

USGS/OFR--98-231

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

**AUDIO-MAGNETOTELLURIC DATA COLLECTED
IN THE BEATTY, NEVADA AREA**

By

Jackie M. Williams

Denver, Colorado

Open-File Report 98-231

1998

RECEIVED
SEP 16 1998
OSTI

This report is preliminary and has not been edited or reviewed for conformity with the U.S. Geological Survey editorial standards. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

AI08-96NV11967

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

MASTER

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

**Portions of this document may be illegible
in electronic image products. Images are
produced from the best available original
document.**

AUDIO-MAGNETOTELLURIC DATA COLLECTED IN THE AREA OF BEATTY, NEVADA

Jackie M. Williams,
U.S. Geological Survey
1997

INTRODUCTION

In the summer of 1997, electrical geophysical data was collected north of Beatty, Nevada. Audio-magnetotellurics (AMT) was the geophysical method used to collect 16 stations along two (2) profiles. The purpose of this data collection was to determine the depth to the alluvial basement, based upon the needs of the geologists requesting the data.

DATA

The data was collected using the MT-1 magnetotelluric system (equipment and computer programs) of ElectroMagnetic Instruments, Inc. This system employs simultaneous orthogonal electric field and magnetic field measurements along with a remote station of either an electrical or magnetic field. We used a local remote that was less than 100 meters from the main station setup. This remote station allows for remote-reference noise cancellation which helps prevent bias of the data from noise created by power lines, radio antenna, or other cultural frequencies. Also, a vertical magnetic coil was used to collect tipper data which allows us to better determine the electrical strike direction.

Data was collected over five (5) ranges of frequency bands. The frequency bands used were, 1-170 Hz, 79-580 Hz, 340-3550 Hz, 885-23370 Hz and 1170-5210 Hz (to collect additional data at the weakest frequencies, the dead band). AMT methods correspond with those used in magnetotelluric (MT) methods (Cagniard, 1953; Vozoff, 1991), but occur at higher frequencies than the lower frequencies of MT. AMT signals originate mainly from atmospheric disturbances and MT signals occur from ionospheric phenomena.

Please, note in the models, that there are gaps in the data at the high frequency end, this is the result of weak signals at some frequencies. Data has not been edited to produce smooth Bostick inversions, but has been edited to eliminate noisy data and repeated data at various frequencies.

Why Use AMT ?

Measurement of earth resistivities can be an effective means of mapping geologic structures because of the large variation in the electrical resistivity of rocks, and in many instances, can be used to determine whether the rocks are intrusive, volcanic, sedimentary, or metamorphic. Alteration and fault zones can also be mapped. The resistivity of geologic units is largely dependent upon their fluid content, porosity, fracturing, temperature, and conductive mineral

content (Keller and Frischknecht, 1966).

Unaltered, unfractured crystalline rocks are normally very resistive (typically 1,000 ohm-m or greater), whereas faults will show low resistivity (less than 100 ohm-m) when they are comprised of rocks fractured enough to have hosted fluid transport. Marine sedimentary rocks and clay-rich alluvium are normally very conductive (a few ohm-m to tens of ohm-m). Metamorphic rocks, including gneiss, schist (non-graphitic), and marble are moderately to highly resistive (hundreds to thousands of ohm-m). Tables of electrical resistivity for a variety of rocks, minerals and geological environments may be found in Keller, 1987; Olheoft, 1980; and Palacky, 1987.

References

- Cagniard, L., 1953, Basic theory of the magnetotelluric method: *Geophysics*, v. 18, no.3, p. 605-635.
- EMI, ElectroMagnetic Instruments, Inc., MT-1 Magnetotelluric System Operation Manual, v. 3.2.
- Keller, G. V. and Frischknecht, F. C., 1966, *Electrical methods in geophysical prospecting*: Pergamno Press, New York, 517 p.
- Keller, G. V., 1987, Rock and mineral properties, *in* *Electromagnetic Methods in Applied Geophysics - Theory*: M. N. Nabighian, Ed., Society of Exploration Geophysicists, Tulsa, Oklahoma, vol. 1, p. 13-51.
- Olheoft, G. R., 1980, Electrical properties of rocks, *in* *Physical Properties of Rocks and Minerals*: Y. S. Touloukian, W. R. Judd, and R. F. Roy, Eds., McGraw-Hill, New York, 257-330.
- Palacky, G. J., 1987, Resistivity characteristics of geologic targets, *in* *Electromagnetic Methods in Applied Geophysics - Theory*: M. N. Nabighian, Ed., Society of Exploration Geophysicists, Tulsa, Oklahoma, vol. 1, 53-129.
- Vozoff, Keava, 1991, The magnetotelluric method; *in* *Electromagnetic methods in applied geophysics*: Nabighian, M.N., ed., v. 2, Applications, Part B: Tulsa, Society of Exploration Geophysicist, p. 641-711.

Appendix

AMT data are presented with nine (9) different plots per station. Bostick inversion for station 1 will be Fig. 1a. The other plots are the Apparent Resistivity, Impedance Phase, Rotation Angle, Impedance Skew, Electrical Multiple Coherency, Tipper Magnitude, Tipper Strike, and Polar Plots proceeding as Figs. 1b, 1c, 1d, etc., respectively.

Fig._a. Bostick inversions. Preliminary 1-dimensional inversion models computed using the apparent resistivity and impedance phase.

Fig._b. Apparent resistivity. The relationship of the time-varying magnetic fields and the electrical fields across frequencies.

Fig._c. Impedance Phase. Represents the ratio of the electric field intensity to magnetic field intensity across frequencies.

Fig._d. Rotation angle. Angle between measurement direction and direction of electrical strike, using only the horizontal sensors in the computation.

Fig._e. Impedance Skew. A measurement of the degree of the multi-dimensional resistivity structure. It should be near 0 for 1-dimensional resistivity structures but larger for 2 or 3-dimensional structures, and very large for noisy data.

Fig._f. E Multiple Coherency. A measure of how well the electrical field correlates with the magnetic field. High coherency generally means low noise in the data.

Fig._g. Tipper Magnitude. A measure of nearby vertical resistivity structure (s). Values close to 0 represents horizontal layering.

Fig._h. Tipper Strike, Angle between measurement direction and direction of electrical strike. Uses both the horizontal sensors and the vertical coil to give a less ambiguous rotation.

Fig._i. Polar Plots. Angular variations in impedance. The simpler circular plots often denote 1-dimensionality; plots that are peanut-shaped denote 2-dimensionality; plots that are four-leaf clover shaped denote 3-dimensionality and more complex denote noise at that frequency.

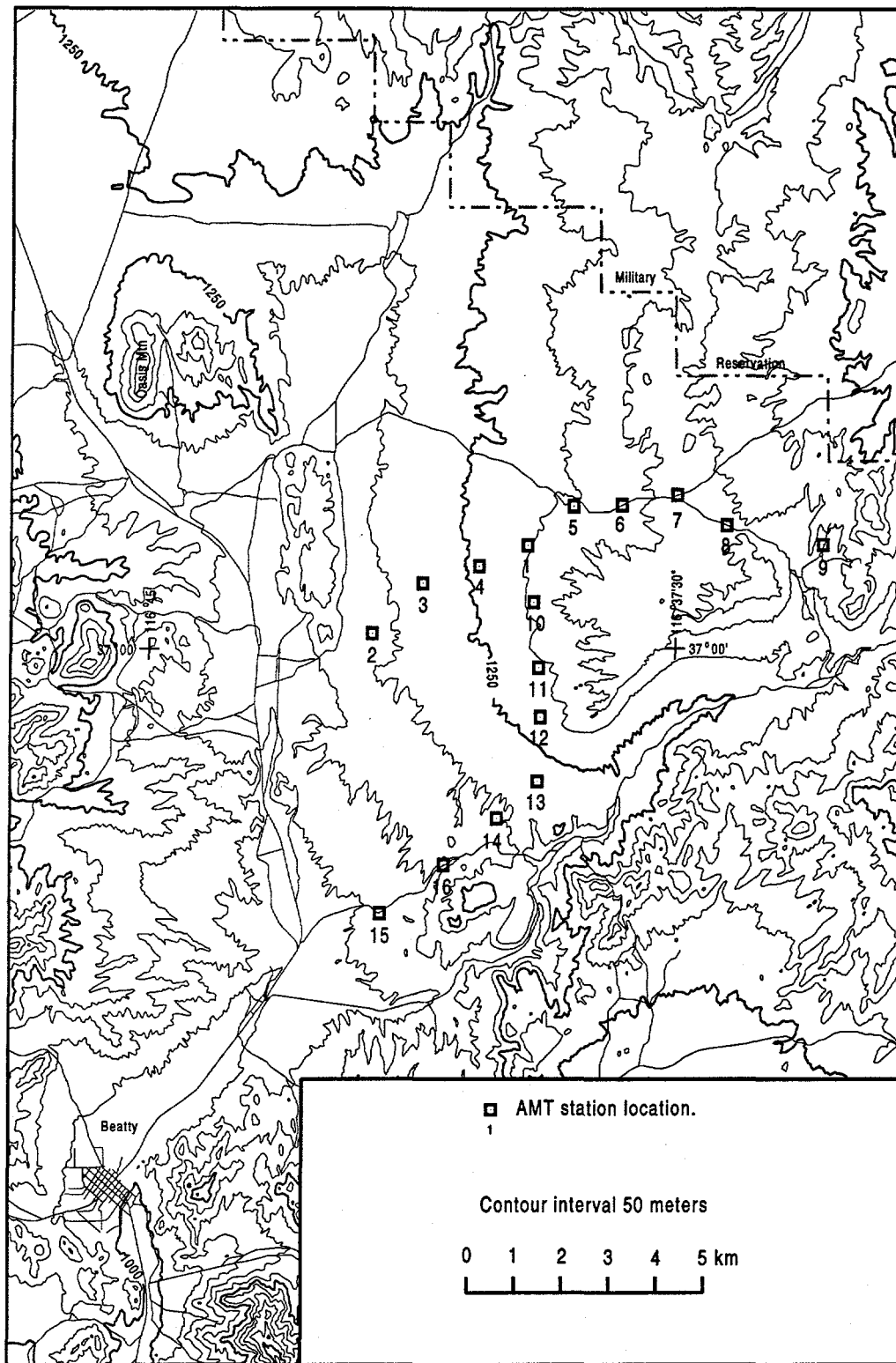
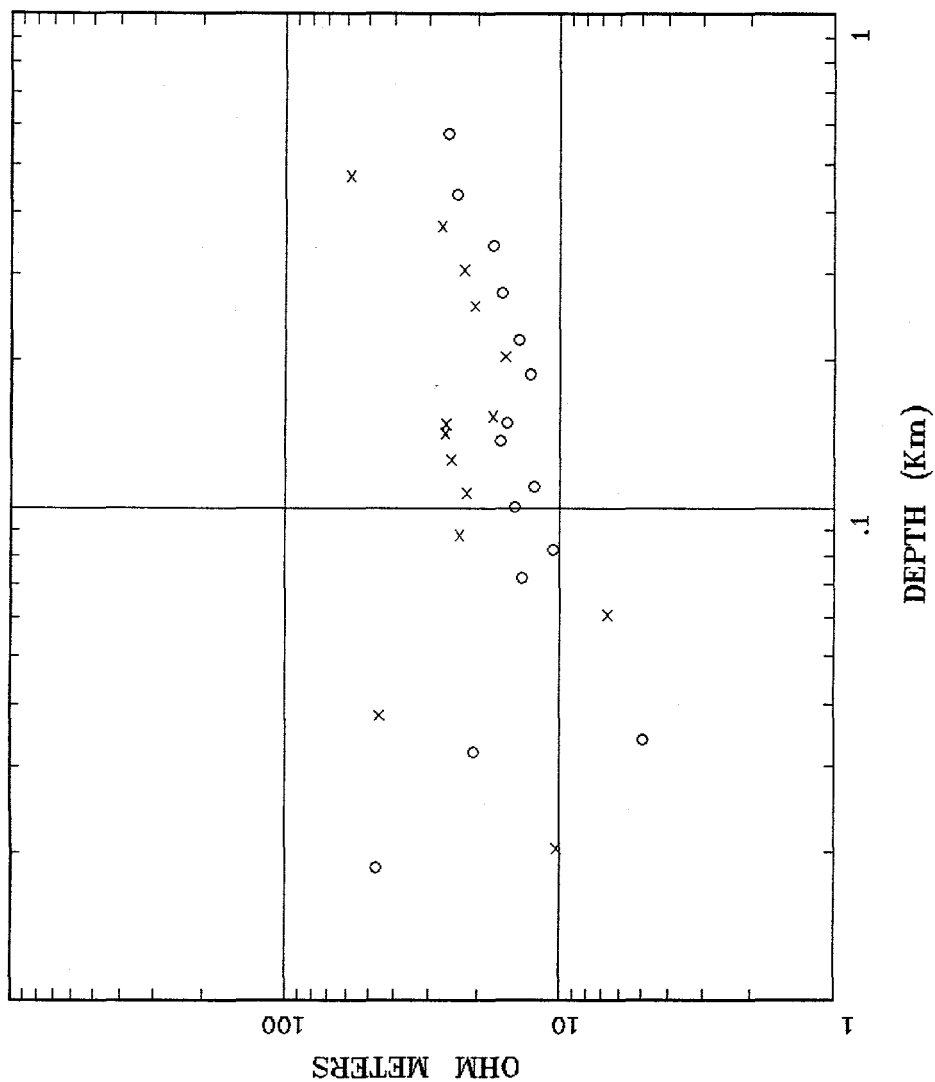


Figure 1. AMT station locations.

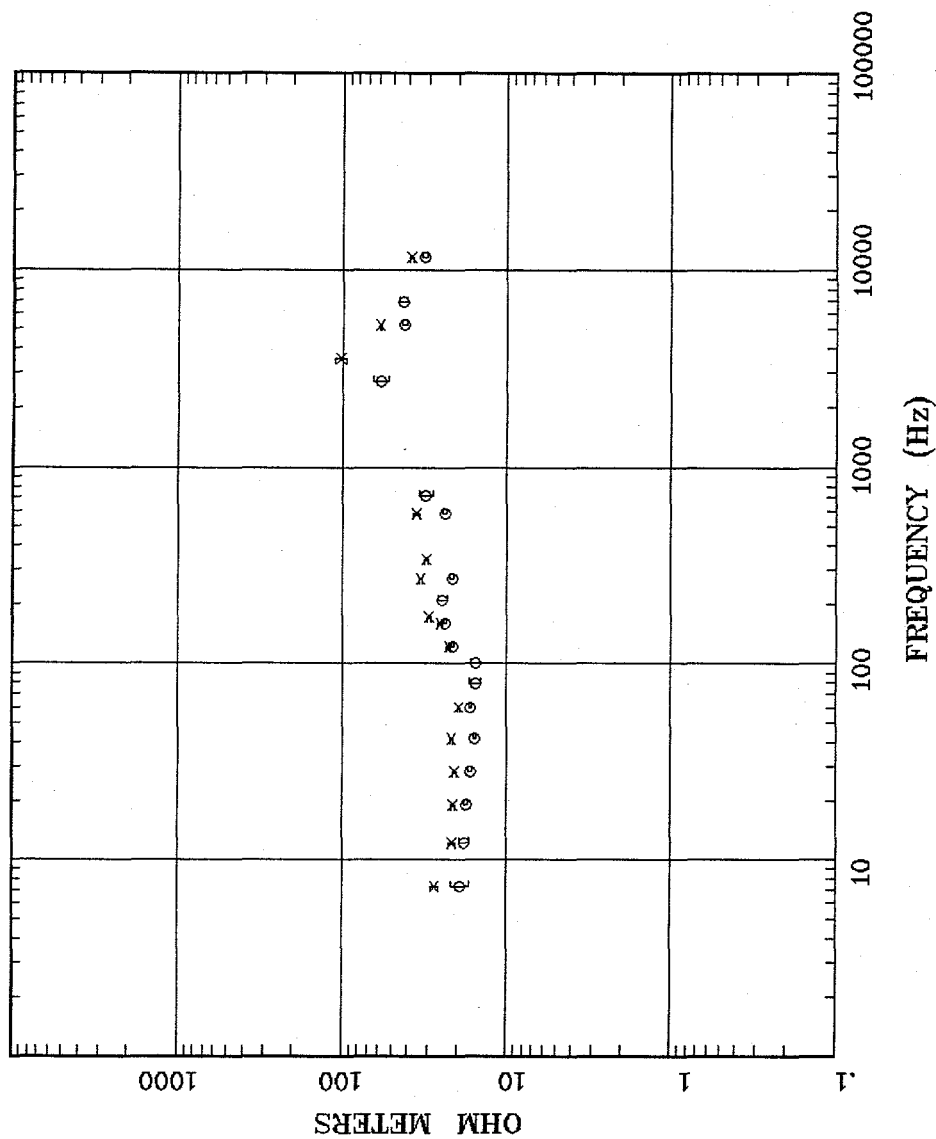
Resistivity (Bostick Inv.)



Client: Rotation: File name: aba01comb.all
 Remote: Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2
 Acquired: 17:5 Jun 08, 1997 Plotted: 18:57 Jun 08, 1997
 Survey Co: < EMI - ElectroMagnetic Instruments

Fig. 1a

APPARENT RESISTIVITY North of Beatty NV

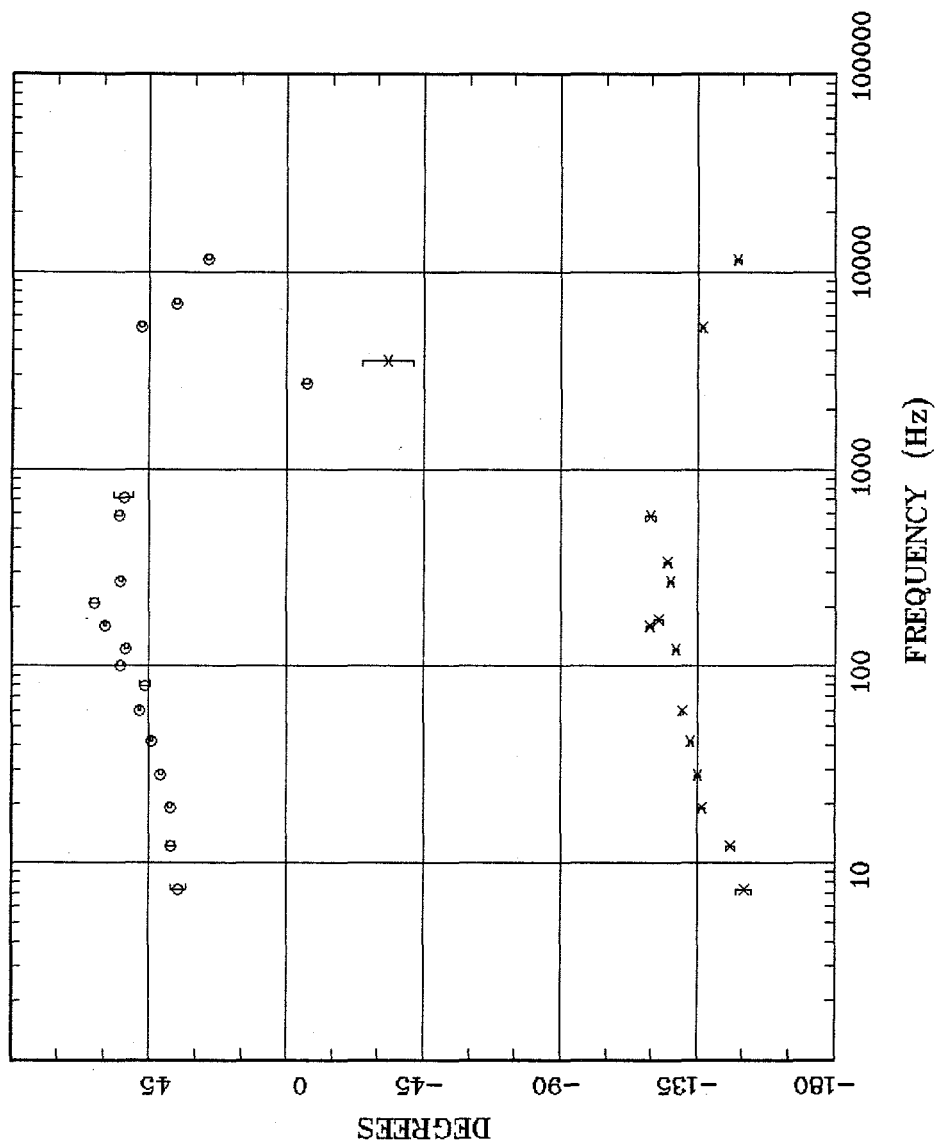


Client: Remote: remote e
 Acquired: 17:5 Jun 08, 1997
 Survey Co:USGS

Rotation: Filename: aba01comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 18:57 Jun 08, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 1b

IMPEDANCE PHASE North of Beatty NV

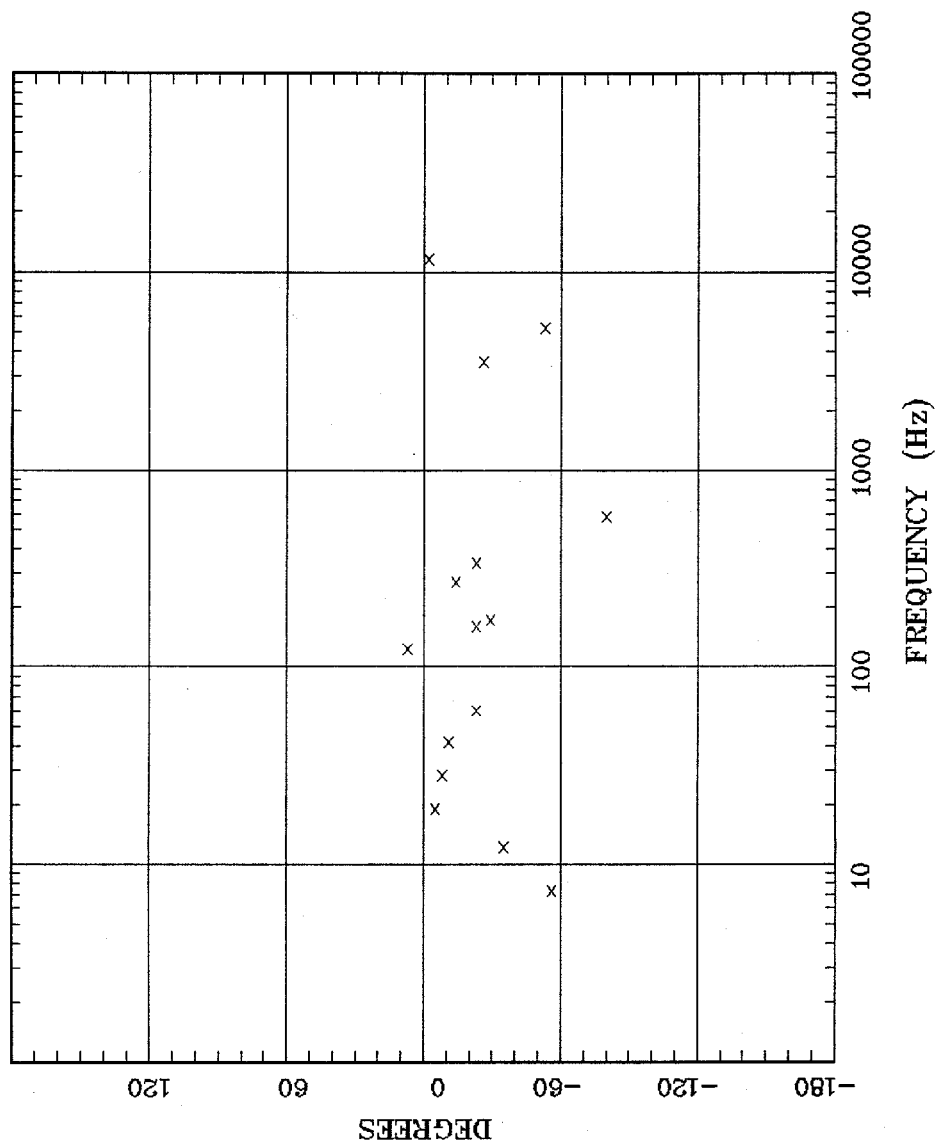


Client: Remote: remote e
 Acquired: 17:5 Jun 08, 1997
 Survey Co:USGS

Rotation:
 Filename: aba01comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 18:57 Jun 08, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 1c

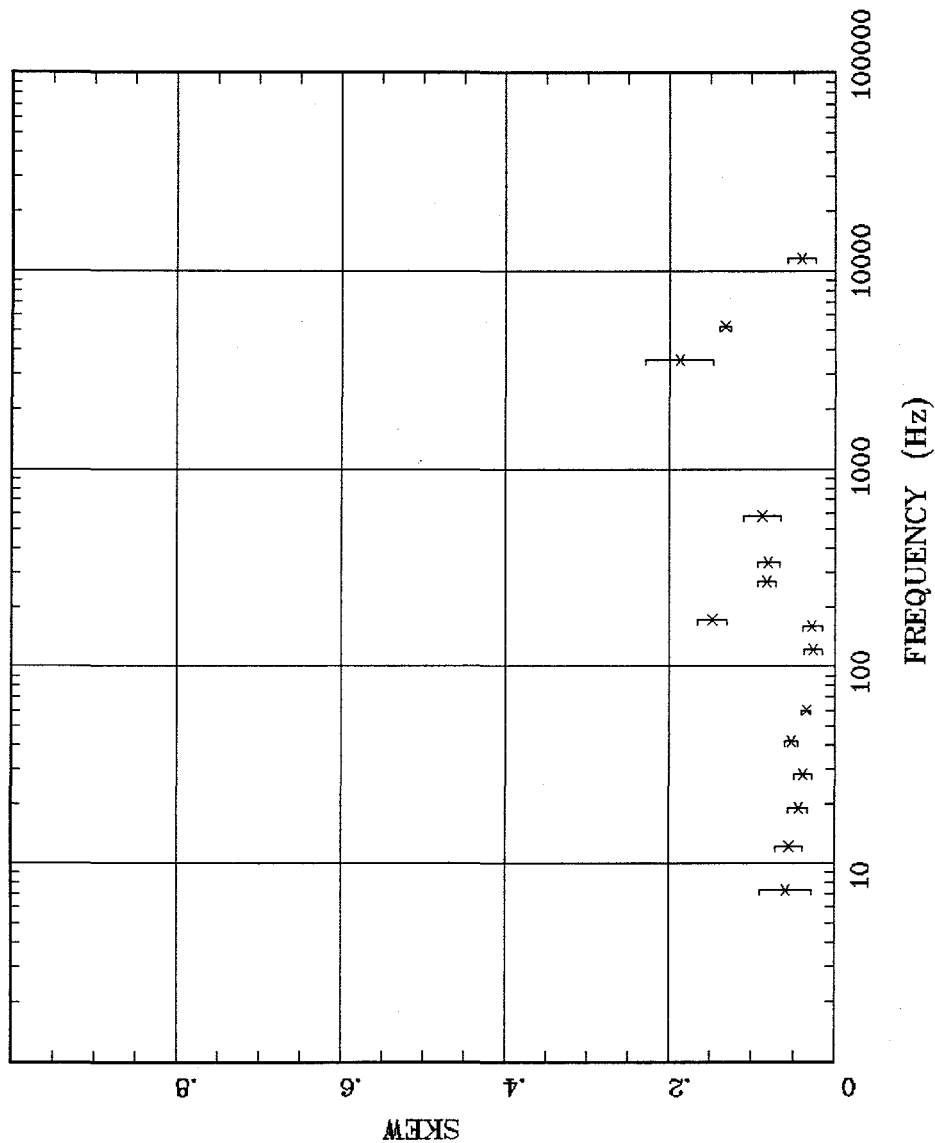
ROTATION ANGLE North of Beatty NV



Client: Remote: remote e
Acquired: 17:5 Jun 08, 1997
Survey Co:USGS
Rotation: Filename: aba01comb.all
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
Plotted: 18:57 Jun 08, 1997
< EMI - ElectroMagnetic Instruments

Fig. 1d

IMPEDANCE SKEW North of Beatty NV

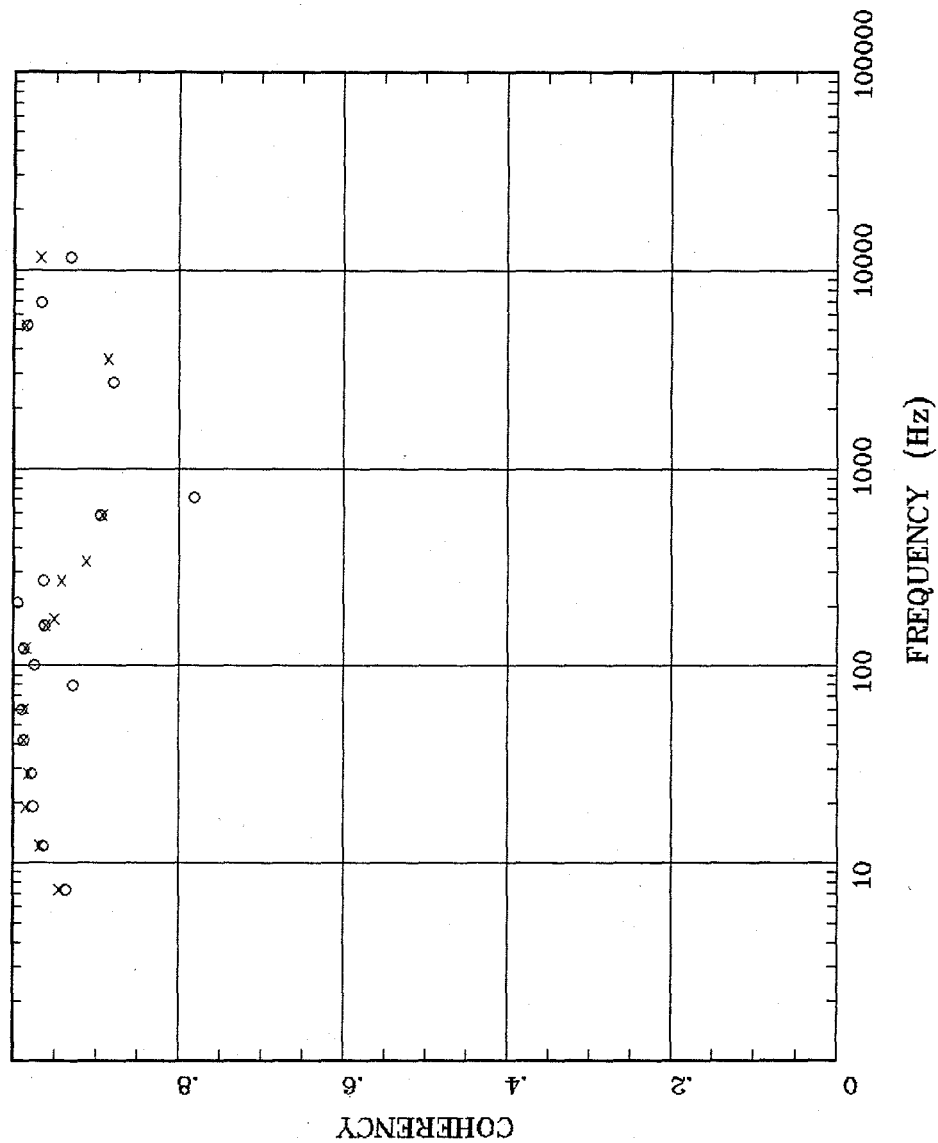


Client: Remote: remote e
 Acquired: 17:5 Jun 08, 1997
 Survey Co:USGS
 Rotation: Filename: aba01comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 18:57 Jun 08, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 1e

E MULT Coh.

North of Beatty NV

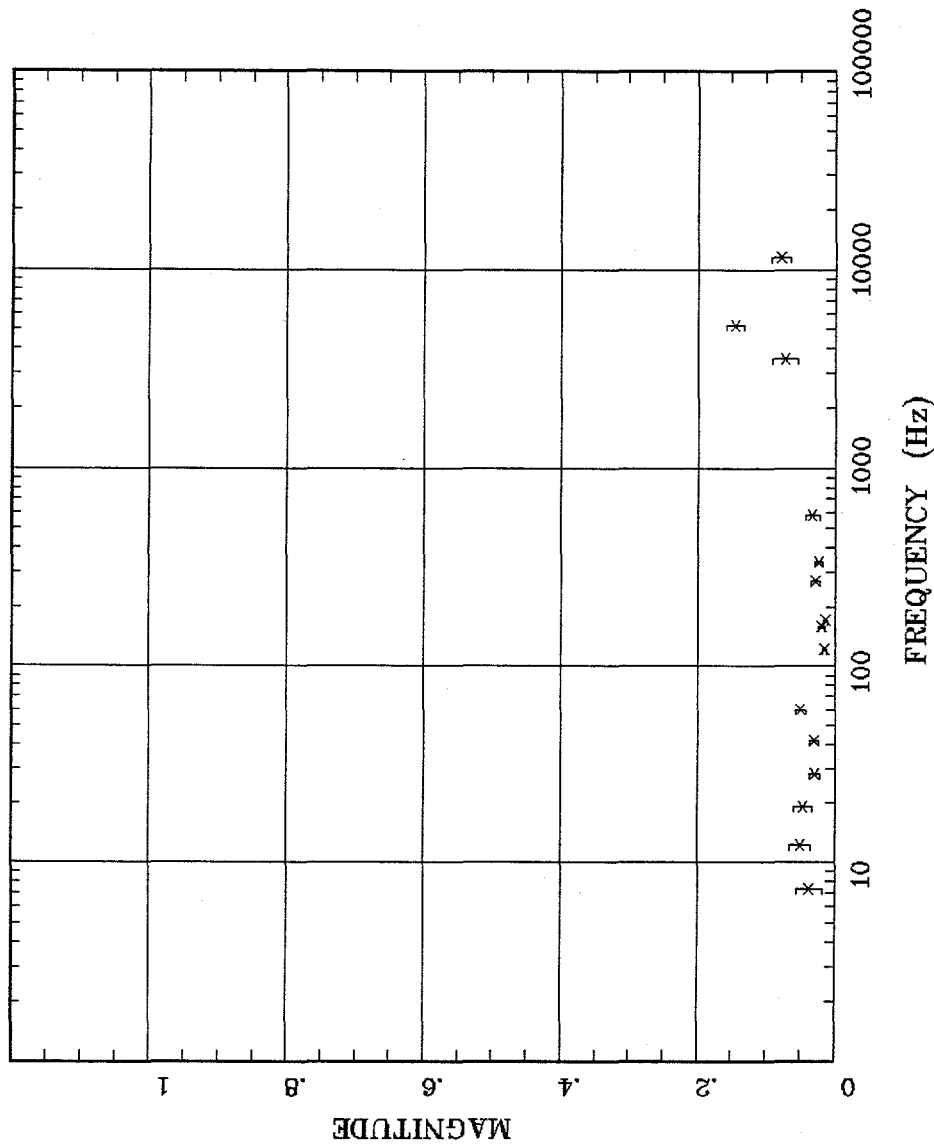


Client: Remote: remote e
Acquired: 17:5 Jun 08, 1997
Survey Co:USGS

Rotation: Filename: aba01comb.all
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
Plotted: 18:57 Jun 08, 1997
< EMI - ElectroMagnetic Instruments

Fig. 1f

TIPPER MAGNITUDE North of Beatty NV

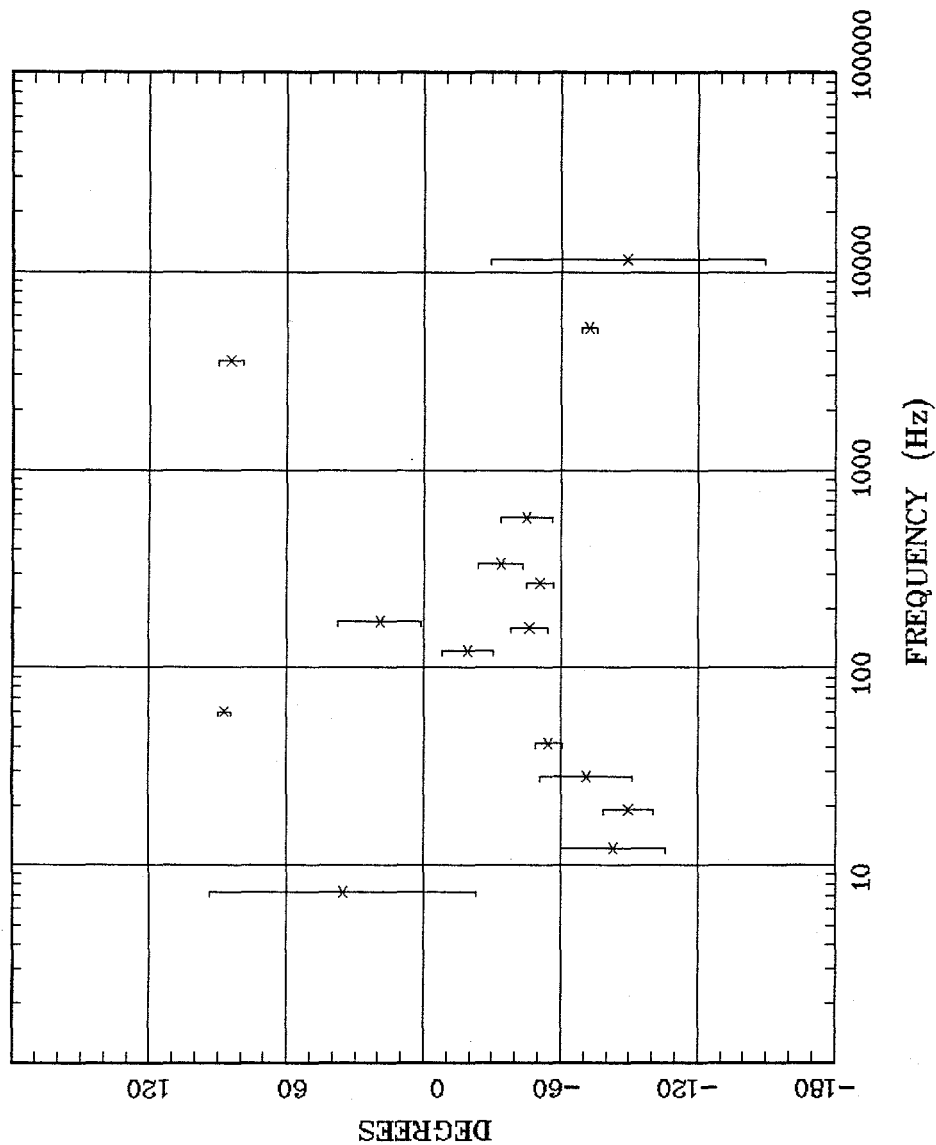


Client: Rotation:
 Remote: remote e Filename: aba01comb.all
 Acquired: 17:5 Jun 08, 1997 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Survey Co:USGS Plotted: 18:58 Jun 08, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 1g

TIPPER STRIKE

North of Beatty NV

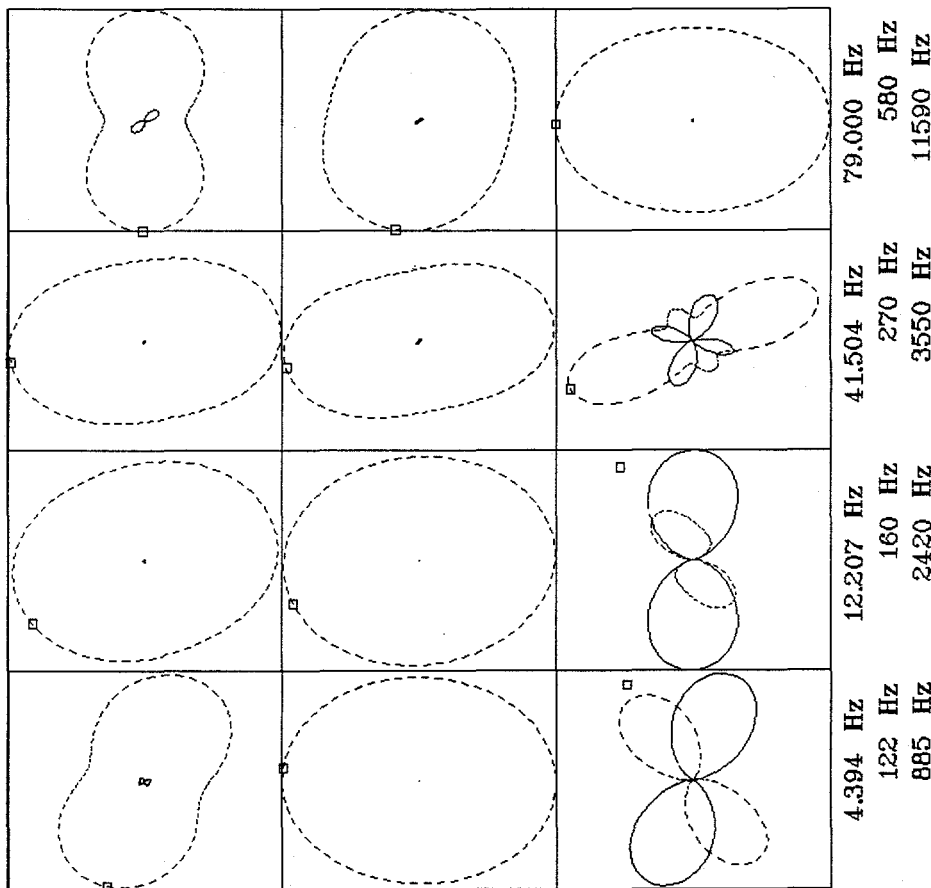


Client: Remote: remote e
 Acquired: 17:5 Jun 08, 1997
 Survey Co:USGS

Rotation: Filename: aba01comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 18:58 Jun 08, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 1h

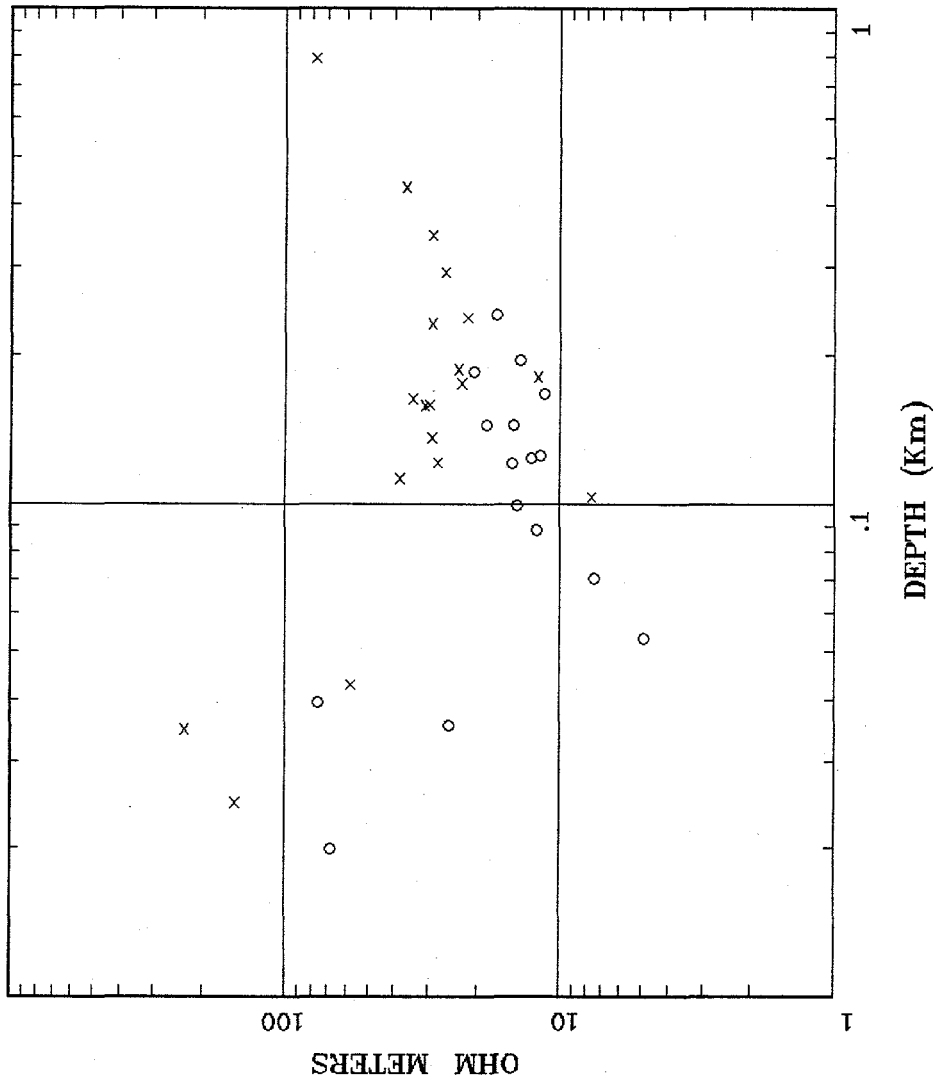
POLAR PLOTS North of Beatty NV



Client: Remote: remote e
 Filename: aba01comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Acquired: 17:5 Jun 08, 1997 Plotted: 18:58 Jun 08, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments >

Fig. 1i

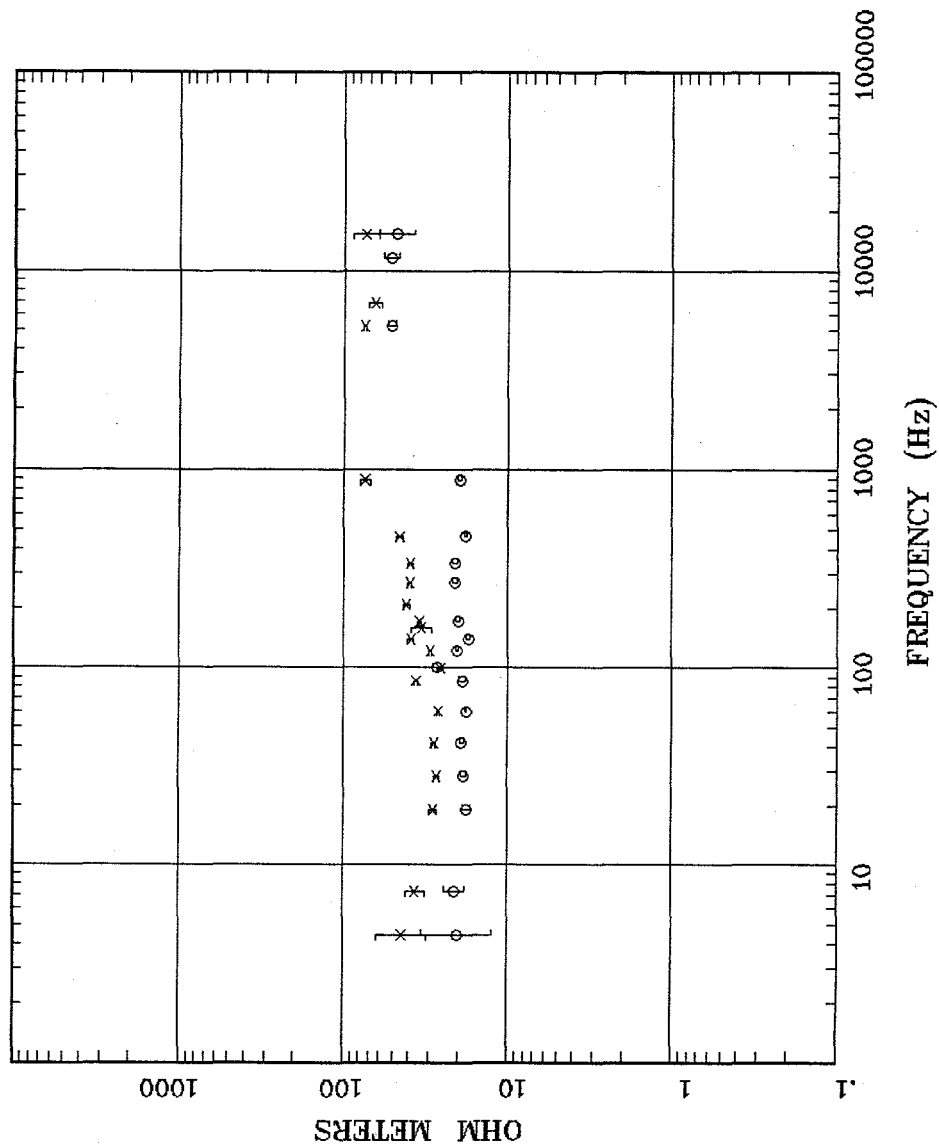
Resistivity (Bostick Inv.)



Client: Rotation:
 Filename: aba02com.all
 Remote: Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2
 Acquired: 09:2 Jul 11, 1997 Plotted: 10:10 Jul 11, 1997
 Survey Co: < EMI - ElectroMagnetic Instruments

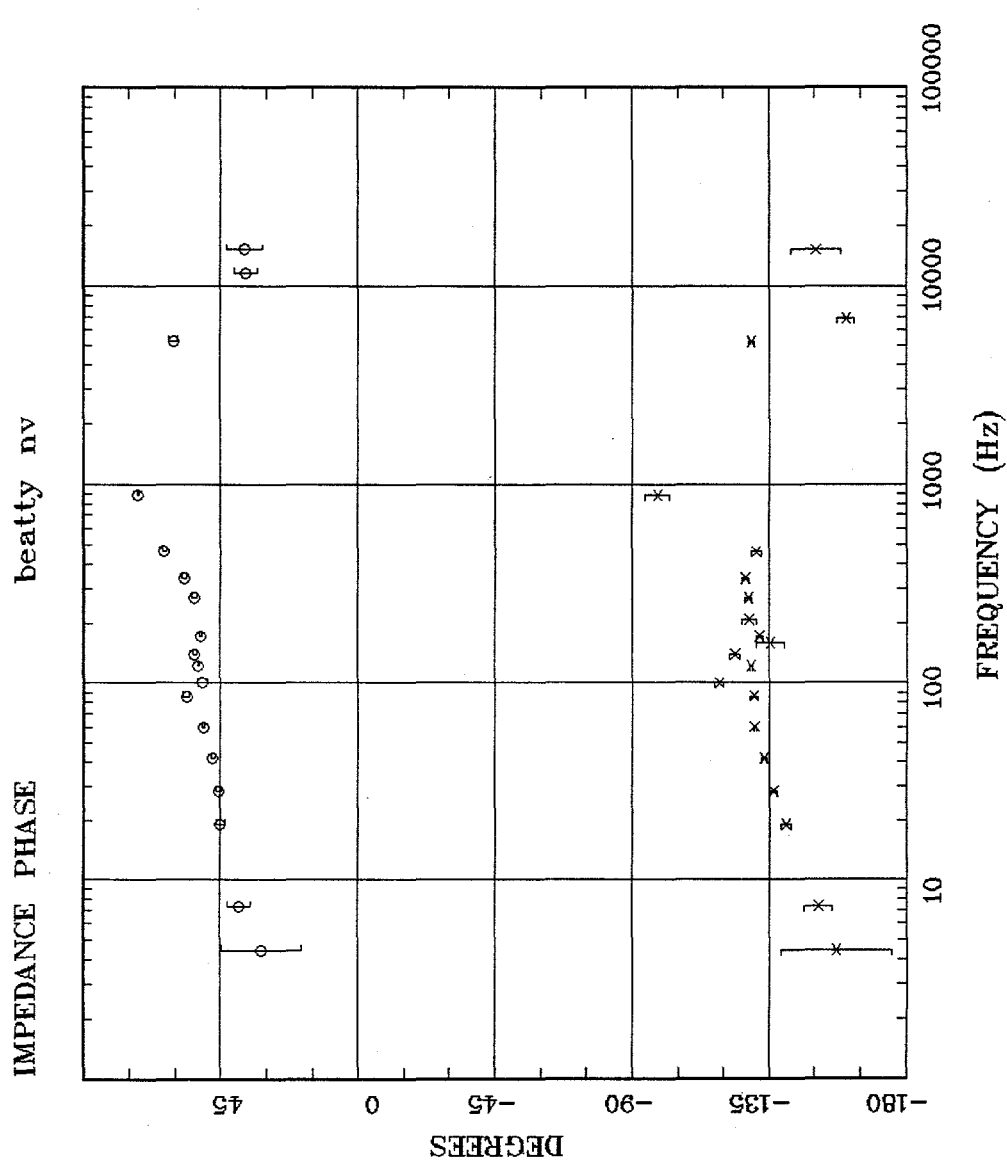
Fig. 2a

APPARENT RESISTIVITY beatty nv



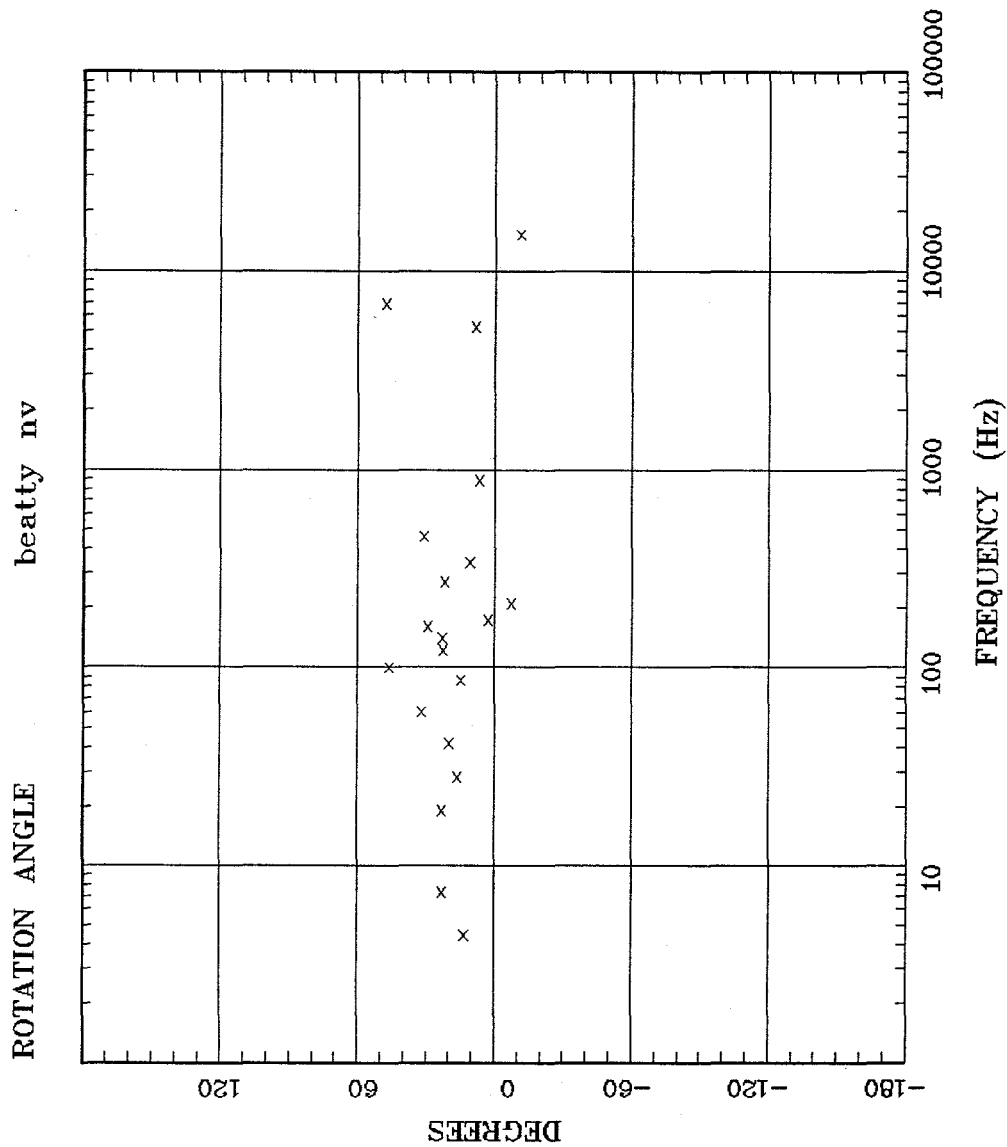
Client: Remote: remote e
 Rotation: Filename: aba02com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 09:22 Jul 11, 1997
 Plotted: 10:10 Jul 11, 1997
 Survey Co: usgs
 < EMI - ElectroMagnetic Instruments

Fig. 2b



Client: Remote: remote e
 Rotation: Filename: aba02com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 09:2 Jul 11, 1997 Plotted: 10:11 Jul 11, 1997
 Survey Co: usgs < EMI - ElectroMagnetic Instruments

Fig. 2c

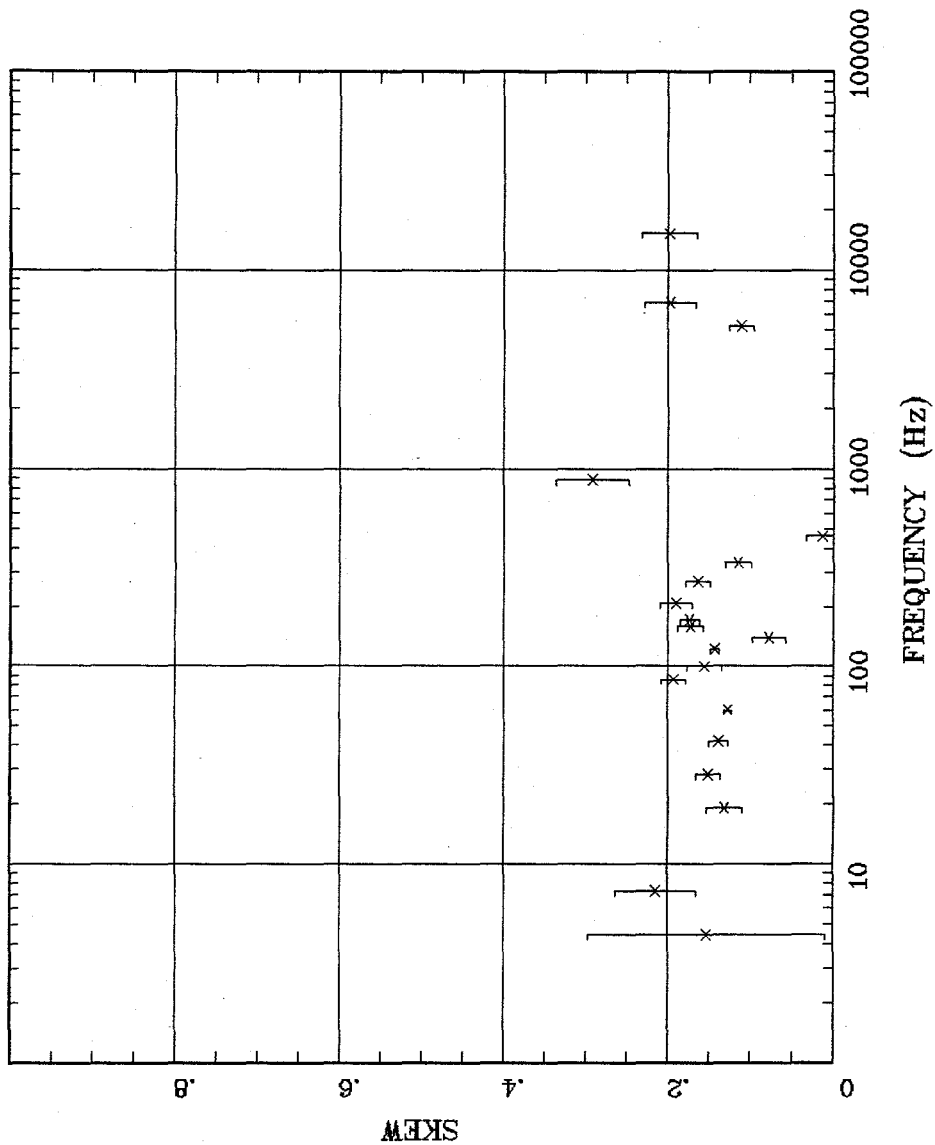


Client: Remote: remote e Rotation: Filename: aba02com.all
 Acquired: 09:2 Jul 11, 1997 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Survey Co:usgs Plotted: 10:11 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 2d

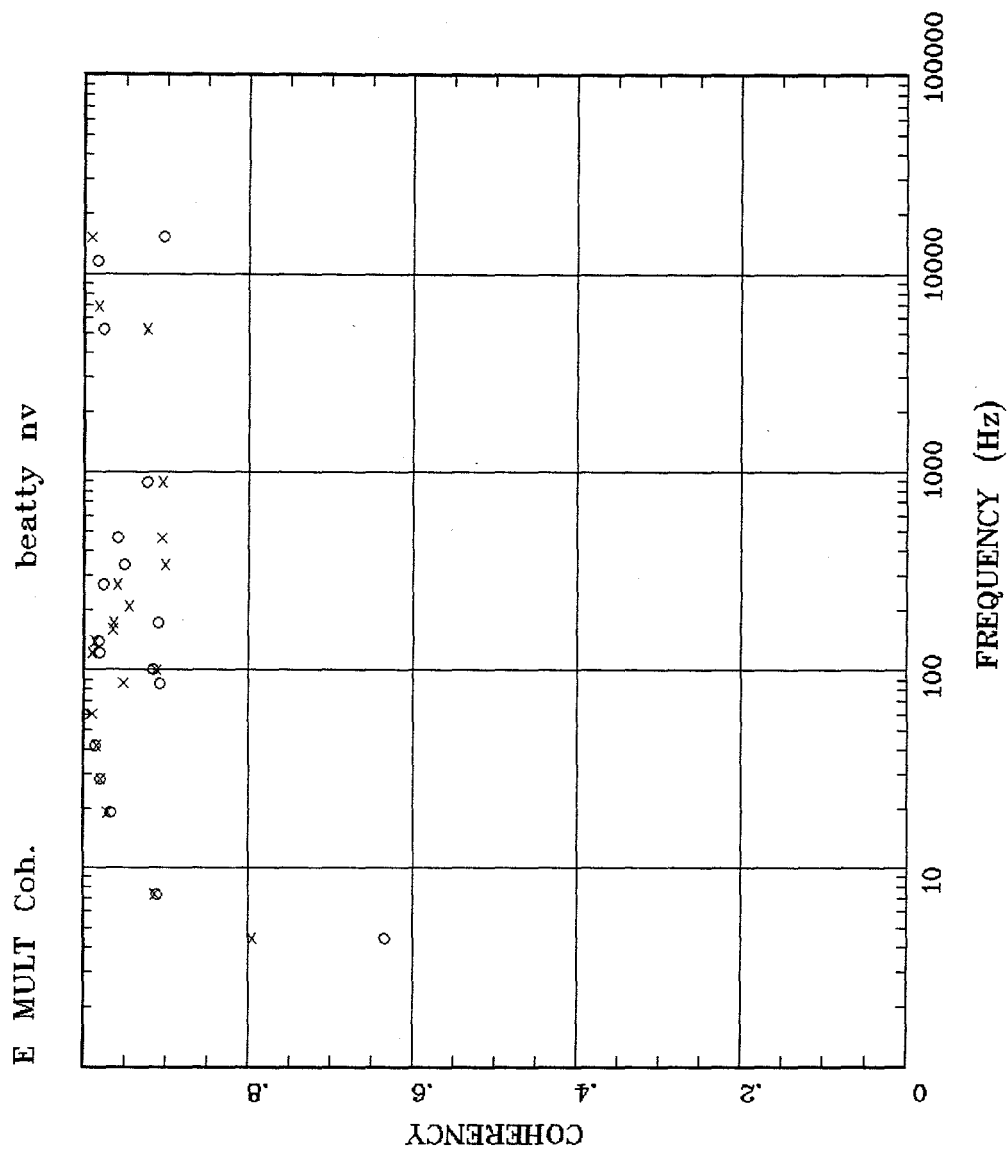
IMPEDANCE SKEW

beatty nv



Client: Remote: remote e
Acquired: 09:2 Jul 11, 1997
Survey Cougs
Rotation: Filename: aba02com.all
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
Plotted: 10:11 Jul 11, 1997
< EMI - ElectroMagnetic Instruments

Fig. 2e



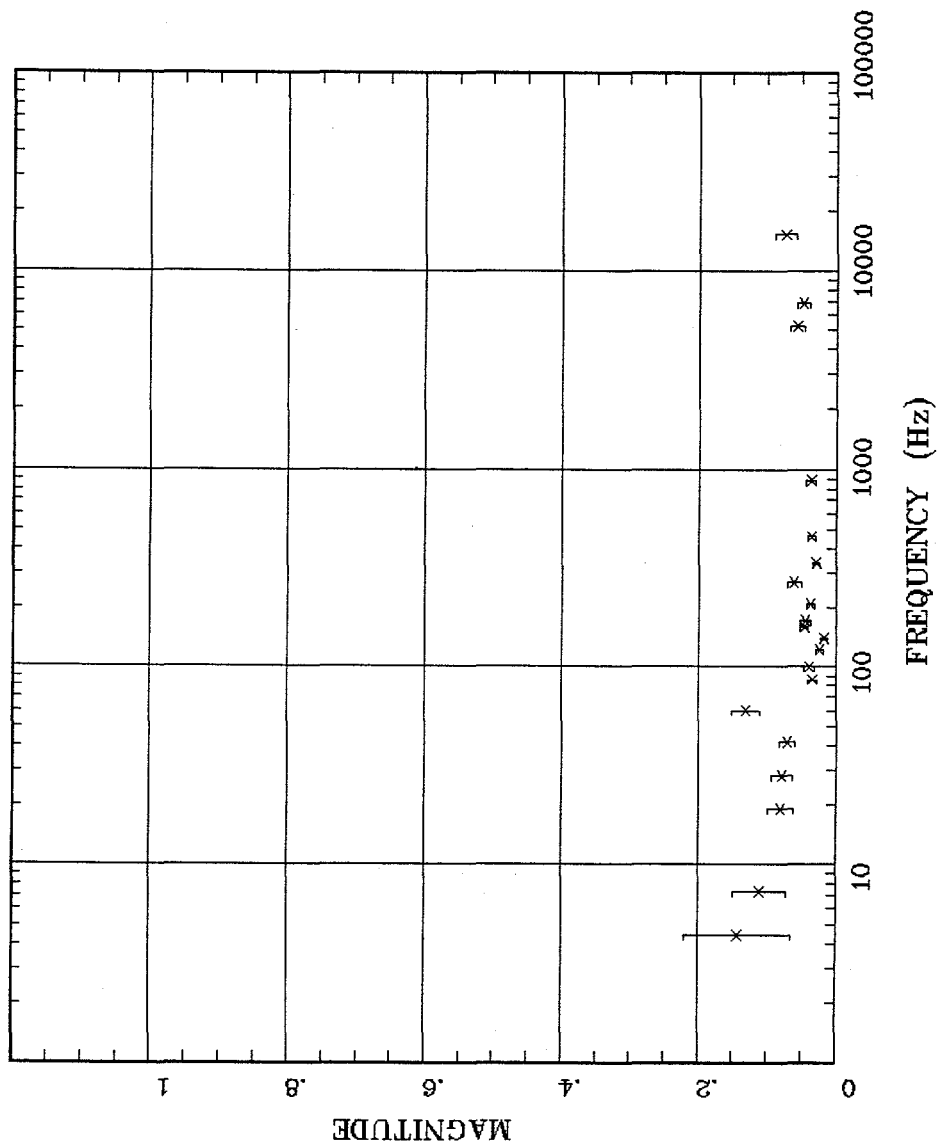
Client: Remote: remote e
 Acquired: 09:2 Jul 11, 1997
 Survey Cougs

