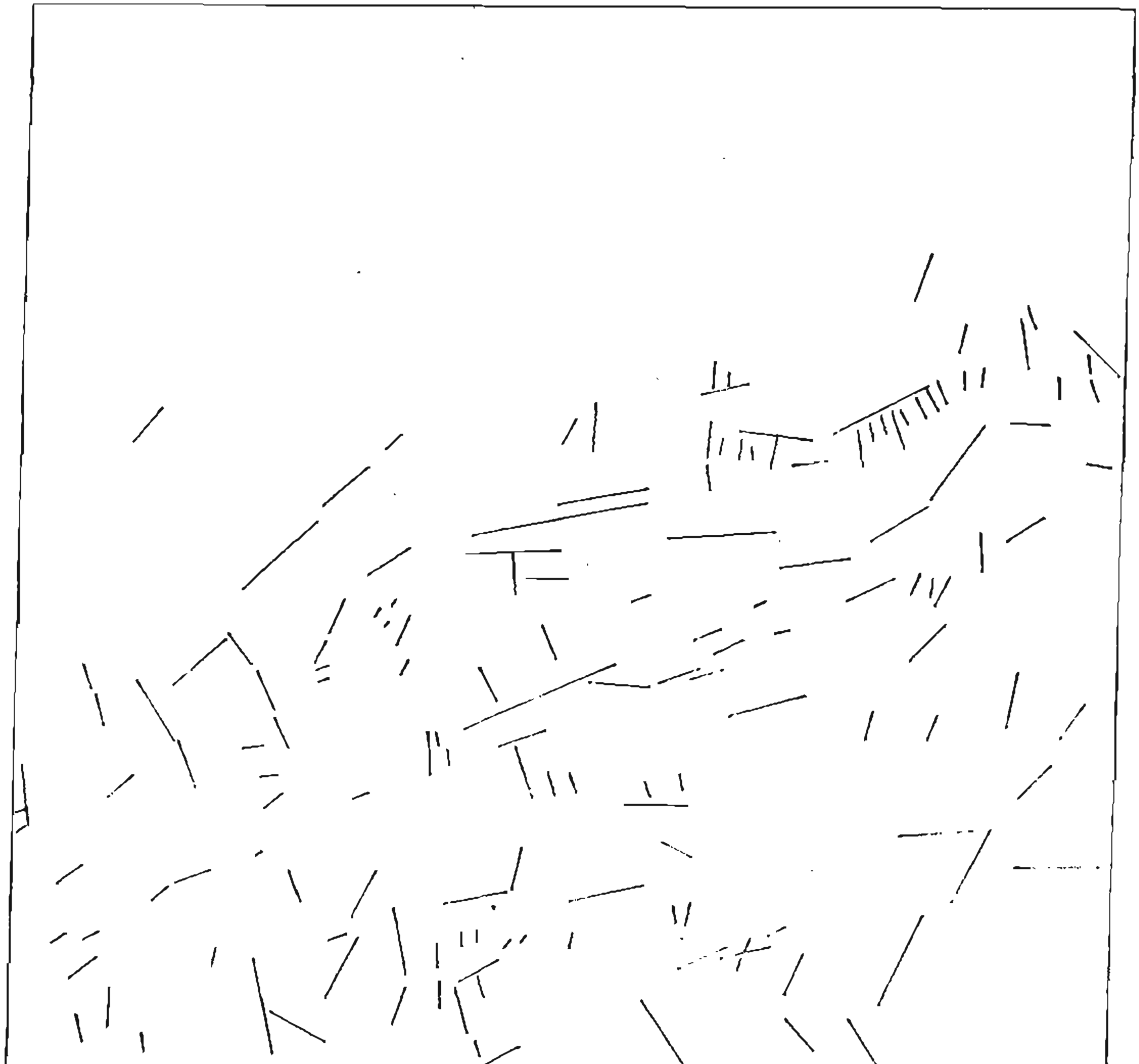
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-2 927-20135-7 PATH/ROW 75/11

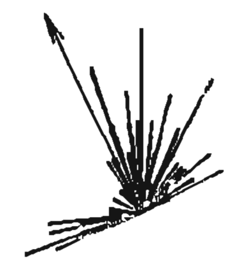


Center Coor.

69° 19′ N

142° 04′ W

1:1,000,000



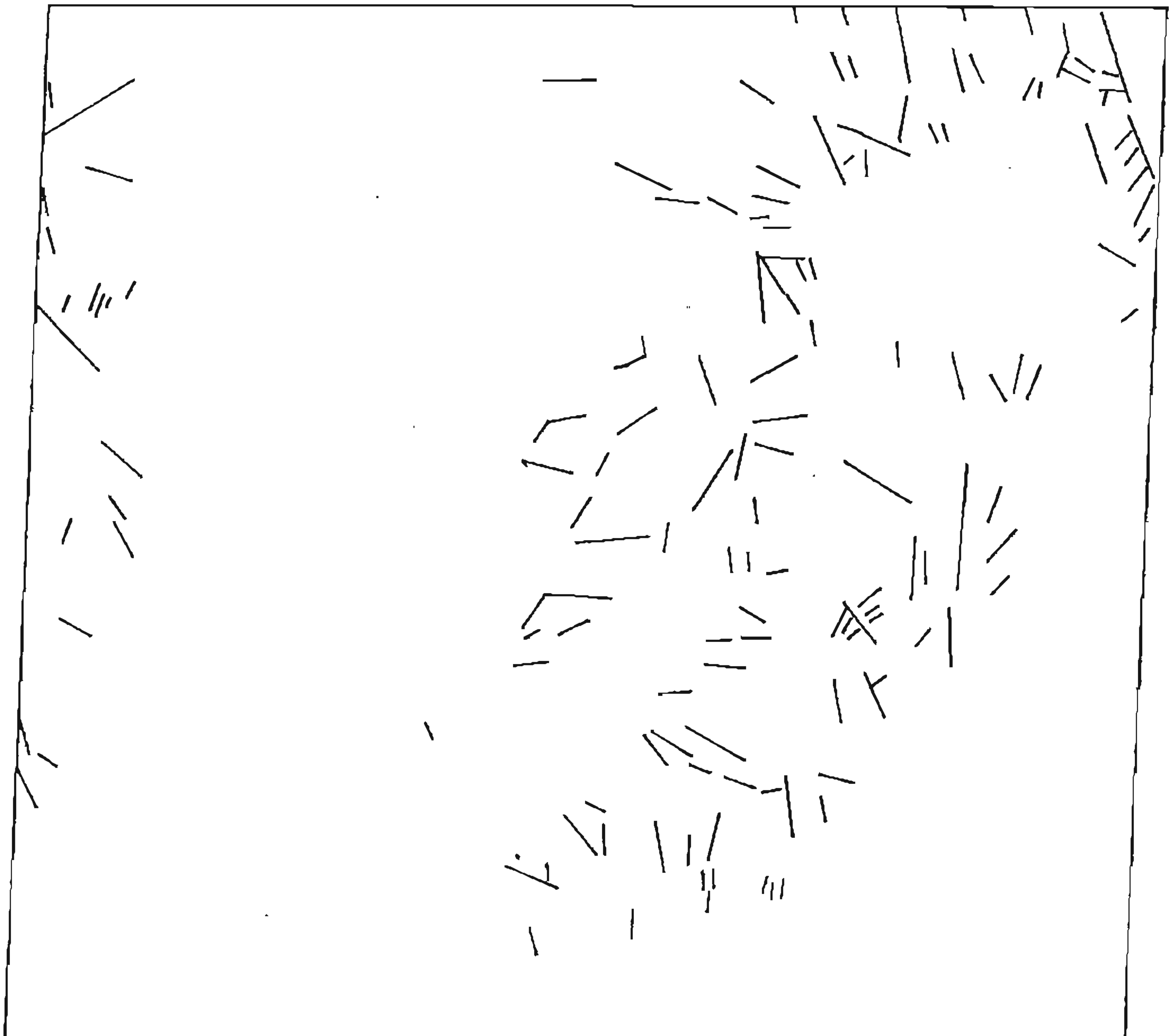
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-30338-20411-7 PATH/ROW 75/18

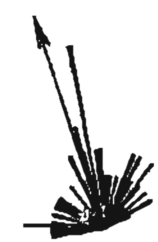


Center Coor.

59° 51′ N

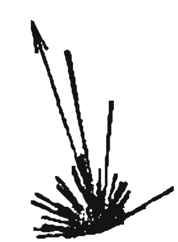
151° 20′ W

1:1,000,000



Linear Count

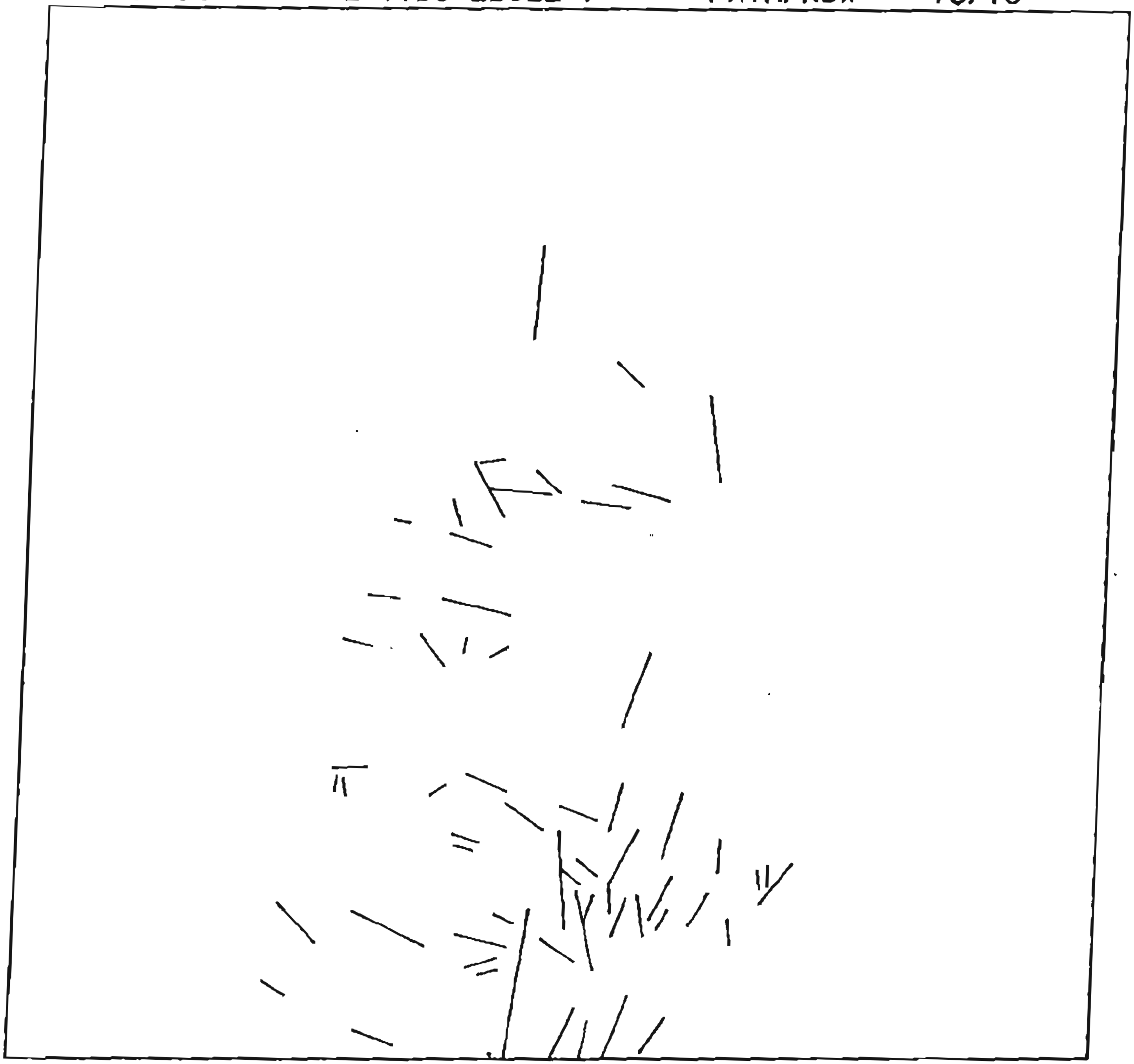
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1103-20522-7 PATH/ROW 75/19

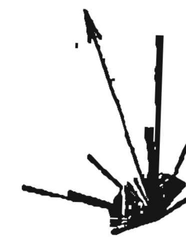


Center Coor.

58° 21′ N

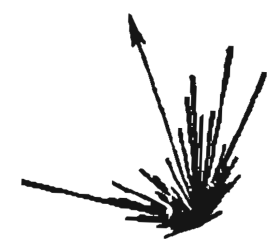
152° 28′ W

1:1,000,000



Linear Count

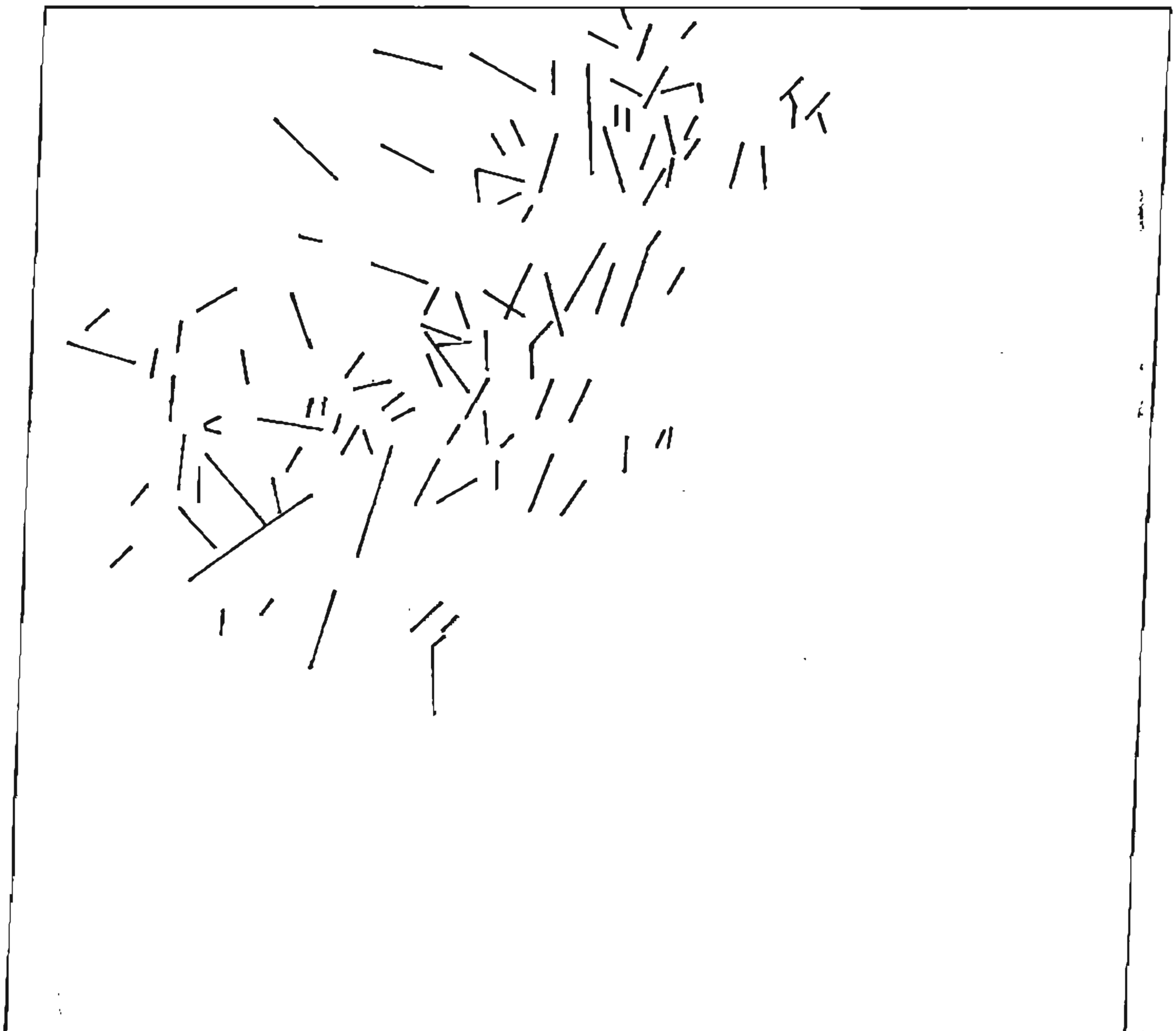
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30356-20415-7 PATH/ROW 75/20

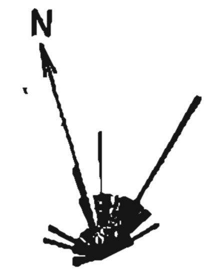


Center Coor.

57° 05′ N

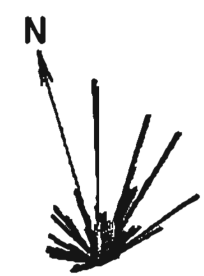
153° 13′ W

1:1,000,000



Linear Count

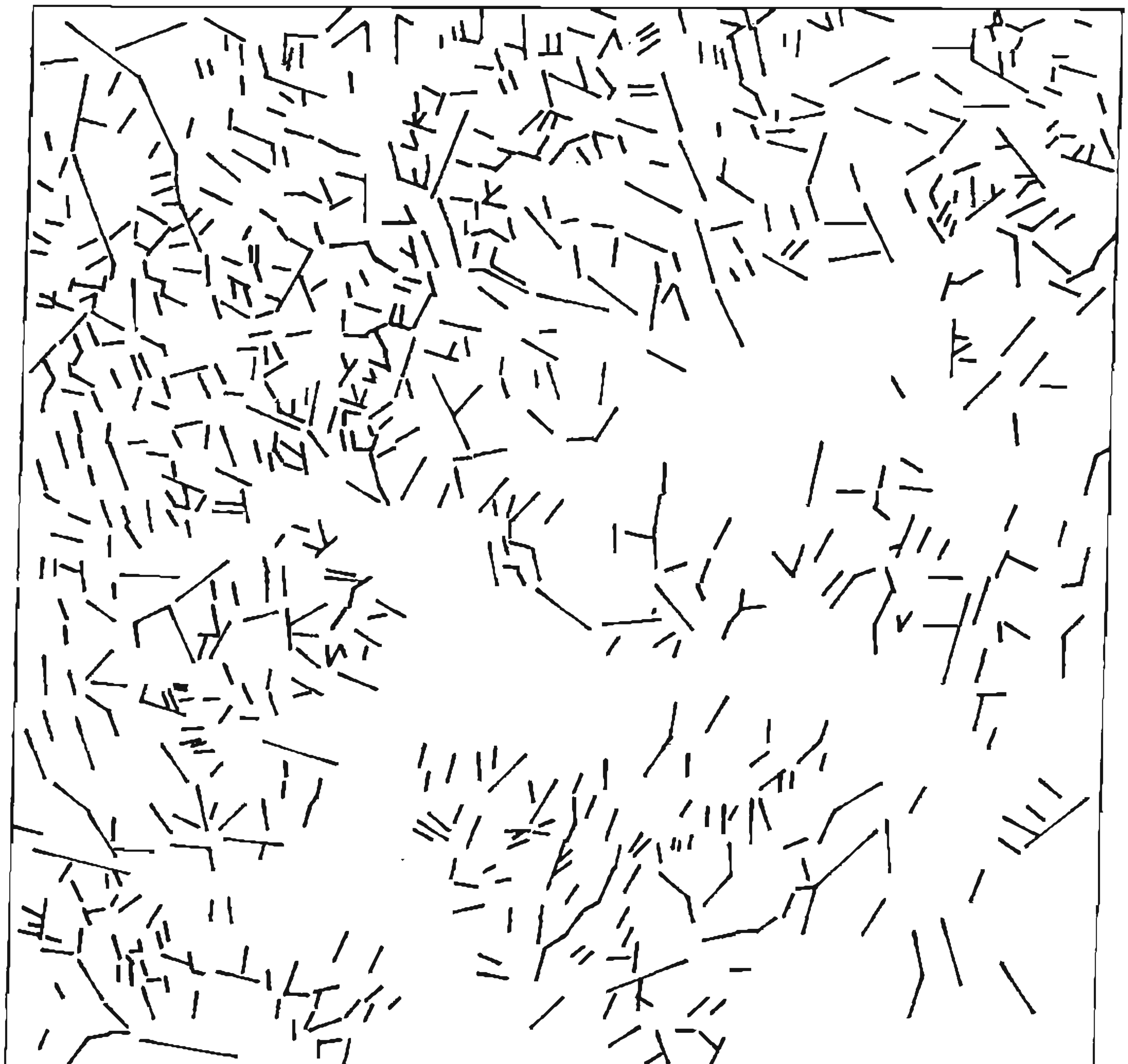
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1590-20502-7 02 PATH/ROW 76/12

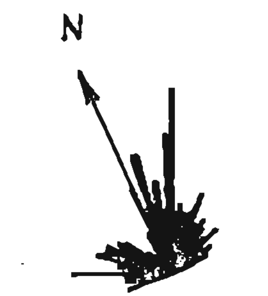


Center Coor.

68° 12′ N

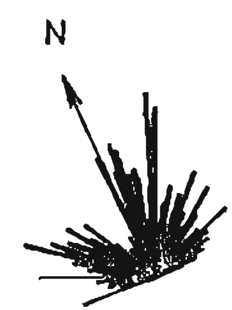
144° 51′ W

1:1,000,000



Linear Count

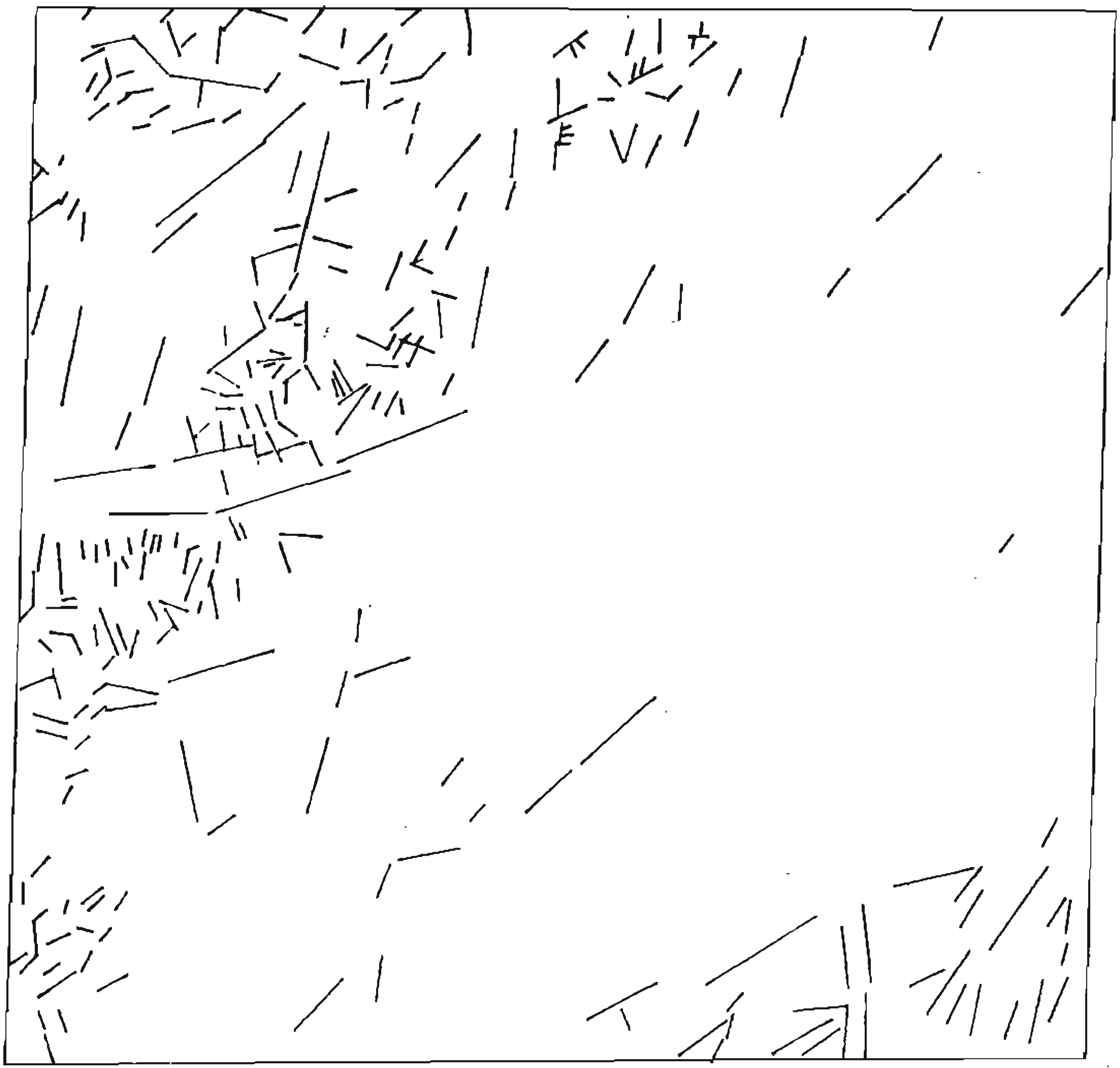
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1590-20504-5 02 PATH/ROW 76/13

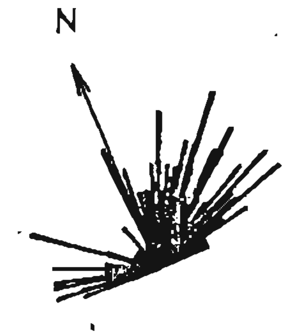


Center Coor.

66° 52′ N

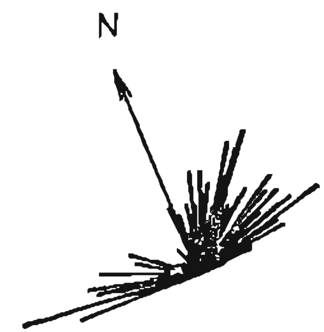
146° 30′ W

1:1,000,000



Linear Count

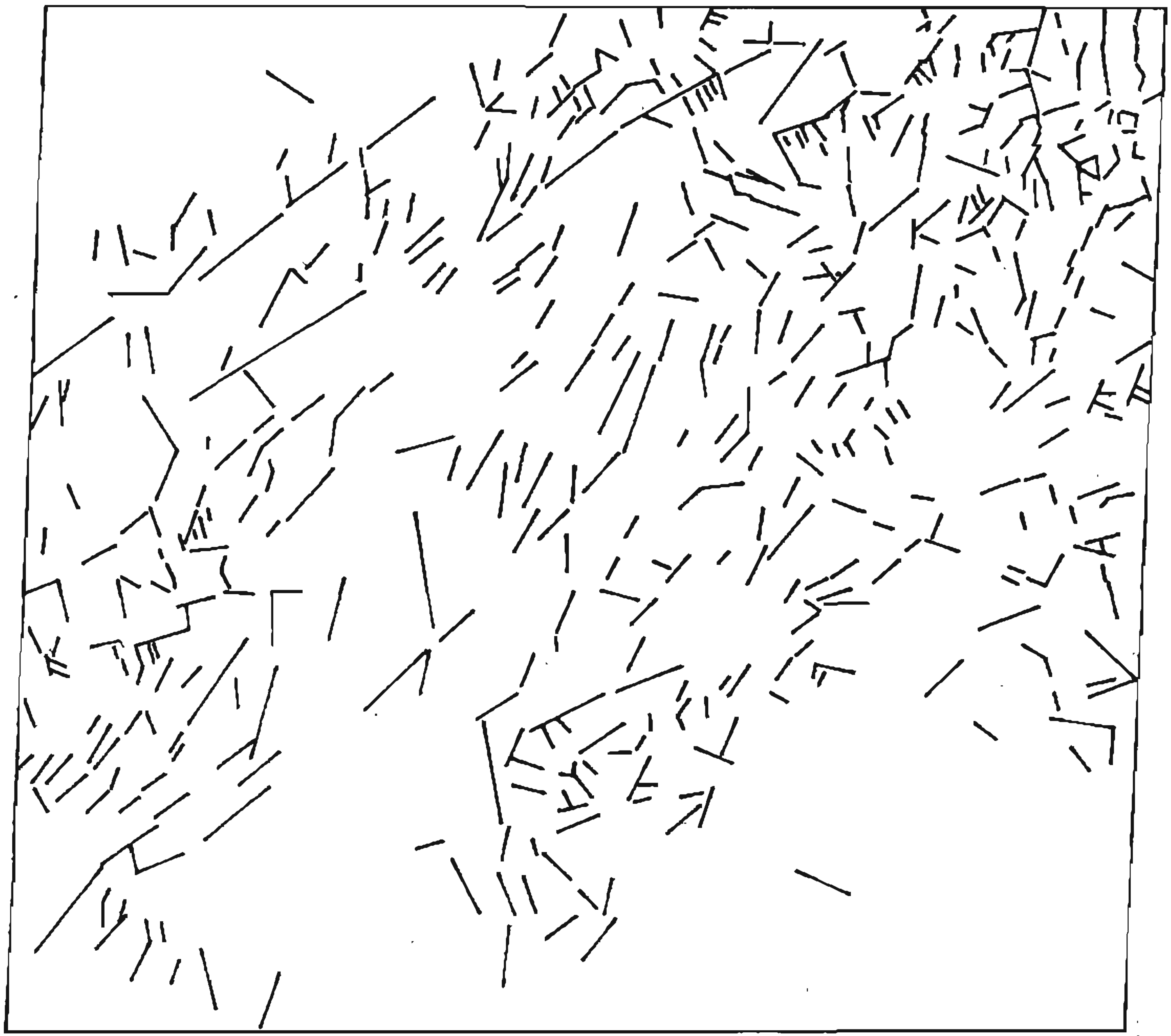
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30357-20450-7 PATH/ROW 76/14

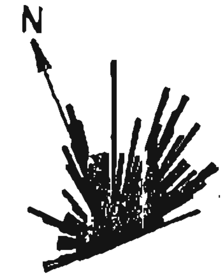


Center Coor.

