1.1 Title Page (W)

A MINERAL RECONNAISSANCE OF EASTERN LINN COUNTY OREGON

by

L.F.HILL

1.OCT.85

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1.2 Objectives (W)

OBJECTIVES

This geochemical reconnaissance was under taken to accomplish several objectives. One was to review and update information on known mineral occurances. The second objective was to develope additional geochemical information on suspected mineralizations. These suspected mineralizations were located primarily by historical and anecdotal information. The third objective was to evaluate geochemically certain occurances of jasperoids. Jasperoid mineralizations represent a depositional model that has not been tested in the survey area. However, jasperoids have proved fruitful hosts in other locals. The fourth objective was to establish levels of background elemental abundances in stream sampling during the course of the survey. And finally the last objective was, with all this information in hand, to make recommendations to certain mineral owners as to whether or not additional exploration would be desireable or warrented.

The reader should note that this report is directed to an audience of forest land owners and forest land managers. Because of this orientation many of the sampling areas are on private land and as such are not open for staking or other mineral entry.

ACKNOWLEDGEMENTS

I would like to briefly acknowledge some of the people who contributed much to the undertaking of this study.
They are: Jerry Gray, State of Oregon, Department of Geology and Mineral Industries; Wylie Hatch; Larry Nobel, Barringer and Assoc.; K.C. Klosterman, Barringer and Assoc.; Burt Wright; Jack Gourley, G-2 Electric; Eugene Ellis; Jack Barringer, Barringer and Assoc.

2.1 Location and Setting (W)

SETTING

The study area is located approximately 75 miles South of Portland, Oregon. It encompasses the Eastern margin of the Willamette Vally, the foothils of the Cascades and extends almost to the crest of the Cascades.

The Western Edge of the study is bounded by the alluvial flood plane of the Willamette River which is about 300 to 400 feet above sea level. Immediately to the East of the Valley lies the lowest bedrock unit in the study area. This unit is the discontinuous CALAPOOYA formation. It is broadly classed as a light colored lapilli tuff (a large particle volcanic ash fall). The formation was laid down during the Oligocene to early Miocene or about 26 million years bp and is part of the Little Butte Volcanic Series. In the study area this formation seldom outcrops due in part to its softness. However one does come across it occasionally and may it be easily misidentified as a yellow clay. It can be easily differentiated from clay as it will have a distinctly gritty feel to it when rolled between the fingers wet. This formation is responcible for thick forest soils like the Jory - Nieka.

A good locality to observe this formation would be the hog - backed ridge just to the East of Gedney Creek perhaps 1/4 mile north of Foster Reservoir.

In the study area this tuff appears for only 1000 vertical feet and tends to be involved in low ridges and valleys whose streams exhibit braiding. This formation also outcrops briefly on the far Eastern edge of the study area.

The next younger bedrock unit is the discontinuous COLUMBIA RIVER BASALT from the middle Miocene or about 22 million years bp. This unit is perched over the CALAPOOYA formation adjacent to the valley floor and does not extend into the Eastern part of the study area. This basalt is generally dark gray to black, fine grained, dense and may exhibit occasionally a well developed columnar jointing. In the study area this unit enjoys many outcrops and is responsible for deep, well drained forest soils like the reddish brown Peavine - Honeygrove. A good locality to observe this formation is at the scaling station on the South shore of Foster Reservoir. This basalt is probably less than 1000 ft. thick in the study area and is found at elevations between 700 ft. and 1500 ft. above sea level. This bedrock tends to be involved in capping rolling foothills.

The Eastern 1/3 of the study area is covered by the RHODODENDRON formation of the Sardine Series. This is a late Miocene andesite (12 million years bp) that ranges from gray to dark gray and may vary from fine grained to fine grained with some large cristals (porphyritic). This andesite is responsible for the thin light gray to tan forest soils. A good locality to observe this formation would be along the Quartzville fork of the Middle Santiam River, up Moose Creek or up Canyon Creek. This volcanic Frequently outcrops and may be found between 1000 ft. and 4000 ft. above sea level. It is involved with immature, highly eroded mountain valleys of " V " shape, knife-edged ridges and swift flowing streams that allow little perminent deposition. This is the thickest formation in the study area and as such it may be observed to the depth of 3000 ft. in several places.

Imbedded in the Sardine Series are a small number of mafic intrusives such as a cinder cone near Quartzville. Also an occasional patch of Boring Lave of the CASCADE ANDESITE formation from the Pliocene (between 2 & 12 million years bp).

2.2 Brief Mineral Developement and Prospecting Information (W)

PROSPECTING AND MINERAL DEVELOPEMENT HISTORY

Past mineral production is one of the keys used in developing currant exploration criteria. Most of Eastern Linn County has been adequately prospected for "free milling" gold of a size large enough to be apparent to the unaided eye. Most other minerals, however, have been virtually ignored.

In the study area only two districts have been rich enough in gold to sustain any long term prosprcting interest. The largest is the Quartzville area which will not be covered by this report. The interested reader is referred to a detailed geochemical study by Steven R. Munts; DOGAMI - OPEN FILE REPORT 0-81-8. The second district is the Gold Hill area of the upper Calapooya which has had little attention paid to it as access to it has not been very good until about 15 years ago. The reader will note that there are three samples that come from claims that are ores of high enough grade to be commercial if adequate tonnage is available.

In addition to obvious mineral developement many of the sampling locations were chosen from word of mouth tales of earlier prospecting. The Scott Creek local was sampled because of a report of petrified logs in the creek bed [1]. Similarly, other examples of silicious mineralizations were sought out. Some white quartz and blue opal [2] were sampled. Also a wide assortment of red and yellow jasperoids [2] were taken as scant attention has been paid to this type of quartz mineralization. A sample of the lavender Holly Blue Carnielian, which is now quite rare, was obtained [3].

Several reports of the occurance of Mercury were appraised and two were confirmed by sampling. In one instance, a forester was told of Mercury in White Rock Creek that the prospector felt was evidence of some early attempts of amalgamation [1]. In another instance, a miner reported of his successful retorting of Mercury on the bank of Two Girls Creek [4].

Additionally, several other locals were thought to be equally promising. The Blagan Mill Road gravel pit [2] was sampled because of sulfide mineralization strong enough to smell of brim-stone. Tidbits Creek was looked at because of an eariler report of Zinc mineralization [5]. The two locations near Quartzville were picked because of visable pyrites. And the author was fortunate enough to be provided with a dump sample of the North Star Claim by its claimant [4].

In addition, a curious and inexplicable mine adit on Scott Mtn. (Pine Mine), [3], [6], was explored. The tunnel was more than 100 yards to the working face which would represent a substantial amount of work for someone with a wheelbarrow. There was little evidence of mineralization both visually and geochemically.

Finally, there are claims just outside the study area that contain commercial quanties of emery, an industrial abrasive [8]. Emery is a form of corundum (rűby, sapphire) and is composed of Aluminum Oxide. These locals then pretty well comprise most of the known mineral occurances of Eastern Linn County.

REFERENCES

[1] - Eugene Ellis, personal communication
[2] - Jerry Gray, personal communication
[3] - Wylie Hatch, personal communication
[4] - Jack Gourley, personal communication
[5] -
[6] - Larry Noble, personal communication

3.1 Types and Number of Samples (W)

SAMPLES

Samples taken during the reconnaissance were collected during August and September of 1984 and 4 additional samples were collected during September of 1985. Fifty four sites were sampled. Approximately two thirds of the samples generated were stream sediment samples while the balance were grab samples. It took about one man month to collect all the samples.

The stream sediment samples were of two kinds. One, a heavy mineral concentrate was panned from gravels in active stream channels. Terrace deposits and inactive stream channels were avoided as a few of the elements, e.g. Silver, Mercury, are entirely too mobil in these environments and such a sample might yield an unrepresentatively low concentration. These samples were panned from approximately a gold pan full of 1/4 inch minus sediment. The concentrate was stored in kraft paper envelopes and air dried.

the other type of stream sample was the silt fraction. Fine sands and silts from under moss and grasses were collected until perhaps a pound was gathered. These were also stored in kraft envelopes and allowed to air dry.

Rock grab samples were taken and basically two collection philosophies were observed. Part of the samples were taken to check the mineral content of a rock such as a quartz or a jasperoid. These were taken to test a particular depositional model. The rest of the samples were taken to check an obvious mineralization such as a bleaching, an iron staining or a pyritization. Because of the nature of the collecting most of the rocks had undergone some weathering. These were stored in oilwell sand sample bags and air dried.

The last type of sample is the soil or dirt sample. In actuallity, these samples were all of extreamily weathered rock and not of a particular soil. These were also stored in an oil well sand sample bag and allowed to air dry.

Fifty four sites generated 27 pan concentrated samples; 27 silt samples; 24 rock chip samples and 7 dirt samples.

3.2 Labling Convention (W)

LABLES

The samples were labled according to a scheme utilized by The Bureau Of Land Management. In brief, the lable is described as:

```
                    L  0 0 0 0  X  0 0
                       |        |  |
  county or quad       | site   |  | sample or split number
     prefix            | number |  |
                       |        |R=rock
                       |        |P=pan concentrate
                       |        |F=fine (silt)
                       |        |D=dirt
```

3.3 Less than / Greater than Convention (W)

SPREADSHEET CONVENTIONS

The elemental abundance was generated by a commercial spreadsheet package. Because of this, the conventions used in expressing the upper and lower limits of detection had to be modified slightly. A conventional lower limit would be shown as: < 5 ppm, i.e. less than 5 parts per million. This is difficult to express in a spreadsheet and still retain the ability to use this number (cell) for calculations. Therefore, the convention was changed to look like:

< 5 ppm = 4.999 ppm.

Similarly, for the upper detection limit although it was reached only twice; once for Lead and once for Zinc. The Spreadsheet shows 10,000 ppm which should be read as > 10,000 ppm or Greater than 10,000 parts per million.

3.4 Tungsten (W)

TUNGSTEN

Tungsten was one of the target elements in the study. However, it is not reported in the raw data as no sample exceeded the element's lower detection limit of 10 ppm.

3.5 Conversion Factors (W)

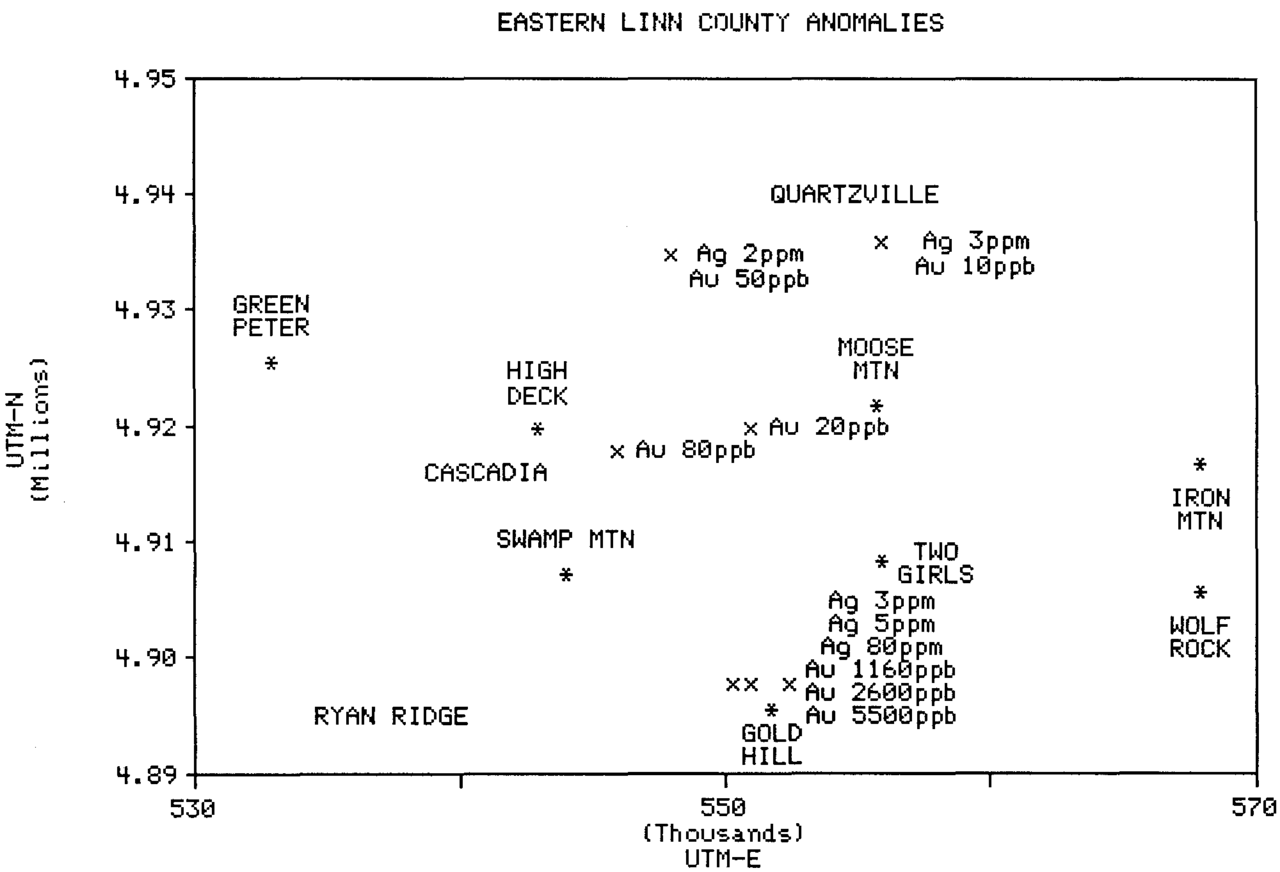
CONVERSION FACTORS

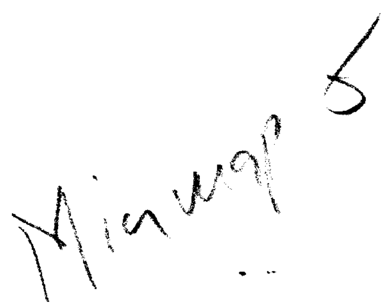
The parts per million measurement is Equivilant to the grams per metric ton of the International System of Measurements. While this is convienent for academic work and promotes a certain uniformity in reporting from country to country; minerals are neither purchased or sold by these measurements. Within the United States most minerals are sold by the Troy ounce and the Avoidupois pound. With that in mind, it may be helpful to remember these three conversion formulae when deriving a dollar per ton value for minerals.

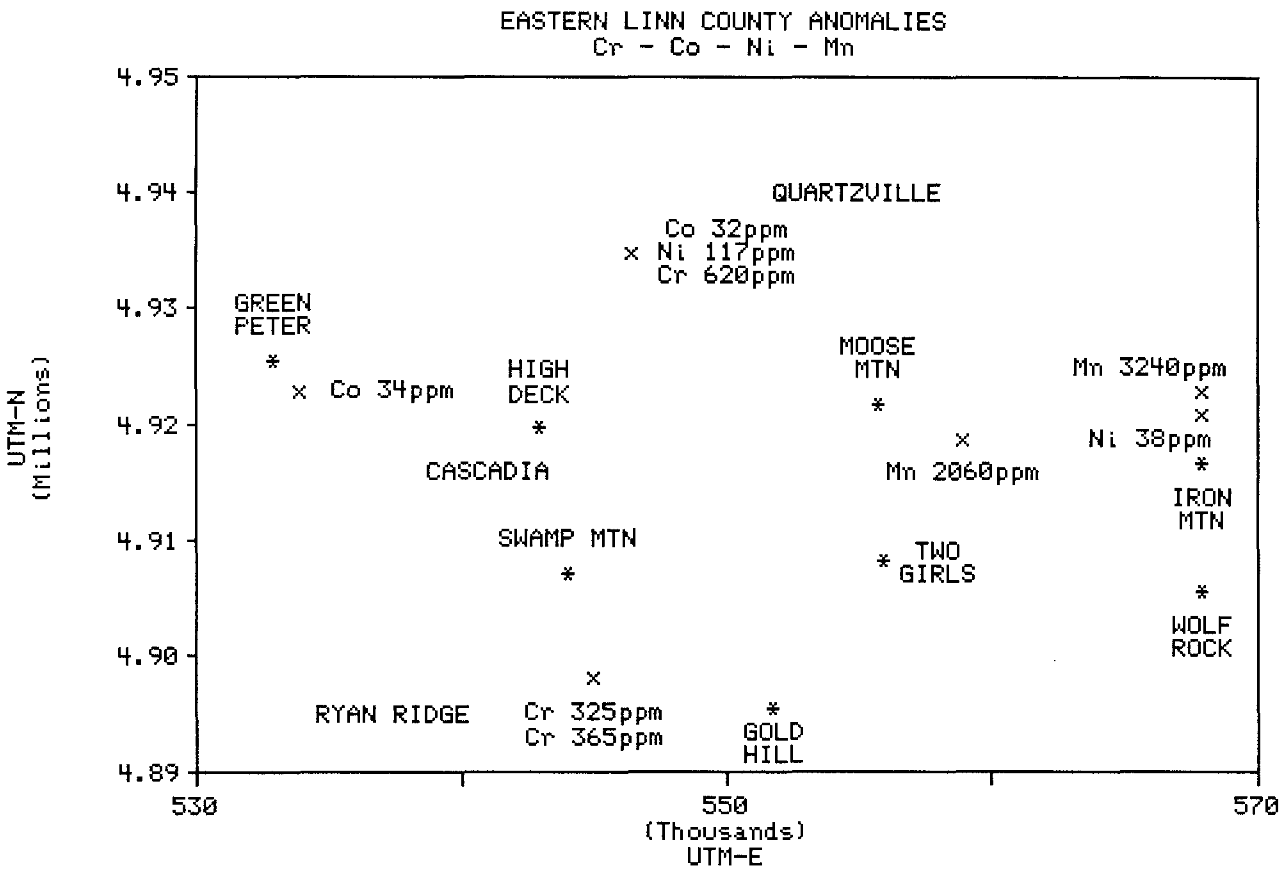
34.3 ppm = 1 Troy ounce per Short ton

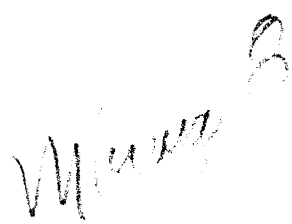
500.0 ppm = 1 Avoirdupois pound per Short ton