Rotation: Filename: aba02com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 10:11 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 2f

TIPPER MAGNITUDE

beatty nv

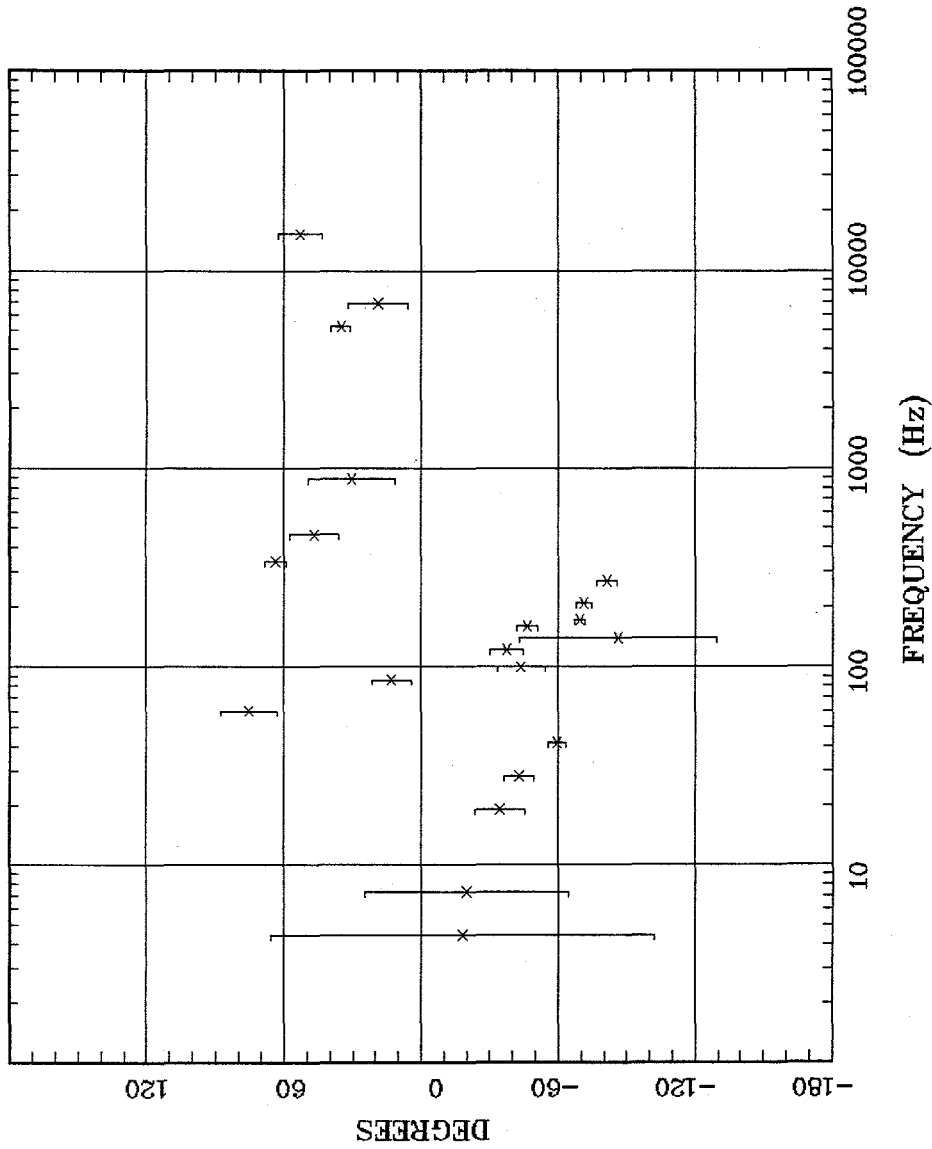


Client: Rotation:
 Remote: remote e Filename: aba02com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 09:2 Jul 11, 1997 Plotted: 10:11 Jul 11, 1997
 Survey Co:usgs < EMI - ElectroMagnetic Instruments

Fig. 2g

TIPPER STRIKE

beatty nv



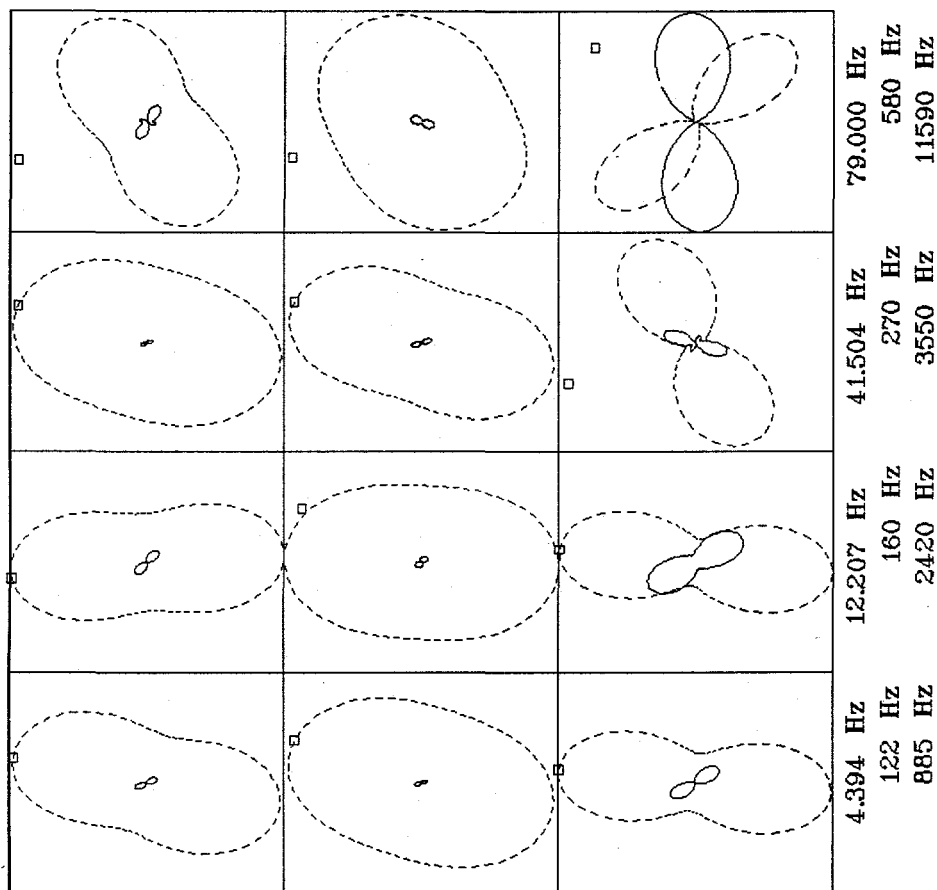
Client: Remote: remote e
 Acquired: 09:2 Jul 11, 1997
 Survey Co: usgs

Rotation: Filename: aba02com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 10:11 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 2h

POLAR PLOTS

beatty nv

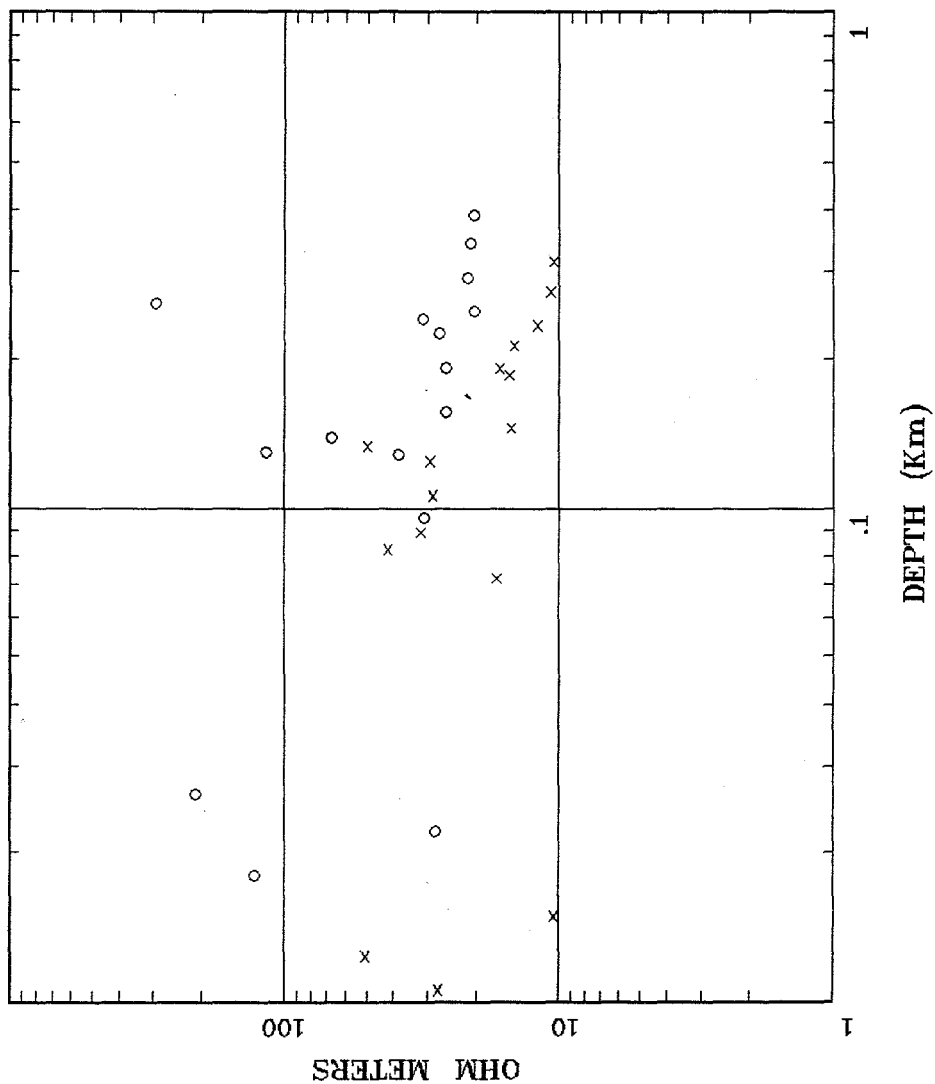


Rotation:

Client: Remote: remote e
 Filename: aba02com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Acquired: 09:2 Jul 11, 1997 Plotted: 10:11 Jul 11, 1997
 Survey Co: usgs < EMI - ElectroMagnetic Instruments >

Fig. 2i

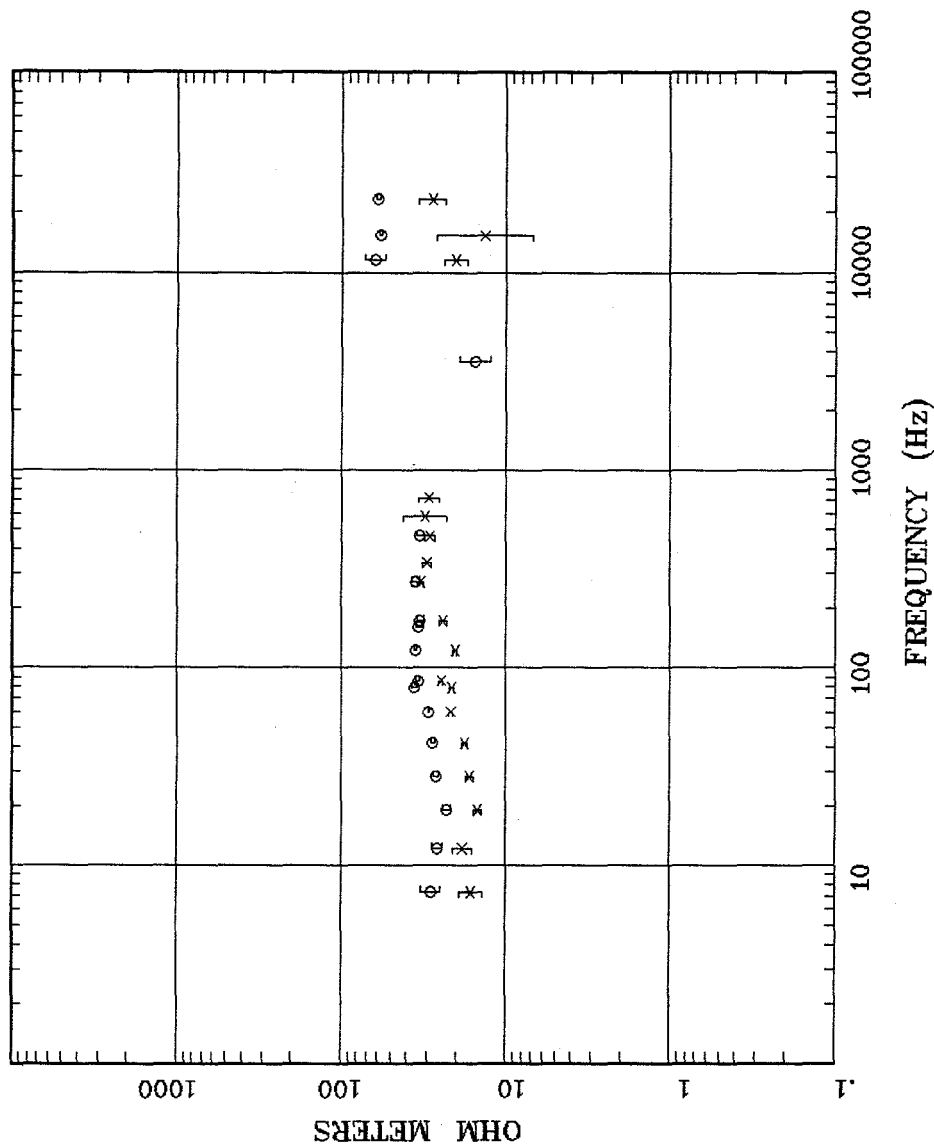
Resistivity (Bostick Inv.)



Client: Rotation:
 Remote: Filename: aba03com.all
 Acquired: 13:4 Jul 11, 1997 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2
 Survey Co: Plotted: 14:01 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 3a

APPARENT RESISTIVITY North of Beatty, Nev

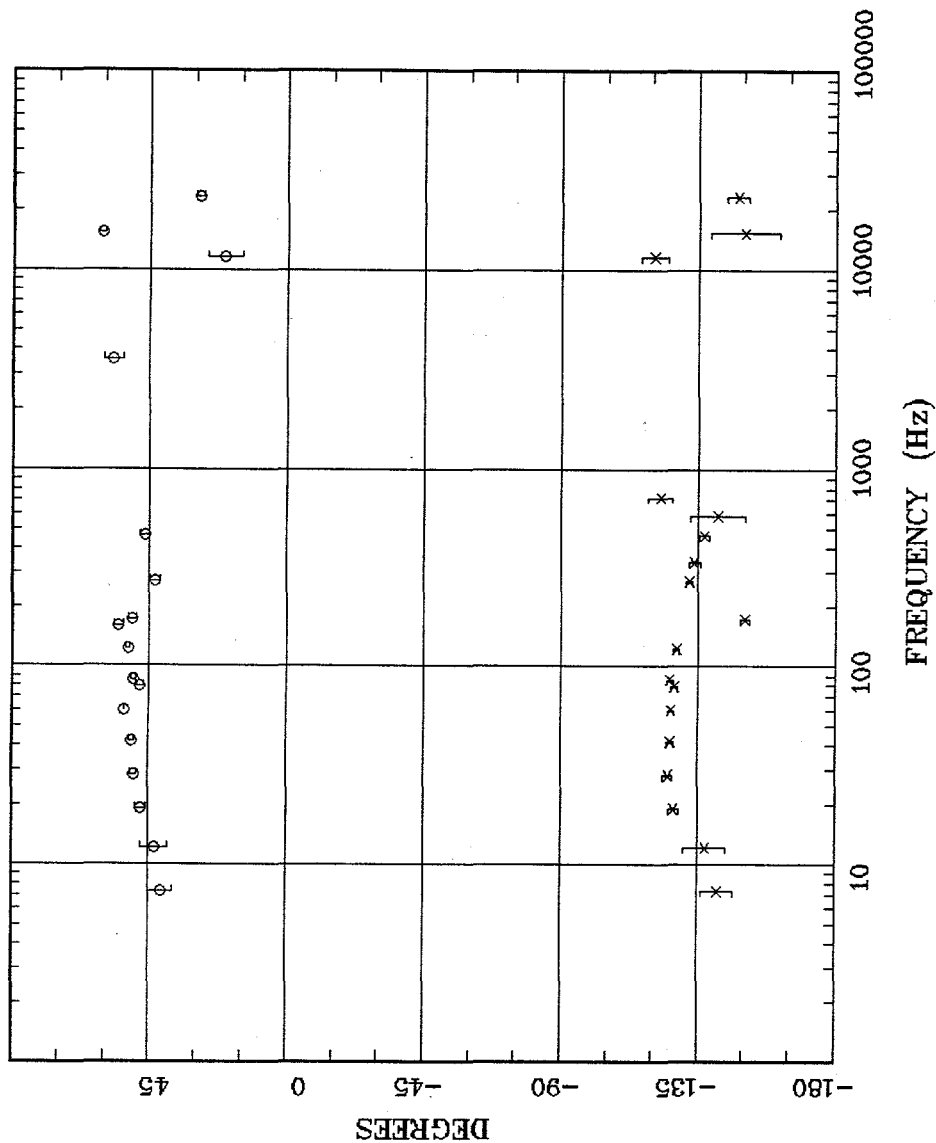


North of Beatty, Nev
 Client: n
 Remote: remote e
 Acquired: 13:4 Jul 11, 1997
 Survey Co:USGS

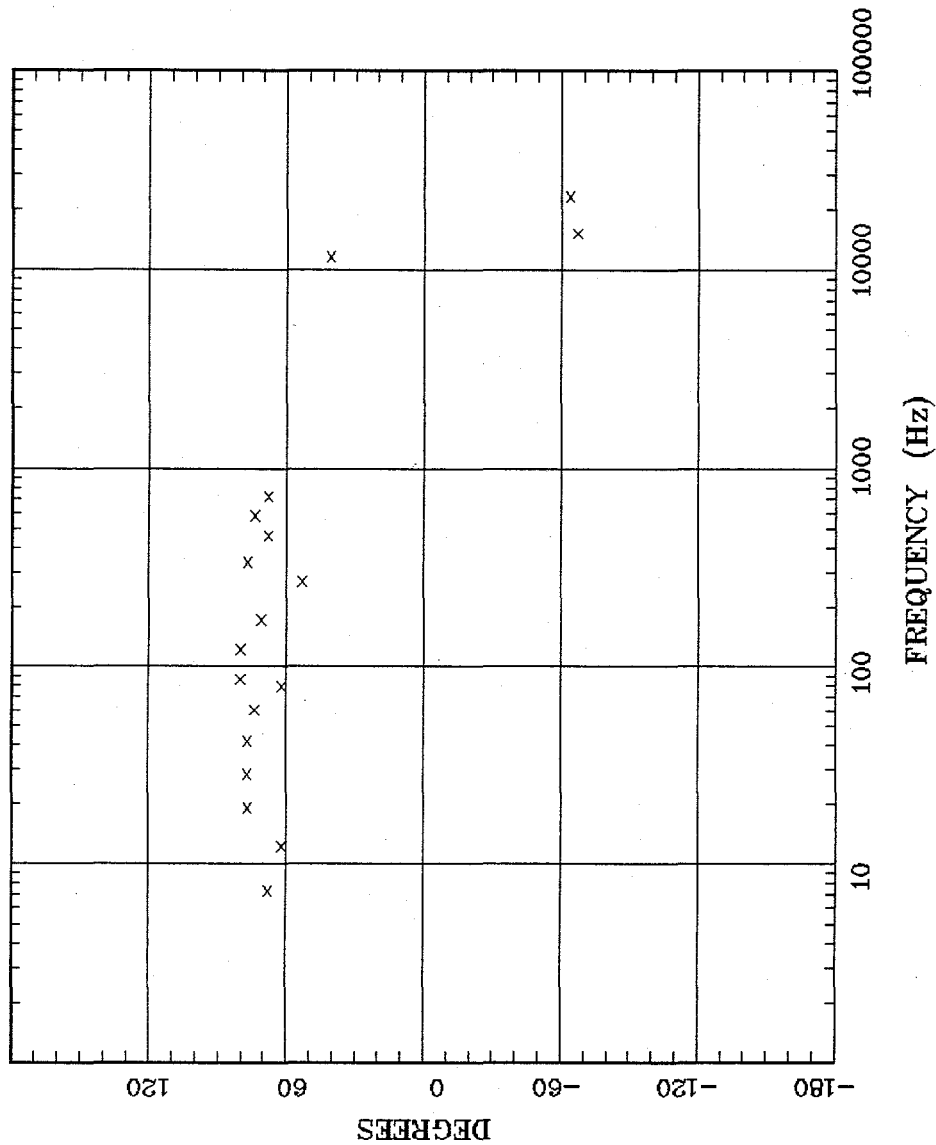
Rotation:
 Filename: aba03com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 14:01 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 3b

IMPEDANCE PHASE North of Beatty, Nev



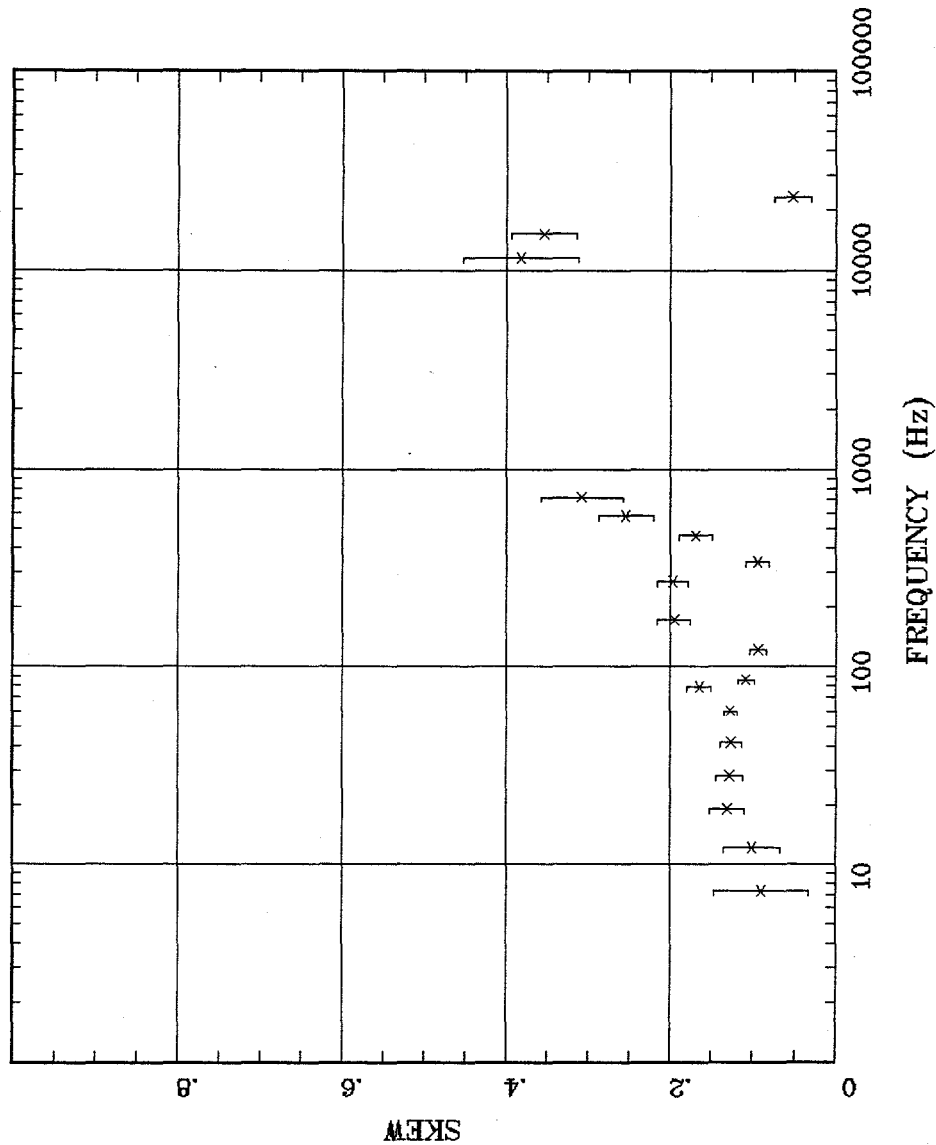
ROTATION ANGLE North of Beatty, Nev



North of Beatty, Nev
 Client: n
 Remote: remote e
 Acquired: 13:4 Jul 11, 1997
 Survey Co:USGS
 Rotation:
 Filename: aba03com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 14:01 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 3d

IMPEDANCE SKEW North of Beatty, Nev

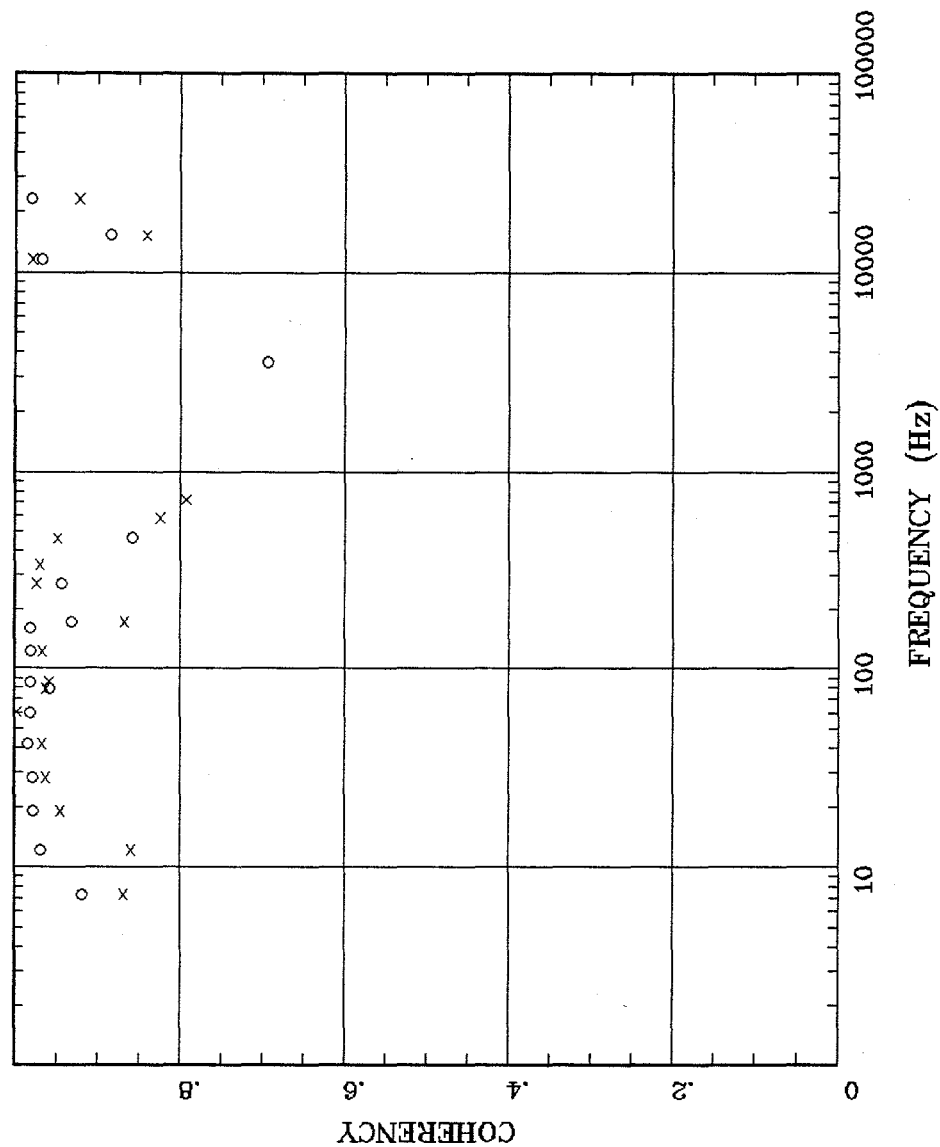


North of Beatty, Nev
 Client: n
 Remote: remote e
 Acquired: 13:4 Jul 11, 1997
 Survey Co:USGS

Rotation: aba03com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 14:01 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 3e

North of Beatty, Nev



Rotation:

Filename: aba03com.all

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6

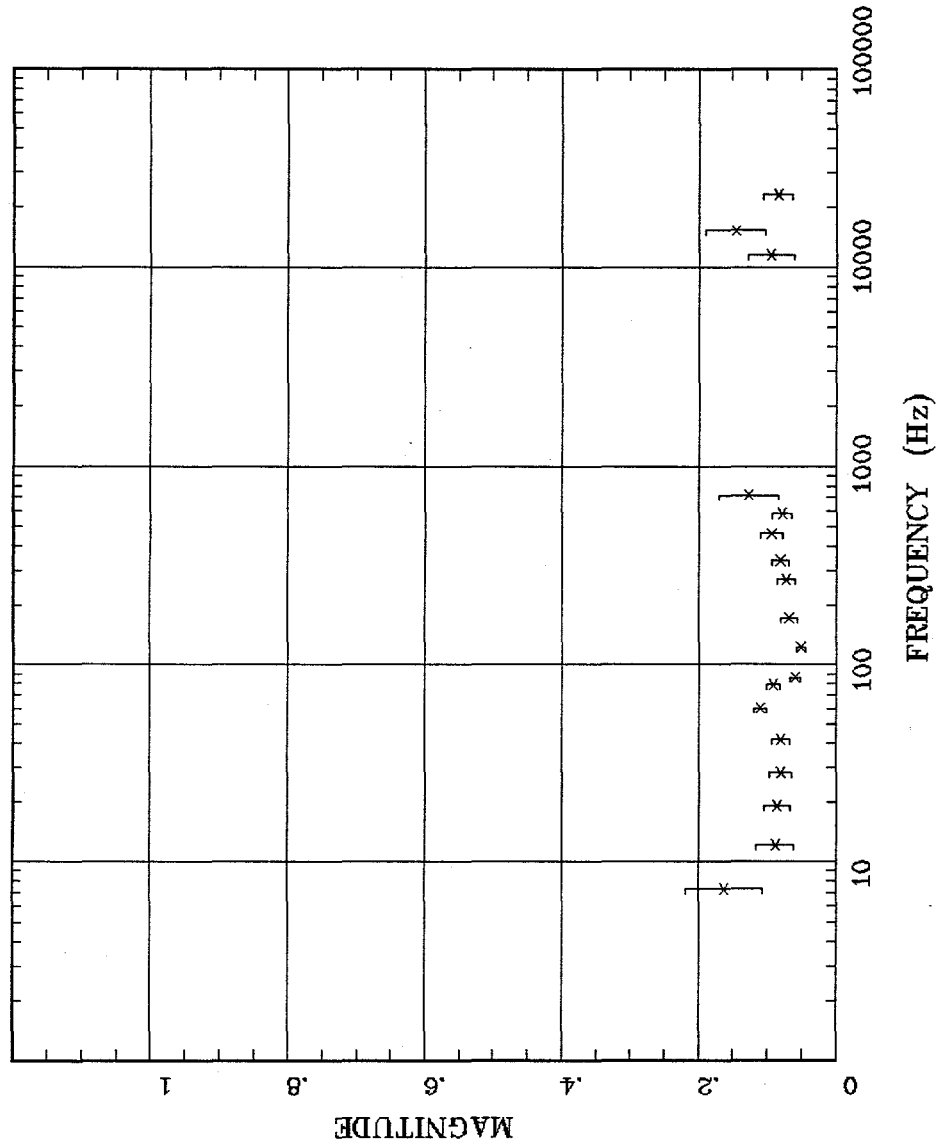
Plotted: 14:01 Jul 11, 1997

EMI - ElectroMagnetic Instruments

Fig. 3f

TIPPER MAGNITUDE

North of Beatty, Nev



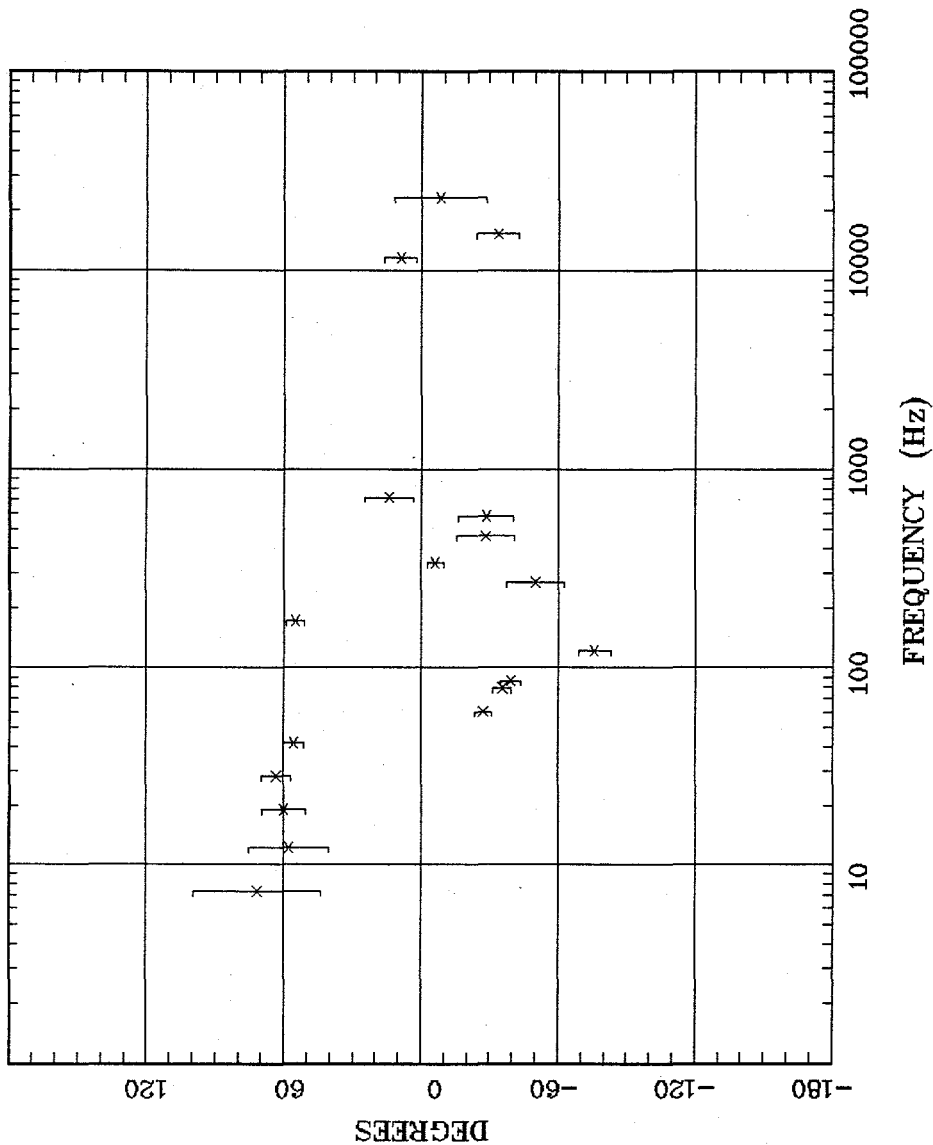
North of Beatty, Nev
 Client: n
 Remote: remote e
 Acquired: 13:4 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba03com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 14:01 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 3g

TIPPER STRIKE

North of Beatty, Nev



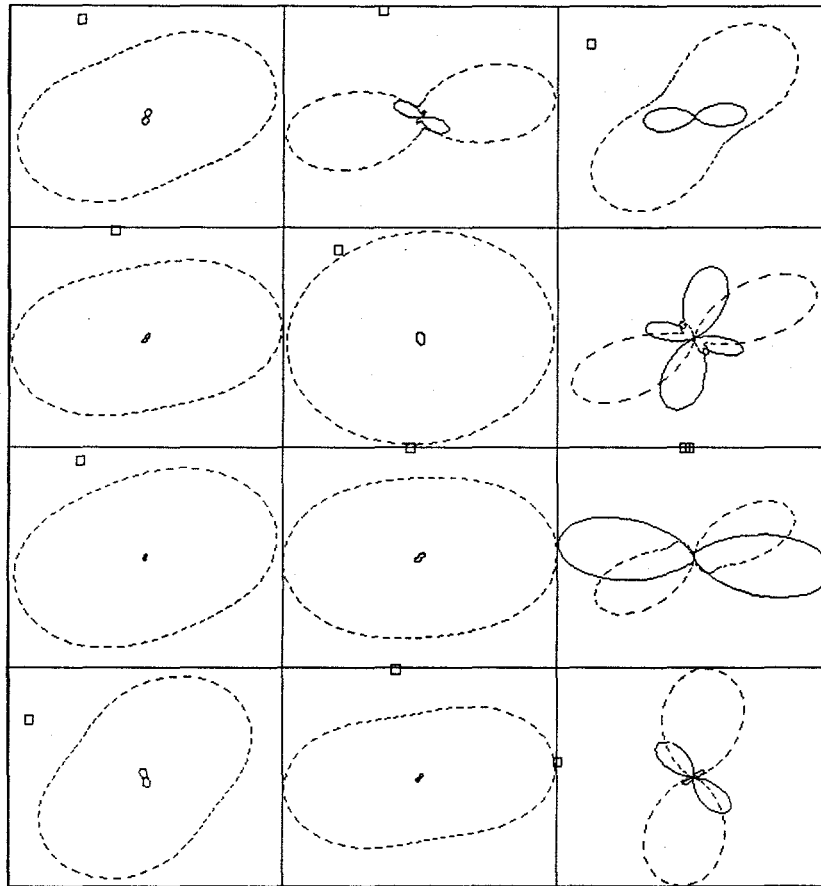
North of Beatty, Nev
 Client: n
 Remote: remote e
 Acquired: 13:4 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba03com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 14:01 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 3h

POLAR PLOTS

North of Beatty, Nev



North of Beatty, Nev

Client: n

Remote: remote e

Acquired: 13:4 Jul 11, 1997

Survey Co:USGS

Rotation:

Filename: aba03com.all

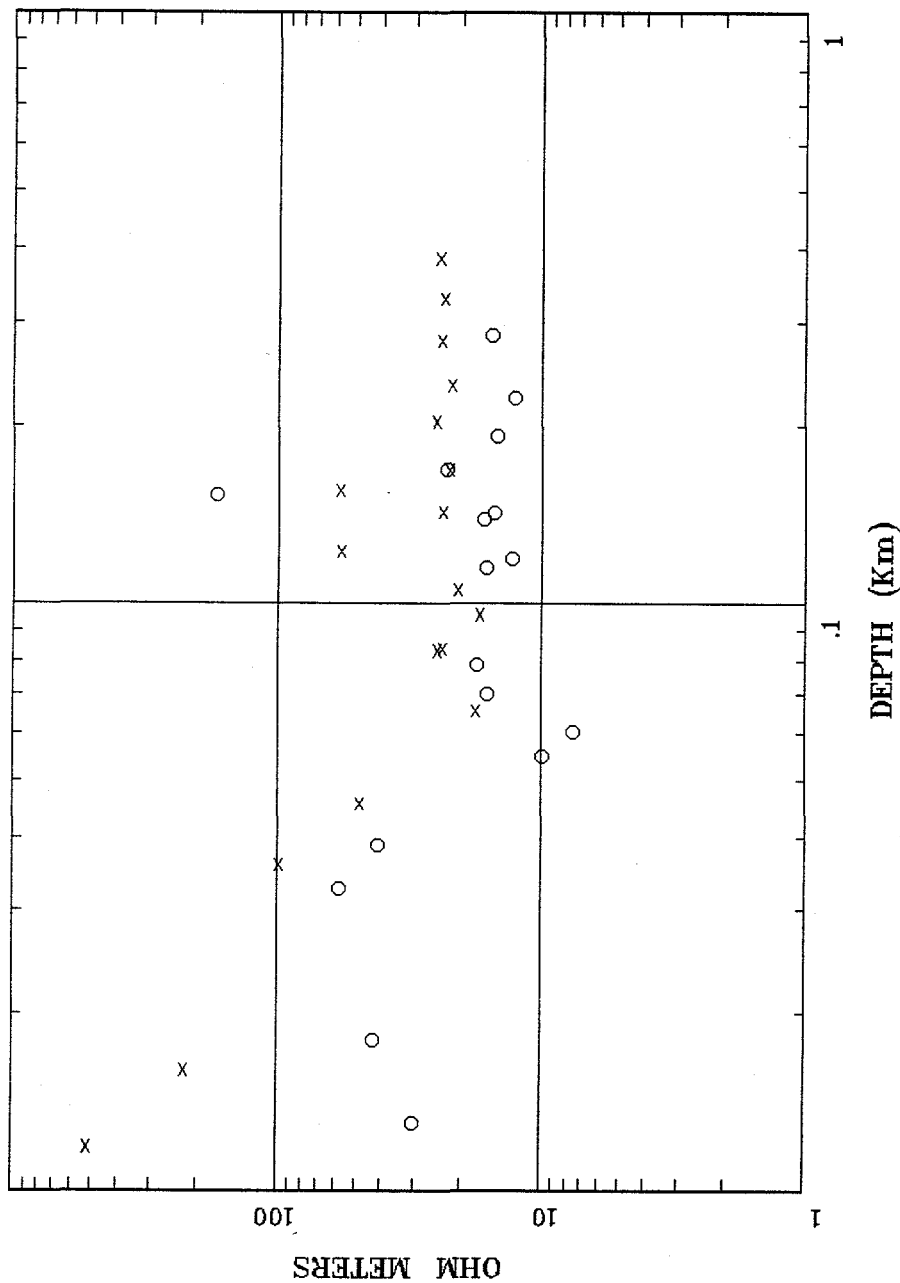
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7

Plotted: 14:01 Jul 11, 1997

< EMI - ElectroMagnetic Instruments >

Fig. 3i

Resistivity (Bostick Inv.)

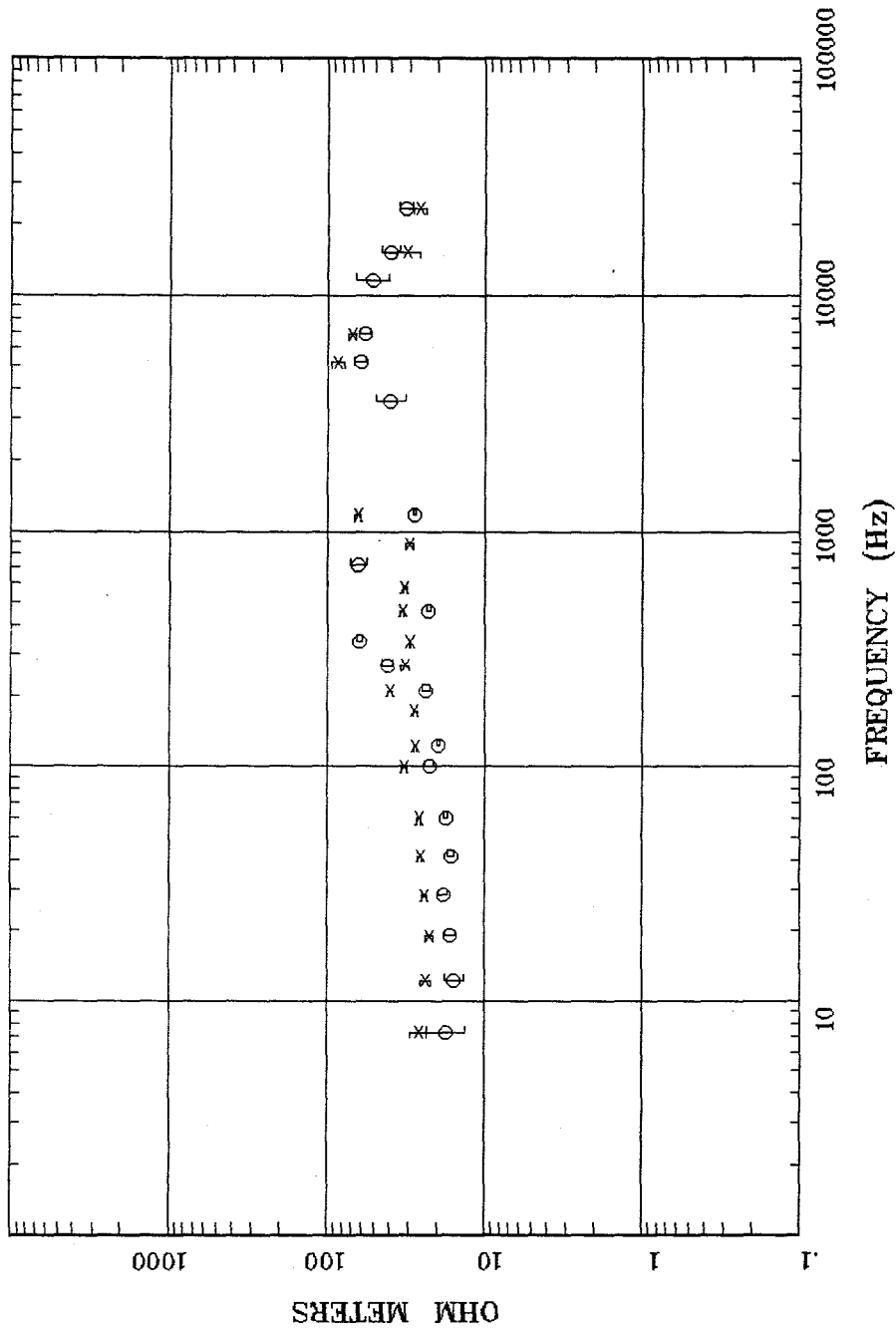


Client: Remote: 14:2 Jul 11, 1997
 Survey Co: Acquired: 14:40 Jul 11, 1997
 Rotation: EMI - ElectroMagnetic Instruments
 Filename: aba04com.all
 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Plotted: 14:40 Jul 11, 1997

Fig. 4a

APPARENT RESISTIVITY

North of Beatty, NV

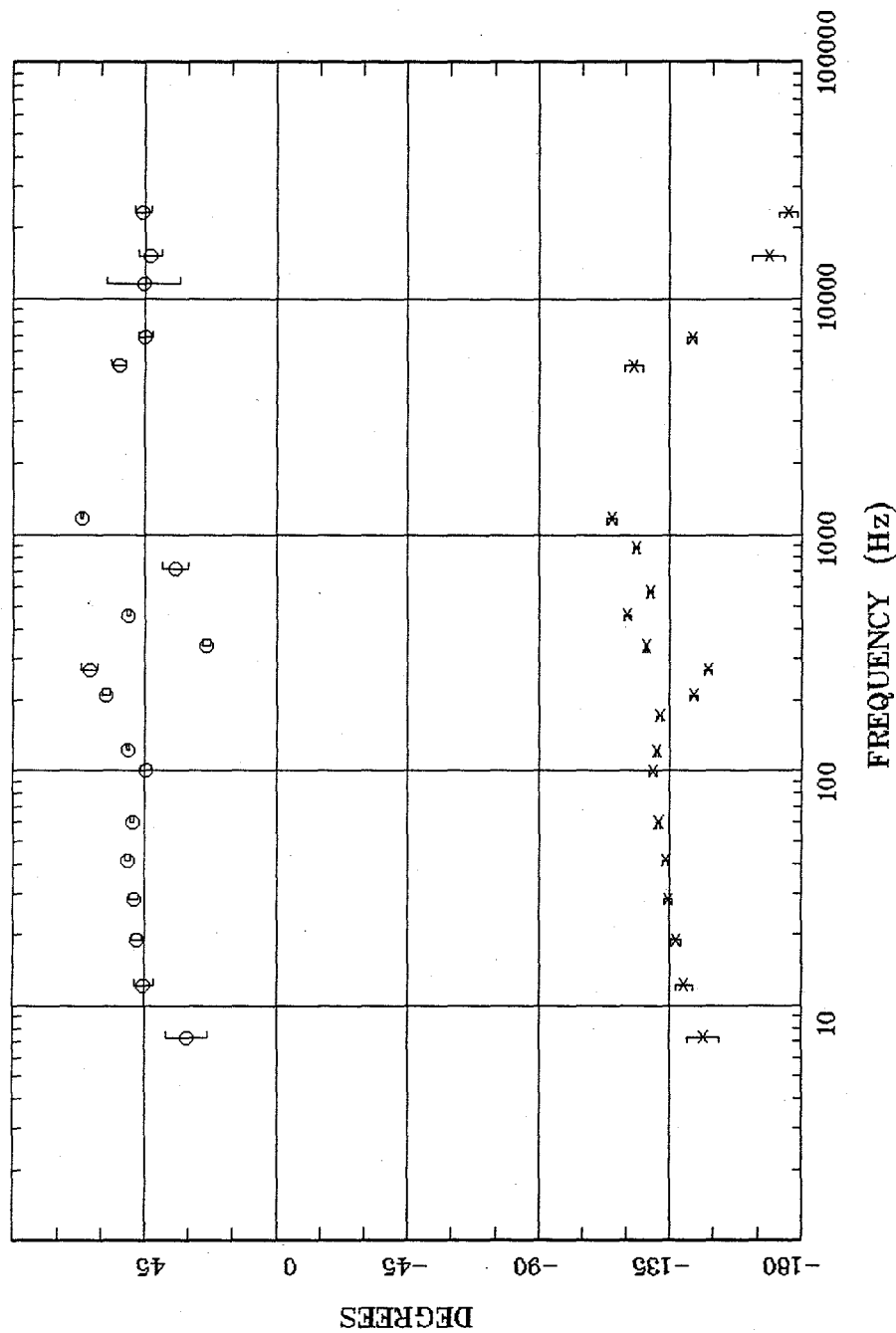


Client: Remote: remote e
 Remote: remote e
 Acquired: 14:2 Jul 11, 1997
 Survey Co:USGS
 Rotation: Rotation: File name: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:40 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4b

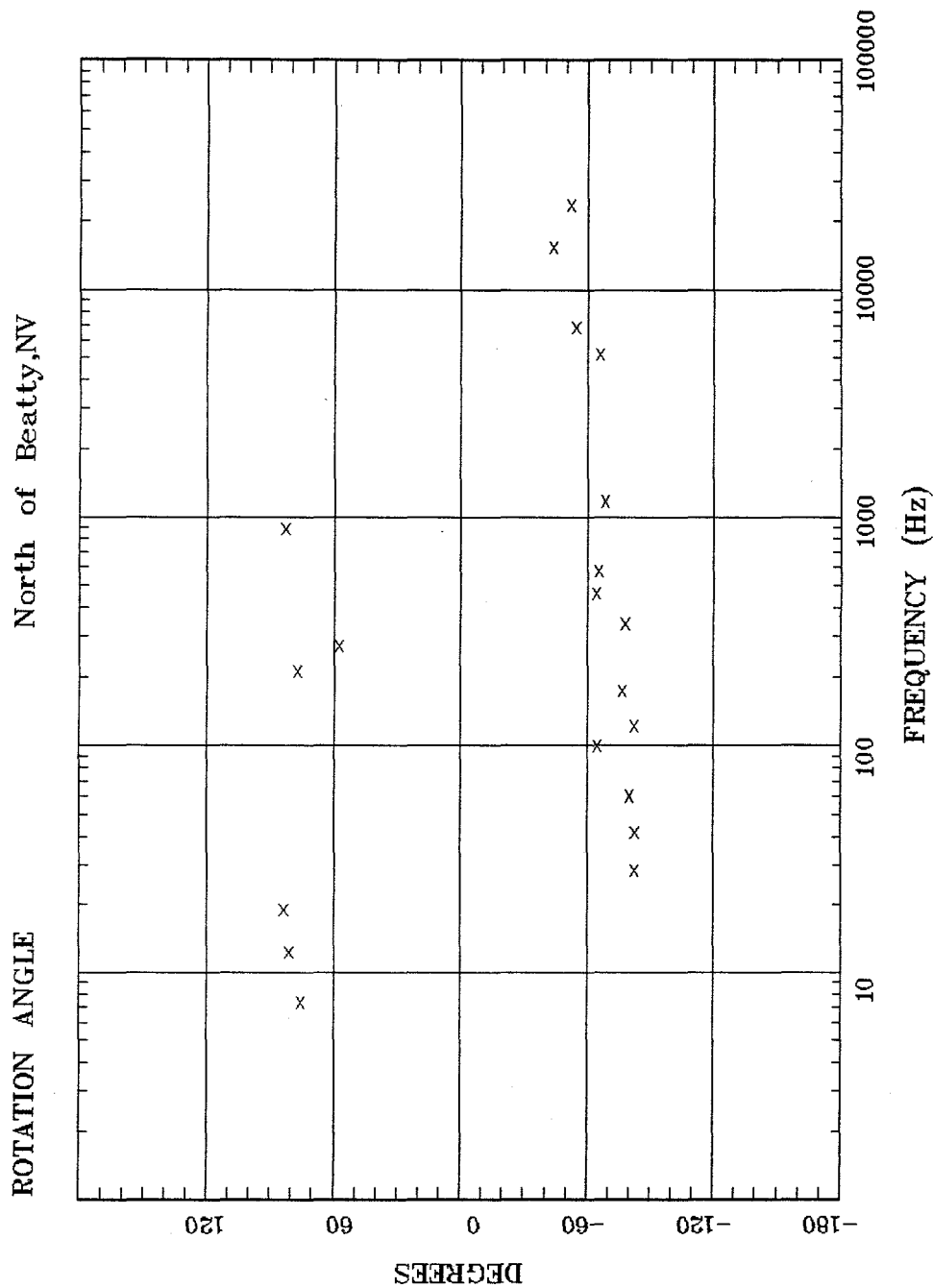
IMPEDANCE PHASE

North of Beatty, NV



Client: Remote: remote e
 Remote: remote e
 Acquired: 14:2 Jul 11, 1997
 Survey Co:USGS
 Rotation: Filename: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:40 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4c



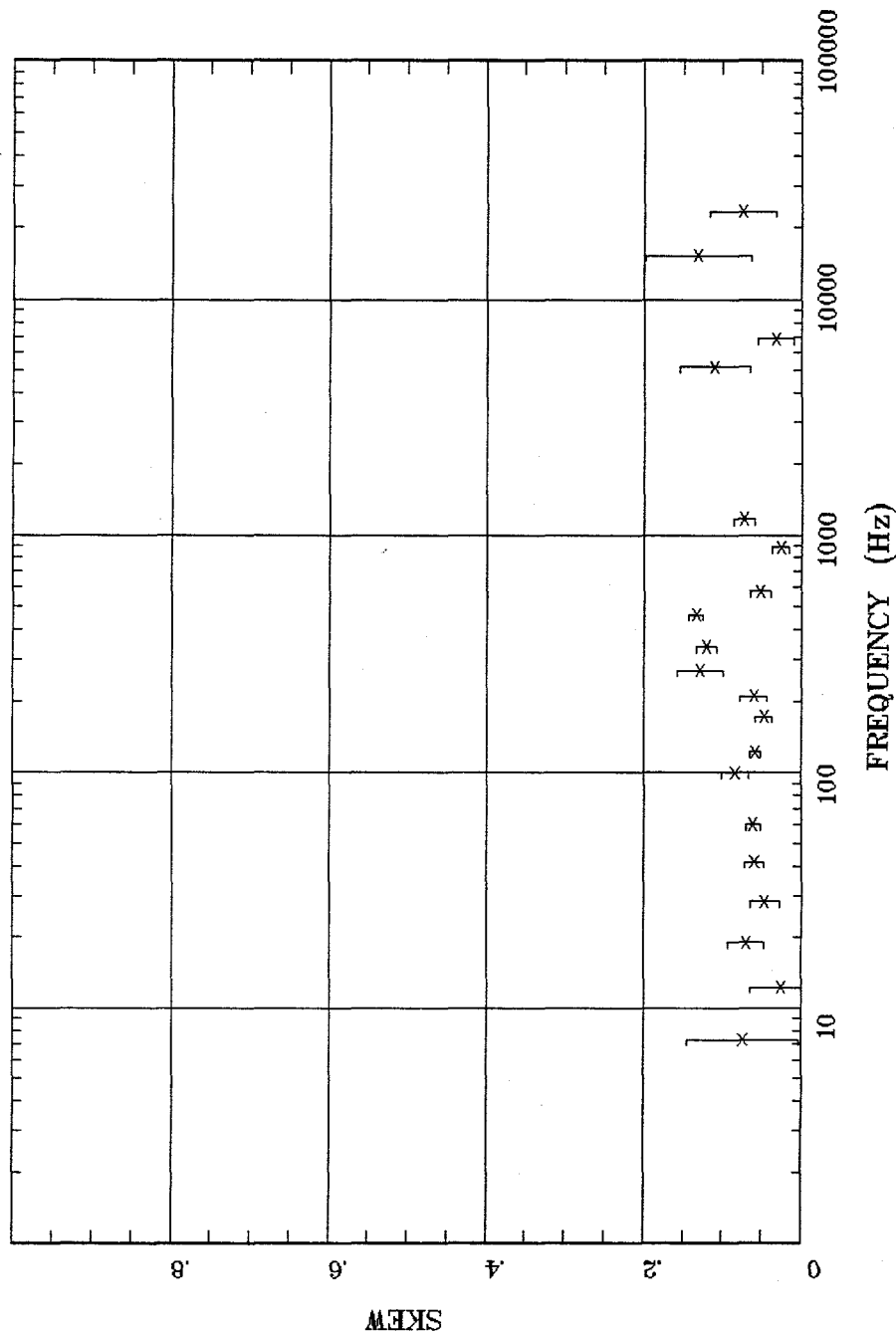
Client: Remote: remote e
 Remote: remote e
 Acquired: 14:2 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:40 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4d

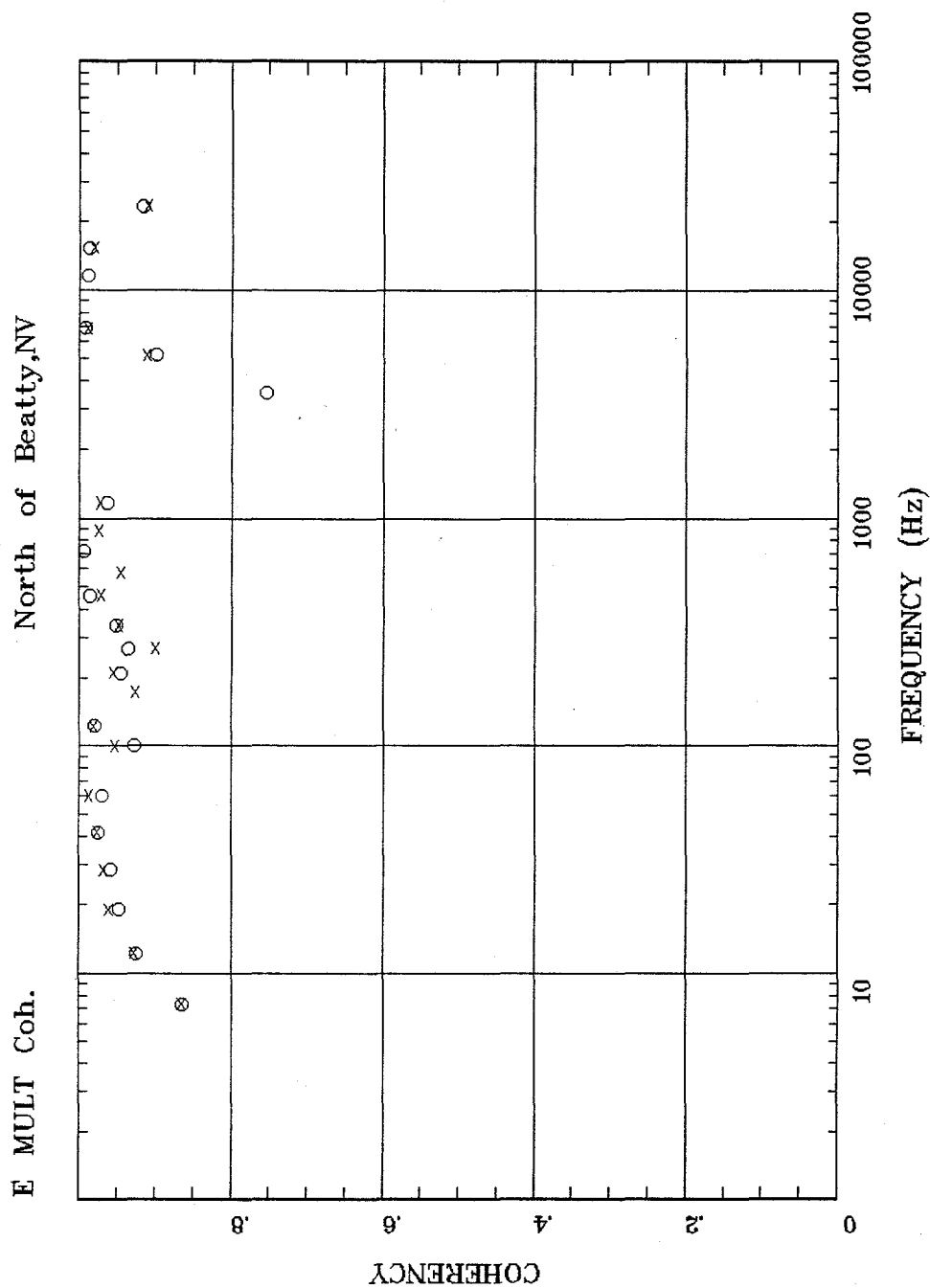
IMPEDANCE SKEW

North of Beatty, NV



Client: Remote: remote e
 Rotation: File: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:2 Jul 11, 1997
 Survey Co: USGS
 < EMI - ElectroMagnetic Instruments >

Fig. 4e



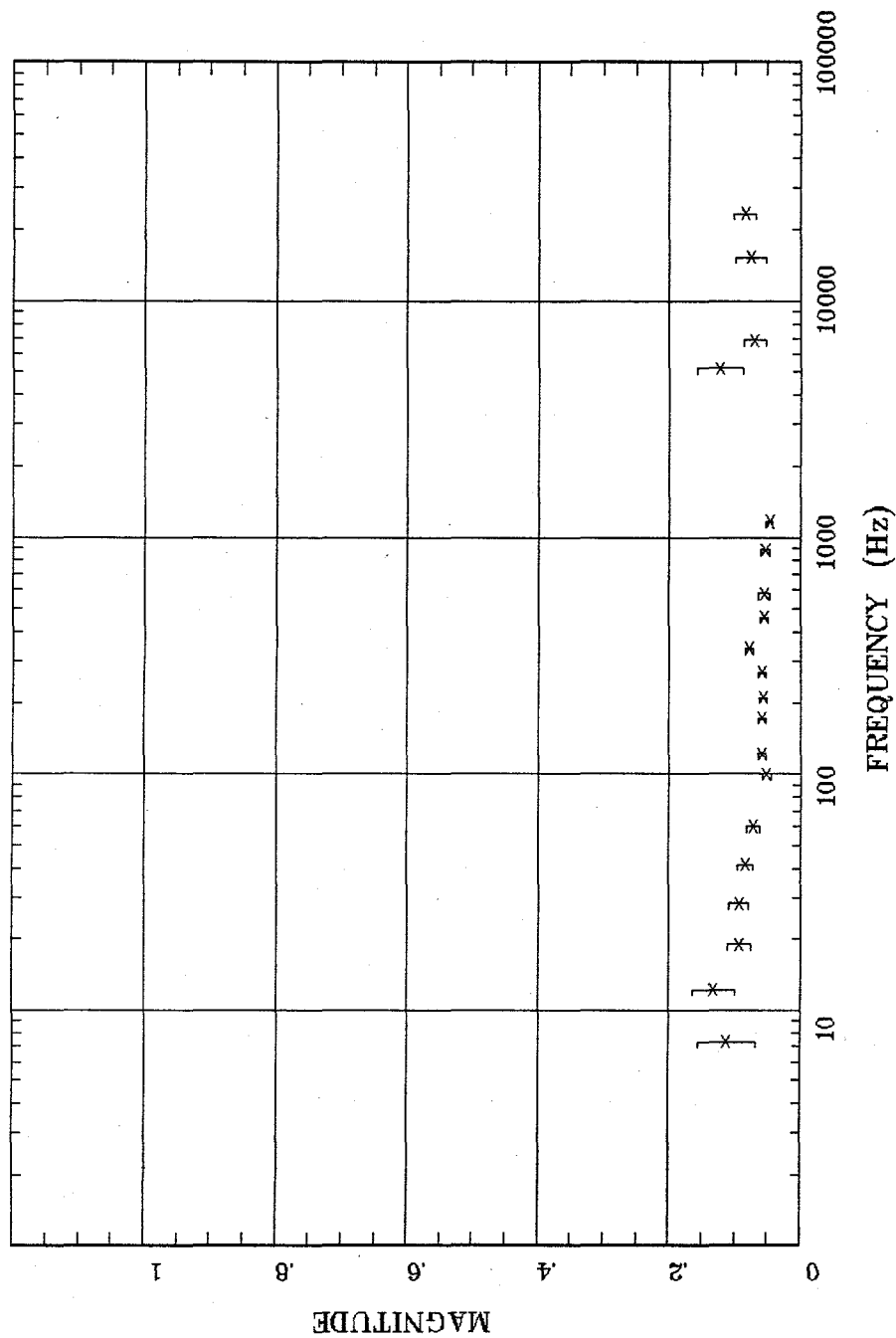
Client: Remote: remote e
 Remote: remote e
 Acquired: 14:2 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:41 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4f