65° 17′ N

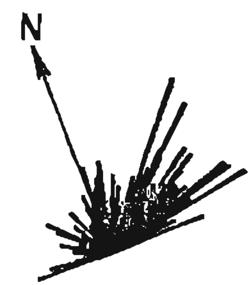
148° 02′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

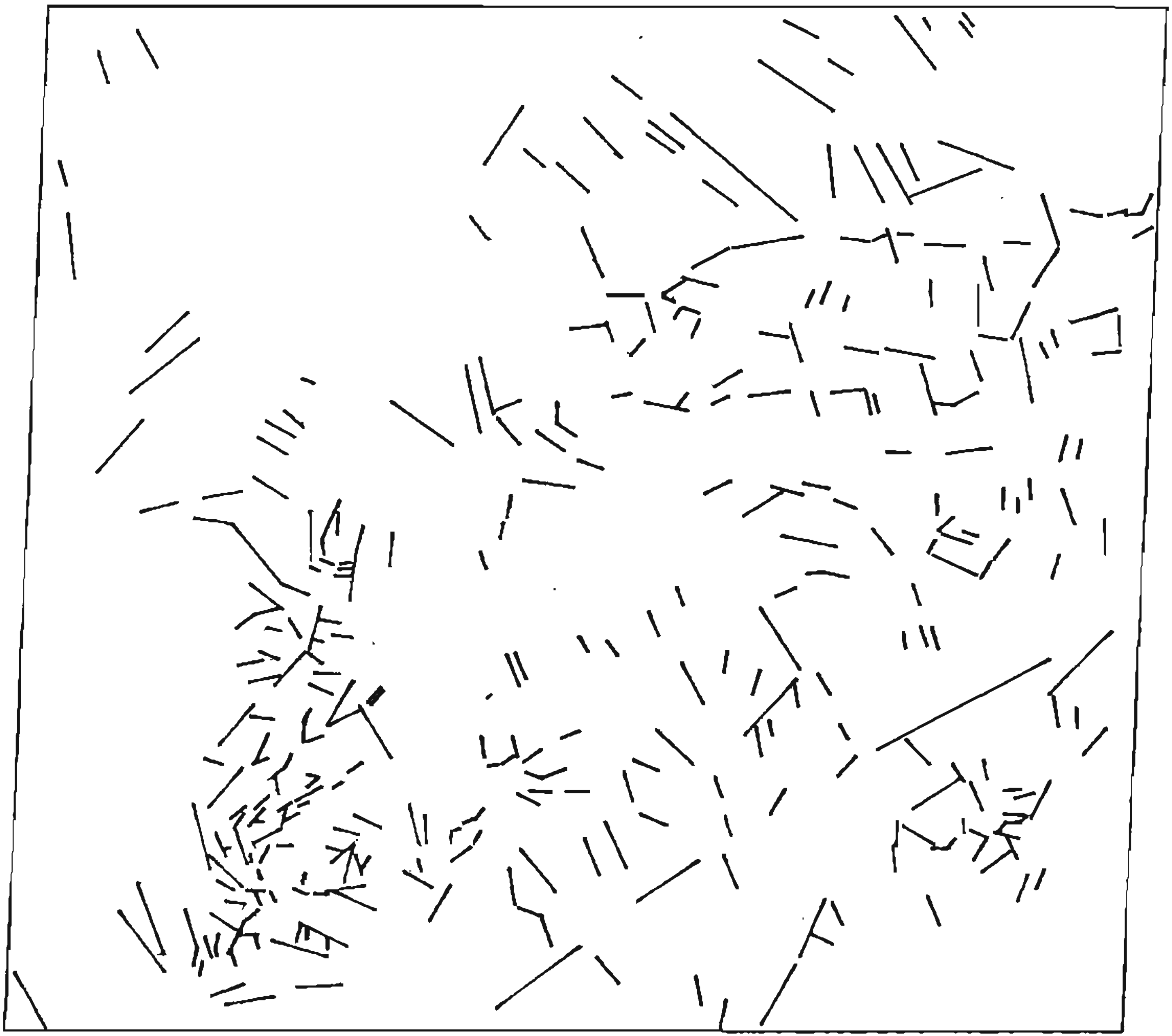
LANDSAT E-3Ø357-2Ø453-7 PATH/ROW 76/15

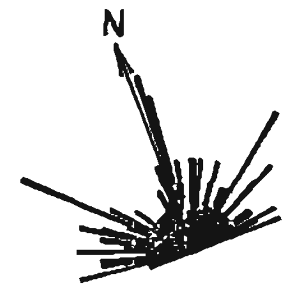
Center Coor.

63° 57′ N

149° 22′ W

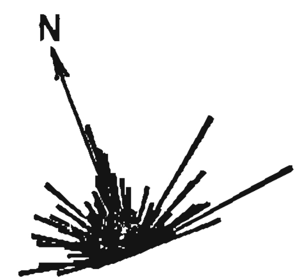
1:1,ØØØ,ØØØ





Linear Count

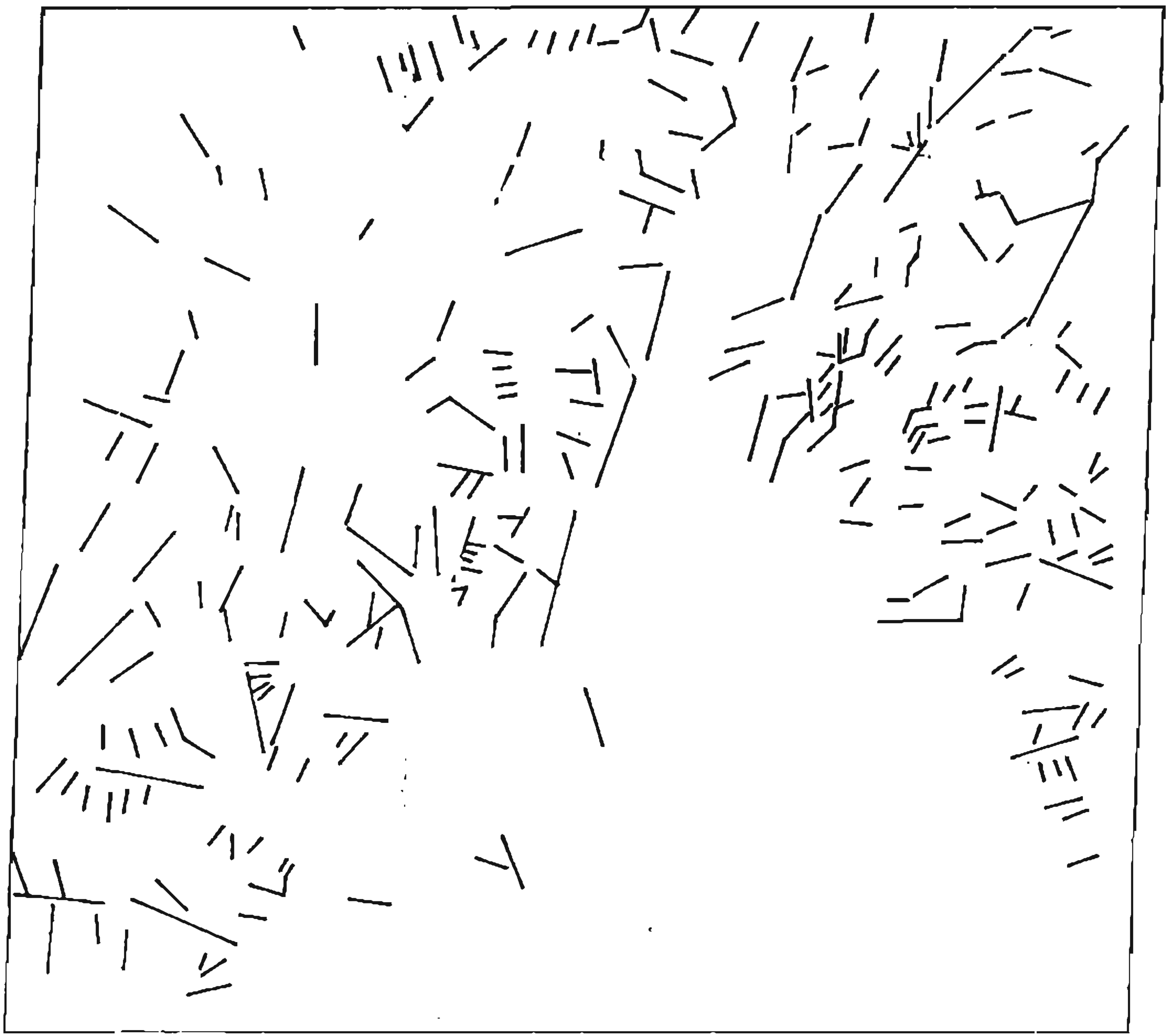
1 Degree/Cell



Linear Lengths

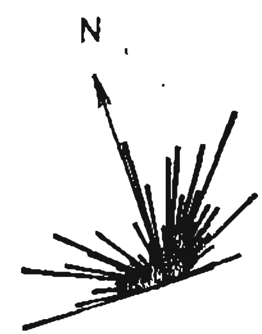
1 Degree/Cell

LANDSAT E-30357-20455-7 PATH/ROW 76/16



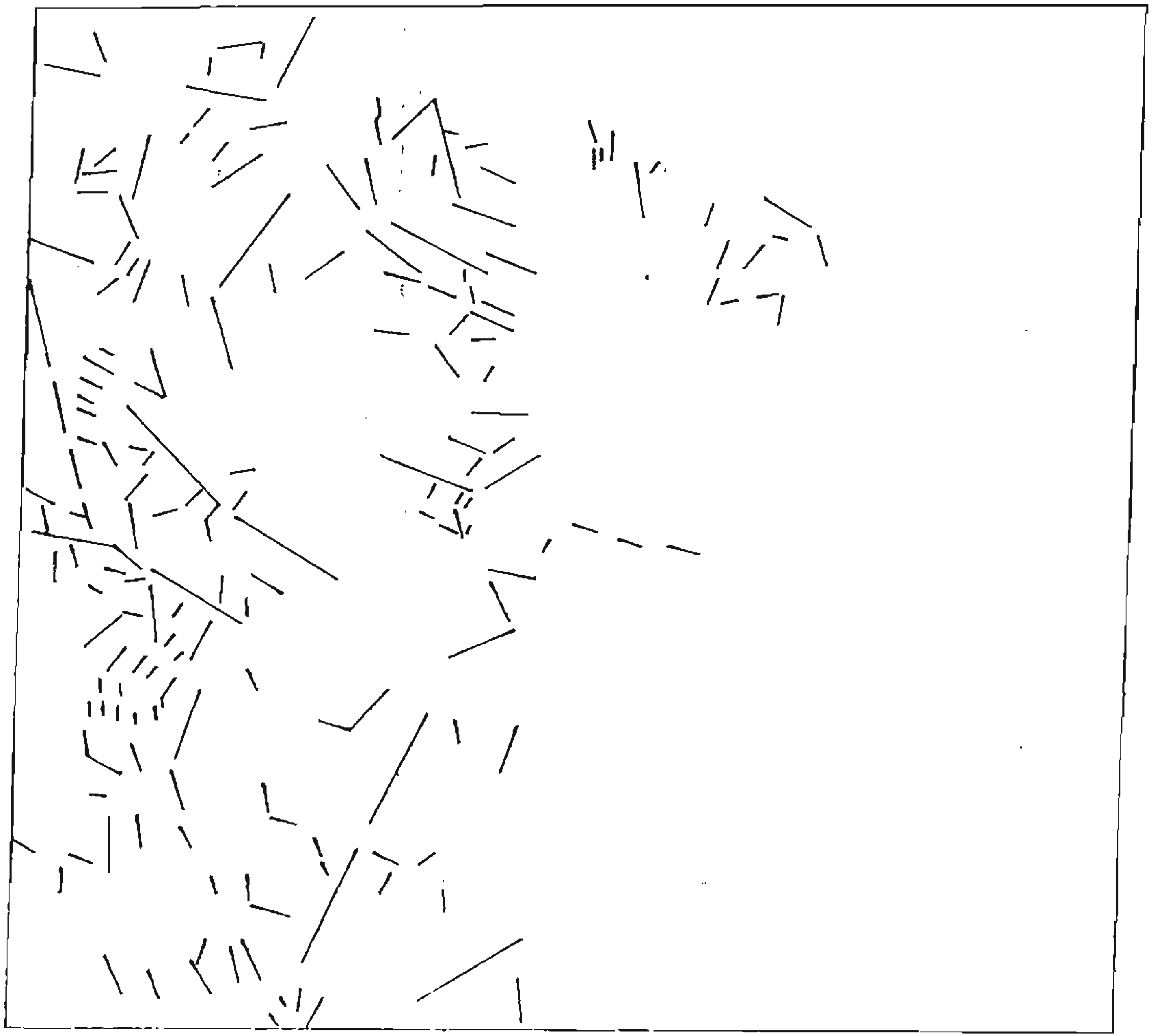
Center Coor.
62° 36′ N
150° 36′ W
1:1,000,000

Linear Count
1 Degree/Cell



Linear Lengths
1 Degree/Cell

LANDSAT E-30339-20463-7 PATH/ROW 76/17

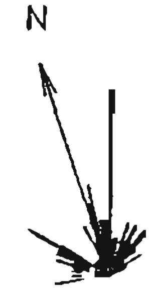


Center Coor.

61° 10′ N

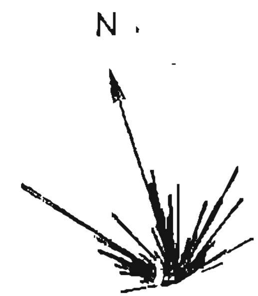
151° 41′ W

1:1,000,000



Linear Count

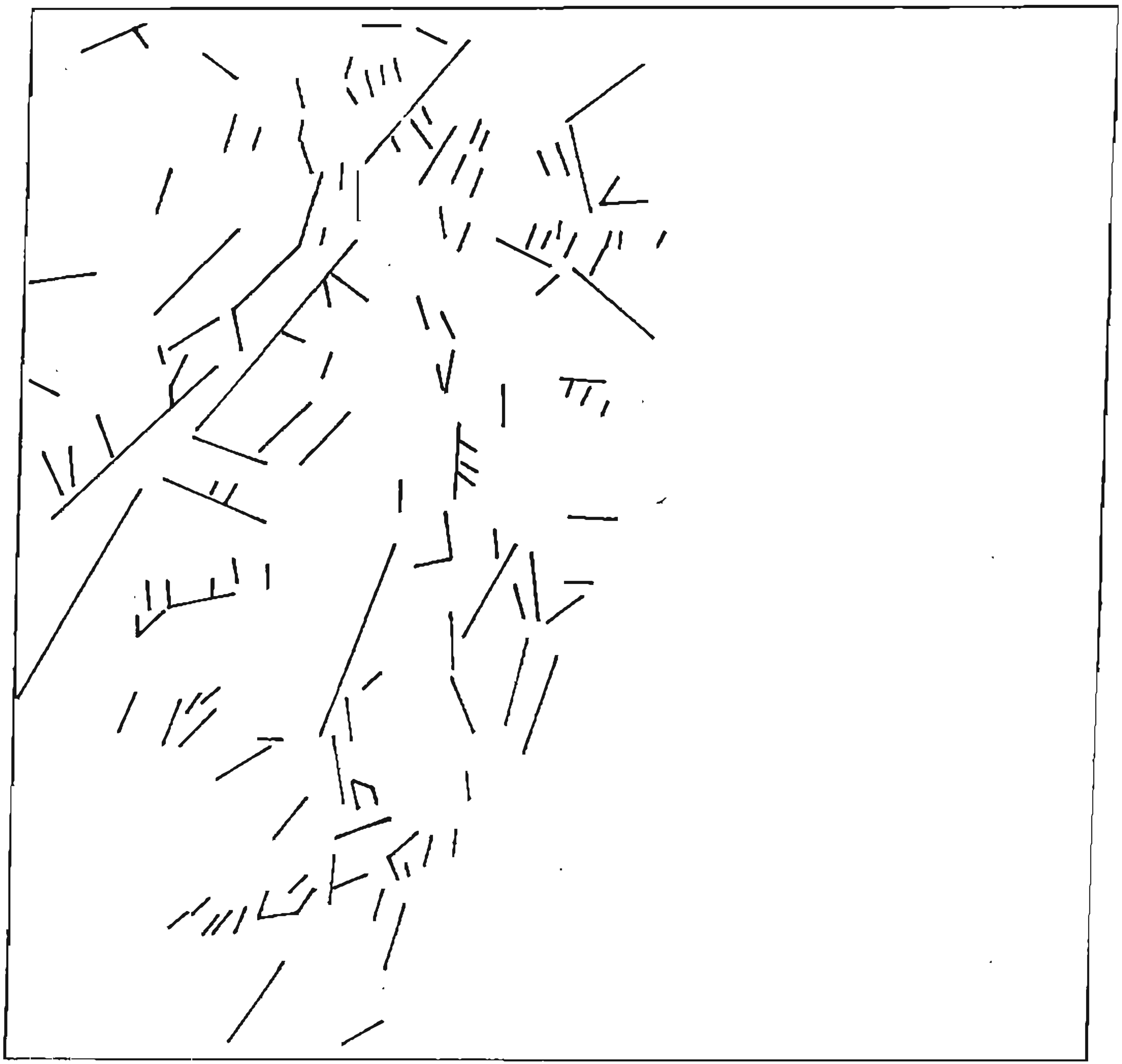
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1932-20413-6 01 PATH/ROW 76/18

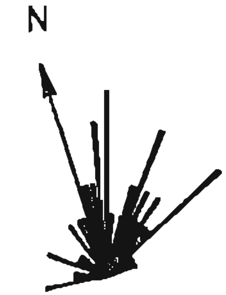


Center Coor.

59° 59′ N

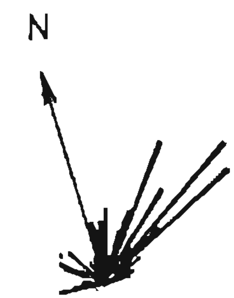
153° 00′ W

1:1,000,000



Linear Count

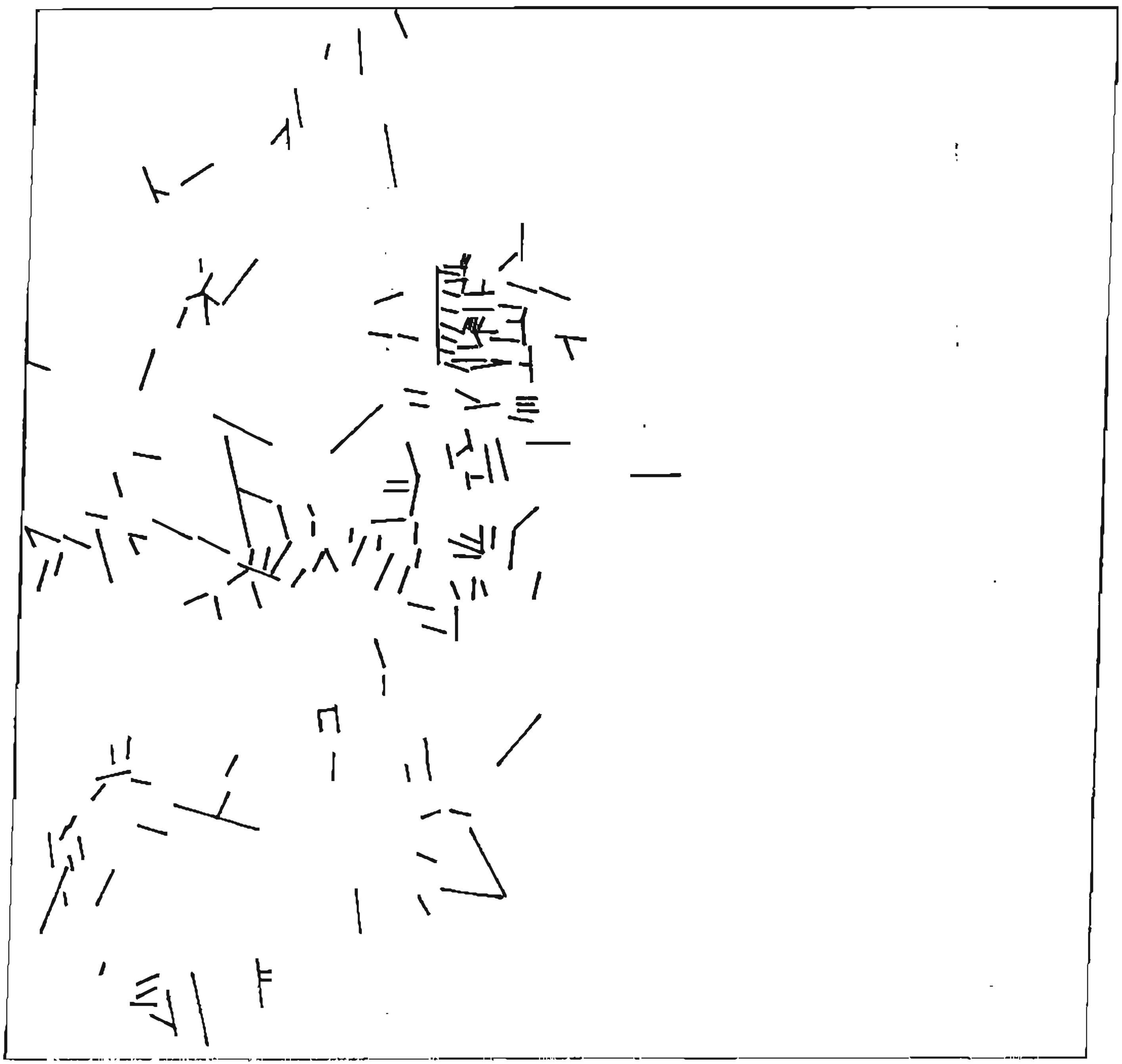
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1932-20420-6 01 PATH/ROW 76/19

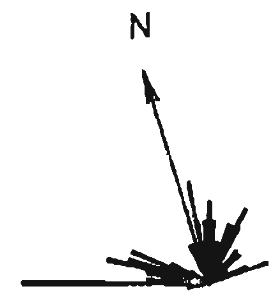


Center Coor.

58° 36′ N

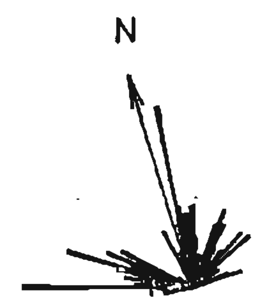
163° 57′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

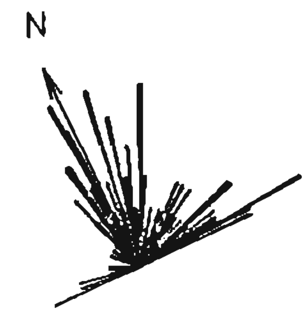
LANDSAT E-5 848-19364-7 PATH/ROW 77/11

Center Coor.

69° 31′ N

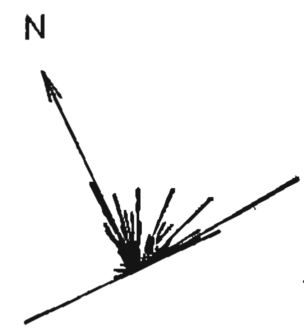
145° 06′ W

1:1,000,000



Linear Count

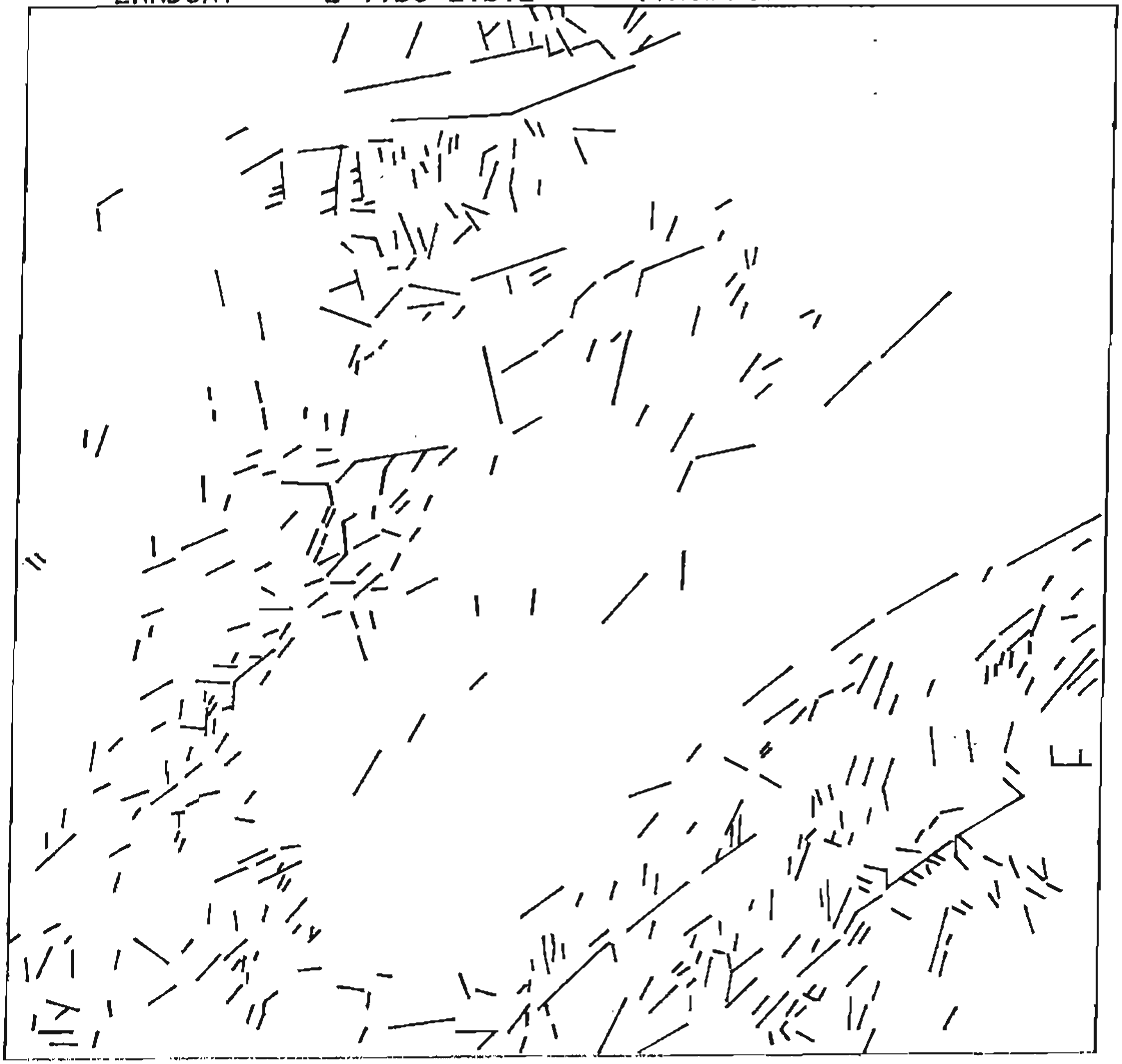
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1105-21012 PATH/ROW 77/13

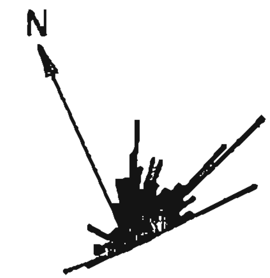


Center Coor.

66° 30′ N

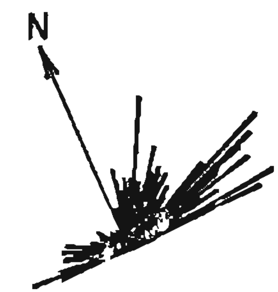
148° 09′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

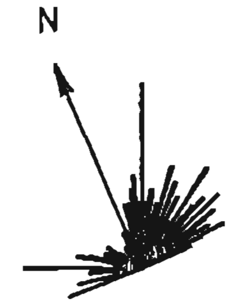
LANDSAT E-1592-21021-7 01 PATH/ROW 78/13

Center Coor.

66° 53' N

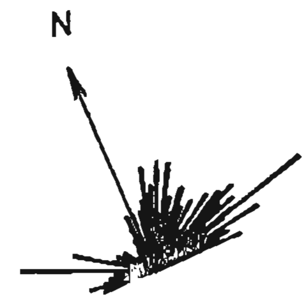
149° 20' W

1:1,000,000



Linear Count

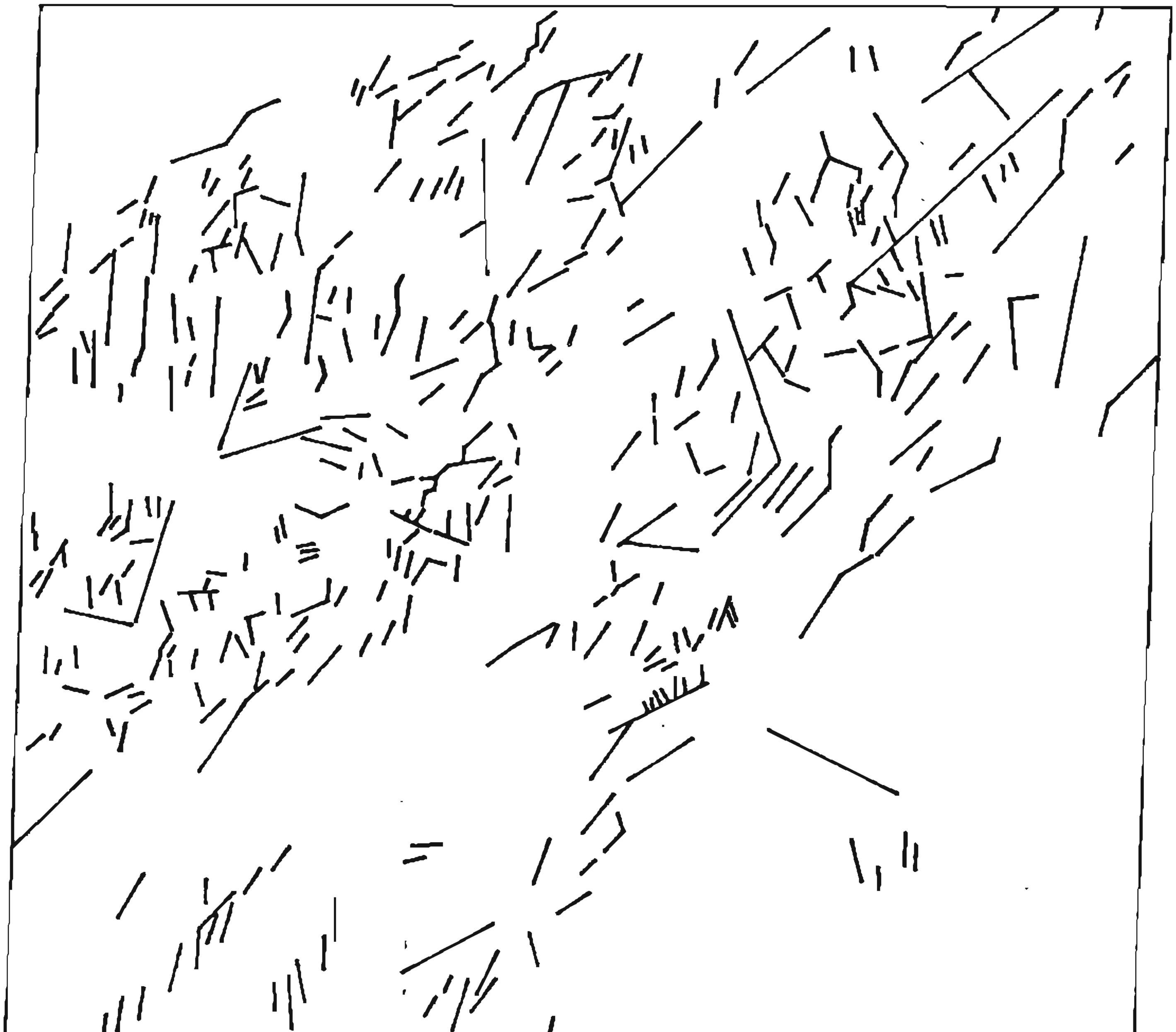
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30359-20563-7 PATH/ROW 78/14

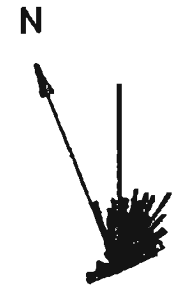


Center Coor.