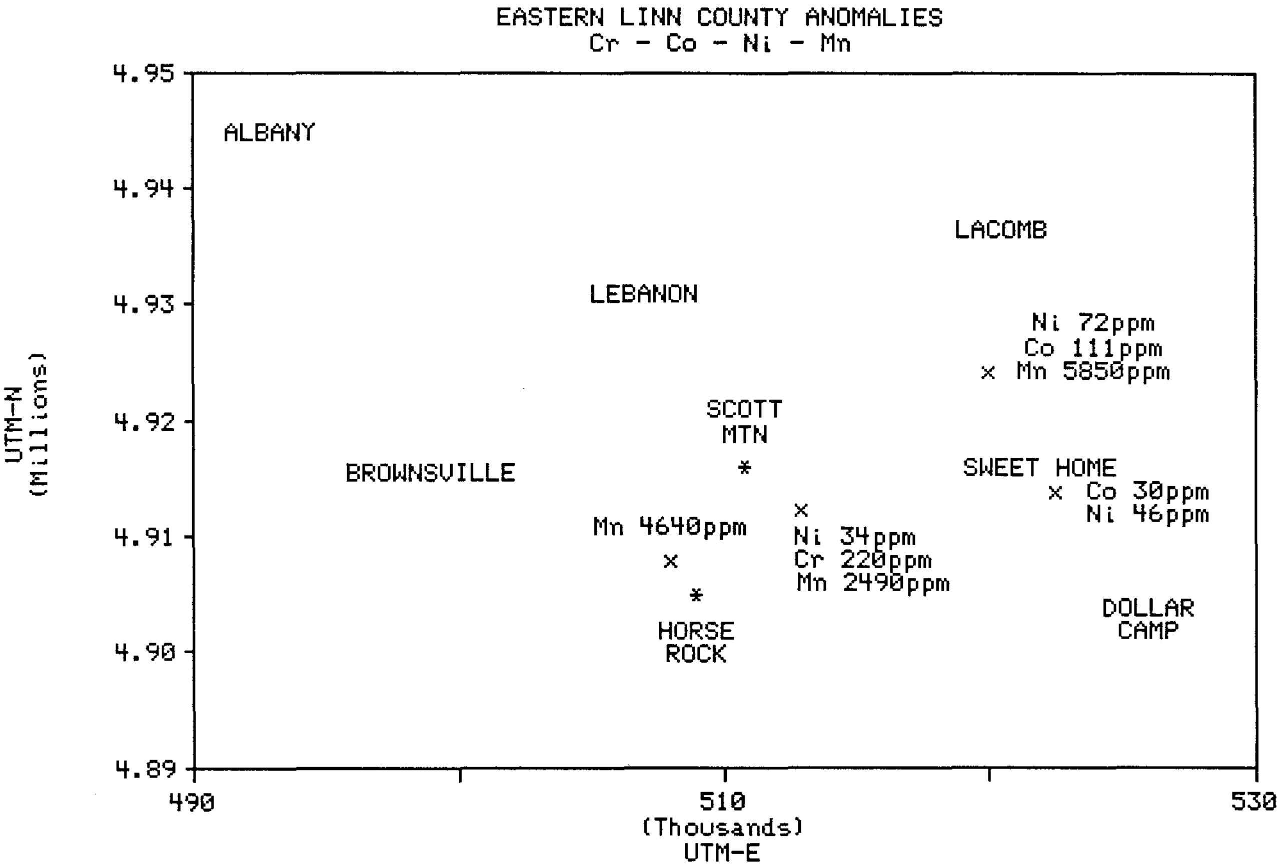
10,000.0 ppm = 1% or 20 pounds per Short ton.


EASTERN LINN COUNTY ANOMALIES
4.95
4.94
4.93
4.92
4.91
4.90
4.89
UTM-N
(Millions)
530
550
570
(Thousands)
UTM-E
QUARTZVILLE
Ag 2ppm
Au 50ppb
Ag 3ppm
Au 10ppb
GREEN
PETER
HIGH
DECK
MOOSE
MTN
Au 20ppb
Au 80ppb
CASCADIA
IRON
MTN
SWAMP MTN
TWO
GIRLS
Ag 3ppm
Ag 5ppm
Ag 80ppm
Au 1160ppb
Au 2600ppb
Au 5500ppb
WOLF
ROCK
RYAN RIDGE
GOLD
HILL

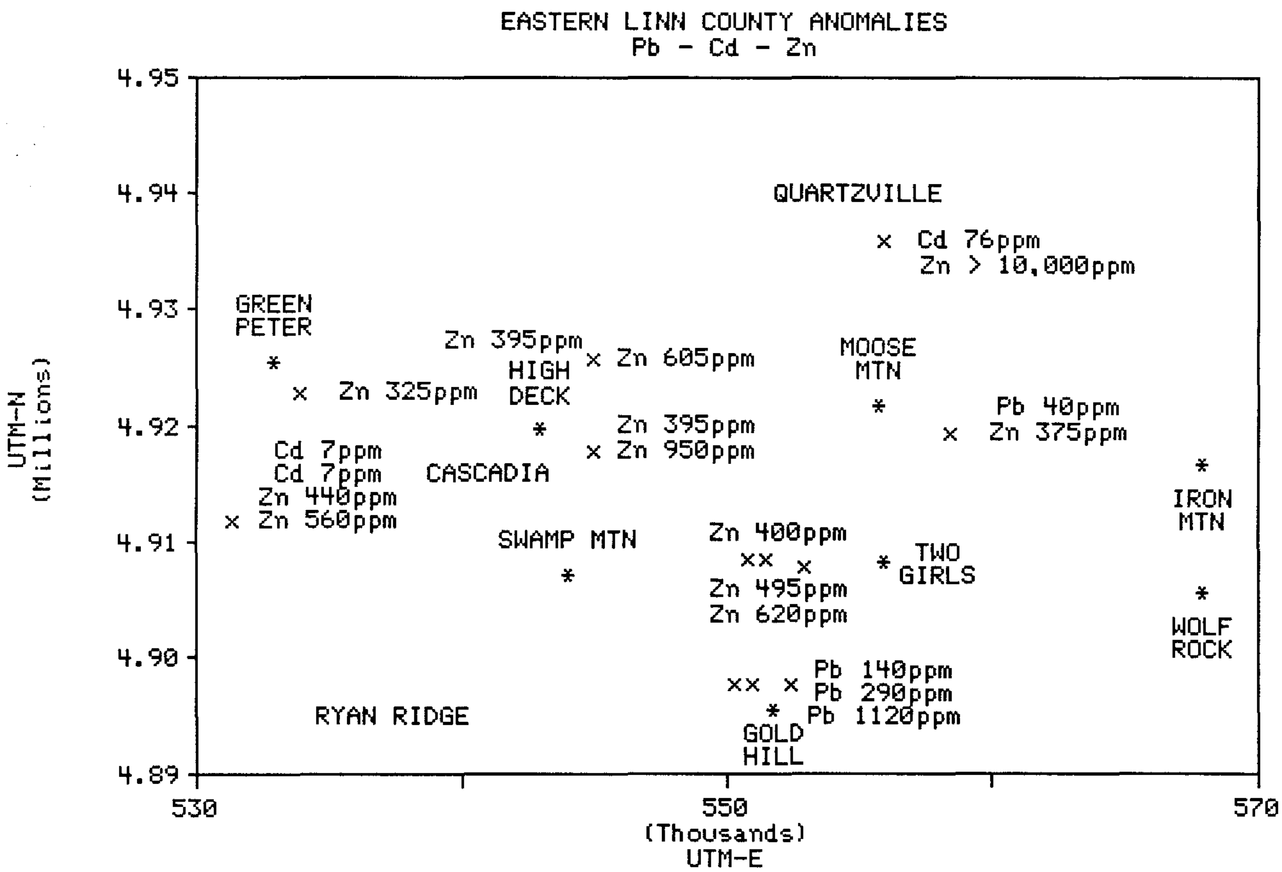


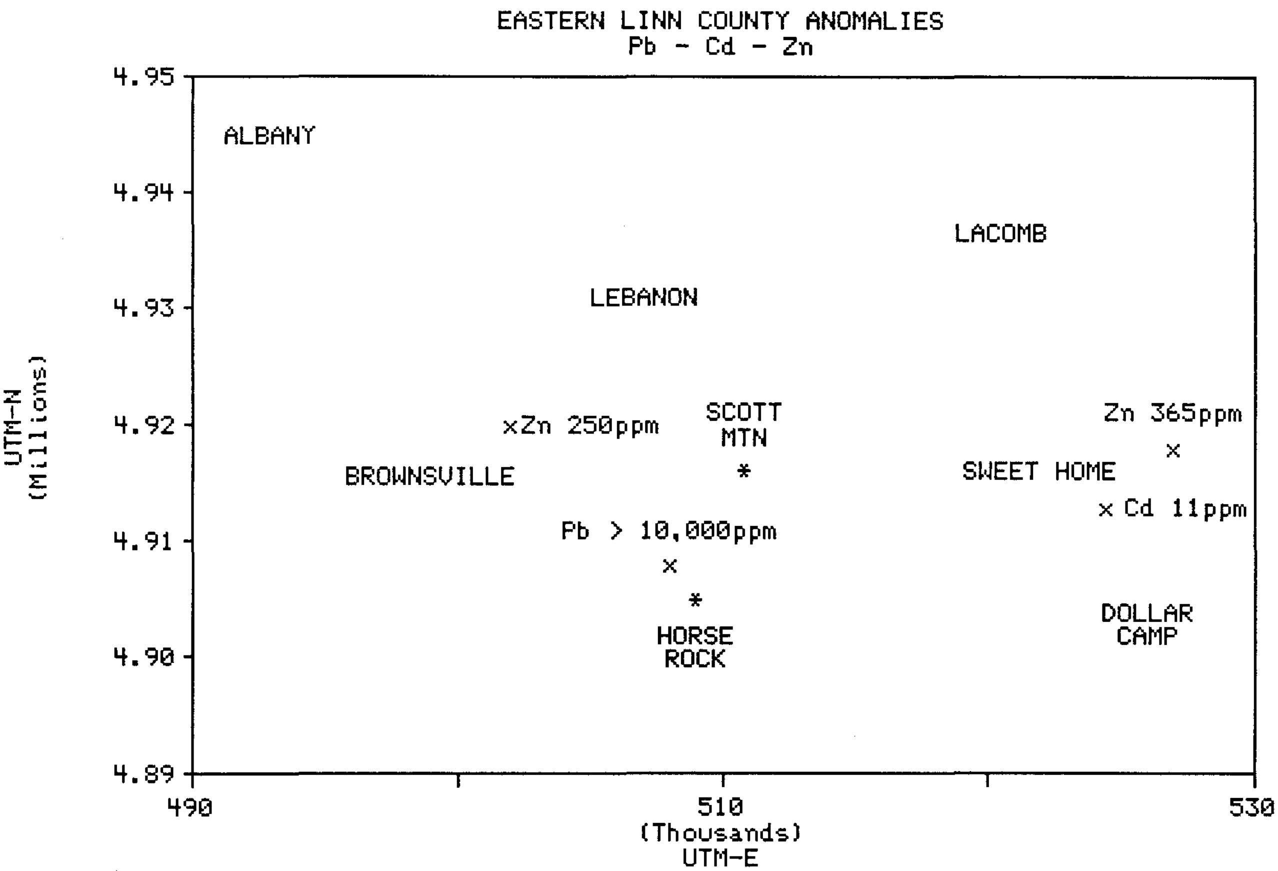

EASTERN LINN COUNTY ANOMALIES
Cr - Co - Ni - Mn
4.95
4.94
4.93
4.92
4.91
4.90
4.89
UTM-N
(Millions)
530
550
570
(Thousands)
UTM-E
QUARTZVILLE
Co 32ppm
Ni 117ppm
Cr 620ppm
GREEN
PETER
Co 34ppm
HIGH
DECK
CASCADIA
SWAMP MTN
RYAN RIDGE
Cr 325ppm
Cr 365ppm
GOLD
HILL
MOOSE
MTN
Mn 2060ppm
TWO
GIRLS
Mn 3240ppm
Ni 38ppm
IRON
MTN
WOLF
ROCK




EASTERN LINN COUNTY ANOMALIES
Cr - Co - Ni - Mn
4.95
4.94
4.93
4.92
4.91
4.90
4.89
UTM-N
(Millions)
ALBANY
LACOMB
LEBANON
Ni 72ppm
Co 111ppm
Mn 5850ppm
SCOTT
MTN
BROWNSVILLE
SWEET HOME
Co 30ppm
Ni 46ppm
Mn 4640ppm
Ni 34ppm
Cr 220ppm
Mn 2490ppm
HORSE
ROCK
DOLLAR
CAMP
490
510
530
(Thousands)
UTM-E

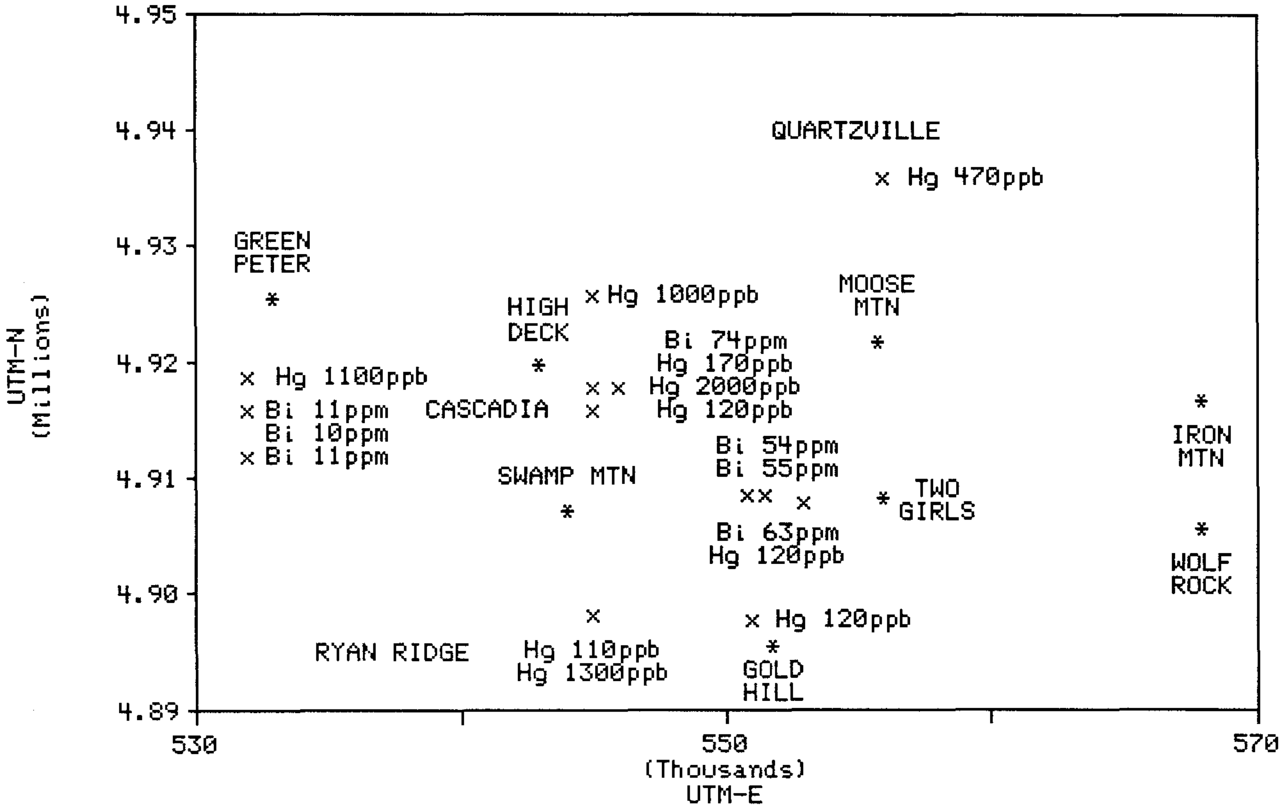
Mining?