TIPPER MAGNITUDE

North of Beatty, NV



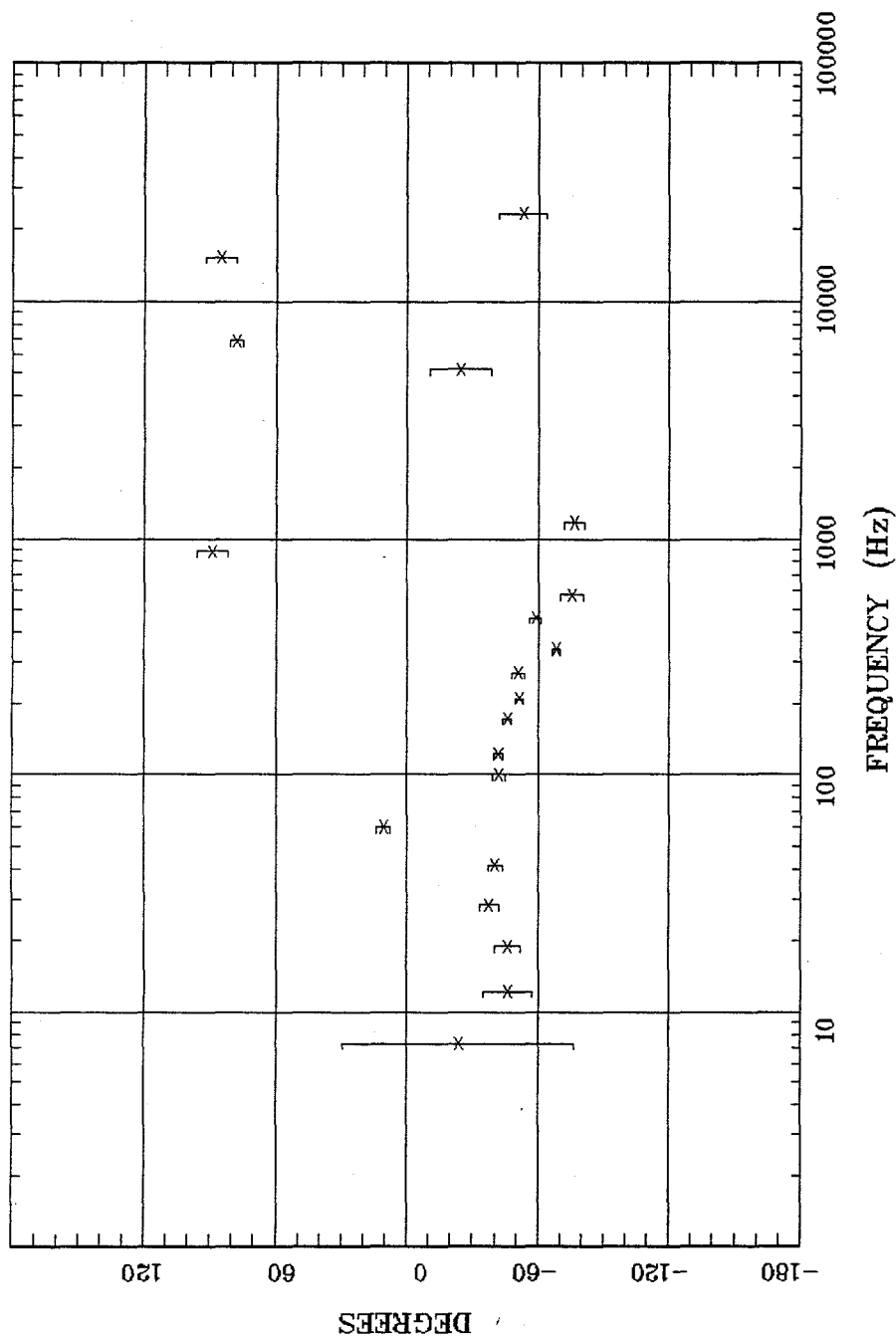
Client: Remote: remote e
 Acquired: 14:2 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:41 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4g

TIPPER STRIKE

North of Beatty, NV

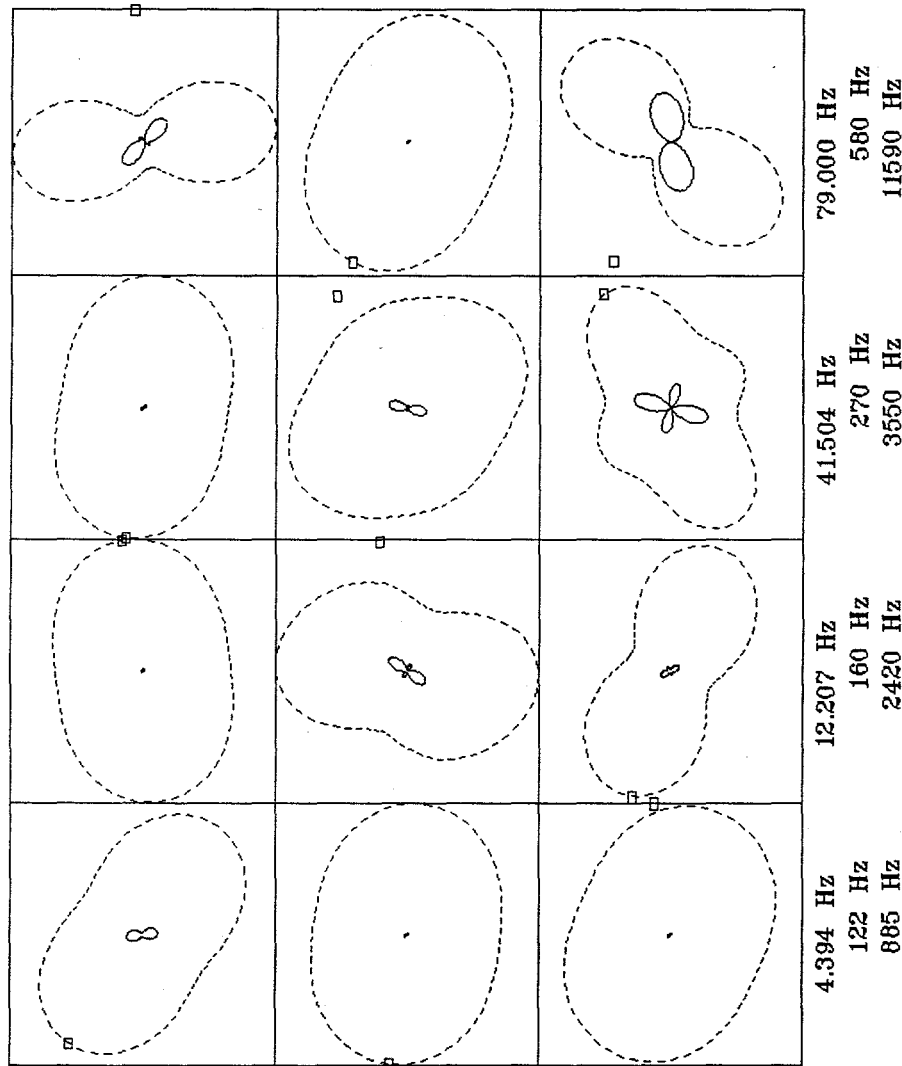


Client: Remote: remote e
 Remoted: 14:2 Jul 11, 1997
 Survey Co:USGS
 Rotation: Filename: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:41 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4h

POLAR PLOTS

North of Beatty, NV

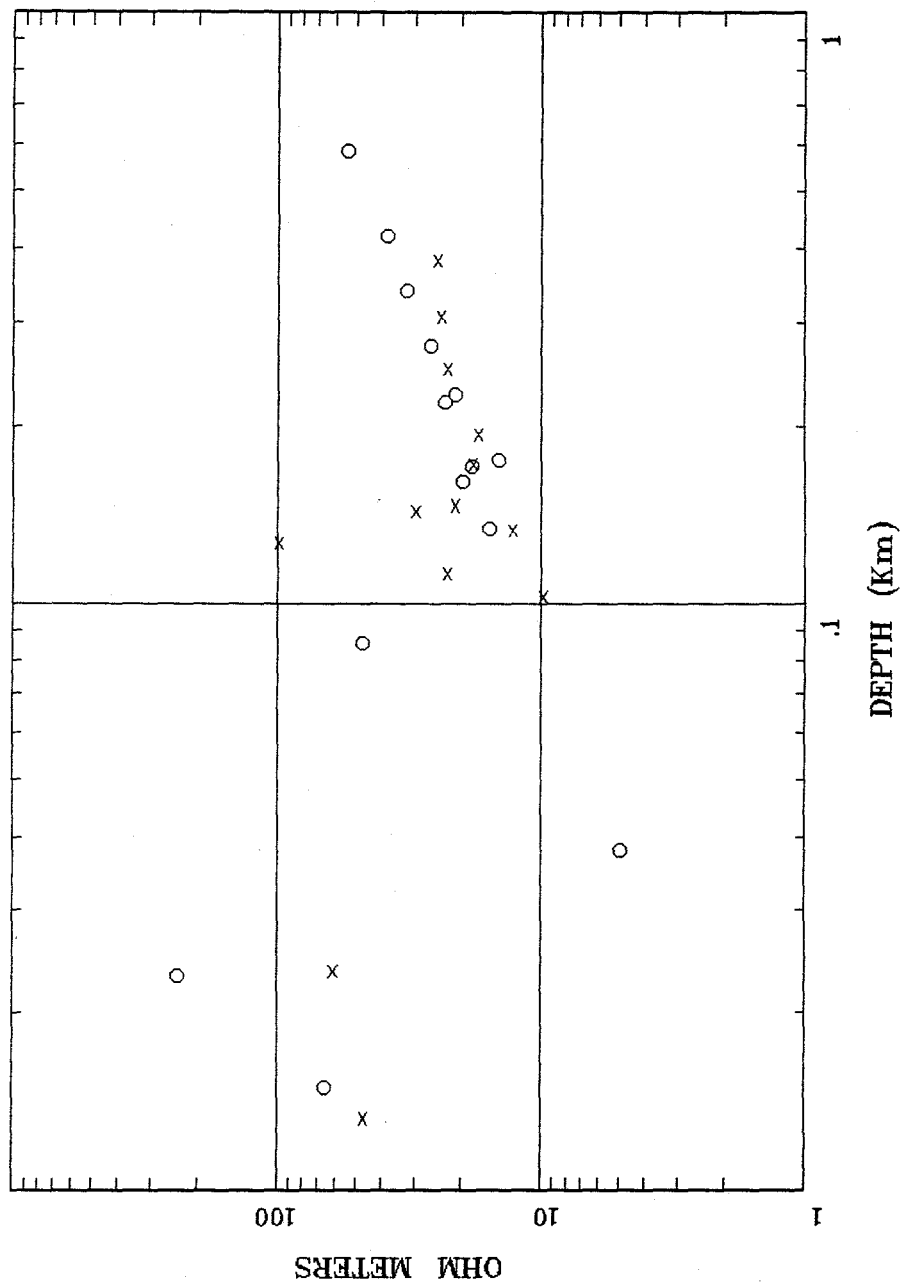


Client: Remote: remote e
 Acquired: 14:2 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba04com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:41 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 4i

Resistivity (Bostick Inv.)

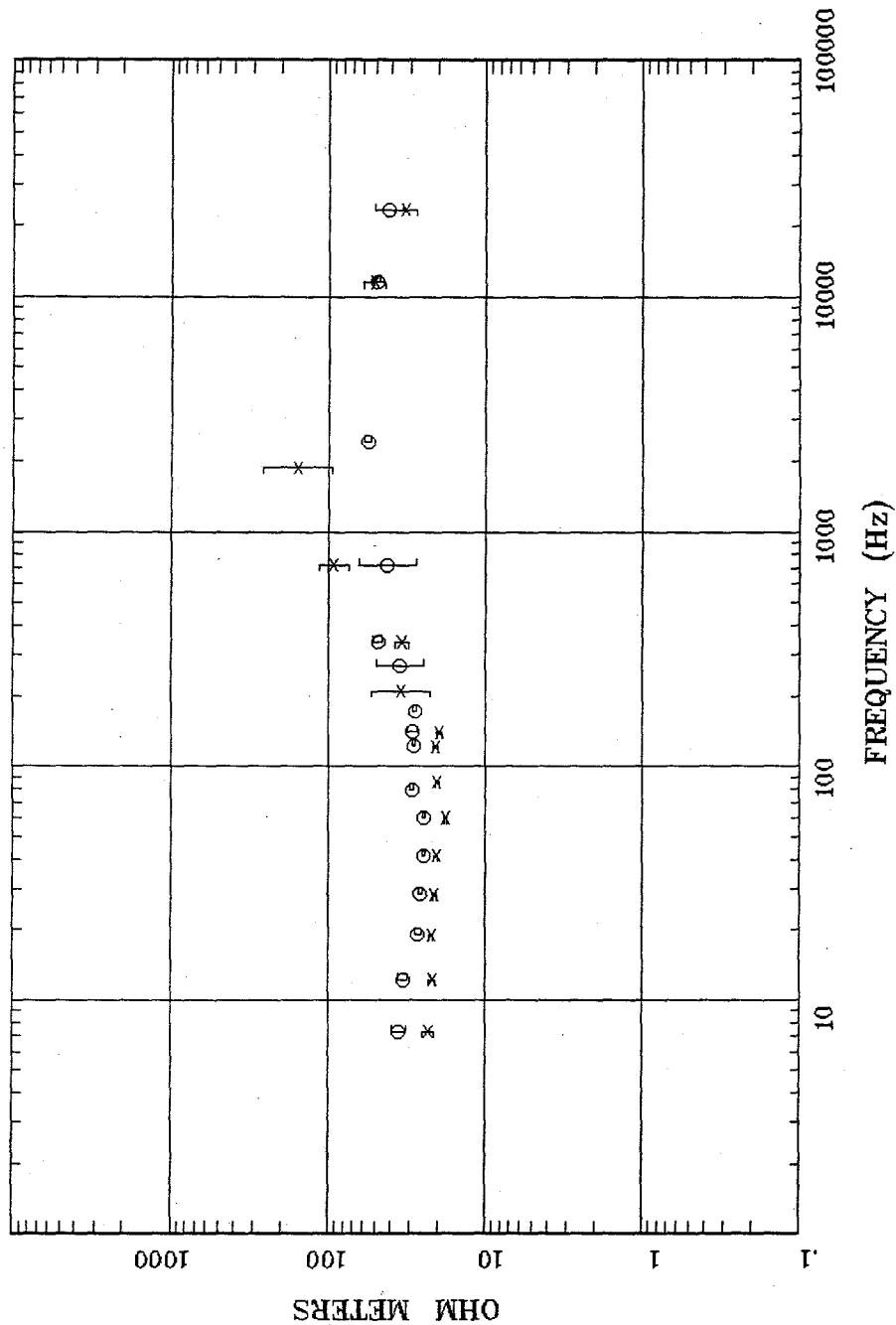


Client: Rotation: File: aba05com.all
 Remote: Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Acquired: 15:1 Jul 11, 1997 Plotted: 15:32 Jul 11, 1997
 Survey Co: < EMI - ElectroMagnetic Instruments >

Fig. 5a

APPARENT RESISTIVITY

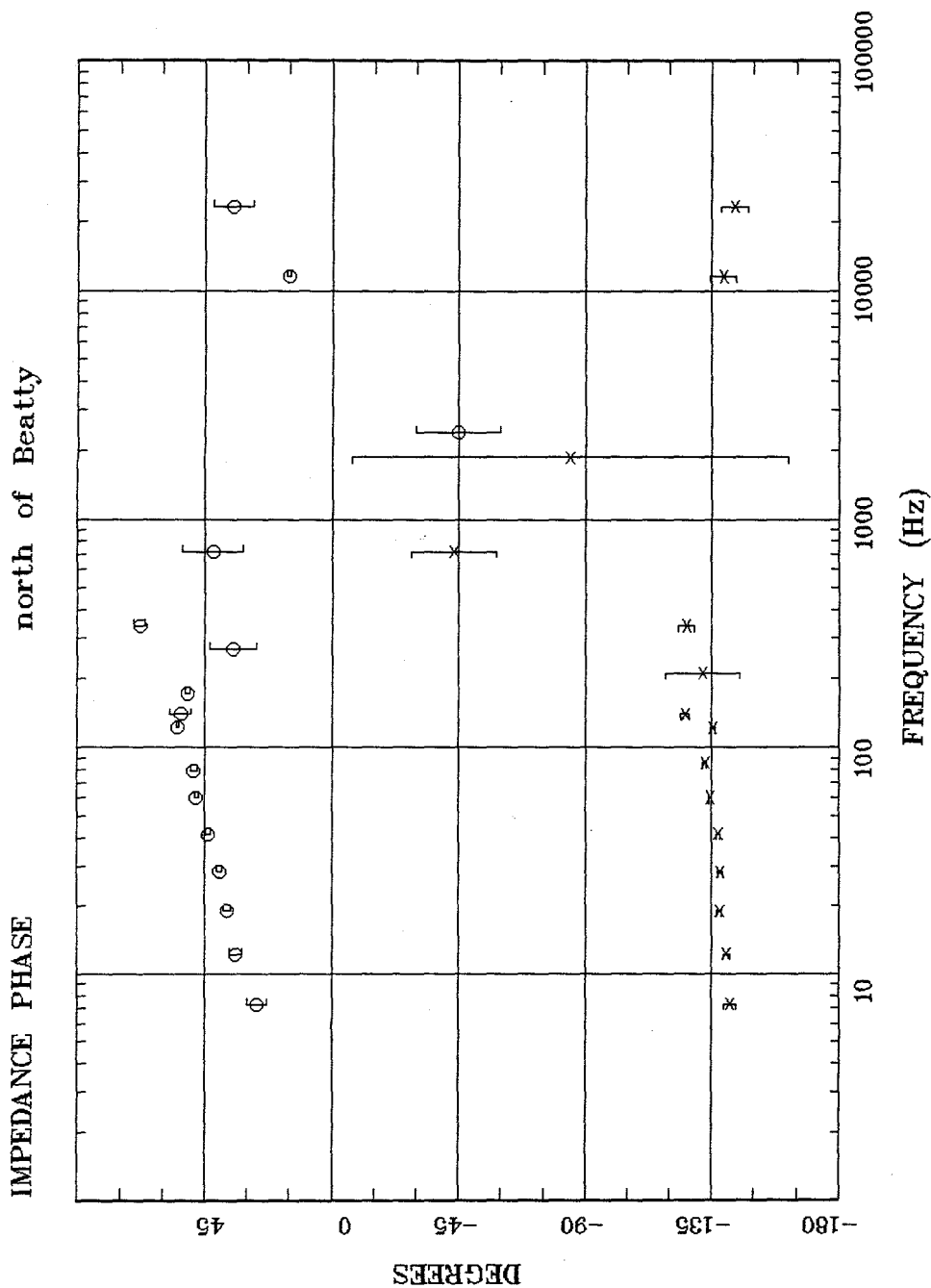
north of Beatty



Client: Remote: remote e
 Remote: remote e
 Acquired: 15:1 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba05com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 15:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

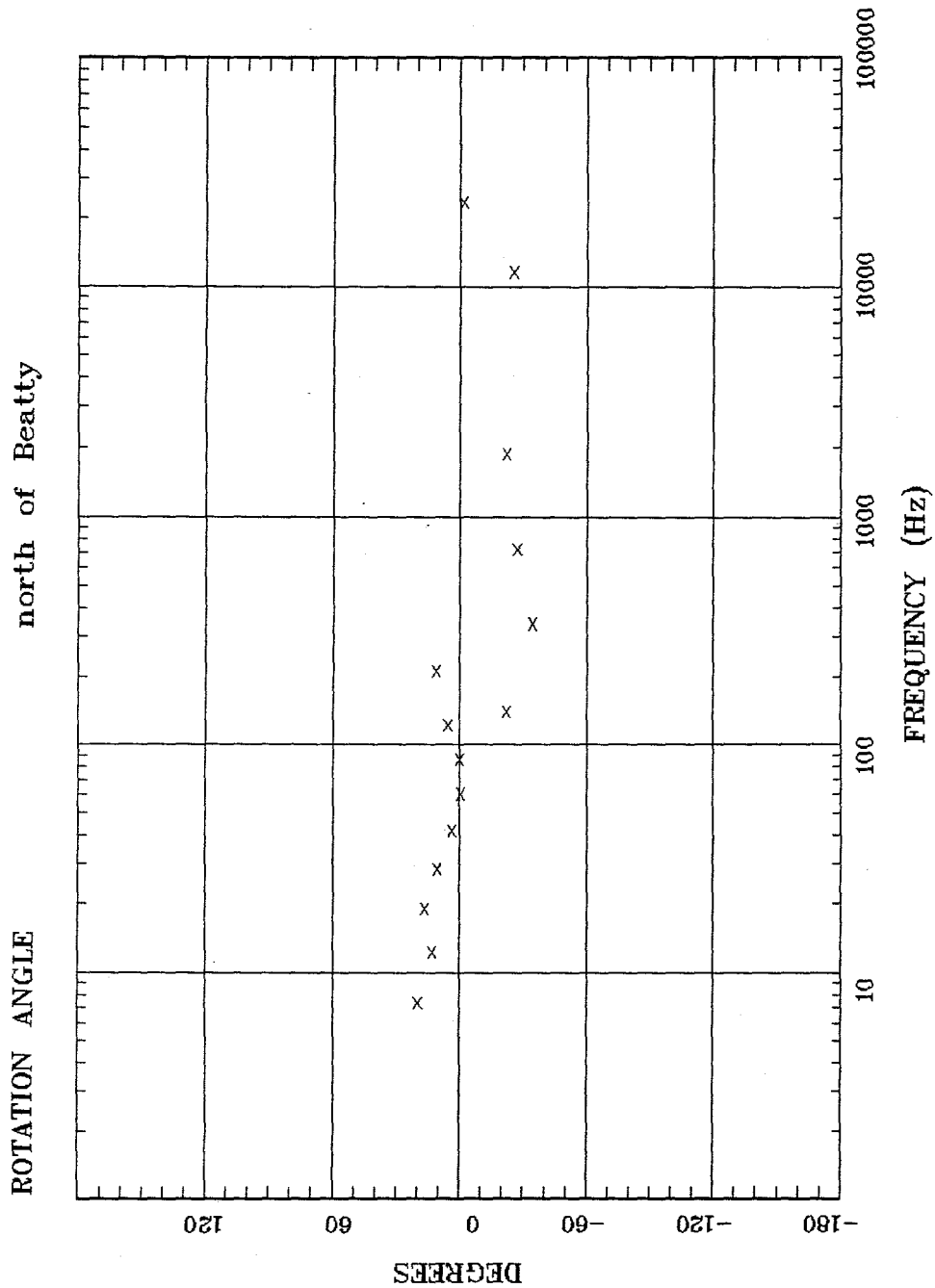
Fig. 5b



Rotation: File: aba05com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 15:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Client: Remote: remote e
 Acquired: 15:1 Jul 11, 1997
 Survey Co:USGS

Fig. 5c



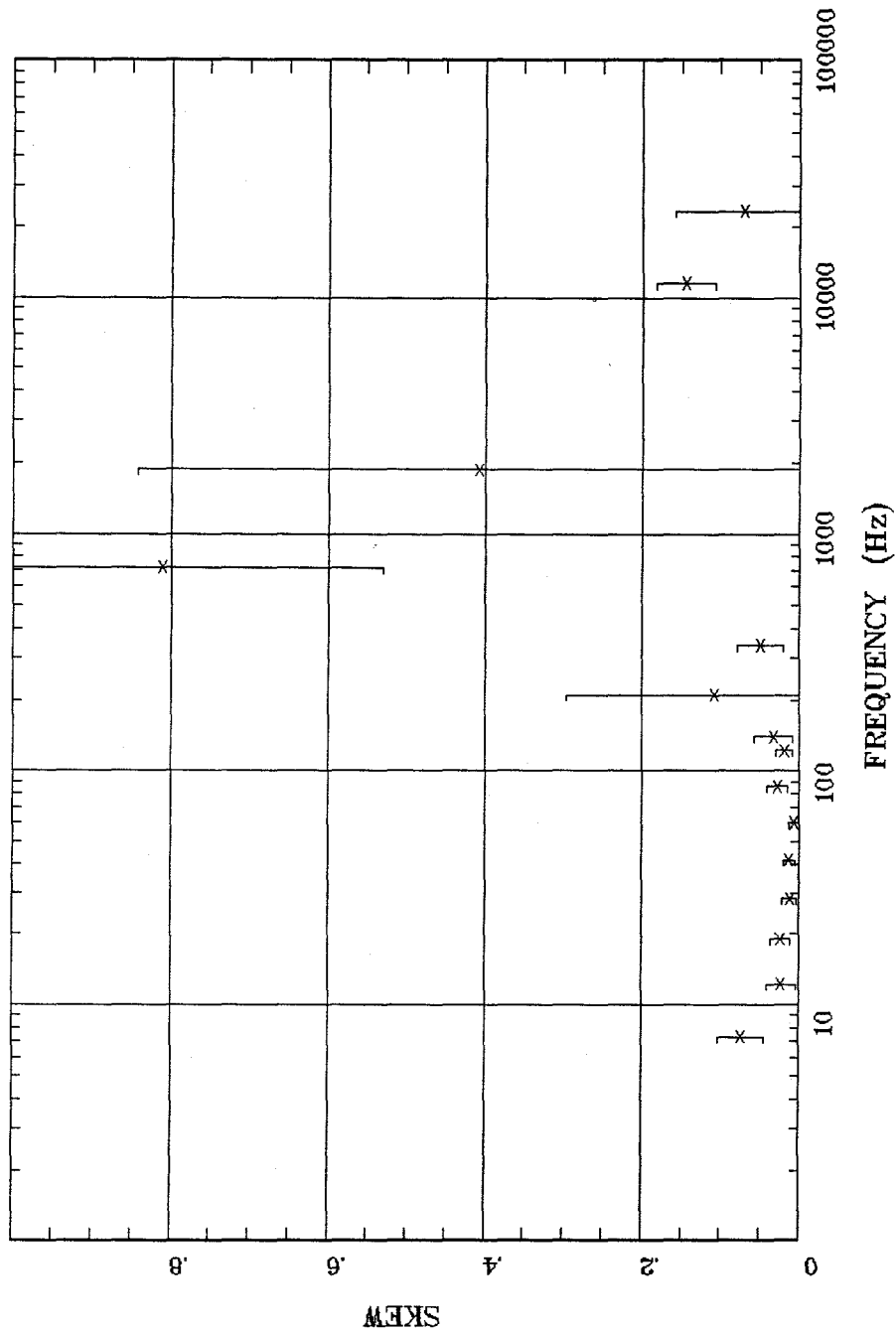
Client: Remote: remote e
 Acquired: 15:1 Jul 11, 1997
 Survey Co:USGS

Rotation: Filename: aba05com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 15:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 5d

IMPEDANCE SKEW

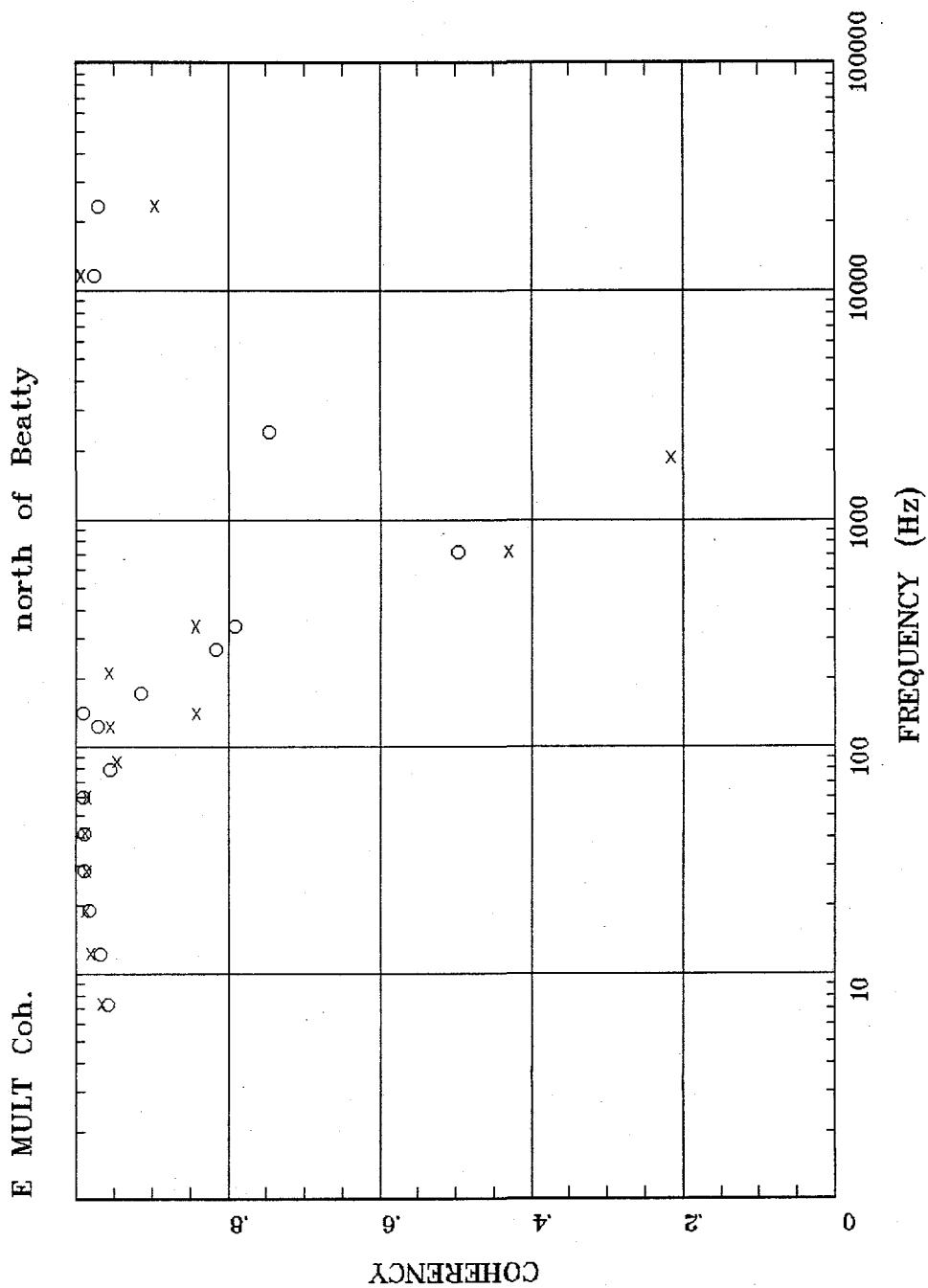
north of Beatty



Client: Remote: remote e
 Acquired: 15:1 Jul 11, 1997
 Survey Co:USGS

Rotation: Filename: aba05com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 15:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 5e



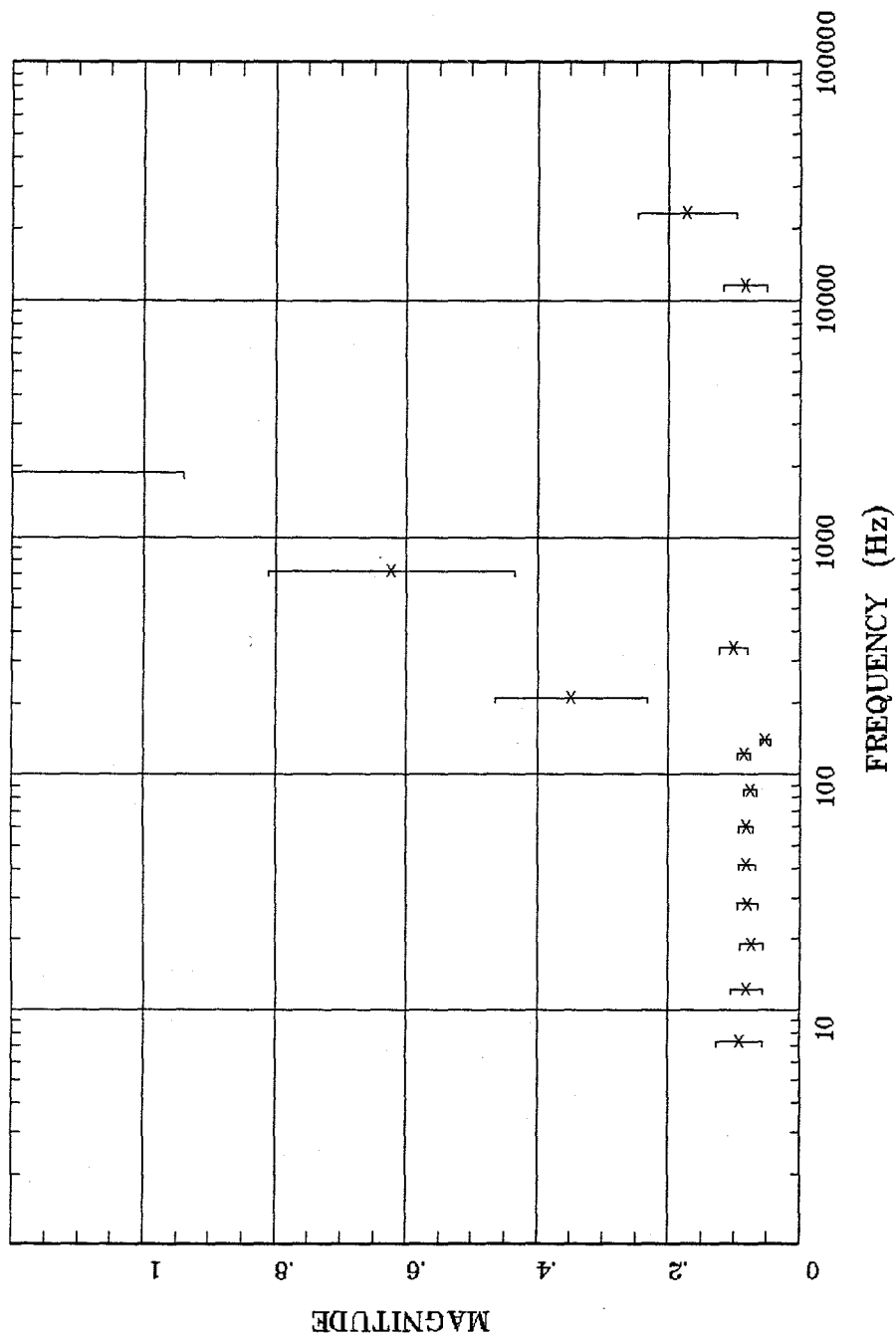
Client: Remote: remote e
 Acquired: 15:1 Jul 11, 1997
 Survey Co:USGS

Rotation: Filename: aba05com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 15:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 5f

TIPPER MAGNITUDE

north of Beatty



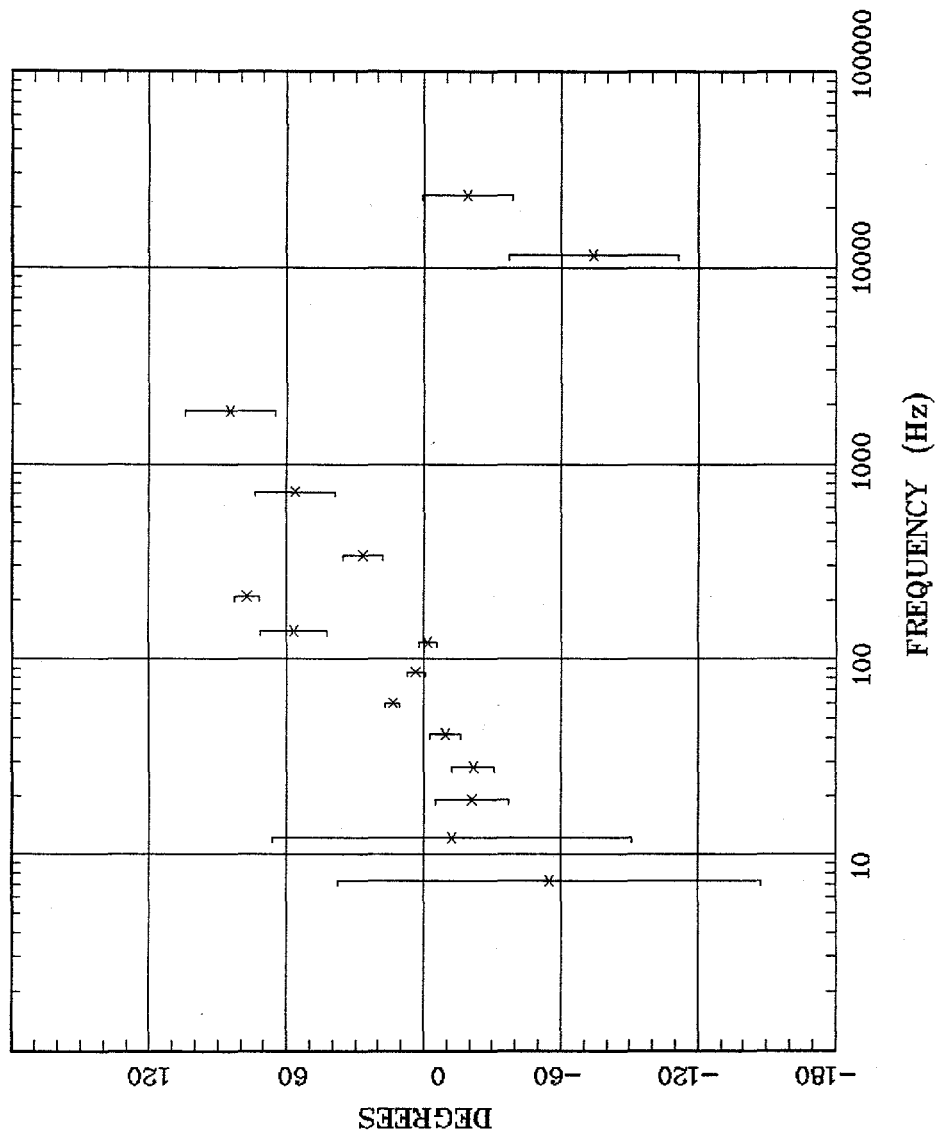
Rotation:
 Filename: aba05com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 15:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Client:
 Remote: remote e
 Acquired: 15:1 Jul 11, 1997
 Survey Co:USGS

Fig. 5g

TIPPER STRIKE

north of Beatty



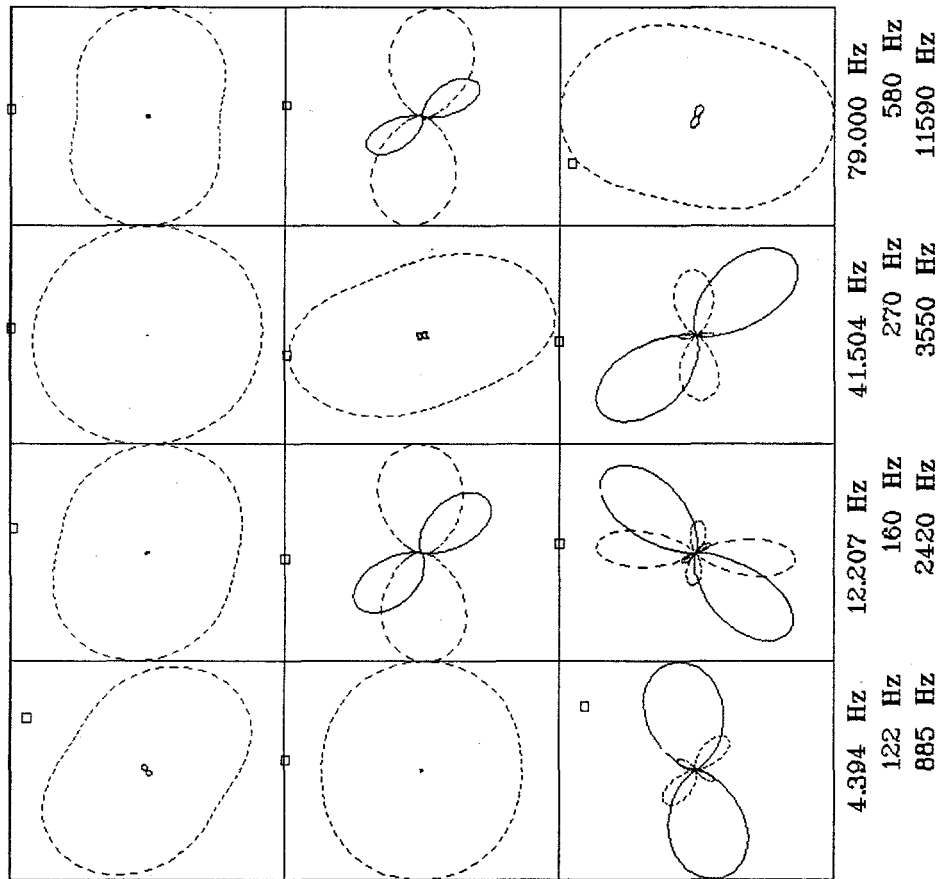
Client: Remote: remote e
Acquired: 15:1 Jul 11, 1997
Survey Co:USGS

Rotation: Filename: aba05com.all
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 C
Plotted: 15:32 Jul 11, 1997
< EMI - ElectroMagnetic Instruments

Fig. 5h

POLAR PLOTS

north of Beatty

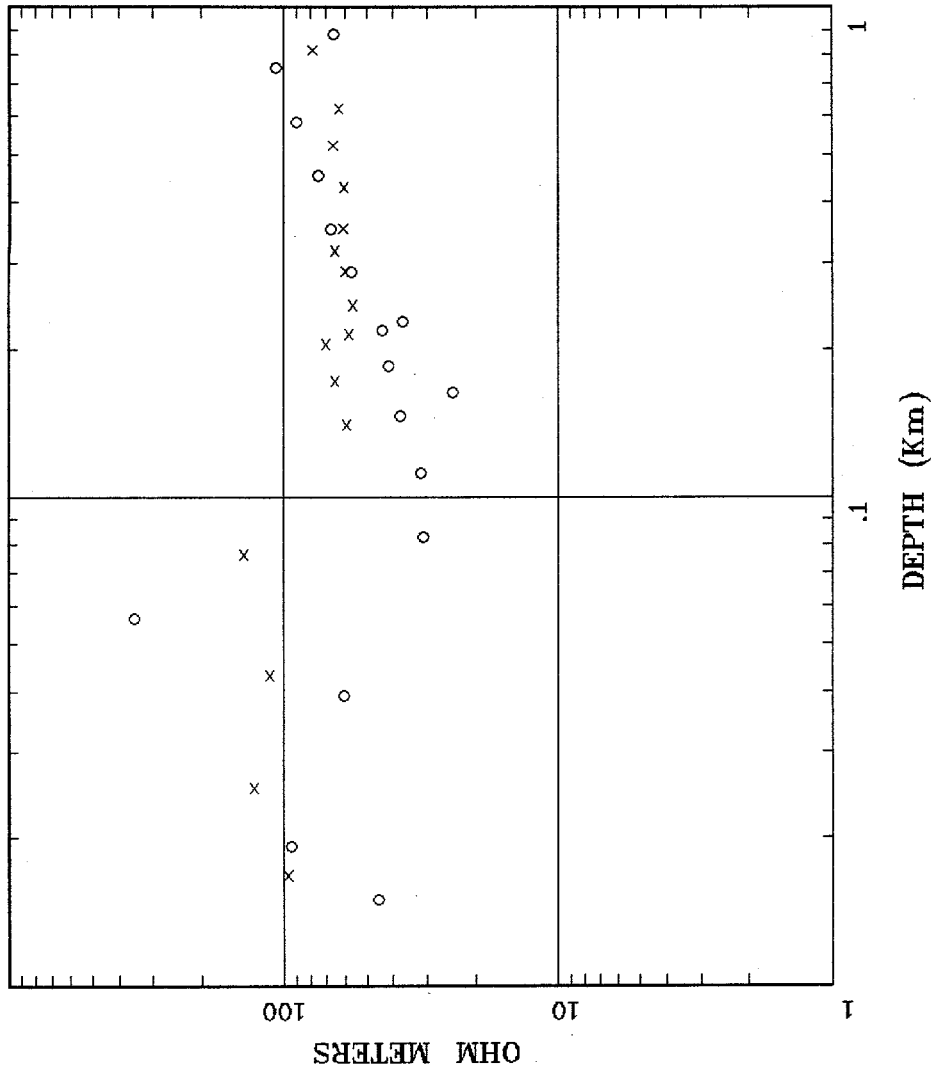


Rotation:

Client: File name: aba05com.all
 Remote: remote e Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Acquired: 15:1 Jul 11, 1997 Plotted: 15:32 Jul 11, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments >

Fig. 5i

Resistivity (Bostick Inv.)

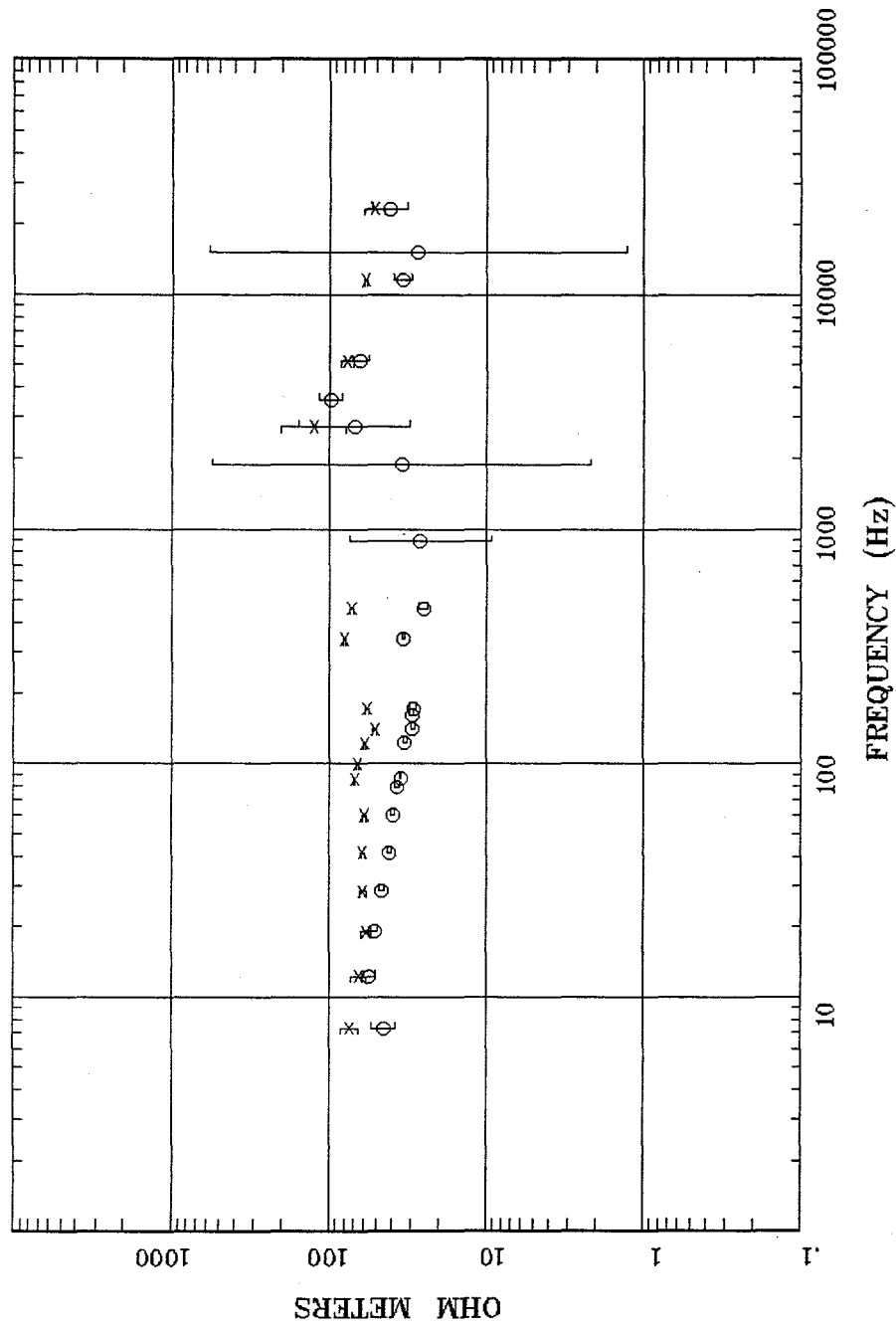


Client: Rotation:
 Remote: Filename: aba06com.all
 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2
 Acquired: 21:3 Jun 10, 1997 Plotted: 14:11 Jul 10, 1997
 Survey Co: < EMI - ElectroMagnetic Instruments

Fig. 6a

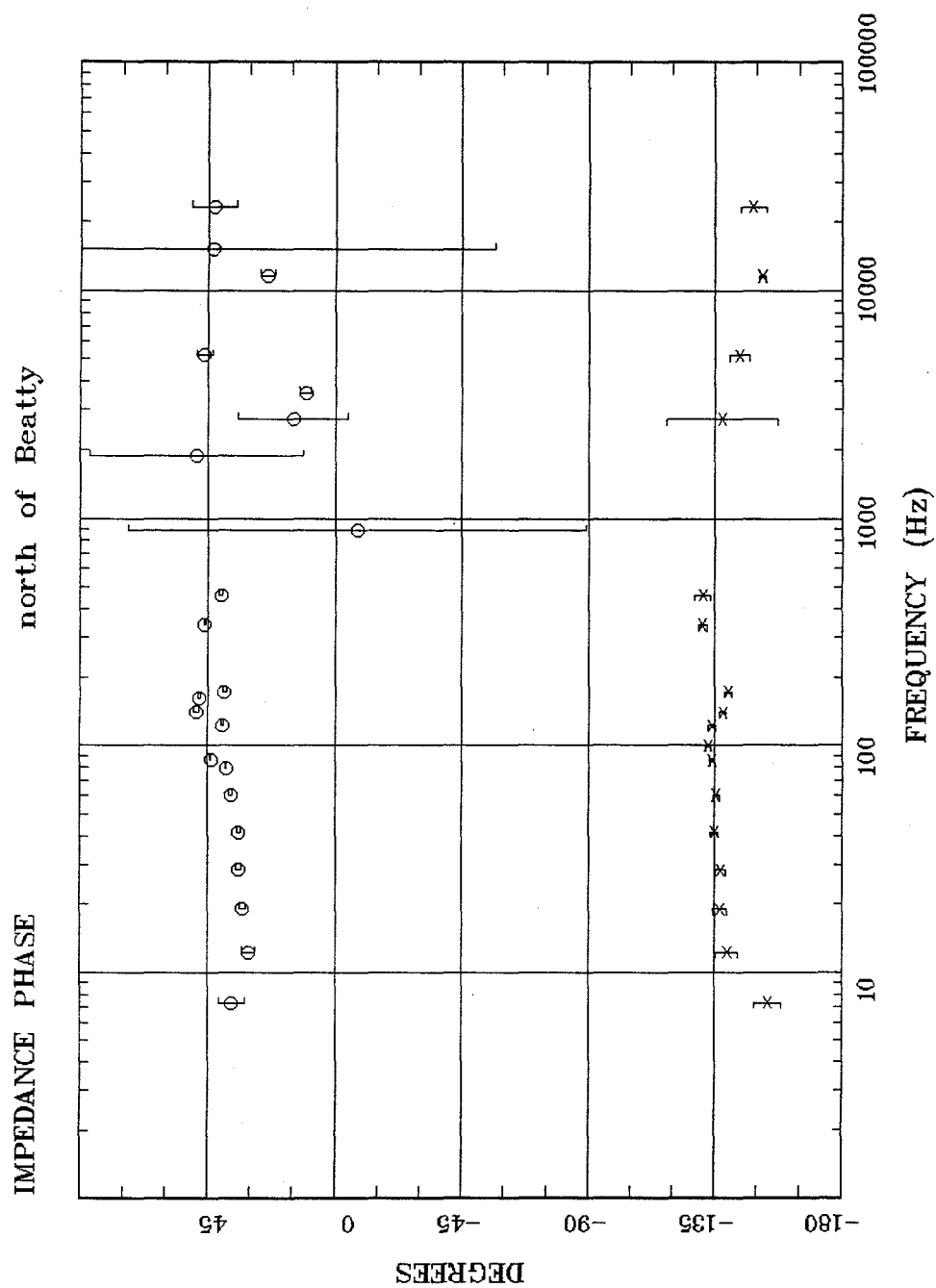
APPARENT RESISTIVITY

north of Beatty



Client: Remote: remote e
 Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS
 Rotation: Filename: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:11 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

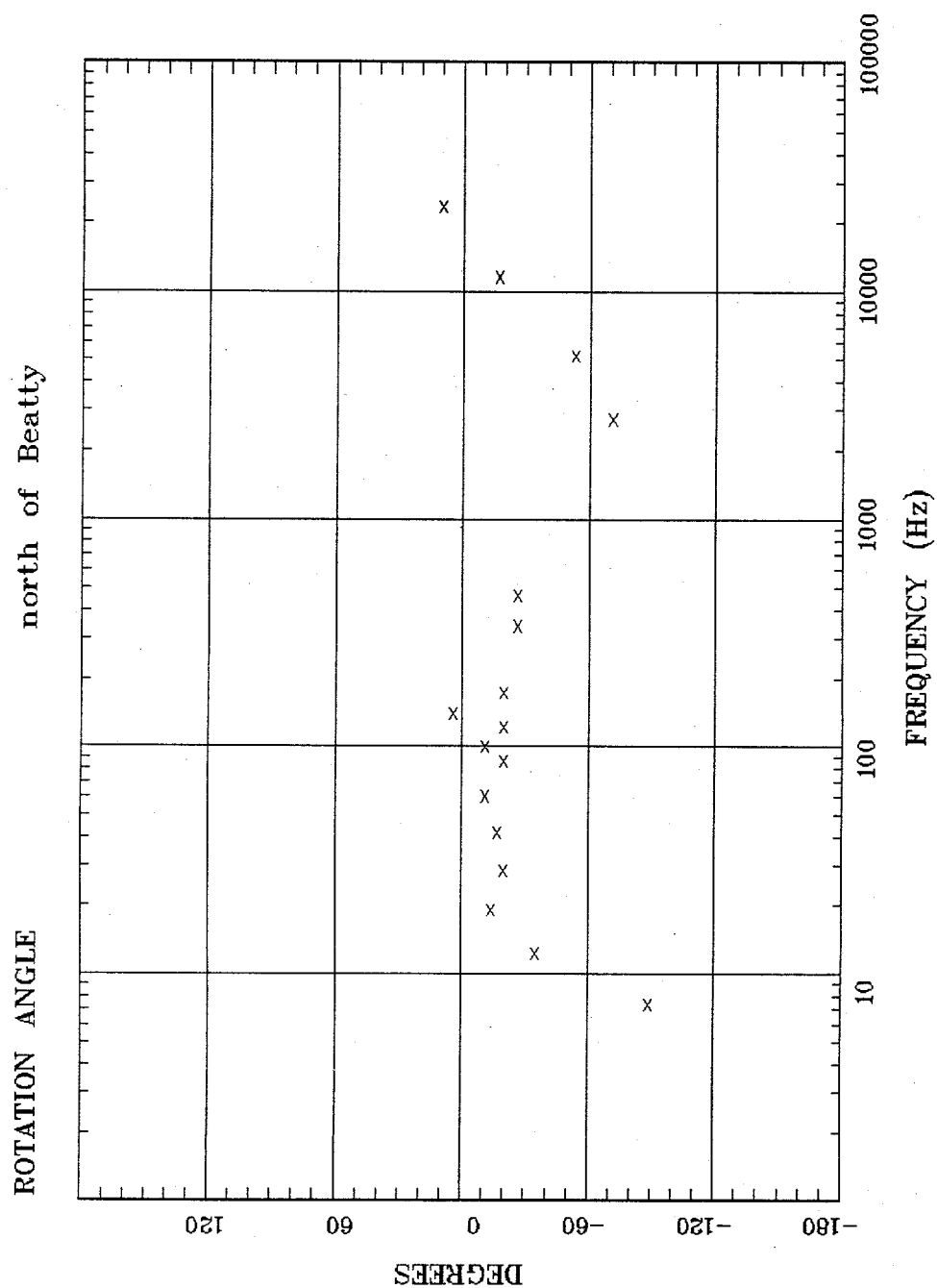
Fig. 6b



Client: Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS

Rotation: Filename: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:11 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

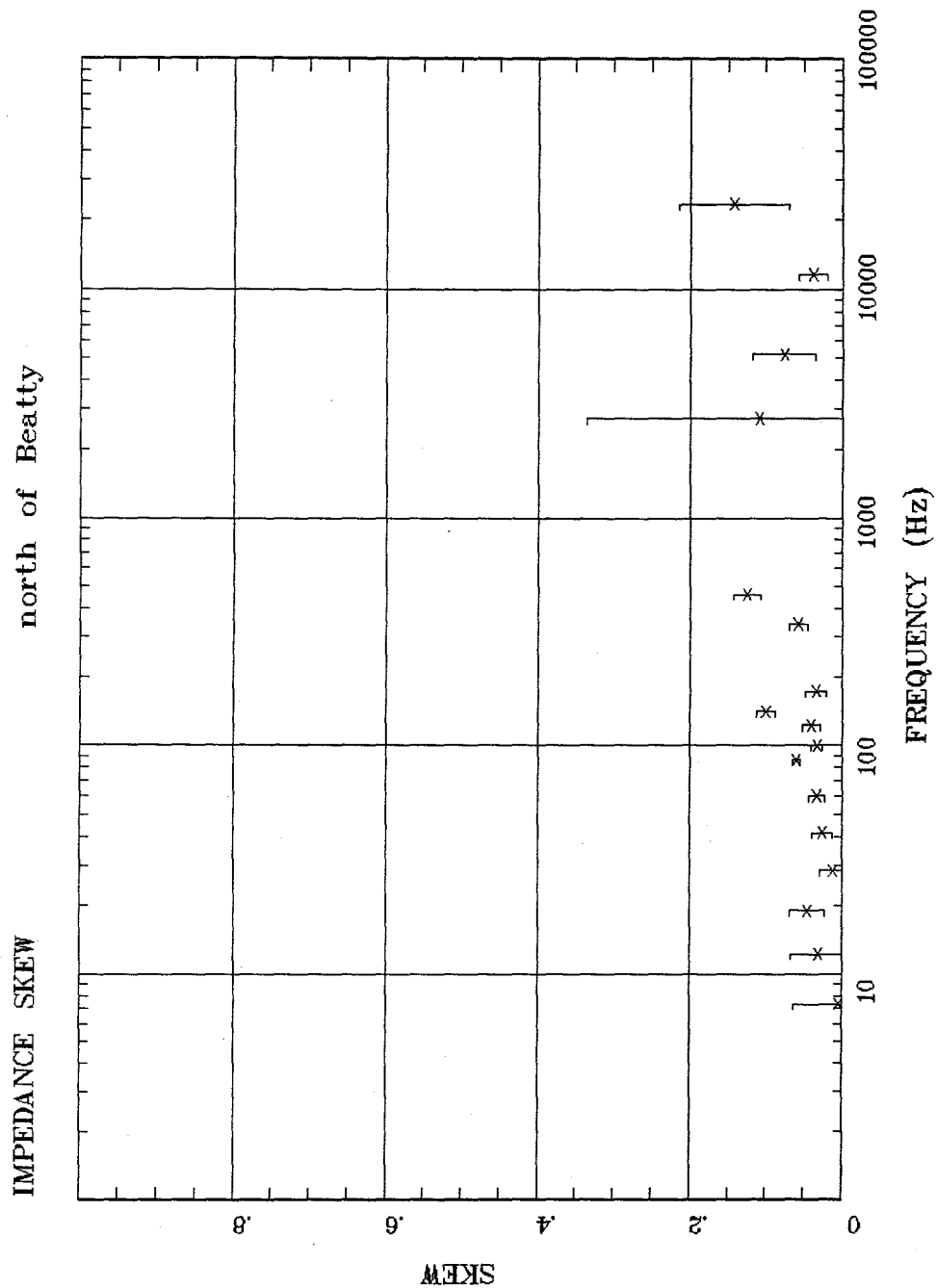
Fig. 6c



Client: Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS

Rotation: Filename: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:12 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

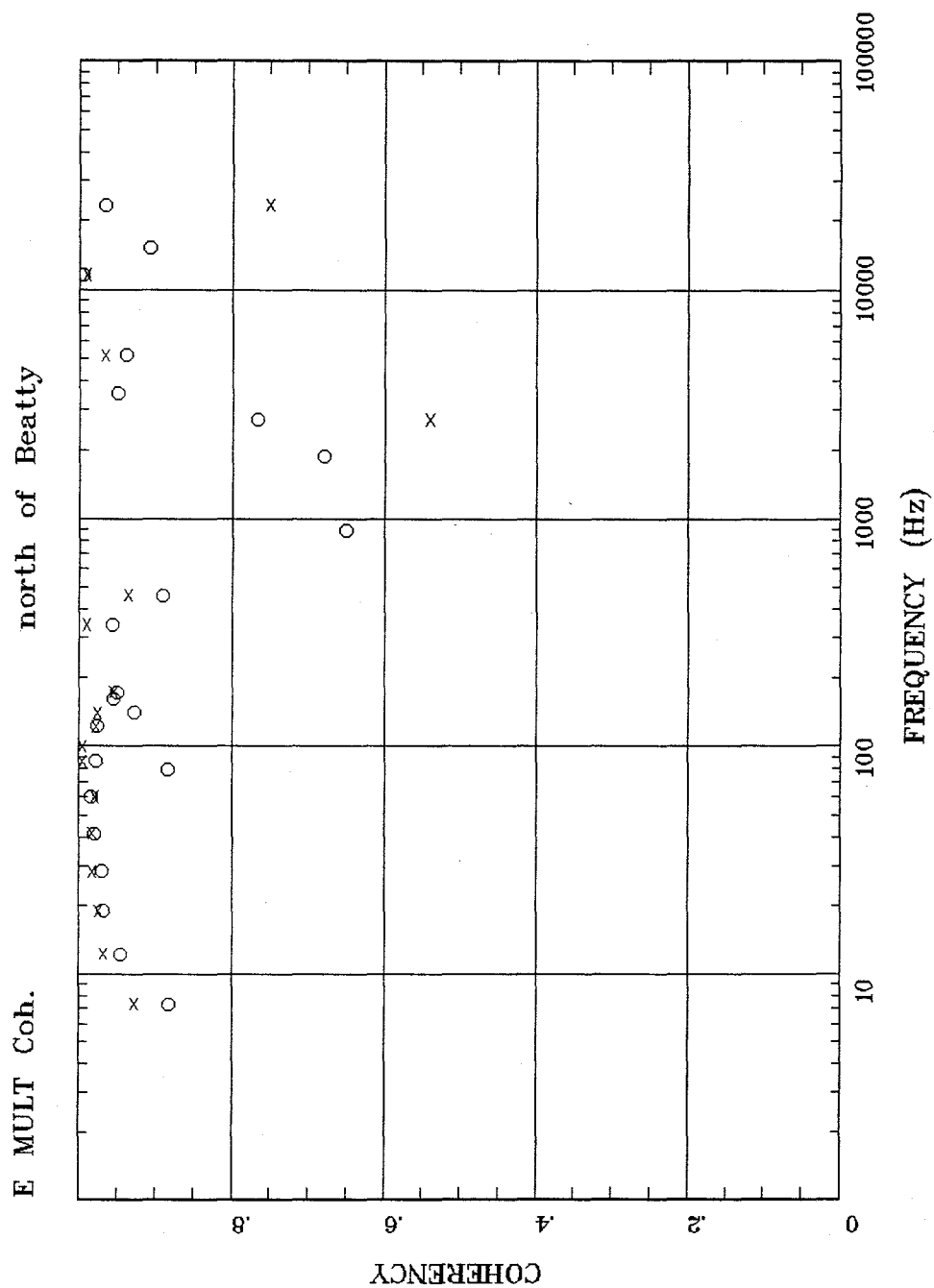
Fig. 6d



Client: Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS

Rotation: File:aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:12 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 6e



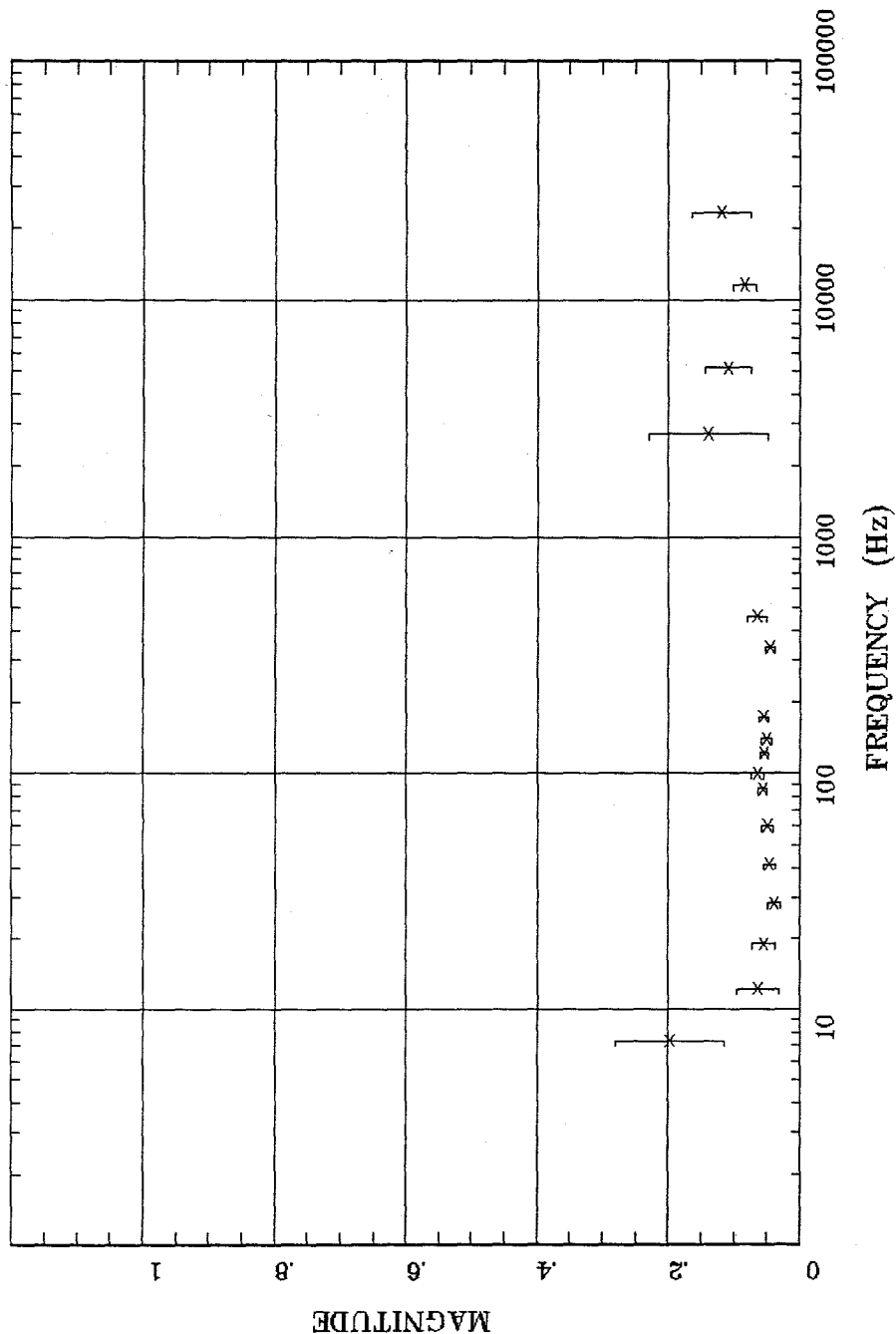
Client: Remote: remote e
 Remoted: 21:3 Jun 10, 1997
 Survey Co:USGS