65° 15′ N

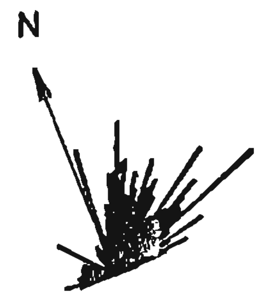
150° 52′ W

1:1,000,000



Linear Count

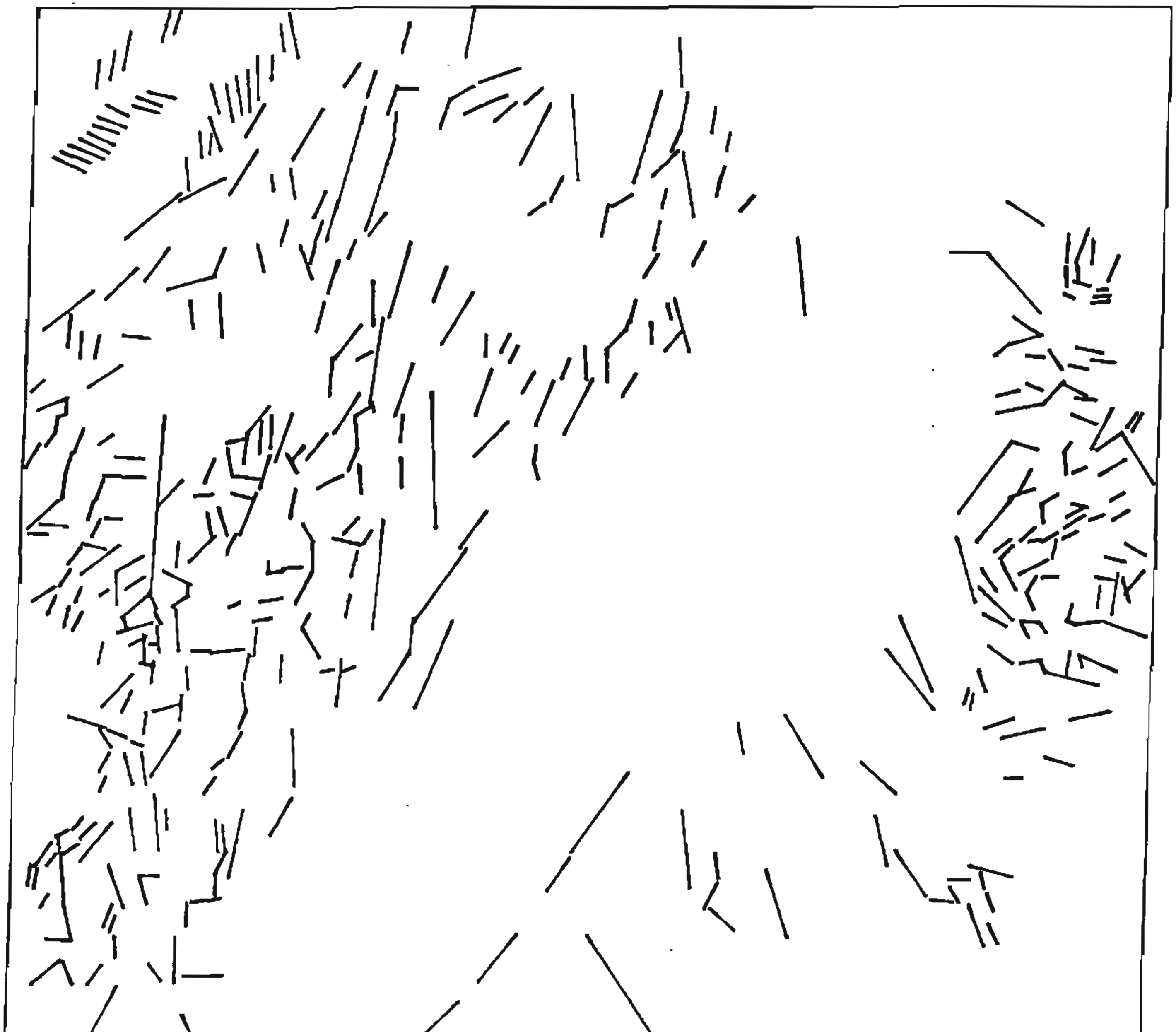
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-21488-20444-7 PATH/ROW 78/15



Center Coor.

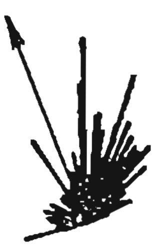
63° 52′ N

152° 09′ W

1:1,000,000

Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

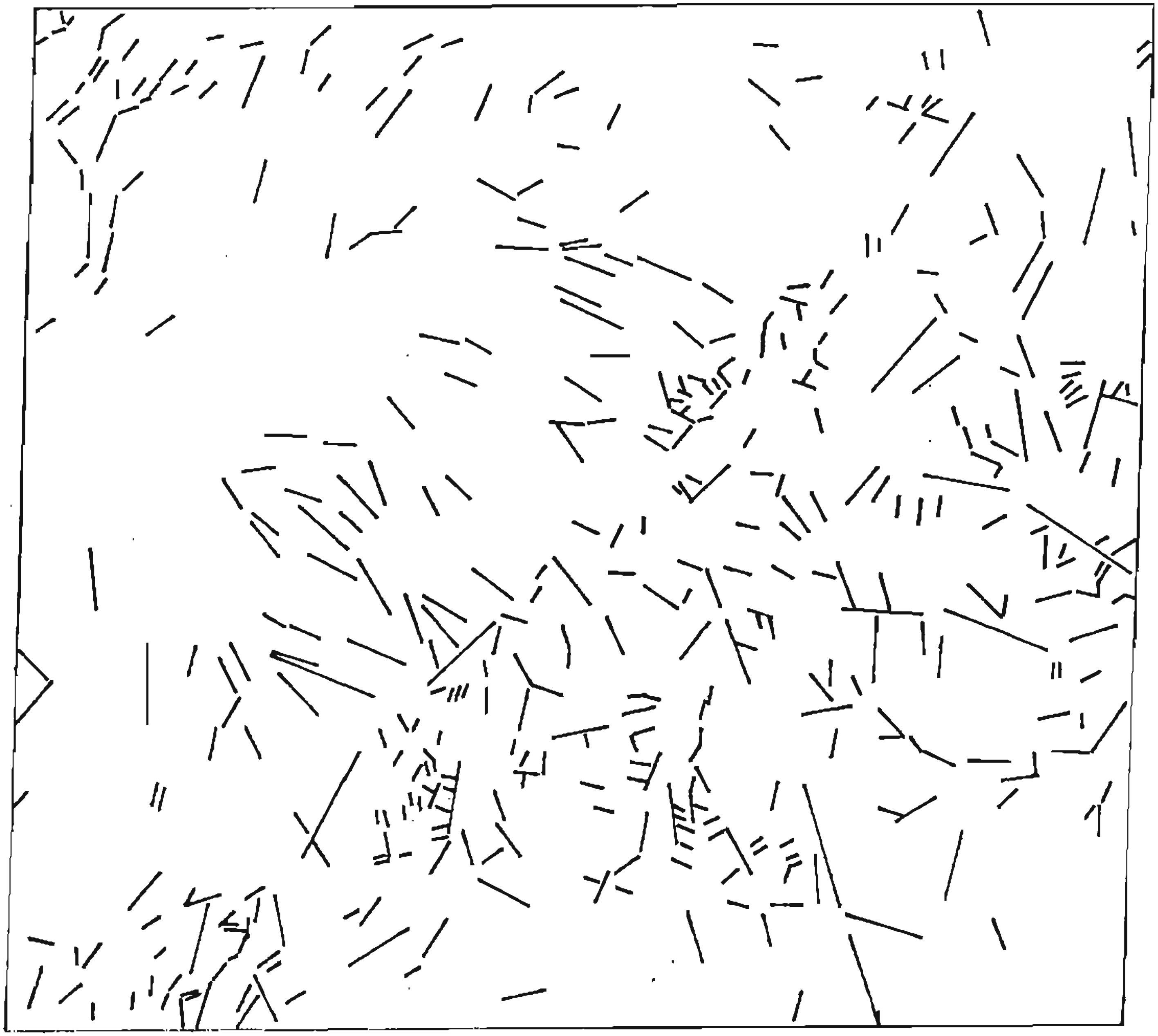
LANDSAT E-3Ø359-2Ø572-7 PATH/ROW 78/16

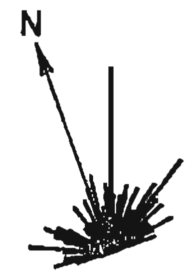
Center Coor.

62° 34′ N

163° 26′ W

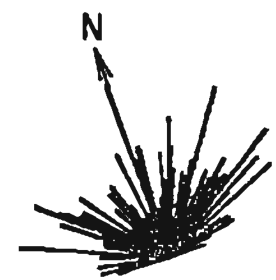
1:1,ØØØ,ØØØ





Linear Count

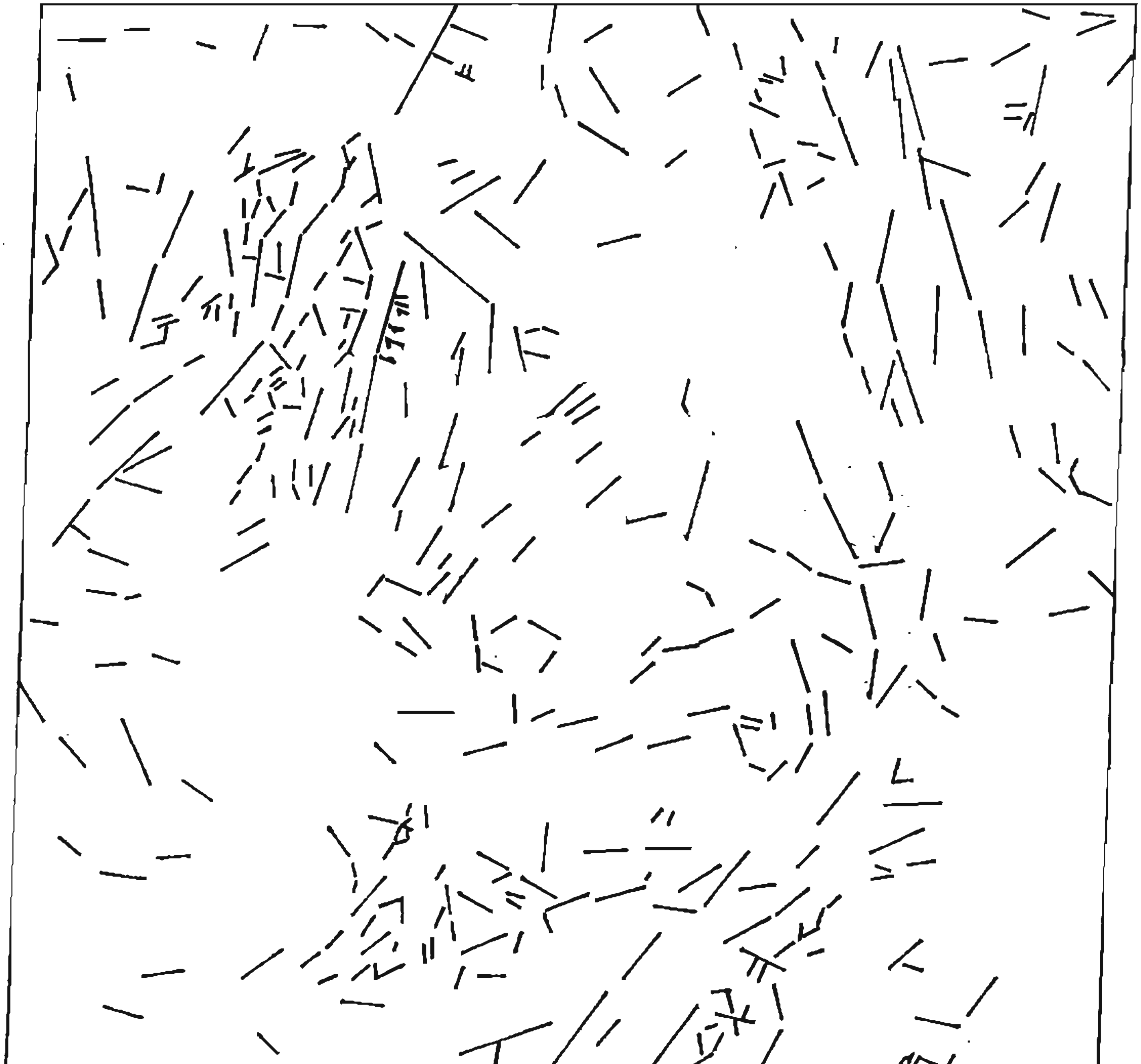
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1574-21040-7 01 PATH/ROW 78/17

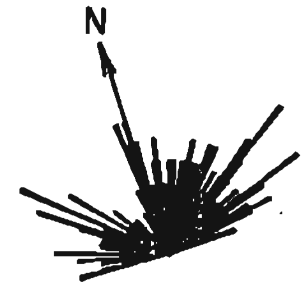


Center Coor.

61° 32′ N

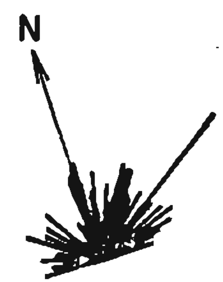
154° 34′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

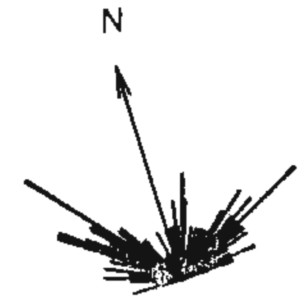
LANDSAT E-1466-21064-7 02 PATH/ROW 78/18

Center Coor.

60° 04′ N

155° 35′ W

1:1,000,000



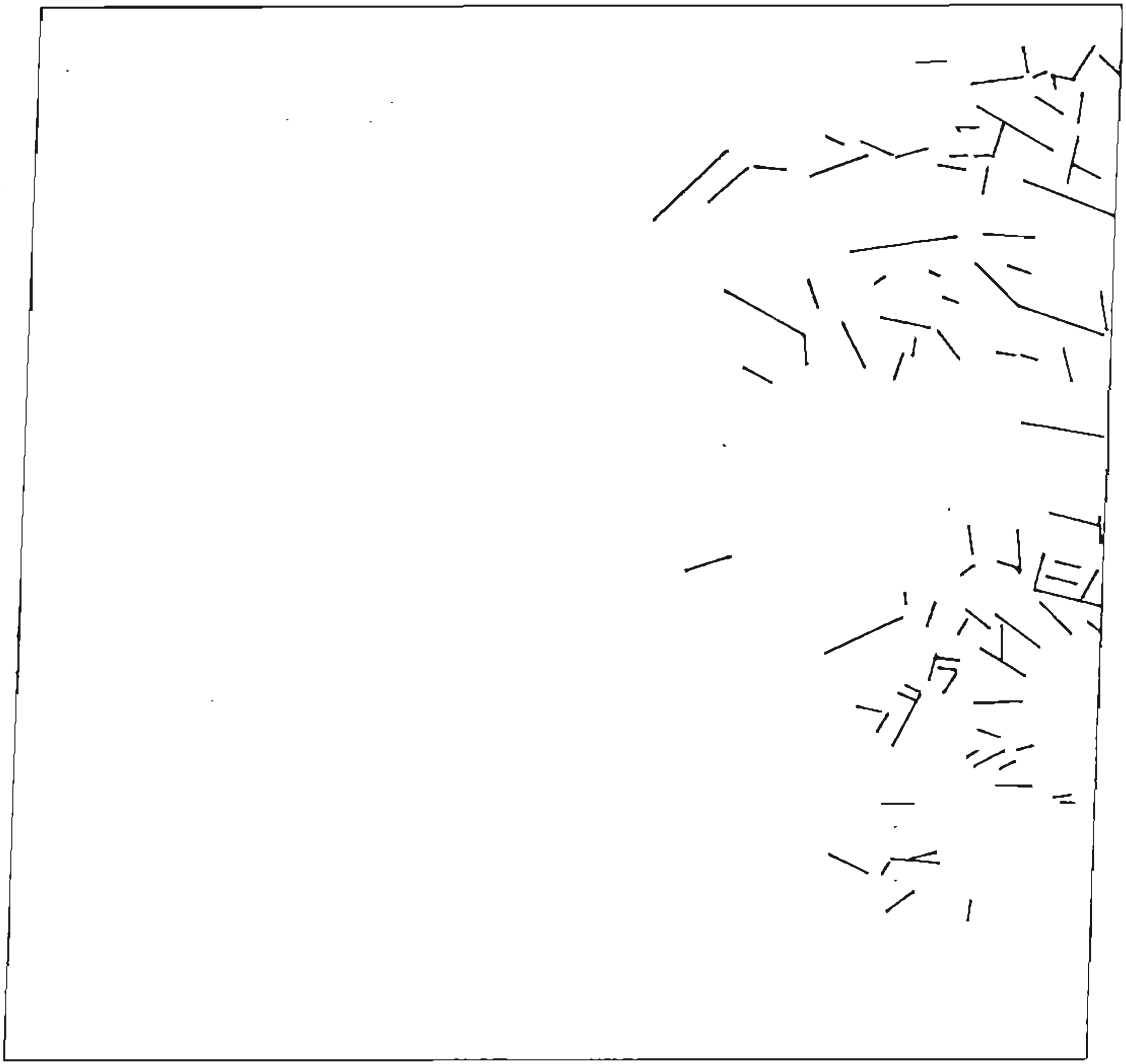
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1466-21070-7 02 PATH/ROW 78/19

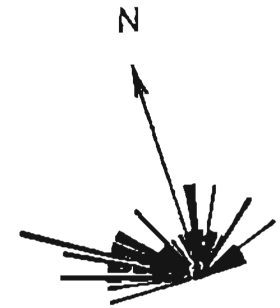


Center Coor.

58° 41′ N

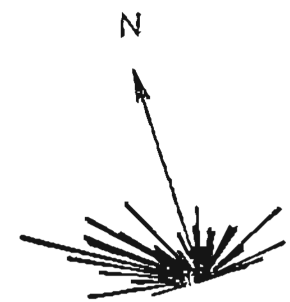
156° 34′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30341-20591-7 PATH/ROW 78/20

Center Coor.

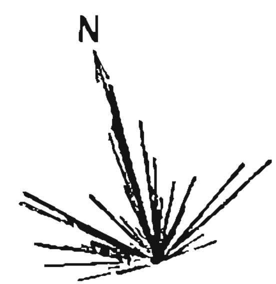
57° 02′ N

157° 27′ W

1:1,000,000

Linear Count

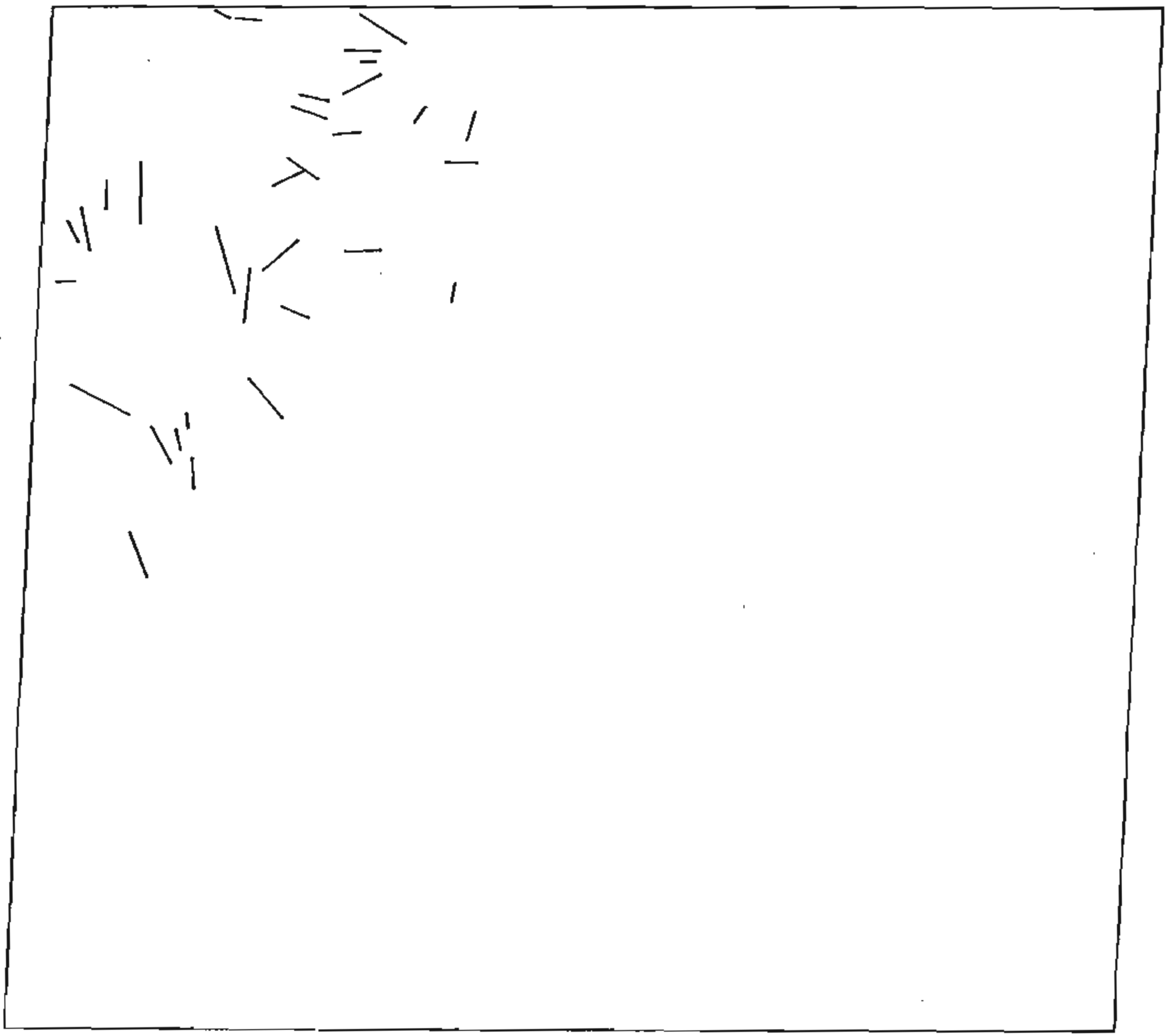
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30341-20593-7 PATH/ROW 78/21

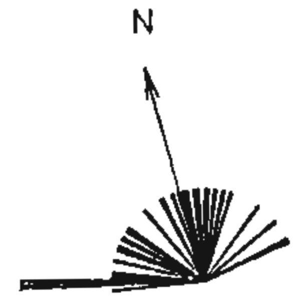


Center Coor.

55° 39′ N

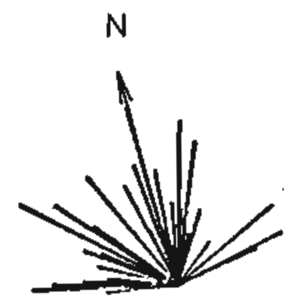
158° 19′ W

1:1,000,000



Linear Count

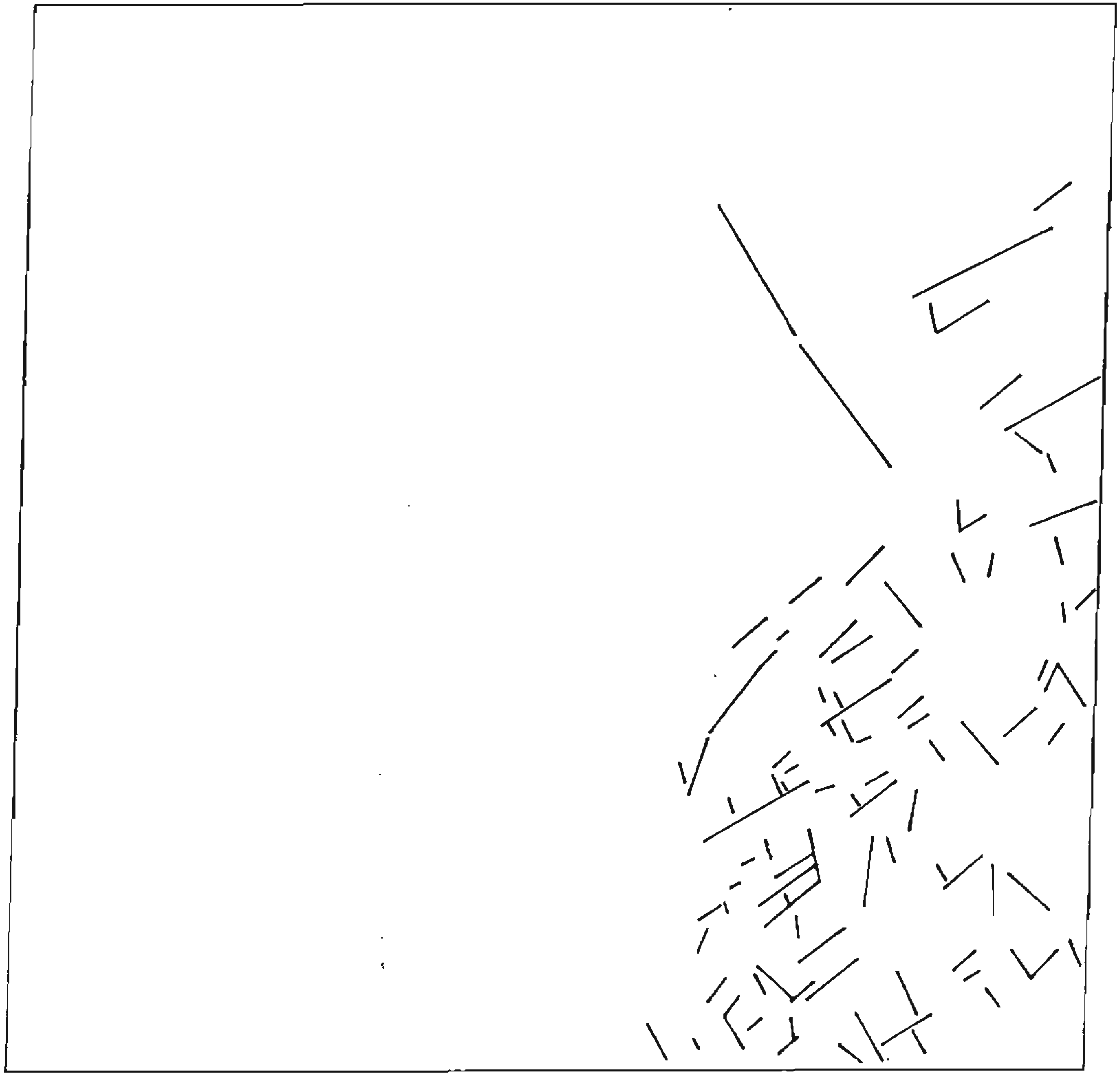
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-5 868-19460-7 PATH/ROW 79/11

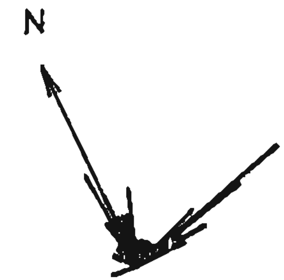


Center Coor.