EASTERN LINN COUNTY ANOMALIES
Pb - Cd - Zn
UTM-N (Millions)
4.95
4.94
4.93
4.92
4.91
4.90
4.89
530
550
570
(Thousands)
UTM-E
QUARTZVILLE
Cd 76ppm
Zn > 10,000ppm
GREEN PETER
Zn 325ppm
Zn 395ppm
HIGH DECK
Zn 605ppm
MOOSE MTN
Pb 40ppm
Zn 375ppm
Zn 395ppm
Zn 950ppm
Cd 7ppm
Cd 7ppm
Zn 440ppm
Zn 560ppm
CASCADIA
IRON MTN
SWAMP MTN
Zn 400ppm
TWO GIRLS
Zn 495ppm
Zn 620ppm
WOLF ROCK
Pb 140ppm
Pb 290ppm
Pb 1120ppm
RYAN RIDGE
GOLD HILL


EASTERN LINN COUNTY ANOMALIES
Pb - Cd - Zn
4.95
4.94
4.93
4.92
4.91
4.90
4.89
UTM-N
(Millions)
ALBANY
LACOMB
LEBANON
×Zn 250ppm
SCOTT
MTN
Zn 365ppm
BROWNSVILLE
SWEET HOME
× Cd 11ppm
Pb > 10,000ppm
HORSE
ROCK
DOLLAR
CAMP
490
510
530
(Thousands)
UTM-E

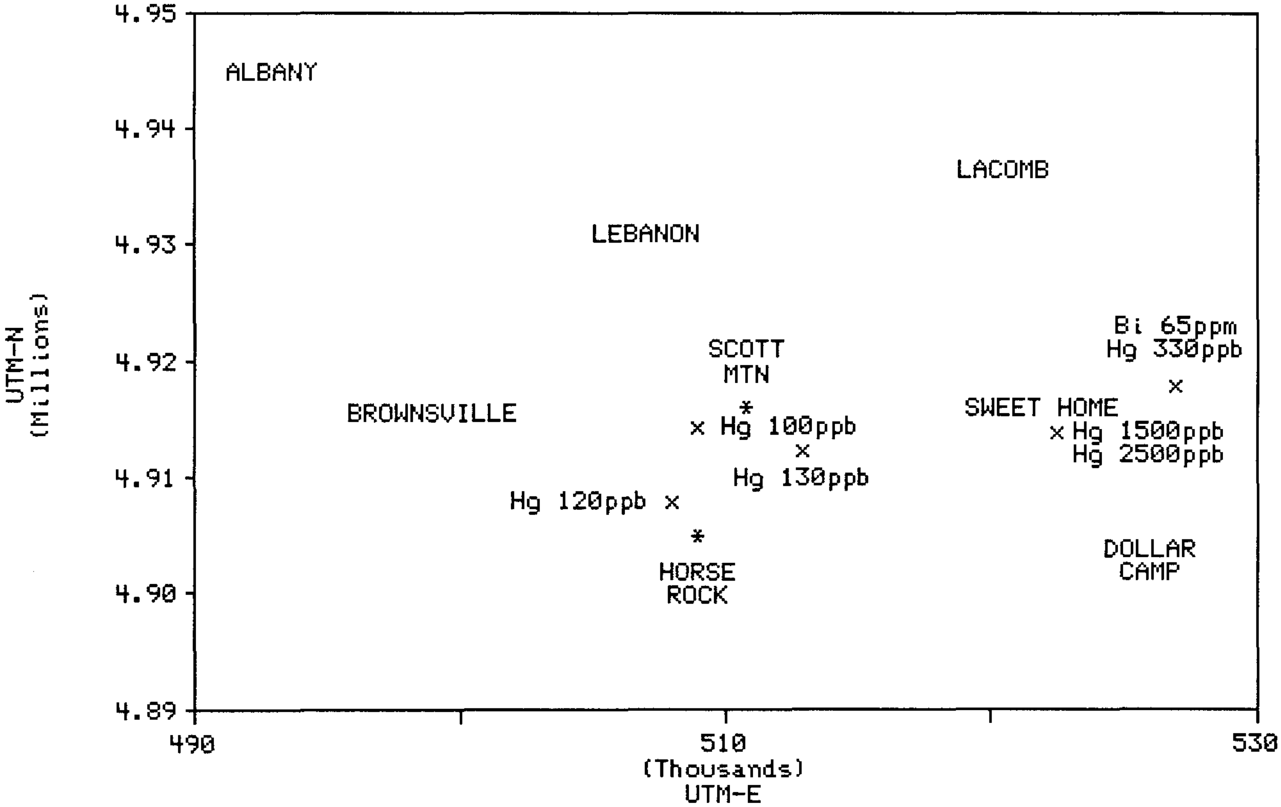
Minmap6

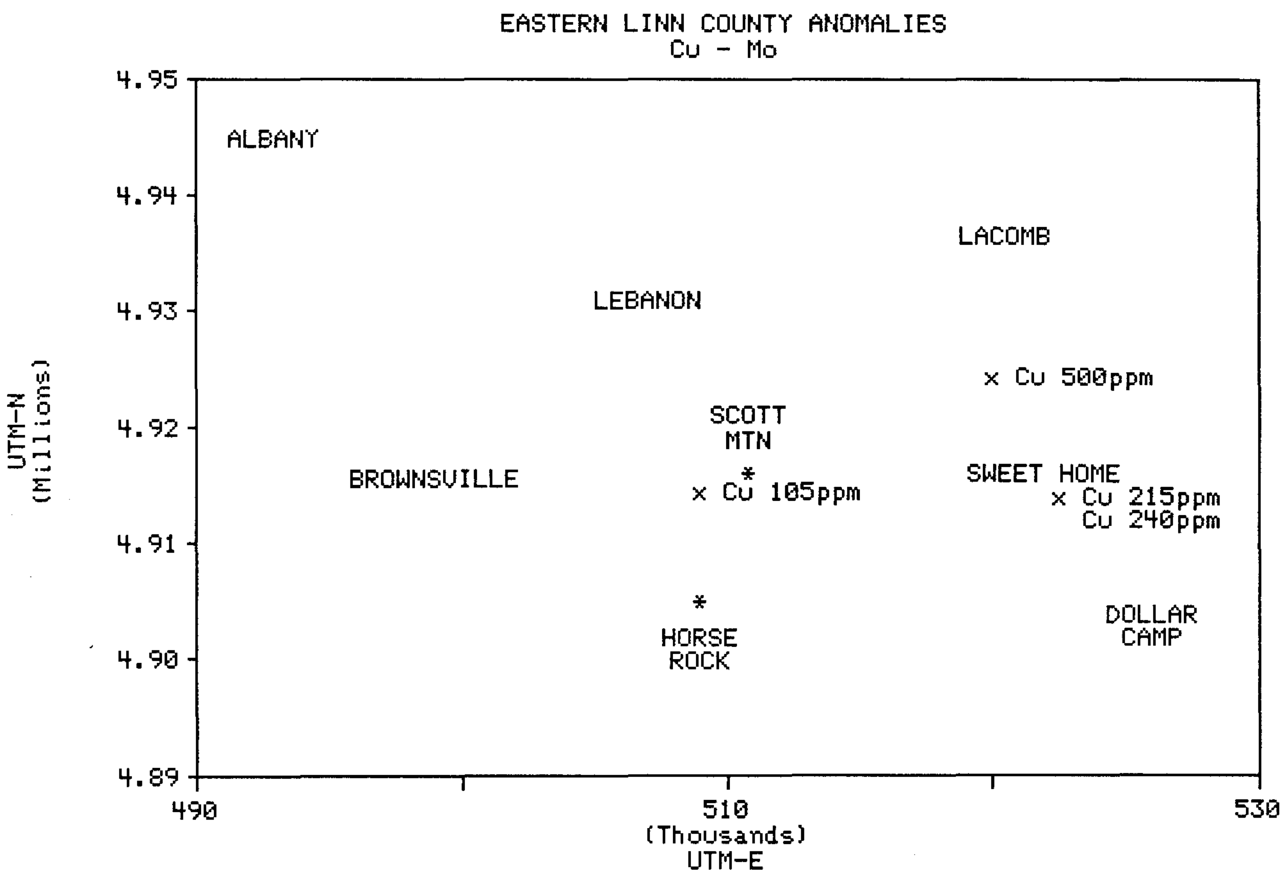
EASTERN LINN COUNTY ANOMALIES
Bi - Hg



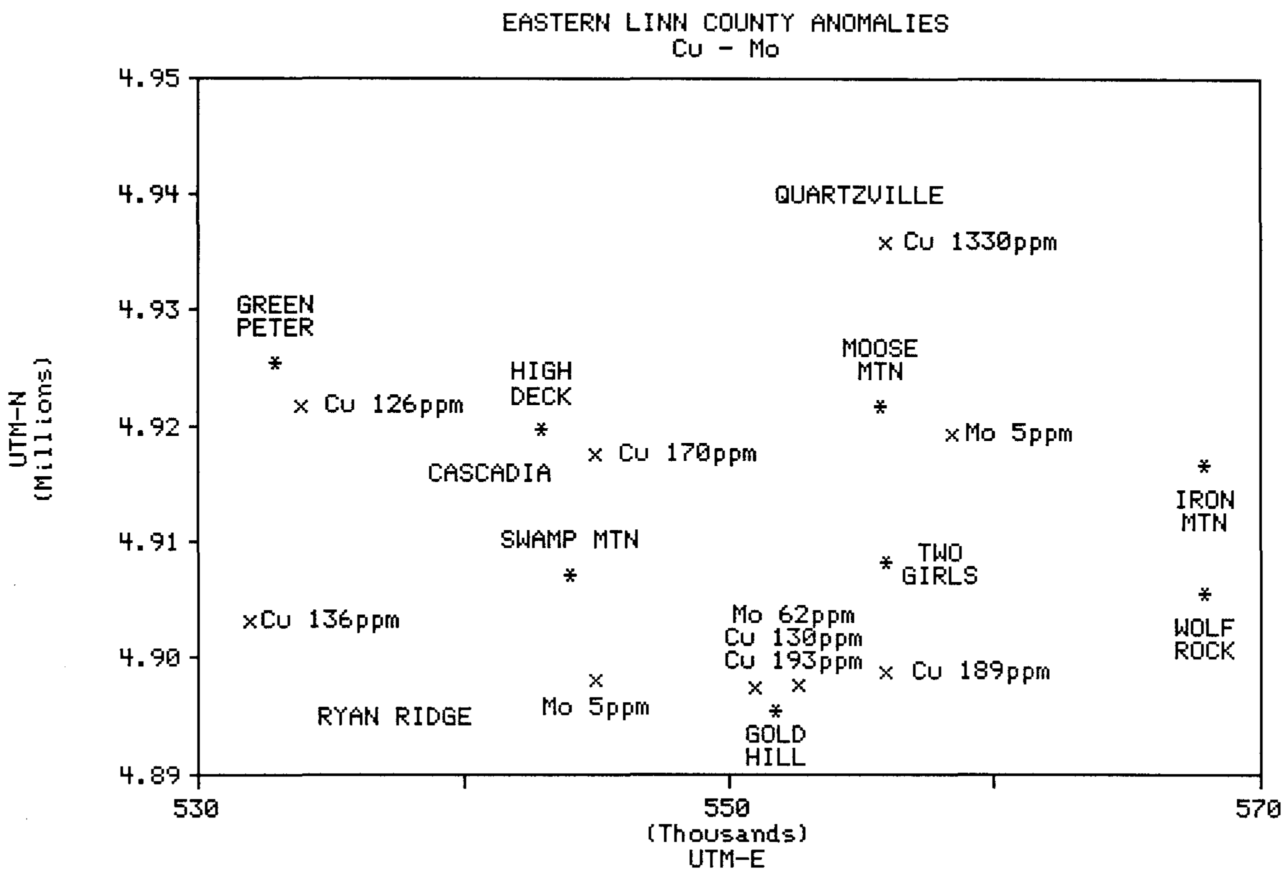
Min map 4

EASTERN LINN COUNTY ANOMALIES
Bi - Hg



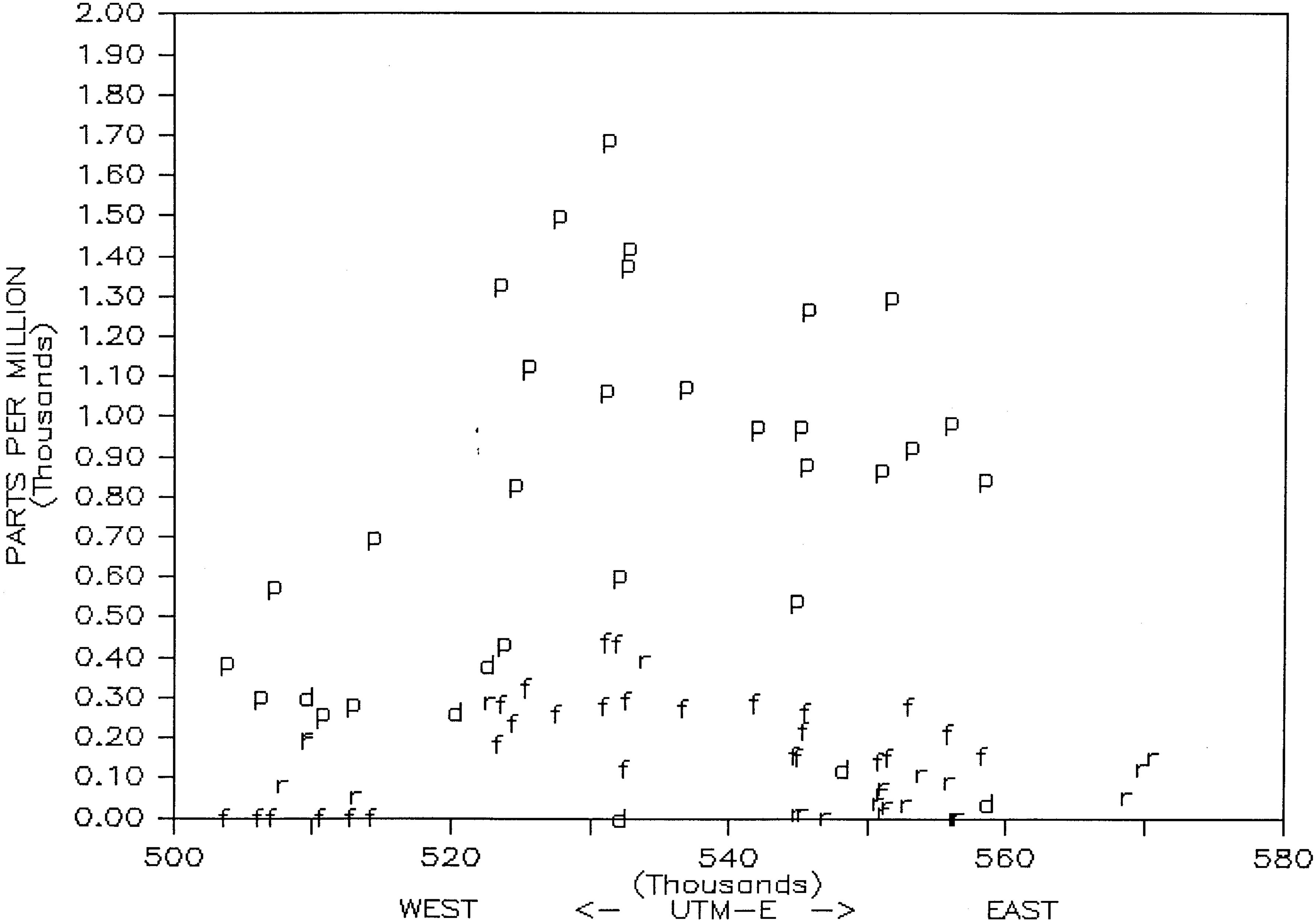

EASTERN LINN COUNTY ANOMALIES
Cu - Mo
4.95
4.94
4.93
4.92
4.91
4.90
4.89
UTM-N
(Millions)
ALBANY
LACOMB
LEBANON
× Cu 500ppm
SCOTT
MTN
BROWNSVILLE
× Cu 105ppm
SWEET HOME
× Cu 215ppm
Cu 240ppm
HORSE
ROCK
DOLLAR
CAMP
490
510
530
(Thousands)
UTM-E

MINMAP2


EASTERN LINN COUNTY ANOMALIES
Cu - Mo
4.95
4.94
4.93
4.92
4.91
4.90
4.89
UTM-N
(Millions)
QUARTZVILLE
x Cu 1330ppm
GREEN
PETER
x Cu 126ppm
HIGH
DECK
x Cu 170ppm
CASCADIA
MOOSE
MTN
x Mo 5ppm
IRON
MTN
SWAMP MTN
TWO
GIRLS
x Cu 136ppm
Mo 62ppm
Cu 130ppm
Cu 193ppm
x Cu 189ppm
WOLF
ROCK
RYAN RIDGE
Mo 5ppm
GOLD
HILL
530
550
570
(Thousands)
UTM-E