Rotation: Rotation: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:12 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 6f

TIPPER MAGNITUDE

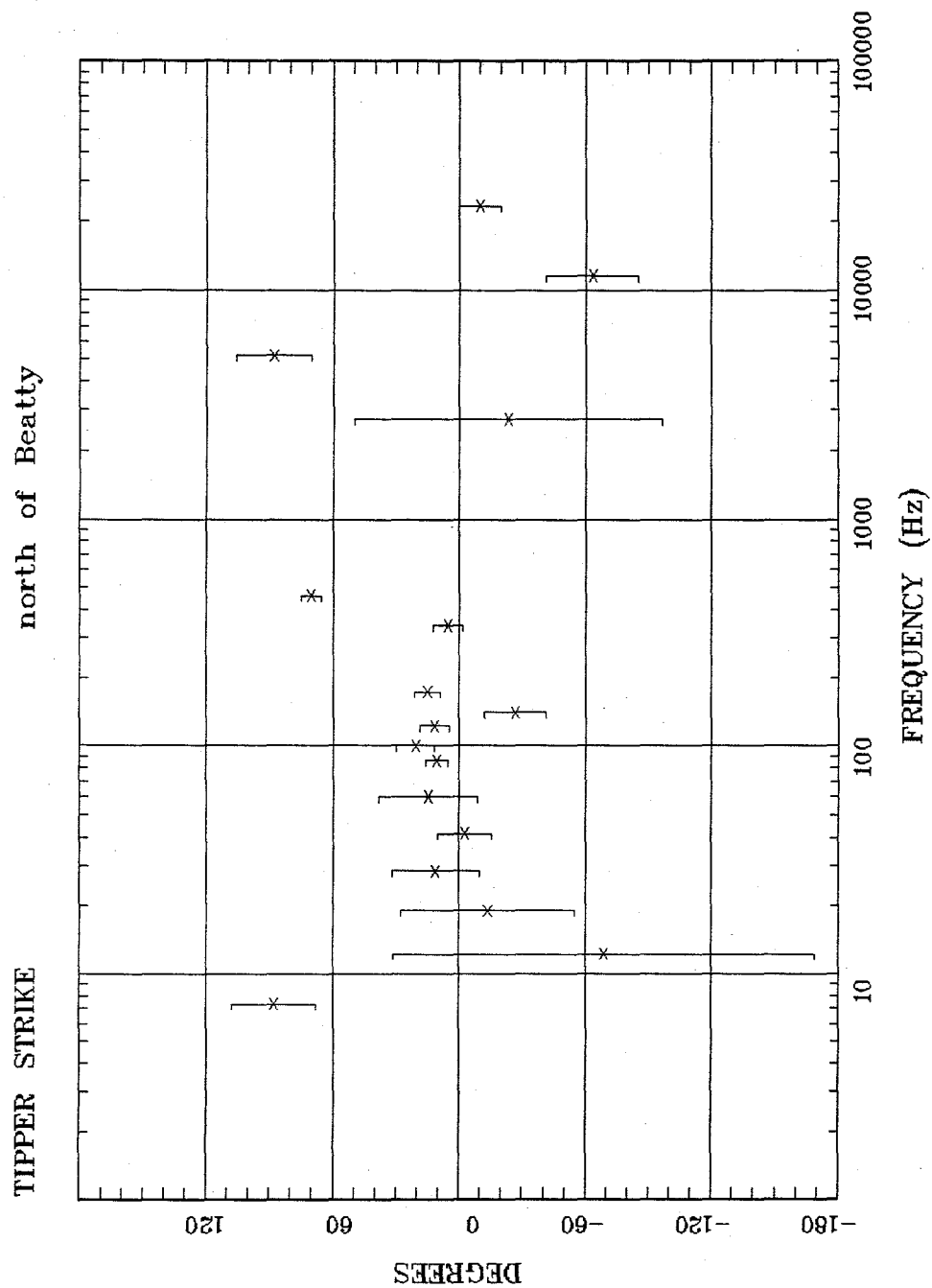
north of Beatty



Client: Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS

Rotation: Filename: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:12 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 6g



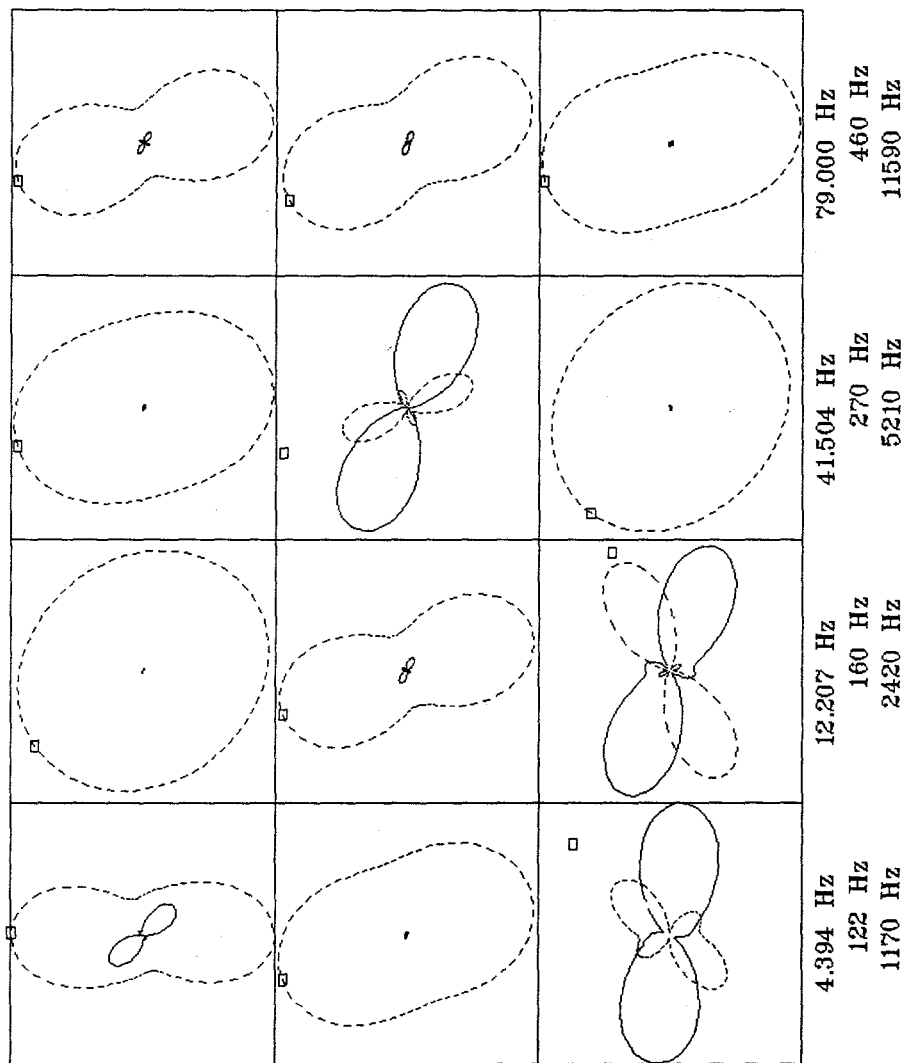
Rotation: Rotation:
 Filename: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:12 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

Client: Client:
 Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS

Fig. 6h

POLAR PLOTS

north of Beatty

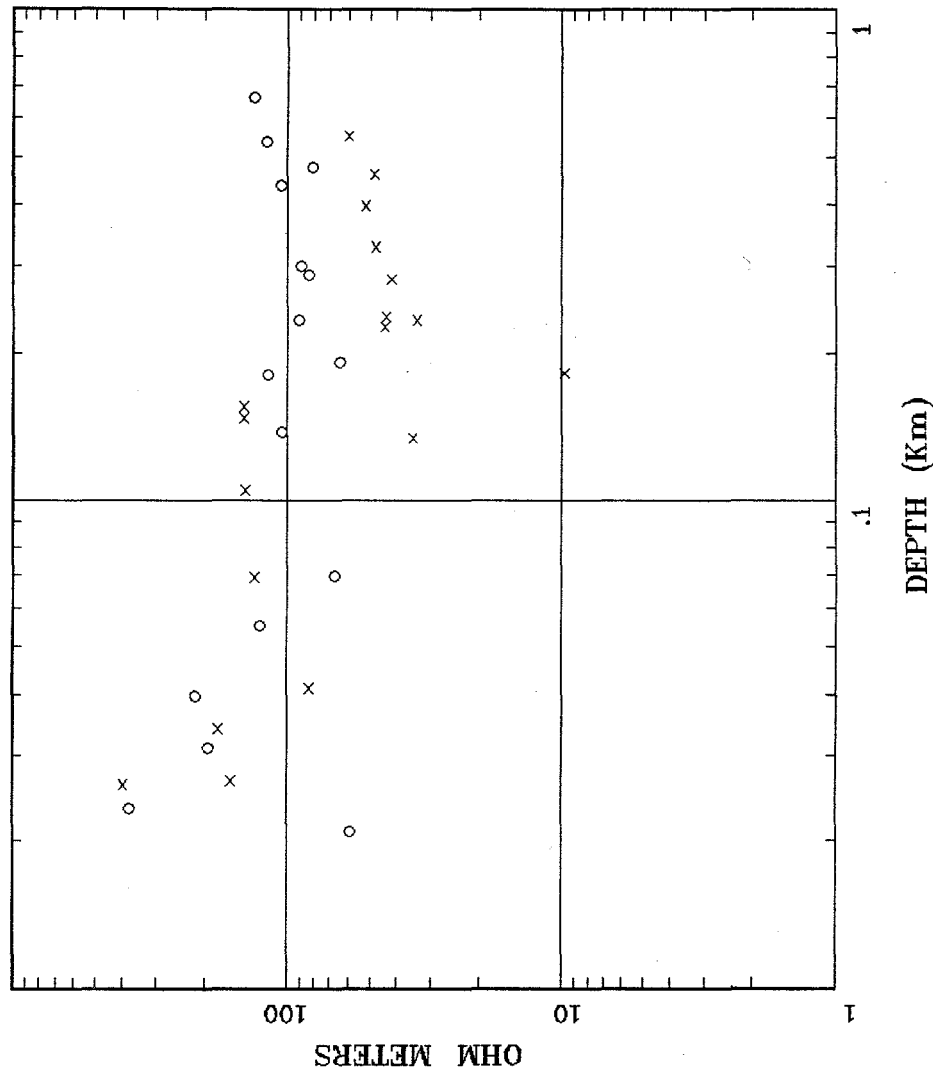


Client: Remote: remote e
 Acquired: 21:3 Jun 10, 1997
 Survey Co:USGS

Rotation:
 Filename: aba06com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 14:12 Jul 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 6i

Resistivity (Bostick Inv.)

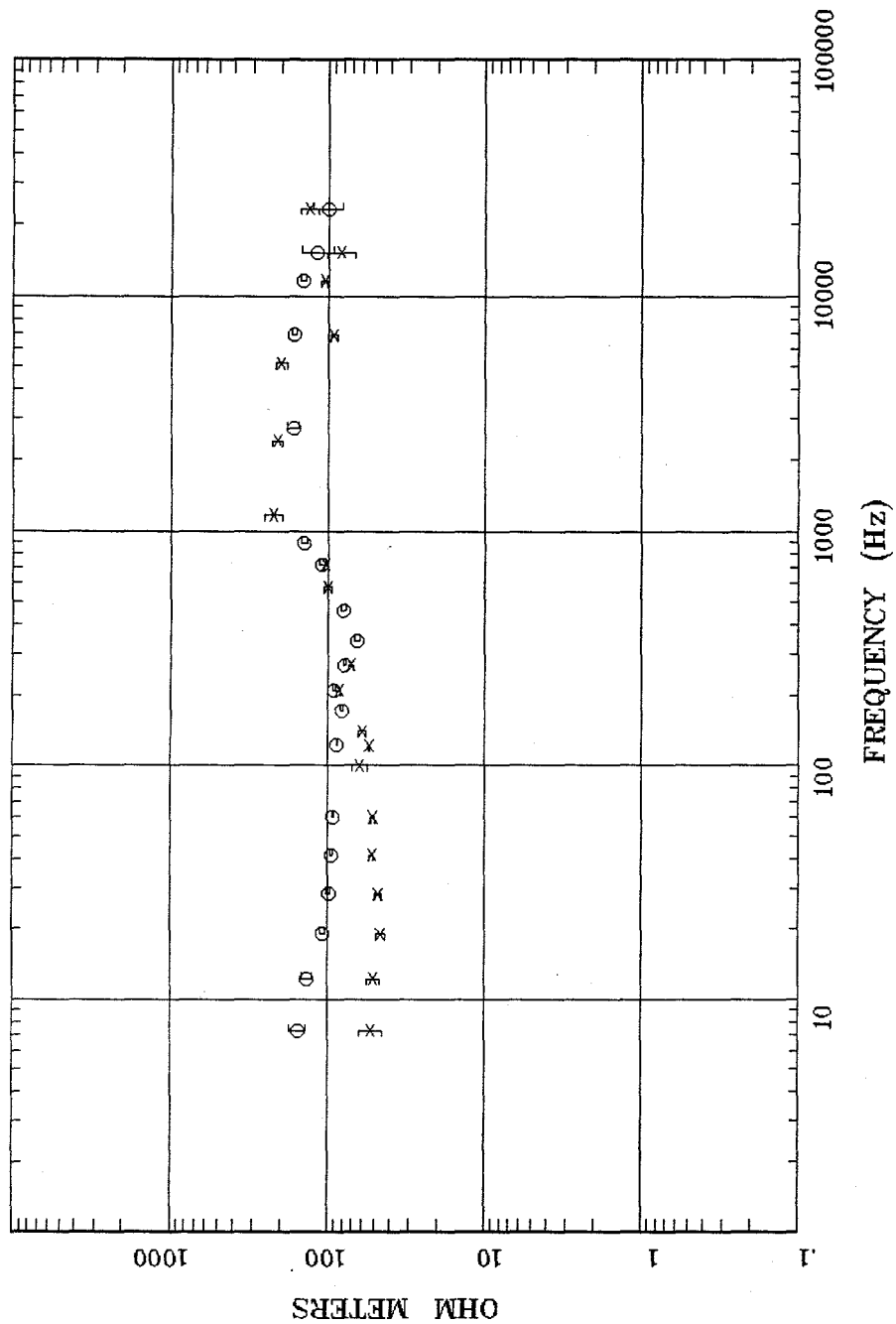


Client: Rotation:
 Remote: Filename: aba07comb.all
 Acquired: 21:2 Jun 09, 1997 Channels: Ex1 Hy1 Hx1 Hy1 Hz1 Ex2
 Survey Co: Plotted: 20:02 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 7a

APPARENT RESISTIVITY

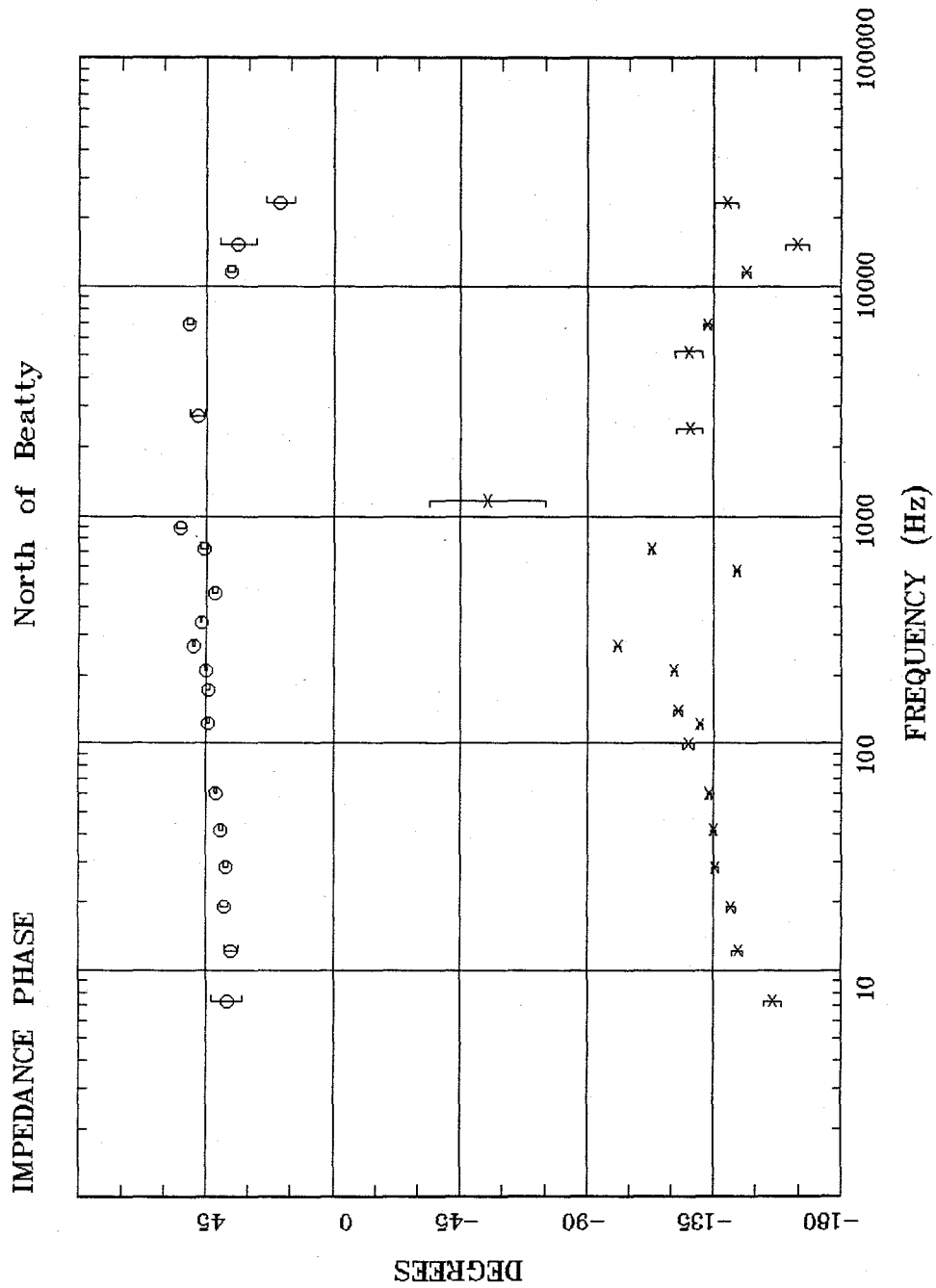
North of Beatty



Client: Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation: Filename: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:02 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

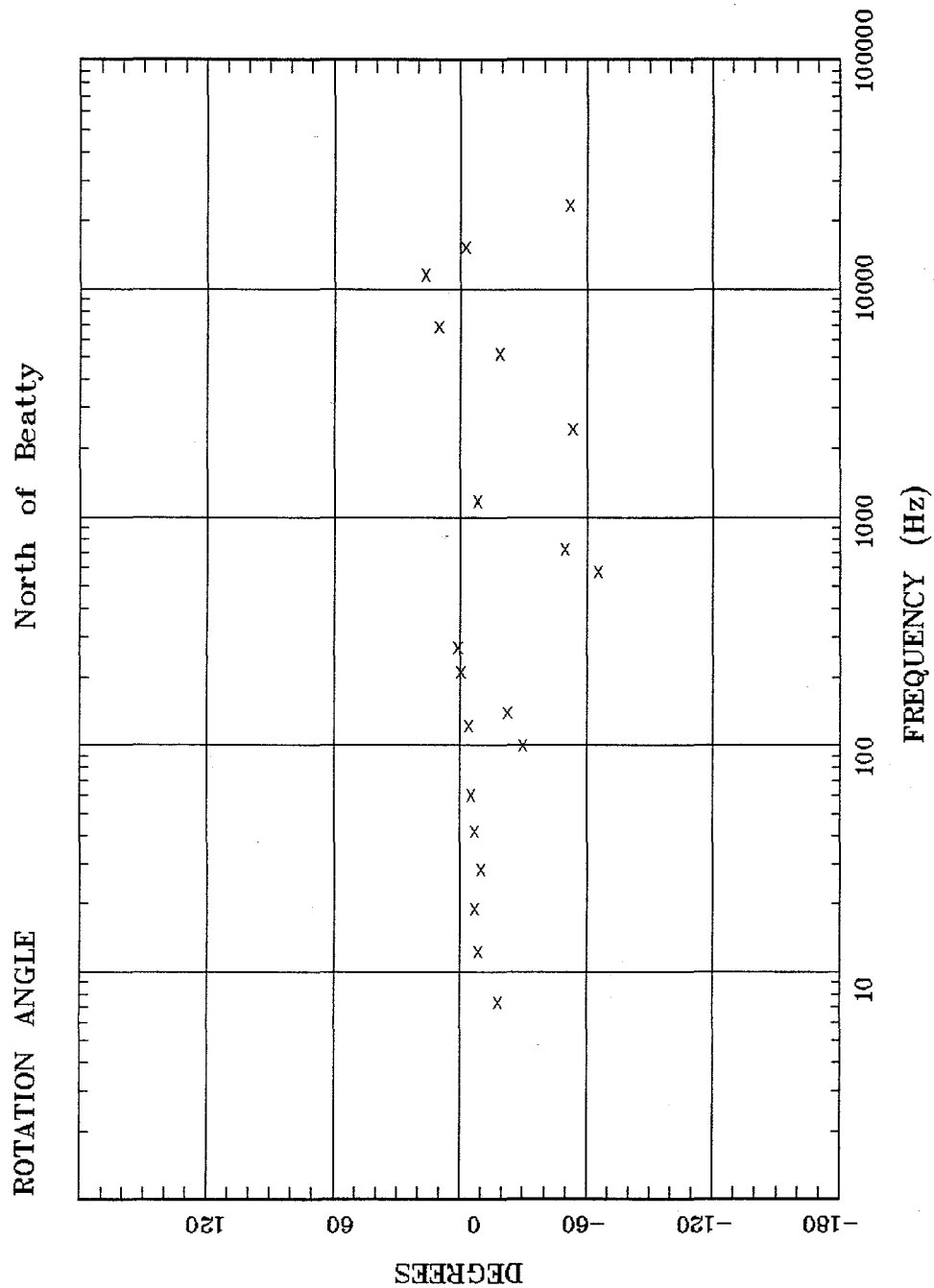
Fig. 7b



Client: Remote: remote e
 Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation:
 Filename: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7c



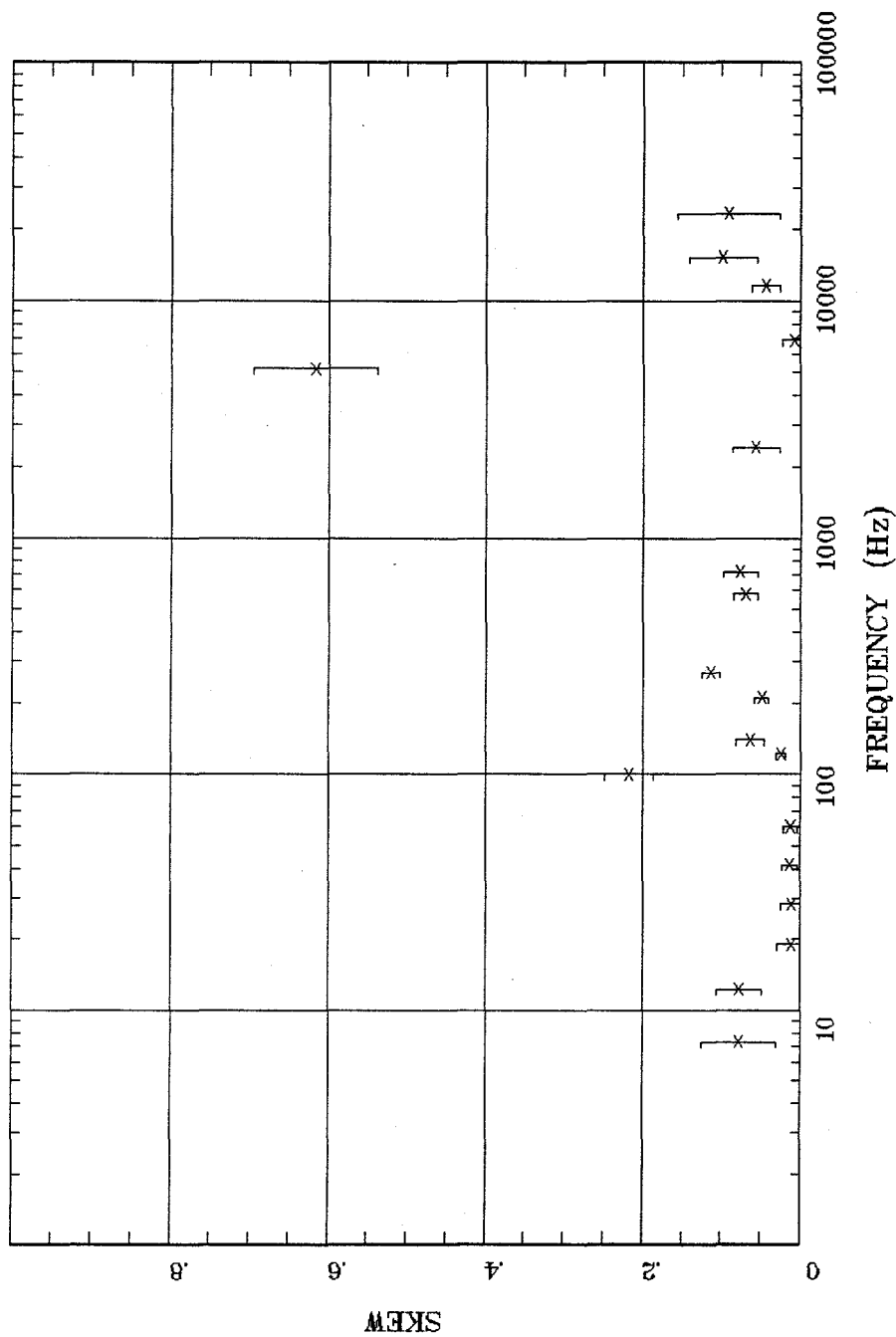
Client: Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation: Filename: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7d

IMPEDANCE SKEW

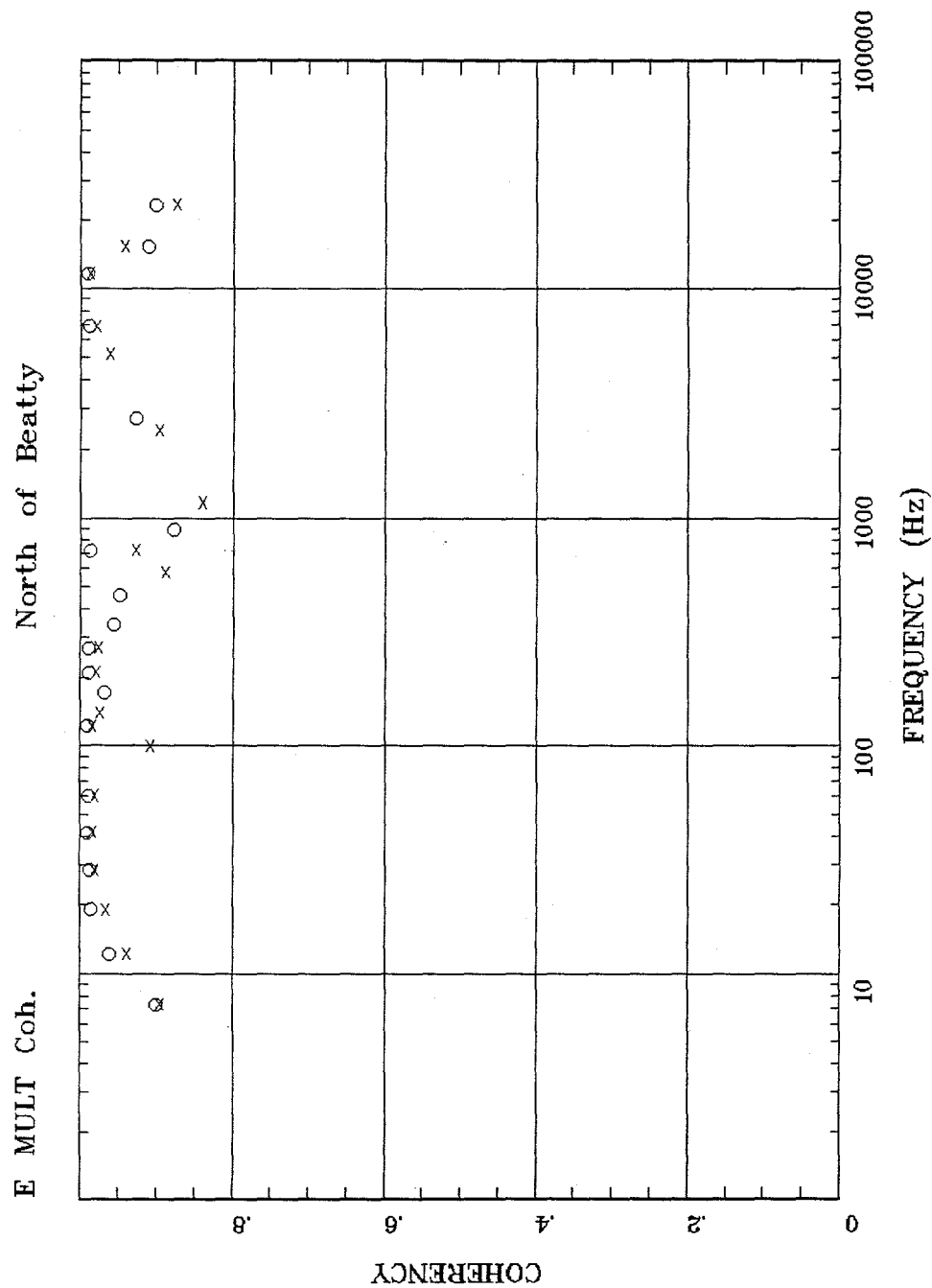
North of Beatty



Client: Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation: Filename: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7e



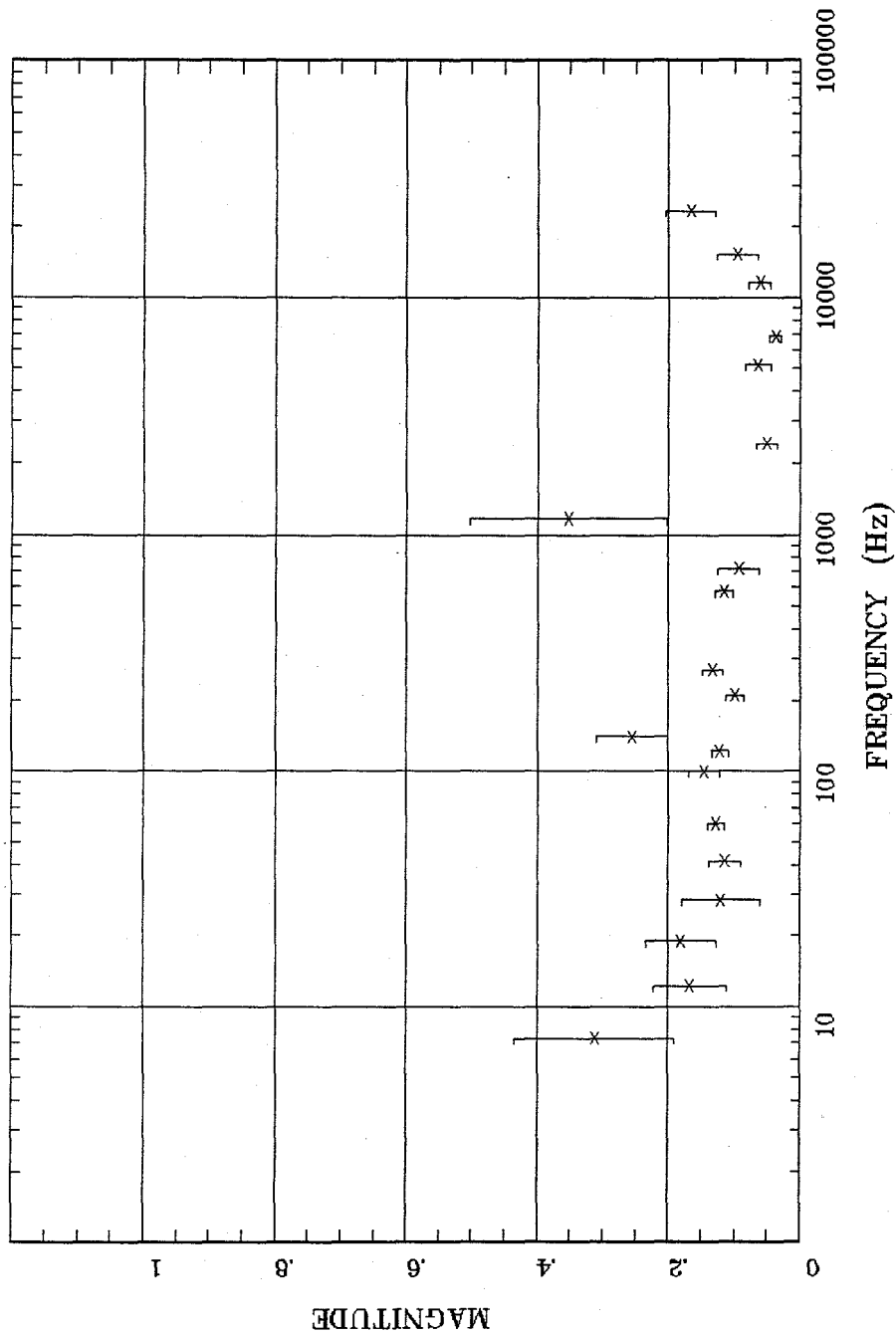
Client: Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation: Rotation: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7f

TIPPER MAGNITUDE

North of Beatty

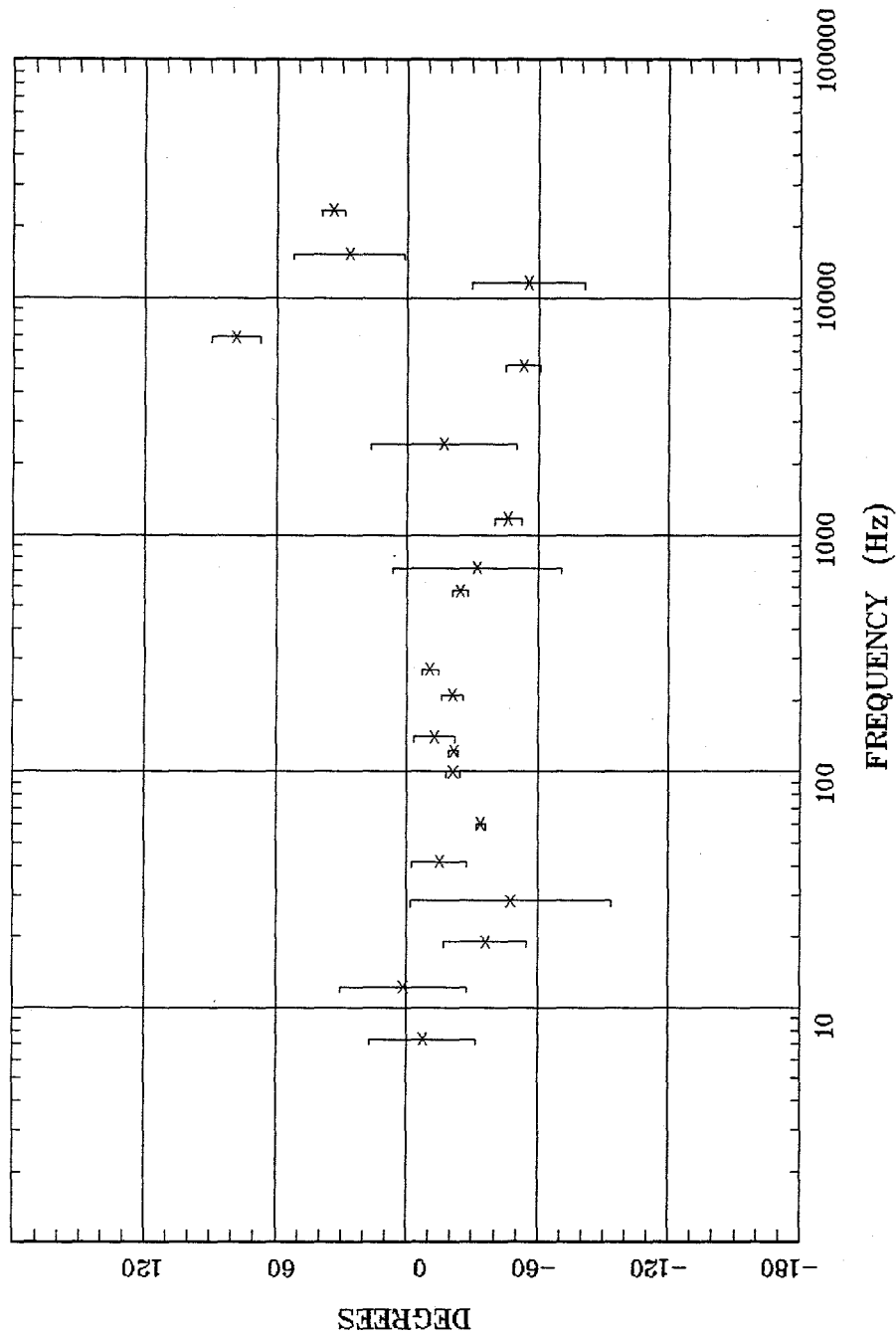


Client: Remote: remote e
 Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS
 Rotation: File:aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7g

TIPPER STRIKE

North of Beatty



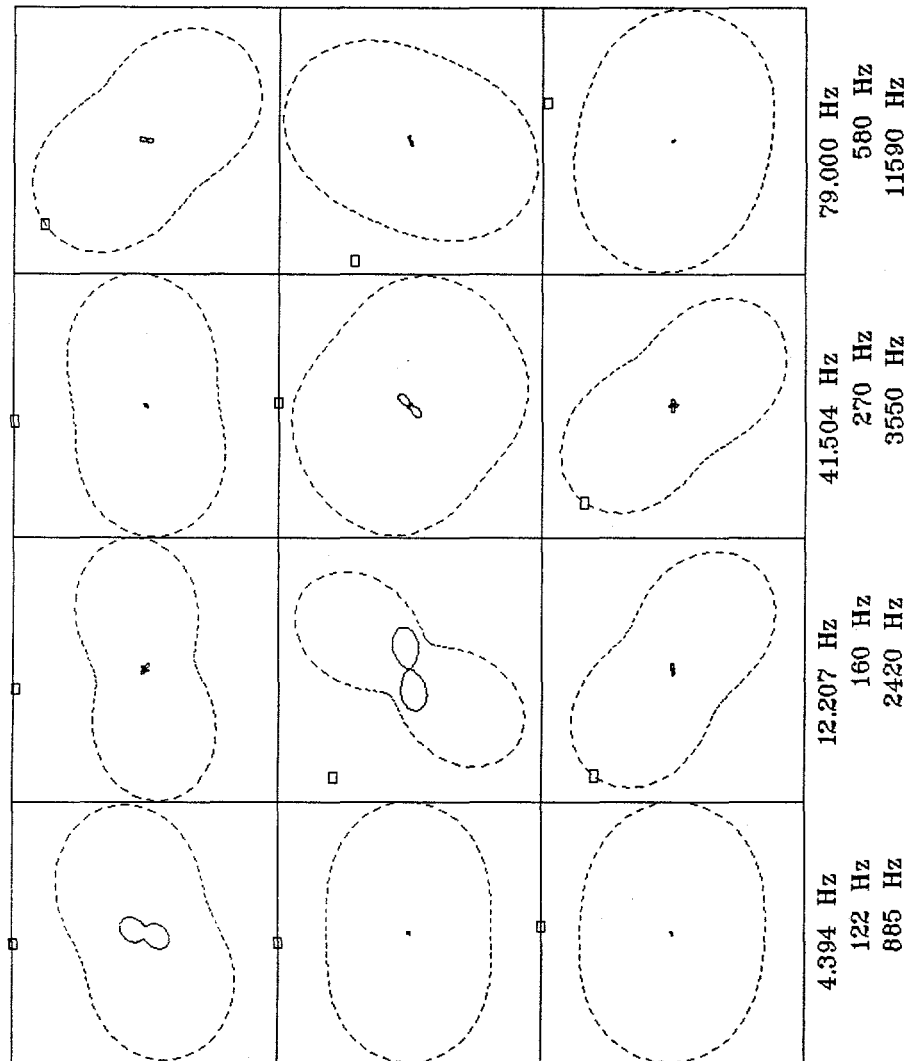
Client: Remote: remote e
 Acquired: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation: Filename: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7h

POLAR PLOTS

North of Beatty

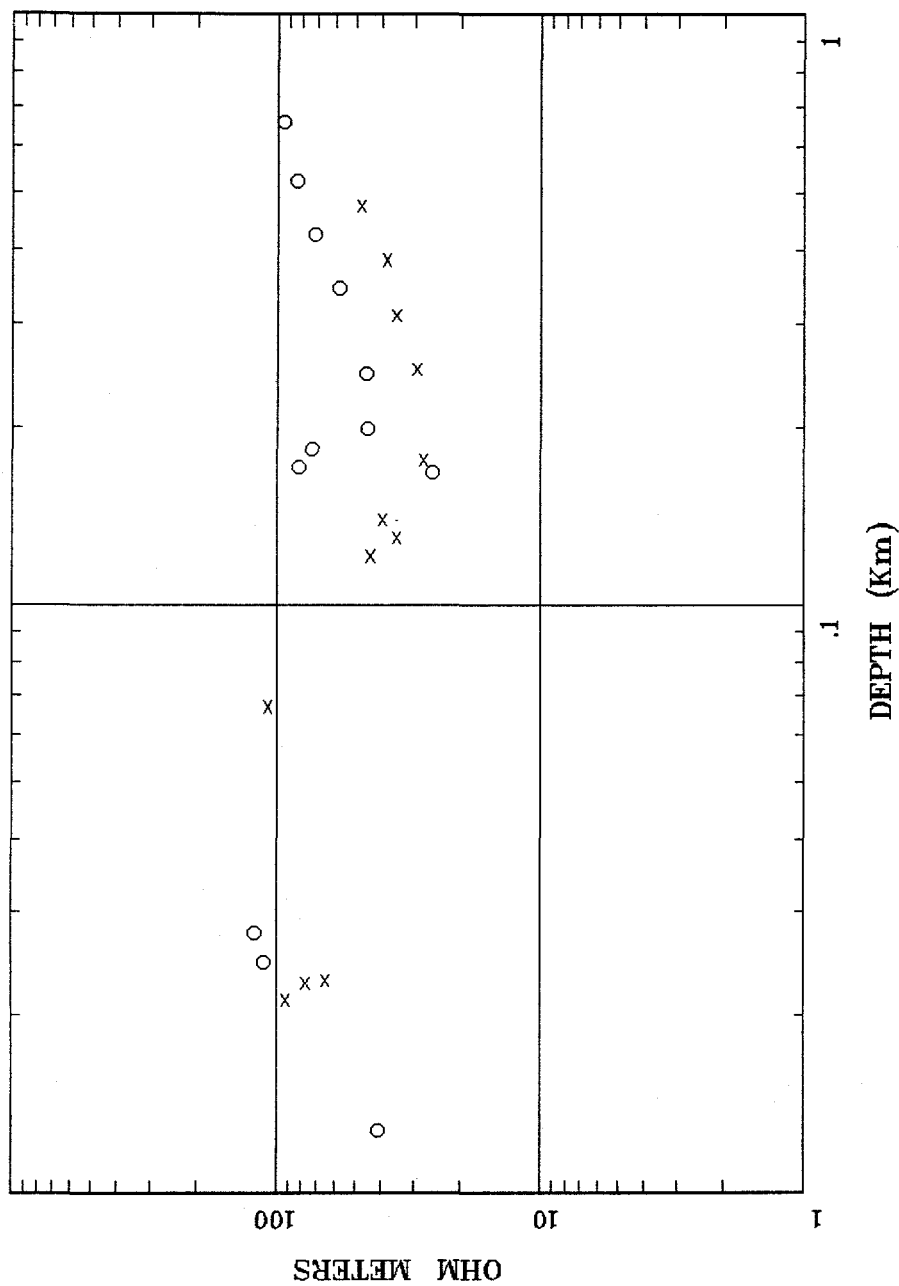


Client: Remote: remote e
 Remoted: 21:2 Jun 09, 1997
 Survey Co:USGS

Rotation:
 Filename: aba07comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:05 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 7i

Resistivity (Bostick Inv.)

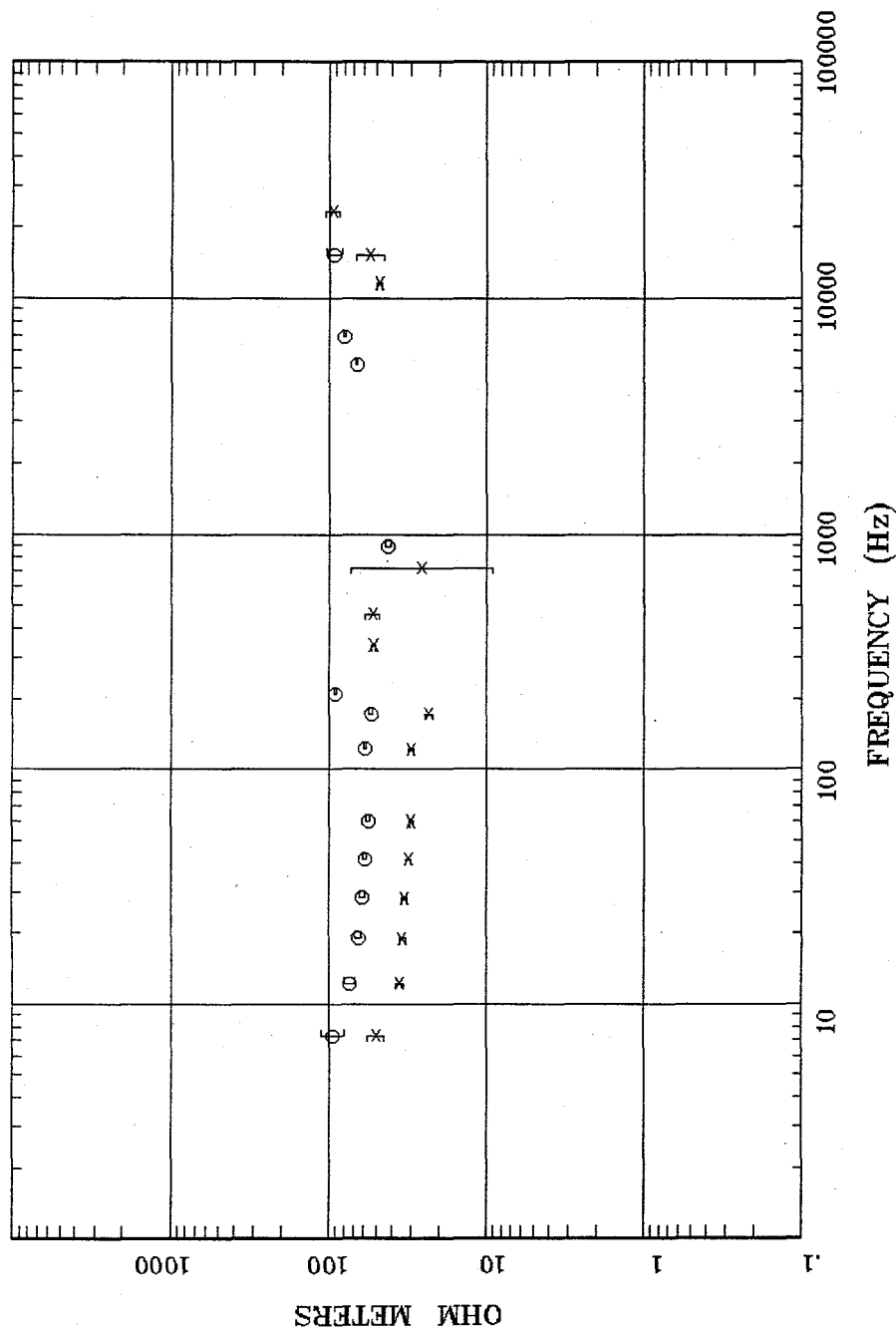


Client: Rotation:
 Remote: Filename: aba08com.all
 Acquired: 18:0 Jul 11, 1997 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Survey Co: Plotted: 16:19 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 8a

APPARENT RESISTIVITY

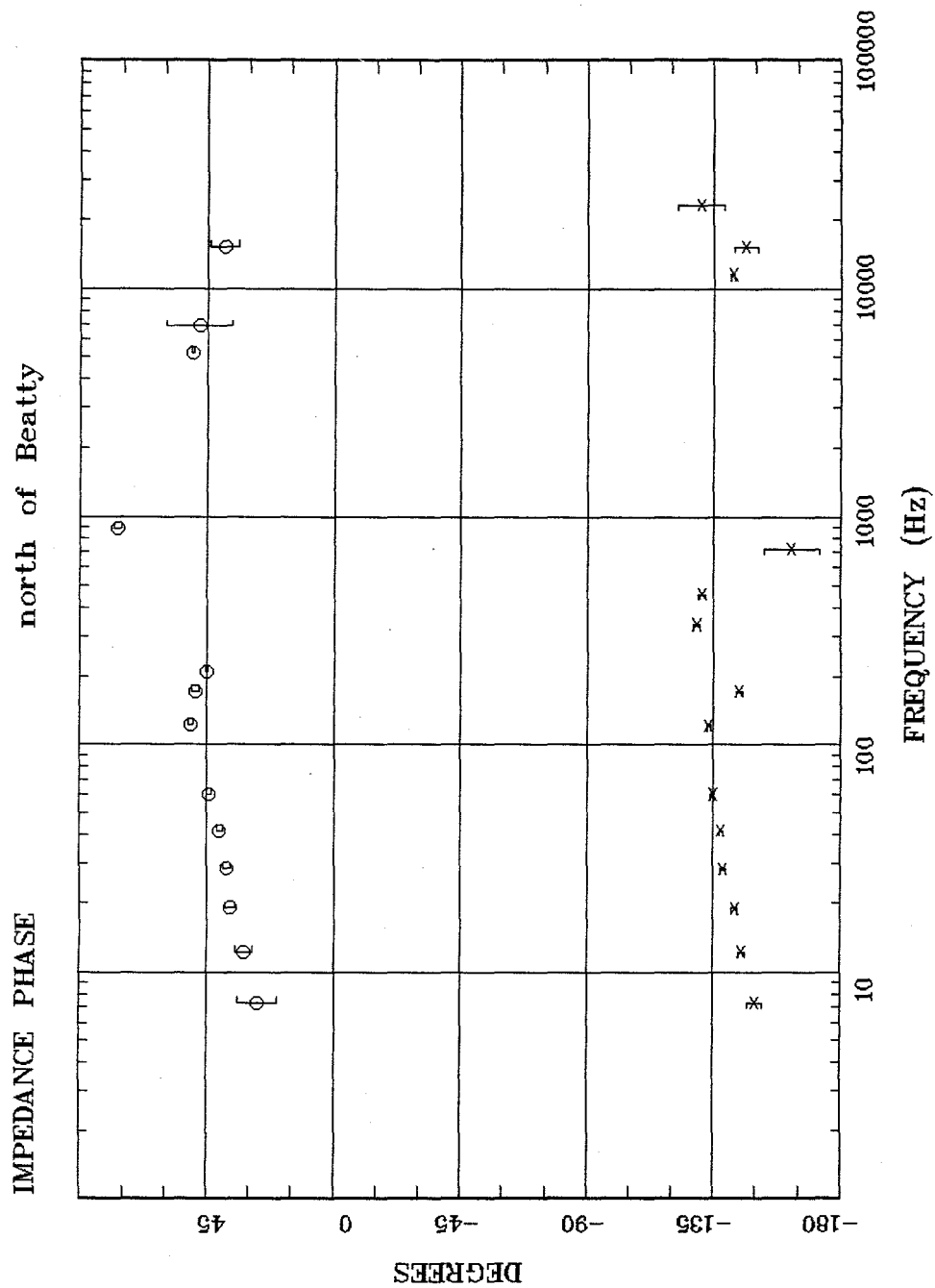
north of Beatty



Client: Remote: remote e
 Acquired: 16:0 Jul 11, 1997
 Survey Co:USGS

Rotation: Filename: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:19 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

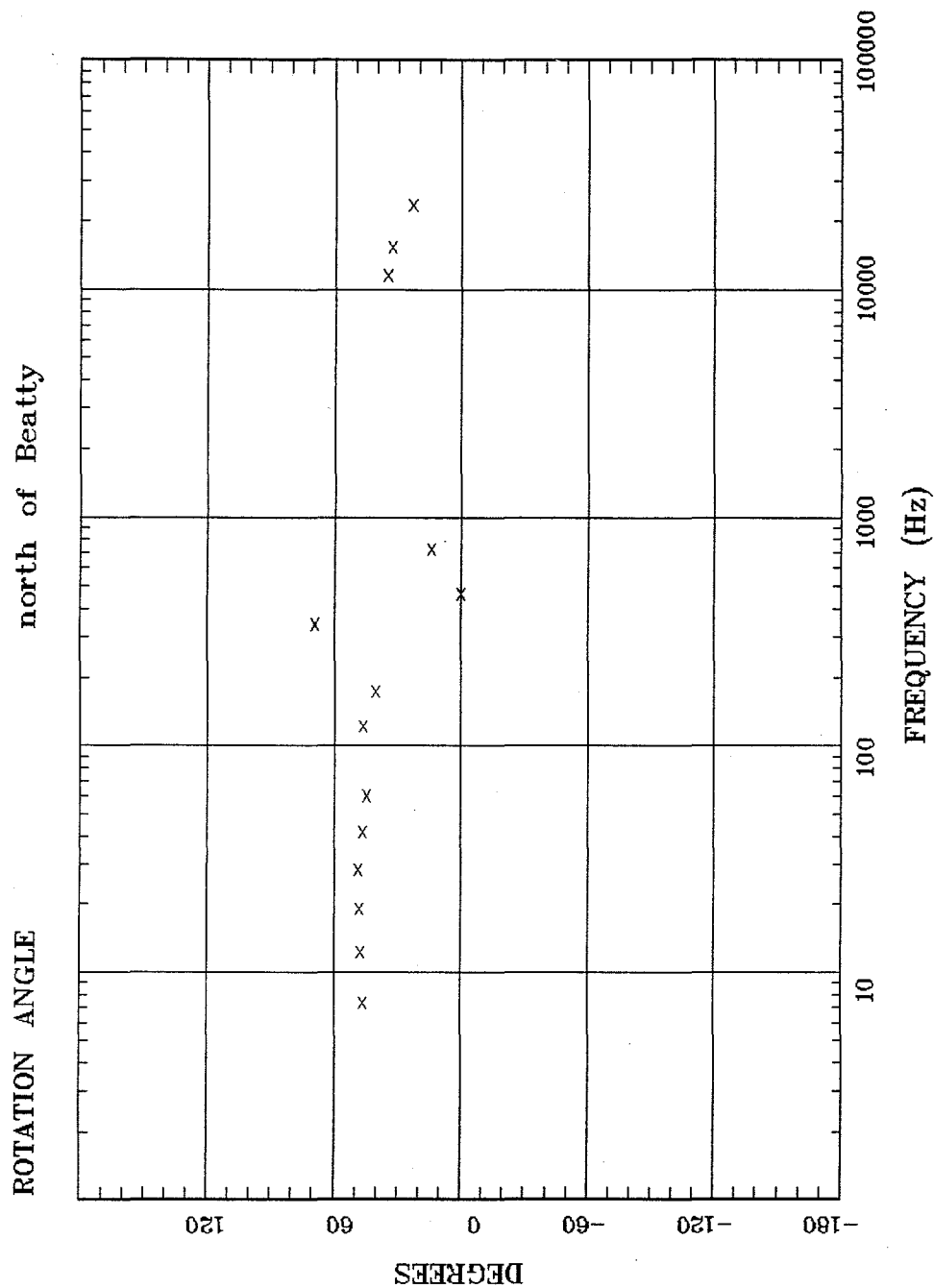
Fig. 8b



Client: Remote: remote e
 Acquired: 16:0 Jul 11, 1997
 Survey Co:USGS

Rotation: File name: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:19 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 8c



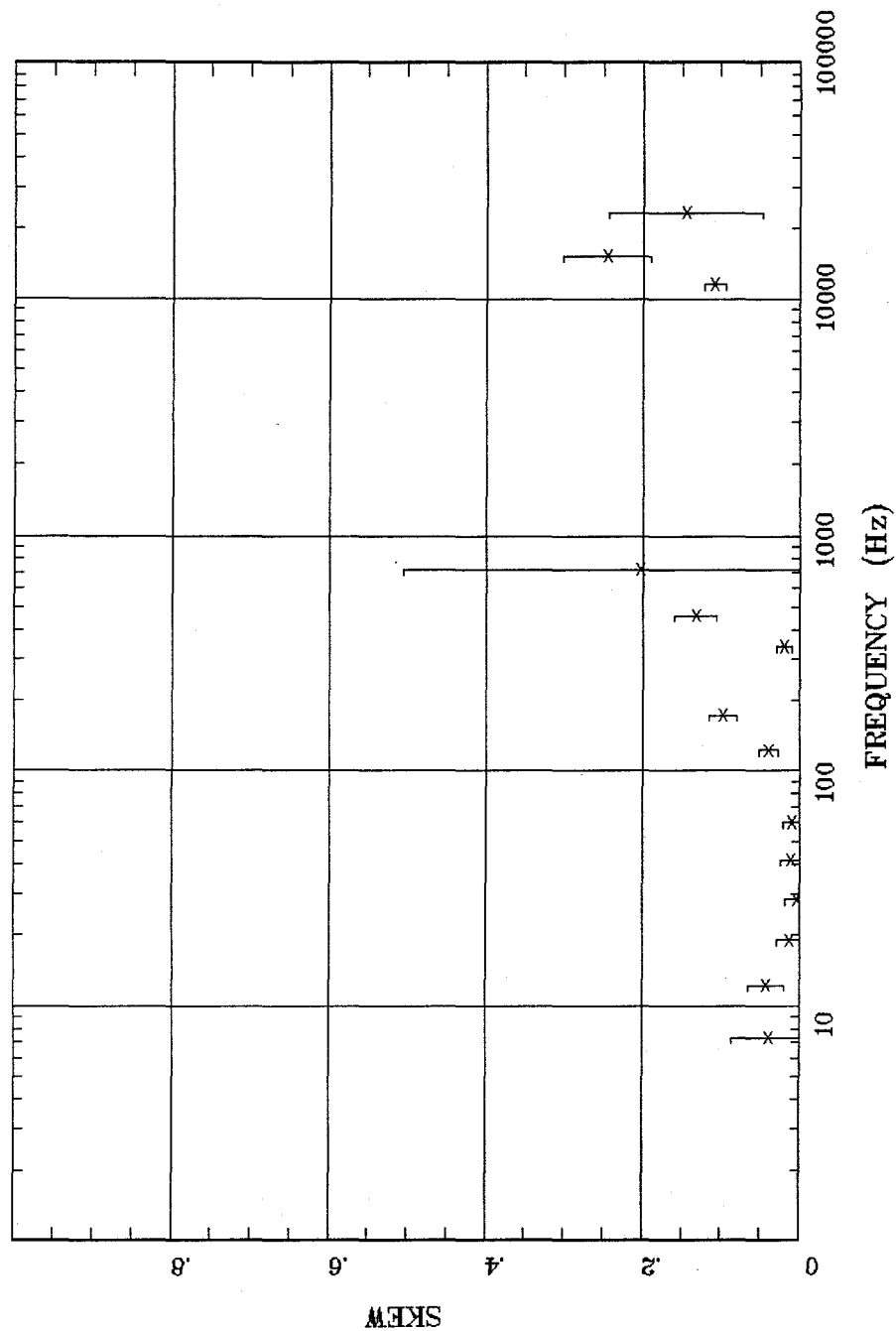
Client: Remote: remote e
 Acquired: 16:0 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:19 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 8d

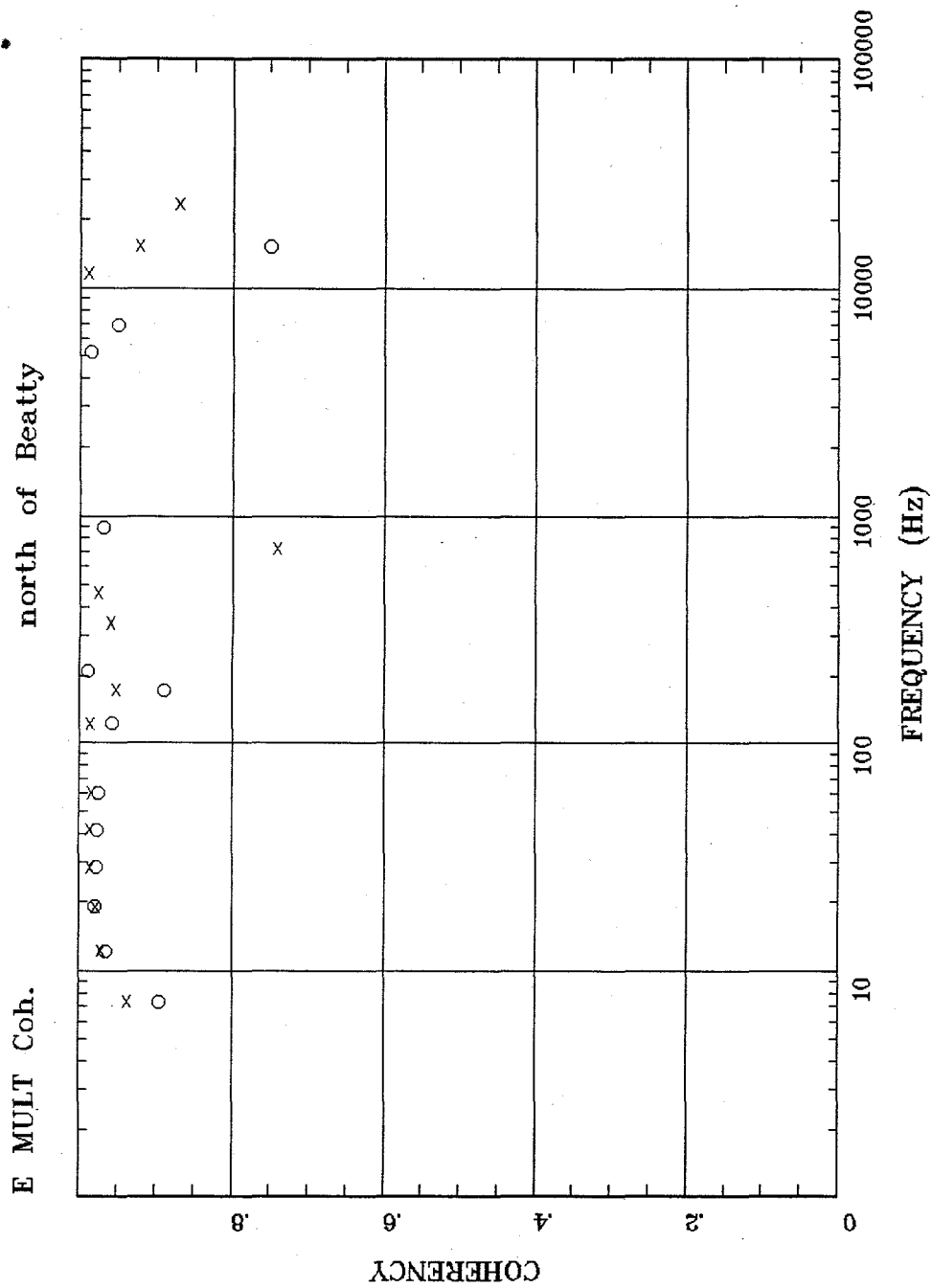
IMPEDANCE SKEW

north of Beatty



Client: Remote: remote e
 Rotation: Filename: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:19 Jul 11, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments >

Fig. 8e



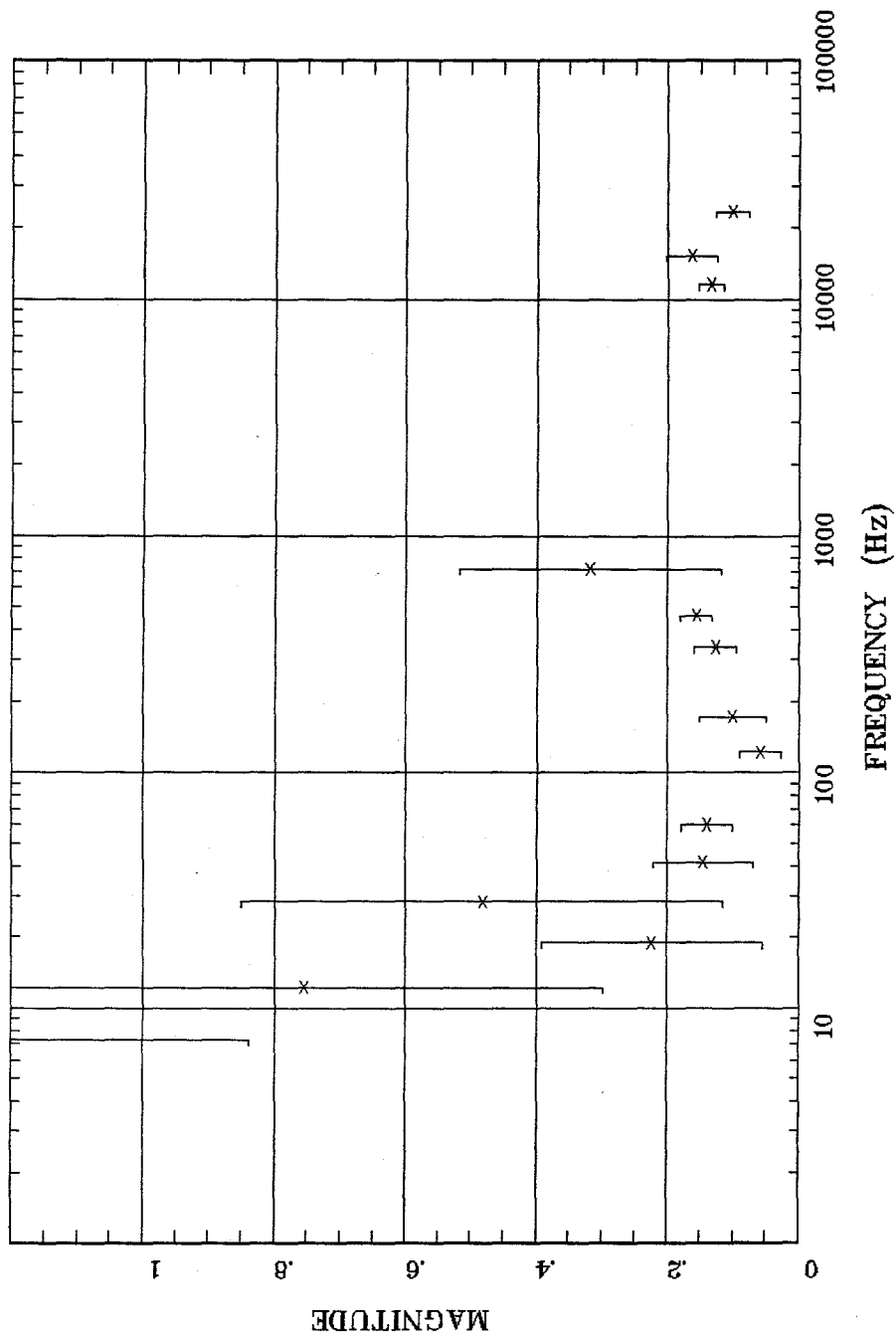
Client: Remote: remote e
 Acquired: 16:0 Jul 11, 1997
 Survey Co:USGS