69° 34′ N

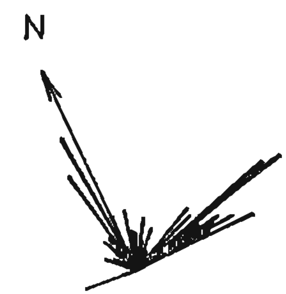
147° 53′ W

1:1,000,000



Linear Count

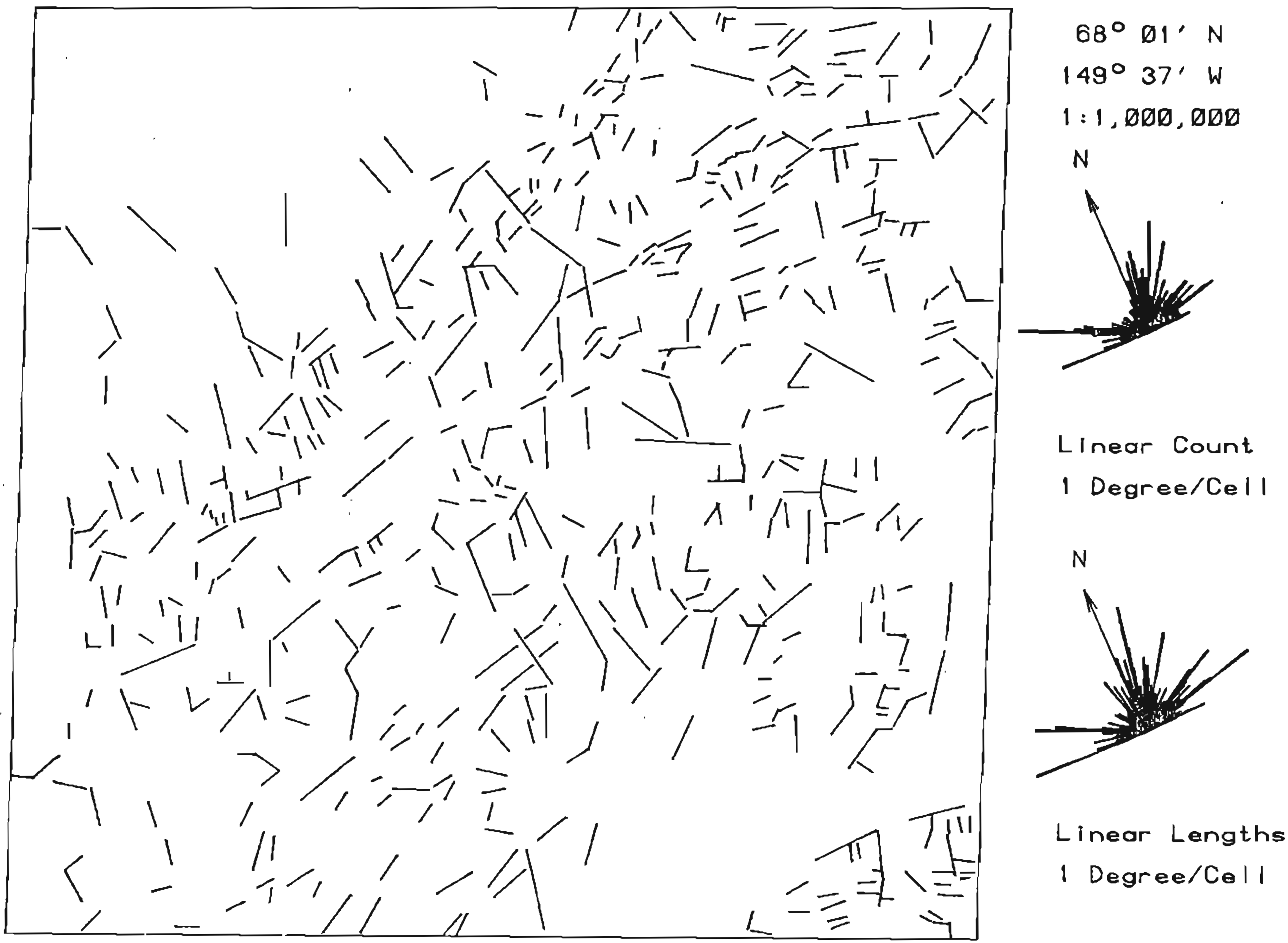
1 Degree/Cell



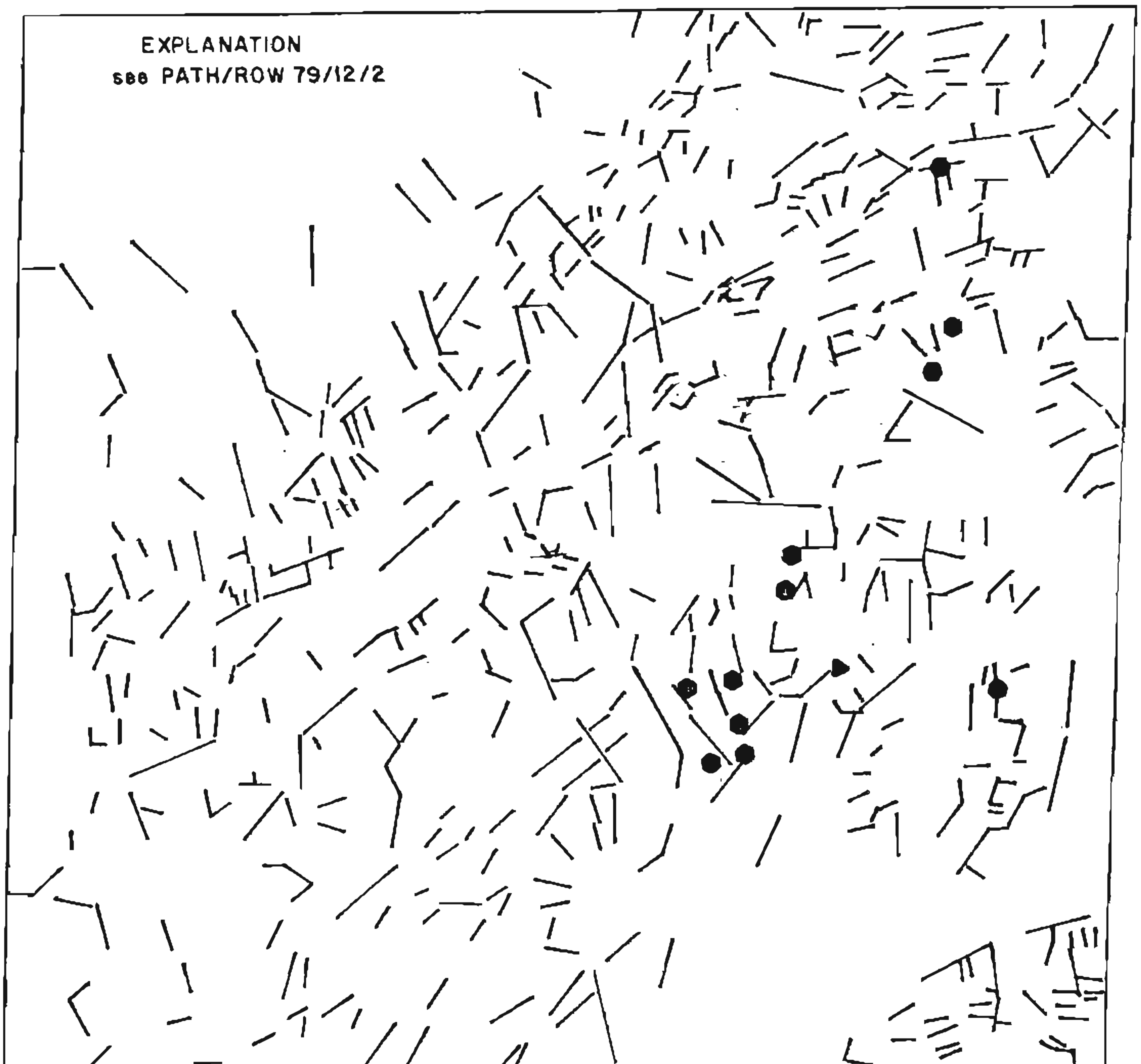
Linear Lengths

1 Degree/Cell

LANDSAT E-1773-21020-7 01 PATH/ROW 79/12



LANDSAT E-1773-21020-7 01 PATH/ROW 79/12/1

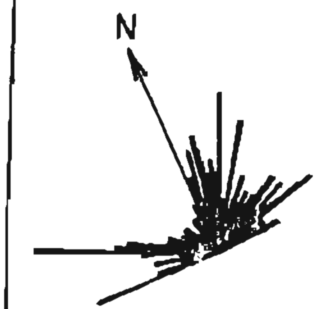


Center Coor.

68° 01′ N

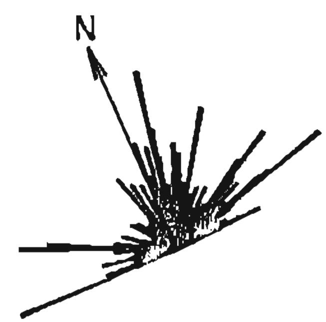
149° 36′ W

1:1,000,000



Linear Count

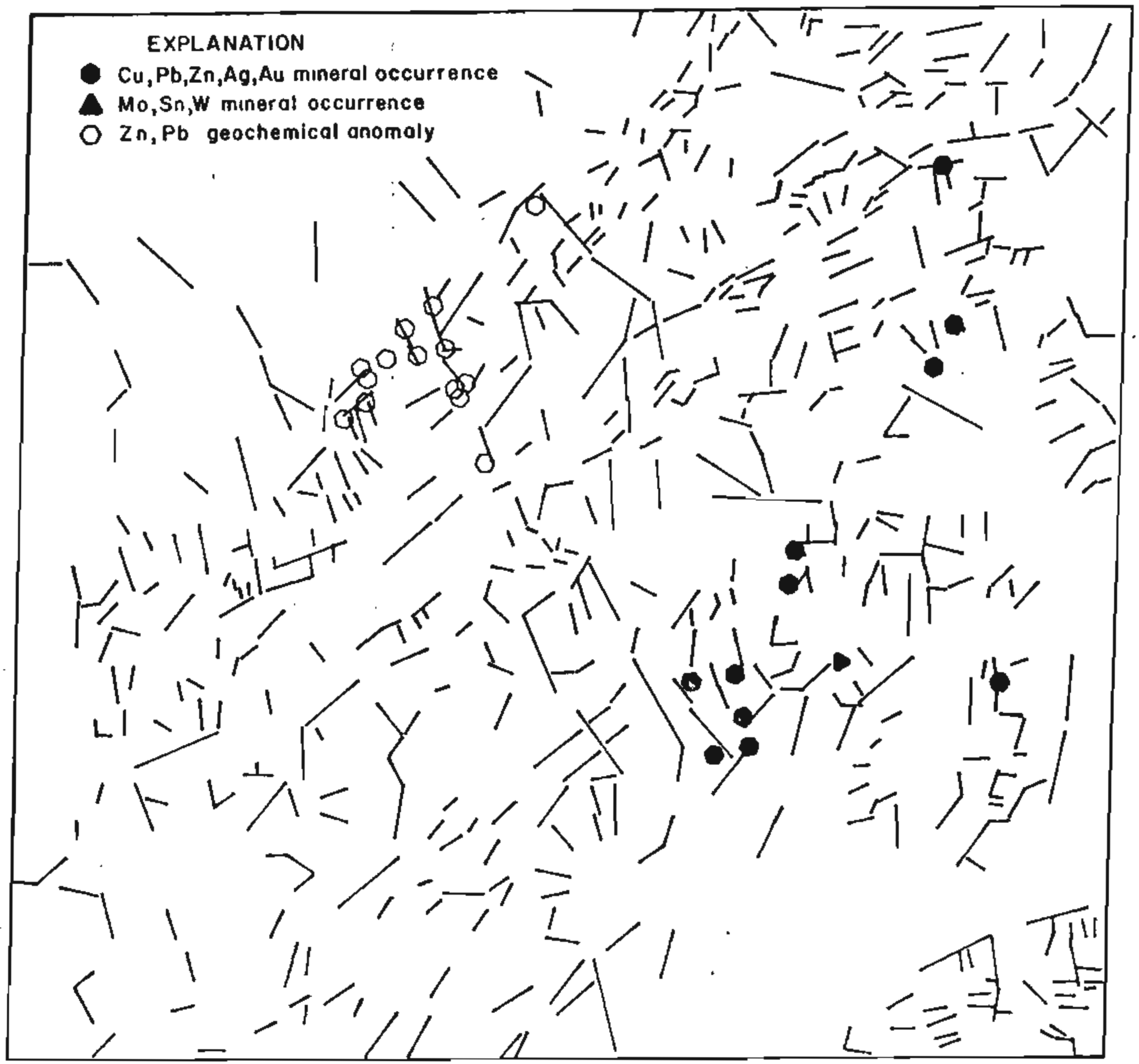
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1773-21020-7 01 PATH/ROW 79/12/2

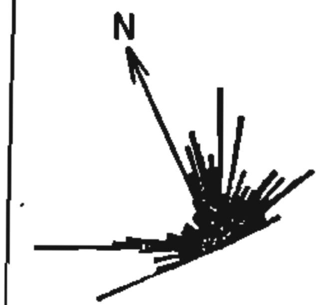


Center Coor.

68° 01′ N

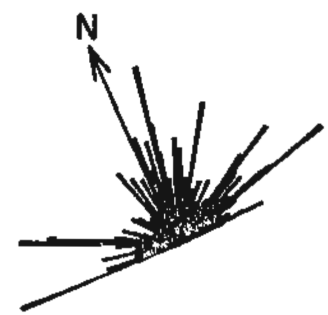
149° 36′ W

1:1,000,000



Linear Count

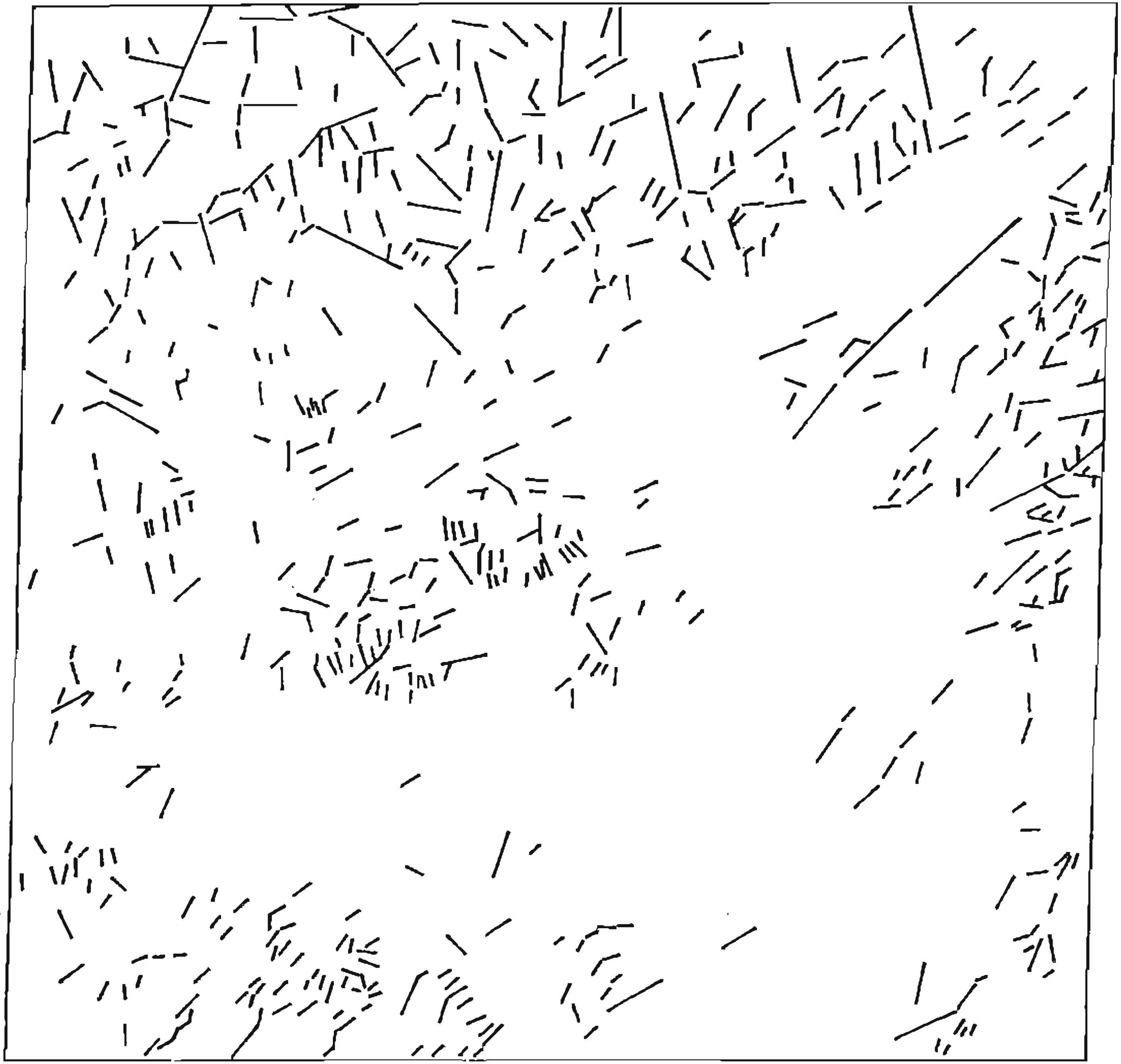
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1594-21133-7 01 PATH/ROW 80/13

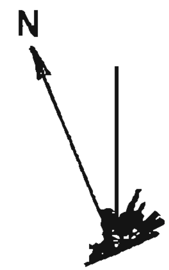


Center Coor.

66° 53′ N

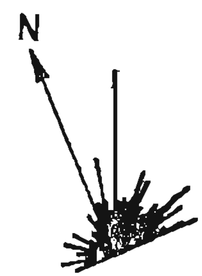
152° 13′ W

1:1,000,000



Linear Count

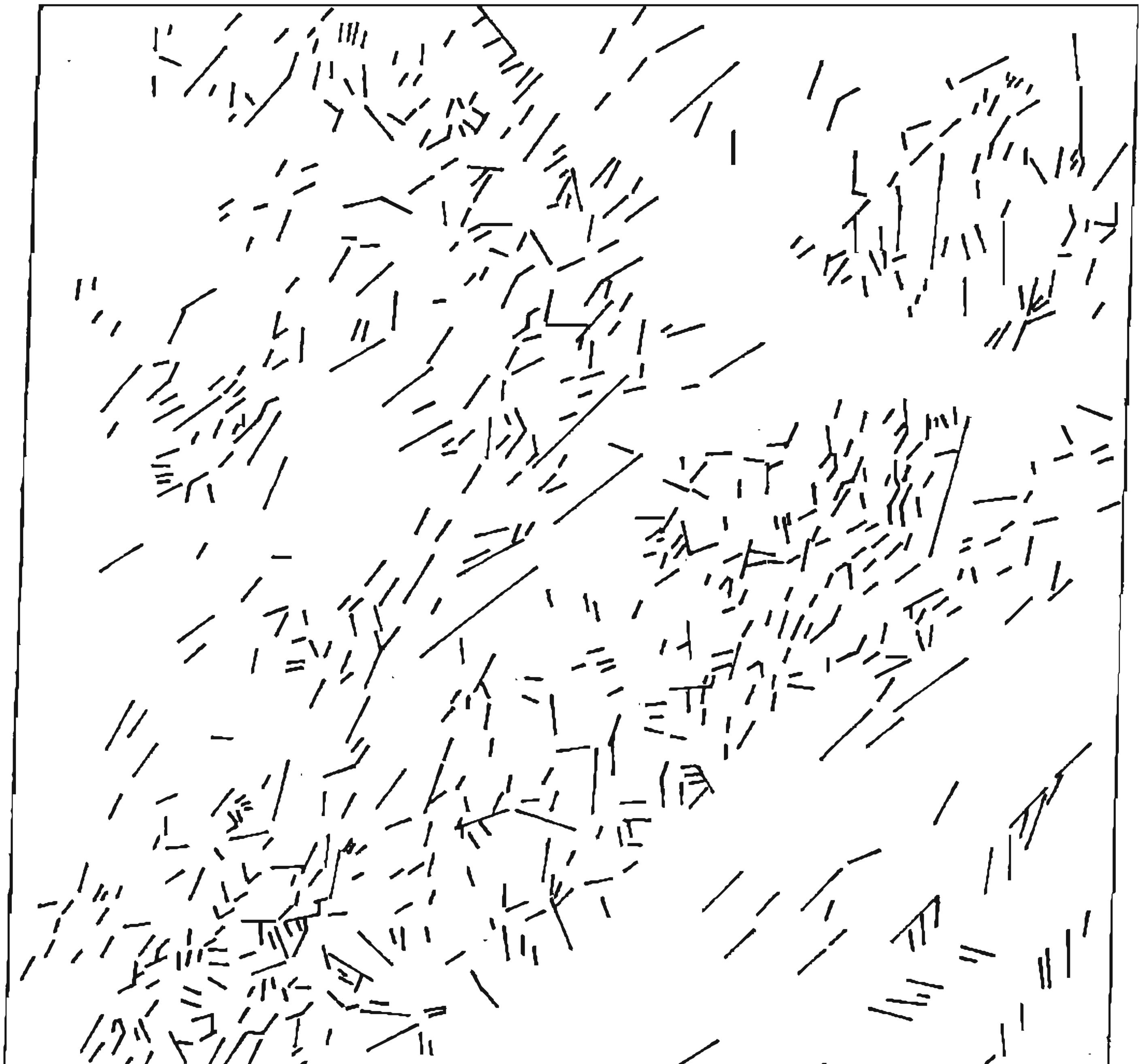
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1594-21140-7 01 PATH/ROW 80/14



Center Coor.

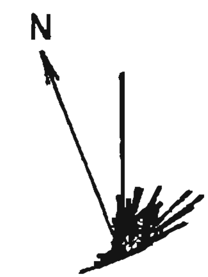
65° 33′ N

153° 43′ W

1:1,000,000

Linear Count

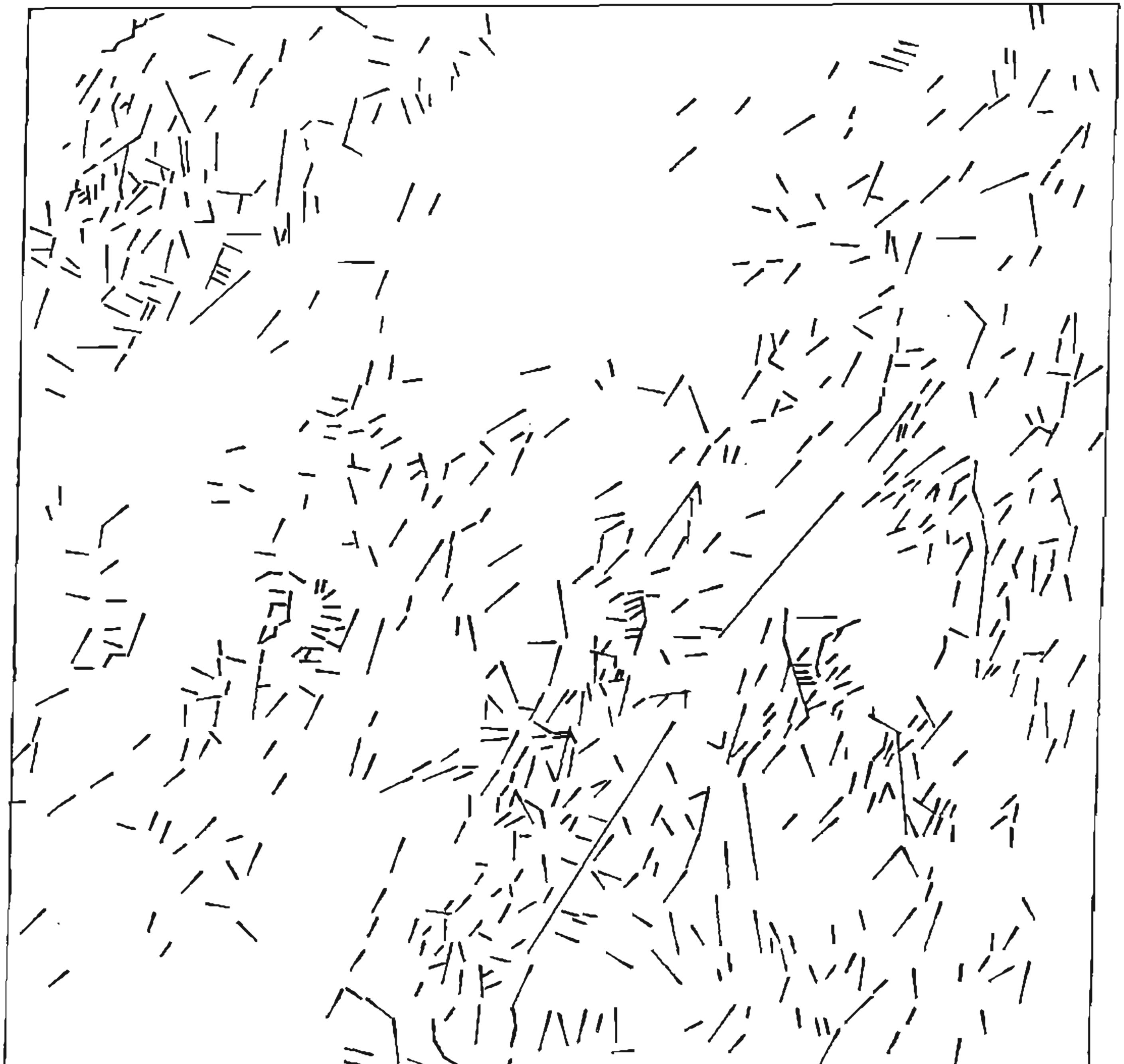
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1576-21144-7 01 PATH/ROW 80/15

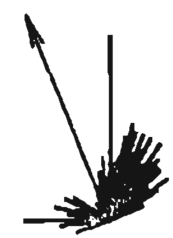


Center Coor.

64° 14′ N

154° 59′ W

1:1,000,000



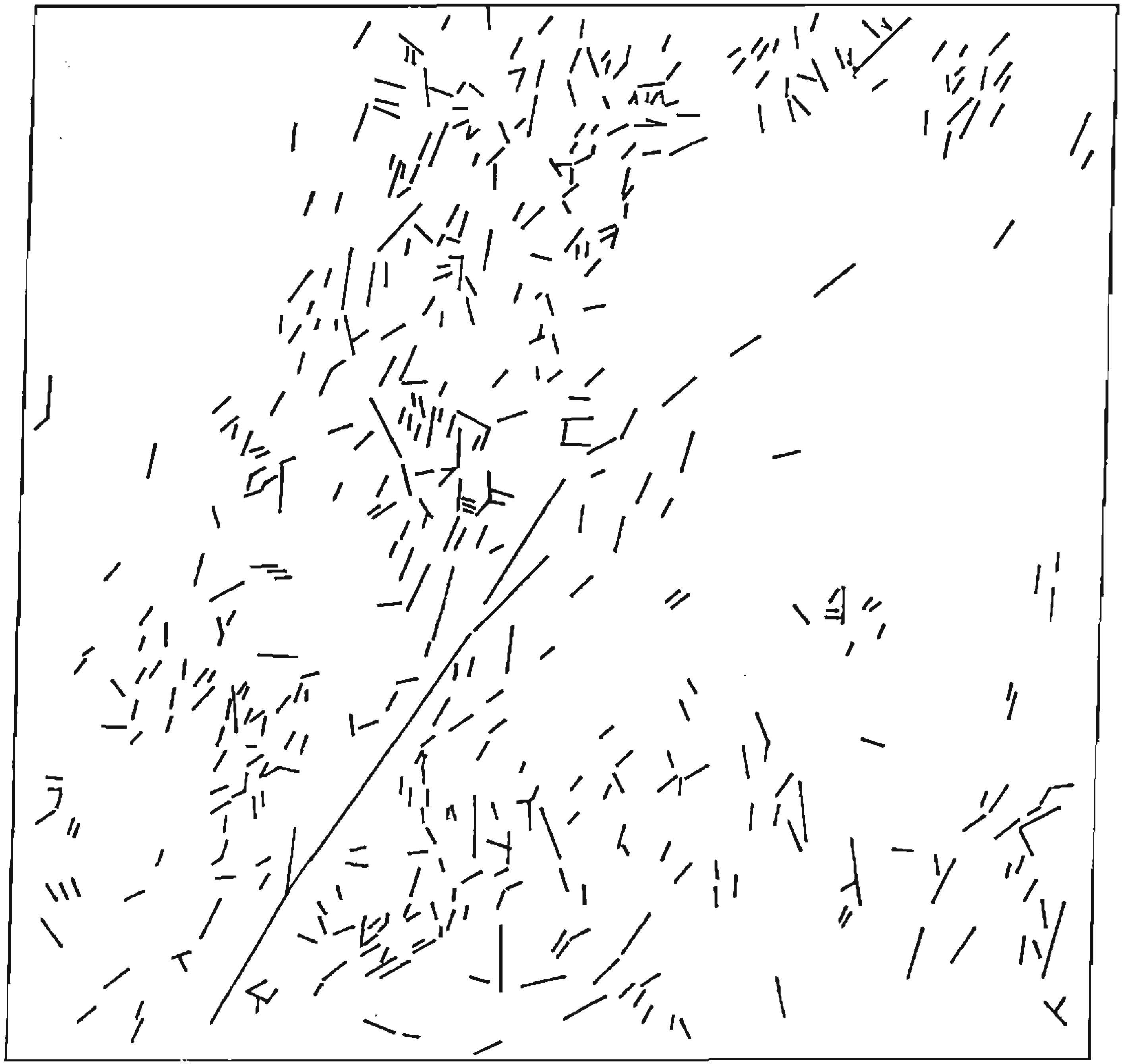
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1576-21151-6 01 PATH/ROW 80/16



Center Coor.

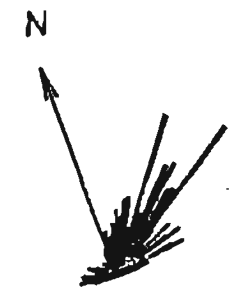
62° 52′ N

156° 14′ W

1:1,000,000

Linear Count

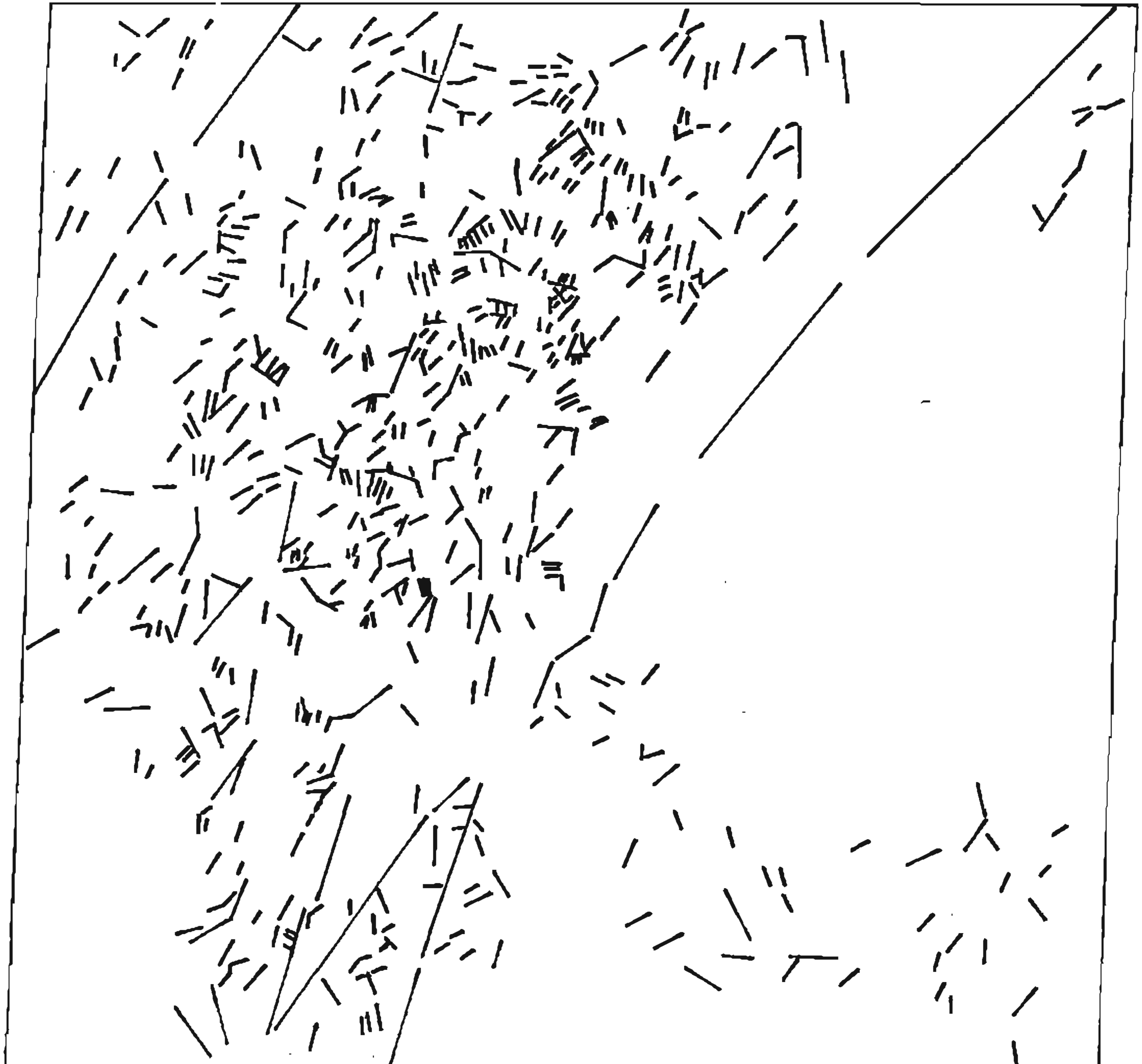
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1576-21153-7 01 PATH/ROW 80/17

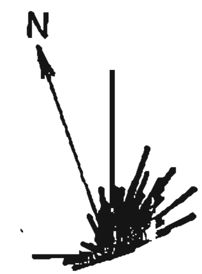


Center Coor.