MINMAP I

VANADIUM



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1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
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520
540
560
580
(Thousands)
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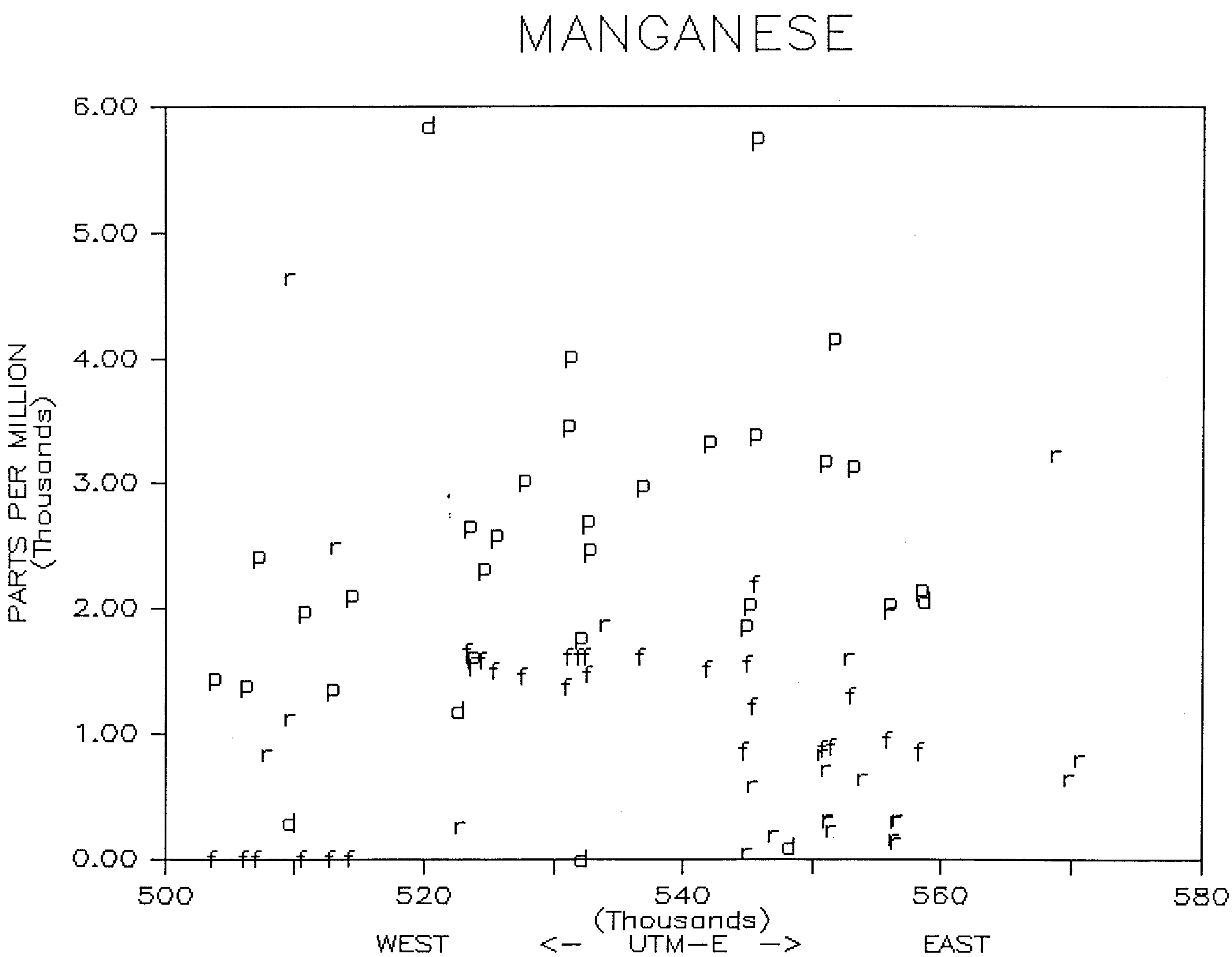
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PARTS PER MILLION
(Thousands)
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(Thousands)
WEST
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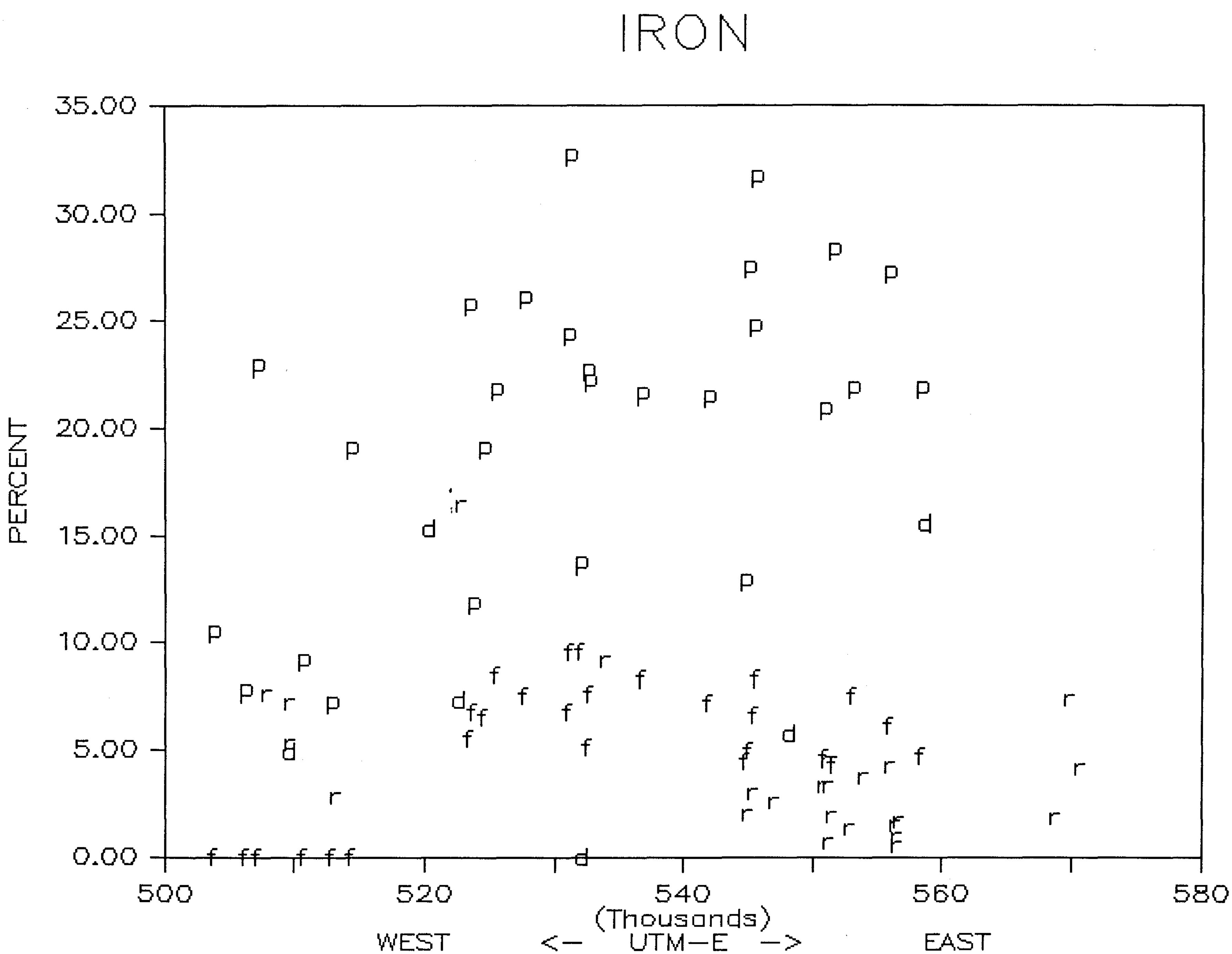
EAST



IRON
PERCENT
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5.00
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(Thousands)
WEST
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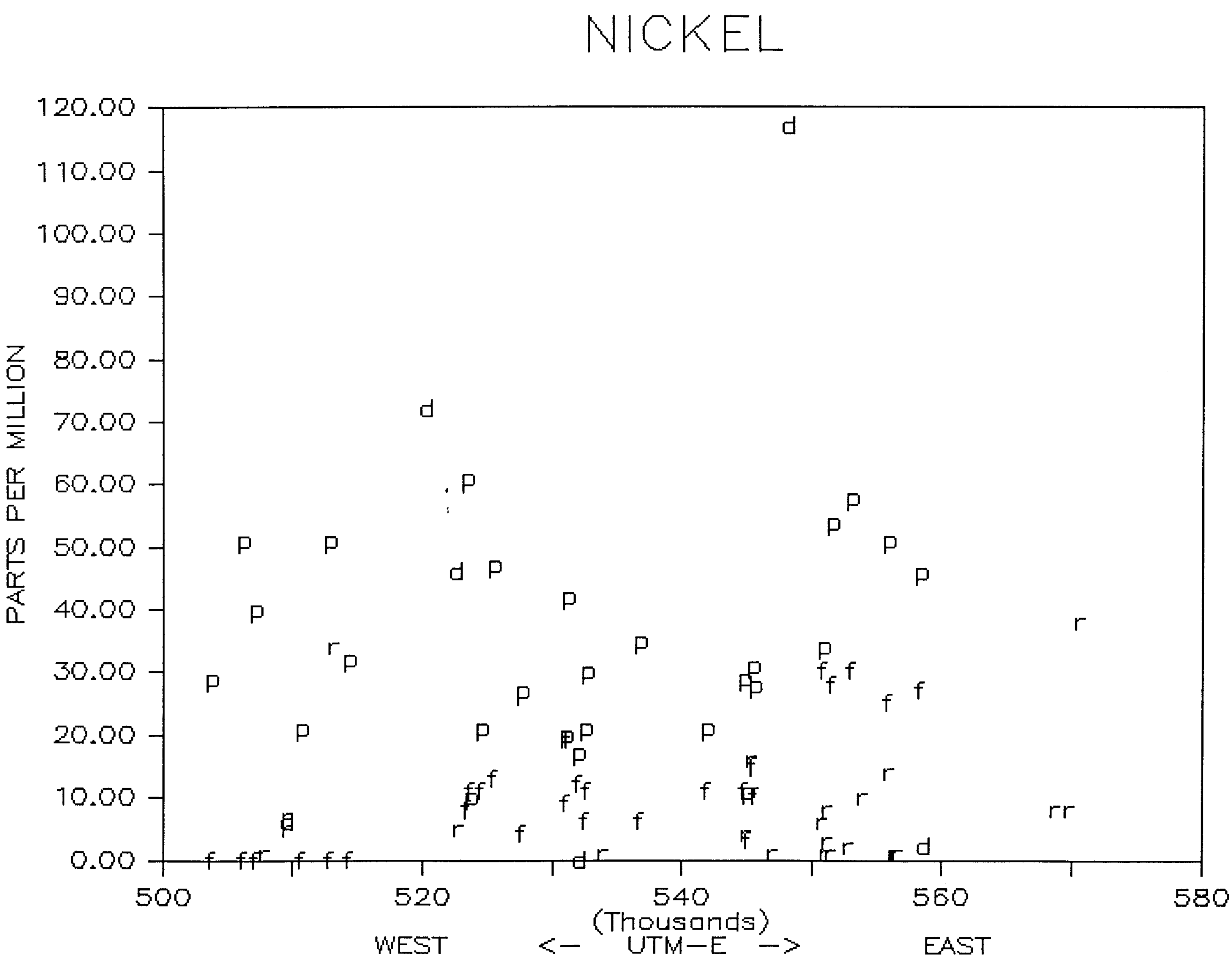
EAST



NICKEL
PARTS PER MILLION
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100.00
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50.00
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10.00
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500
520
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580
(Thousands)
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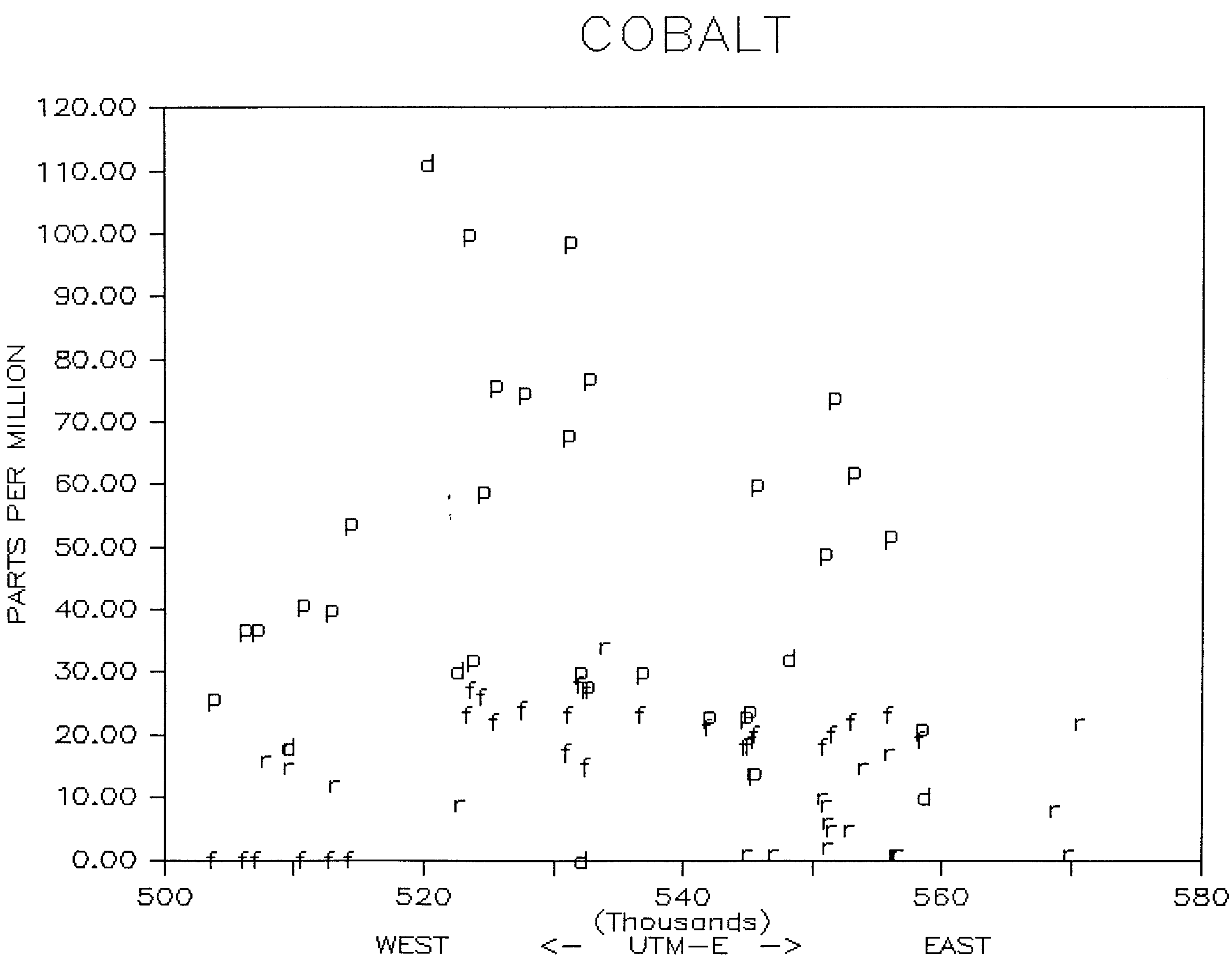
EAST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70.00
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50.00
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20.00
10.00
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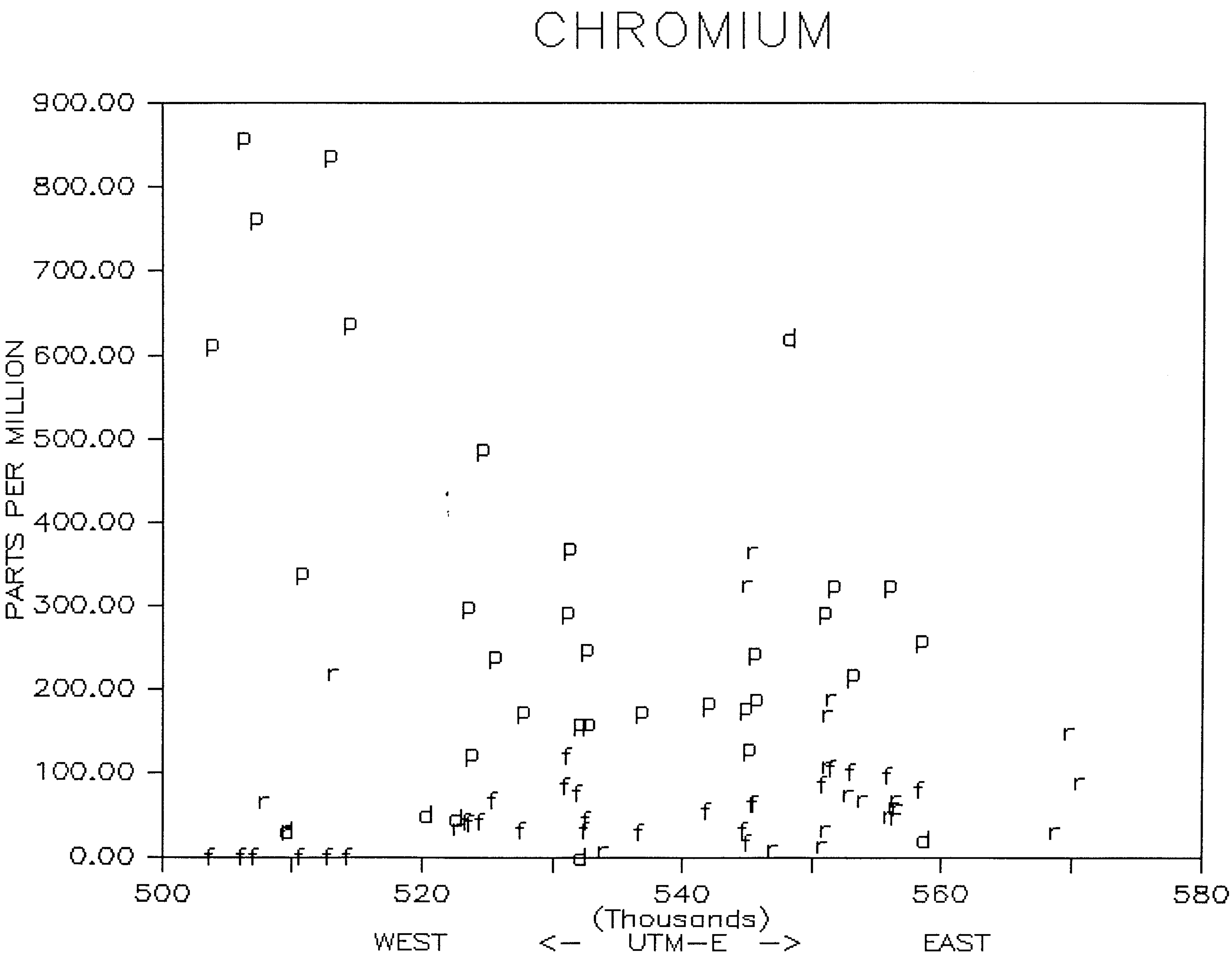
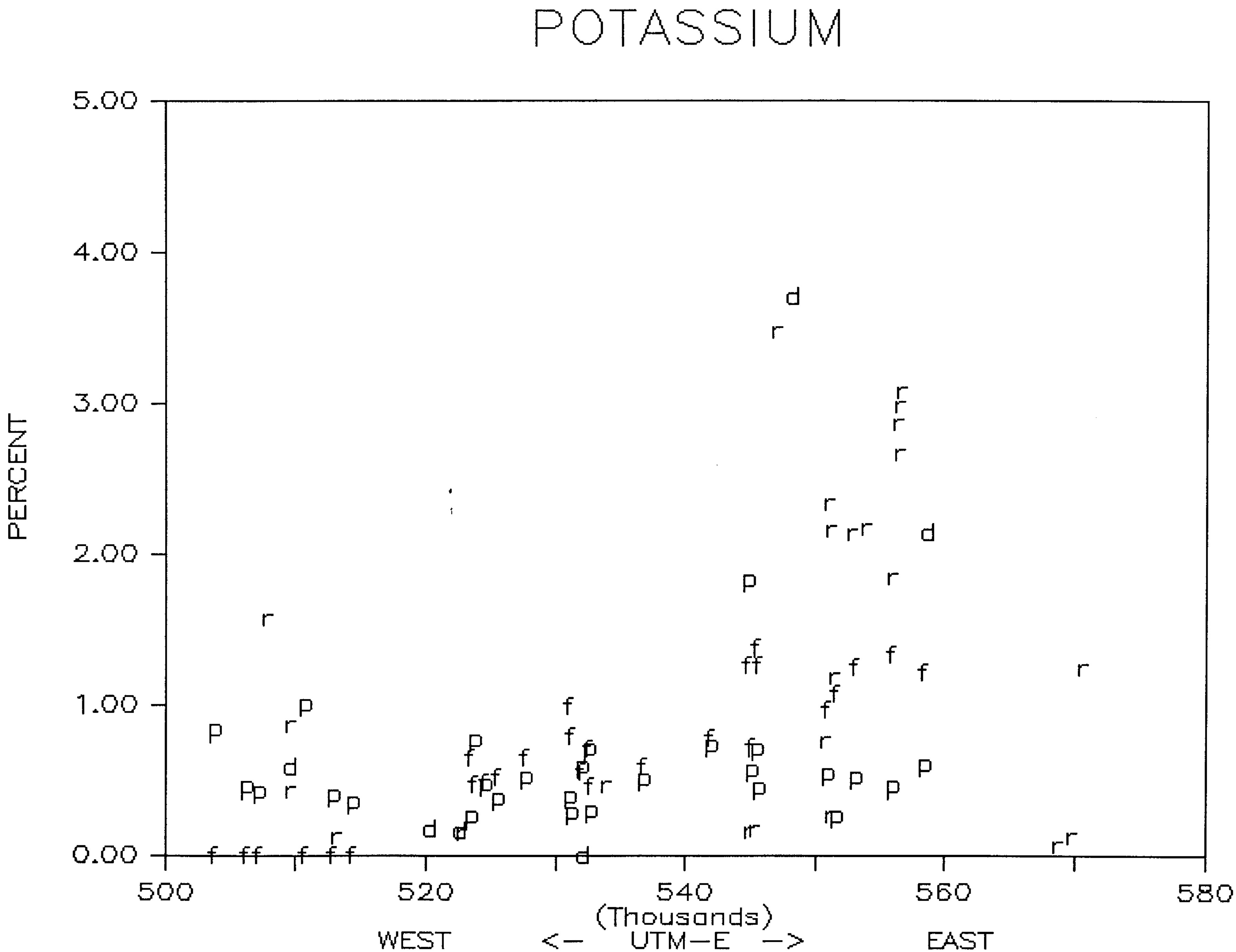
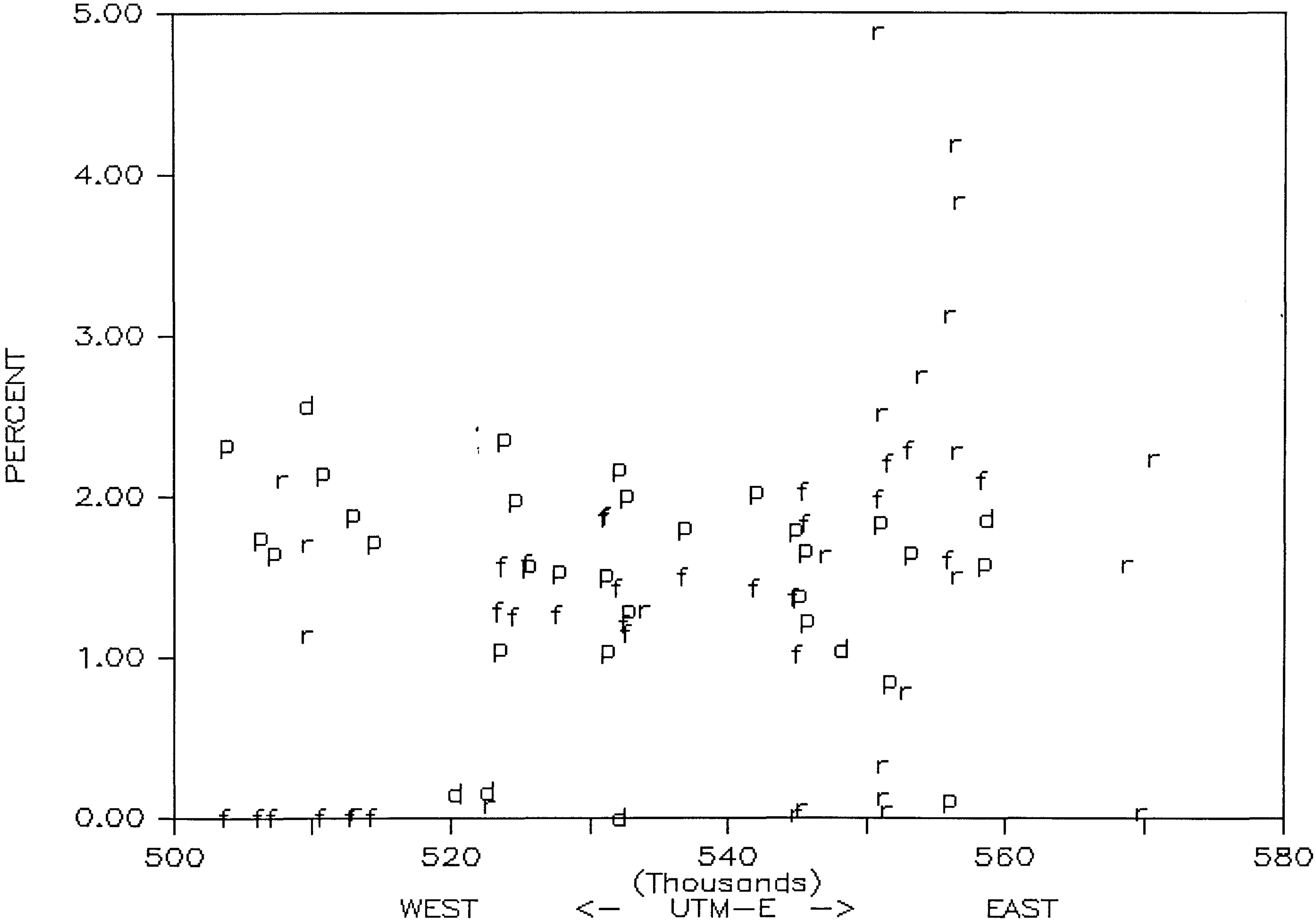
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST