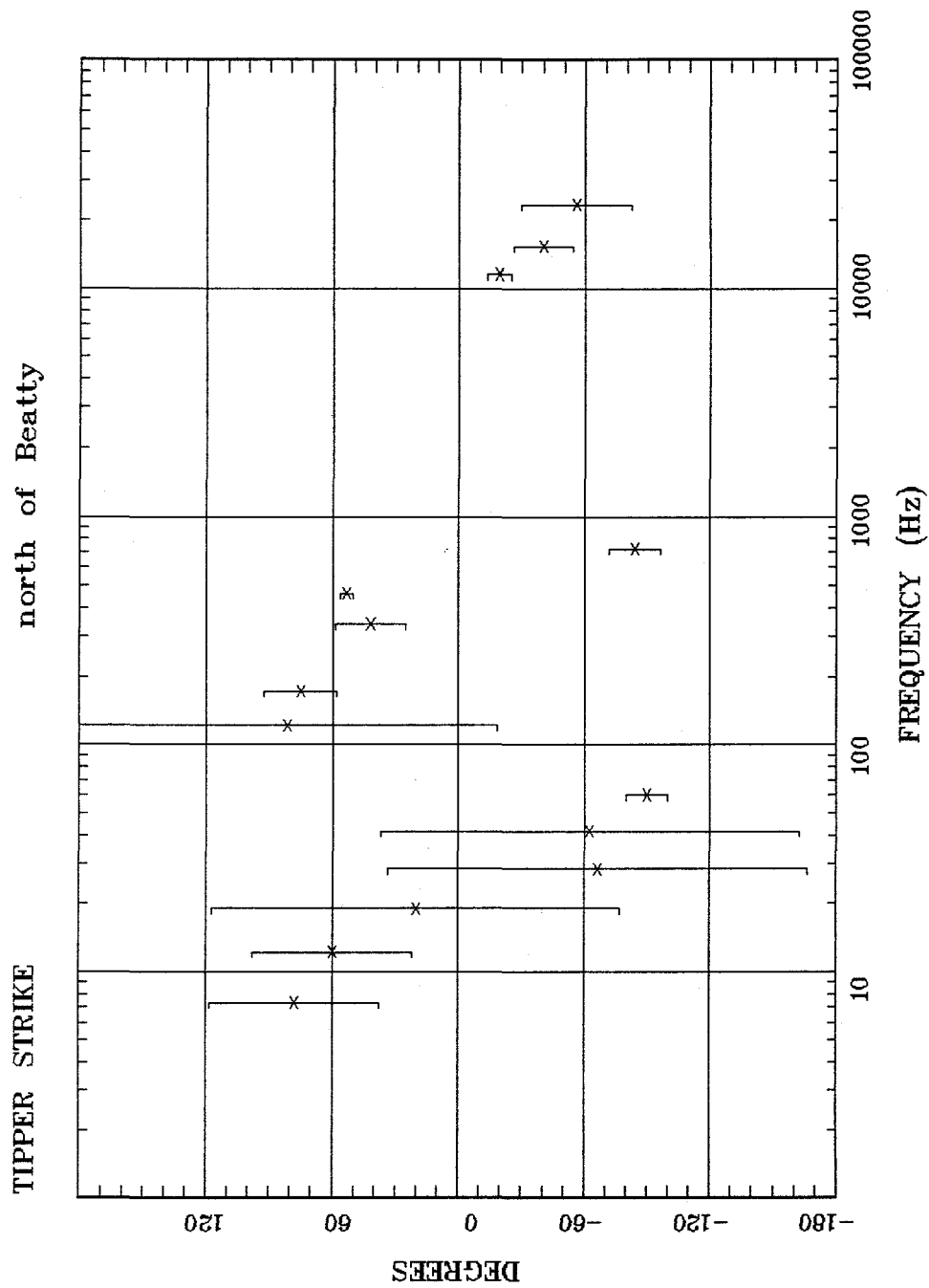
Rotation: Filename: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:19 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 8f

north of Beatty

TIPPER MAGNITUDE





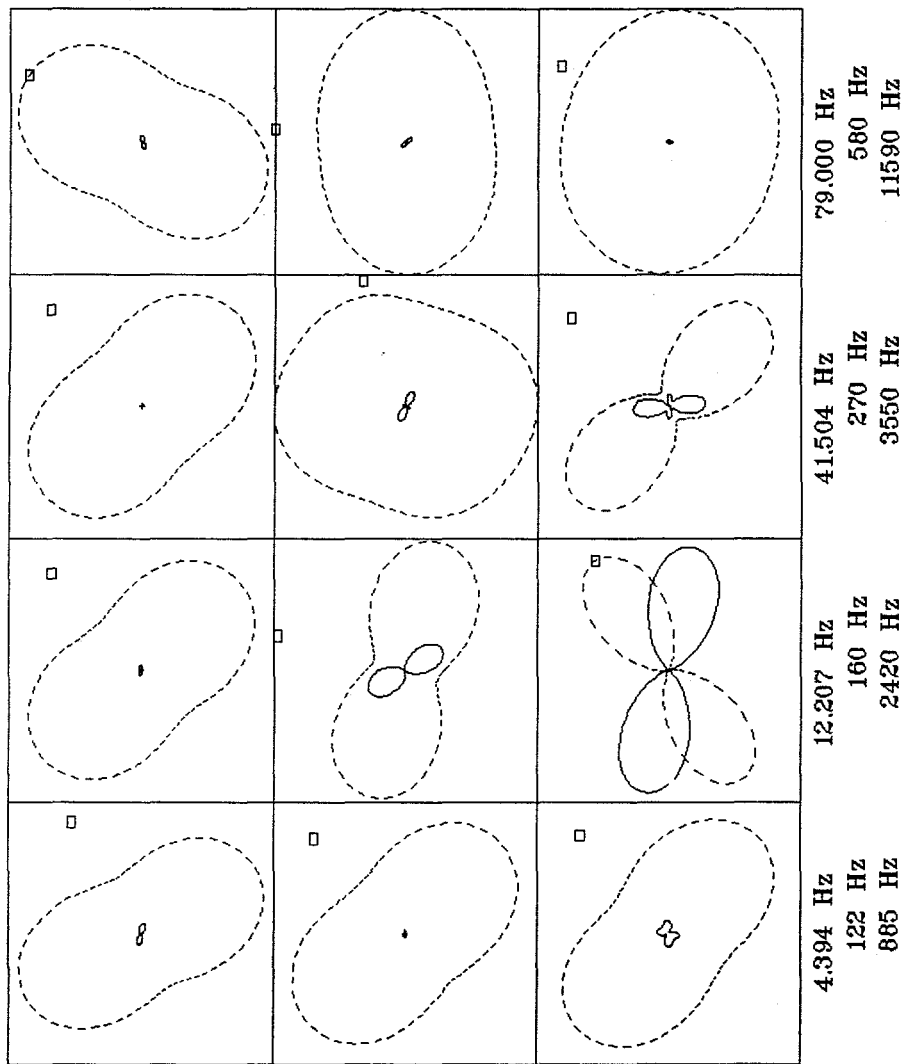
Client: Remote: remote e
 Acquired: 16:0 Jul 11, 1997
 Survey Co:USGS

Rotation: Rotation:
 Filename: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:20 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 8h

POLAR PLOTS

north of Beatty

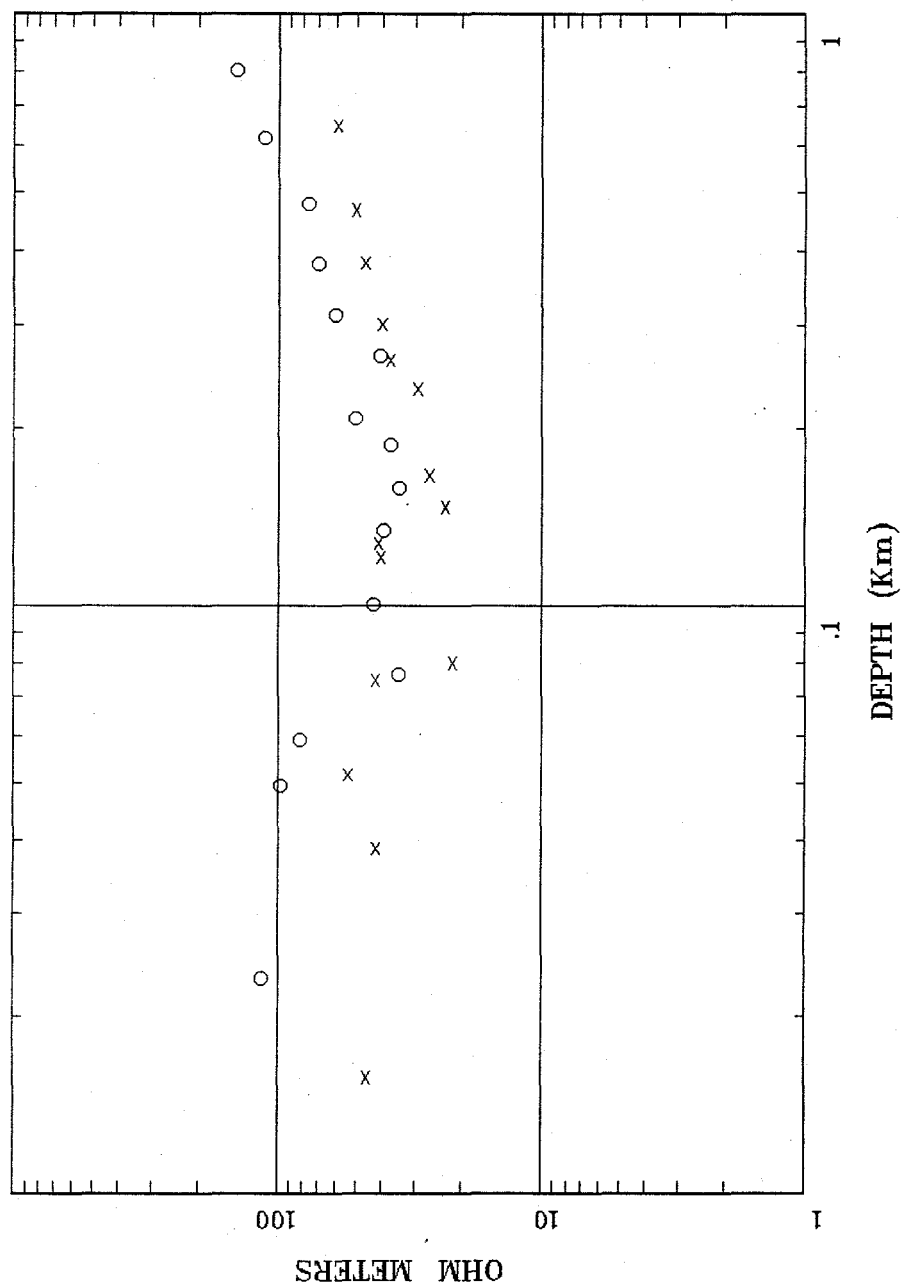


Client: Remote: remote e
 Remoted: 16:0 Jul 11, 1997
 Survey Co:USGS

Rotation:
 Filename: aba08com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 16:20 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 8i

Resistivity (Bostick Inv.)

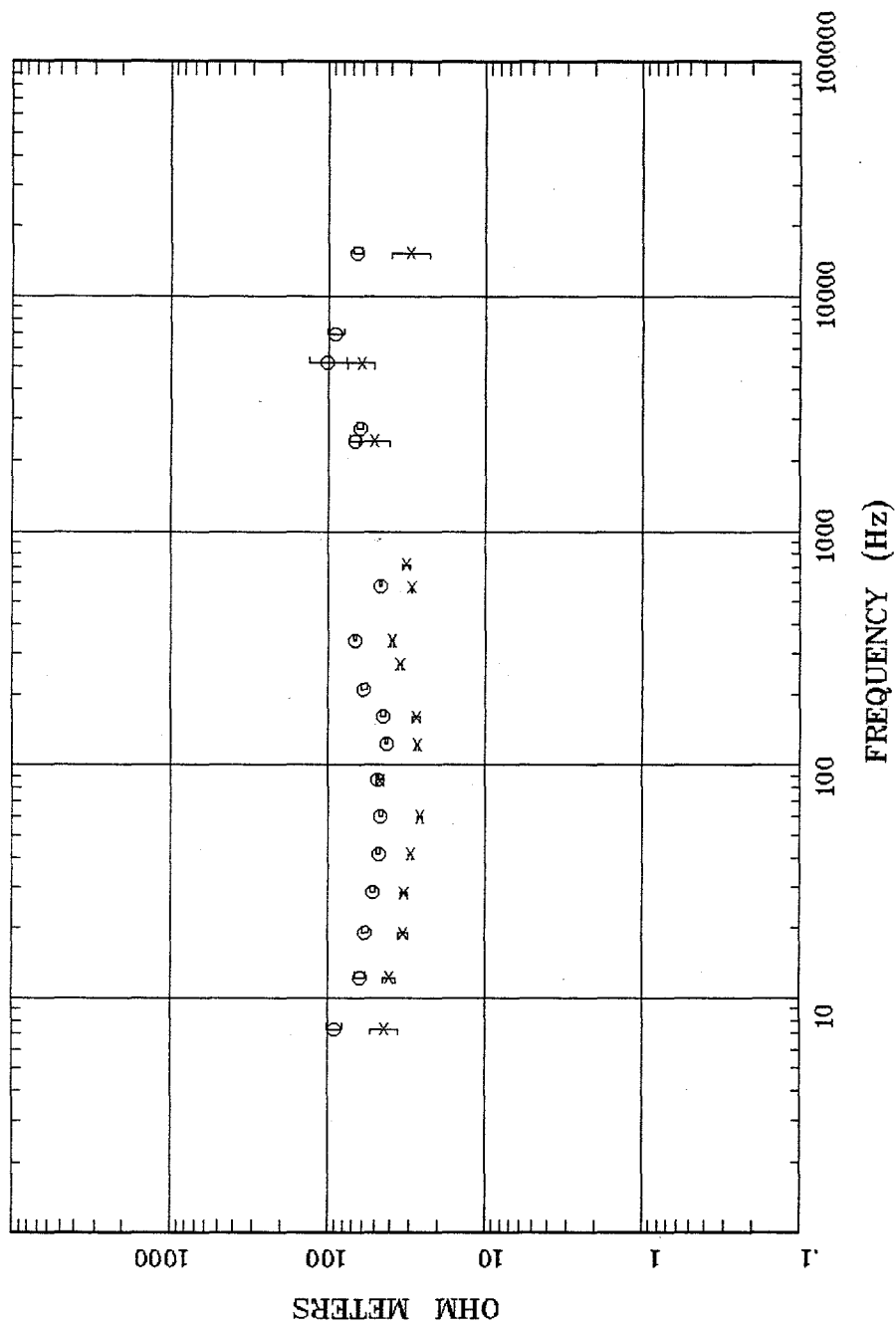


Client: Remote: 20:3 Jun 10, 1997
 Survey Co: EMI - ElectroMagnetic Instruments >
 Rotation: File name: aba09comb.all
 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Plotted: 20:49 Jun 10, 1997

Fig. 9a

APPARENT RESISTIVITY

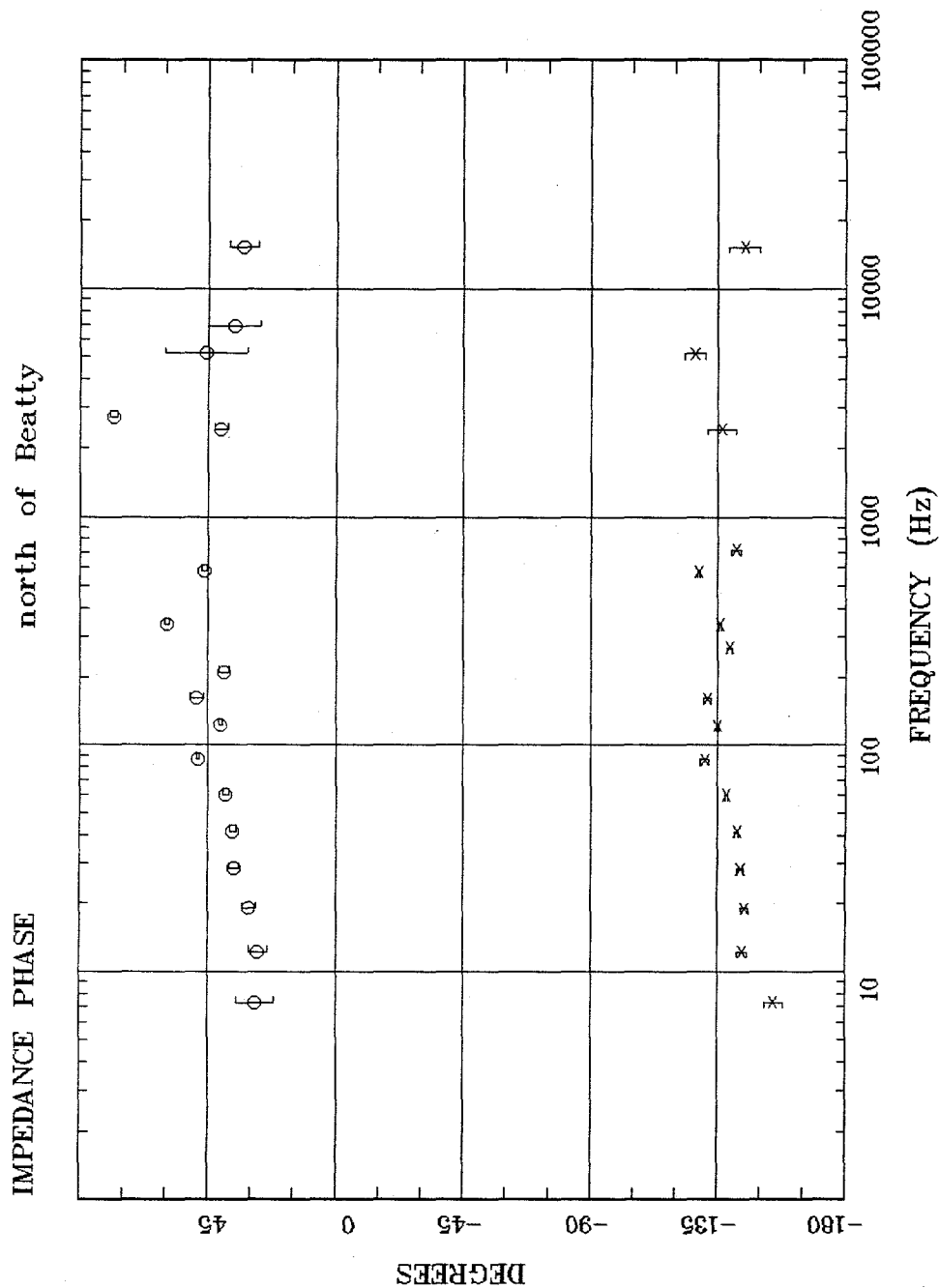
north of Beatty



Client: Remote: remote e
 Remote: remote e
 Acquired: 20:3 Jun 10, 1997
 Survey Co:USGS

Rotation:
 Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:49 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 9b

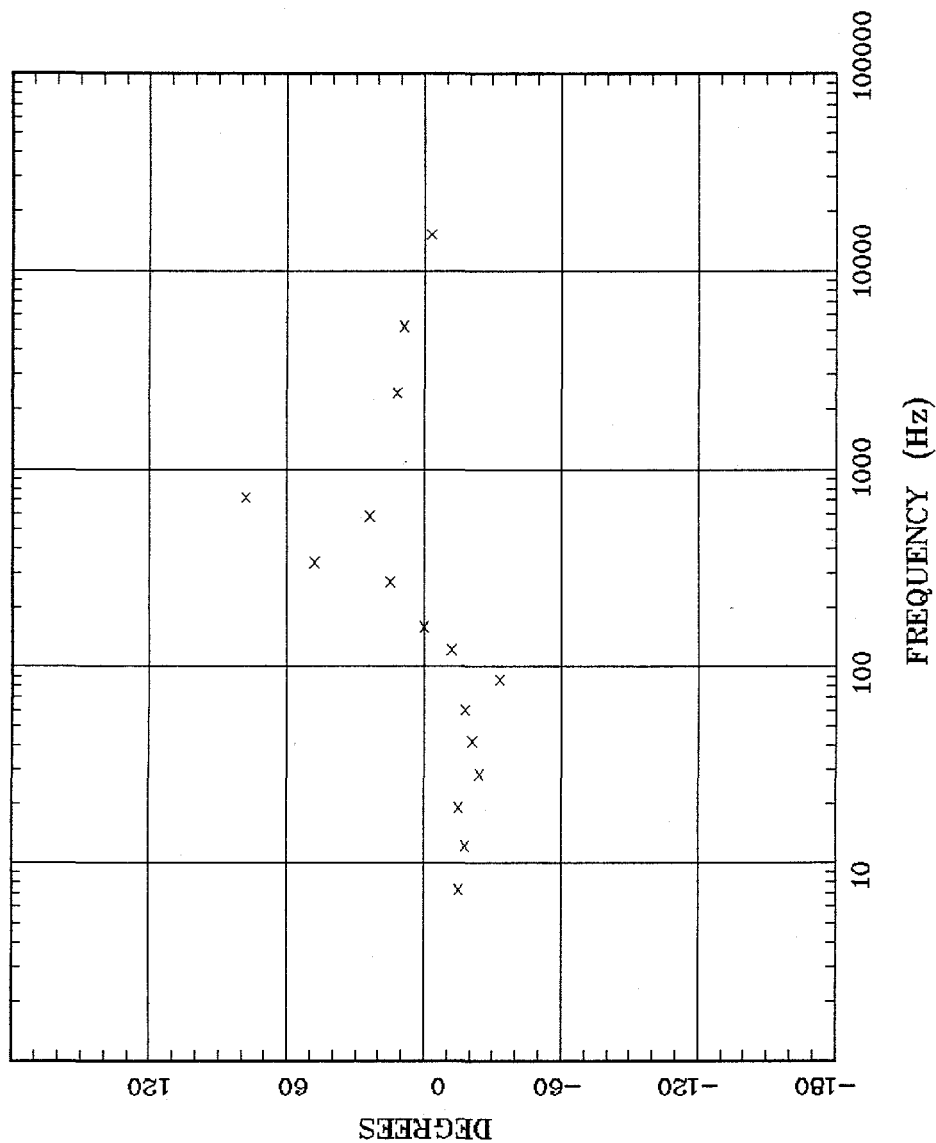


Client: Remote: remote e
 Acquired: 20:3 Jun 10, 1997
 Survey Co:USGS

Rotation:
 Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:49 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 9c

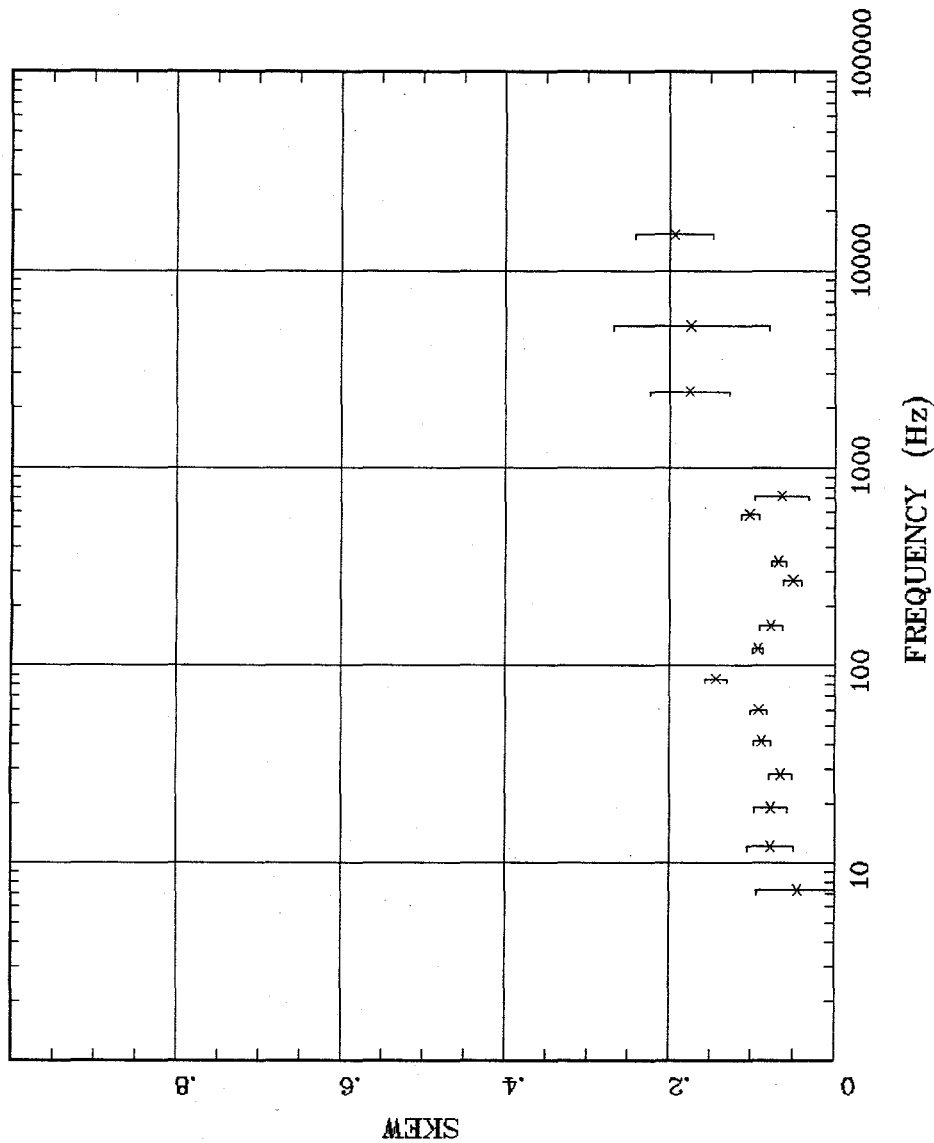
ROTATION ANGLE



Client: Remote: remote e
 Acquired: 20:3 Jun 10, 1997
 Survey Co:USGS
 Rotation: EMI - ElectroMagnetic Instruments
 Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:49 Jun 10, 1997

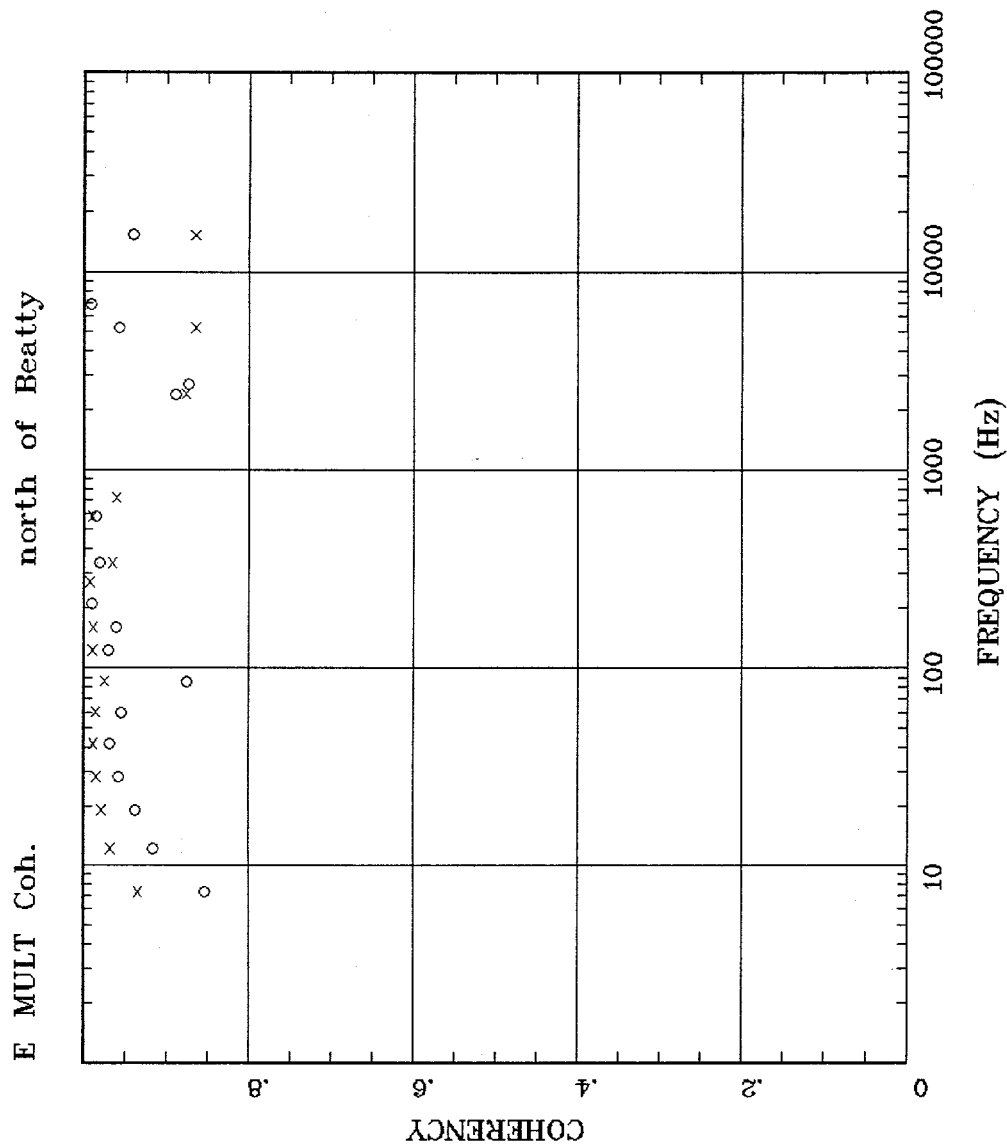
Fig. 9d

IMPEDANCE SKEW north of Beatty



Client: Rotation:
 Remote: remote e Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 20:3 Jun 10, 1997 Plotted: 20:49 Jun 10, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments

Fig. 9e



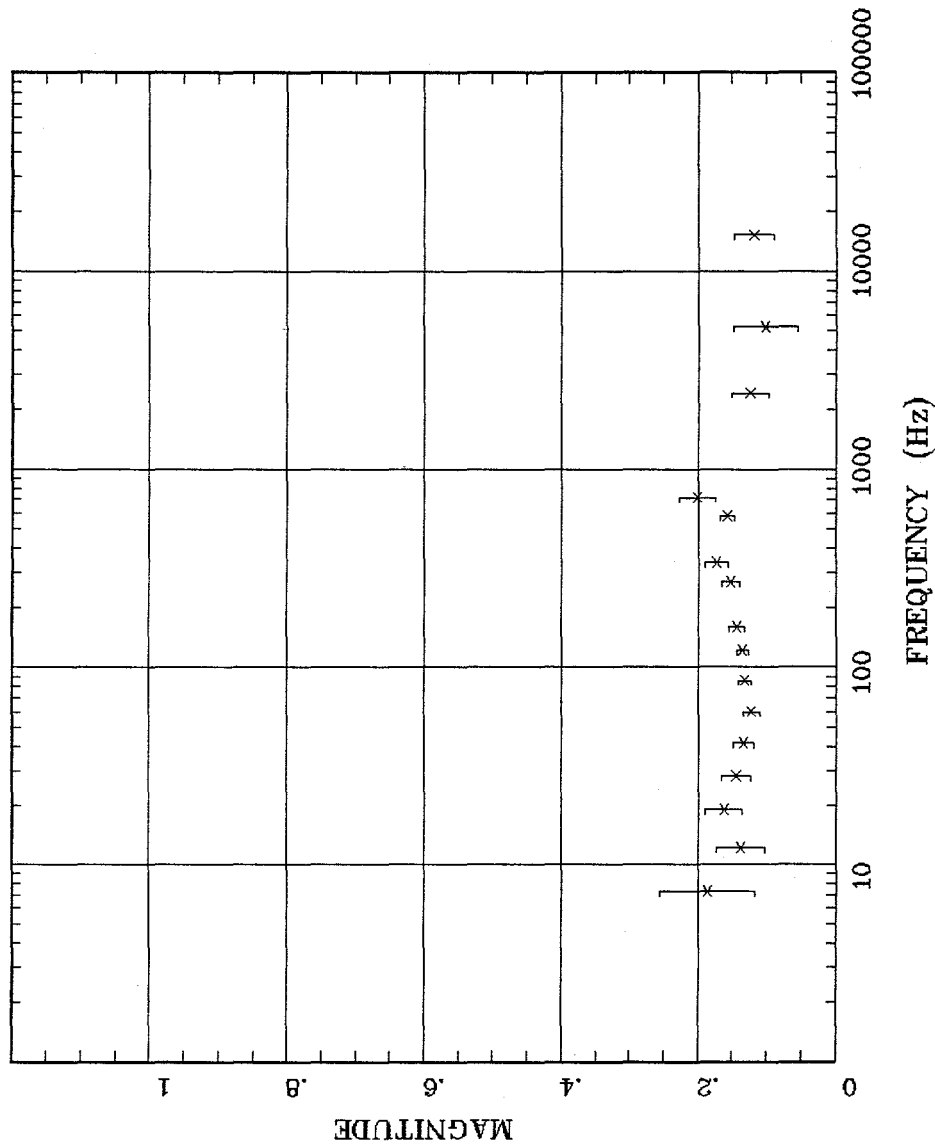
Client: Remote: remote e
 Acquired: 20:3 Jun 10, 1997
 Survey Co:USGS

Rotation: Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:49 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 9f

TIPPER MAGNITUDE north of Beatty

MAGNITUDE



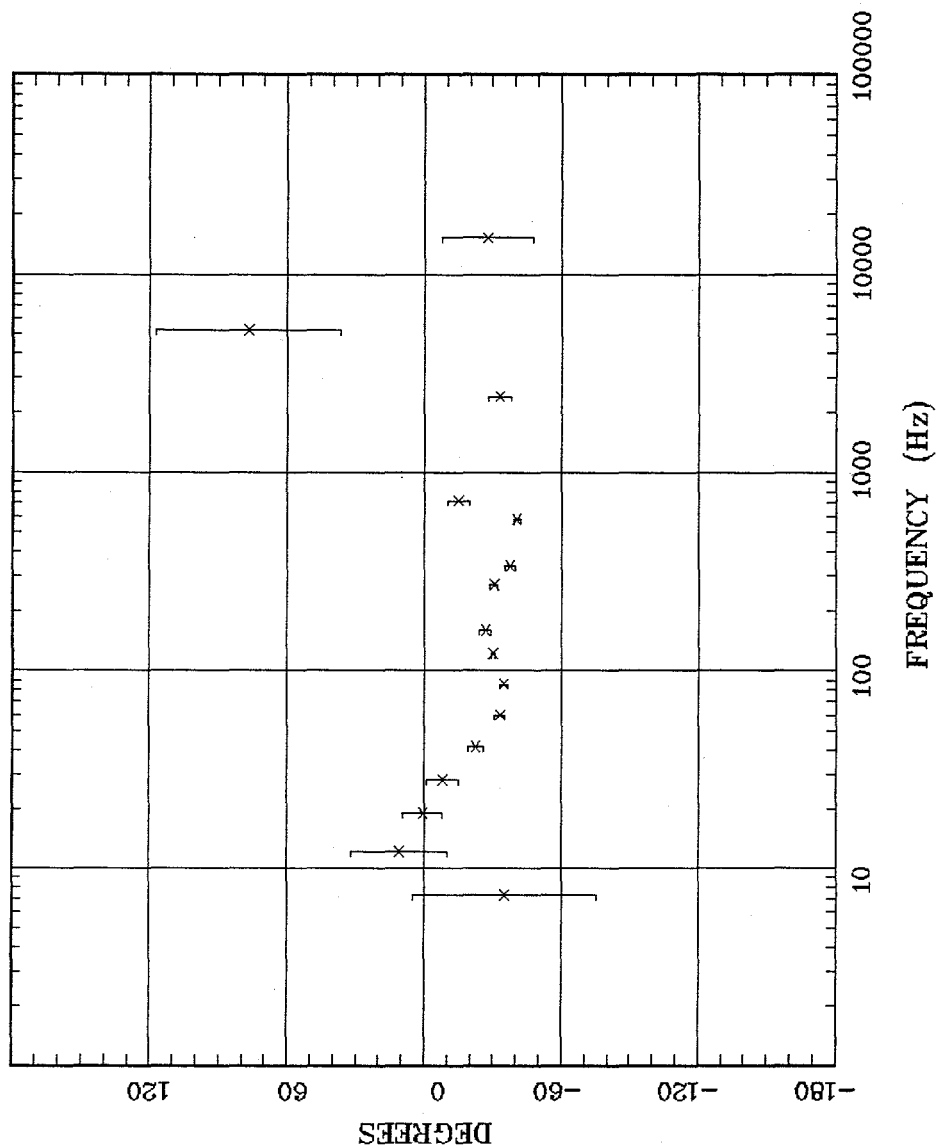
Client: Remote: remote e
 Acquired: 20:3 Jun 10, 1997
 Survey Co:USGS

Rotation: Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:49 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 9g

TIPPER STRIKE

north of Beatty



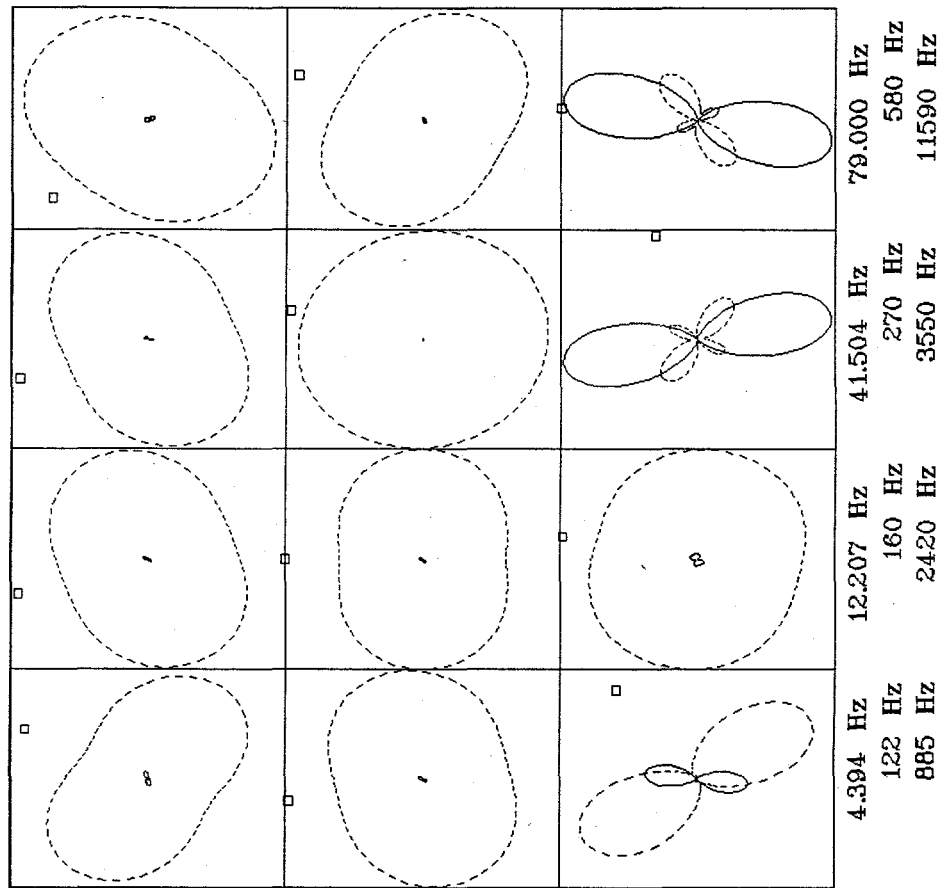
Client: Remote: remote e
 Acquired: 20:3 Jun 10, 1997
 Survey Co:USGS

Rotation:
 Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:50 Jun 10, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 9h

POLAR PLOTS

north of Beatty

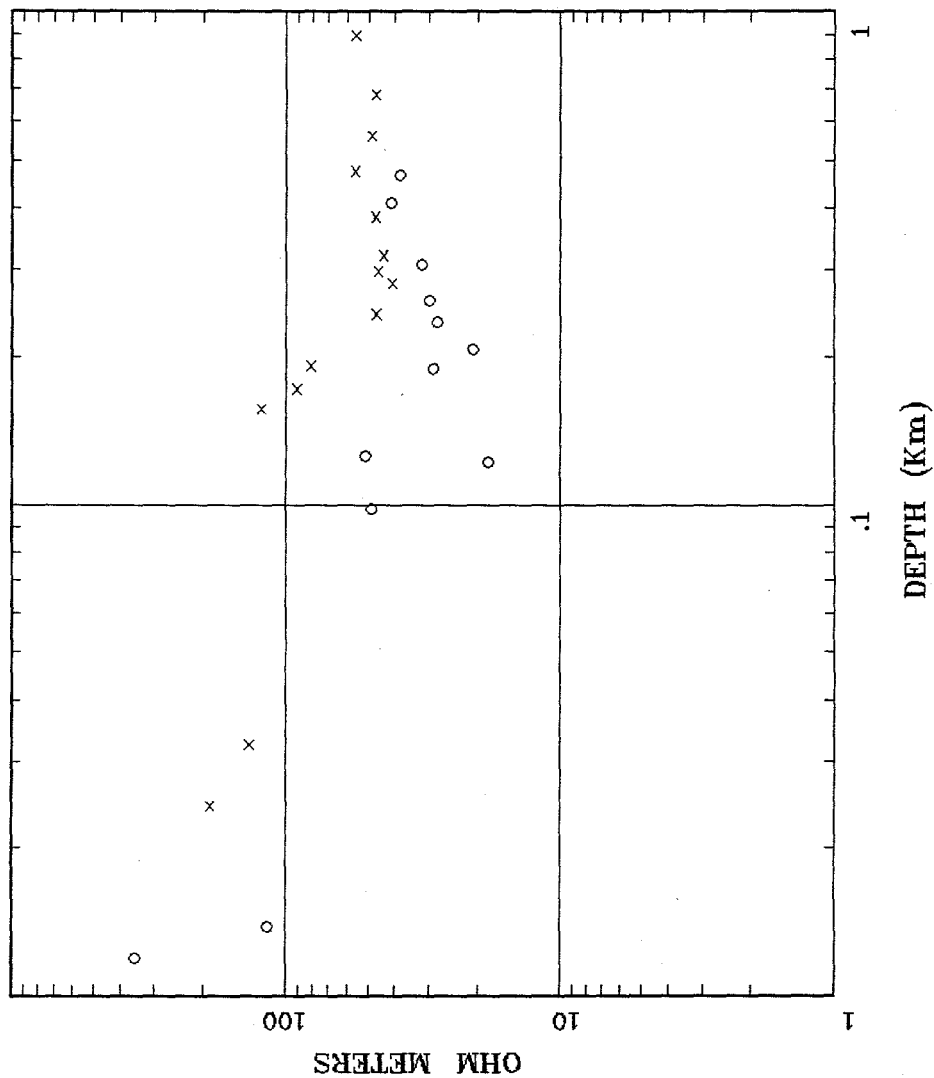


Rotation:

Client: Remote: remote e
 Filename: aba09comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Acquired: 20:3 Jun 10, 1997 Plotted: 20:50 Jun 10, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments >

Fig. 9i

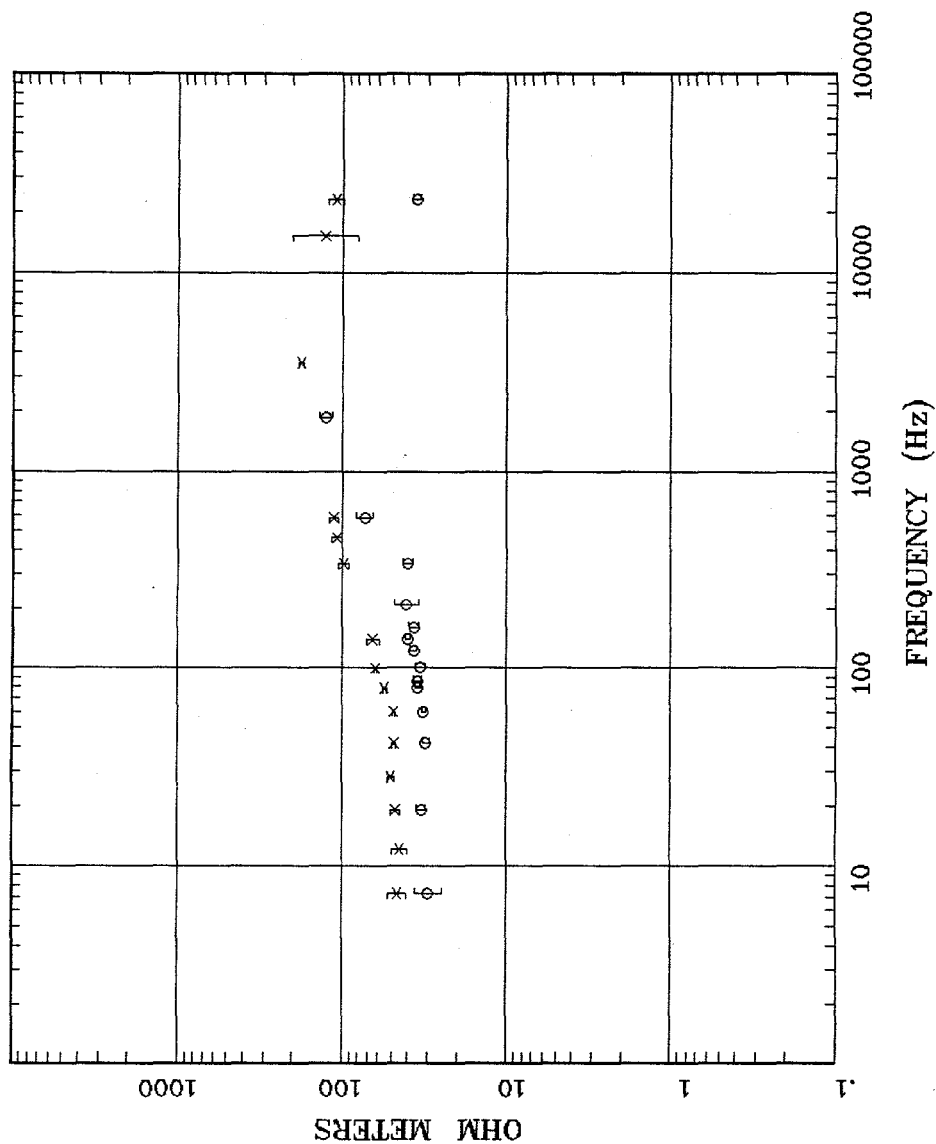
Resistivity (Bostick Inv.)



Client: Rotation:
 Remote: Filename: bba10com.all
 Acquired: 14:1 Sep 05, 1997 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2
 Survey Co: Plotted: 10:44 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 10a

APPARENT RESISTIVITY north of Beatty

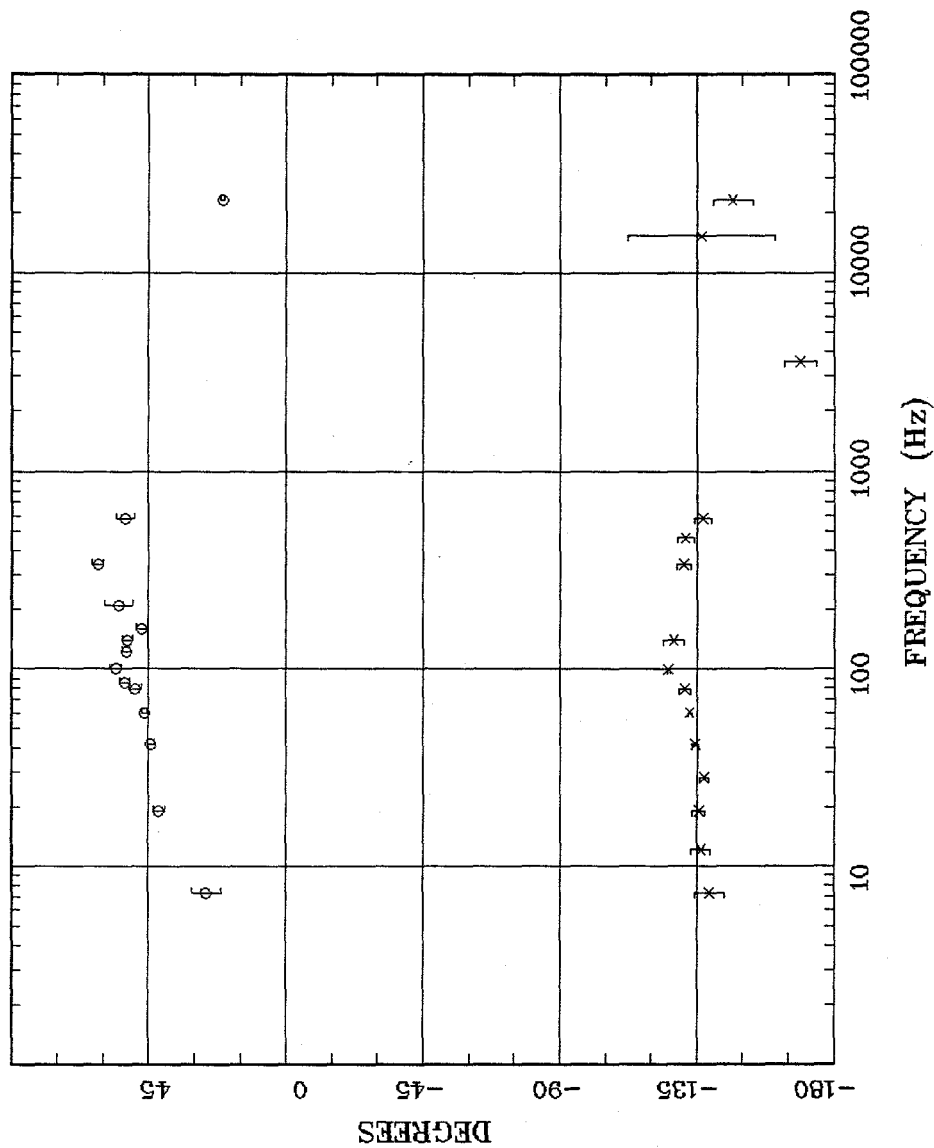


Client: Remote: remote e
 Rotation: Filename: bba10com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 14:1 Sep 05, 1997
 Plotted: 10:44 Sep 17, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments

Fig. 10b

IMPEDANCE PHASE

north of Beatty



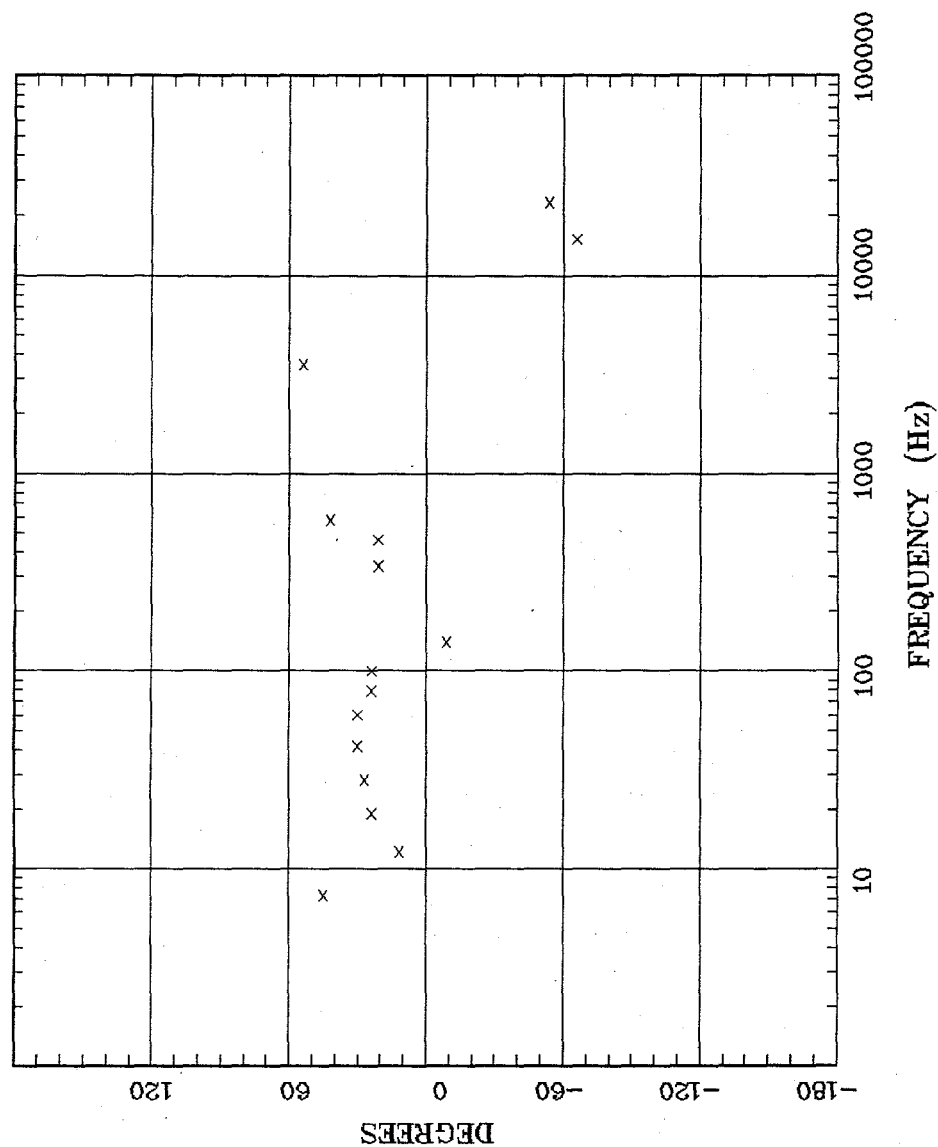
Client: Remote: remote e
 Acquired: 14:1 Sep 05, 1997
 Survey Co:USGS

Rotation:
 Filename: bba10com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 10:45 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 10c

ROTATION ANGLE

north of Beatty



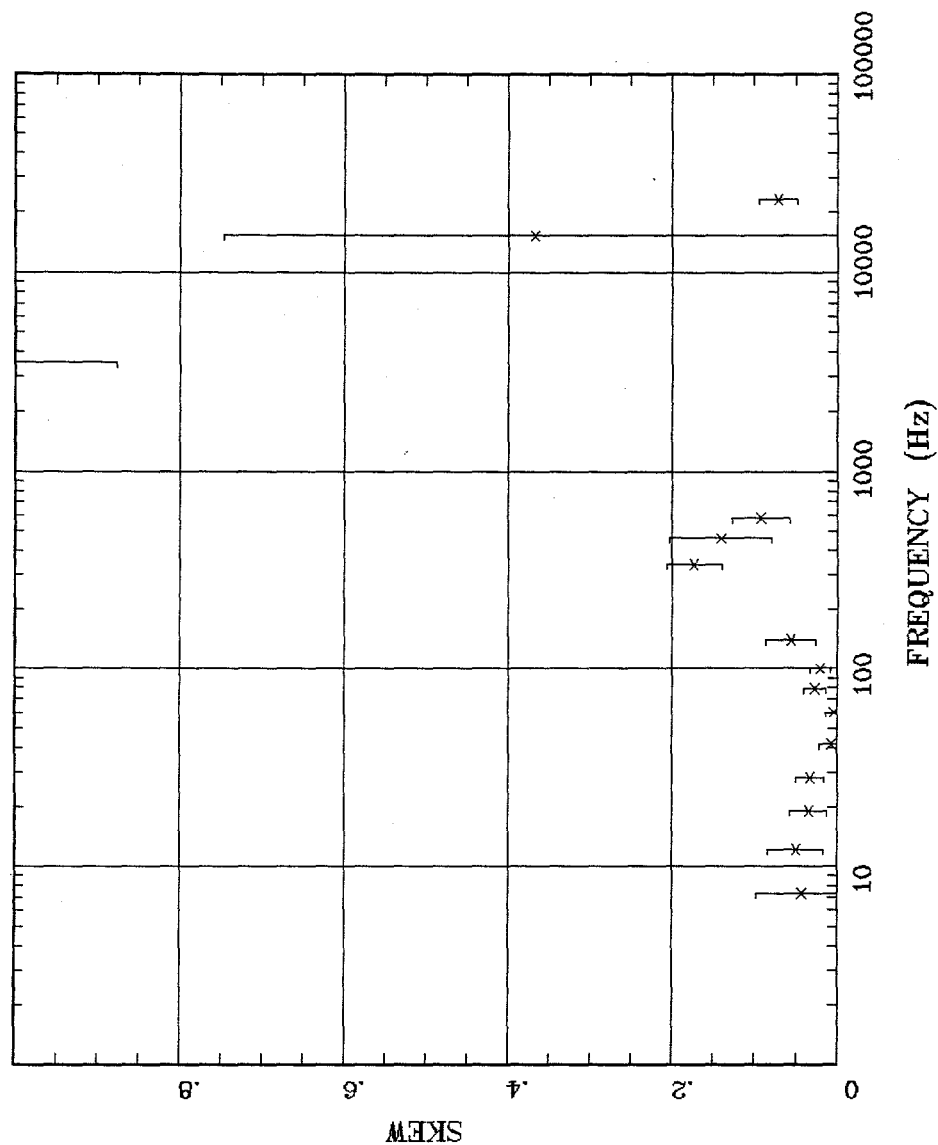
Client: Remote: remote e
Acquired: 14:1 Sep 05, 1997
Survey Co:USGS

Rotation: Filename: bba10com.all
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
Plotted: 10:45 Sep 17, 1997
< EMI - ElectroMagnetic Instruments

Fig. 10d

IMPEDANCE SKEW

north of Beatty



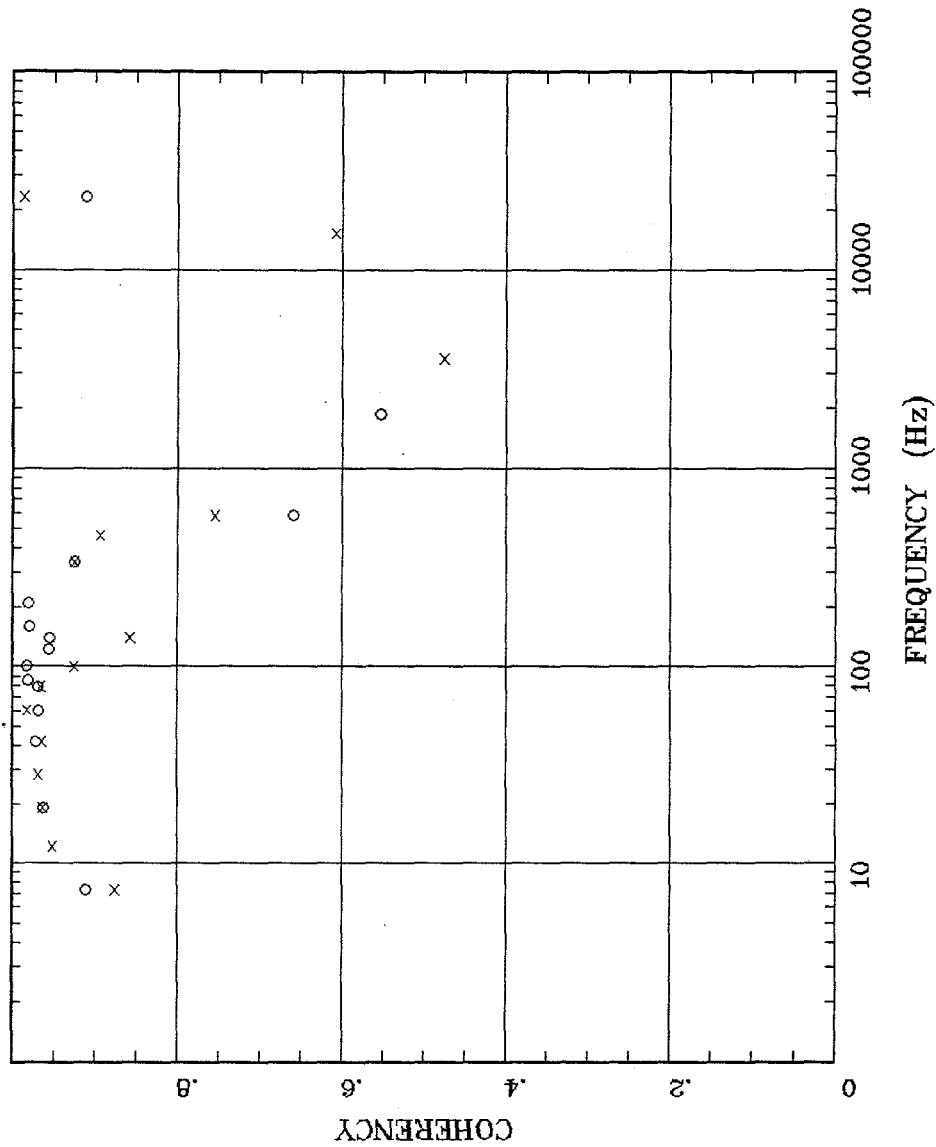
Client: Remote: remote e
 Acquired: 14:1 Sep 05, 1997
 Survey Co:USGS

Rotation: bba10com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 10:45 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 10e

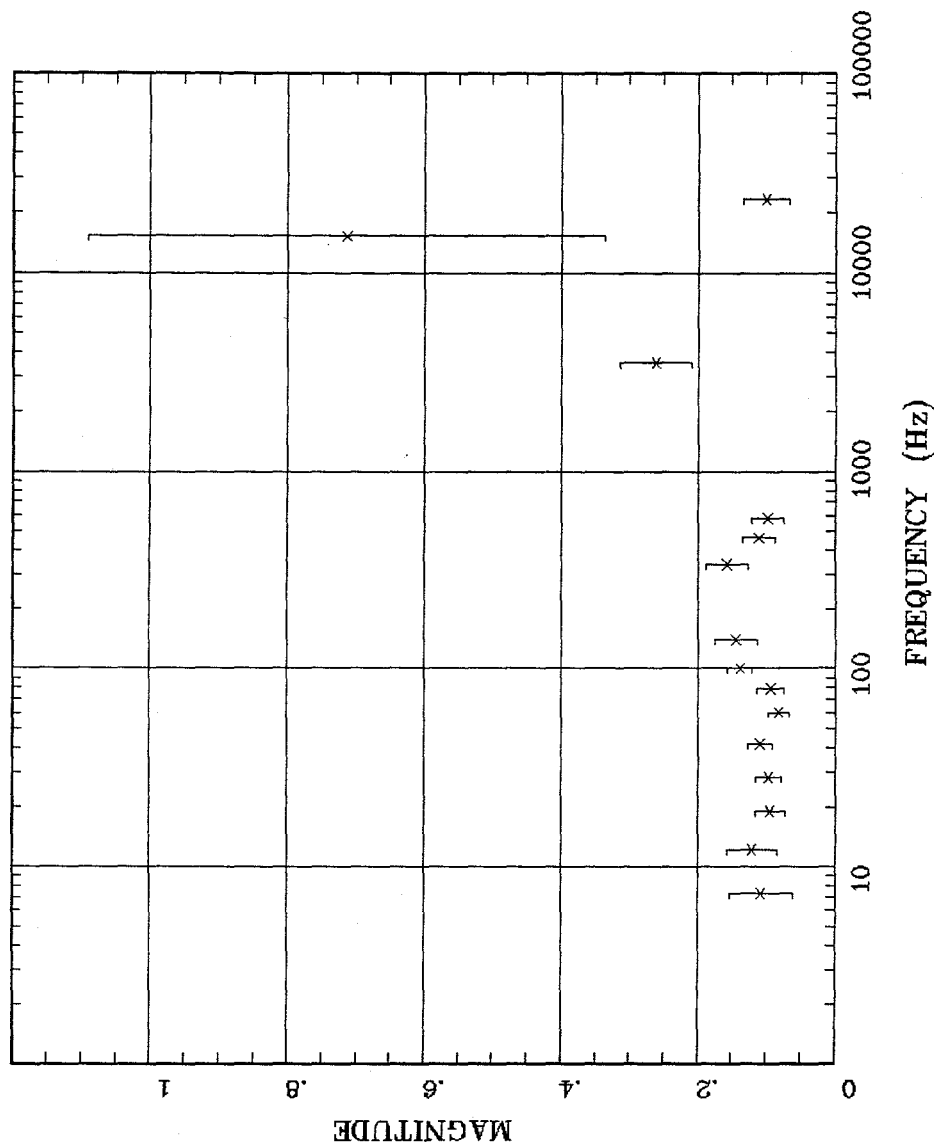
E MULT Coh.