61° 31′ N

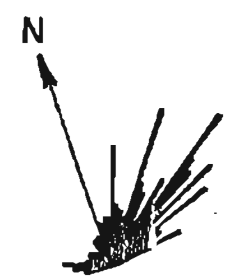
157° 23′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

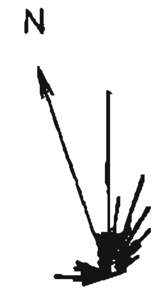
LANDSAT E-1576-21160-7 01 PATH/ROW 80/18

Center Coor.

60° 08′ N

158° 27′ W

1:1,000,000



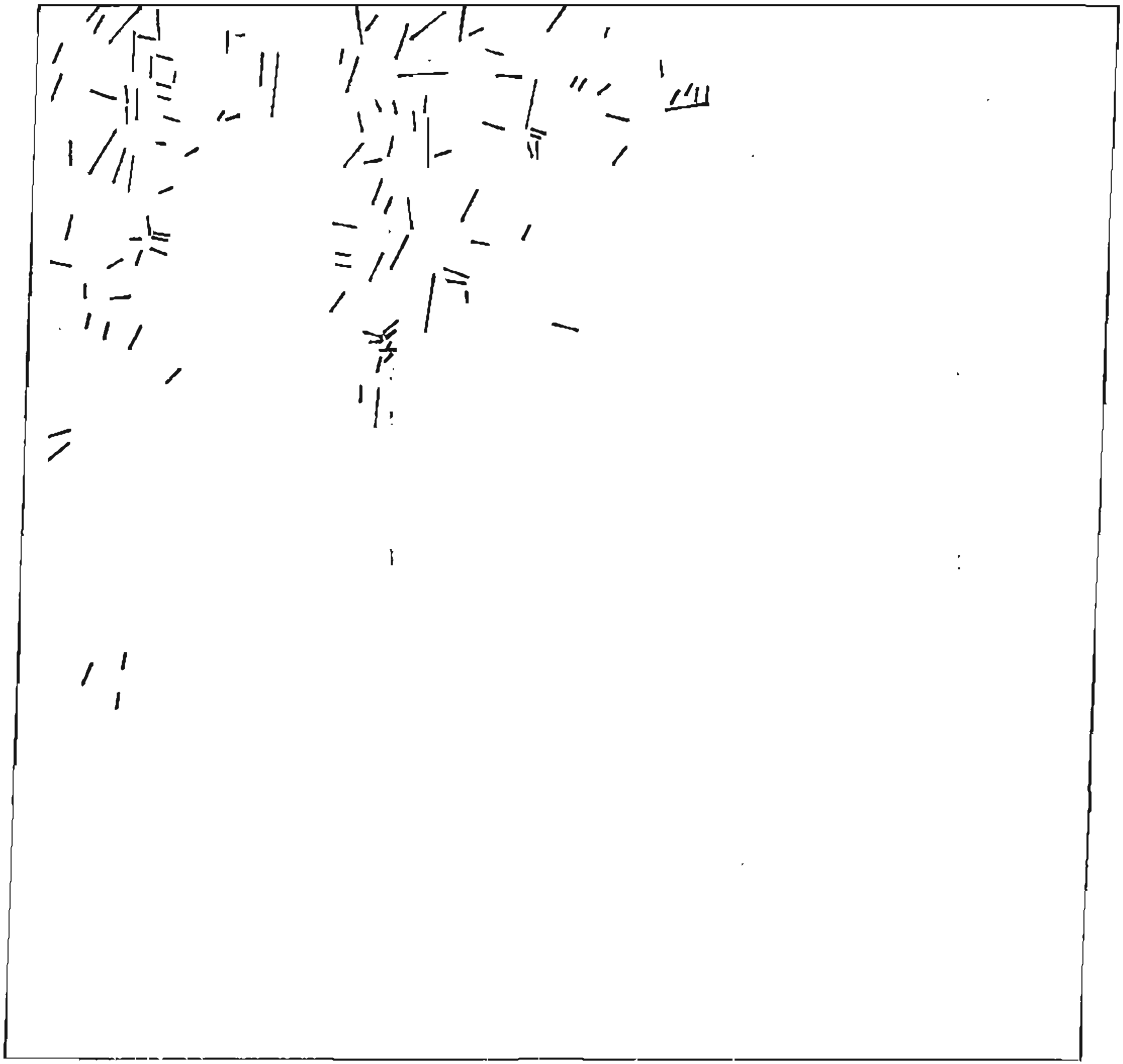
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1216-21213-6 Ø1 PATH/ROW 8Ø/19

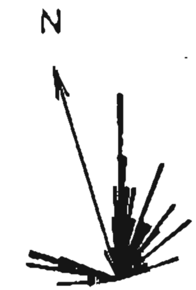


Center Coor.

58° 39′ N

159° 32′ W

1:1,ØØØ,ØØØ



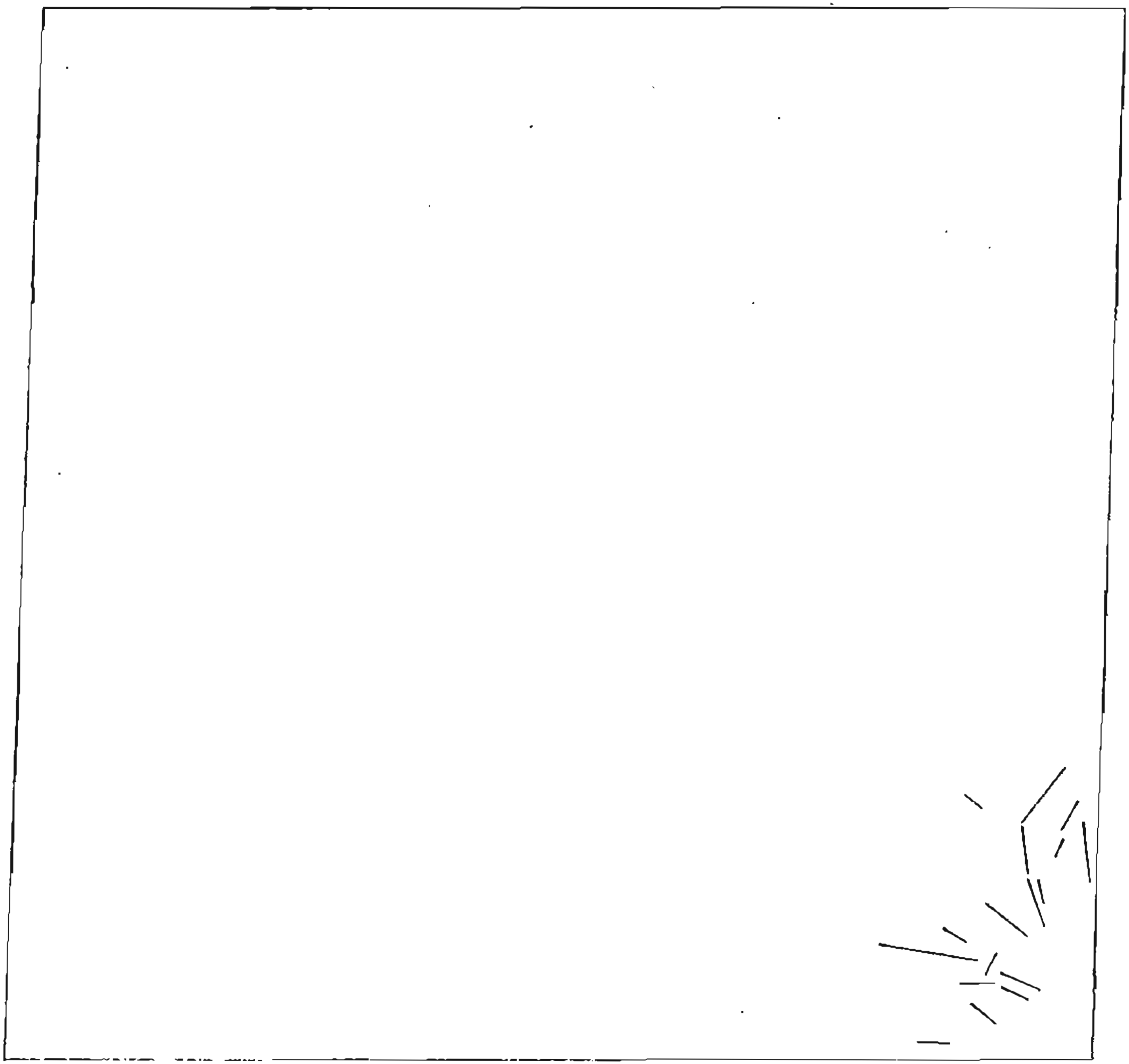
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-3Ø253-211Ø5-7 PATH/ROW 8Ø/2Ø

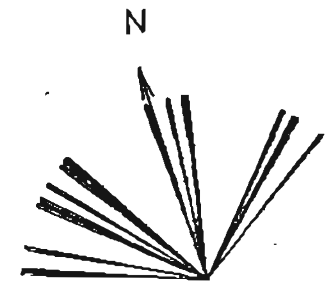


Center Coor.

57° Ø3′ N

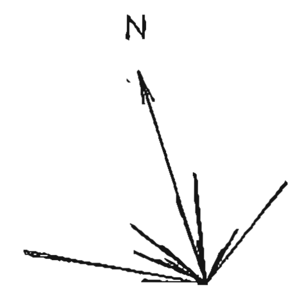
16Ø° 21′ W

1:1,ØØØ,ØØØ



Linear Count

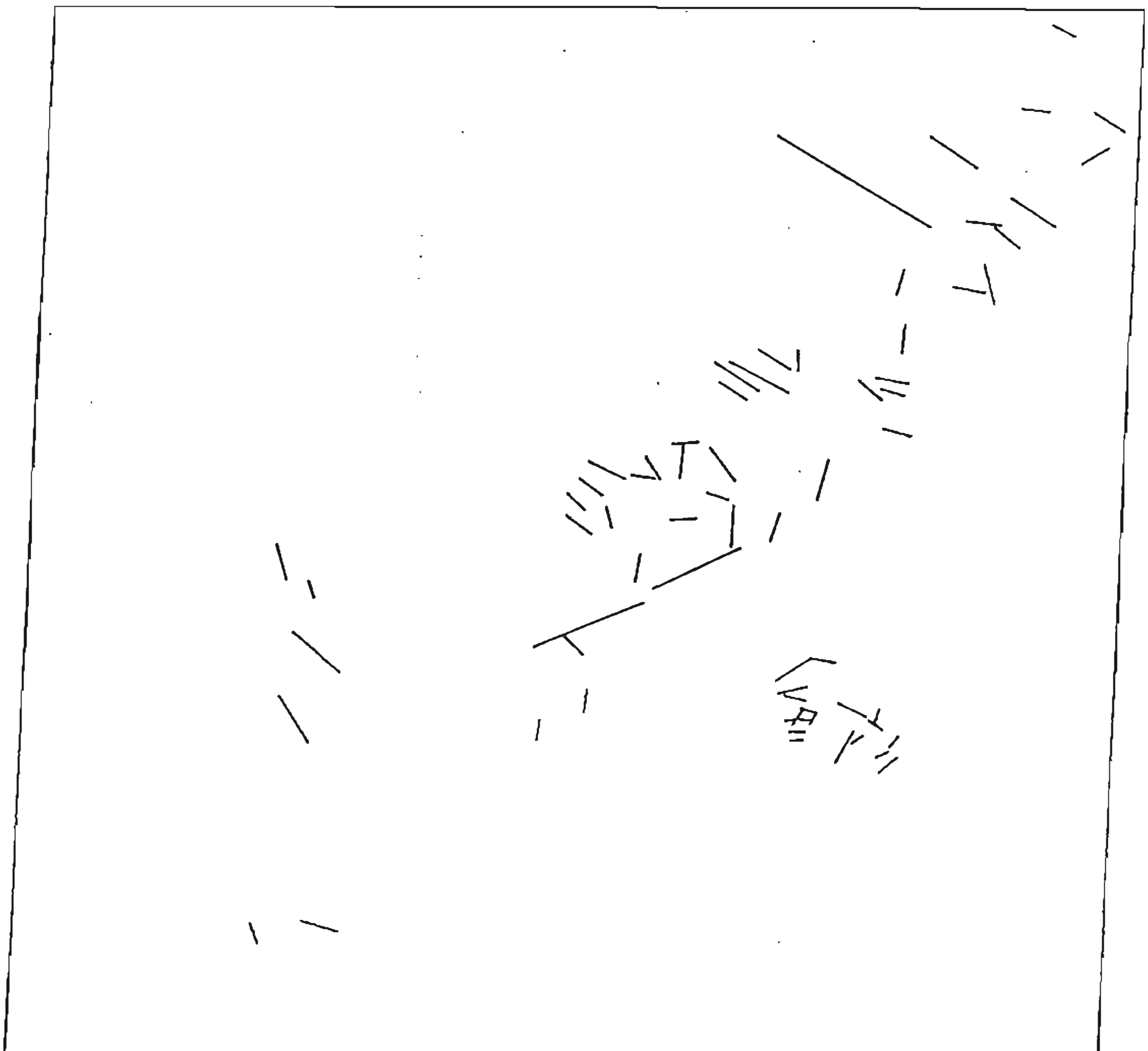
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30253-21111-7 PATH/ROW 80/21

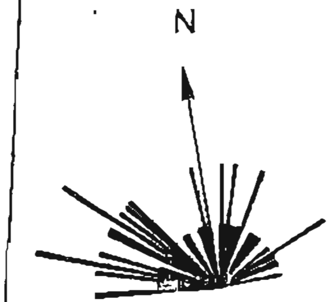


Center Coor.

55° 40′ N

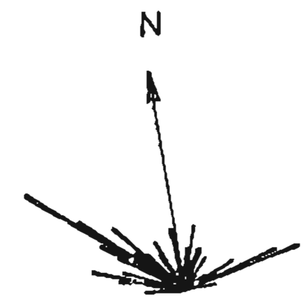
161° 13′ W

1:1,000,000



Linear Count

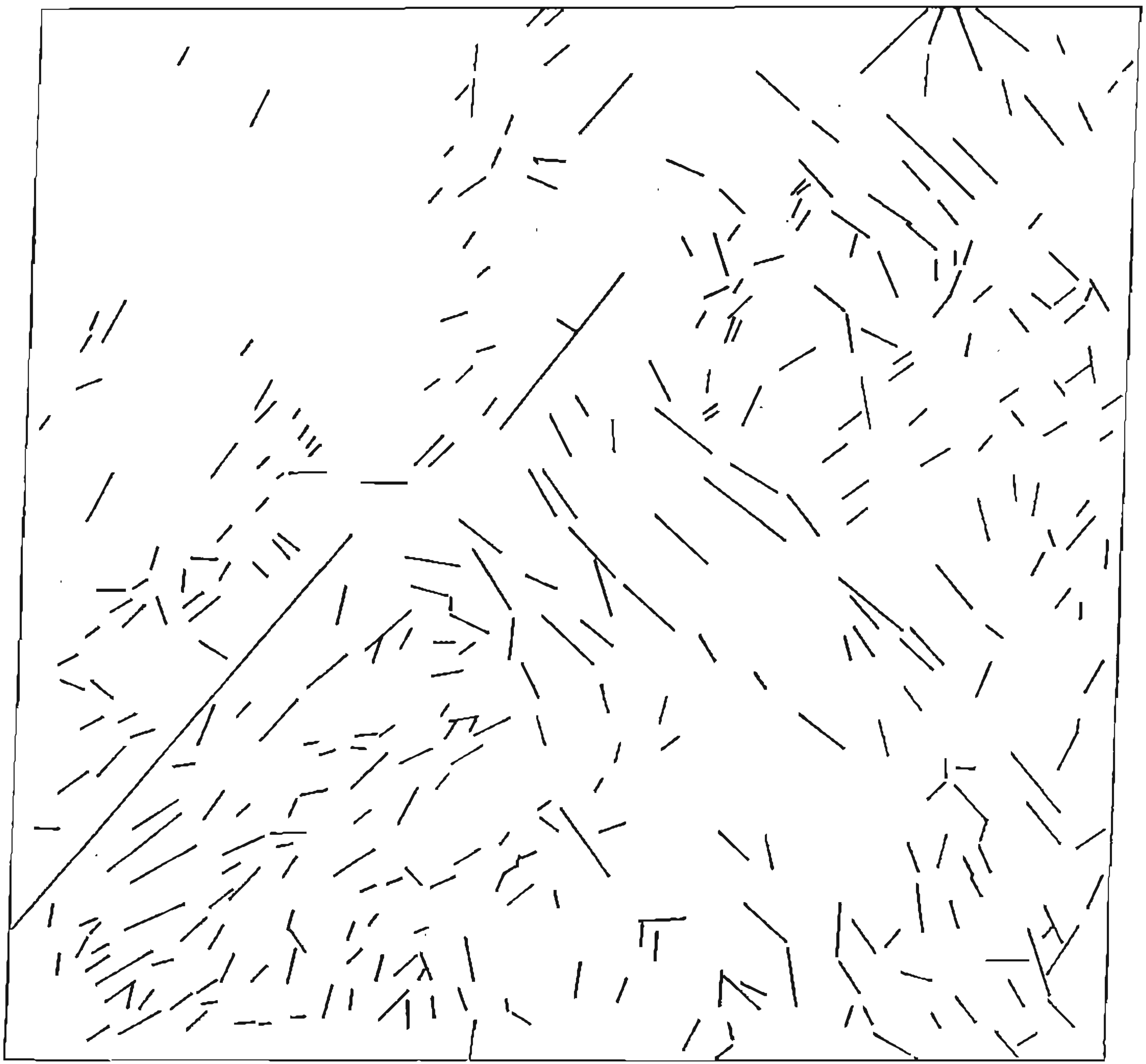
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1775-21130-7 01 PATH/ROW 81/11

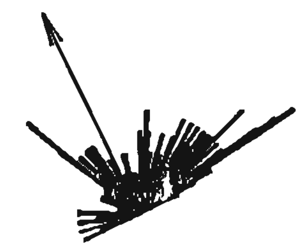


Center Coor.

69° 19′ N

150° 44′ W

1:1,000,000



Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

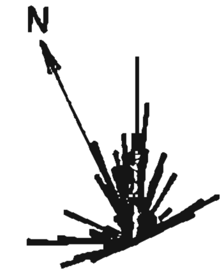
LANDSAT E-1596-21243-7 01 PATH/ROW 82/12

Center Coor.

68° 10′ N

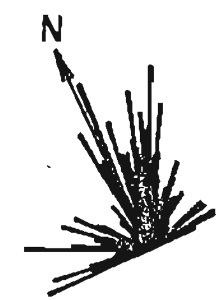
153° 24′ W

1:1,000,000



Linear Count

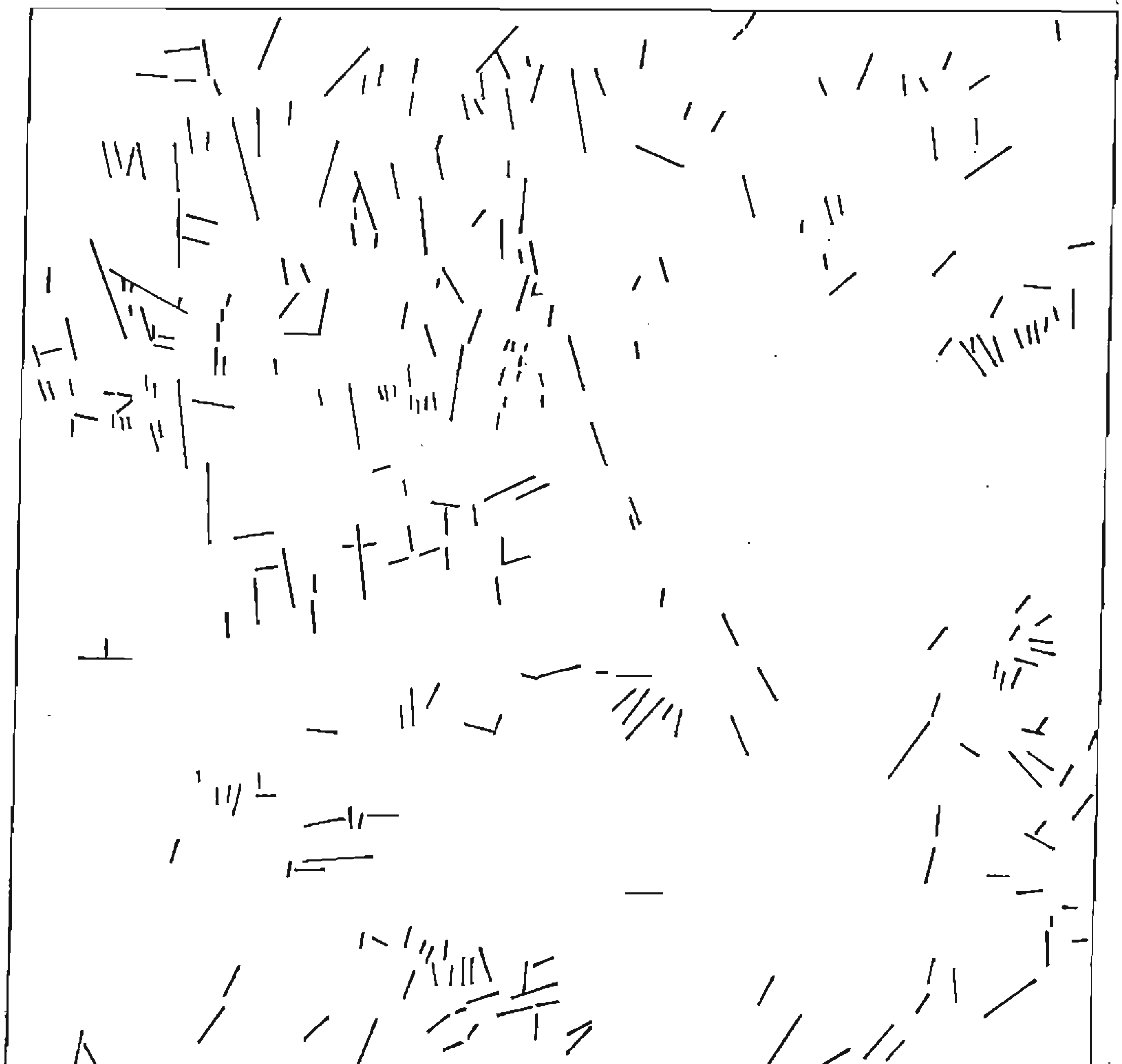
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1596-21250-7 01 PATH/ROW 82/13



Center Coor.

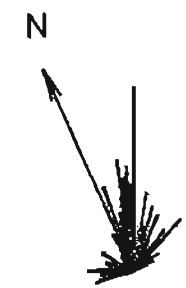
66° 51′ N

155° 03′ W

1:1,000,000

Linear Count

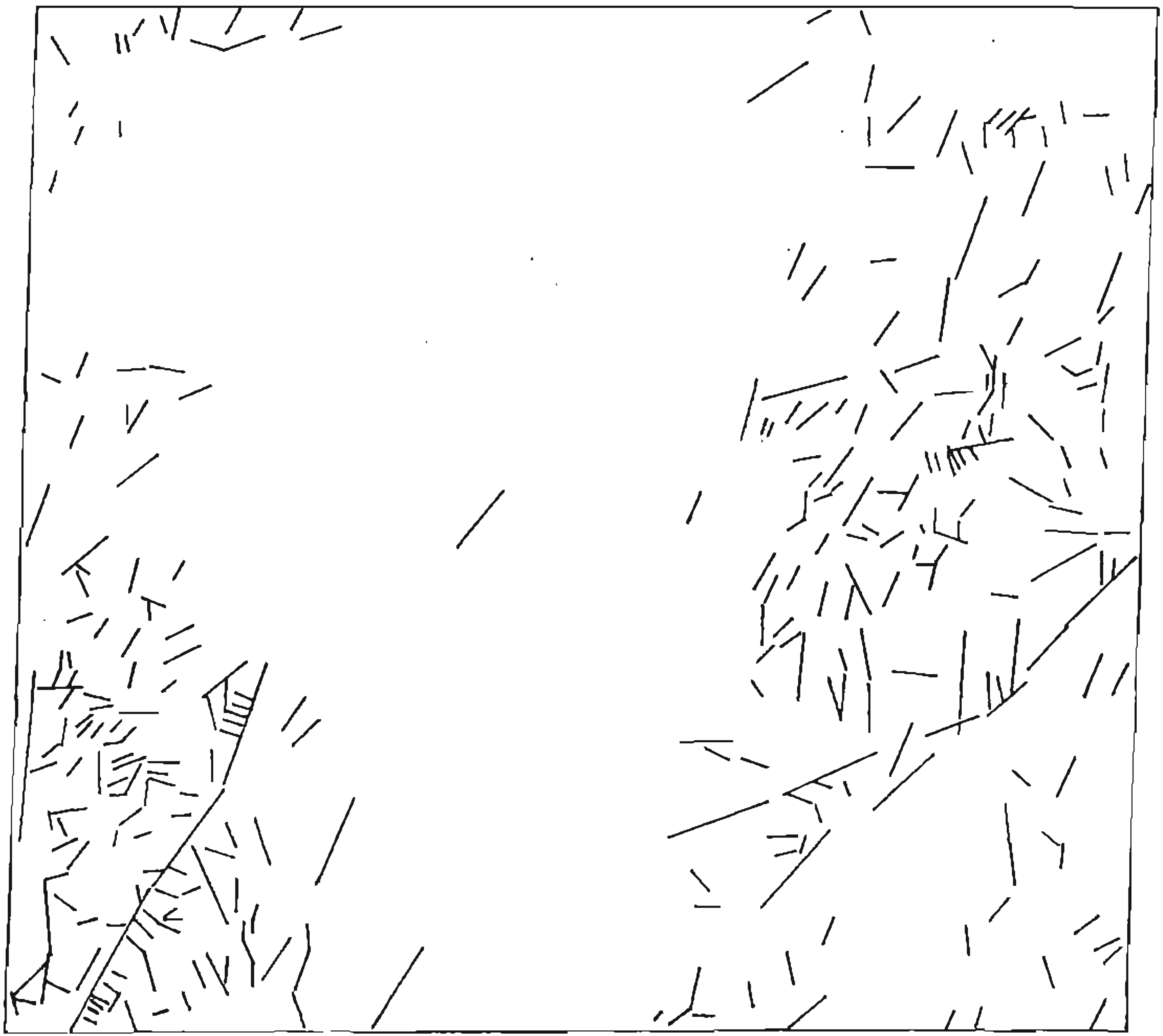
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-21492-21073-7 PATH/ROW 82/14

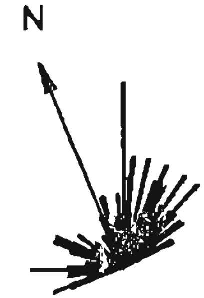


Center Coor.

65° 13′ N

156° 34′ W

1:1,000,000



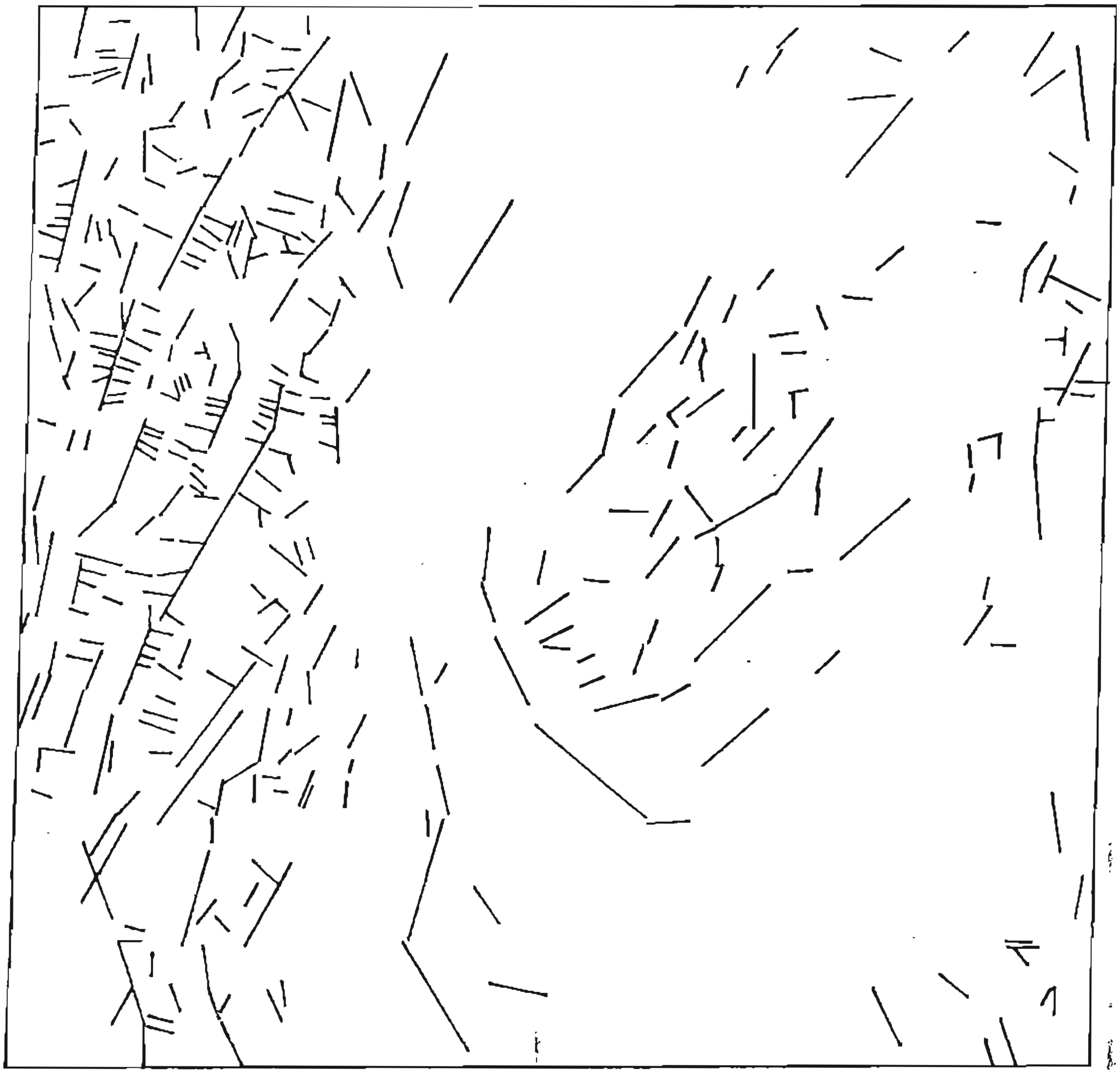
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1578-21261-7 Ø1 PATH/ROW 82/15

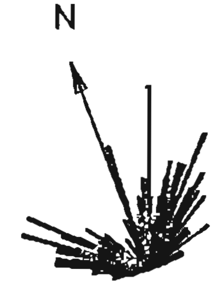


Center Coor.