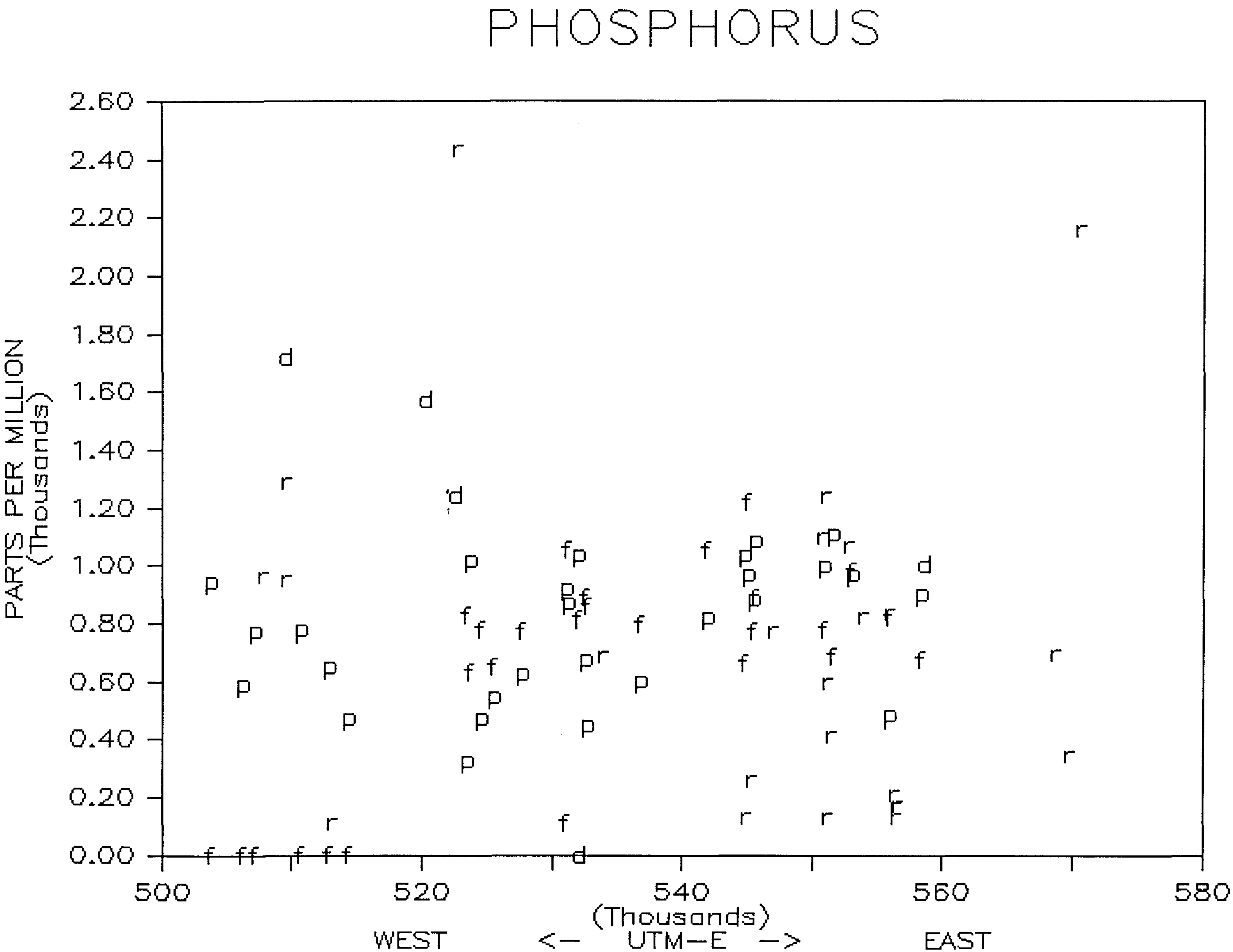

CHROMIUM
PARTS PER MILLION
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST


POTASSIUM
PERCENT
5.00
4.00
3.00
2.00
1.00
0.00
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

SODIUM



5.00
4.00
3.00
2.00
1.00
0.00
PERCENT
500
520
540
560
580
(Thousands)
WEST
<– UTM–E –>
EAST


PHOSPHORUS
PARTS PER MILLION
(Thousands)
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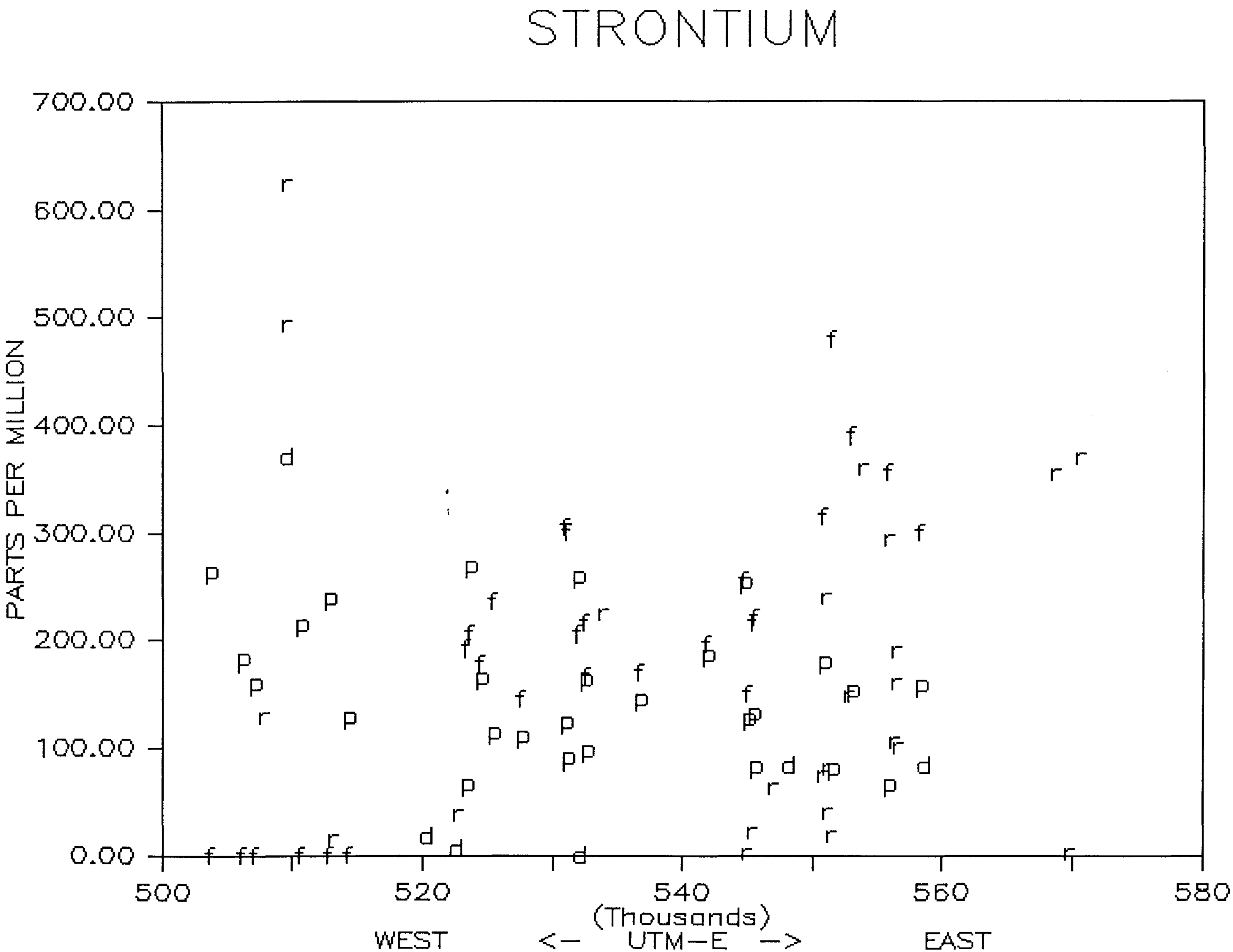
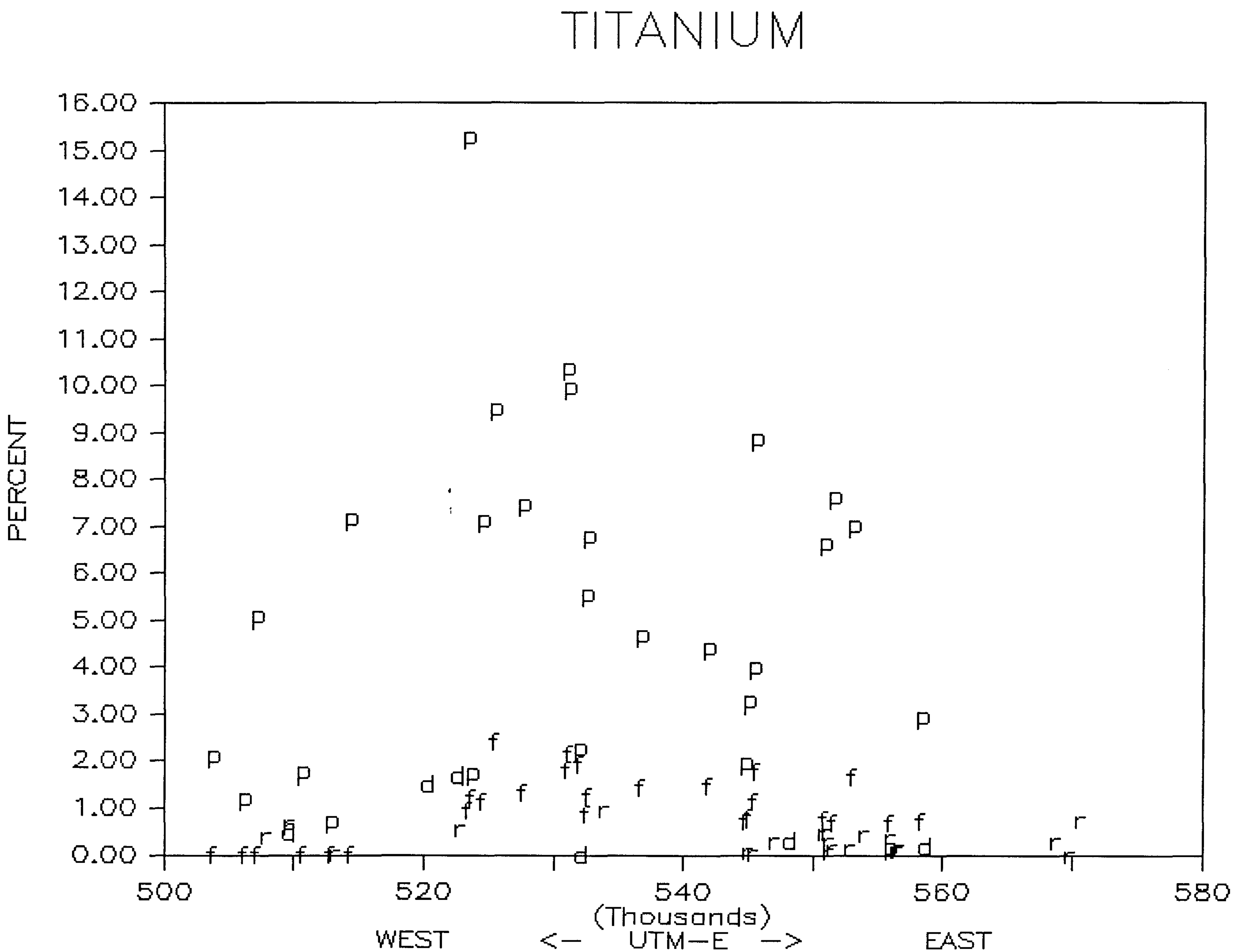
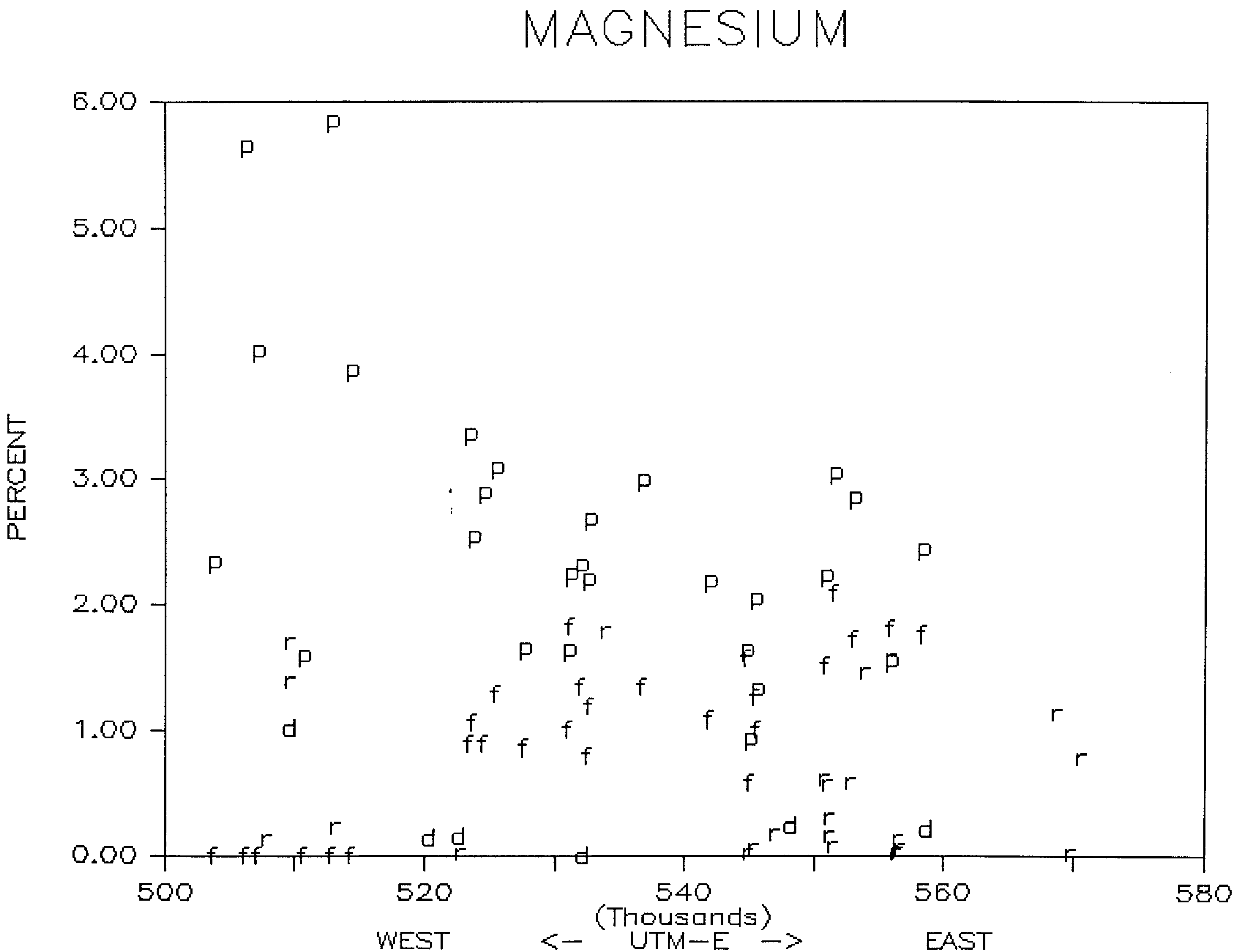
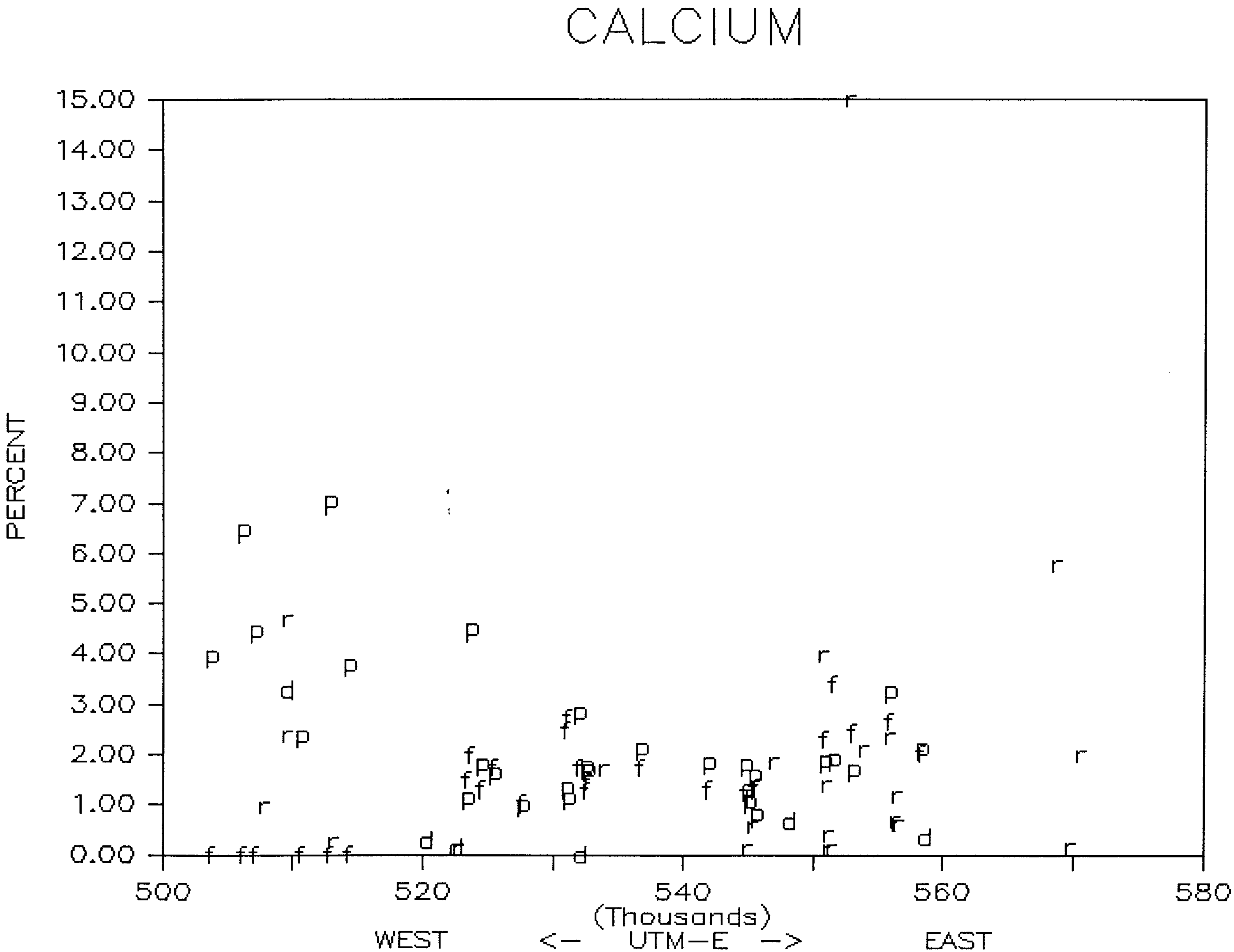
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