north of Beatty



TIPPER MAGNITUDE

north of Beatty



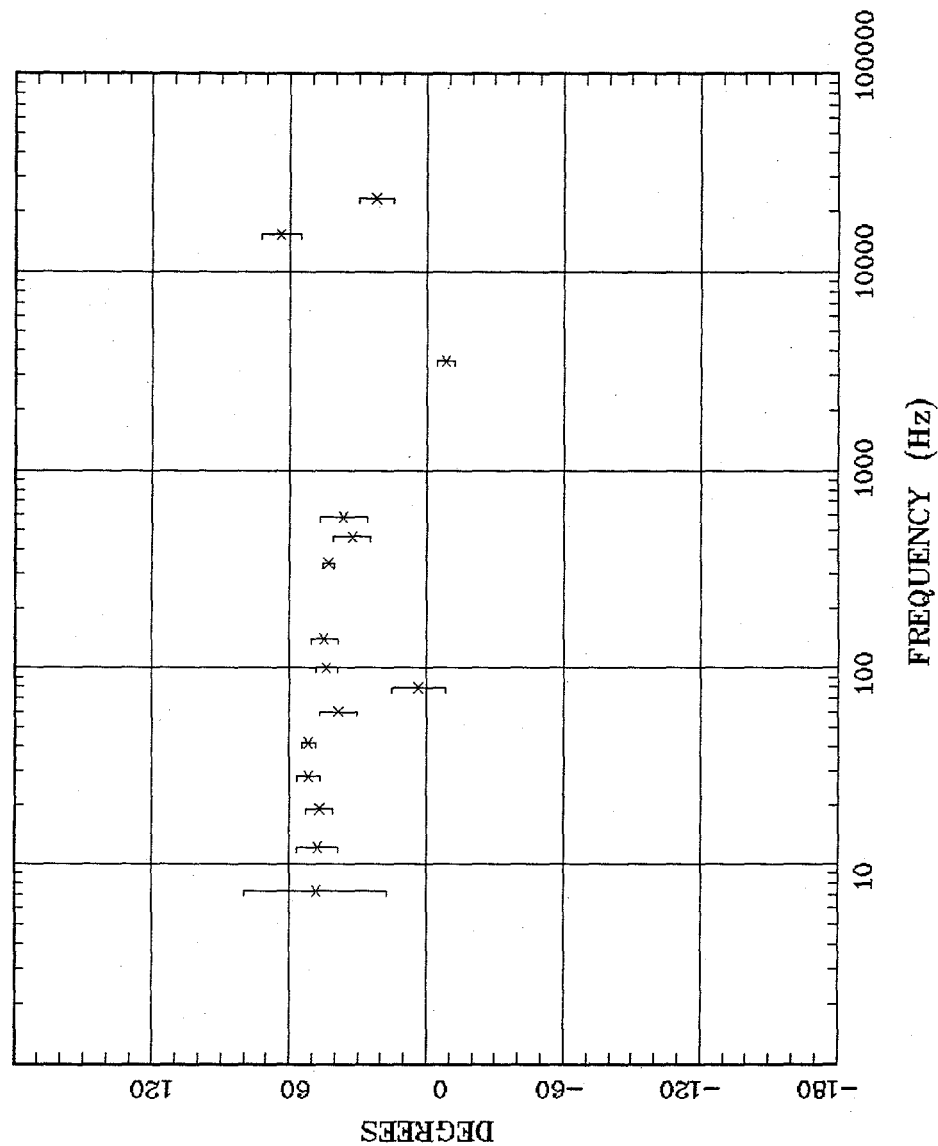
Client: Remote: remote e
 Acquired: 14:1 Sep 05, 1997
 Survey Co:USGS

Rotation: bba10com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 10:45 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 10g

TIPPER STRIKE

north of Beatty



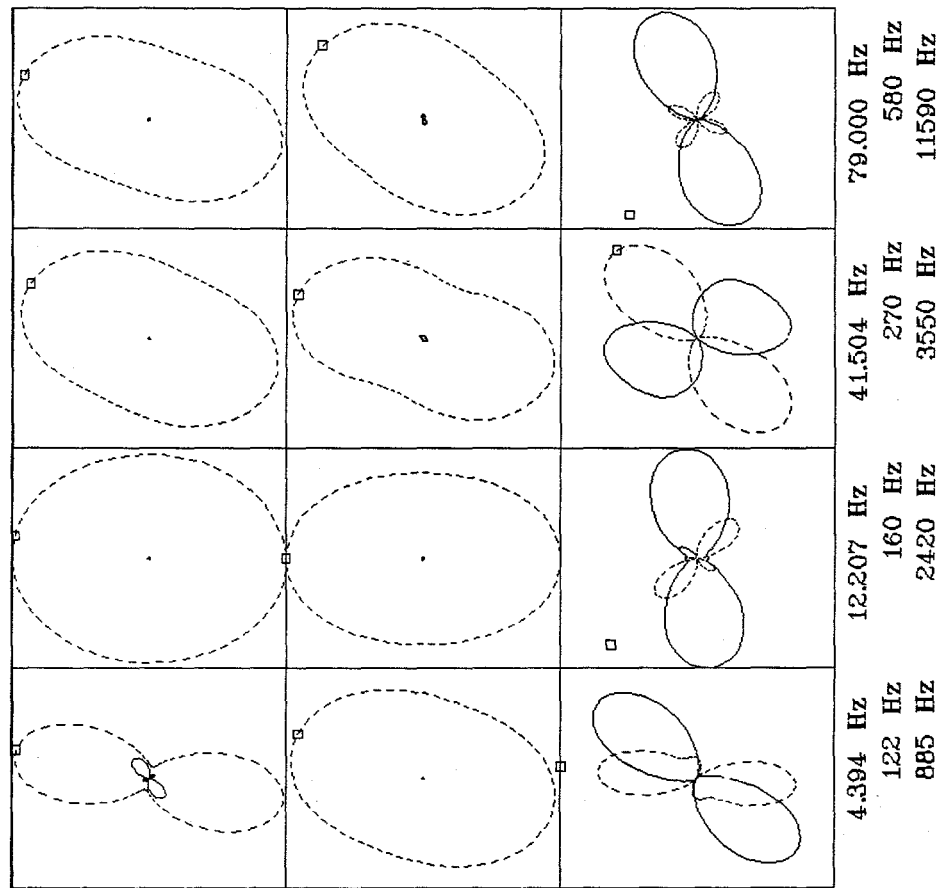
Client: Remote: remote e
 Acquired: 14:1 Sep 05, 1997
 Survey Co:USGS

Rotation:
 Filename: bba10com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 10:46 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 10h

POLAR PLOTS

north of Beatty

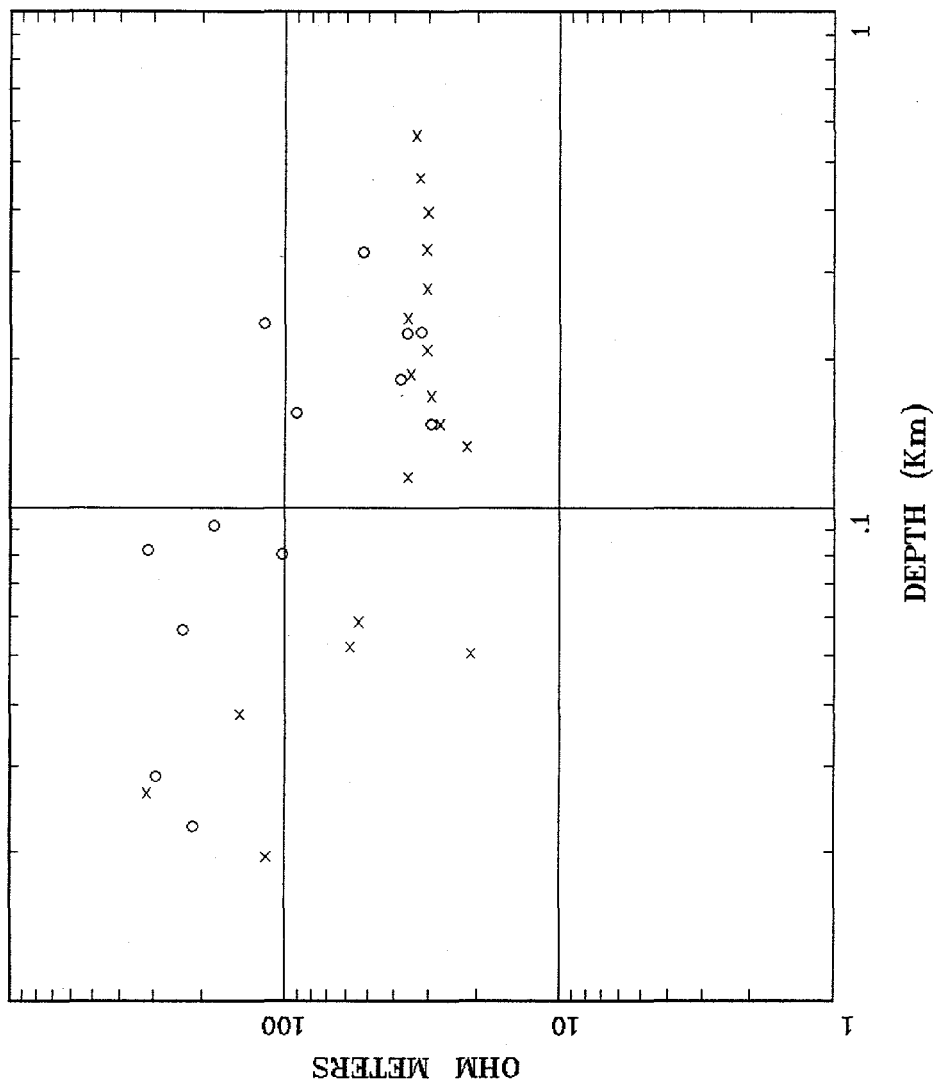


Client: Remote: remote e
 Remote: remote e
 Acquired: 14:1 Sep 05, 1997
 Survey Co:USGS

Rotation:
 Filename: bba10com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 10:46 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 10i

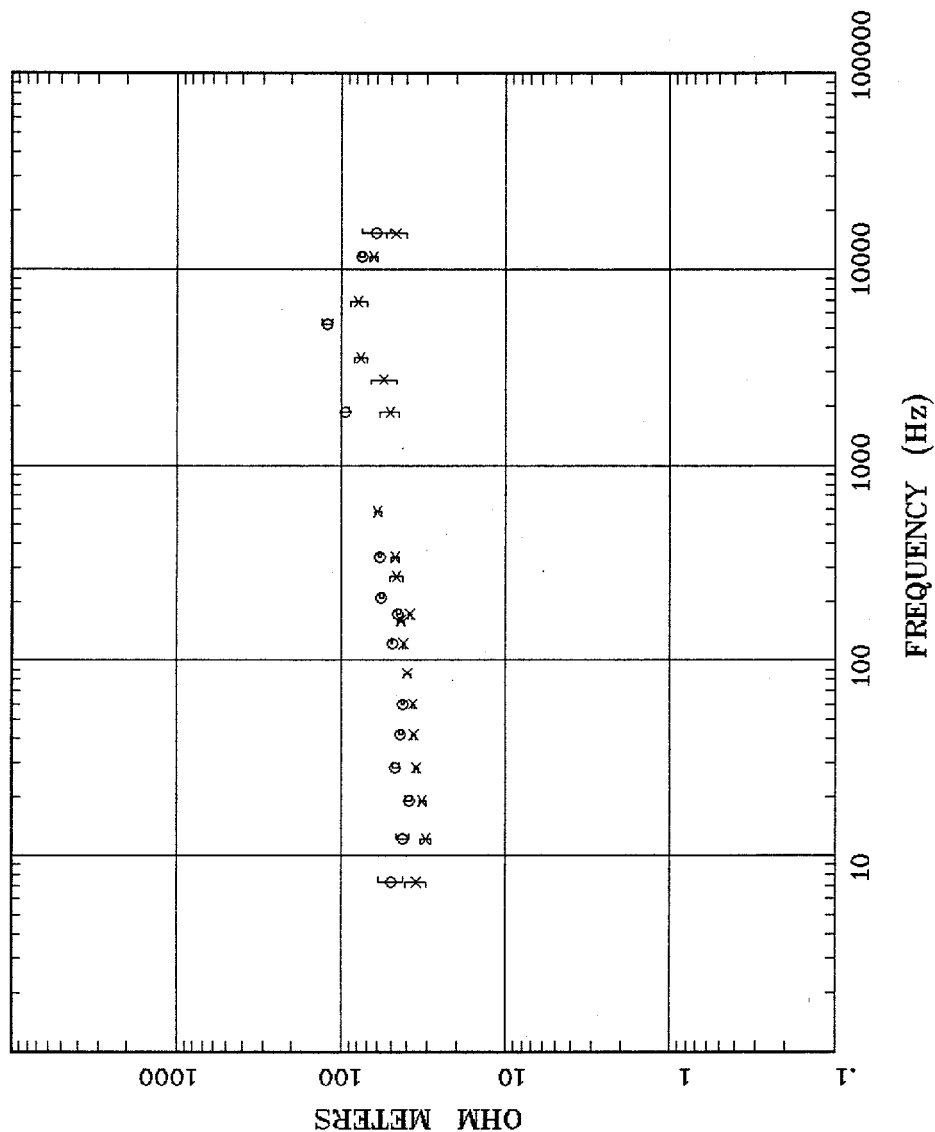
Resistivity (Bostick Inv.)



Client: Rotation:
 Remote: Filename: bba11com.all
 Acquired: 13:3 Sep 17, 1997 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2
 Survey Co: Plotted: 13:57 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

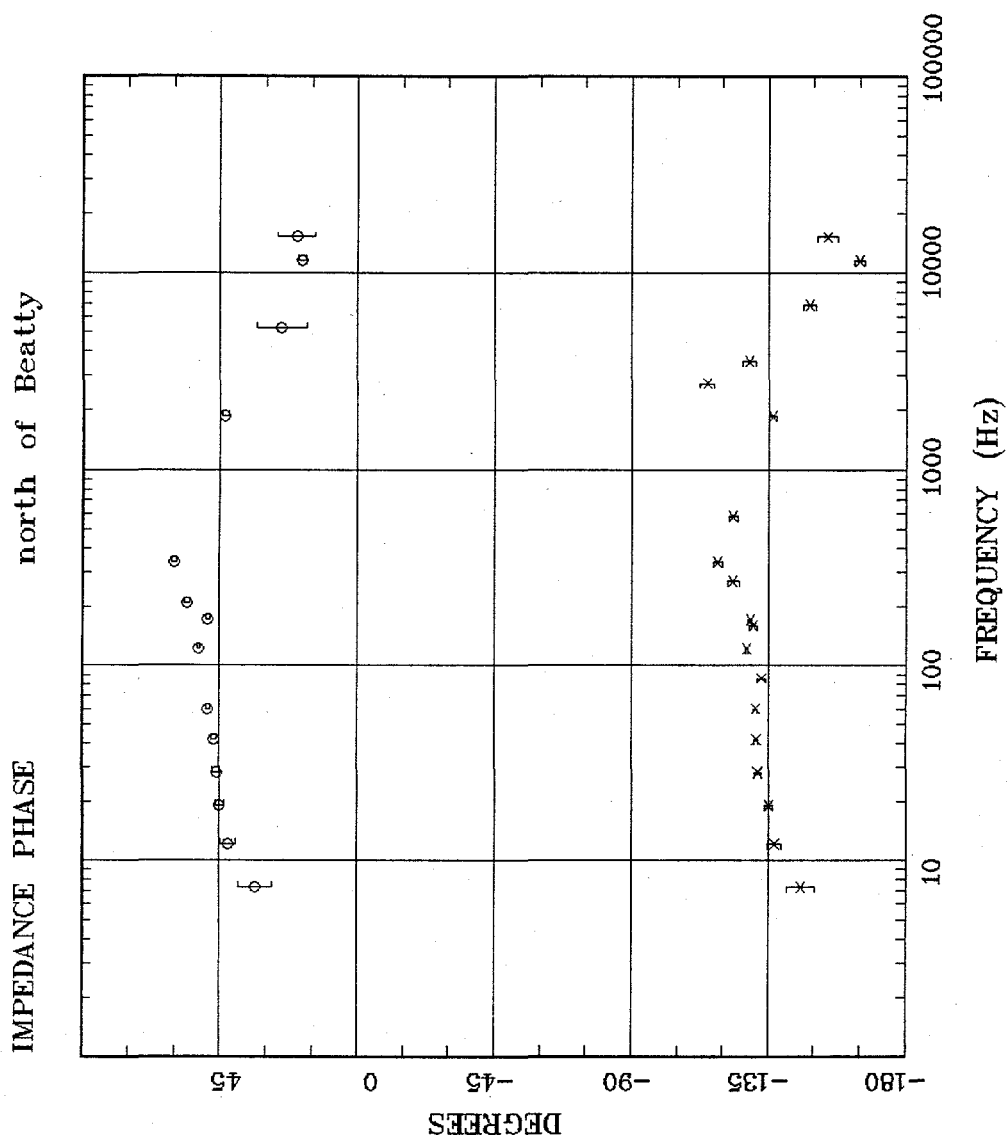
Fig. 11a

APPARENT RESISTIVITY north of Beatty



Client: Rotation:
 Remote: remote e Filename: bba11com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 13:3 Sep 17, 1997 Plotted: 13:57 Sep 17, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments

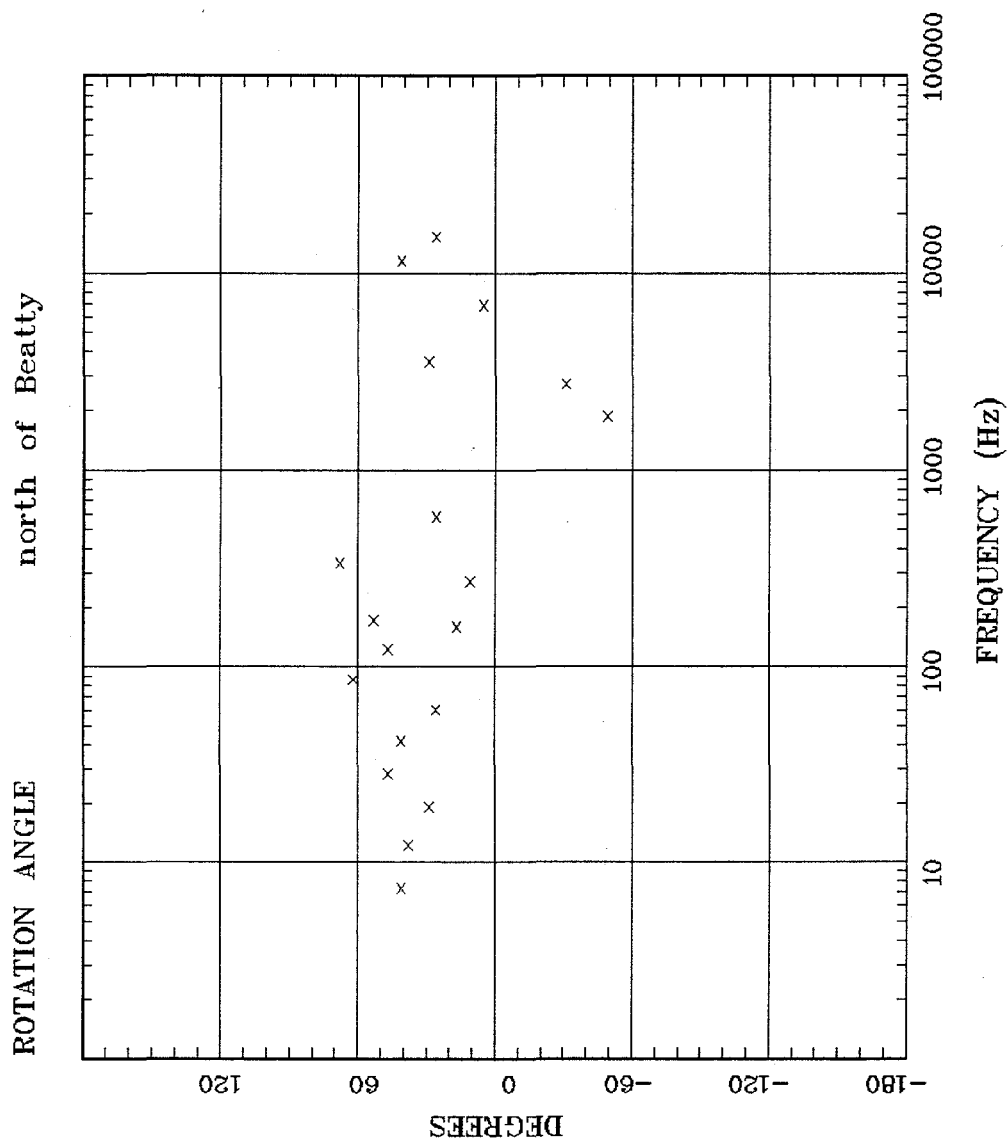
Fig. 11b



Client:
 Remote: remote e
 Acquired: 13:3 Sep 17, 1997
 Survey Co:USGS

Rotation:
 Filename: bba11com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 13:57 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 11c



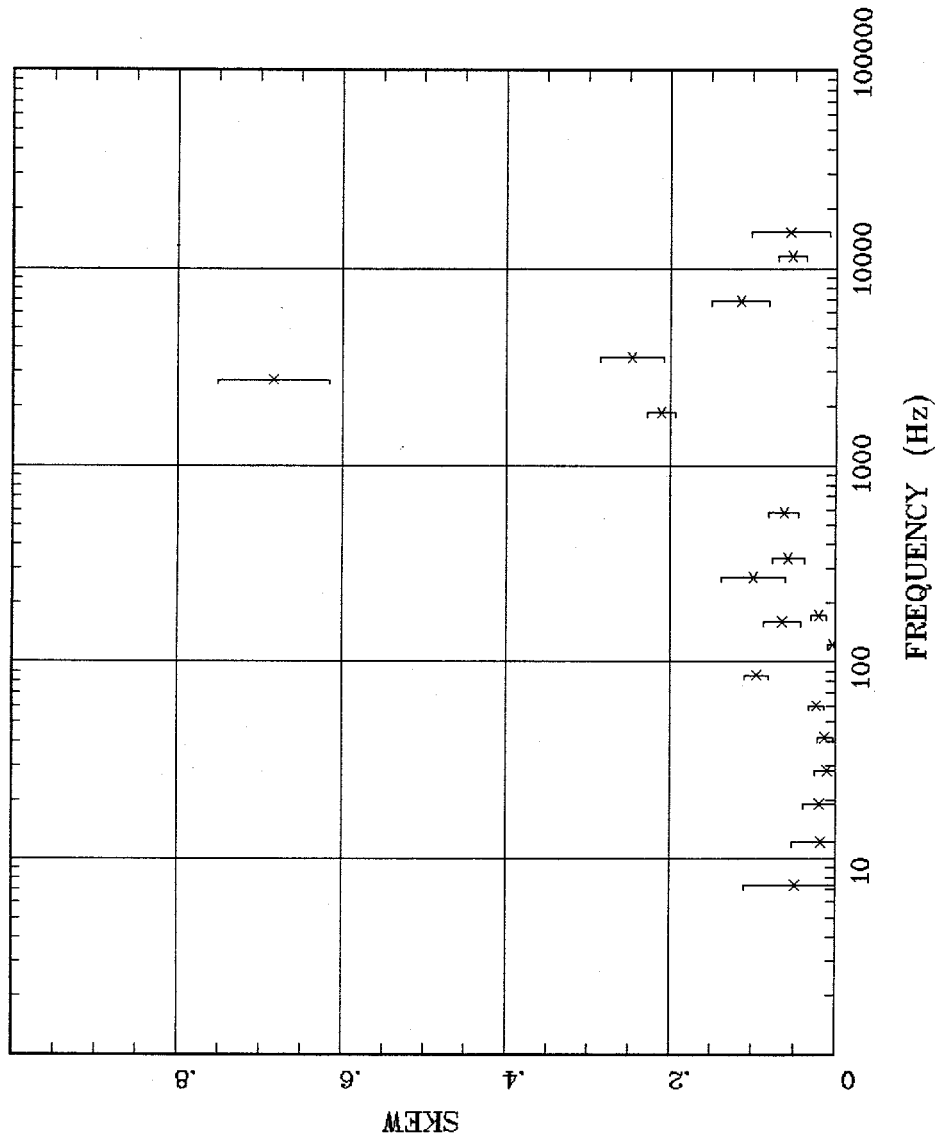
Client: Remote: remote e
 Acquired: 13:3 Sep 17, 1997
 Survey Co:USGS

Rotation: Filename: bba11com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 13:57 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 11d

IMPEDANCE SKEW

north of Beatty



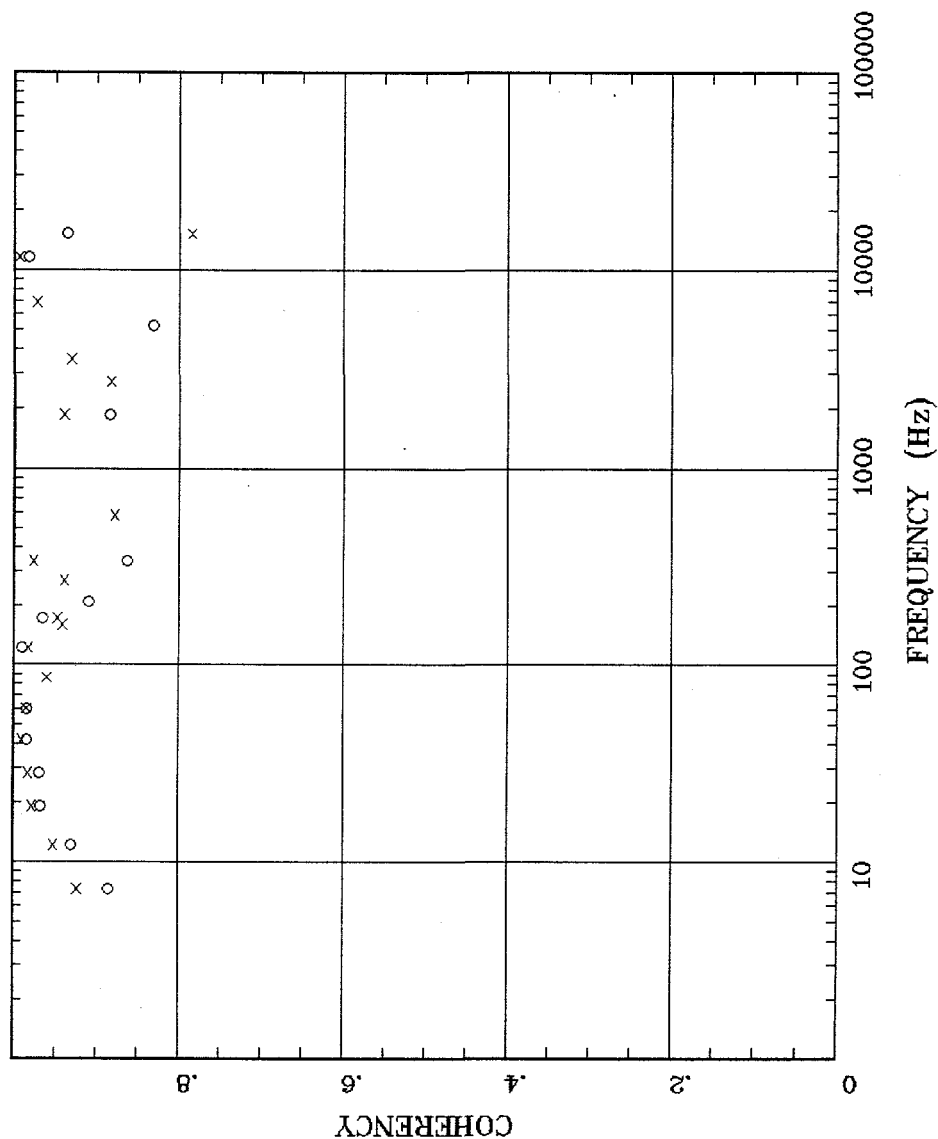
Client: Remote: remote e
 Acquired: 13:3 Sep 17, 1997
 Survey Co:USGS

Rotation:
 Filename: bba11com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 13:57 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 11c

north of Beatty

E MULT Coh.

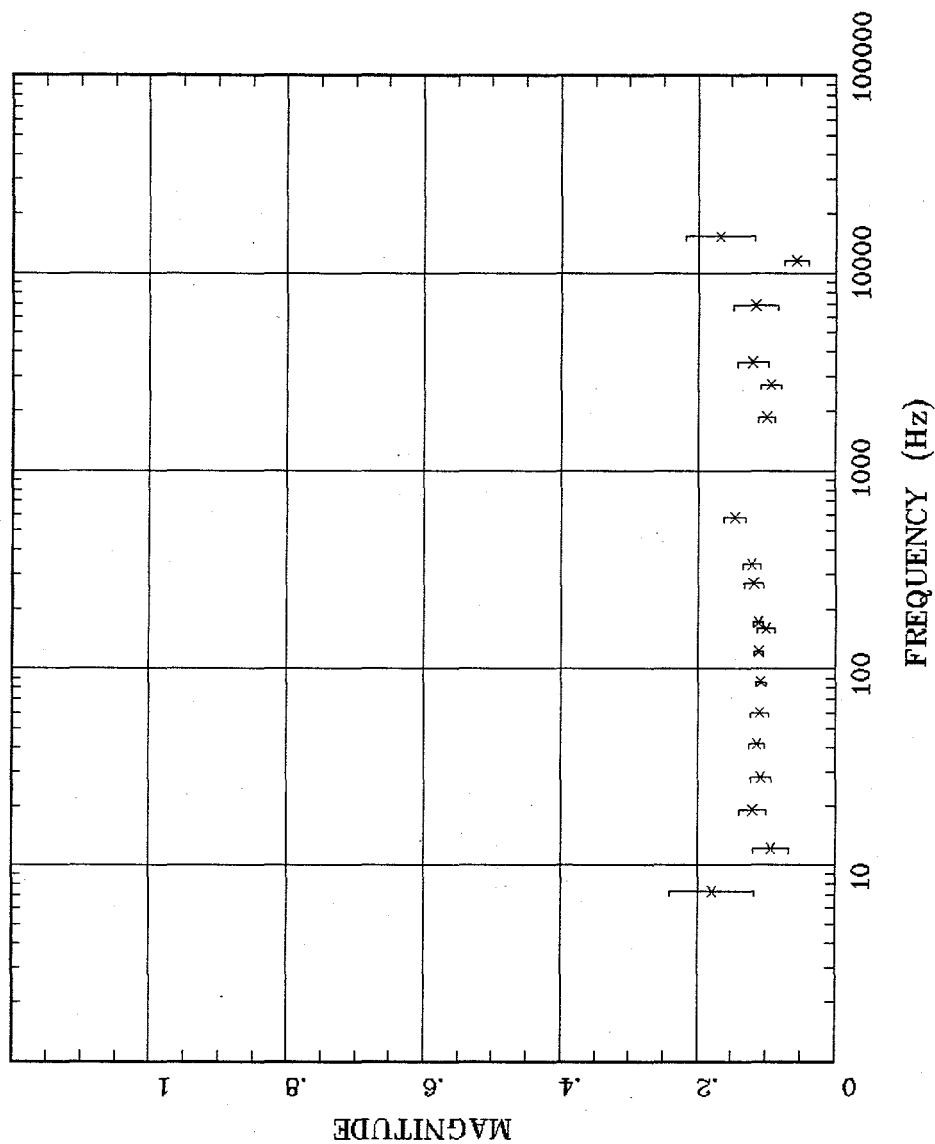


Client: Remote: remote e
 Rotation: Filename: bba11com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 13:3 Sep 17, 1997 Plotted: 13:57 Sep 17, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments

Fig. 11f

TIPPER MAGNITUDE

north of Beatty

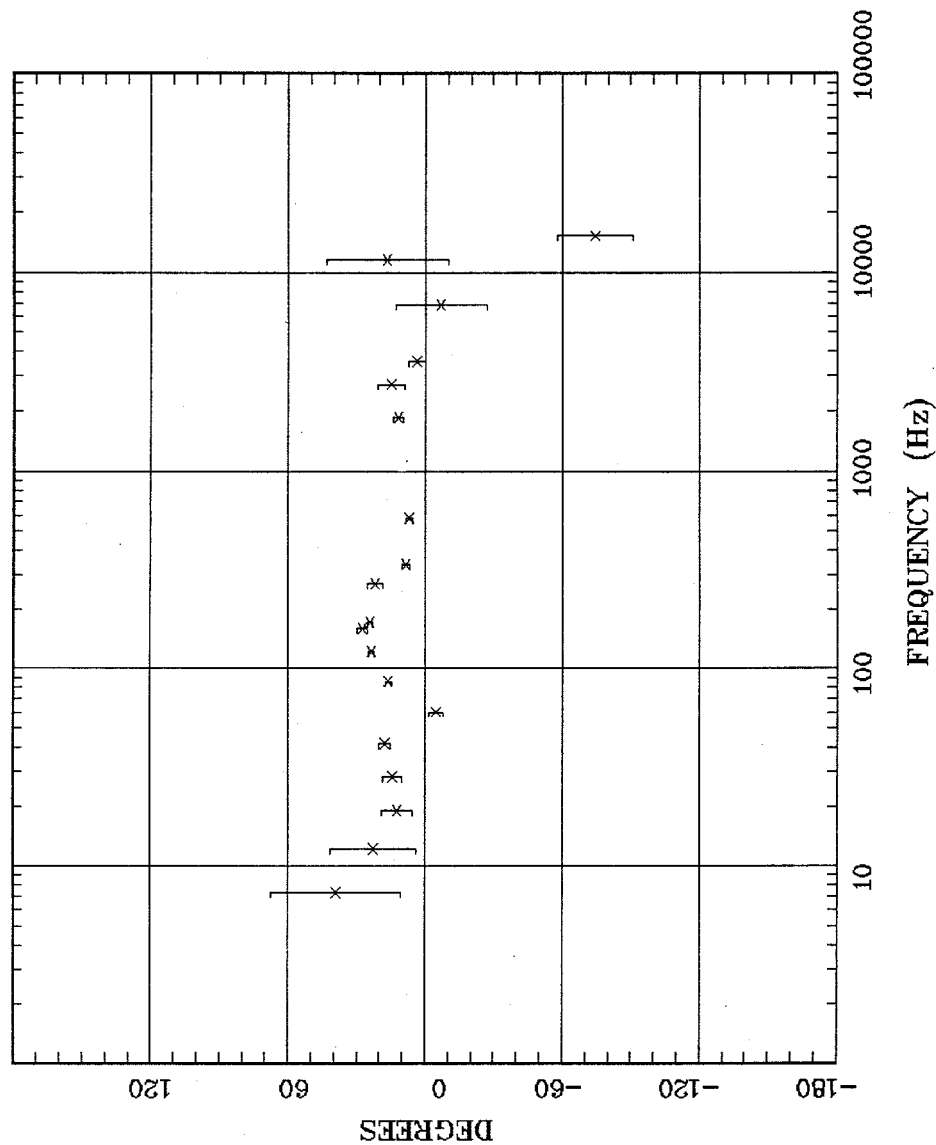


Client: Remote: remote e
 Rotation: Filename: bba11com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 13:3 Sep 17, 1997 Plotted: 13:58 Sep 17, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments

Fig. 11g

TIPPER STRIKE

north of Beatty



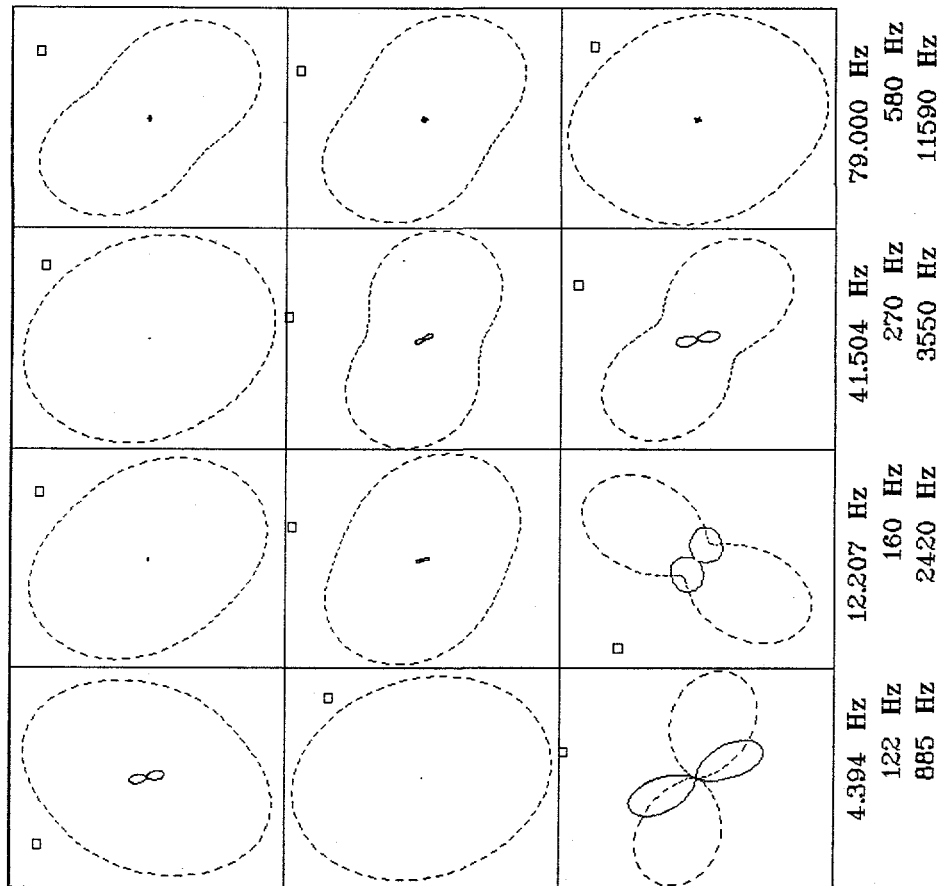
Client: Remote: remote e
 Acquired: 13:3 Sep 17, 1997
 Survey Co:USGS

Rotation: Filename: bballcom.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 13:58 Sep 17, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 11h

POLAR PLOTS

north of Beatty

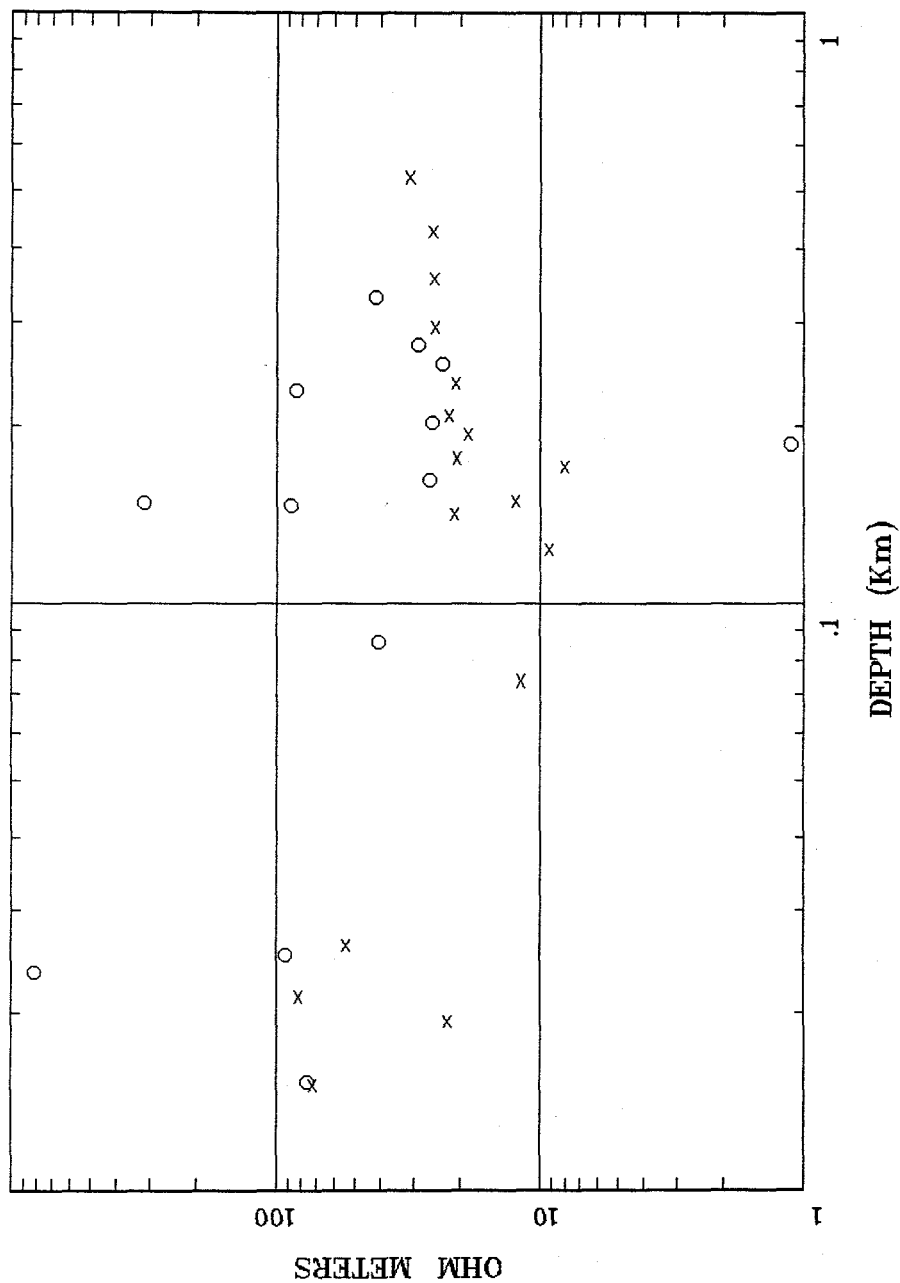


Rotation:

Client: Filename: bballcom.all
 Remote: remote e Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Acquired: 13:3 Sep 17, 1997 Plotted: 13:58 Sep 17, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments >

Fig. 11i

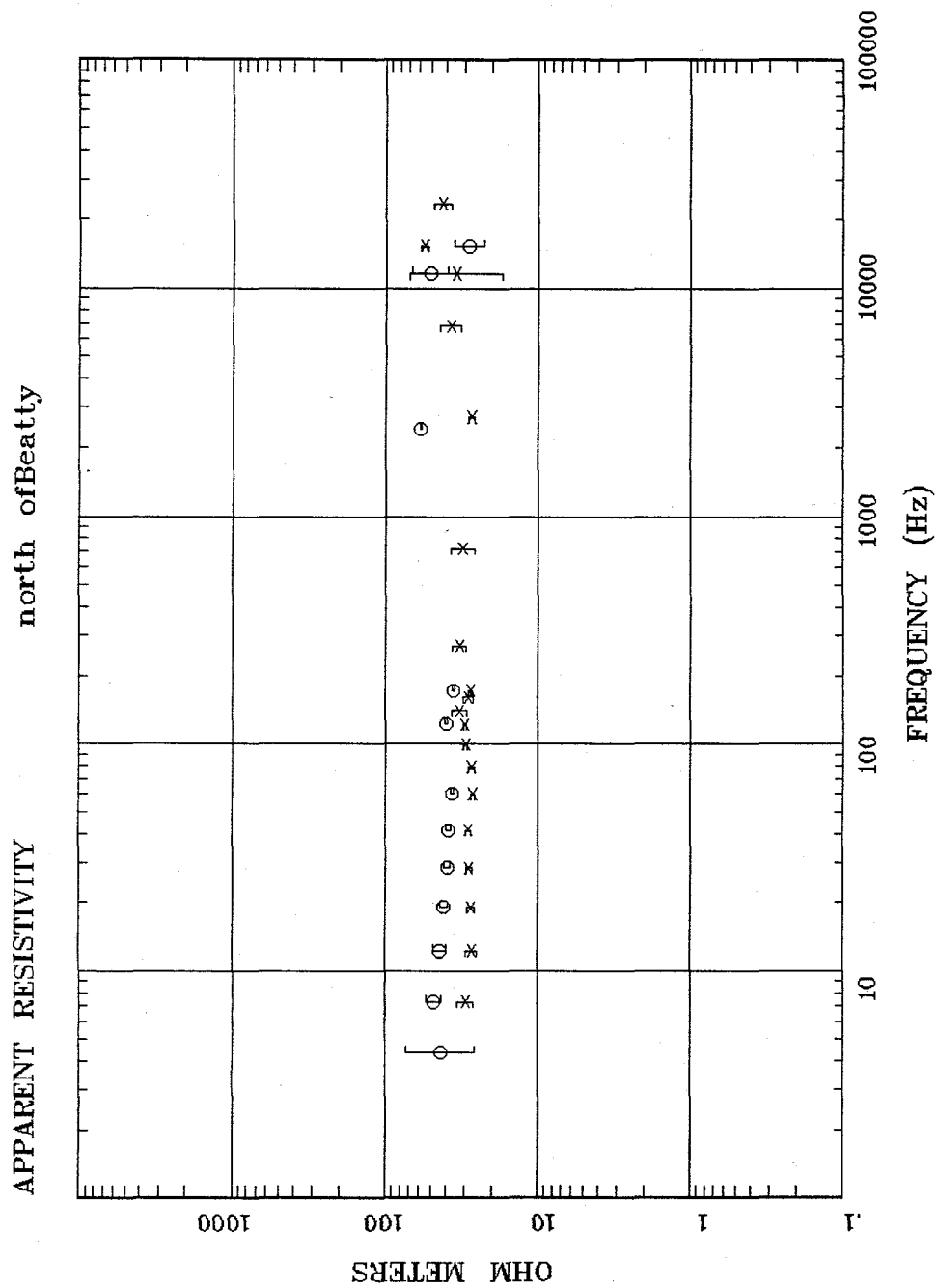
Resistivity (Bostick Inv.)



Rotation:
 Filename: bba12com.all
 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Plotted: 12:46 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

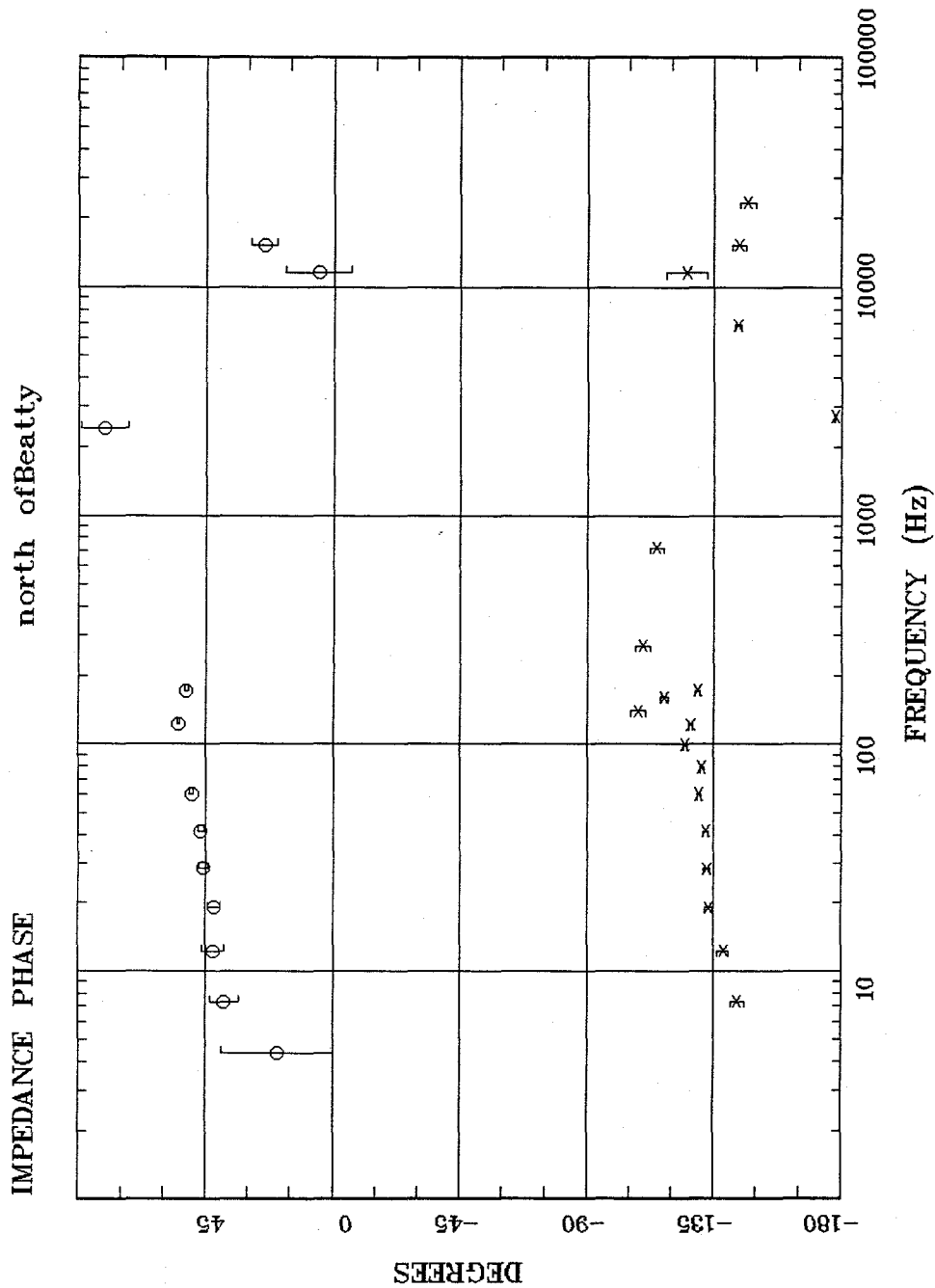
Fig.12a

Client:
 Remote: 20:4 Jun 12, 1997
 Acquired:
 Survey Co:



Client: Remote: remote e
 Rotated: bbal2com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:4 Jun 12, 1997
 Survey Co:USGS
 < EMI - ElectroMagnetic Instruments >

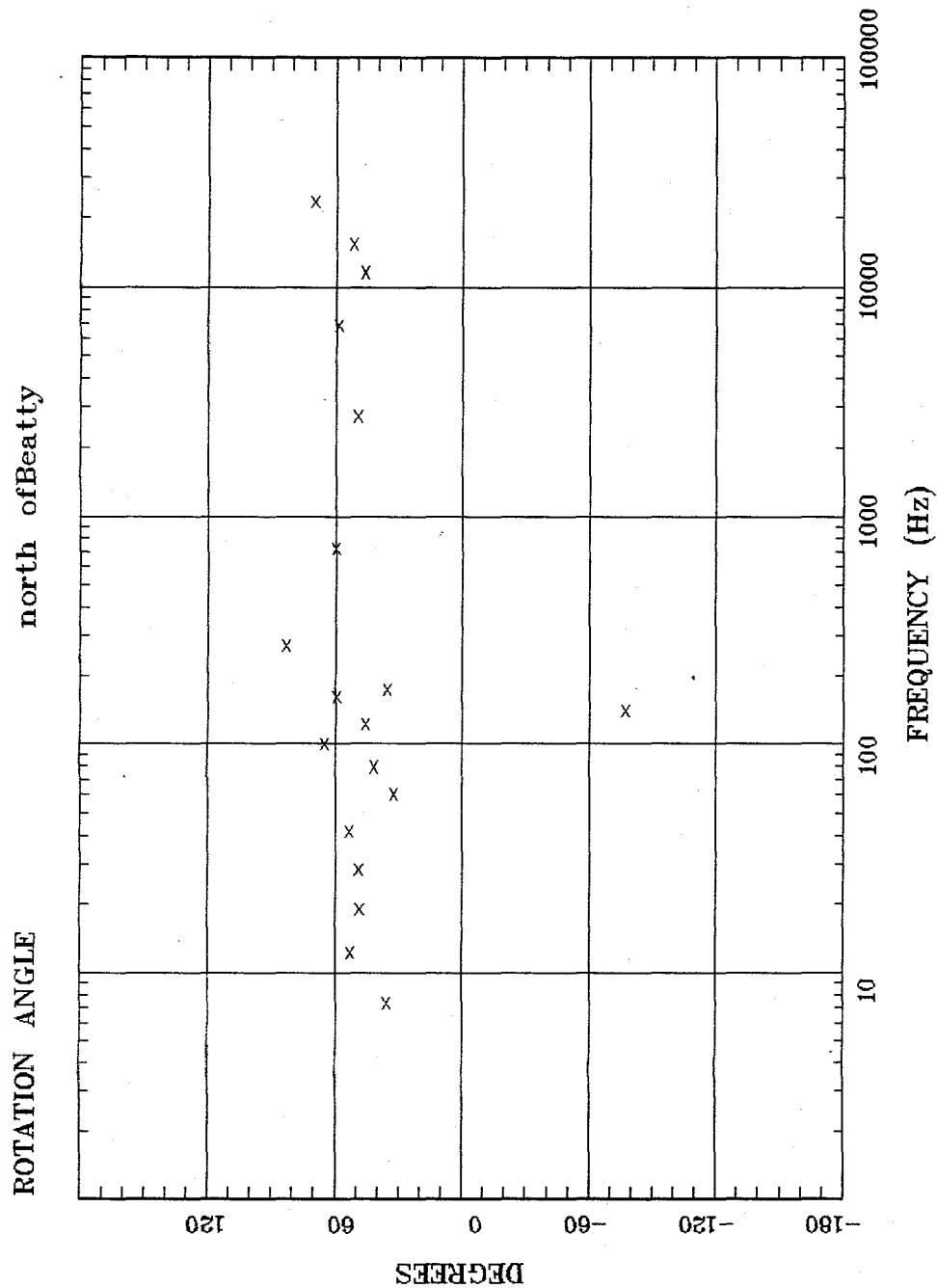
Fig. 12b



Client: Remote: remote e
 Remote: remote e
 Acquired: 20:4 Jun 12, 1997
 Survey Co:USGS

Rotation: bba12com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:46 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 12c



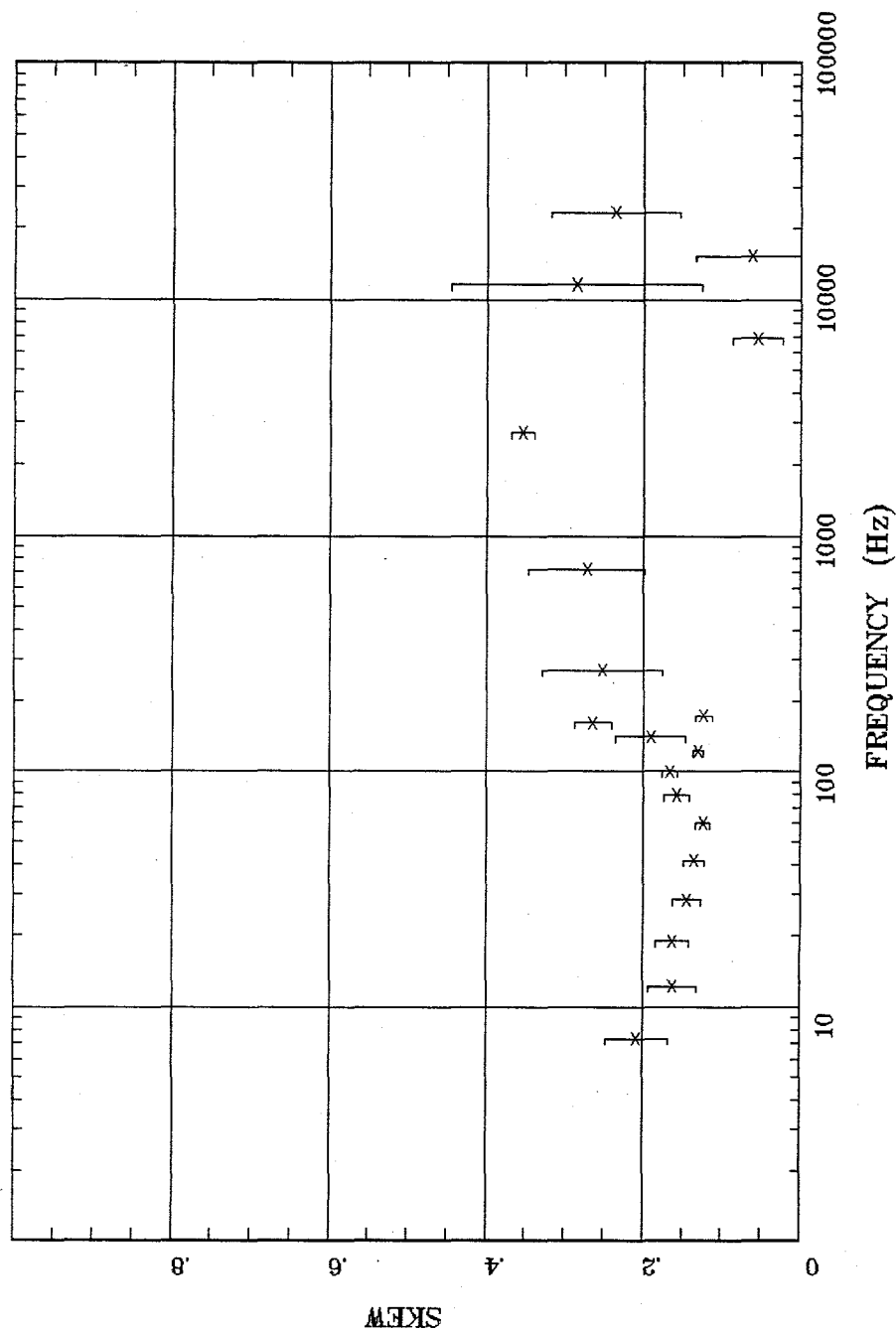
Client: Remote: remote e
 Remote: 20:4 Jun 12, 1997
 Survey Co:USGS

Rotation: Filename: bbal2com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:47 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 12d

IMPEDANCE SKEW

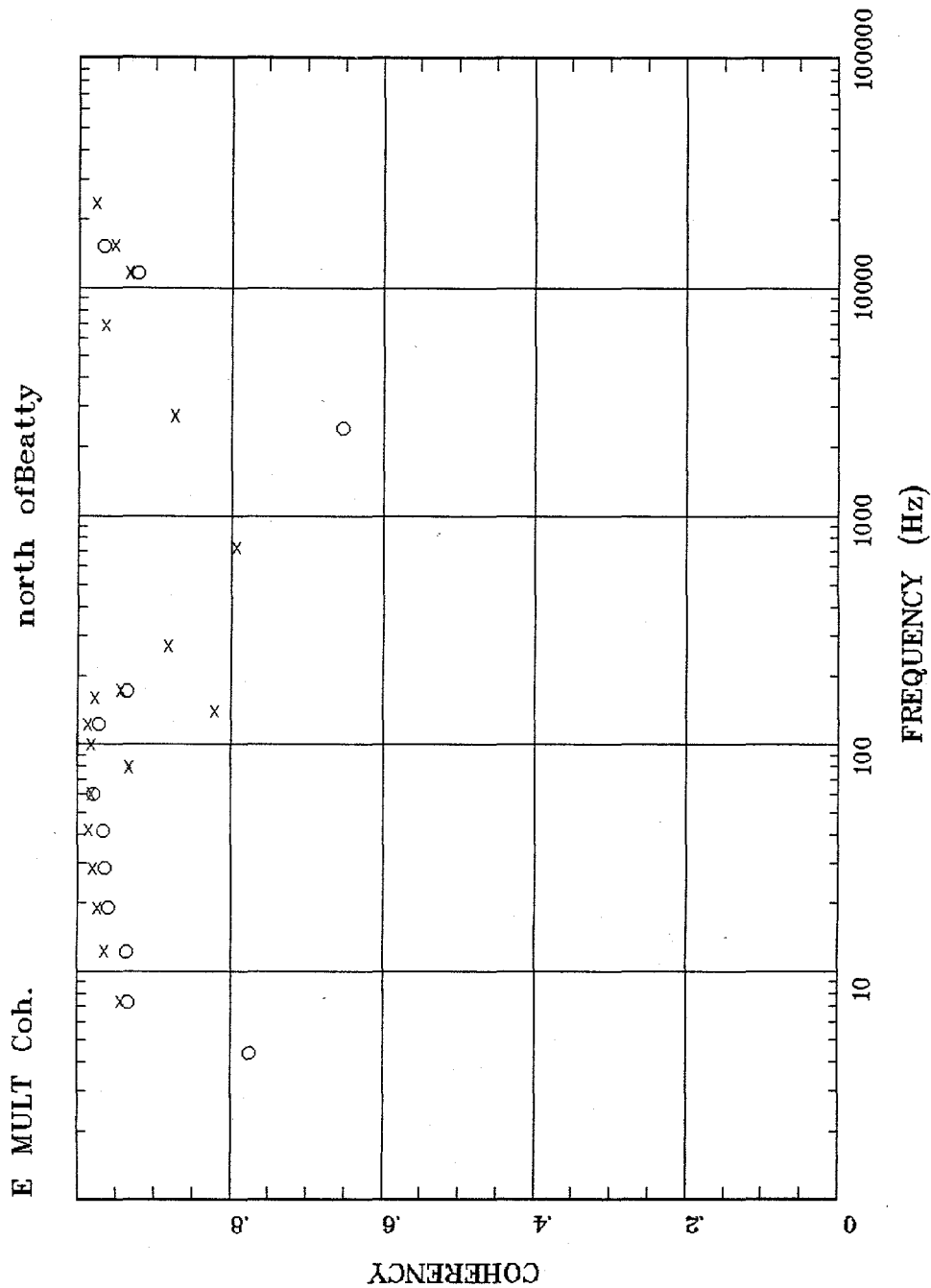
north of Beatty



Rotation:
 Filename: bba12com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:47 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Client:
 Remote: remote e
 Acquired: 20:4 Jun 12, 1997
 Survey Co:USGS

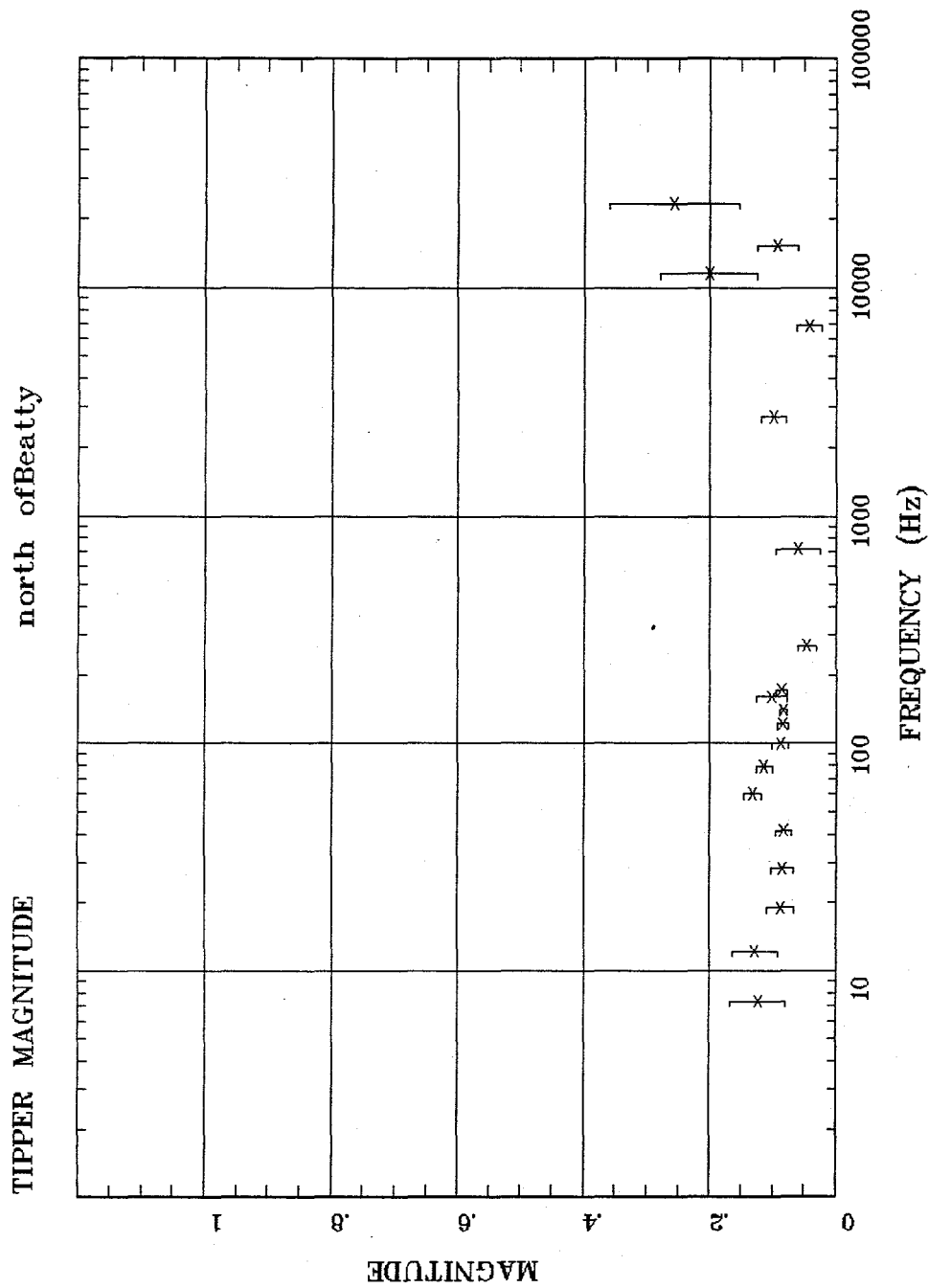
Fig. 12e



Client: Remote: remote e
 Acquired: 20:4 Jun 12, 1997
 Survey Co:USGS

Rotation: bbal2com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:47 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

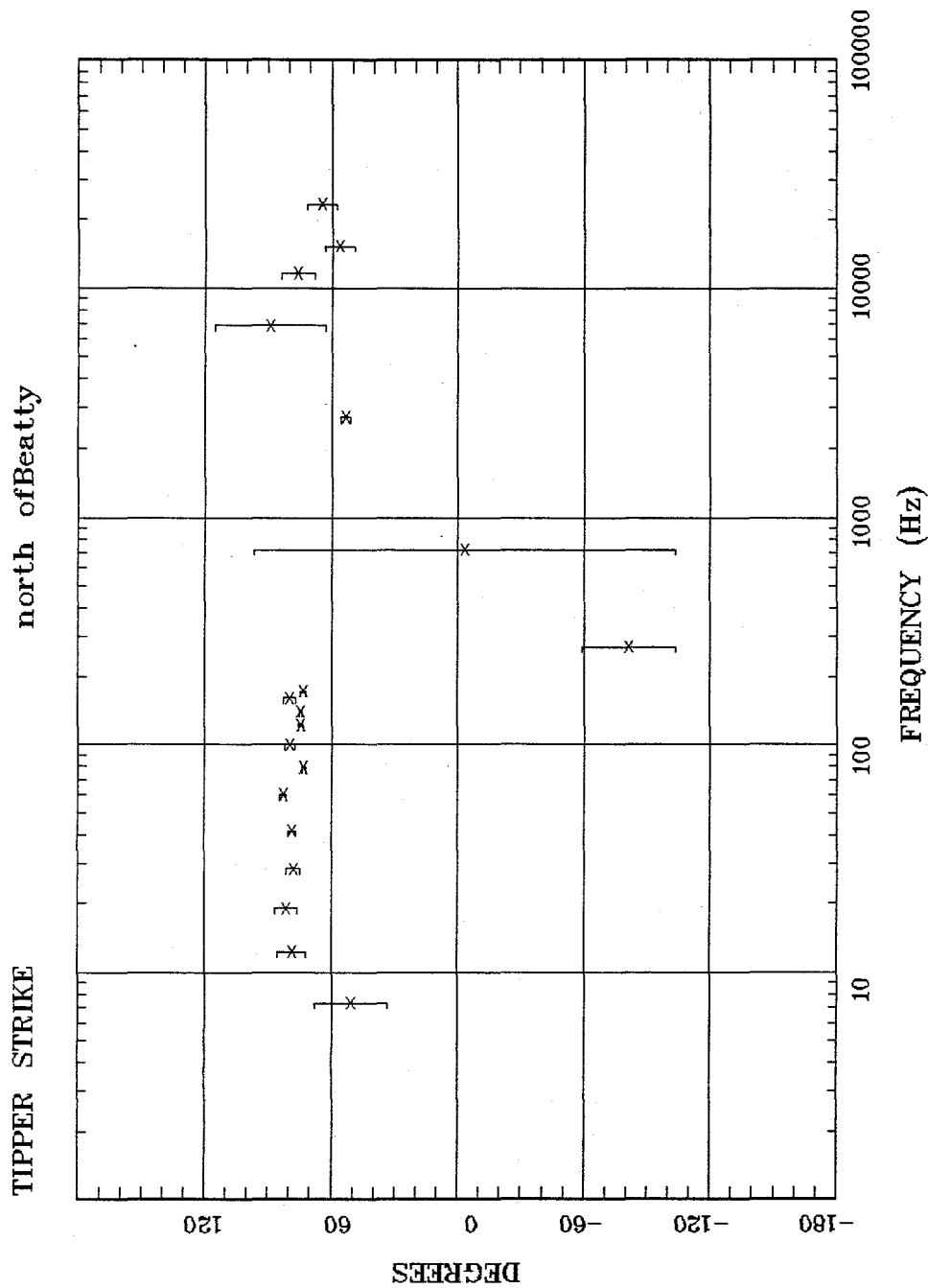
Fig. 12f



Client: Remote: remote e
 Acquired: 20:4 Jun 12, 1997
 Survey Co:USGS

Rotation:
 Filename: bba12com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:47 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 12g



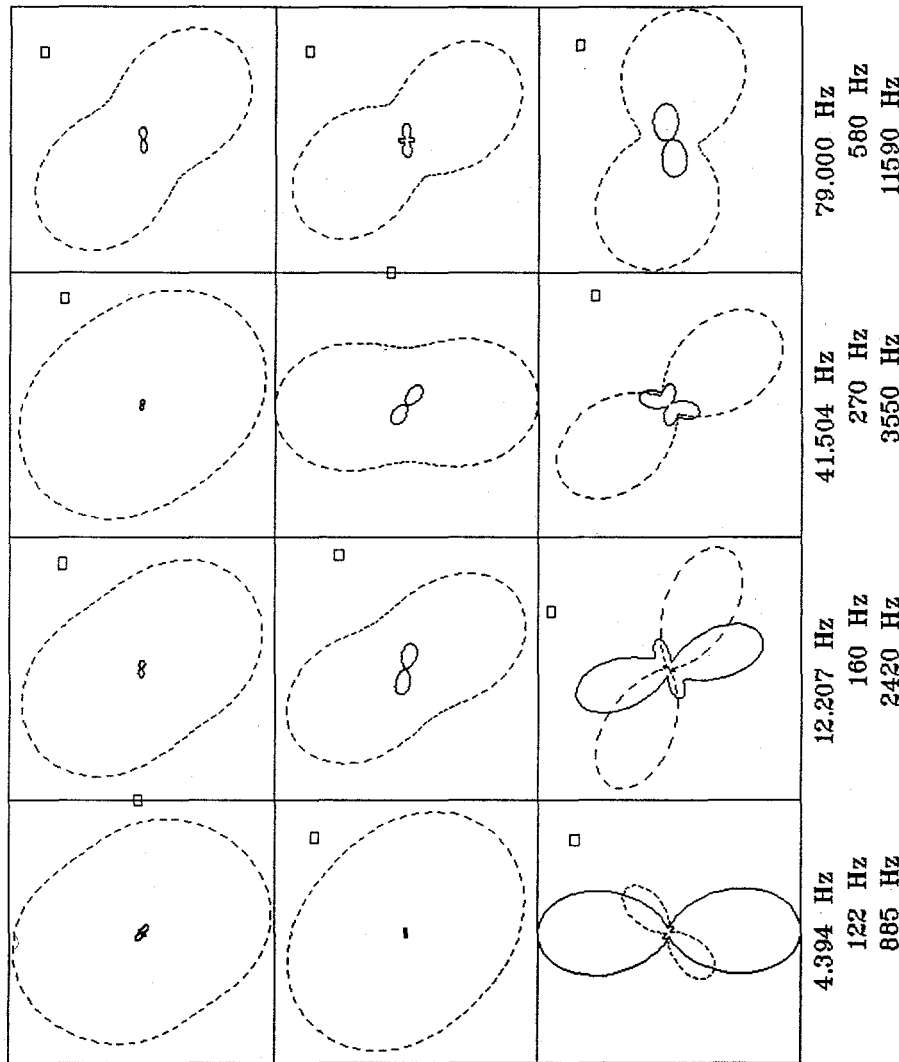
Client: Remote; remote e
 Acquired: 20:4 Jun 12, 1997
 Survey Co:USGS

Rotation: bba12com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:47 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 12h

POLAR PLOTS

north of Beatty

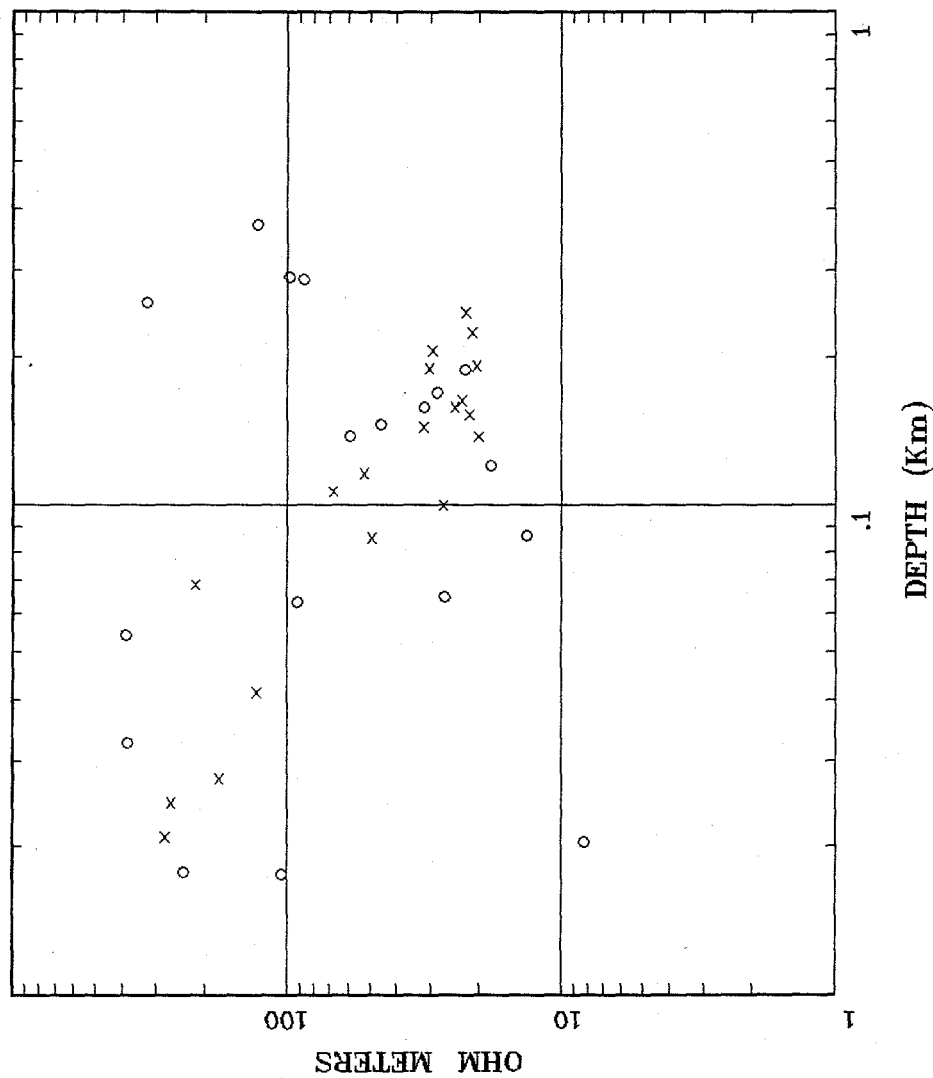


Client: Remote: remote e
 Acquired: 20:4 Jun 12, 1997
 Survey Co:USGS

Rotation:
 Filename: bba12com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 12:47 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 12i

Resistivity (Bostick Inv.)