64° 17′ N

157° 51′ W

1:1,ØØØ,ØØØ



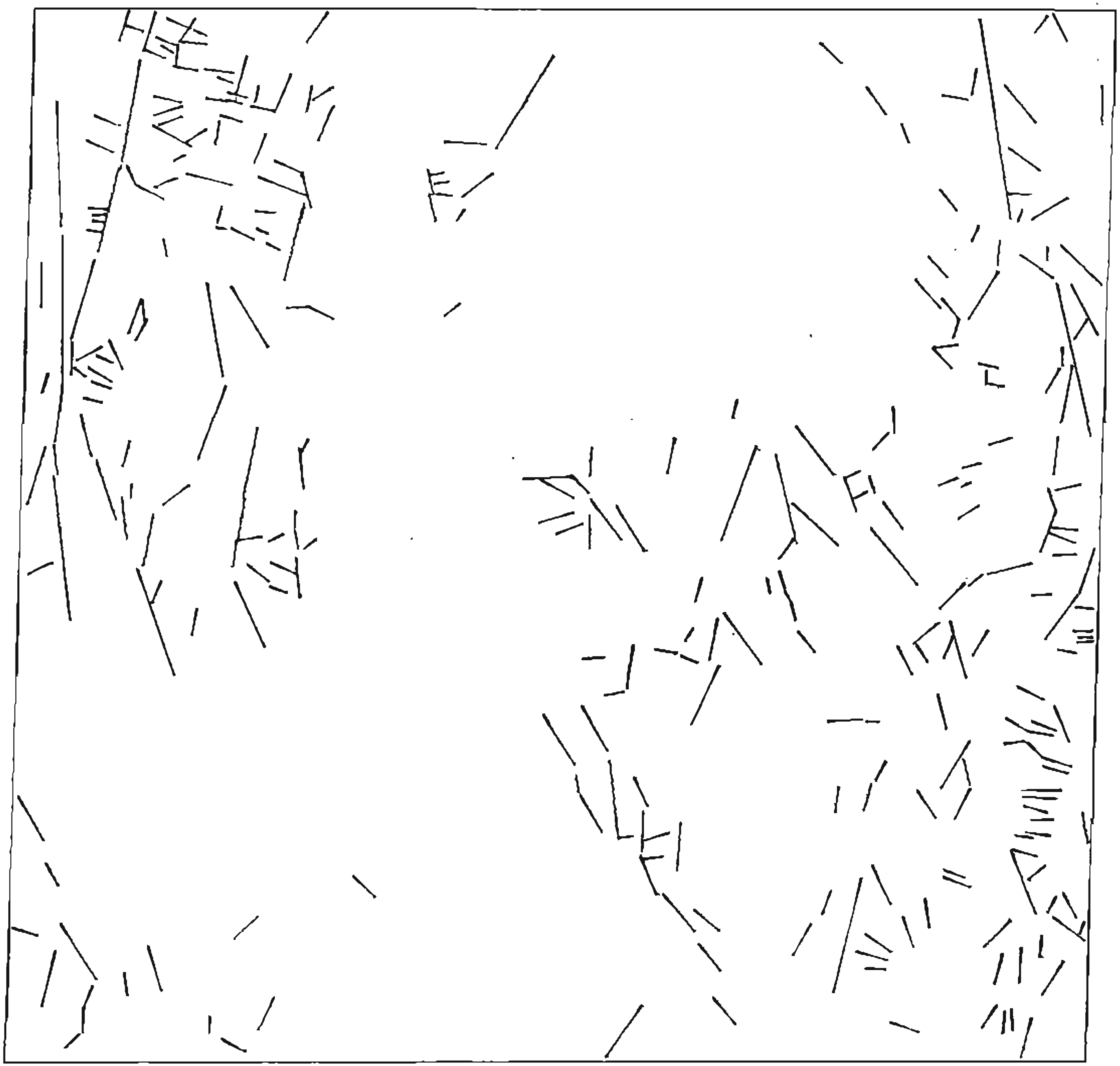
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1218-21314-7 02 PATH/ROW 82/16

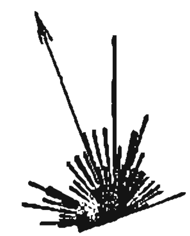


Center Coor.

62° 45′ N

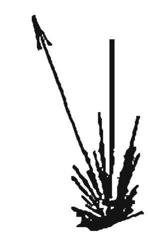
159° 17′ W

1:1,000,000



Linear Count

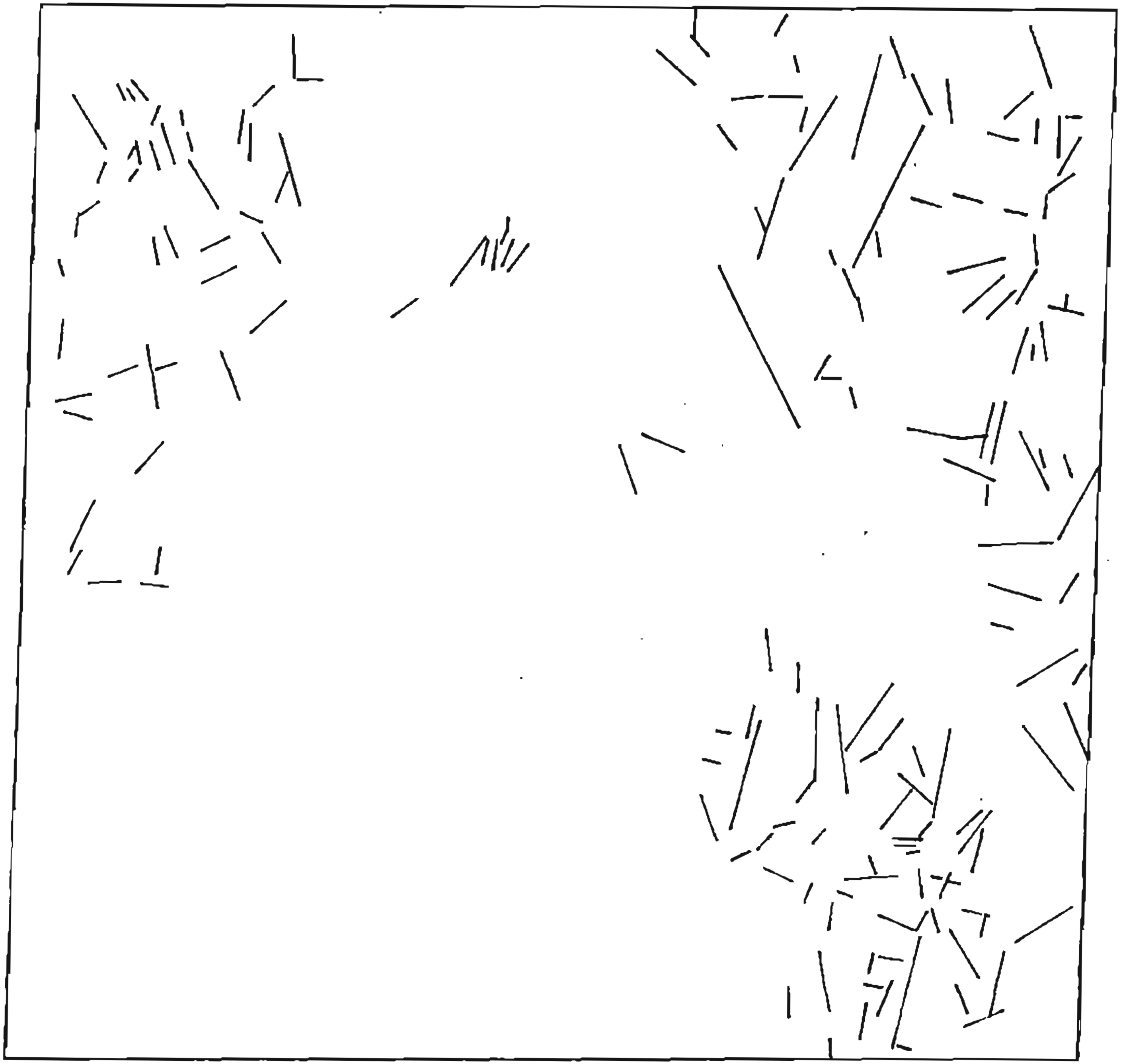
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1578-21270-7 01 PATH/ROW 82/17

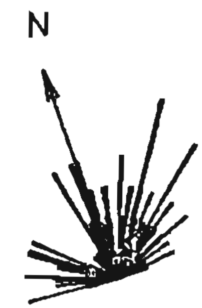


Center Coor.

61° 33′ N

160° 15′ W

1:1,000,000



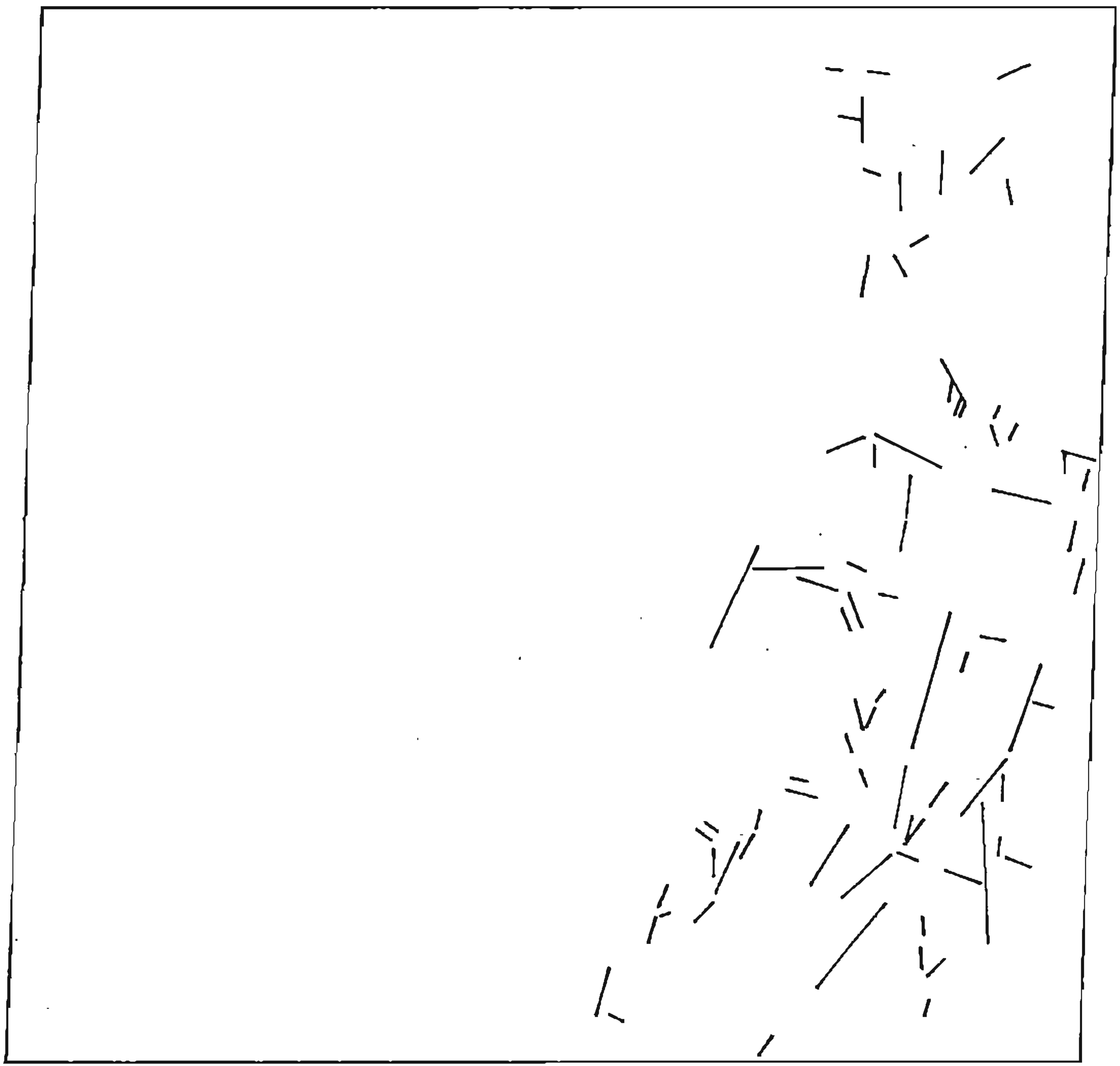
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-1578-21272-6 01 PATH/ROW 82/18

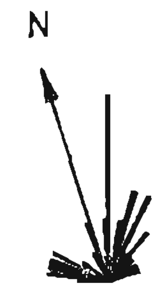


Center Coor.

60° 11′ N

161° 19′ W

1:1,000,000



Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

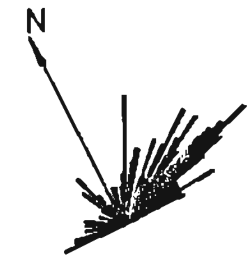
LANDSAT E-21295-21033-7 PATH/ROW 83/11

Center Coor.

69° 10′ N

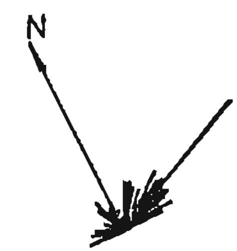
153° 06′ W

1:1,000,000



Linear Count

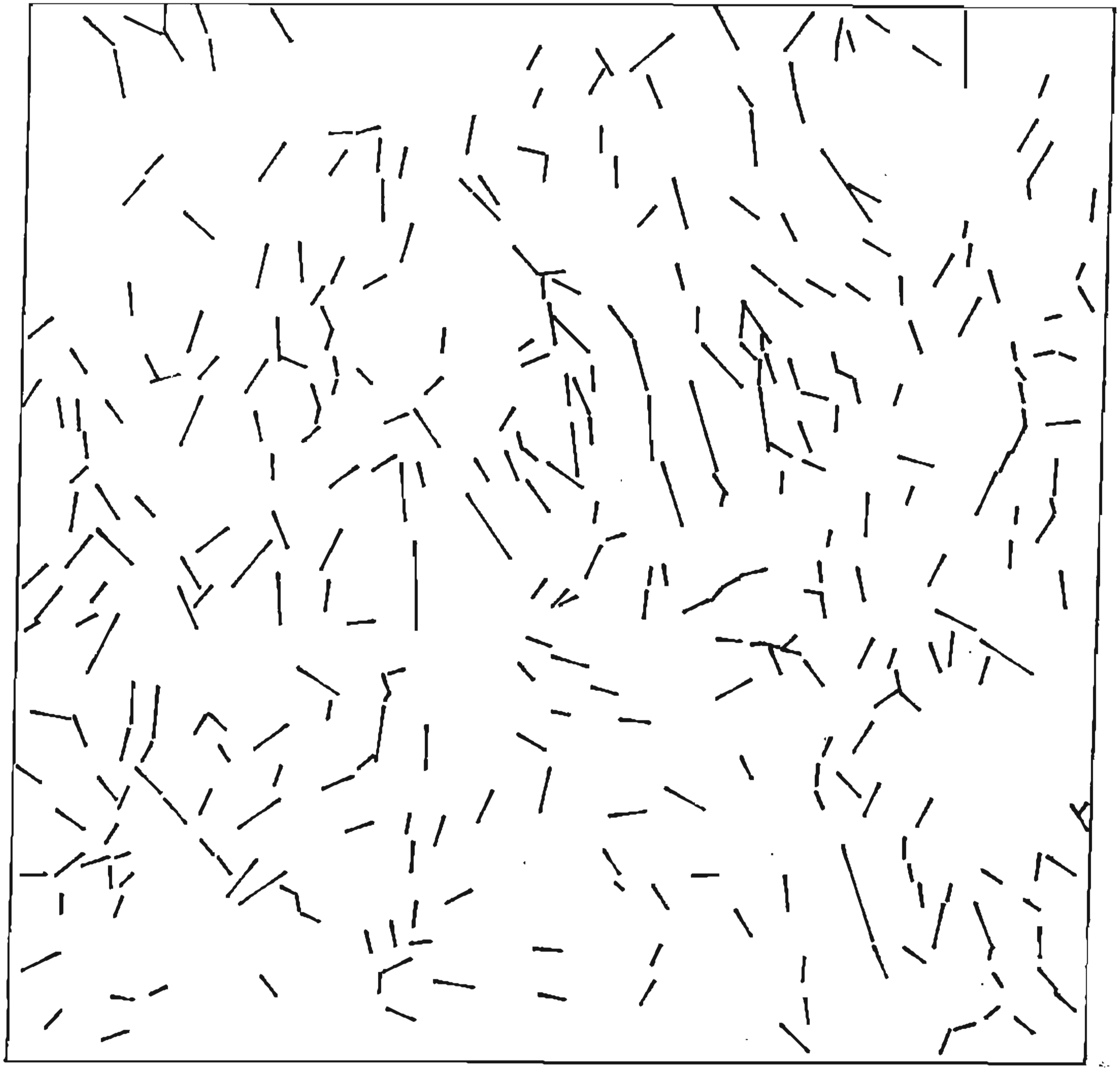
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1580-21362-6 02 PATH/ROW 84/12

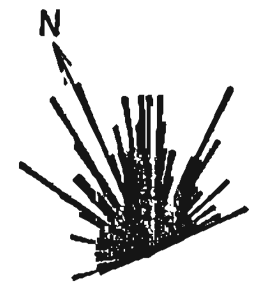


Center Coor.

68° 16′ N

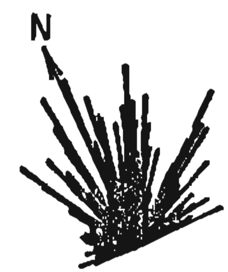
156° 05′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

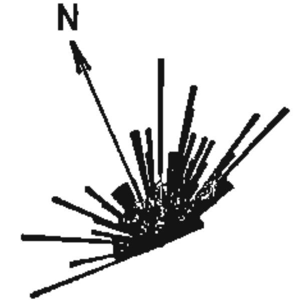
LANDSAT E-1580-21364-5 02 PATH/ROW 84/13

Center Coor.

66° 57′ N

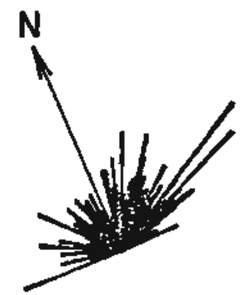
157° 46′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

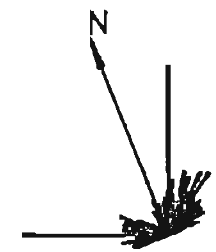
LANDSAT E-21494-21180-7 PATH/ROW 84/14

Center Coor.

65° 13′ N

159° 26′ W

1:1,000,000



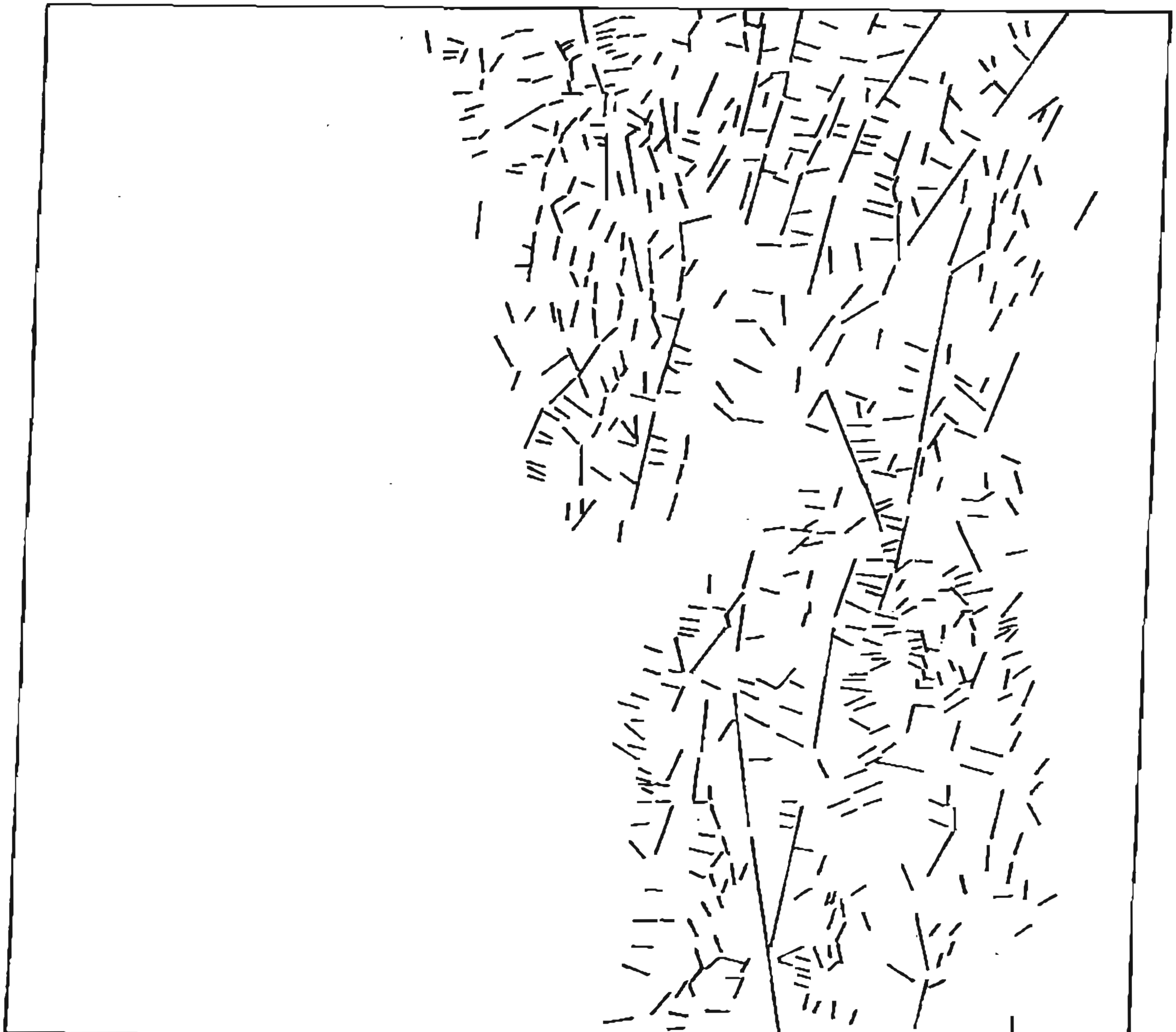
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-21494-21193-7 PATH/ROW 84/15

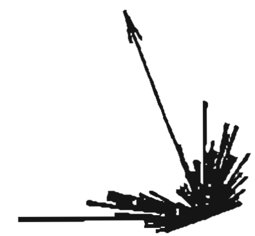


Center Coor.

63° 53′ N

160° 47′ W

1:1,000,000



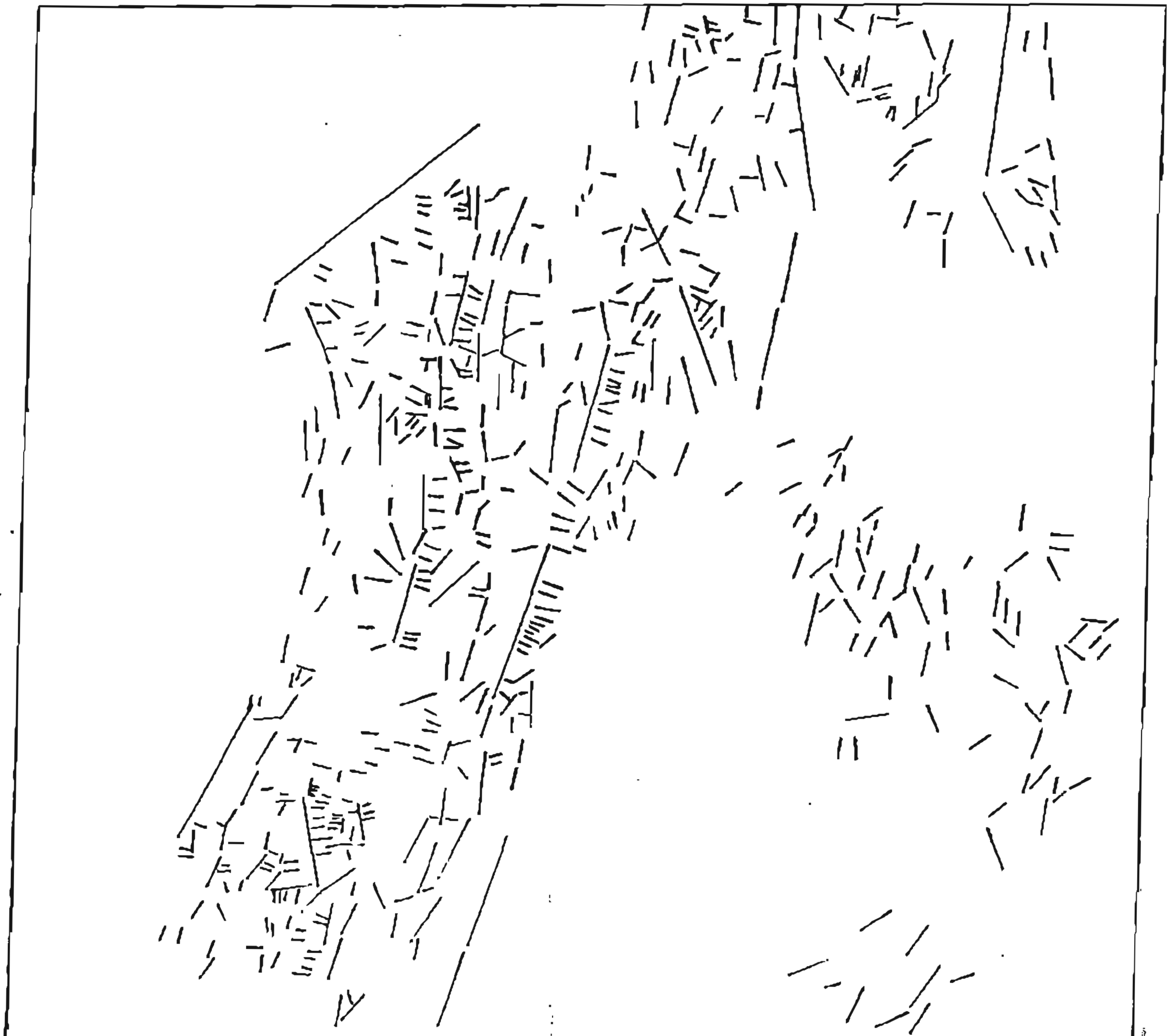
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-21494-21195-7 PATH/ROW 84/16



Center Coor.

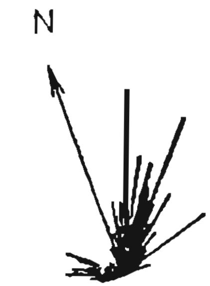
62° 33′ N

162° 01′ W

1:1,000,000

Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

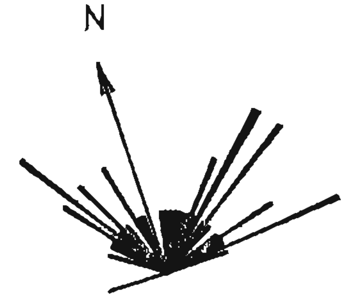
LANDSAT E-1706-21351-7 02 PATH/ROW 84/17

Center Coor.