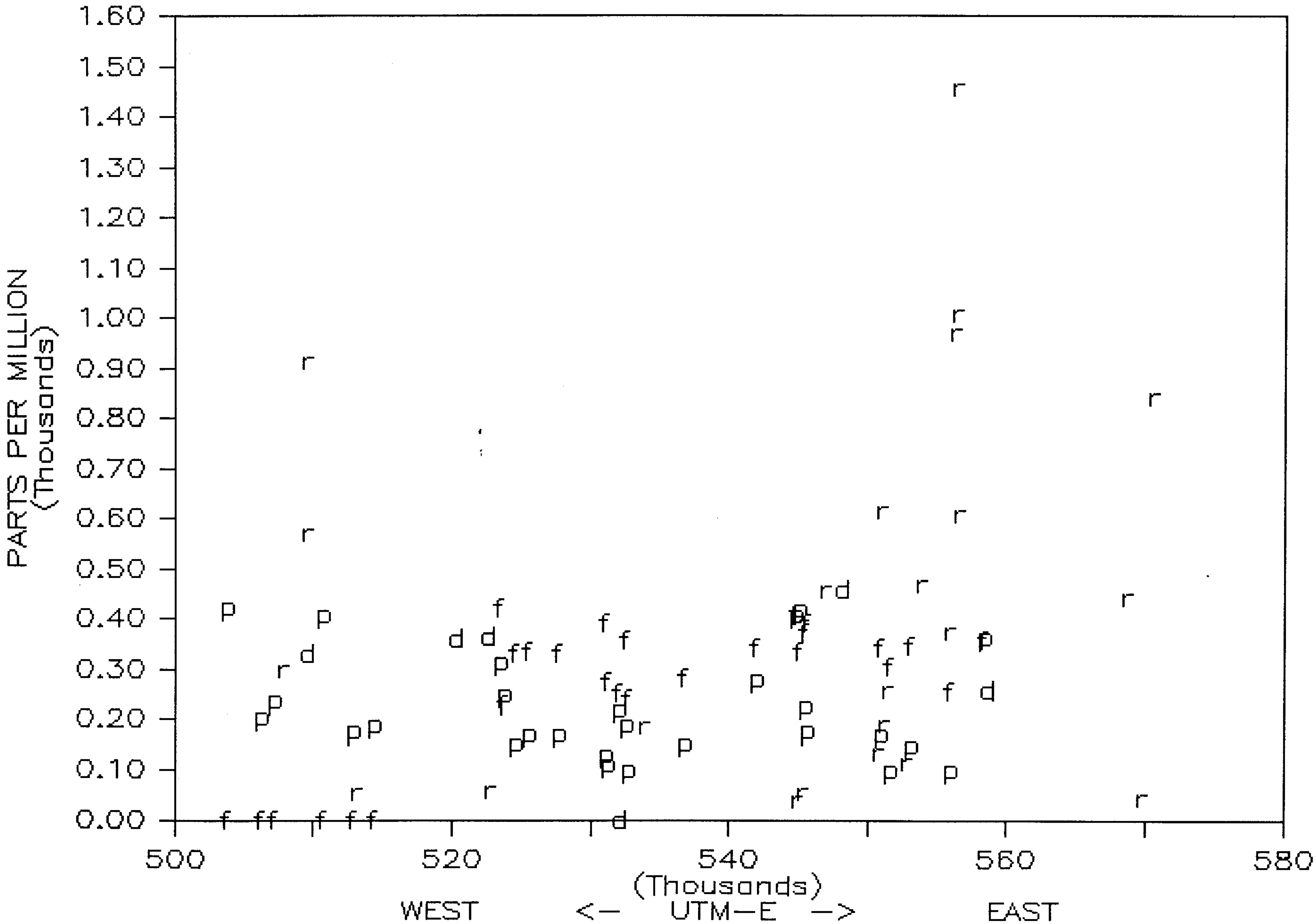

STRONTIUM
PARTS PER MILLION
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST


TITANIUM
PERCENT
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

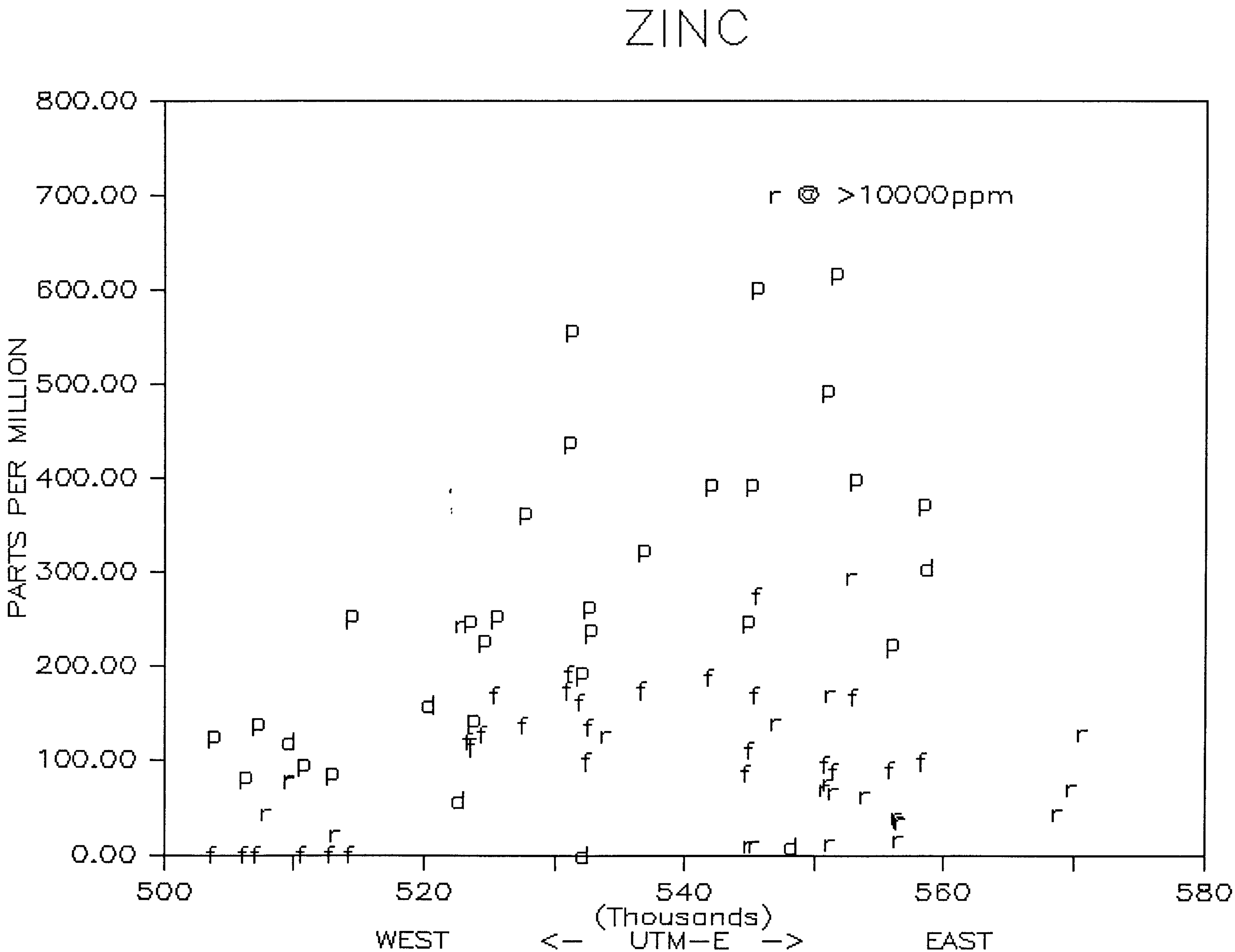

MAGNESIUM
PERCENT
6.00
5.00
4.00
3.00
2.00
1.00
0.00
500
520
540
560
580
(Thousands)
WEST
<- UTM-E ->
EAST