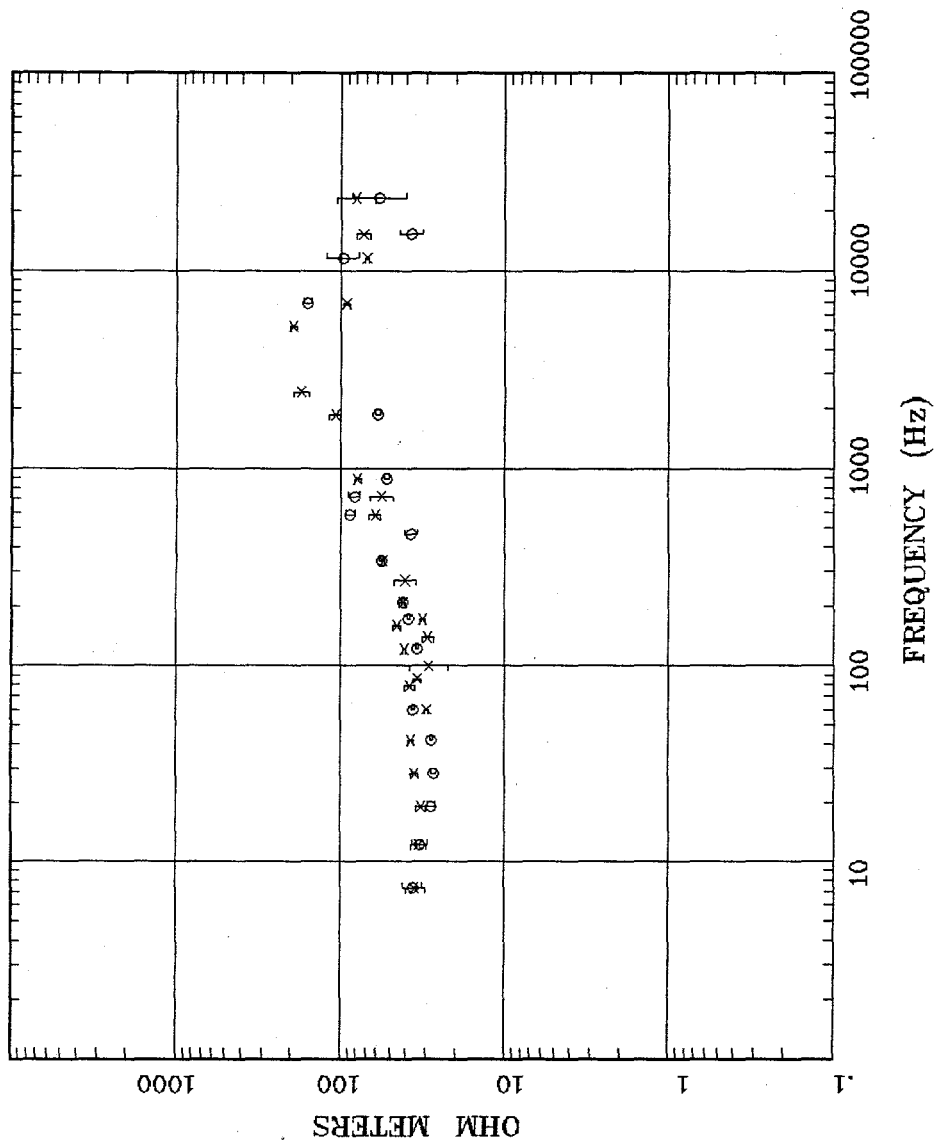


Client: Remote: Acquired: 20:0 Jun 12, 1997 Survey Co: EMI - ElectroMagnetic Instruments

Rotation: Filename: bba13comb.all Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Plotted: 20:28 Jun 12, 1997

Fig. 13a

APPARENT RESISTIVITY north of Beatty

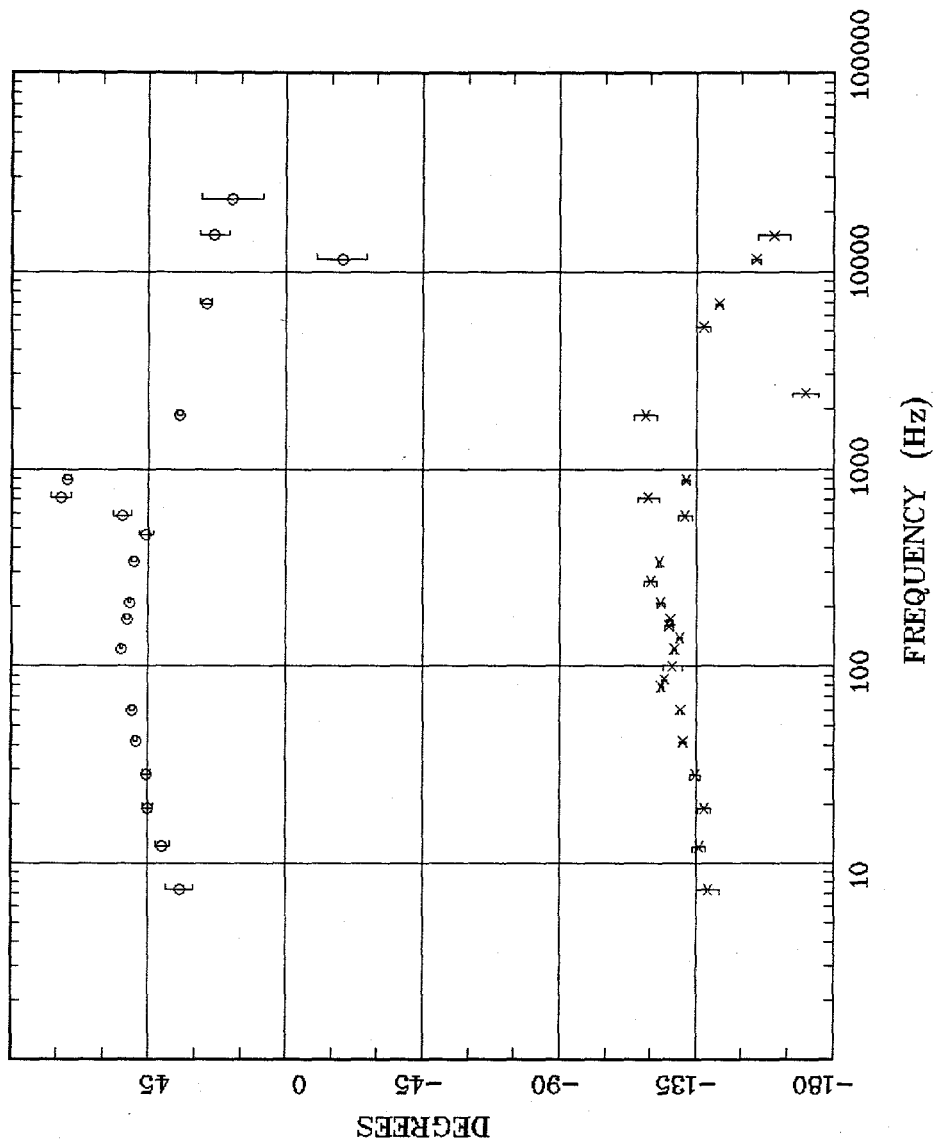


Client: Remote: remote e
 Rotation: Filename: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Acquired: 20:0 Jun 12, 1997 Plotted: 20:28 Jun 12, 1997
 Survey Co:USGS < EMI - ElectroMagnetic Instruments

Fig. 13b

IMPEDANCE PHASE

north of Beatty



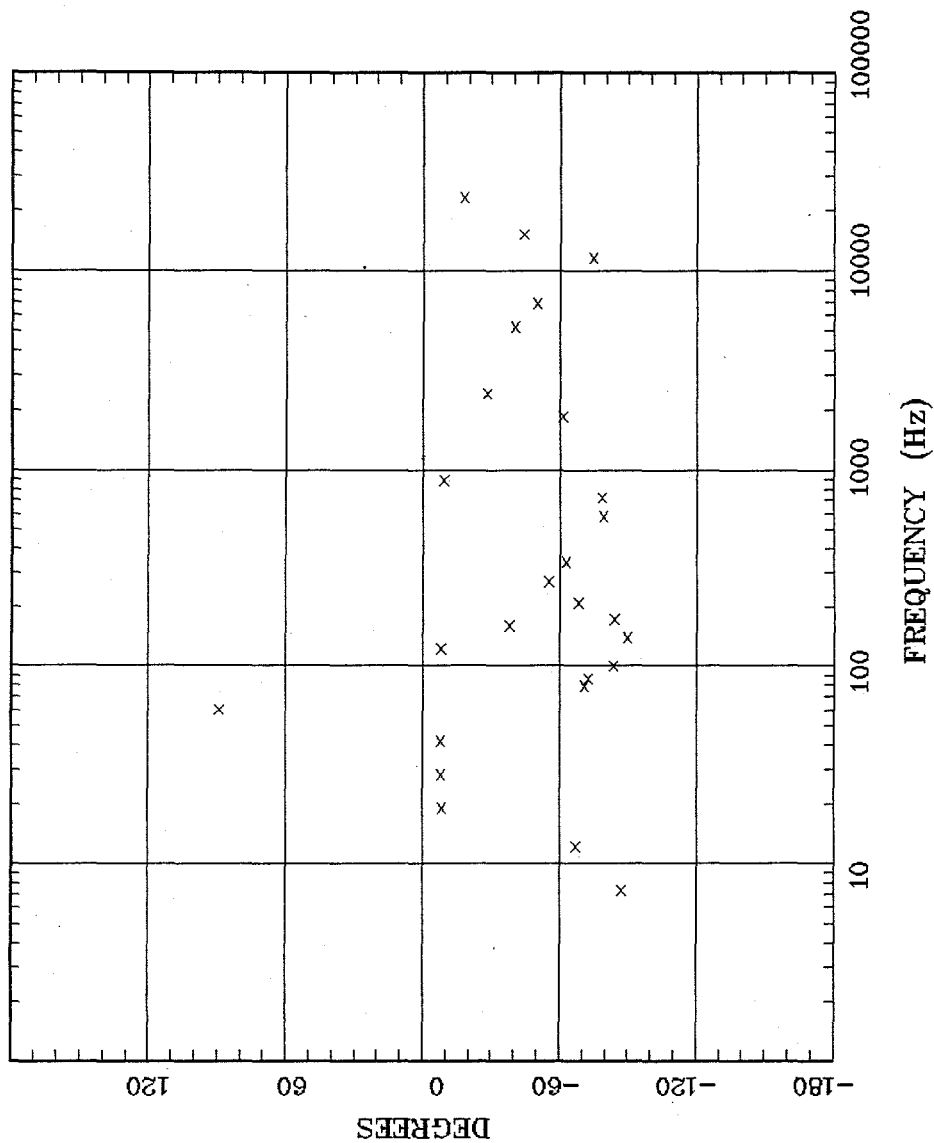
Client: Remote: remote e
 Acquired: 20:0 Jun 12, 1997
 Survey Co:USGS

Rotation:
 Filename: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:28 Jun 12, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 13c

ROTATION ANGLE

north of Beatty

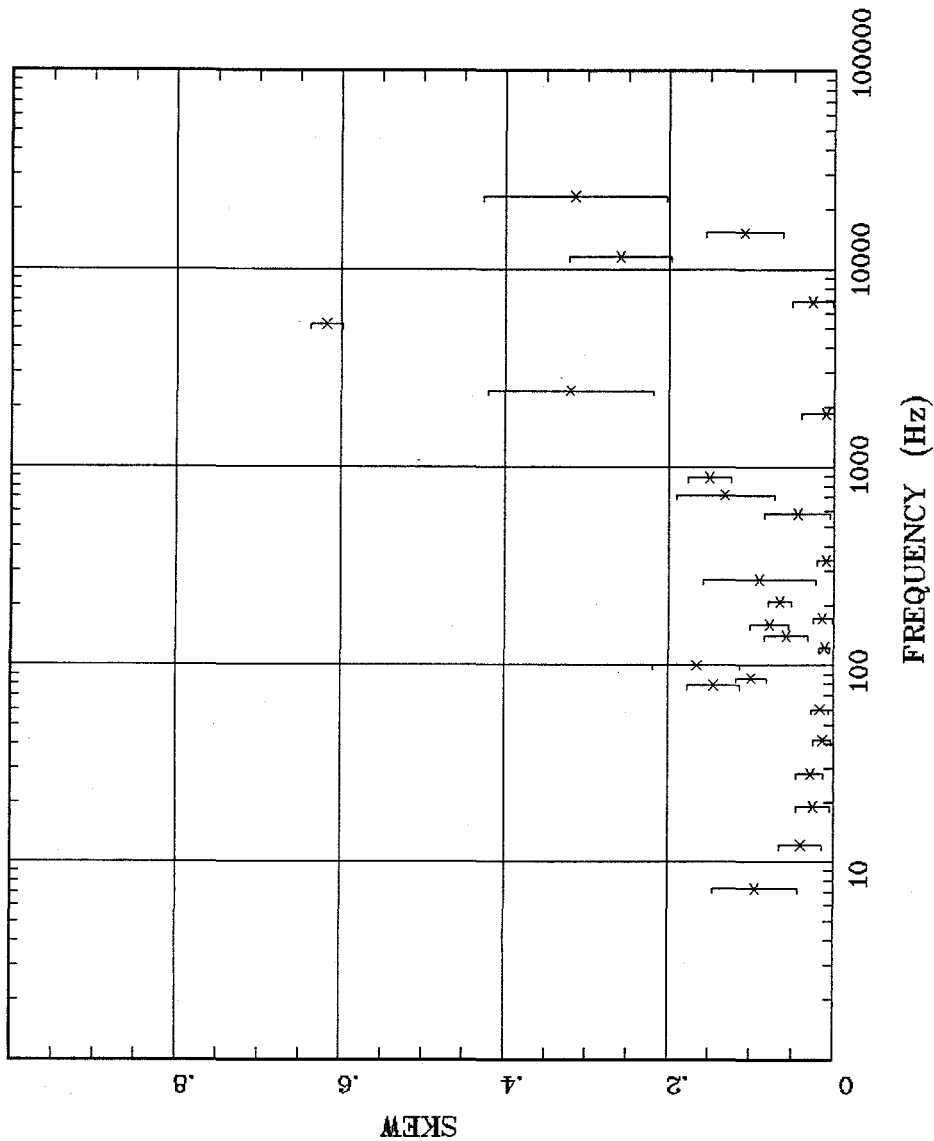


Client: Remote: remote e
 Acquired: 20:0 Jun 12, 1997
 Survey Co:USGS

Rotation: Filename: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:28 Jun 12, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 13d

IMPEDANCE SKEW north of Beatty

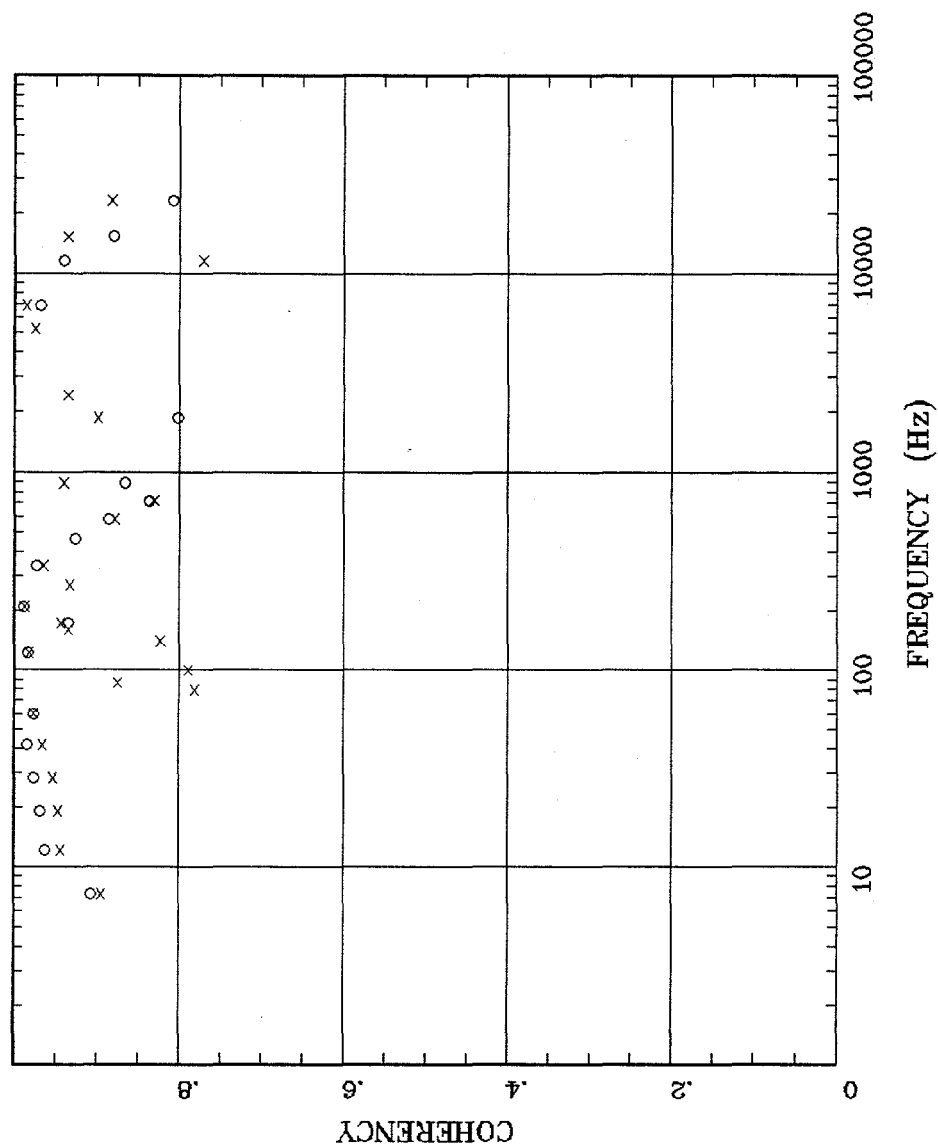


Client: Remote: remote e
 Acquired: 20:0 Jun 12, 1997
 Survey Co:USGS

Rotation: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:28 Jun 12, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 13e

E MULT Coh. north of Beatty

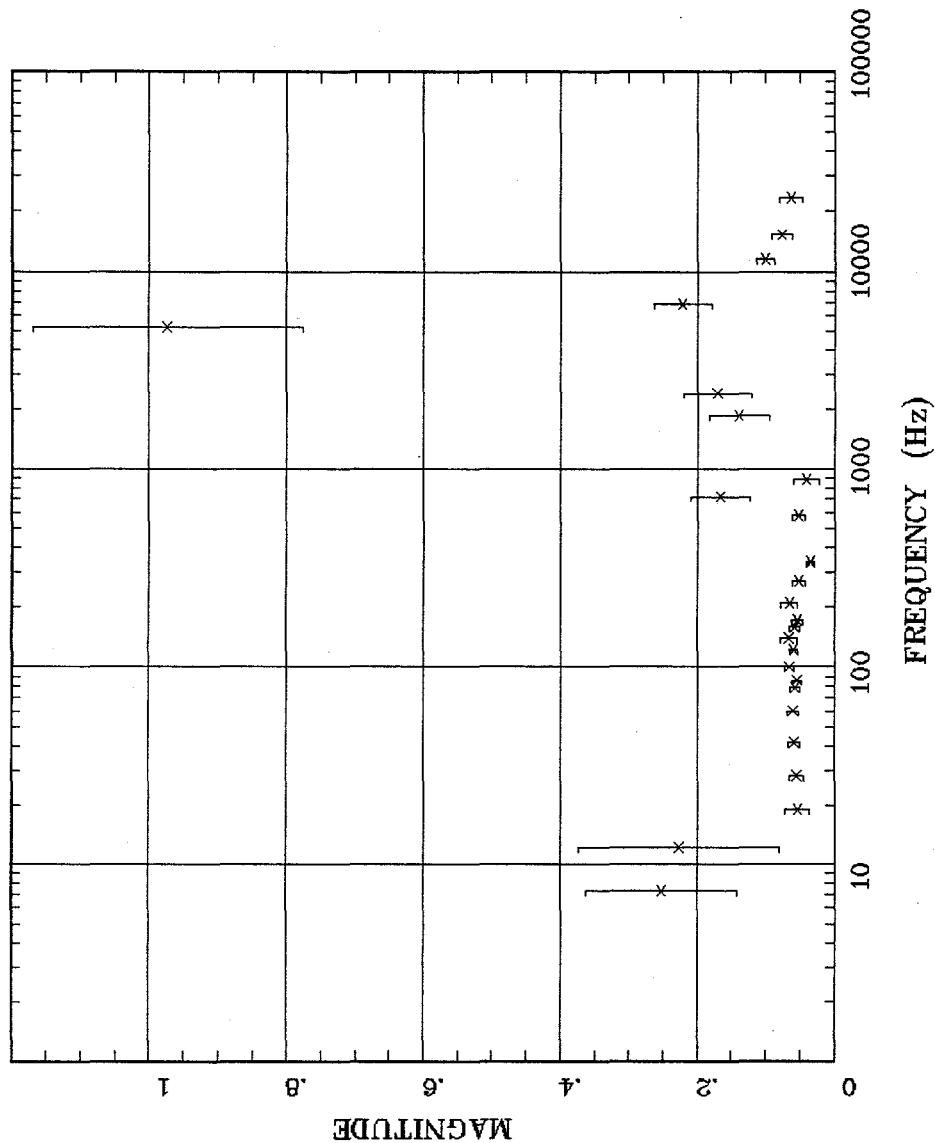


Client: Remote: remote e
 Acquired: 20:0 Jun 12, 1997
 Survey Co:USGS
 Rotation: Filename: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:28 Jun 12, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 13f

TIPPER MAGNITUDE

north of Beatty



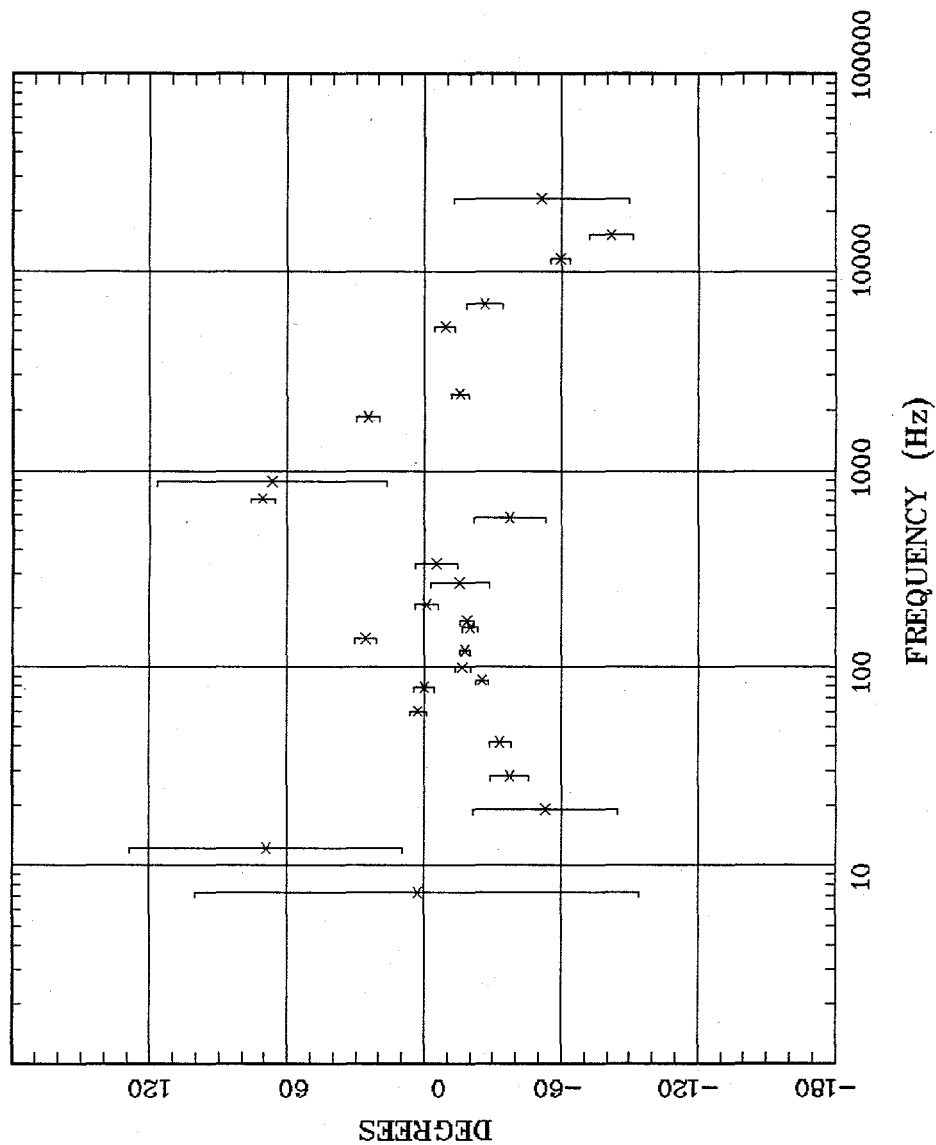
Client: Remote: remote e
 Acquired: 20:0 Jun 12, 1997
 Survey Co:USGS

Rotation: Filename: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:29 Jun 12, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 13g

TIPPER STRIKE

north of Beatty



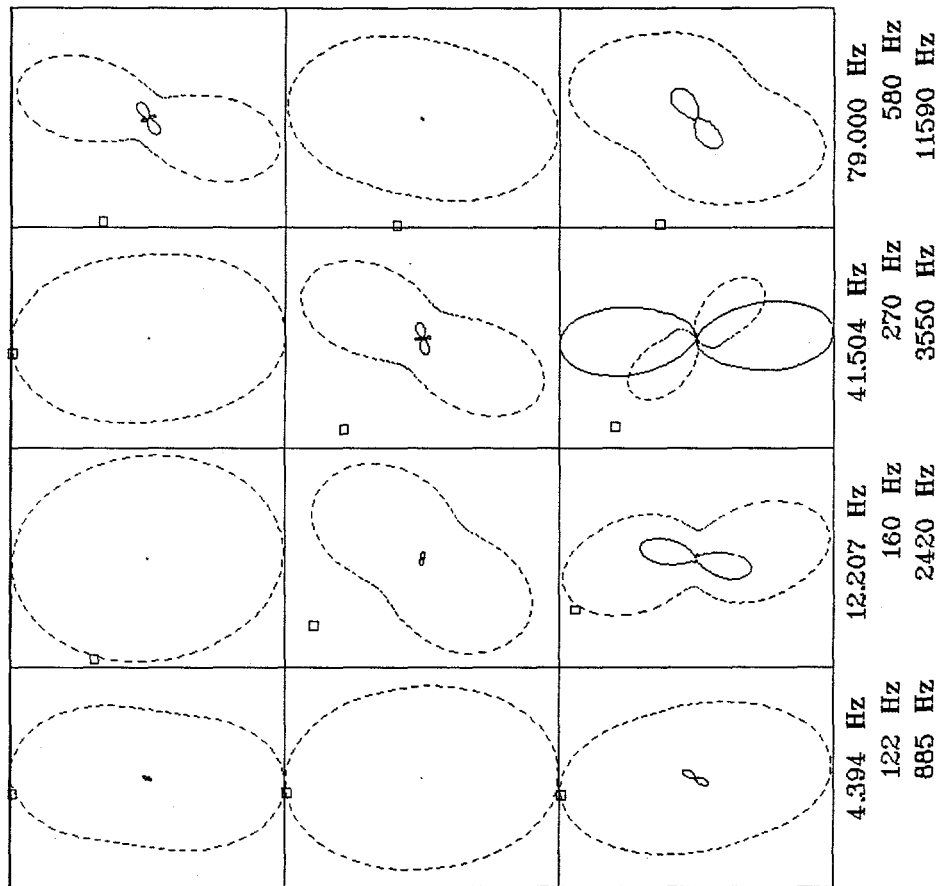
Client: Remote: remote e
 Acquired: 20:0 Jun 12, 1997
 Survey Co:USGS

Rotation: Filename: bba13comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6
 Plotted: 20:29 Jun 12, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 13h

POLAR PLOTS

north of Beatty



Rotation:

Filename: bba13comb.all

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7

Plotted: 20:29 Jun 12, 1997

< EMI - ElectroMagnetic Instruments >

Fig. 13i

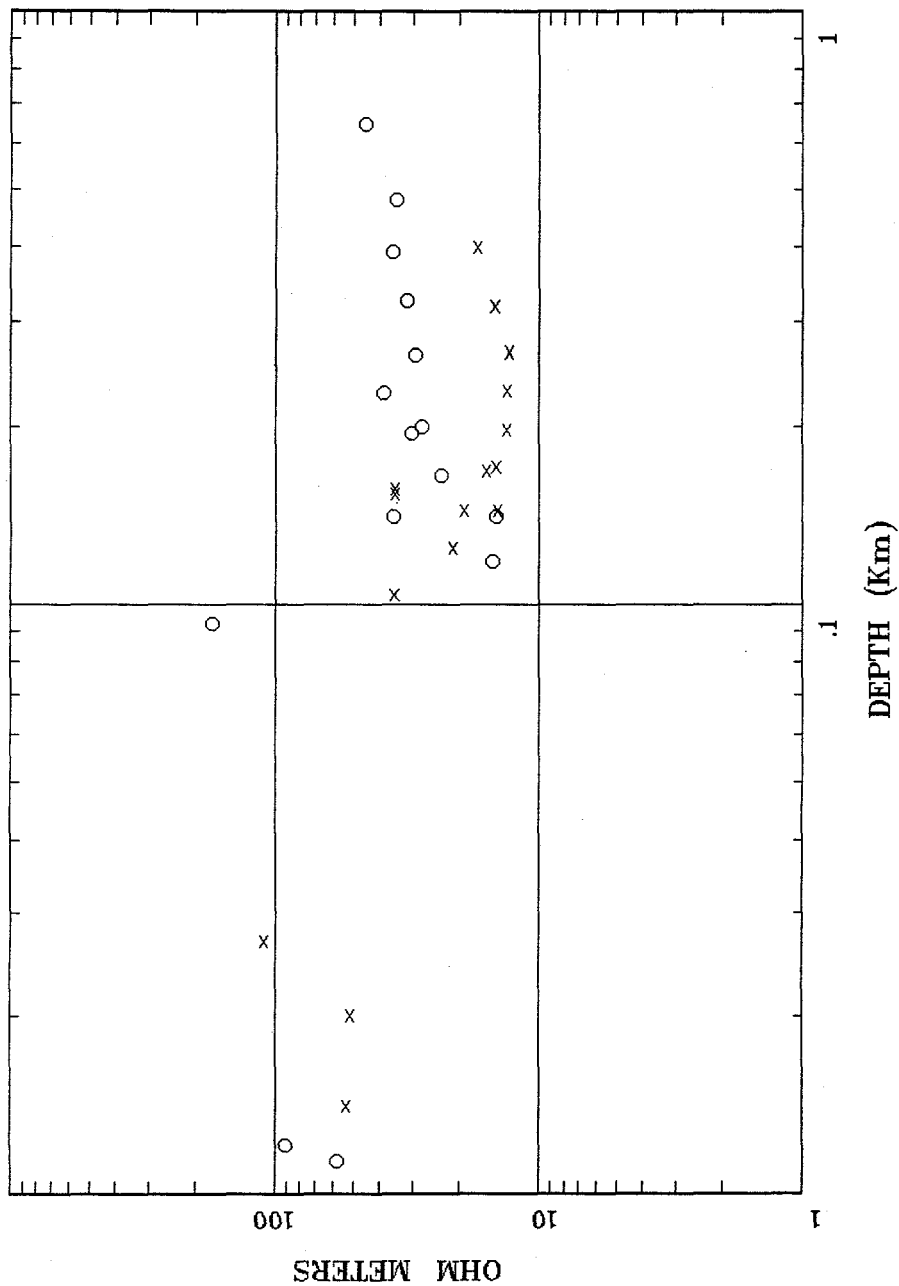
Client:

Remote: remote e

Acquired: 20:0 Jun 12, 1997

Survey Co:USGS

Resistivity (Bostick Inv.)

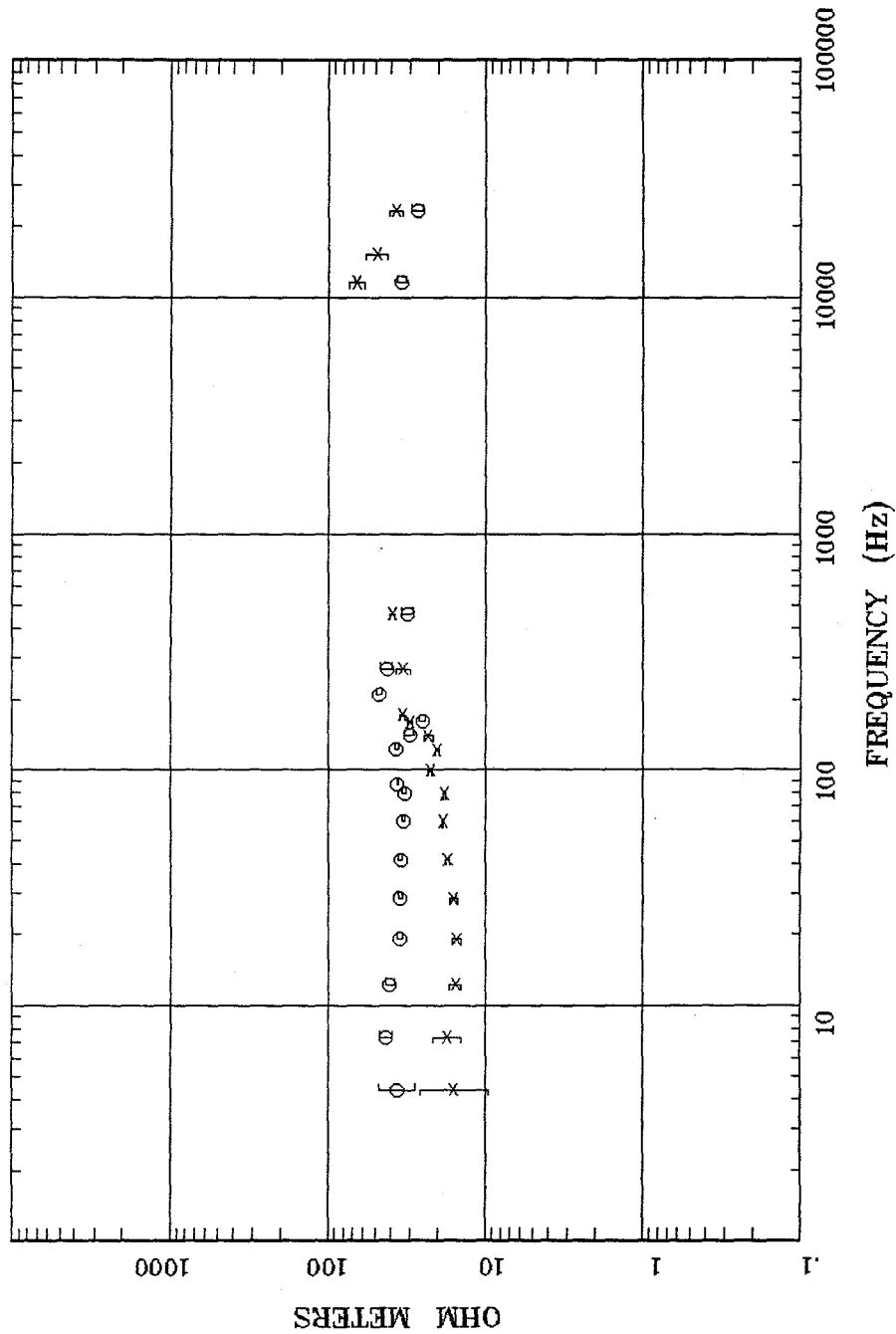


Client: Rotation:
 Remote: Filename: bba14com.all
 Acquired: 21:0 Jun 13, 1997 Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Survey Co: Plotted: 11:31 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 14a

APPARENT RESISTIVITY

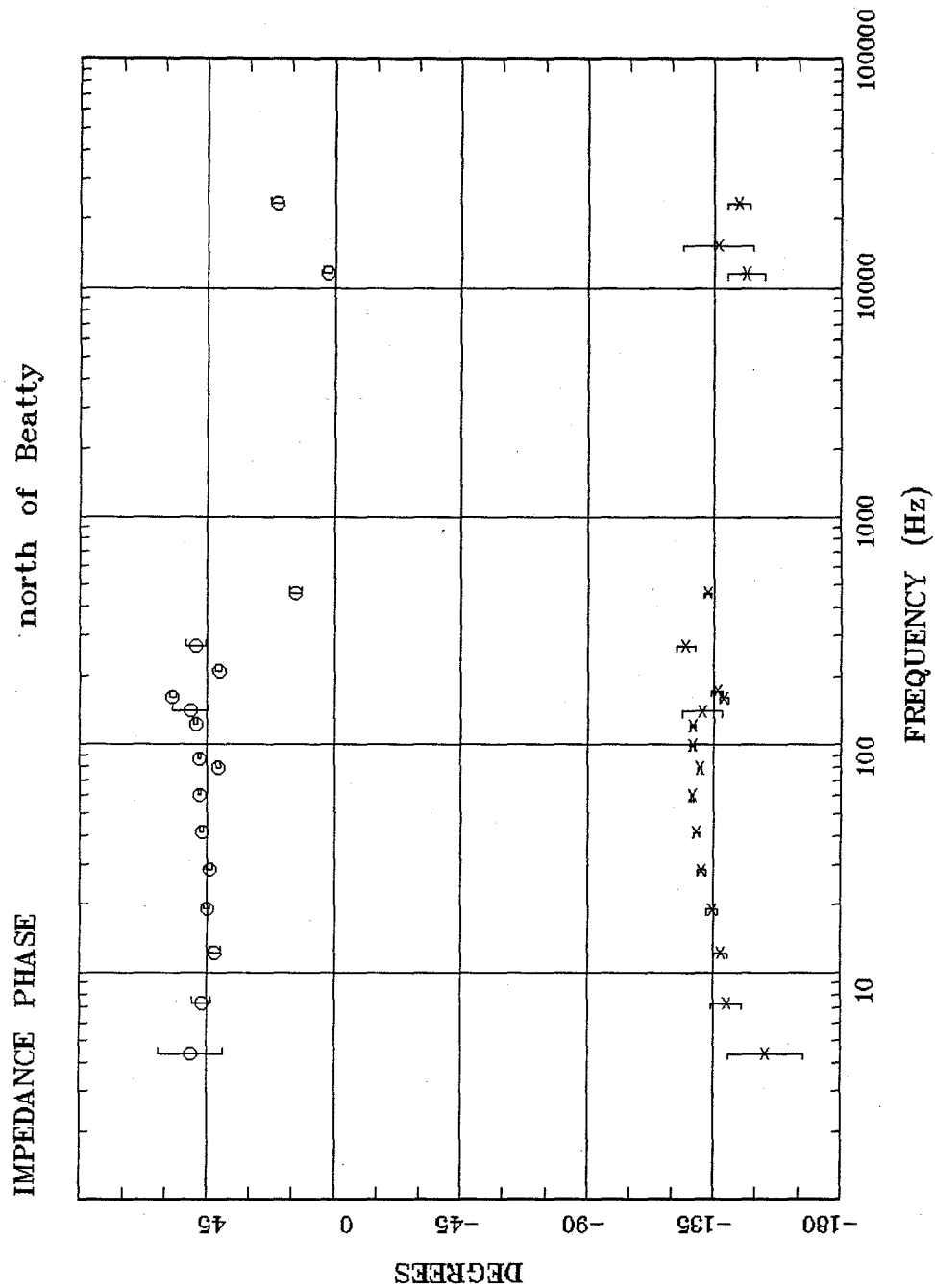
north of Beatty



Client: Remote: remote e
 Acquired: 21:0 Jun 13, 1997
 Survey Co:US Geological Survey

Rotation: Filename: bba14com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:31 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

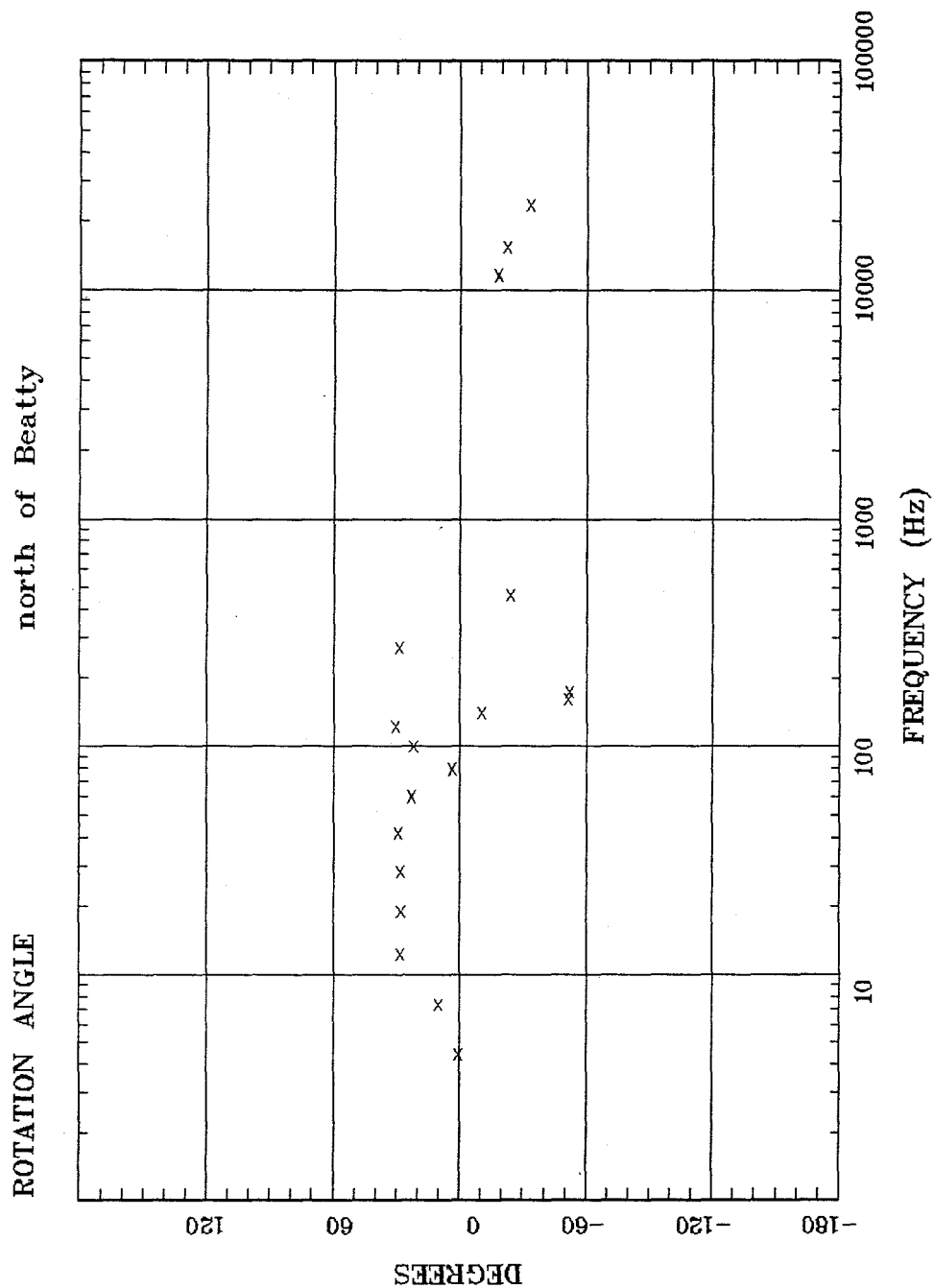
Fig. 14b



Client: Remote: remote e
 Acquired: 21:0 Jun 13, 1997
 Survey Co:US Geological Survey

Rotation: bbal4com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

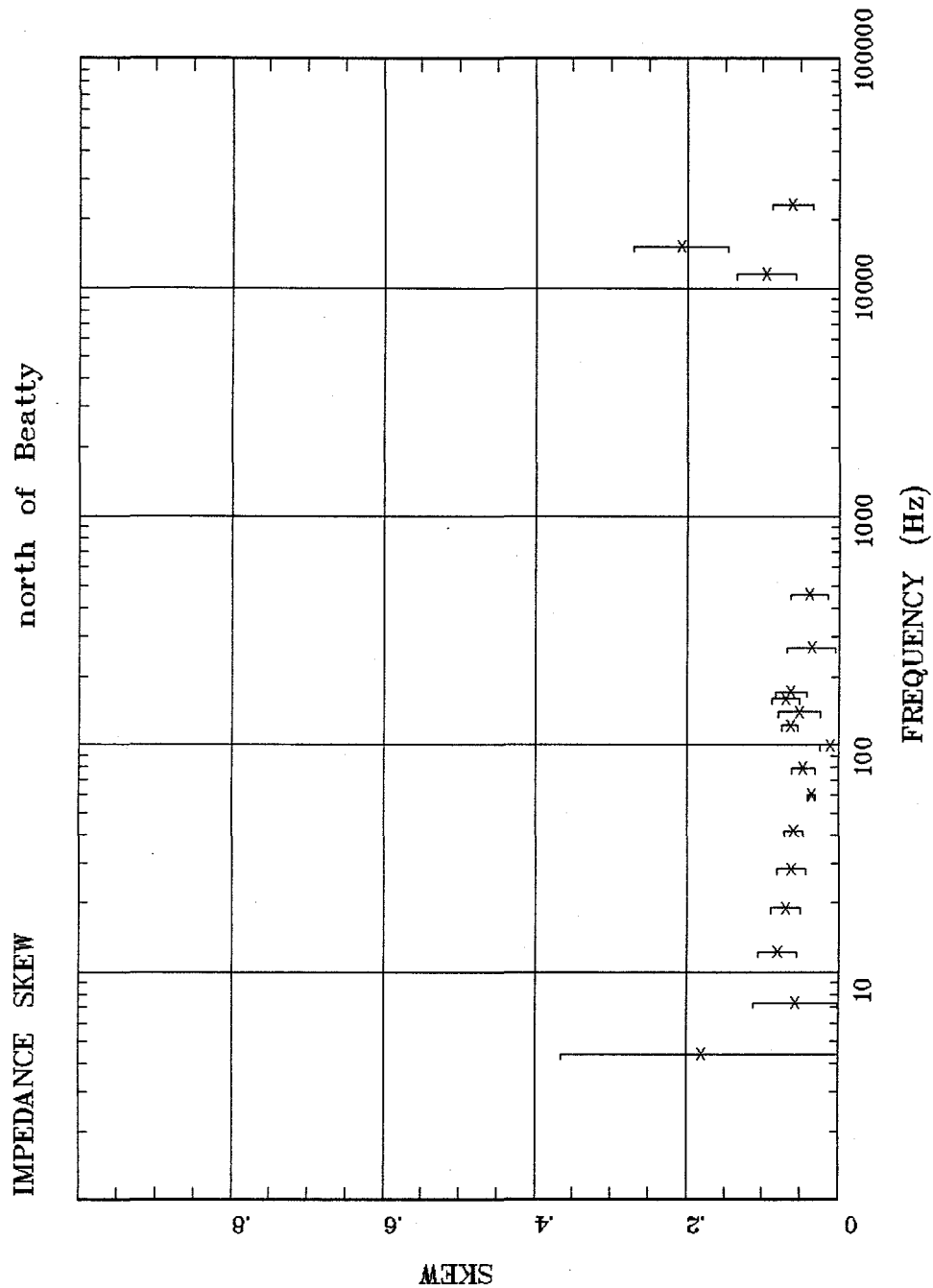
Fig. 14c



Client: Remote: remote e
 Remoted: 21:0 Jun 13, 1997
 Acquired: 21:0 Jun 13, 1997
 Survey Co: US Geological Survey

Rotation: bba14com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

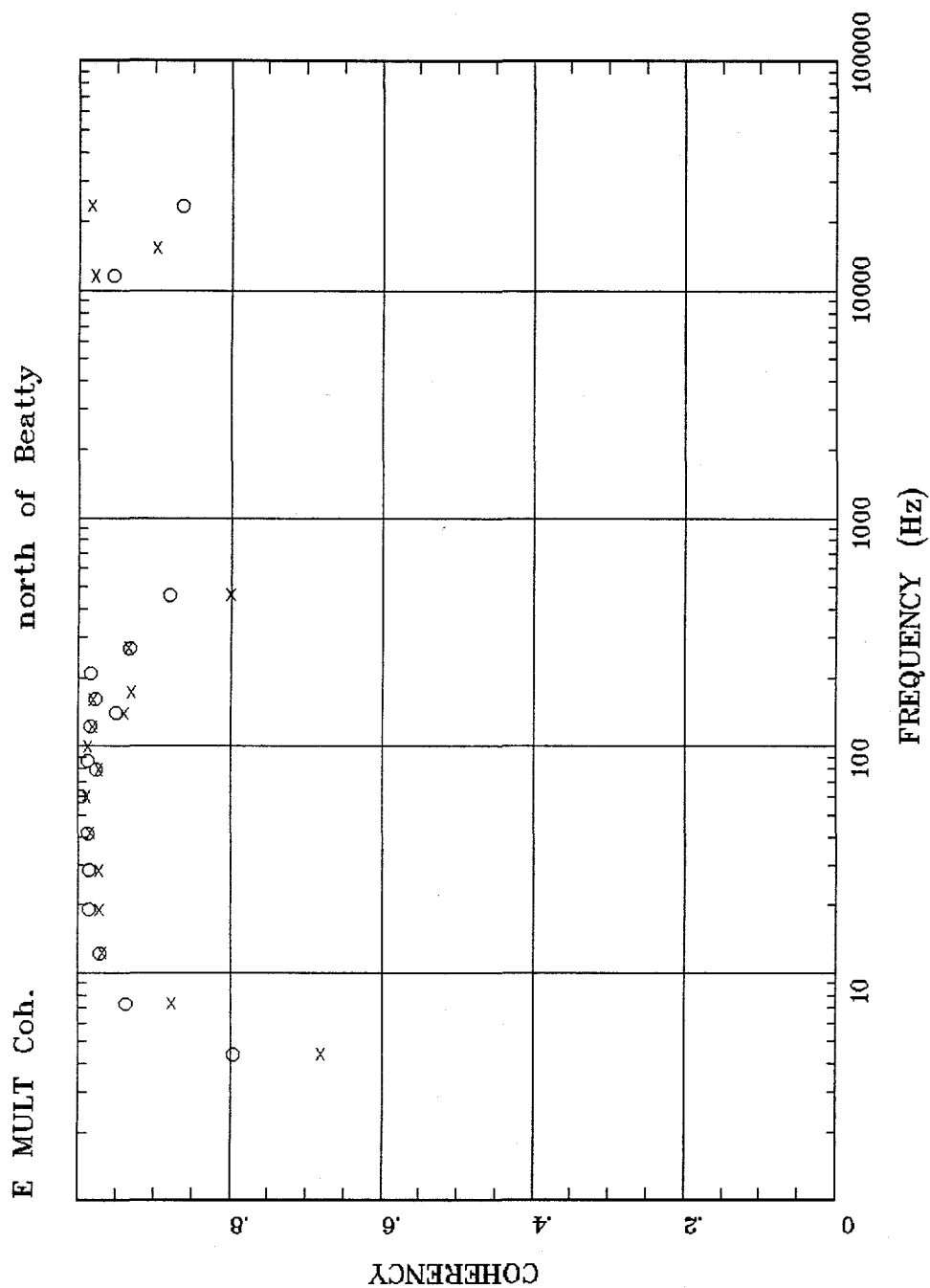
Fig. 14d



Client: Remote: remote e
 Acquired: 21:0 Jun 13, 1997
 Survey Co:US Geological Survey

Rotation: bba14com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 14e



```

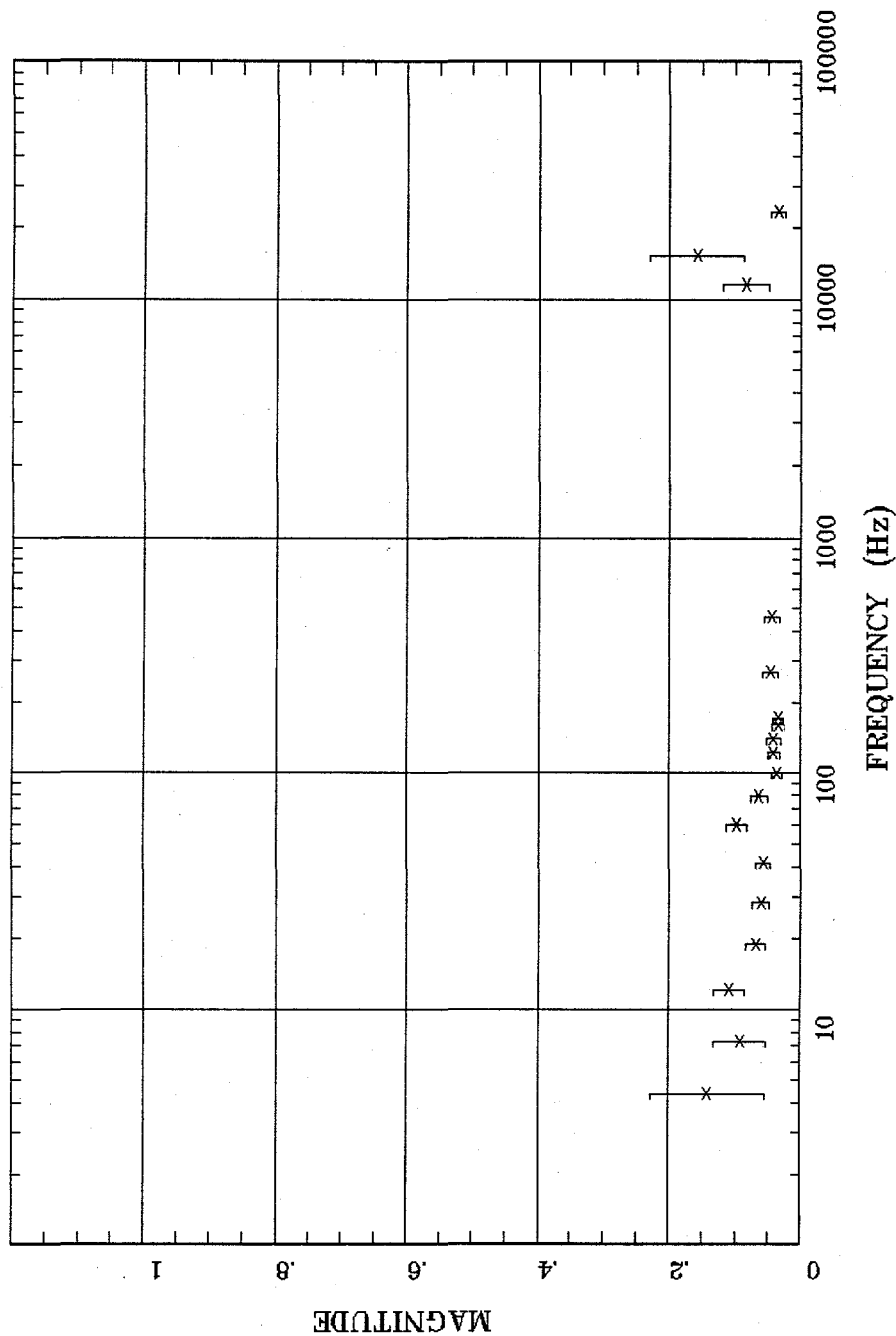
Client:
Remnote: remote e
Acquired: 21:0 Jun 13, 1997
Survey Co:US Geological Survey
Rotation:
Filename: bba14com.all
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 11:32 Jul 11, 1997
< EMI - ElectroMagnetic Instruments >

```

Fig. 14f

TIPPER MAGNITUDE

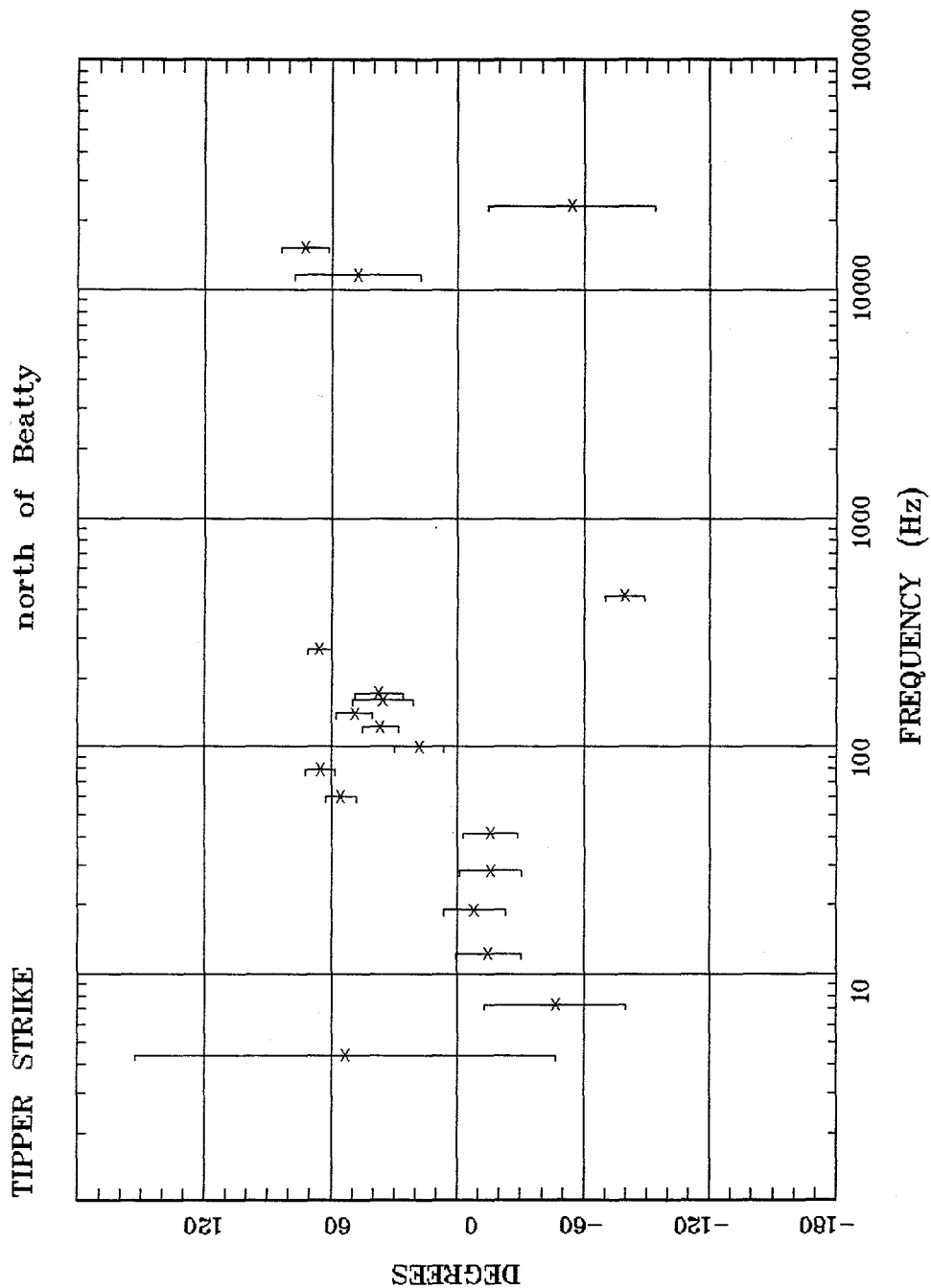
north of Beatty



Client: Remote: remote e
 Acquired: 21:0 Jun 13, 1997
 Survey Co:US Geological Survey

Rotation: Filename: bba14com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 14g



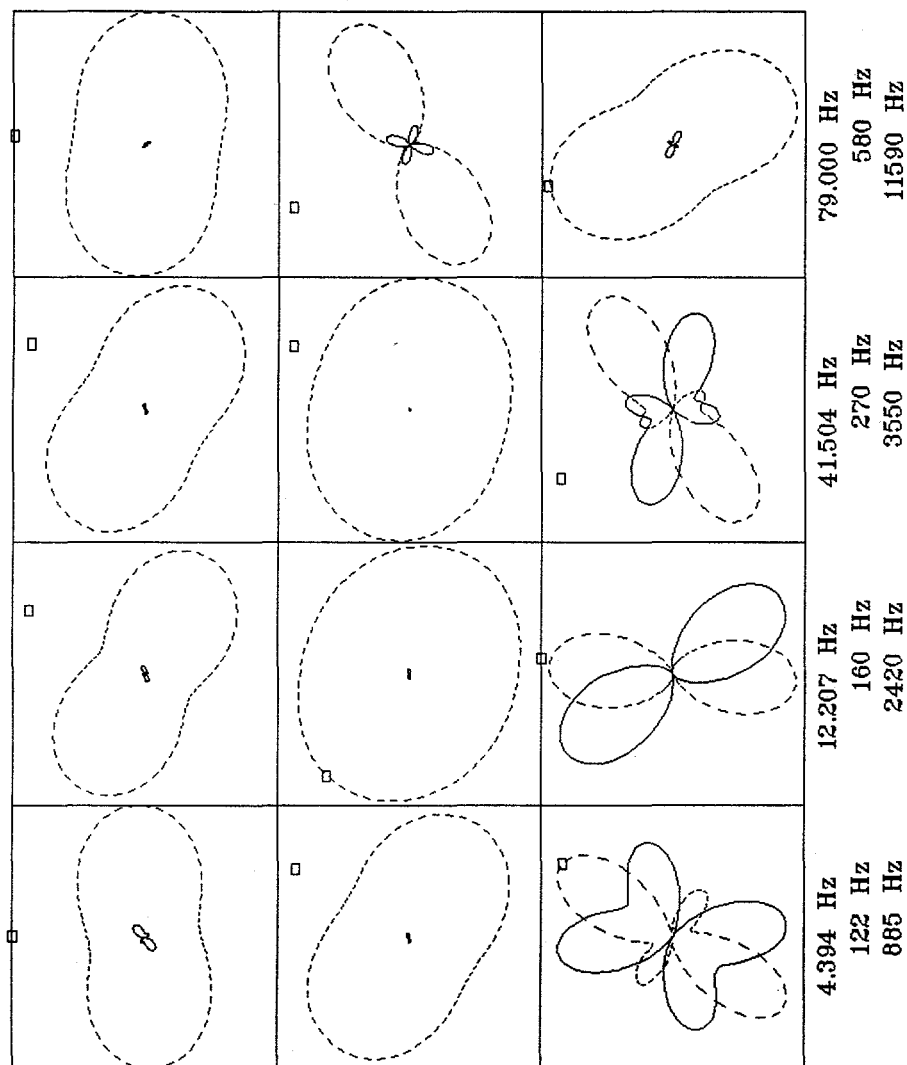
Client: Remote: remote e
 Remoted: 21:0 Jun 13, 1997
 Acquired: 21:0 Jun 13, 1997
 Survey Co:US Geological Survey

Rotation:
 Filename: bba14com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 14h

POLAR PLOTS

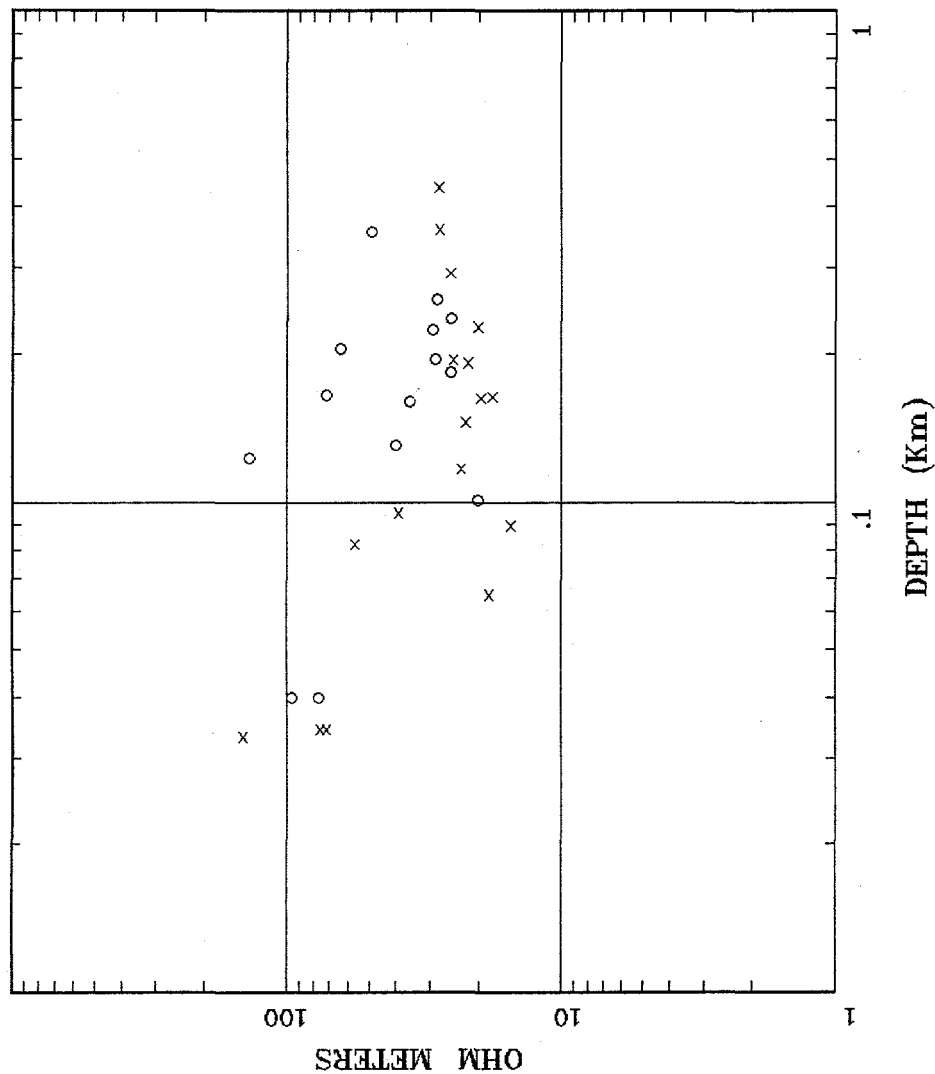
north of Beatty



Client: Remote: remote e
 Acquired: 21:0 Jun 13, 1997
 Survey Co:US Geological Survey
 Rotation: File: bba14com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:32 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 14i

Resistivity (Bostick Inv.)