61° 31′ N

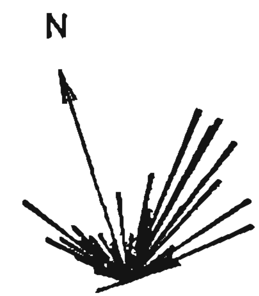
163° 27′ W

1:1,000,000



Linear Count

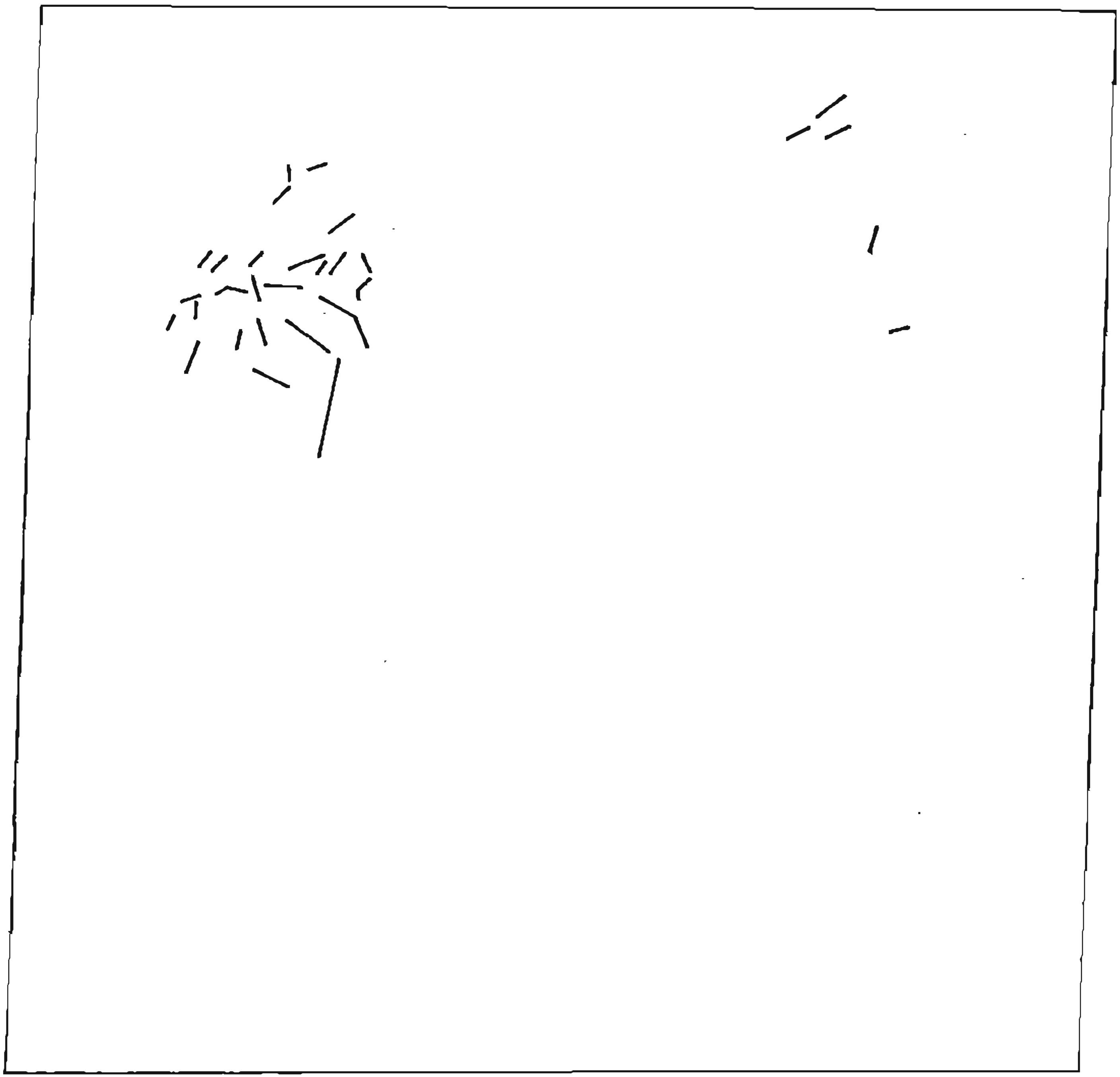
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-2198-21311-6 01 PATH/ROW 84/18

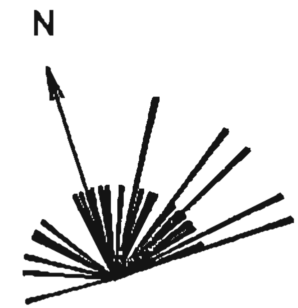


Center Coor.

60° 08′ N

164° 08′ W

1:1,000,000



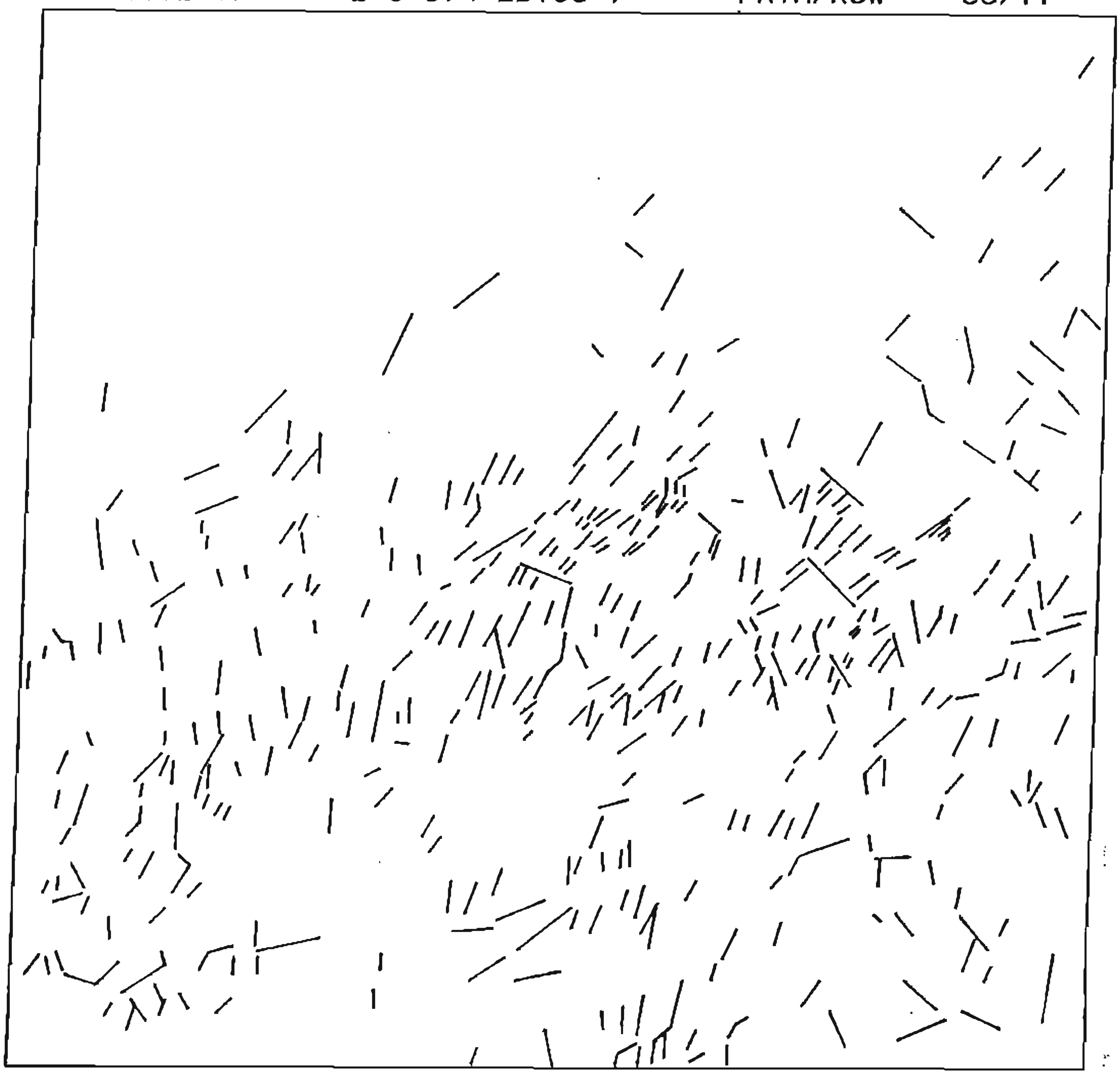
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-5 874-20195-7 PATH/ROW 85/11

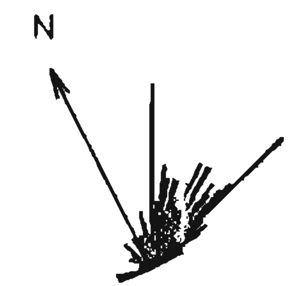


Center Coor.

69° 35′ N

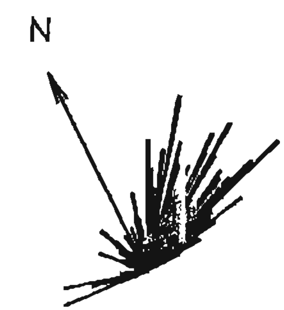
156° 29′ W

1:1,000,000



Linear Count

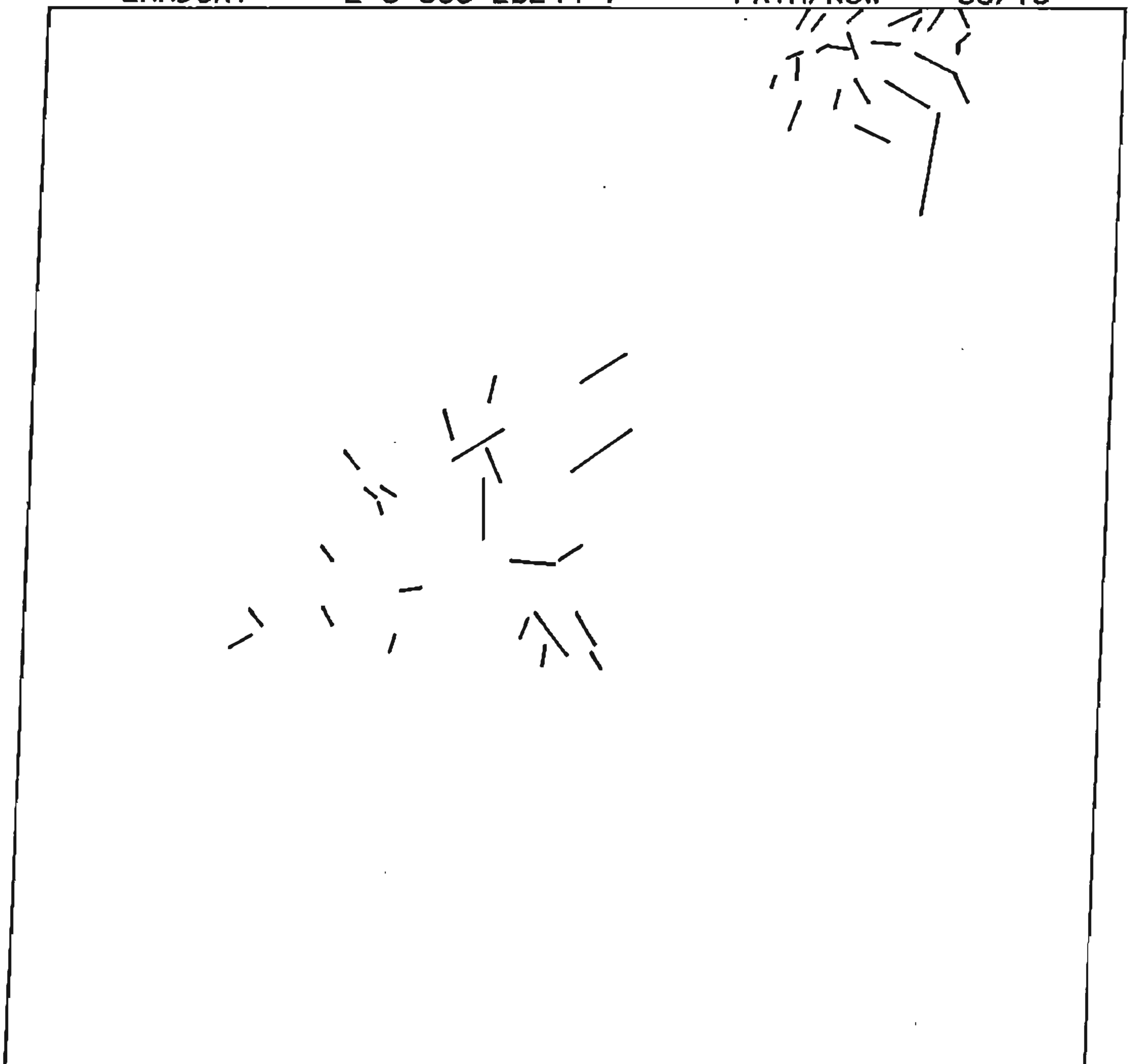
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-5 856-20244-7 PATH/ROW 85/18

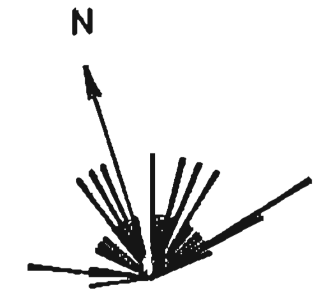


Center Coor.

60° 04′ N

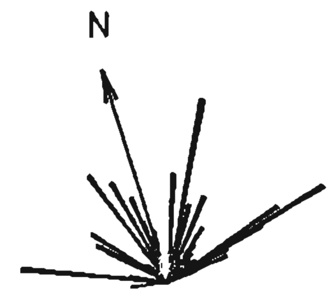
166° 12′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

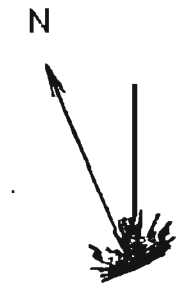
LANDSAT E-1582-21481-7 Ø1 PATH/ROW 86/13

Center Coor.

67° ØØ′ N

16Ø° 36′ W

1:1,ØØØ,ØØØ



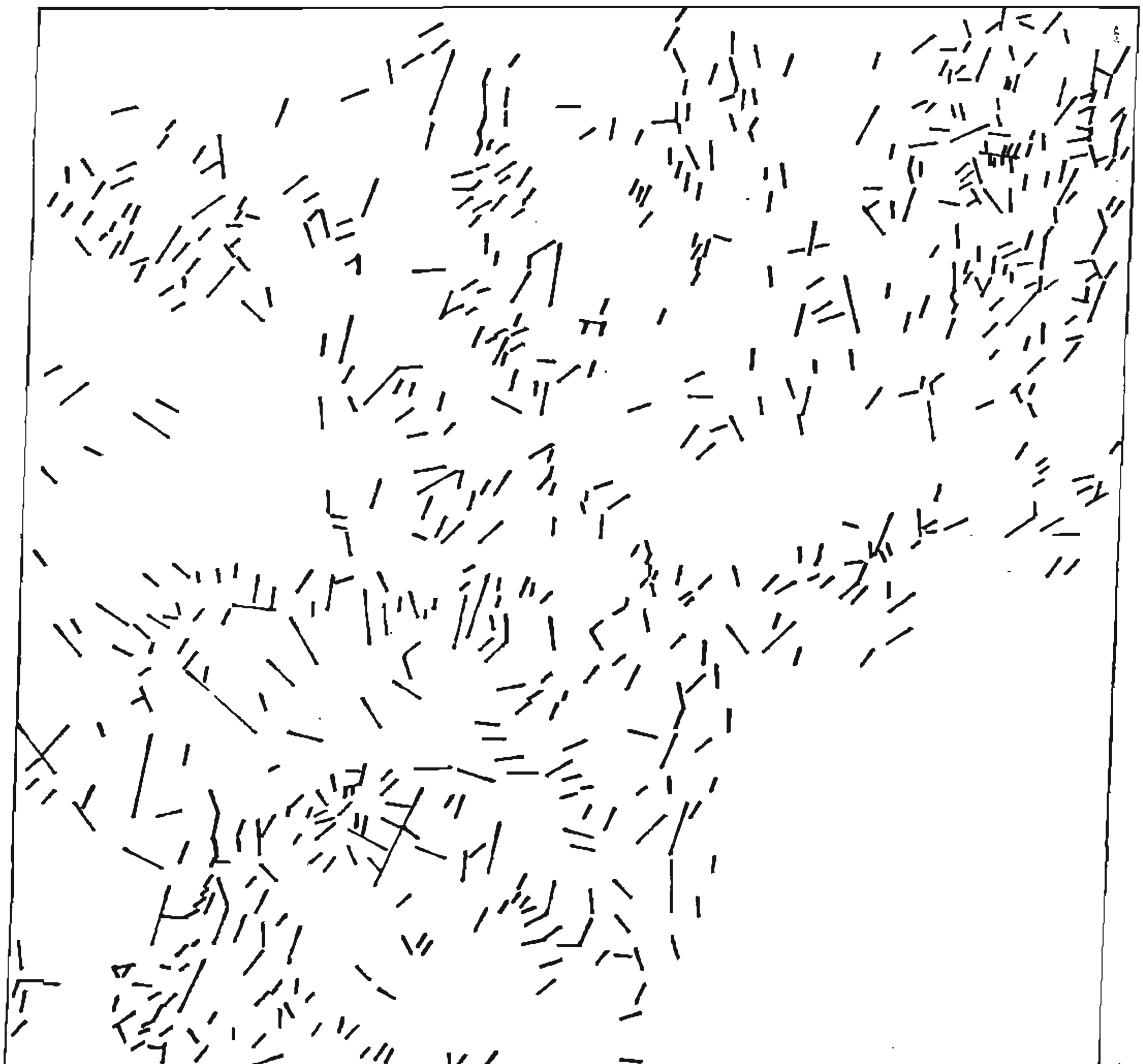
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-21136-21140-7 PATH/ROW 86/14

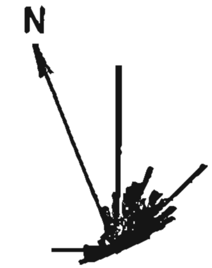


Center Coor.

65° 12′ N

162° 18′ W

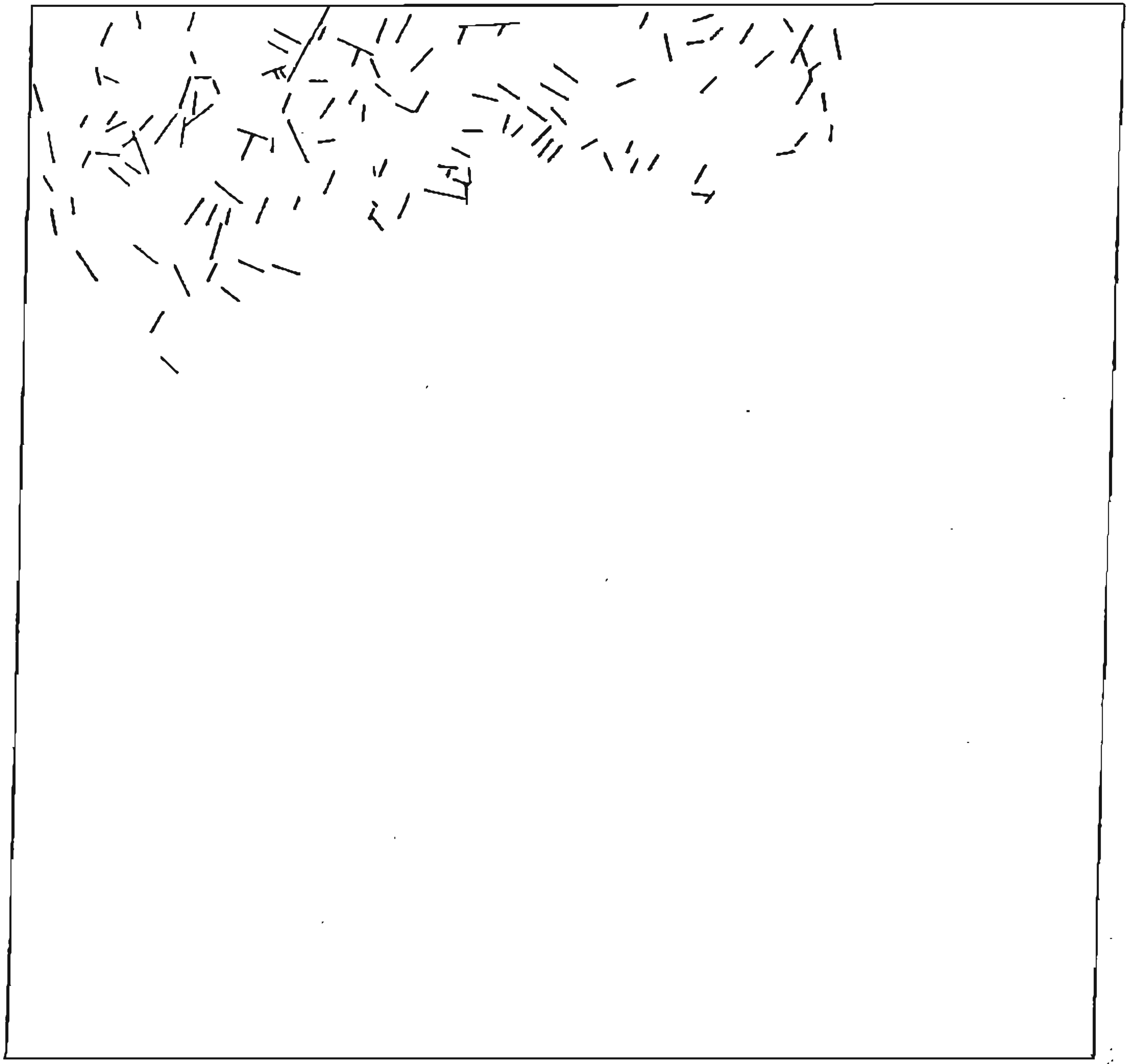
1:1,000,000



Linear Count
1 Degree/Cell

Linear Lengths
1 Degree/Cell

LANDSAT E-2 758-21271-6 PATH/ROW 86/15

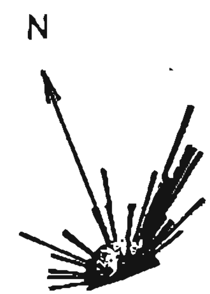


Center Coor.

64° 04′ N

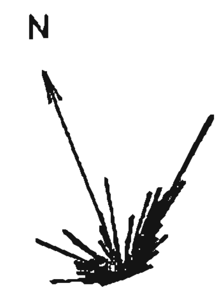
163° 59′ W

1:1,000,000



Linear Count

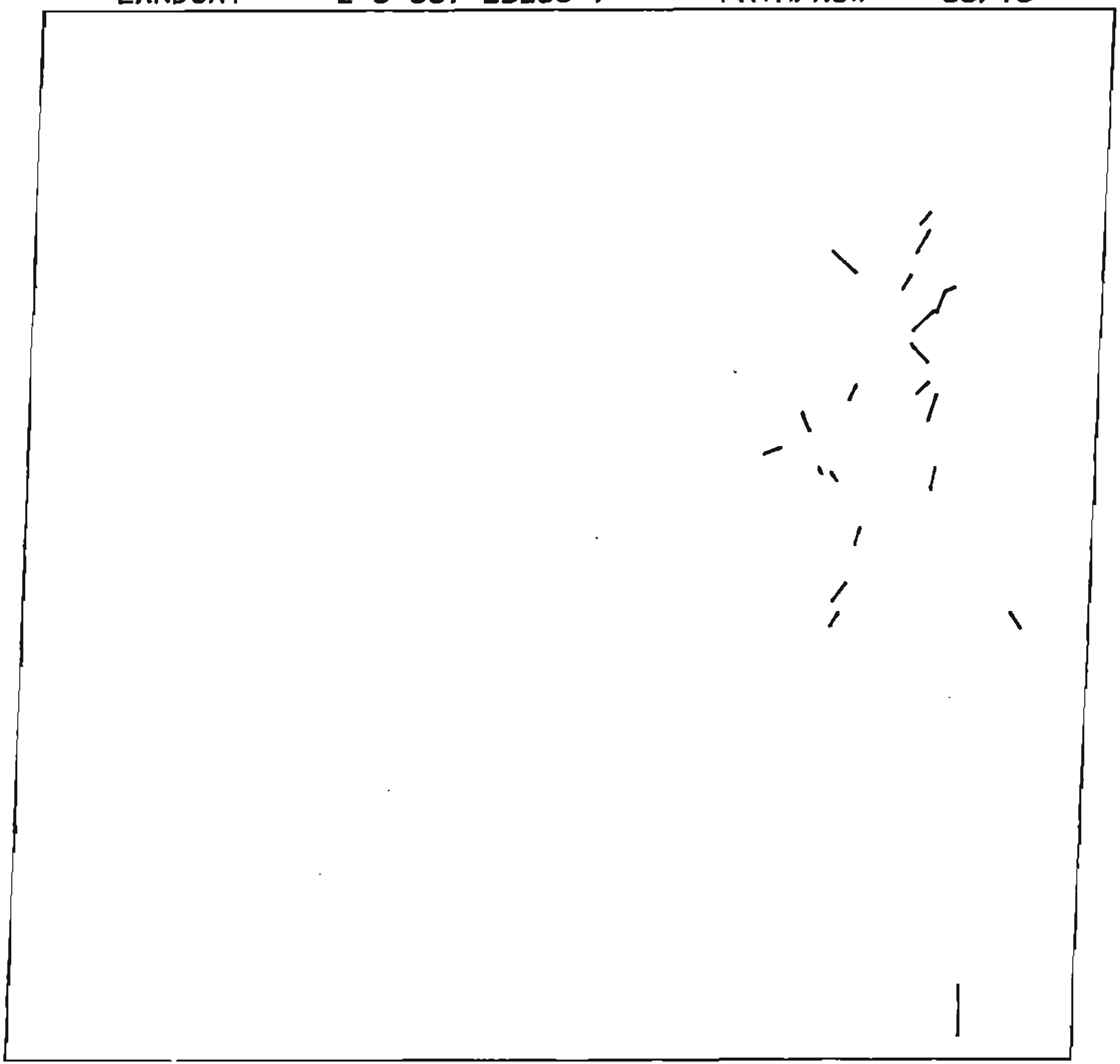
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-5 857-20283-7 PATH/ROW 86/16



Center Coor.

62° 53′ N

165° 27′ W

1:1,000,000

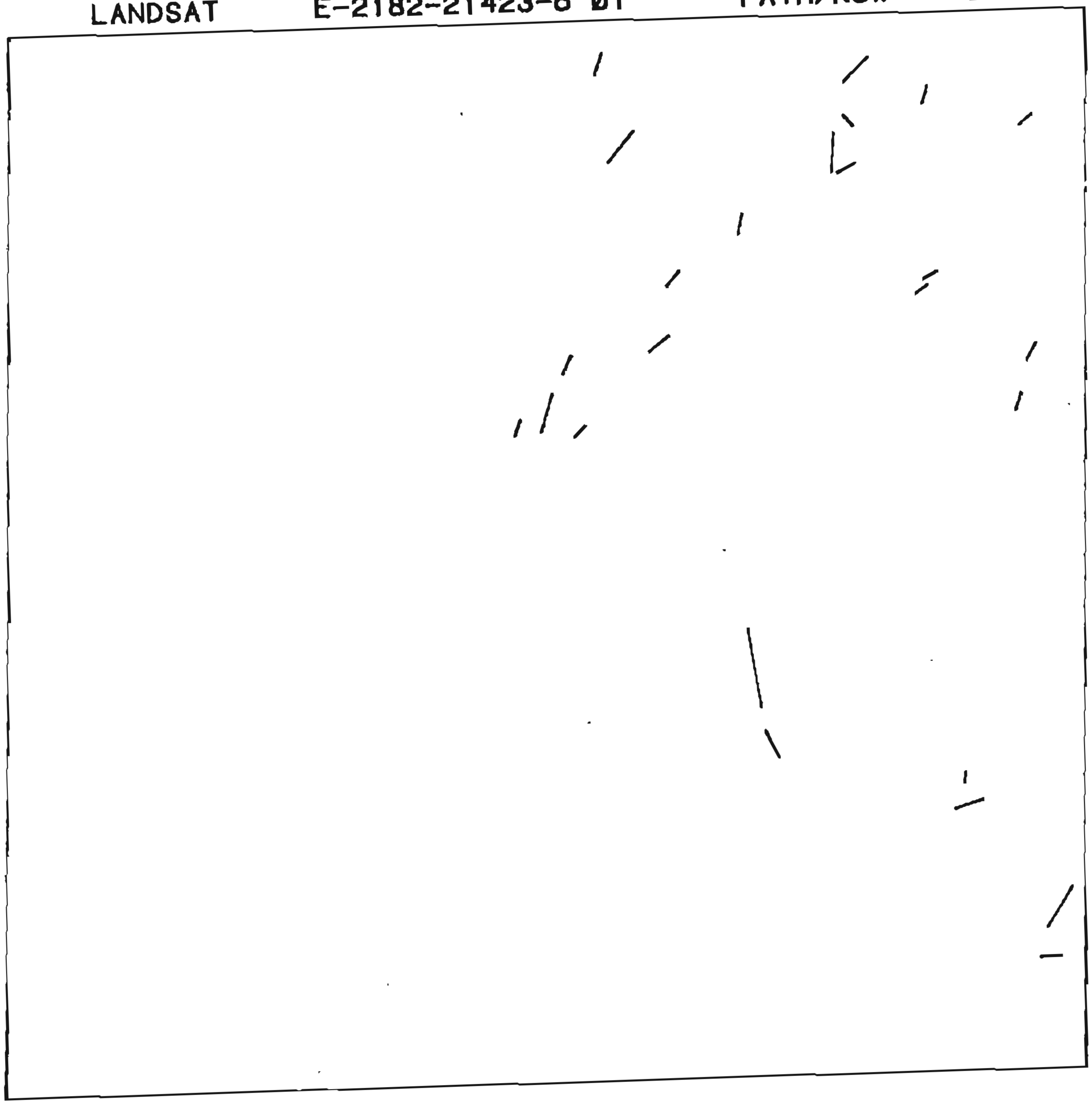
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-2182-21423-6 01 PATH/ROW 86/17

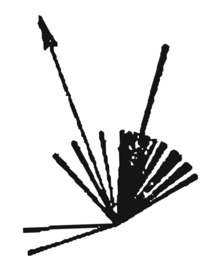


Center Coor.