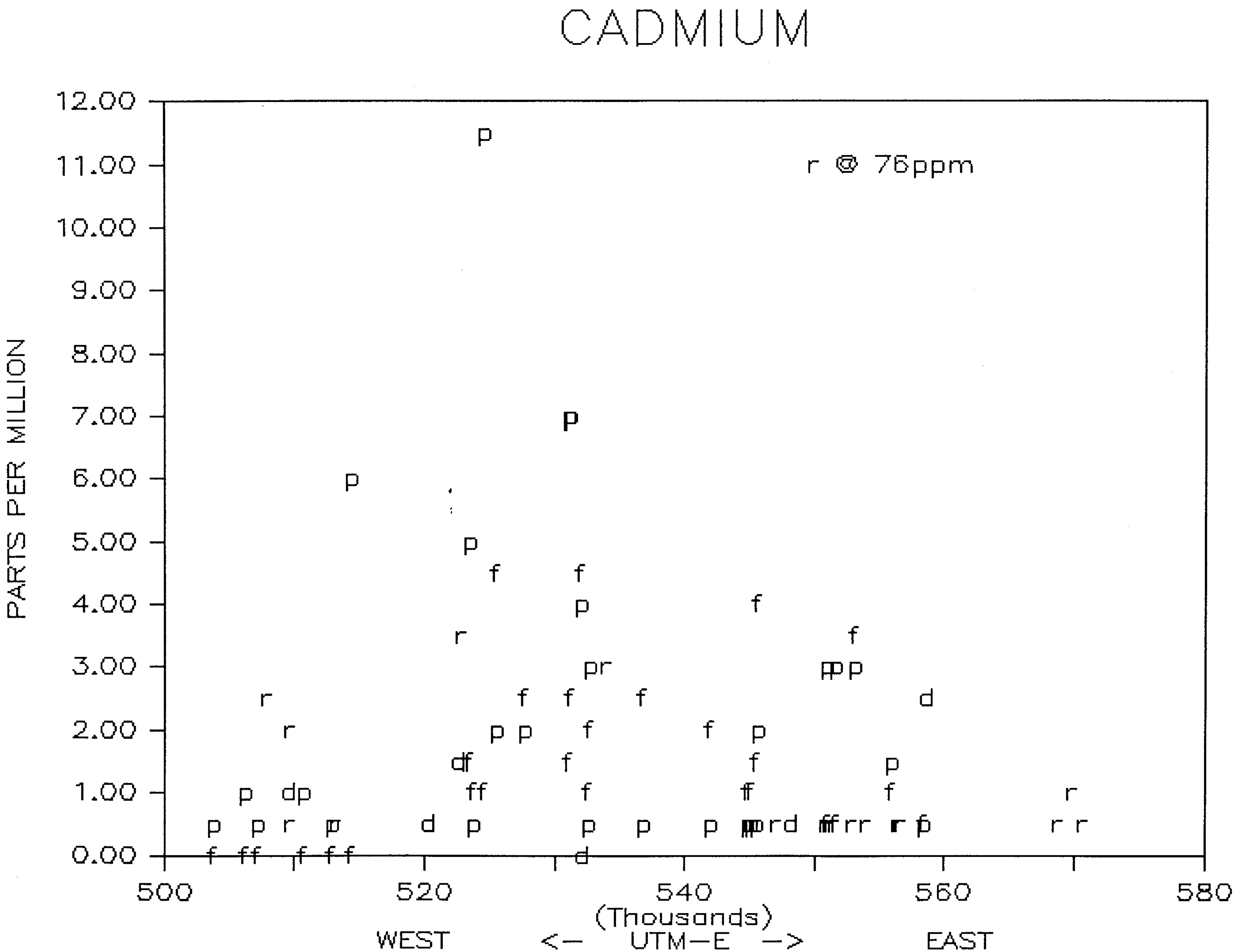

CALCIUM
PERCENT
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

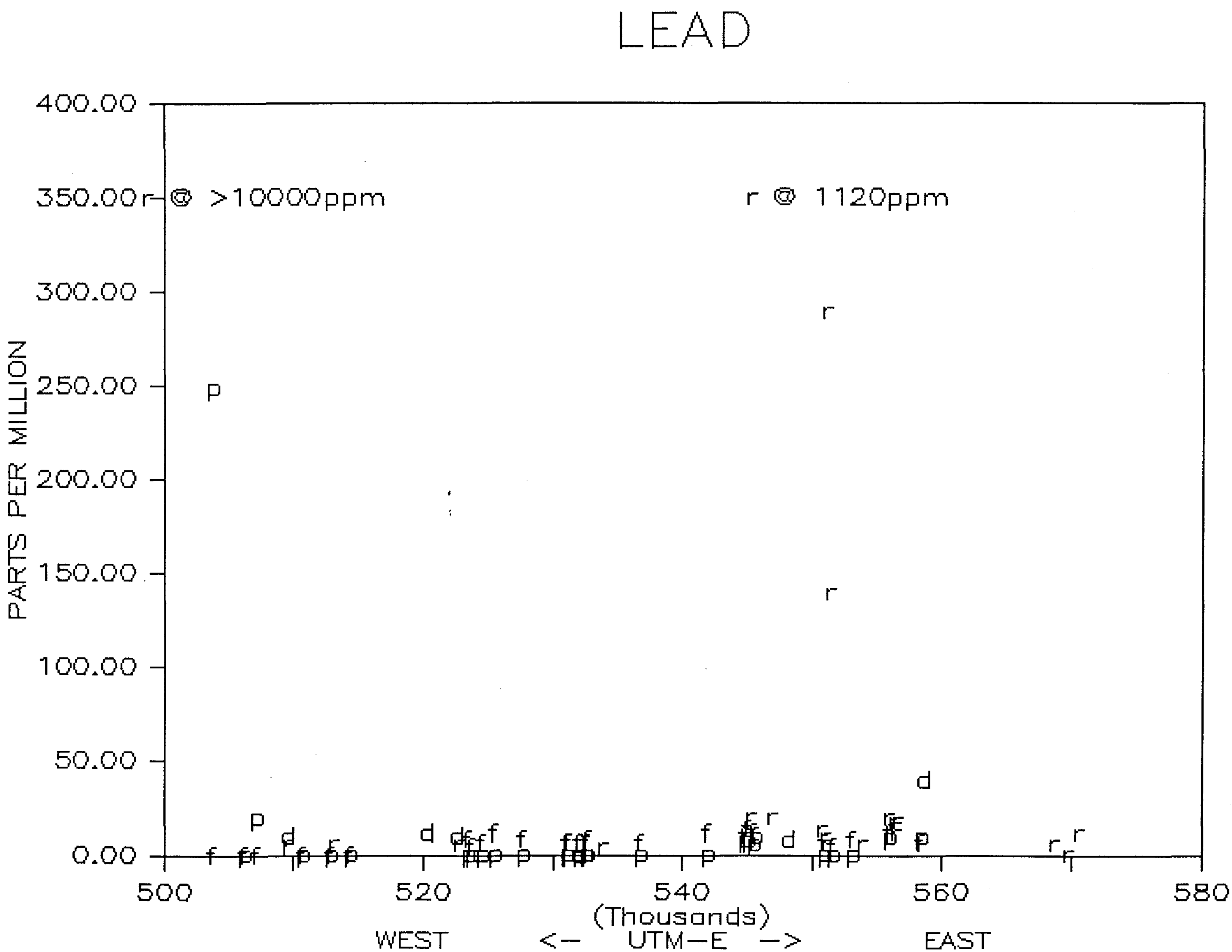
BARIUM



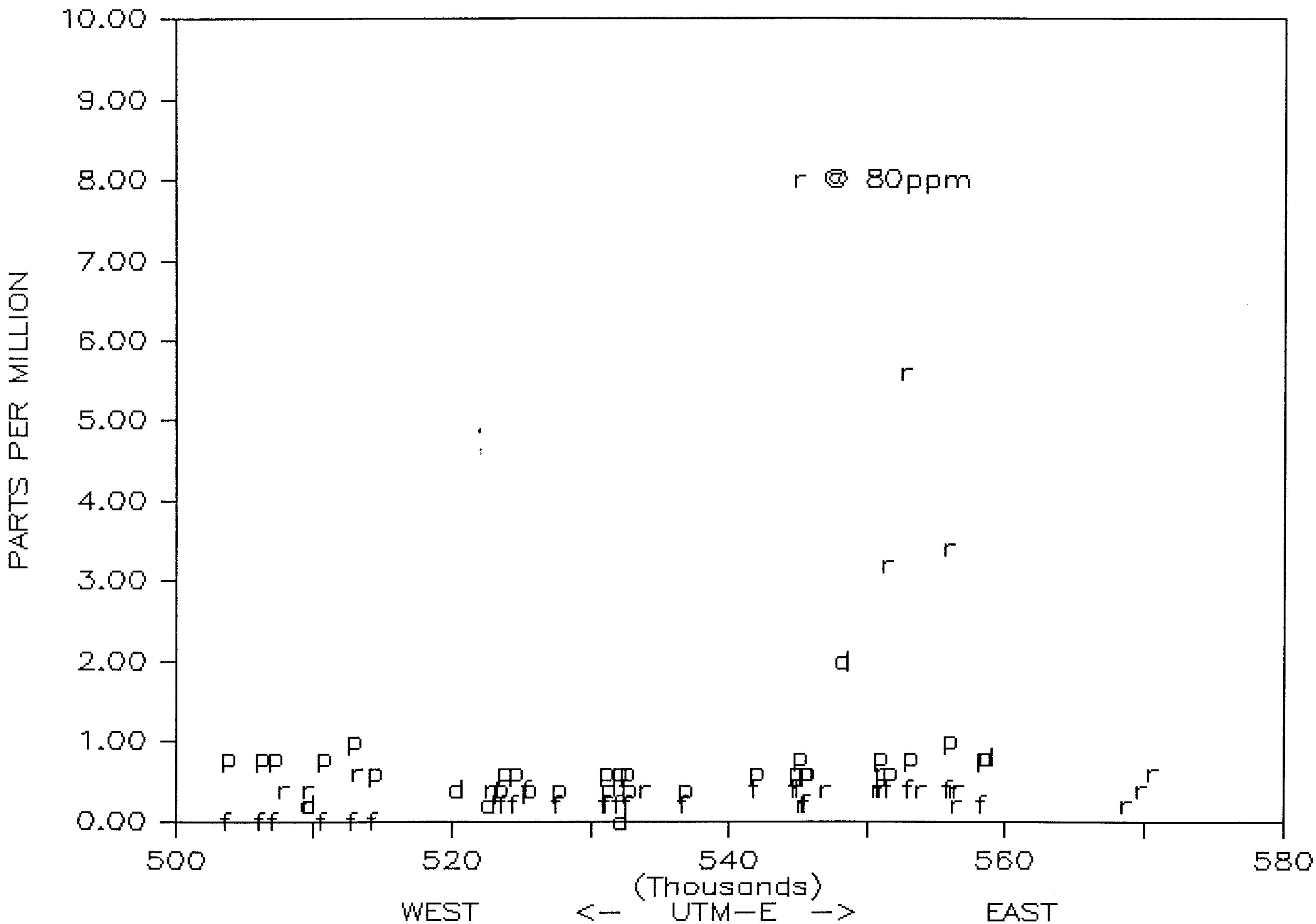
PARTS PER MILLION
(Thousands)
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
1.20
1.30
1.40
1.50
1.60
500
520
540
560
580
(Thousands)
WEST <– UTM–E –> EAST

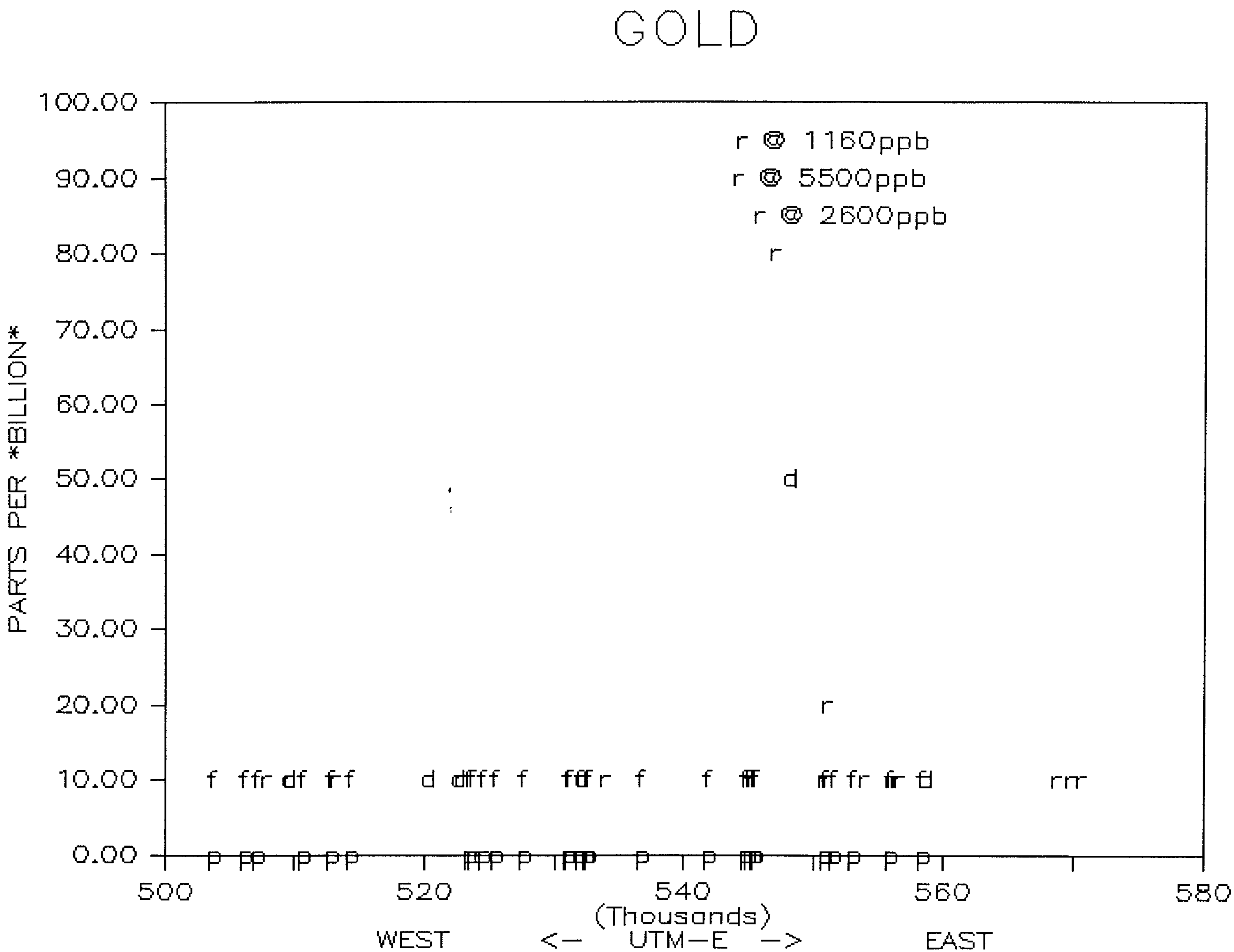

ZINC
r @ >10000ppm
PARTS PER MILLION
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST


CADMIUM
r @ 76ppm
PARTS PER MILLION
(Thousands)
WEST
<— UTM—E —>
EAST

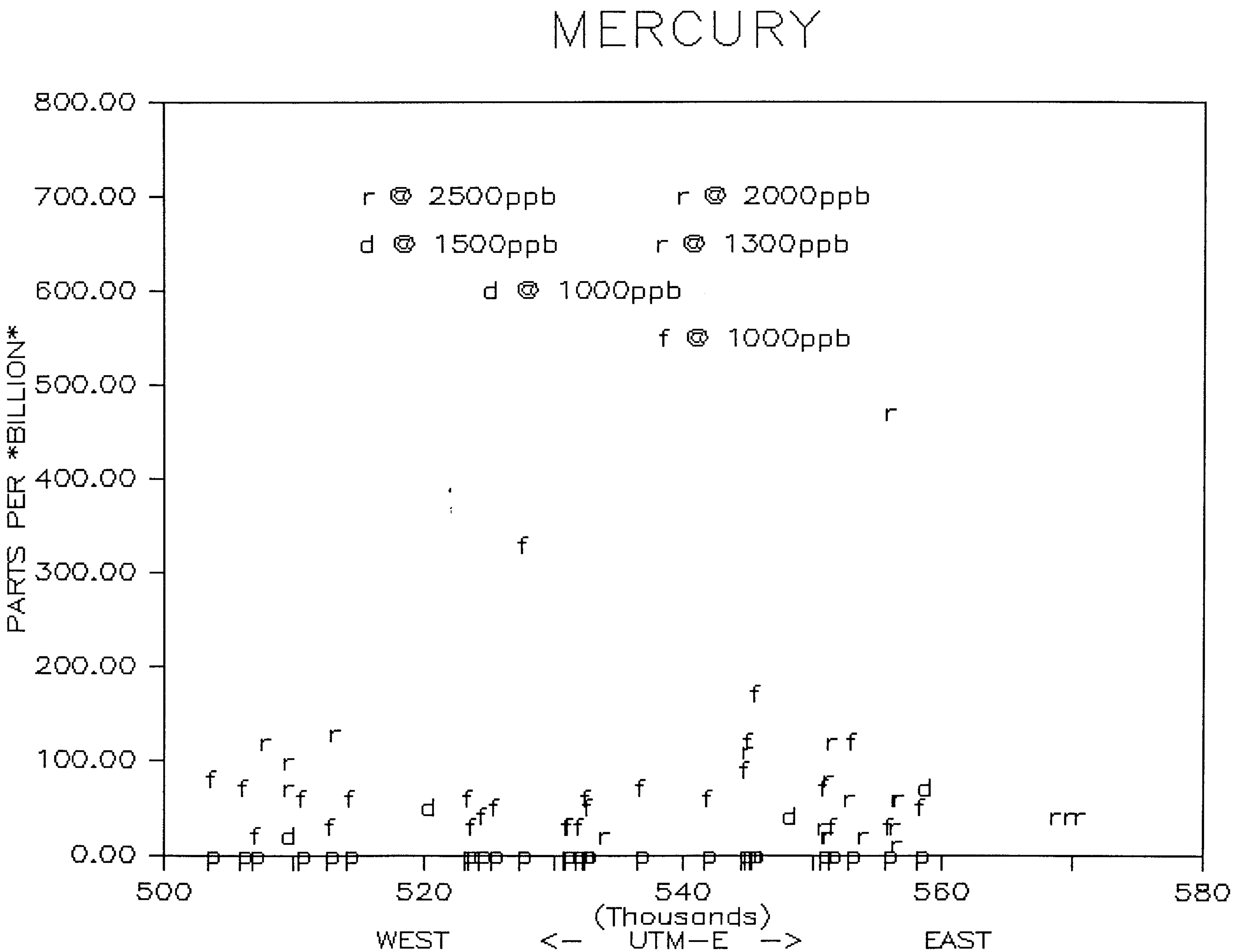

LEAD
PARTS PER MILLION
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
r @ >10000ppm
r @ 1120ppm
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

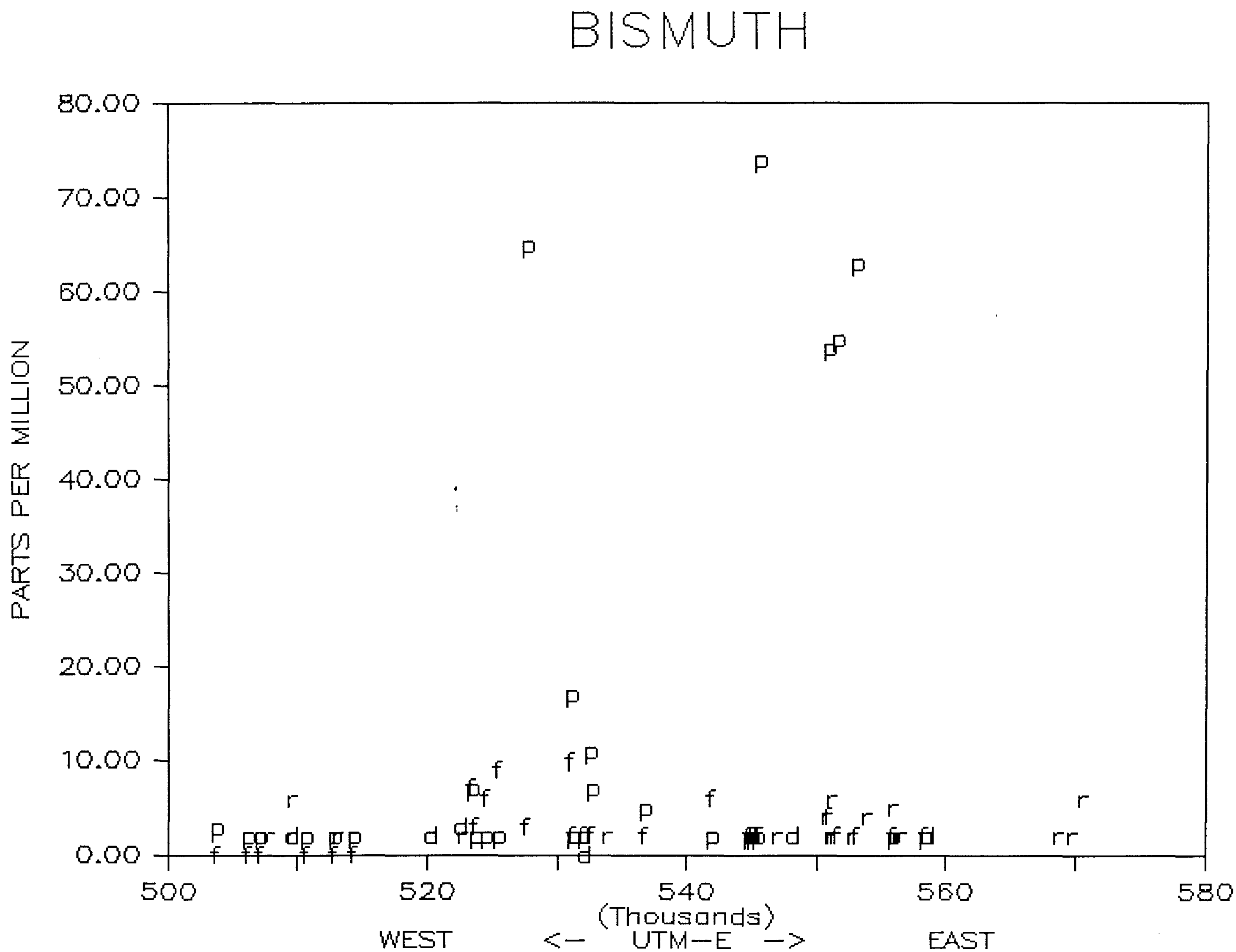
SILVER

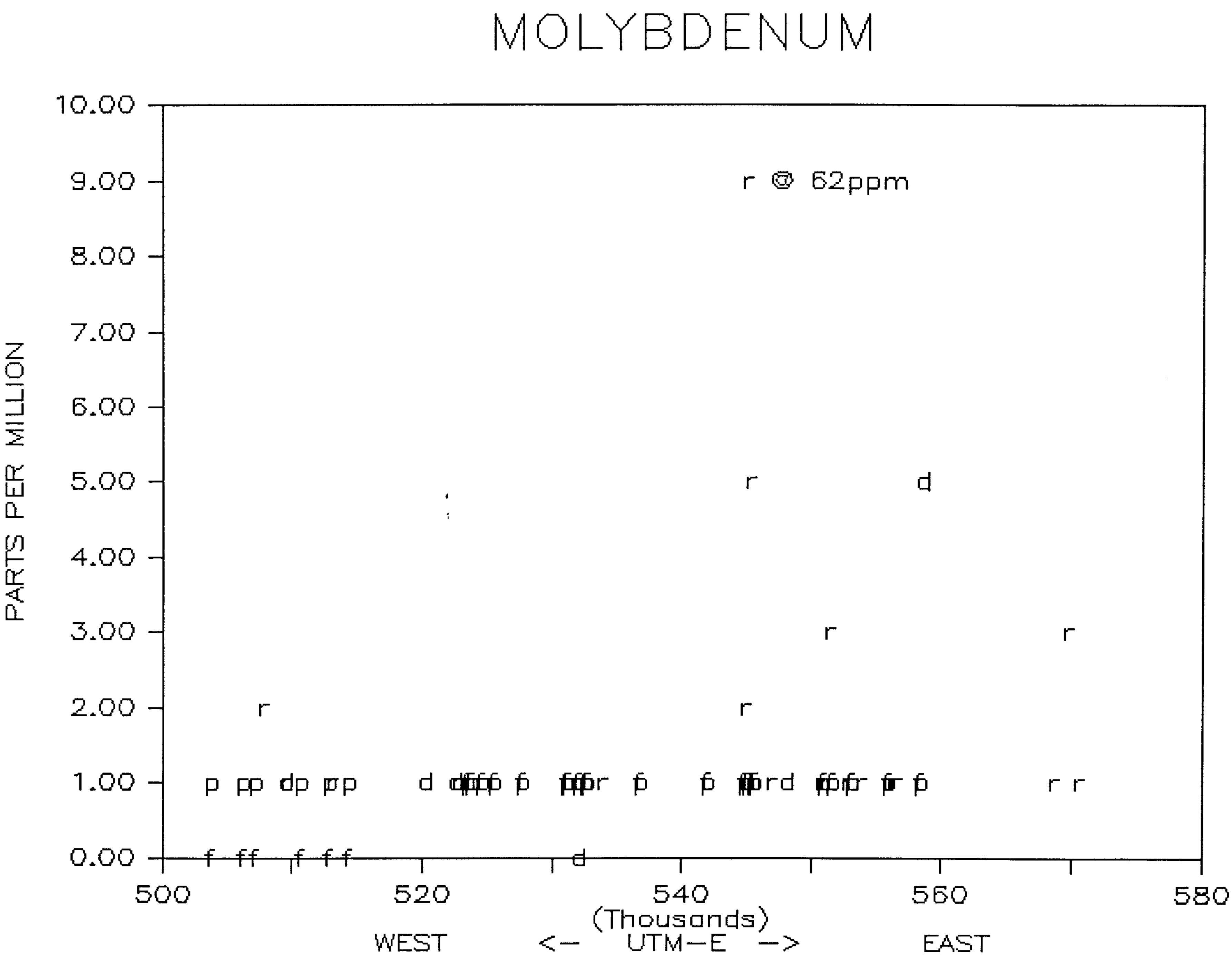

PARTS PER MILLION
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
r @ 80ppm
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

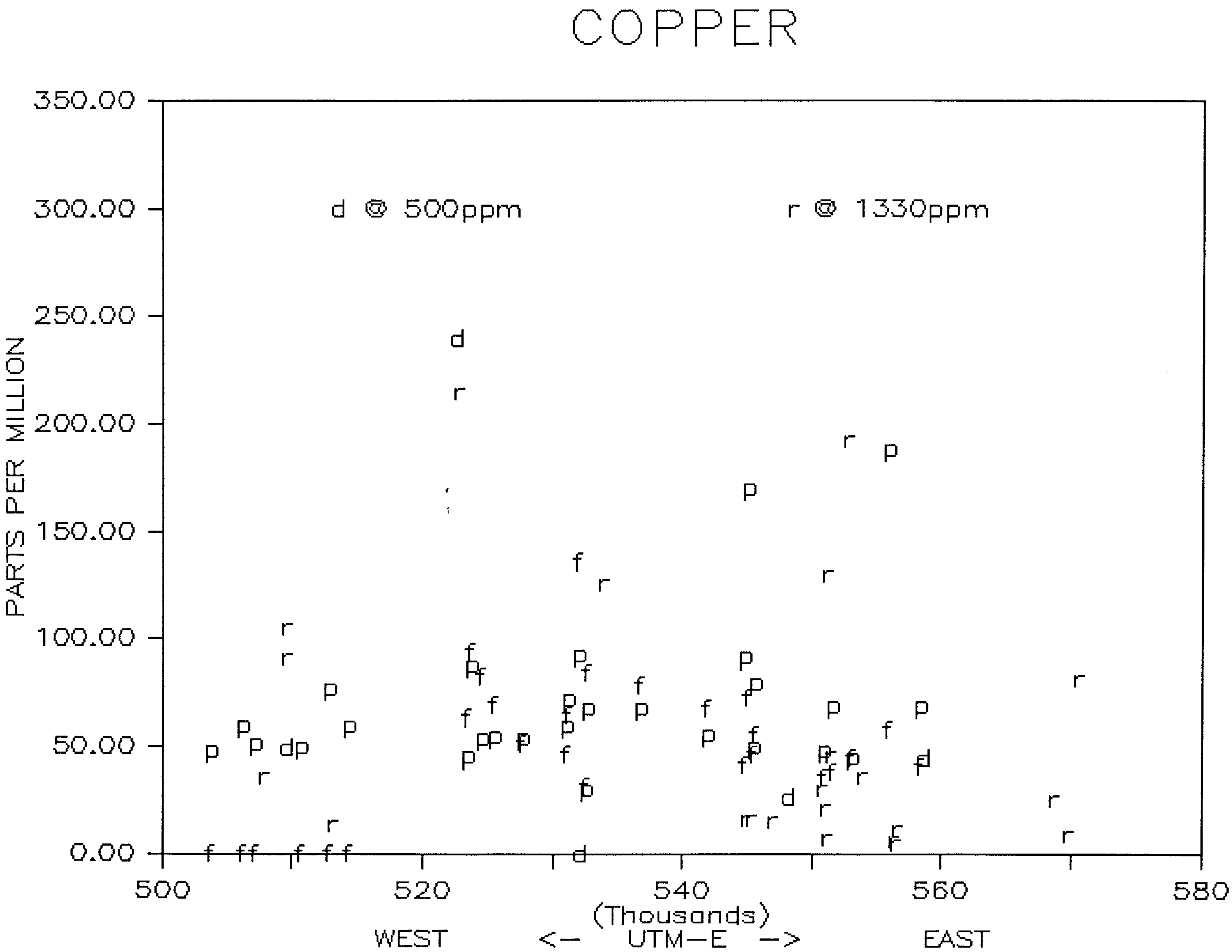


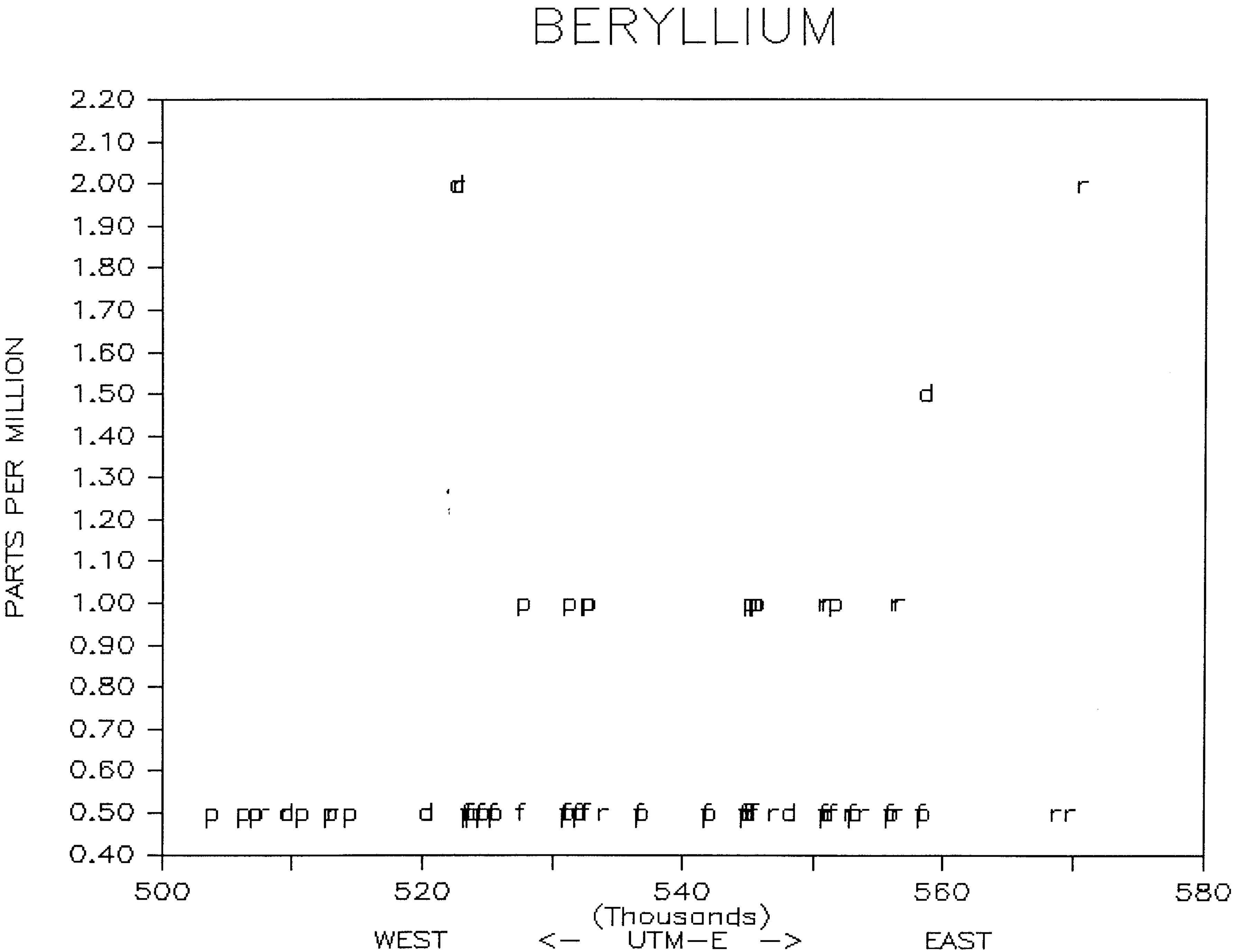
GOLD
r @ 1160ppb
r @ 5500ppb
r @ 2600ppb
PARTS PER *BILLION*
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST

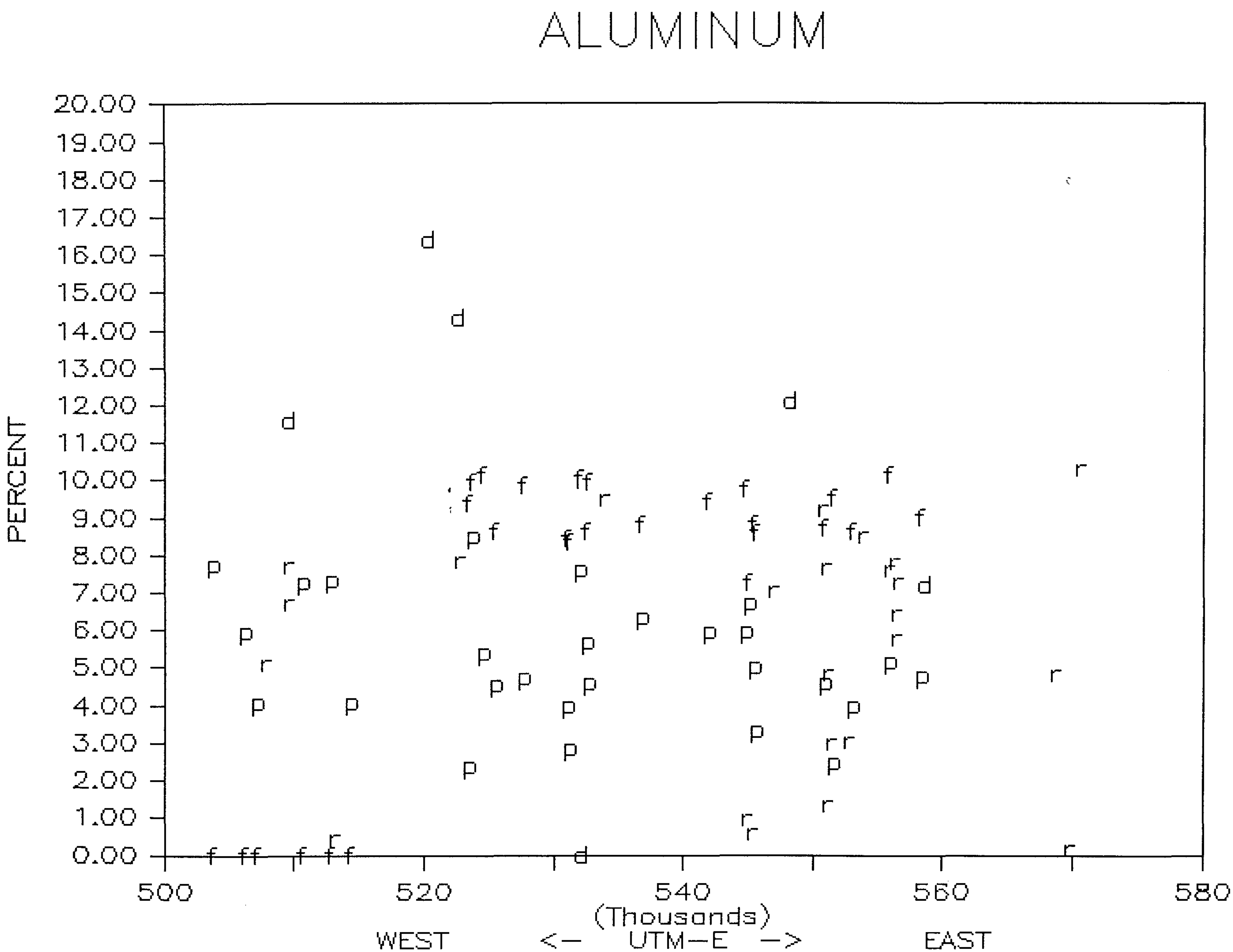

MERCURY
r @ 2500ppb
r @ 2000ppb
d @ 1500ppb
r @ 1300ppb
d @ 1000ppb
f @ 1000ppb
PARTS PER *BILLION*
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
500
520
540
560
580
(Thousands)
WEST
<— UTM—E —>
EAST


BISMUTH
PARTS PER MILLION
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
500
520
540
560
580
(Thousands)
WEST
<- UTM-E ->
EAST


MOLYBDENUM
r @ 62ppm
PARTS PER MILLION
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
500
520
540
560
580
(Thousands)
WEST
<– UTM–E –>
EAST


COPPER
d @ 500ppm
r @ 1330ppm
PARTS PER MILLION
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST


BERYLLIUM
PARTS PER MILLION
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST


ALUMINUM
PERCENT
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
500
520
540
560
580
(Thousands)
WEST <— UTM—E —> EAST