61° 32′ N

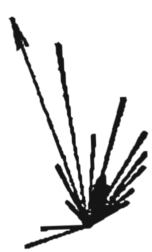
166° 00′ W

1:1,000,000



Linear Count

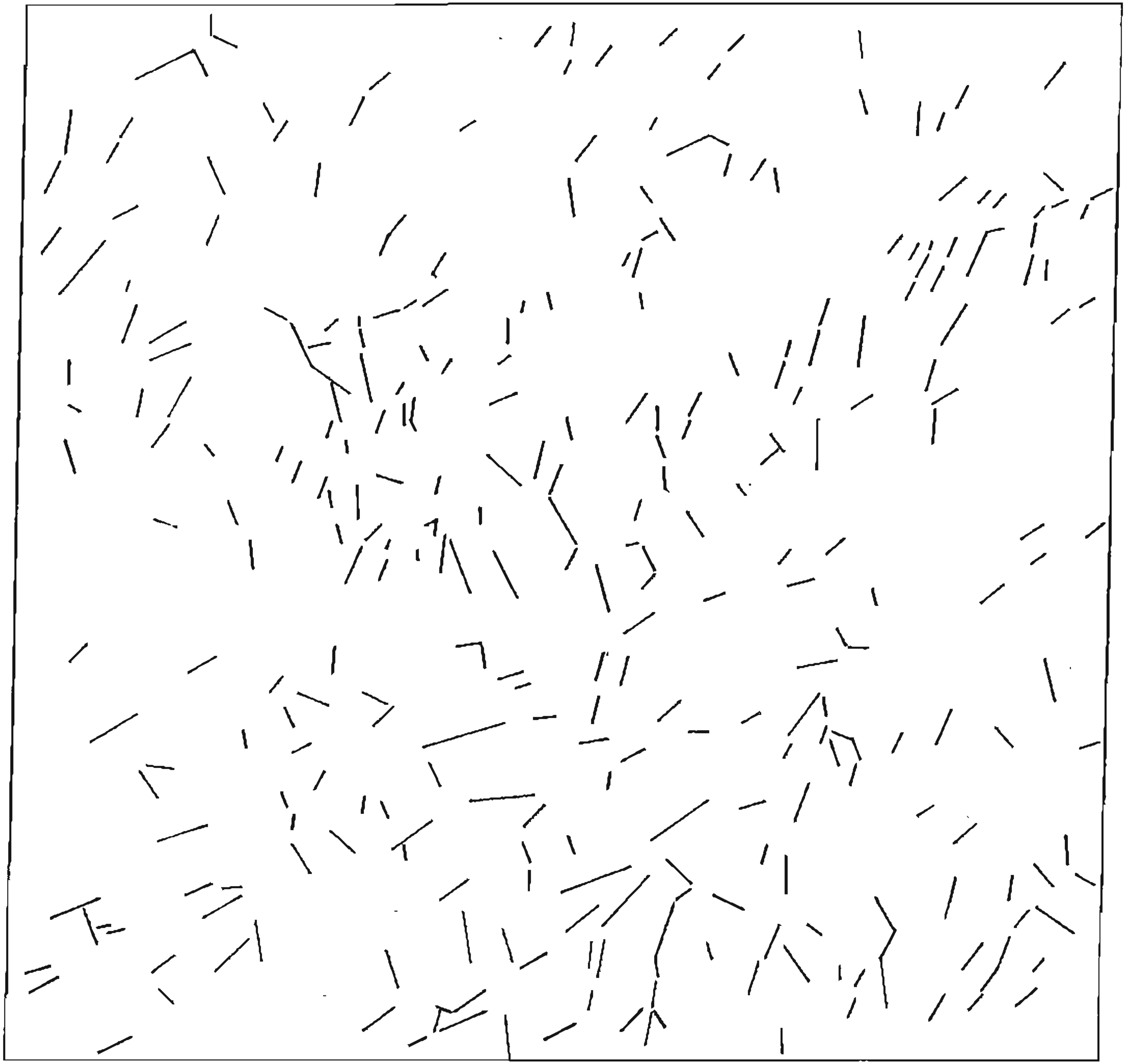
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-2165-21461-7 01 PATH/ROW 87/11

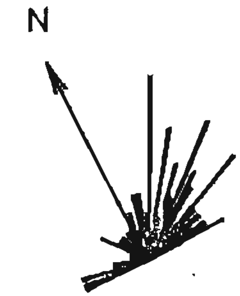


Center Coor.

69° 24′ N

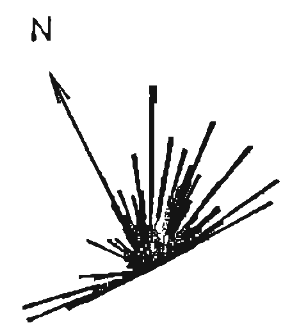
159° 02′ W

1:1,000,000



Linear Count

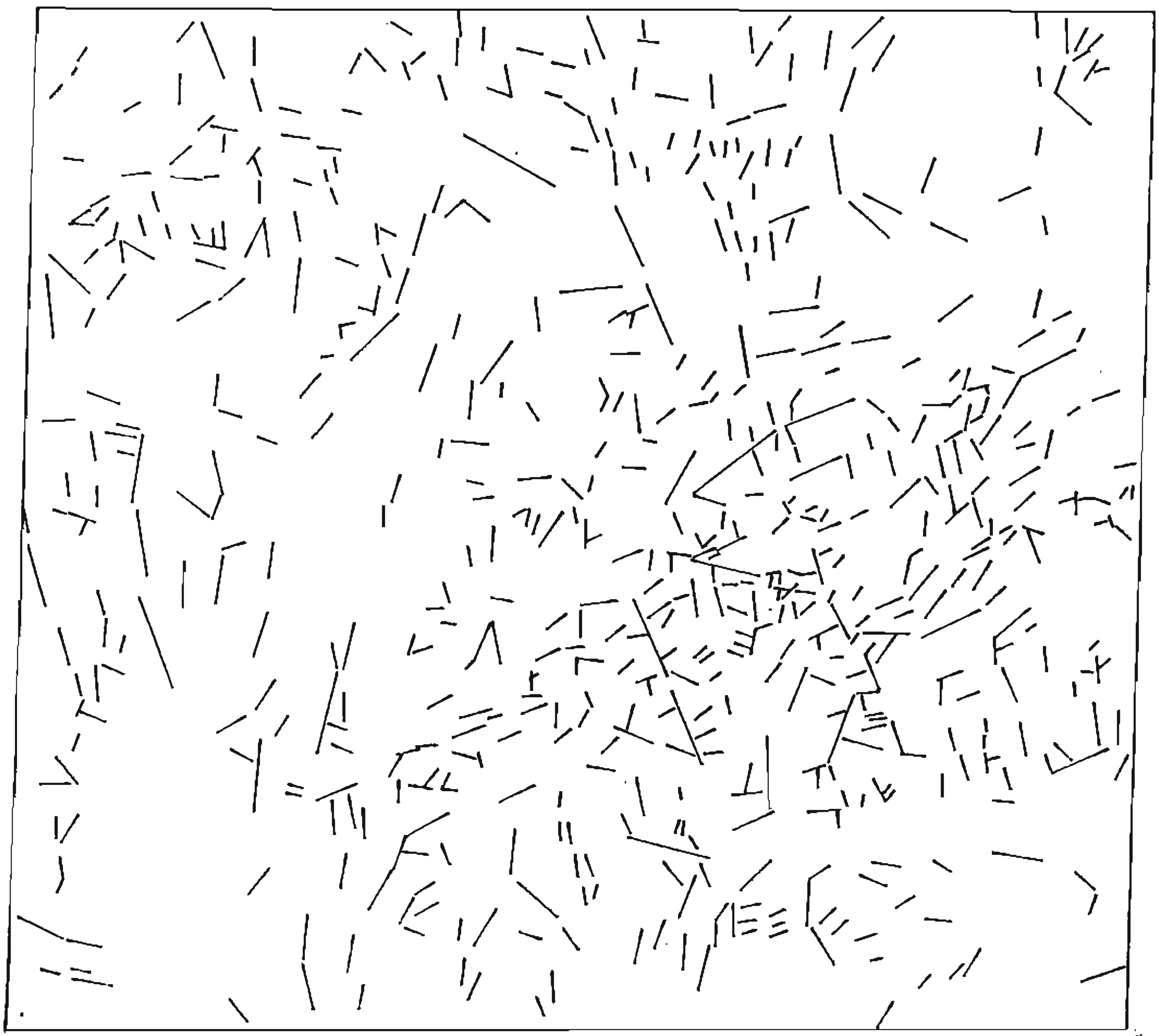
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-21497-21353-7 PATH/ROW 87/12

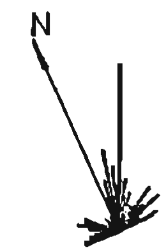


Center Coor.

67° 52′ N

160° 39′ W

1:1,000,000



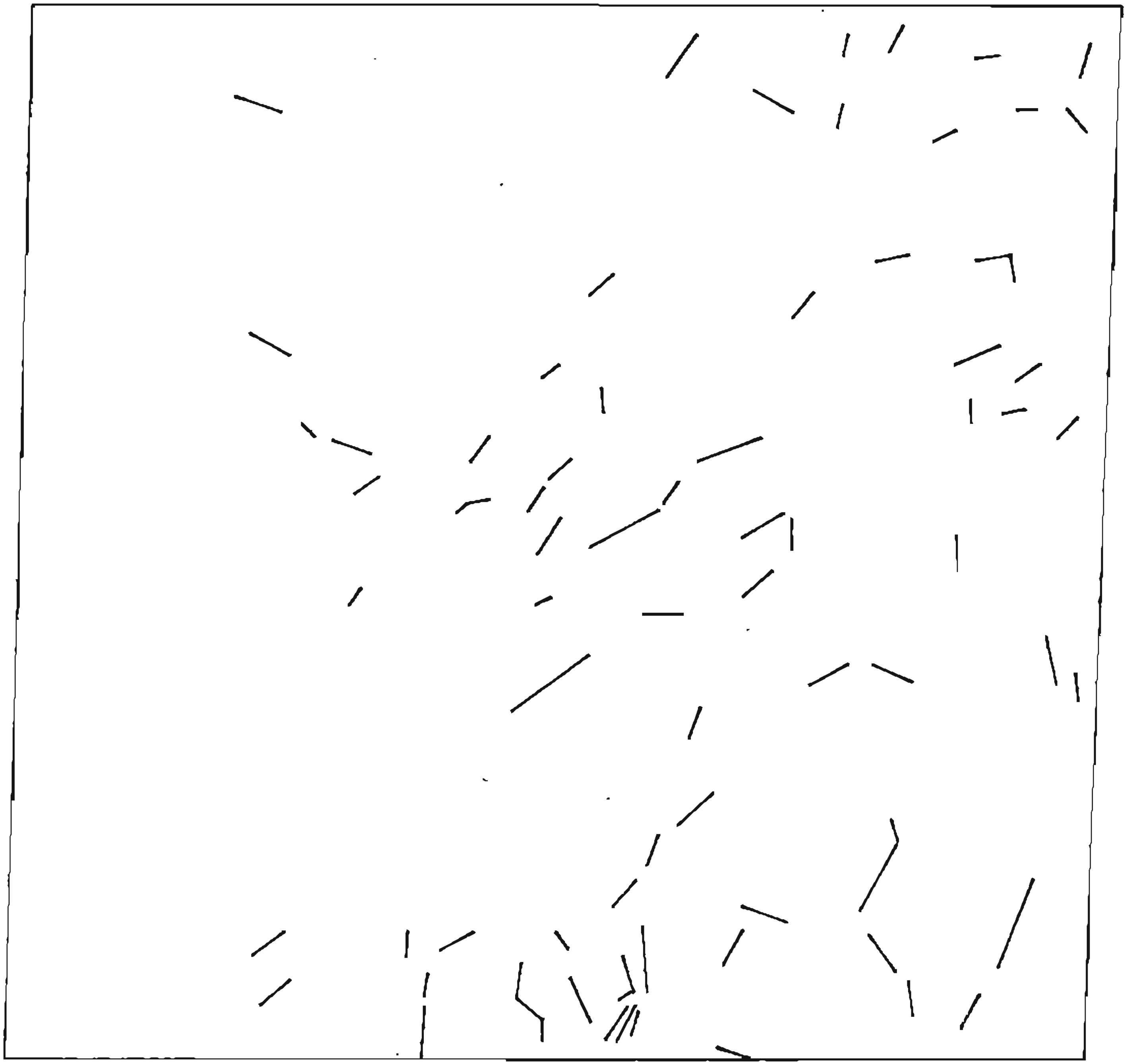
Linear Count

1 Degree/Cell

Linear Lengths

1 Degree/Cell

LANDSAT E-30172-21582-7 PATH/ROW 88/11

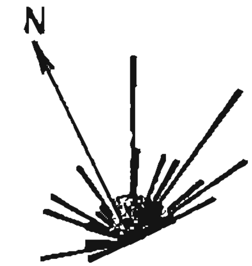


Center Coor.

69° 14′ N

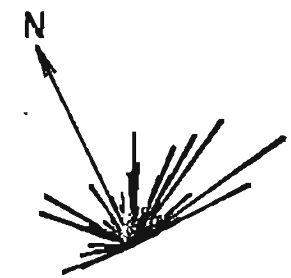
161° 46′ W

1:1,000,000



Linear Count

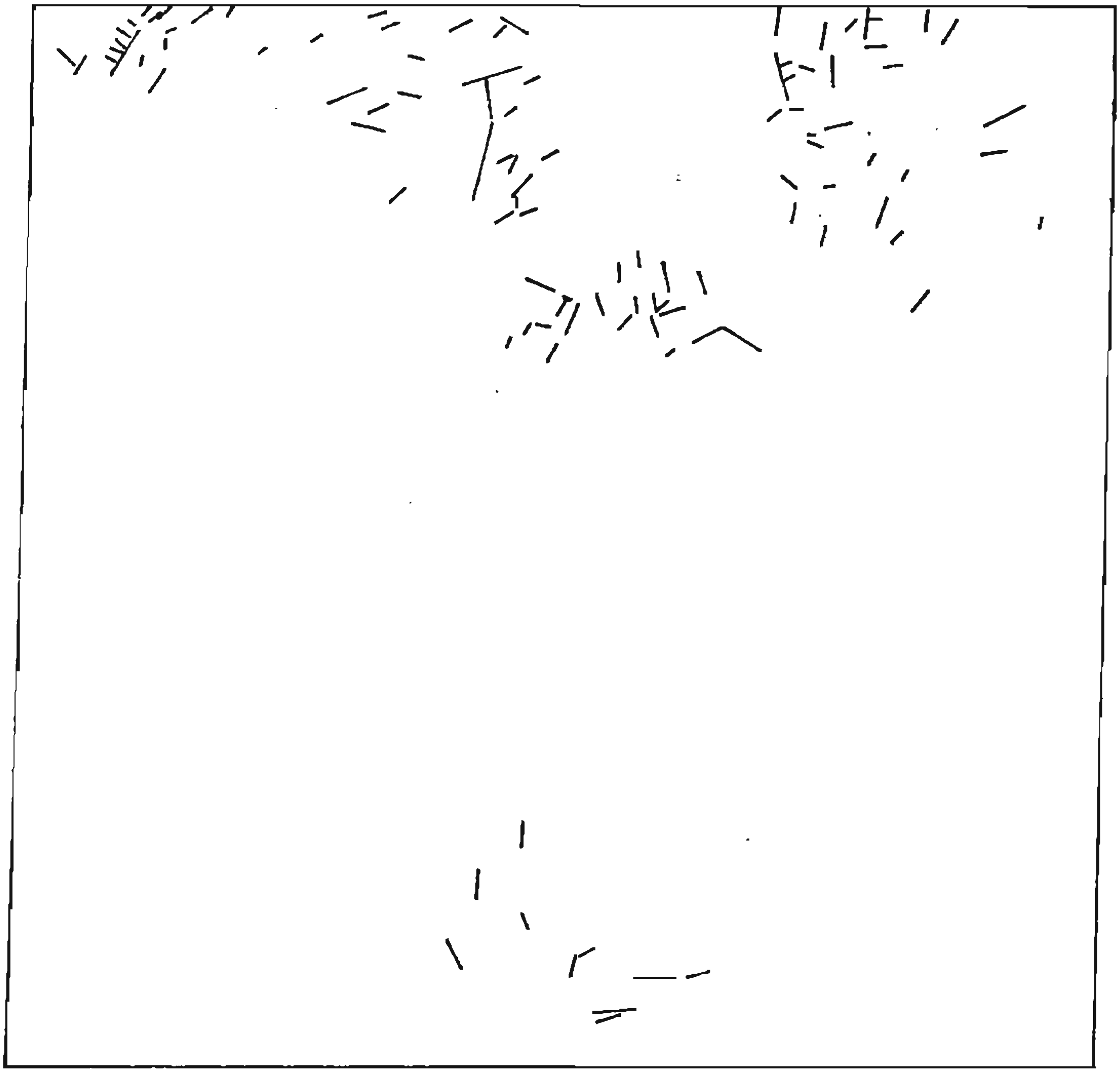
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-2 994-21253-7 PATH/ROW 88/13

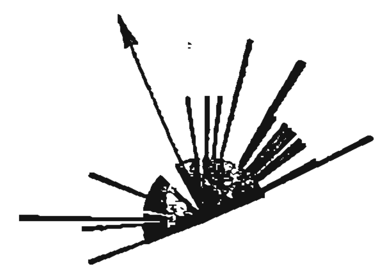


Center Coor.

66° 58′ N

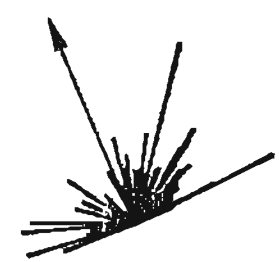
163° 47′ W

1:1,000,000



Linear Count

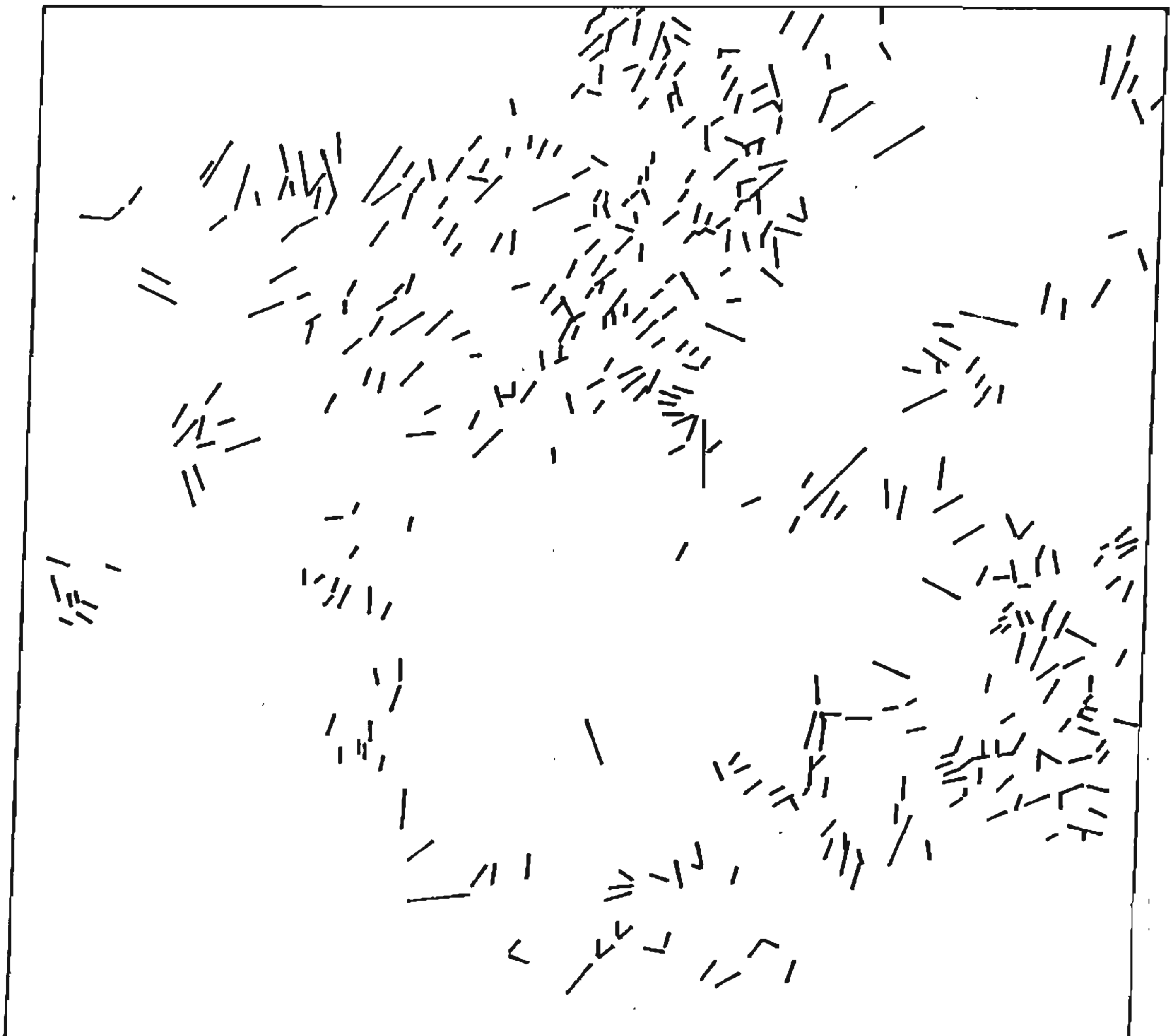
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-30351-21540-7 PATH/ROW 88/14



Center Coor.

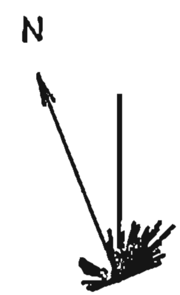
65° 15′ N

165° 12′ W

1:1,000,000

Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

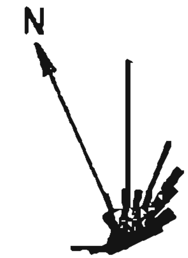
LANDSAT E-1711-22014-7 01 PATH/ROW 89/12

Center Coor.

68° 17′ N

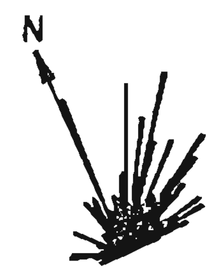
163° 50′ W

1:1,000,000



Linear Count

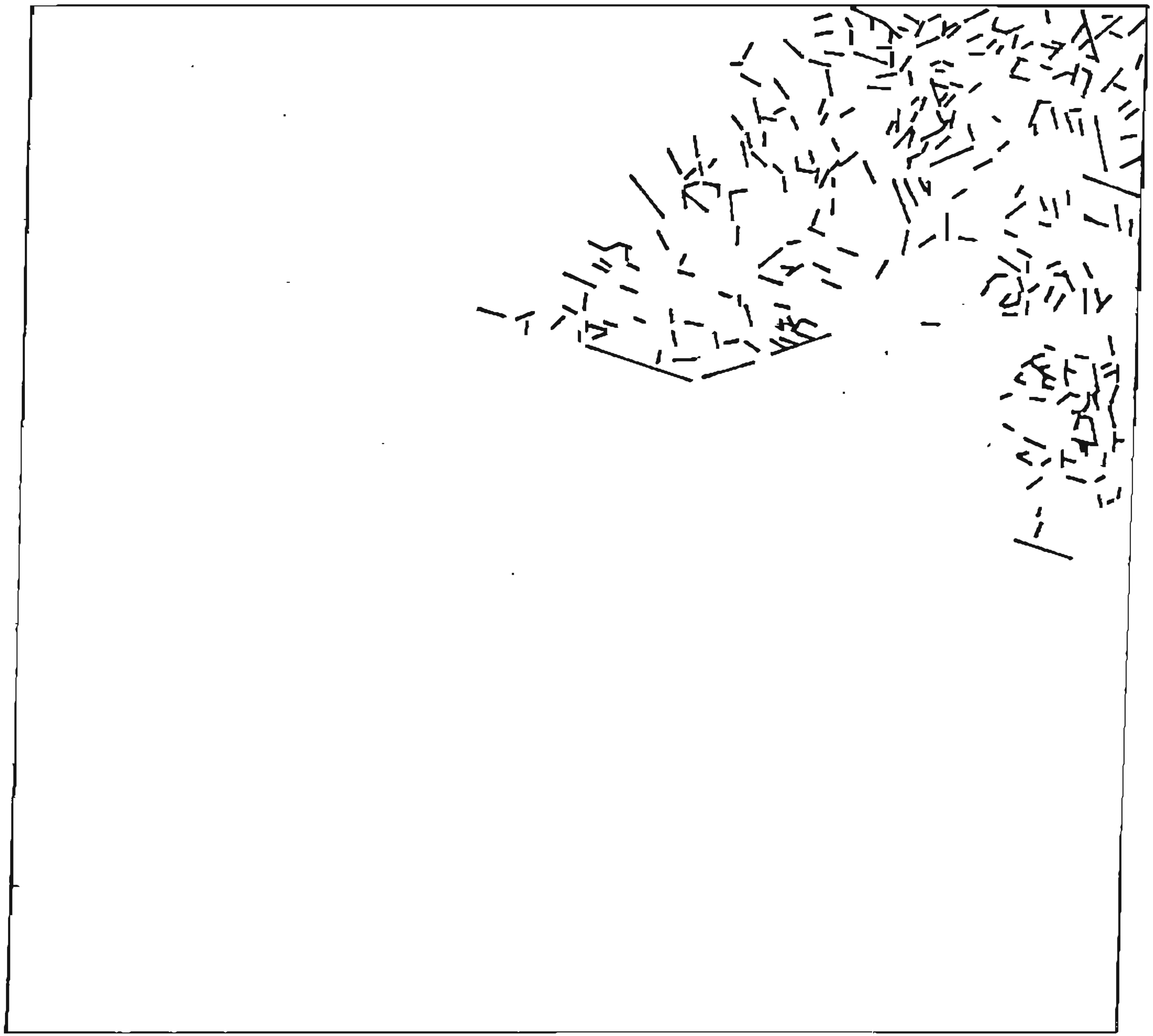
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-21500-21534-7 PATH/ROW 90/14

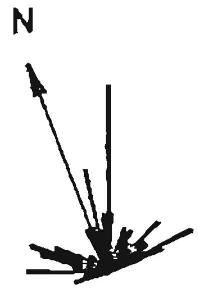


Center Coor.

65° 14′ N

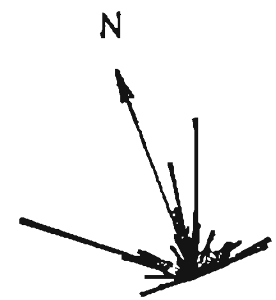
168° 04′ W

1:1,000,000



Linear Count

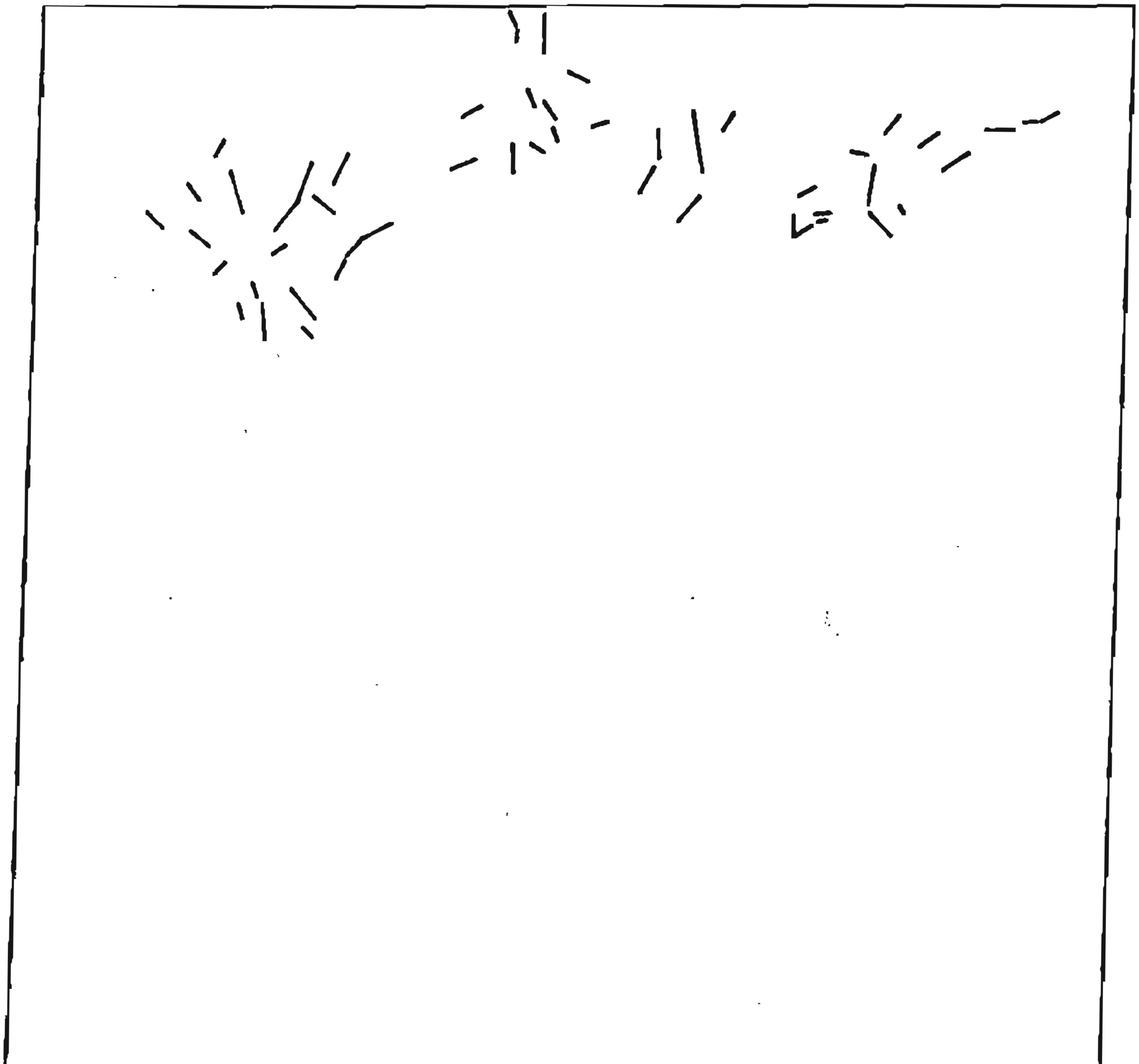
1 Degree/Cell



Linear Lengths

1 Degree/Cell

LANDSAT E-1684-22084-7 01 PATH/ROW 90/16

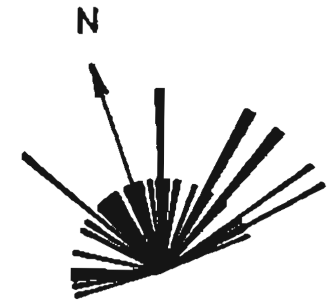


Center Coor.

62° 54′ N

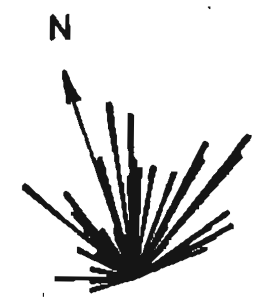
170° 55′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell

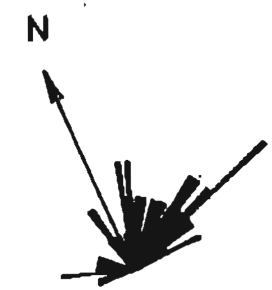
LANDSAT E-5 825-20541-7 PATH/ROW 91/12

Center Coor.

68° 05′ N

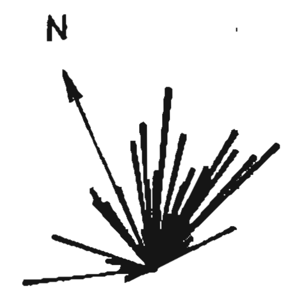
165° 45′ W

1:1,000,000



Linear Count

1 Degree/Cell



Linear Lengths

1 Degree/Cell