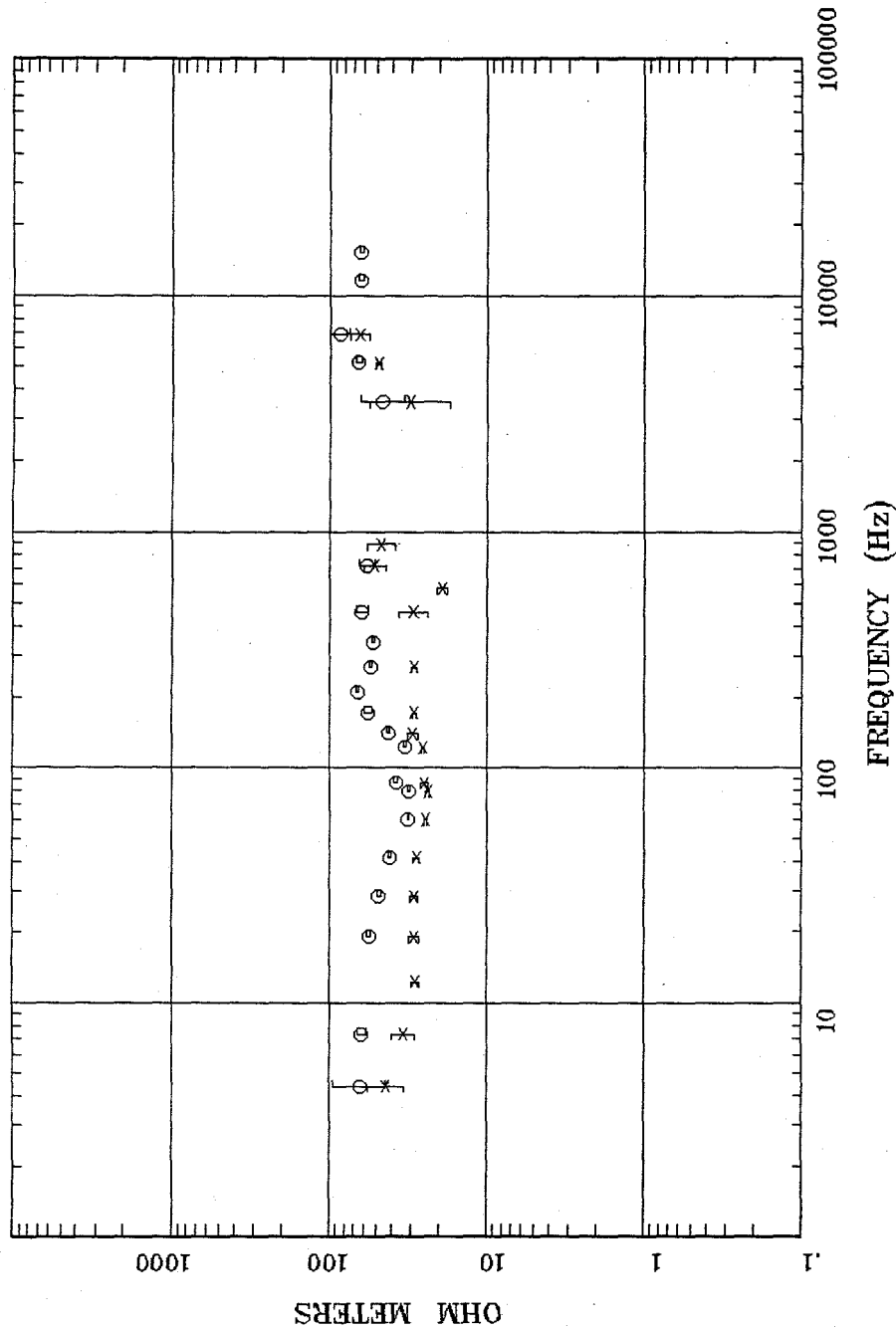


Client: Remote: Acquired: 20:2 Jun 13, 1997 Survey Co:
 Rotation: Filename: bba15comb.all Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey
 Plotted: 20:52 Jun 13, 1997 < EMI - ElectroMagnetic Instruments

Fig. 15a

APPARENT RESISTIVITY

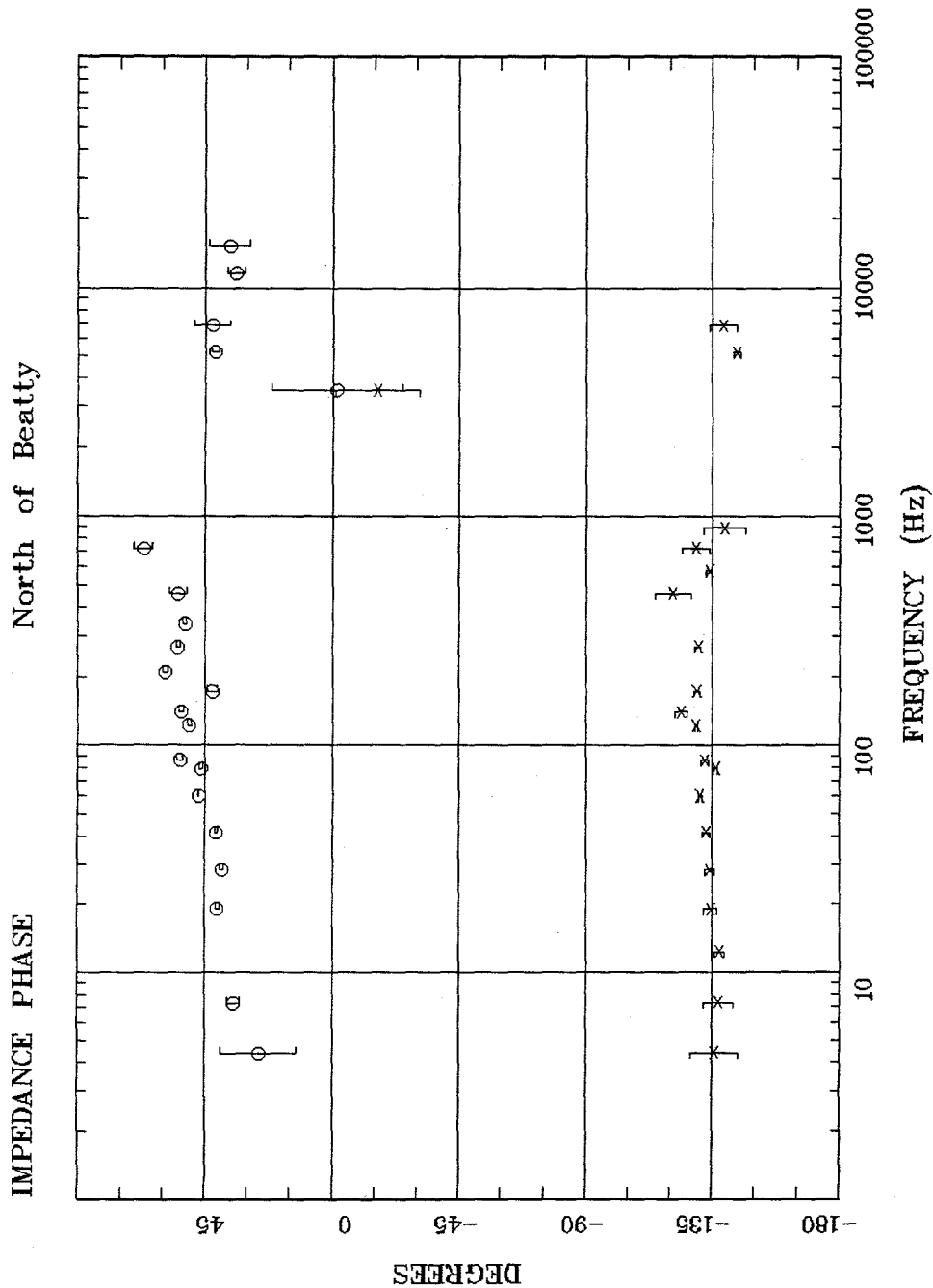
North of Beatty



Client: Remote: Remote E
 Acquired: 20:2 Jun 13, 1997
 Survey Co:USGS

Rotation: bba15comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:52 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments >

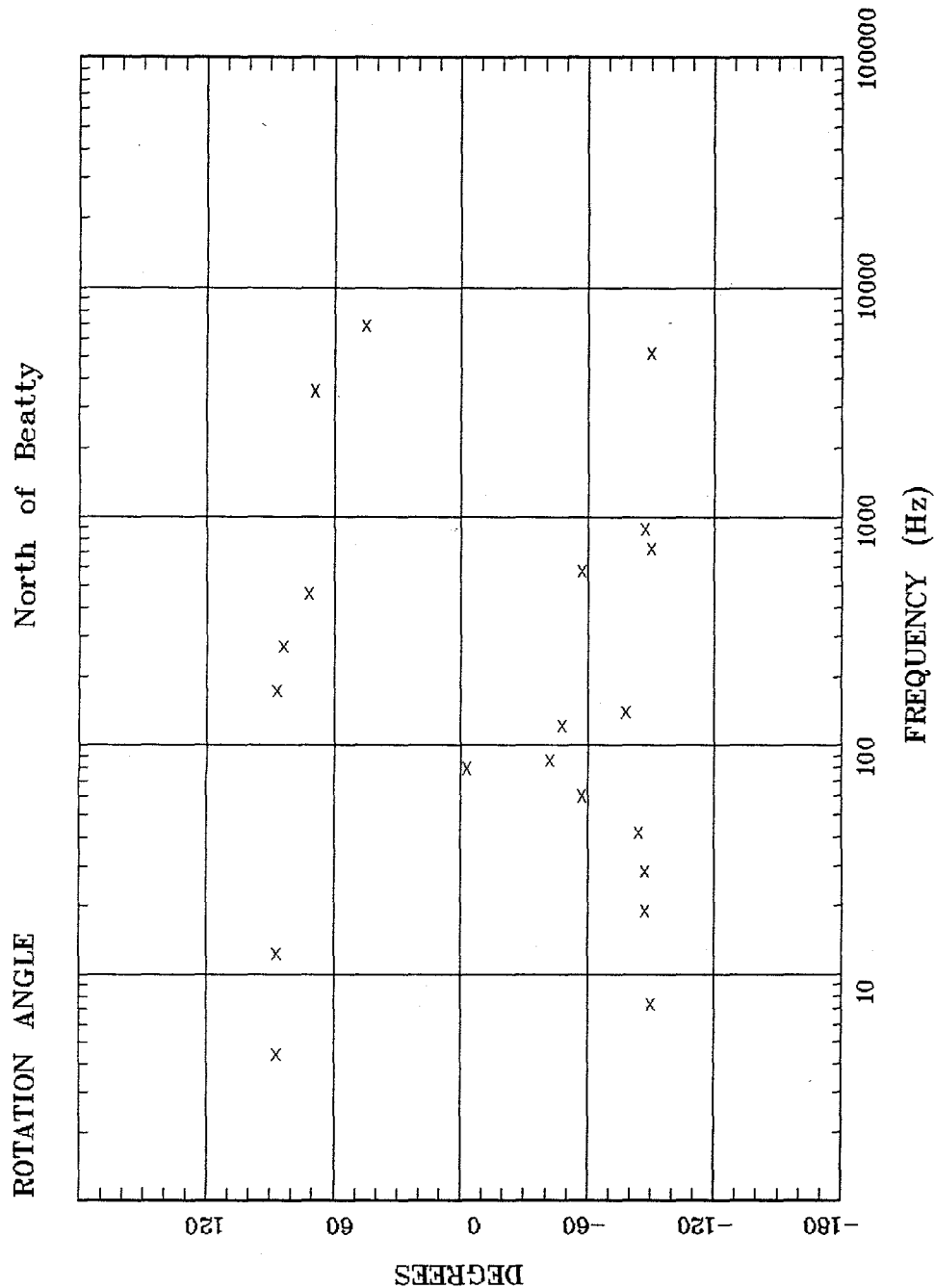
Fig. 15b

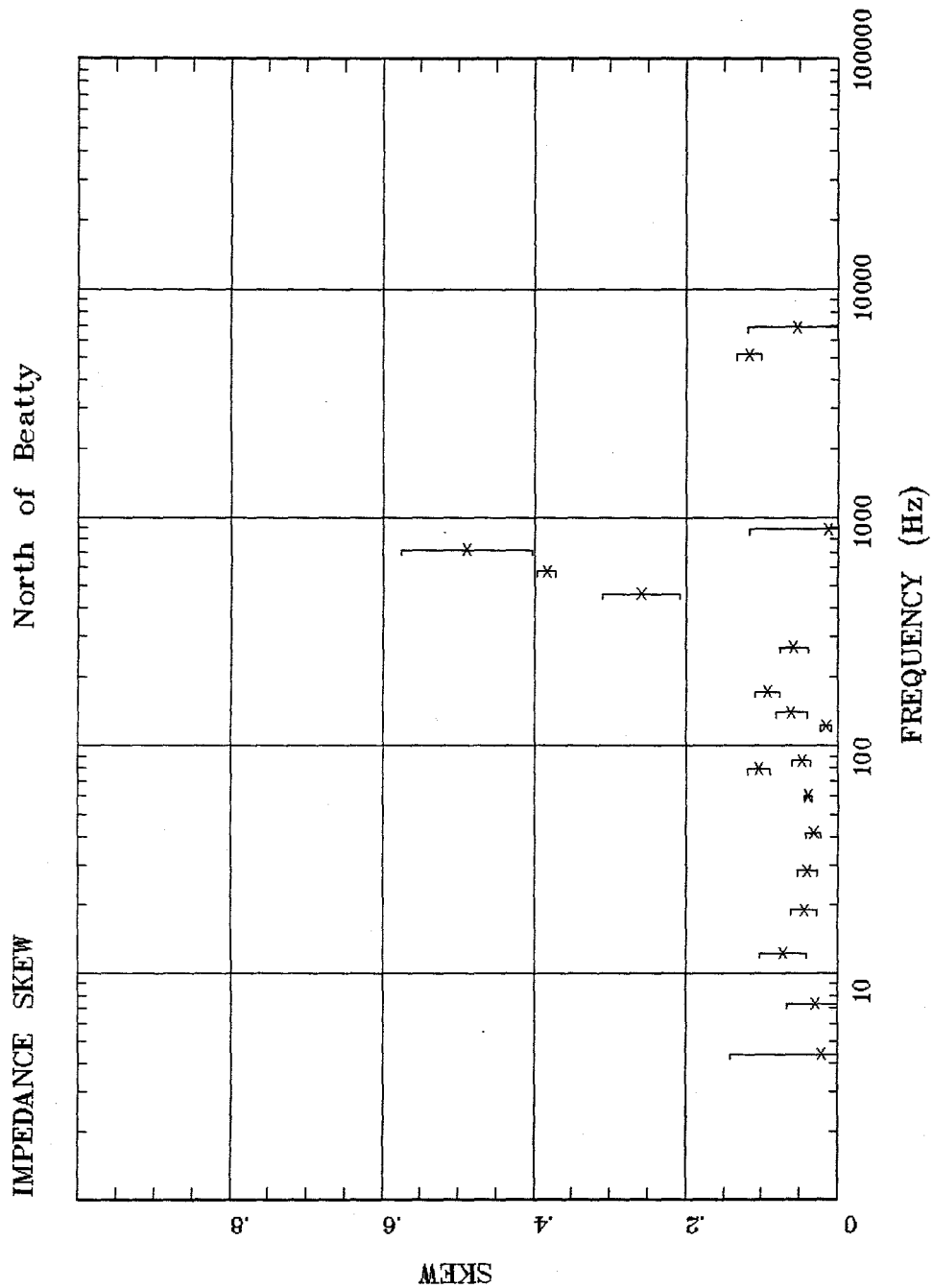


Client: Remote: Remote E
 Remoted: 20:2 Jun 13, 1997
 Survey Co:USGS

Rotation:
 Filename: bba15comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:52 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 15c

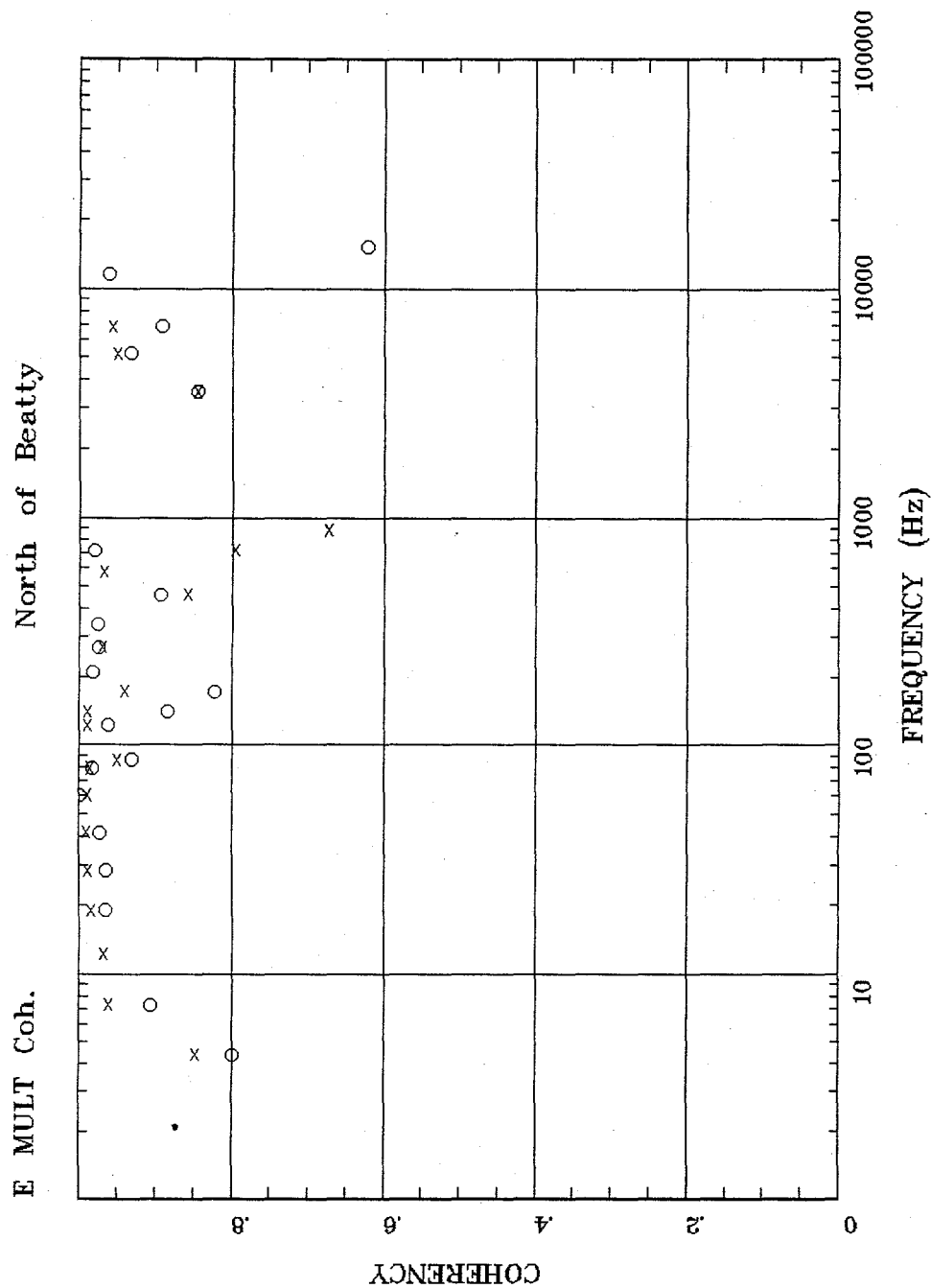




Client: Remote: Remote E
 Remote: Remote E
 Acquired: 20:2 Jun 13, 1997
 Survey Co:USGS

Rotation: bbal5comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:52 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 15e



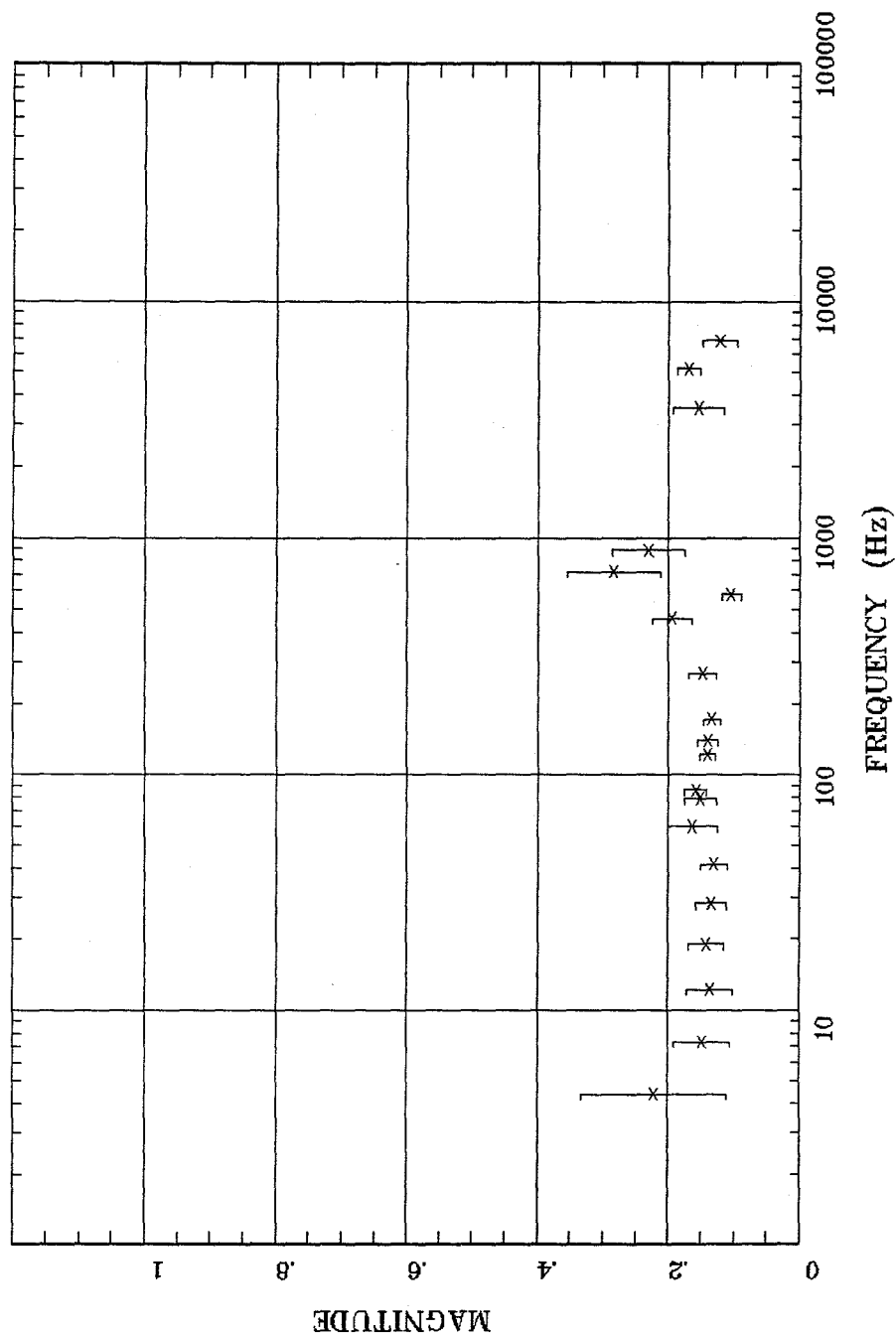
Client: Remote: Remote E
 Remote: Remote E
 Acquired: 20:2 Jun 13, 1997
 Survey Co:USGS

Rotation: Filename: bbal5comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:52 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 15f

TIPPER MAGNITUDE

North of Beatty



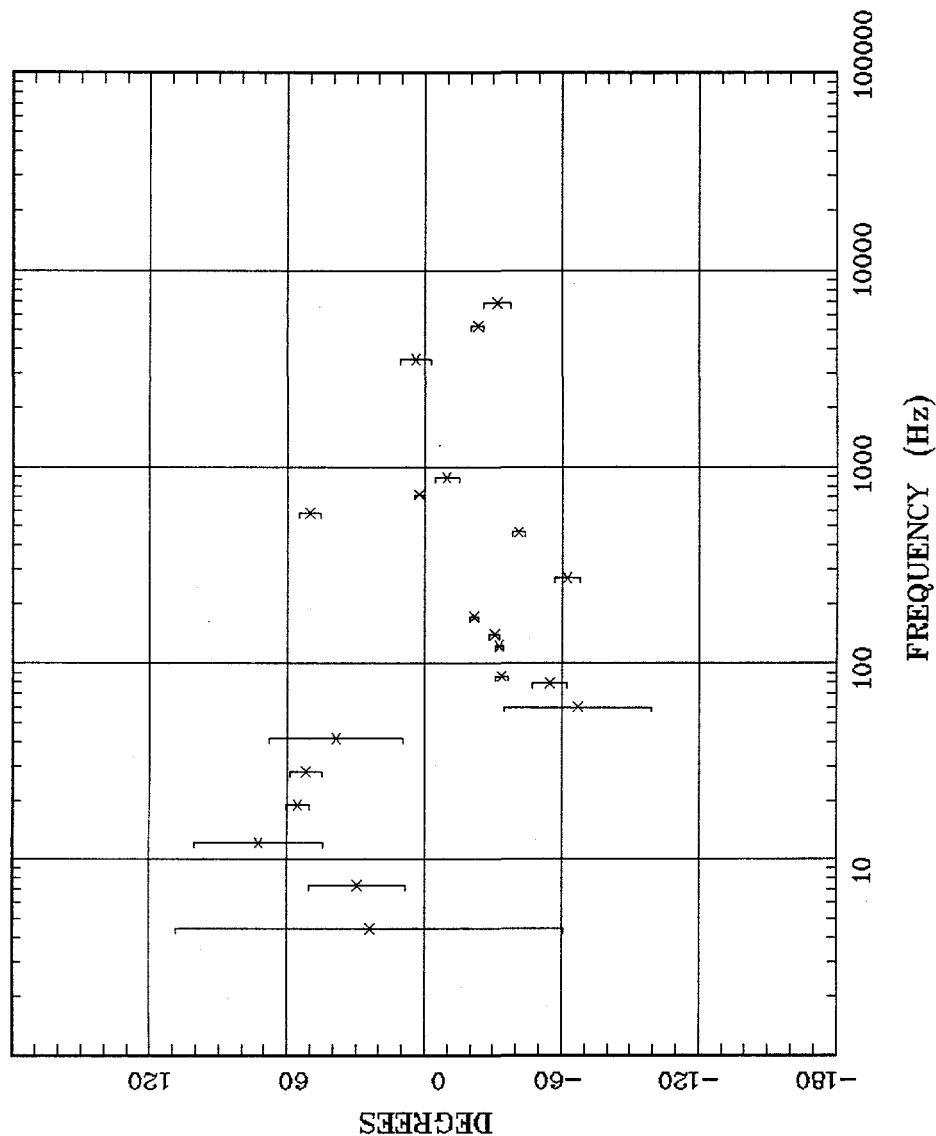
Client: Remote: Remote E
 Remote: Remote E
 Acquired: 20:2 Jun 13, 1997
 Survey Co:USGS

Rotation:
 Filename: bba15comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:53 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 15g

TIPPER STRIKE

North of Beatty

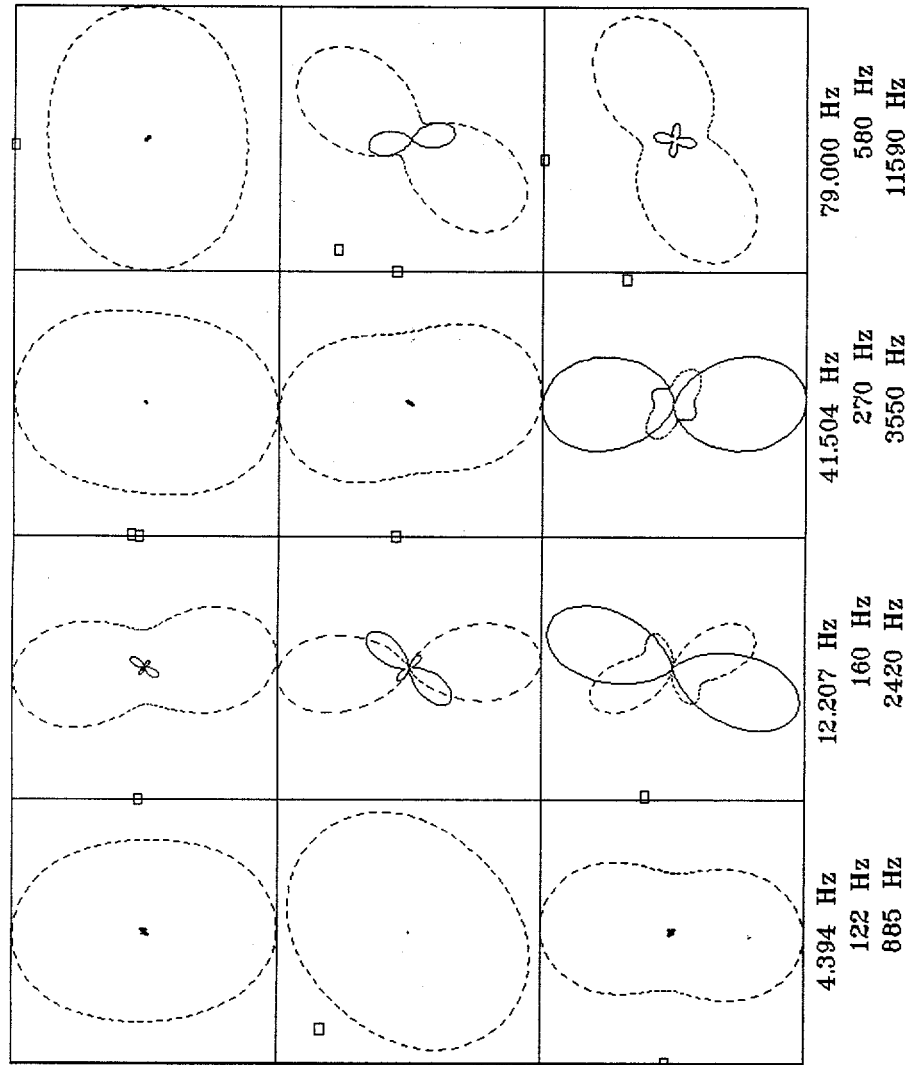


Client: Remote: Remote E
 Rotation: Filename: bba15comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 C
 Acquired: 20:2 Jun 13, 1997
 Survey Co:USGS
 Plotted: 20:53 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 15h

POLAR PLOTS

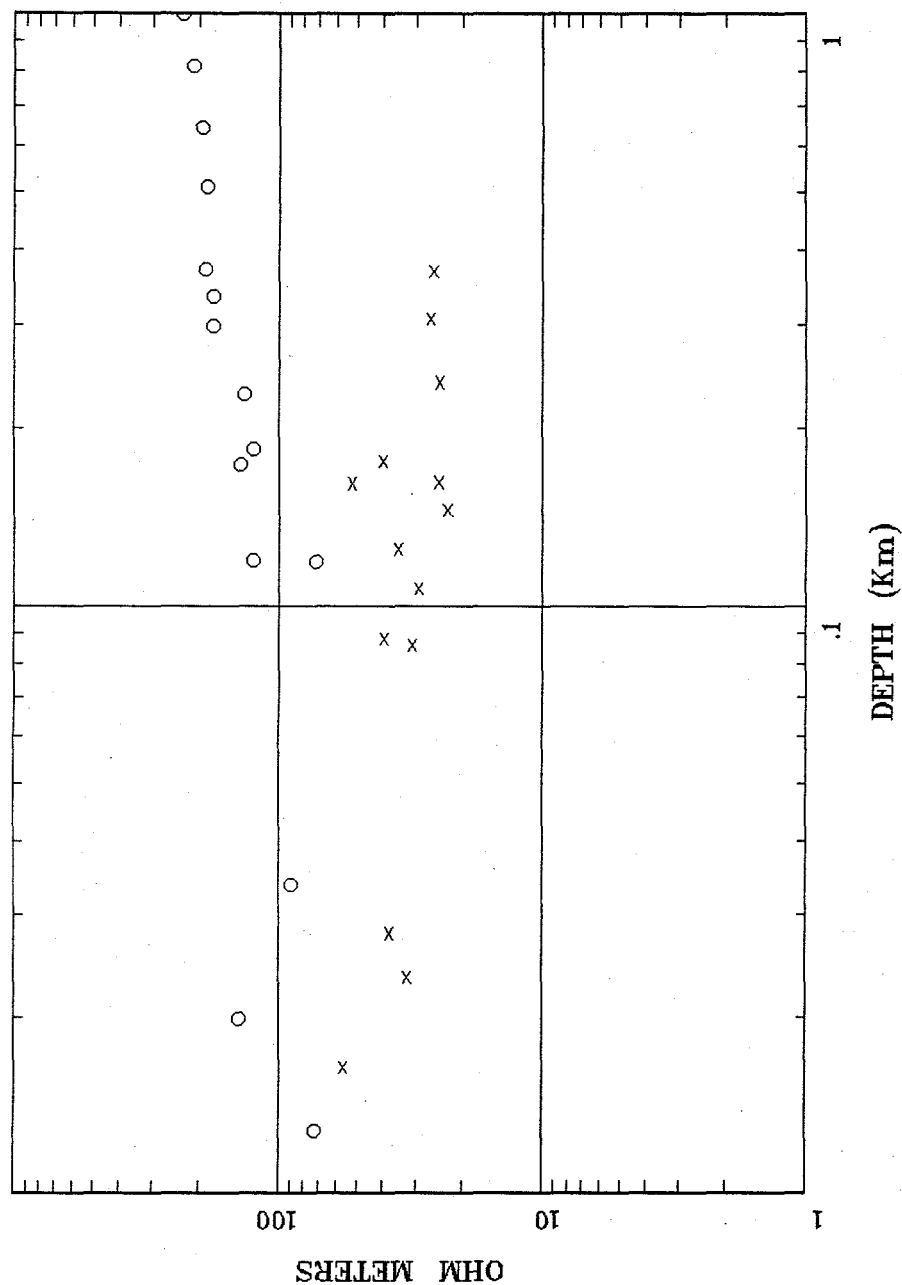
North of Beatty



Client: Remote: Remote E
 Acquired: 20:2 Jun 13, 1997
 Survey Co:USGS
 Rotation: File: bba15comb.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 20:53 Jun 13, 1997
 < EMI - ElectroMagnetic Instruments >

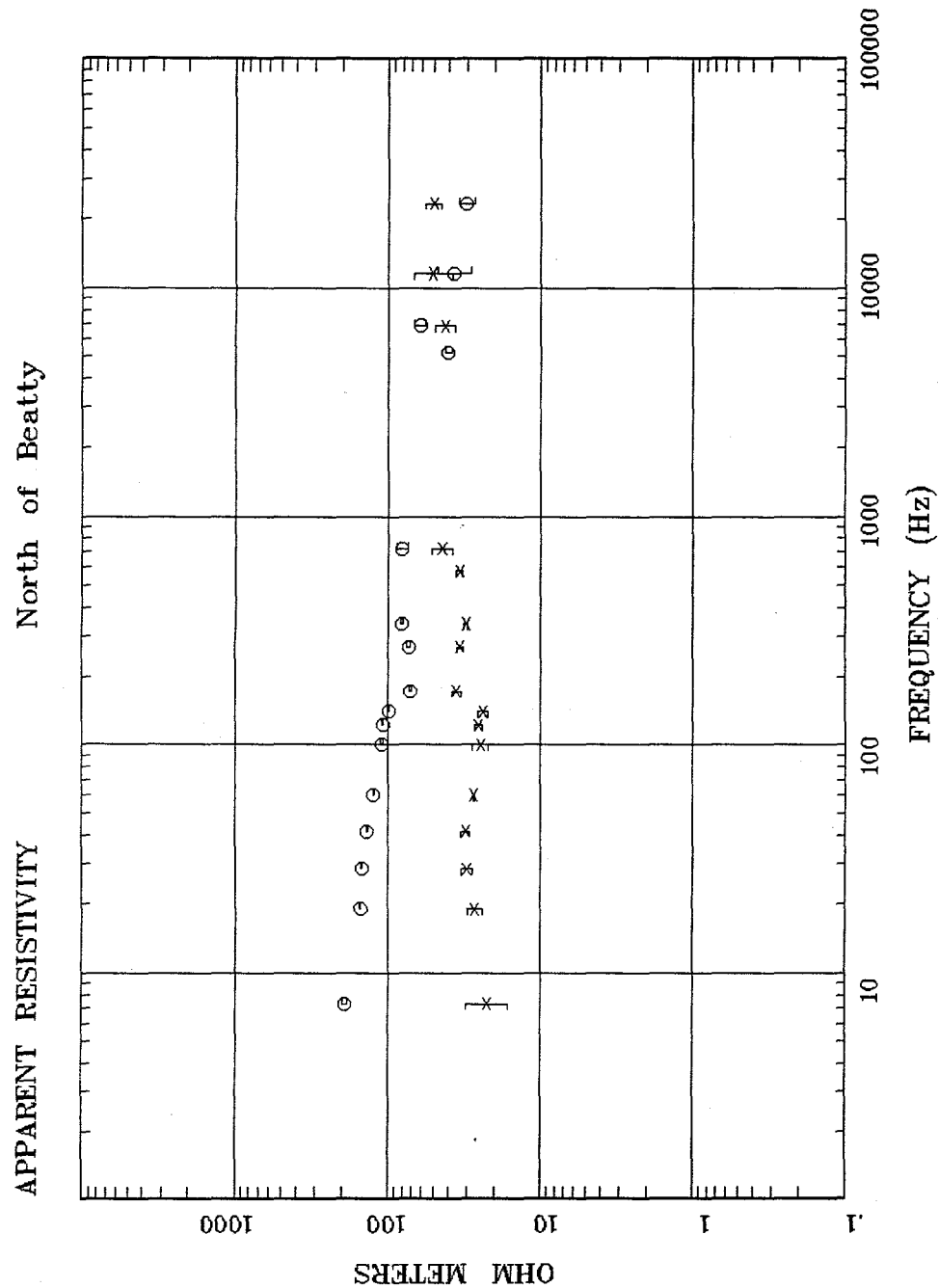
Fig: 15i

Resistivity (Bostick Inv.)



Client: Rotation: bba16com.all
 Remote: Channels: Ex1 Ey1 Hx1 Hy1 Hz1 Ex2 Ey2
 Acquired: 17:4 Jun 14, 1997 Plotted: 11:14 Jul 11, 1997
 Survey Co: < EMI - ElectroMagnetic Instruments >

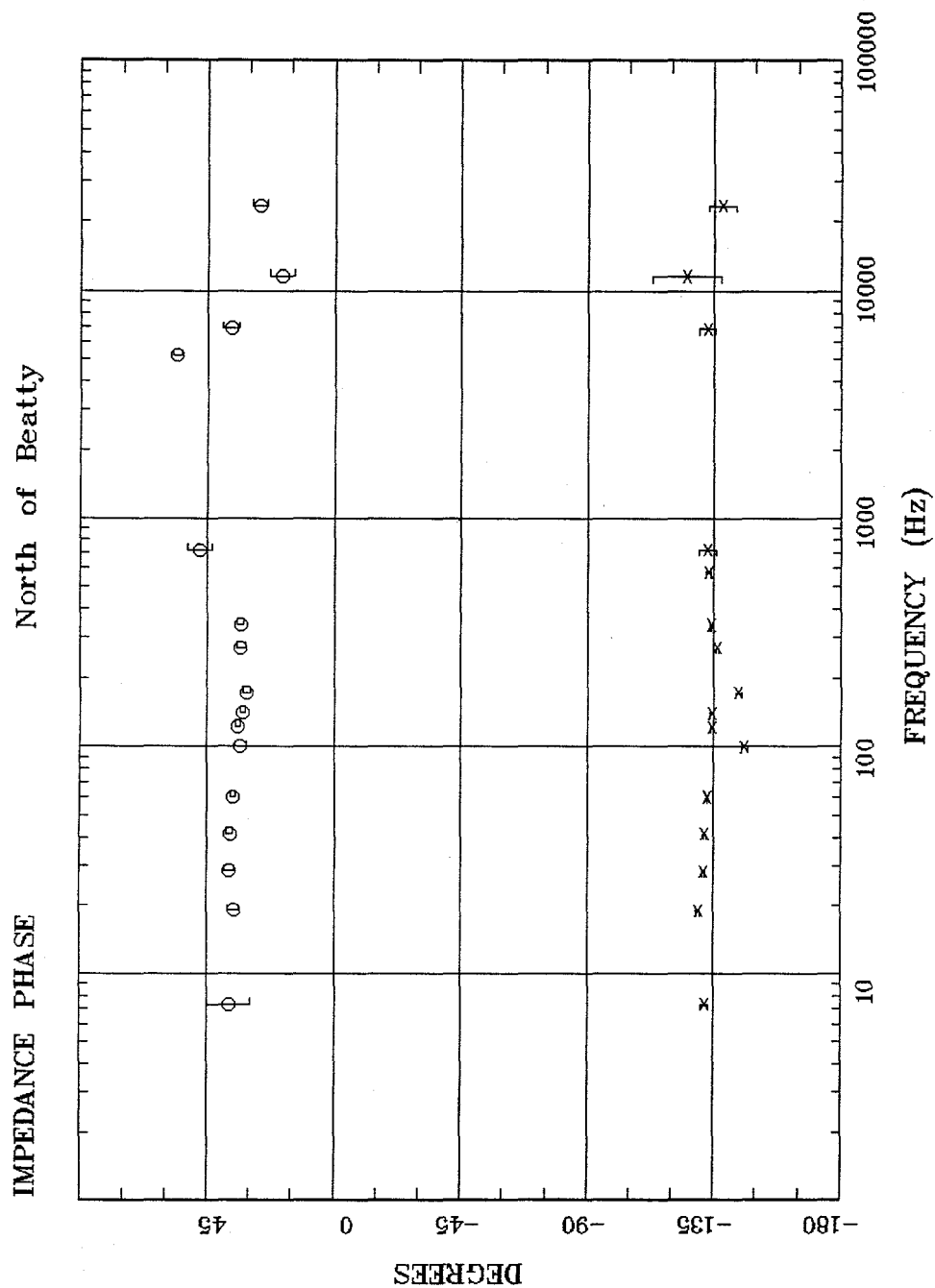
Fig. 16a



Client: Remote: Remote E
 Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS

Rotation:
 Filename: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:14 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

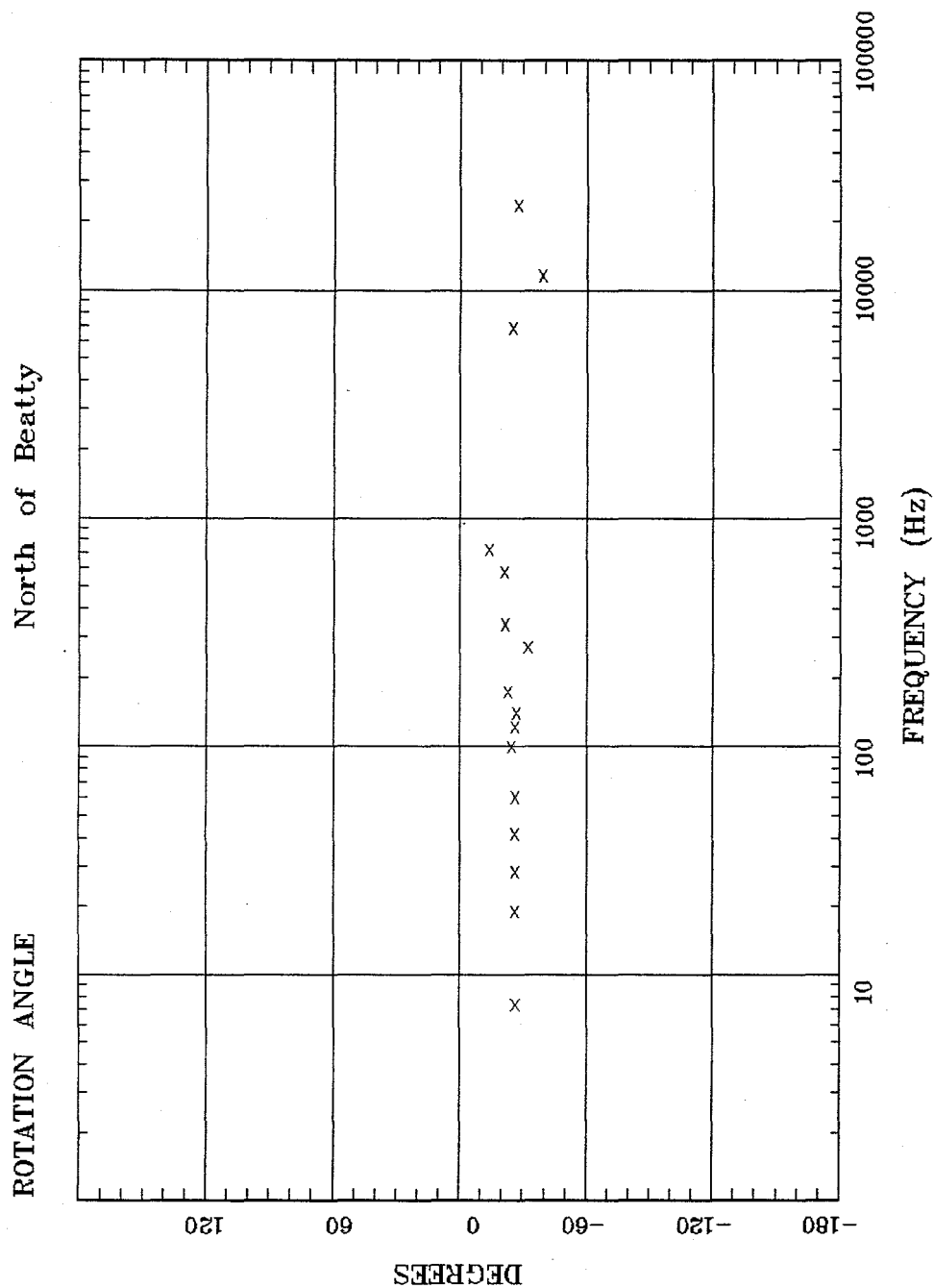
Fig. 16b



Client: Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS

Rotation: Filename: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:15 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 16c



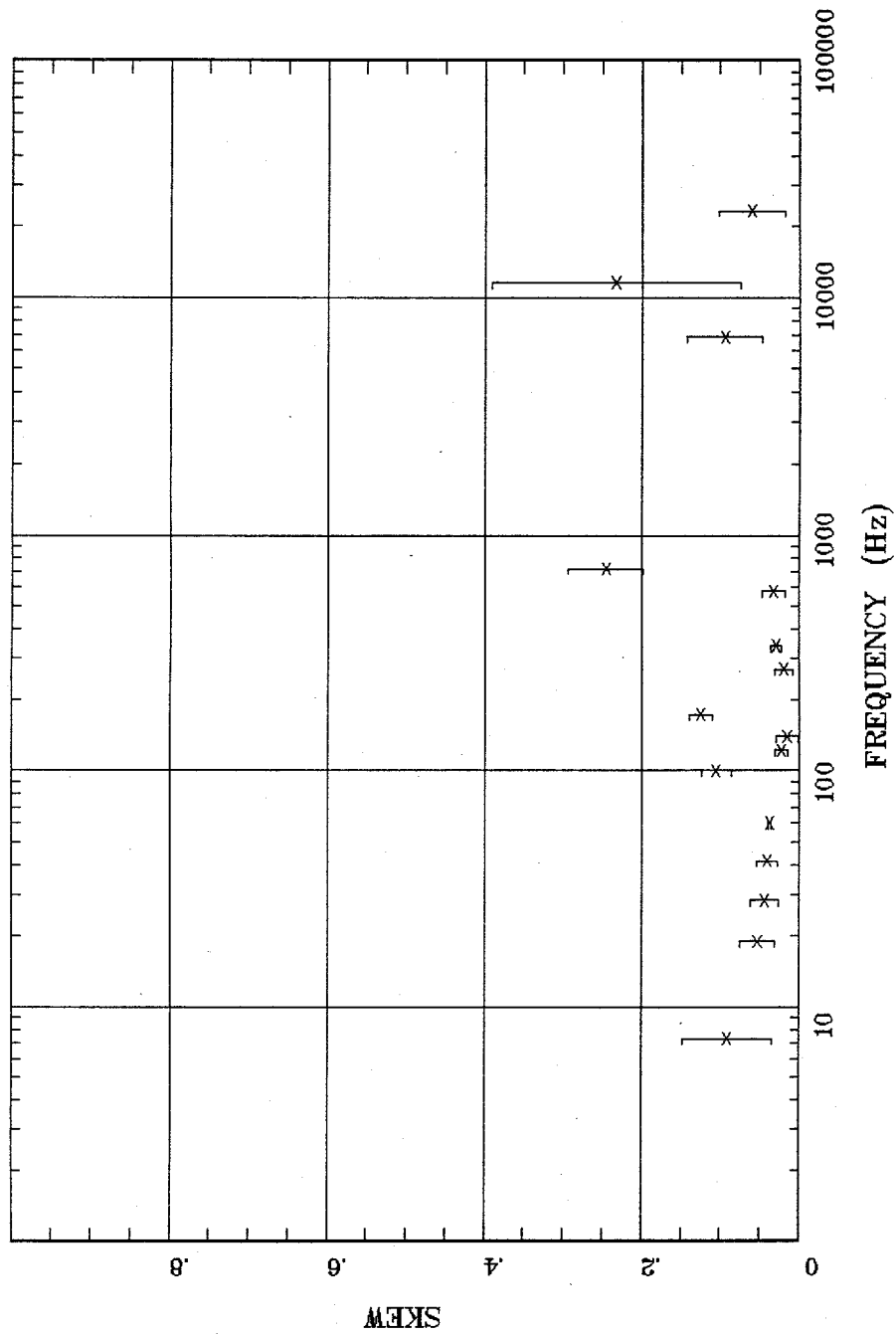
Client: Remote: Remote E
 Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS

Rotation: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:15 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 16d

IMPEDANCE SKEW

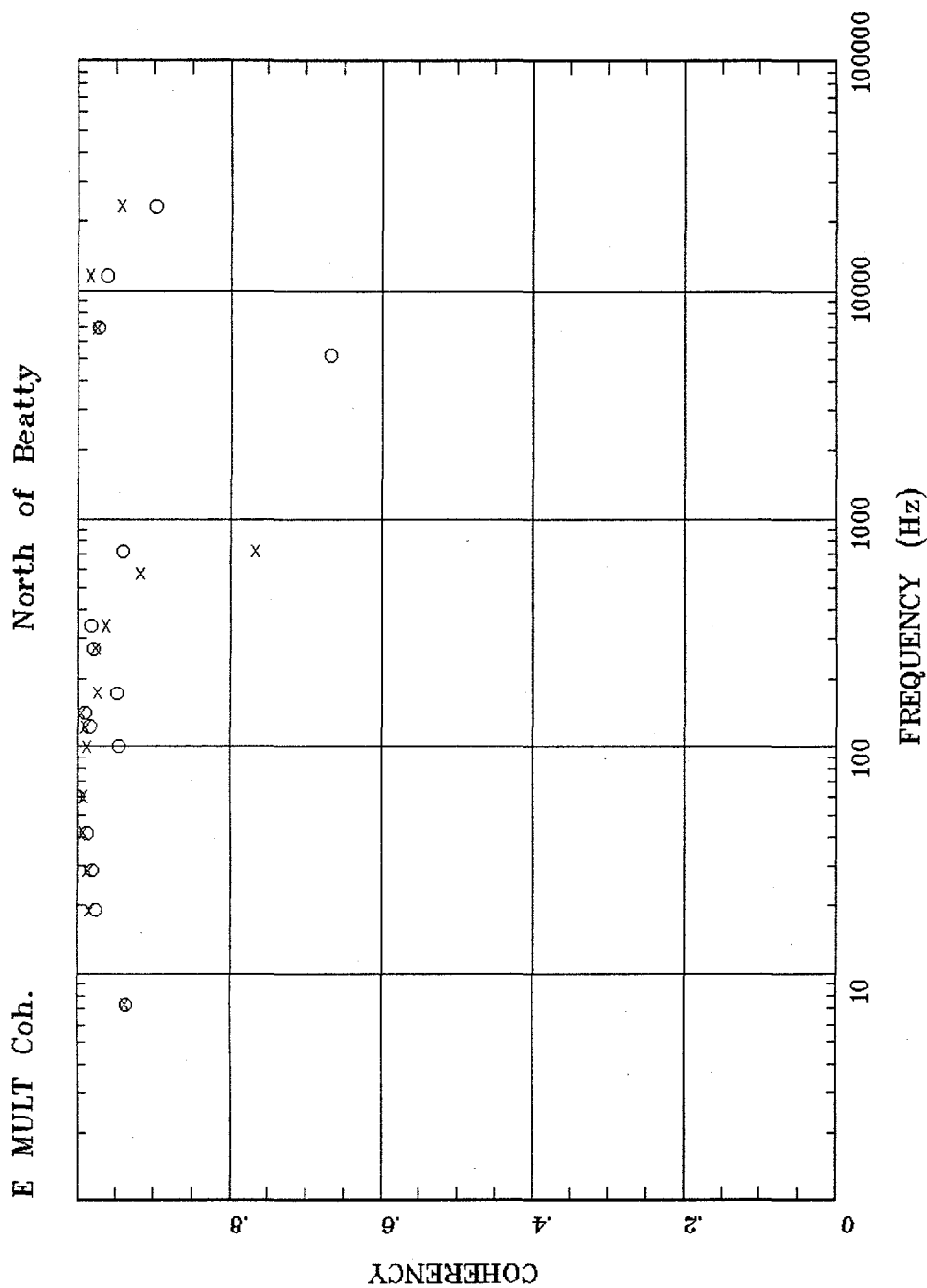
North of Beatty



Client: Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS

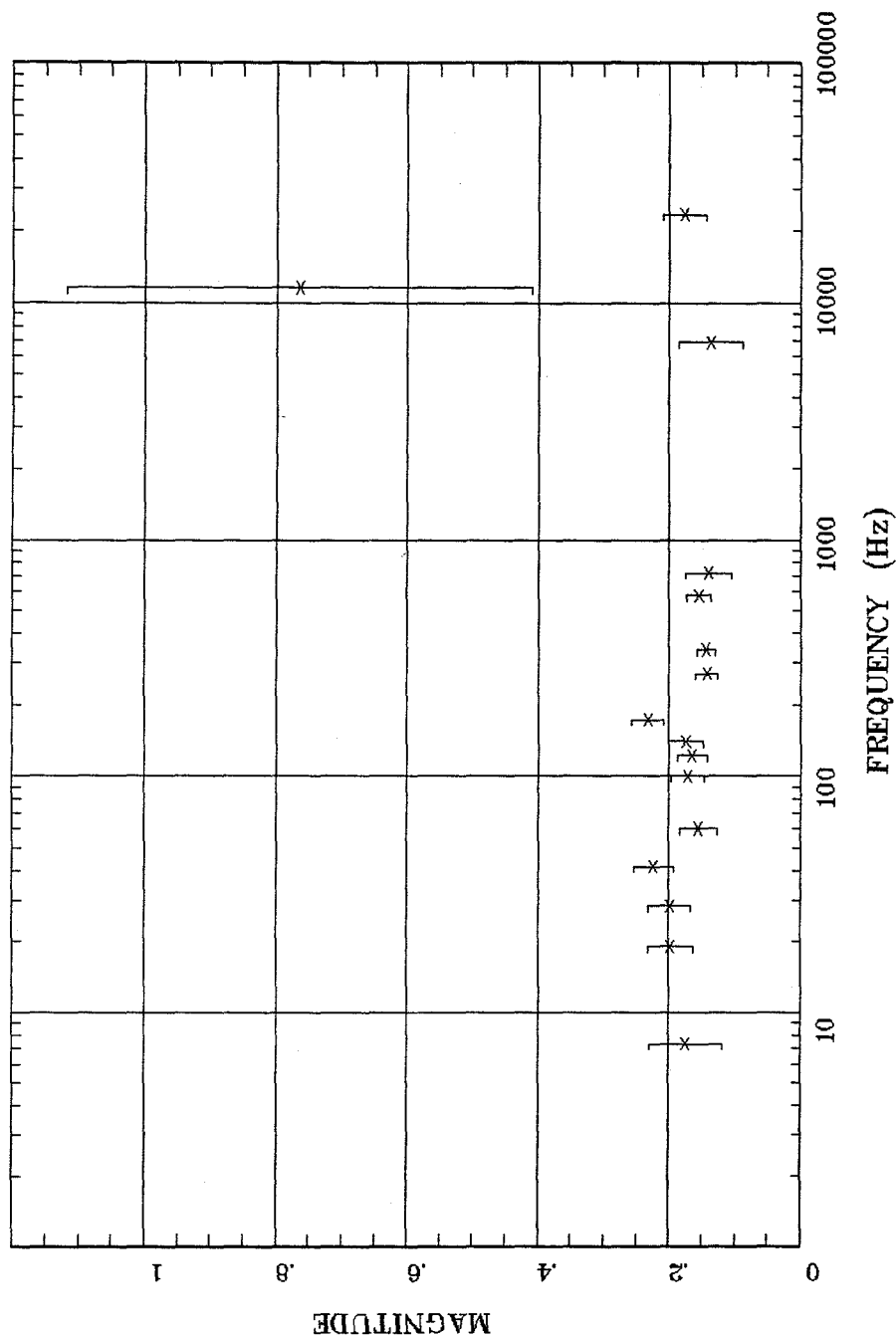
Rotation: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:15 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig.16e



TIPPER MAGNITUDE

North of Beatty



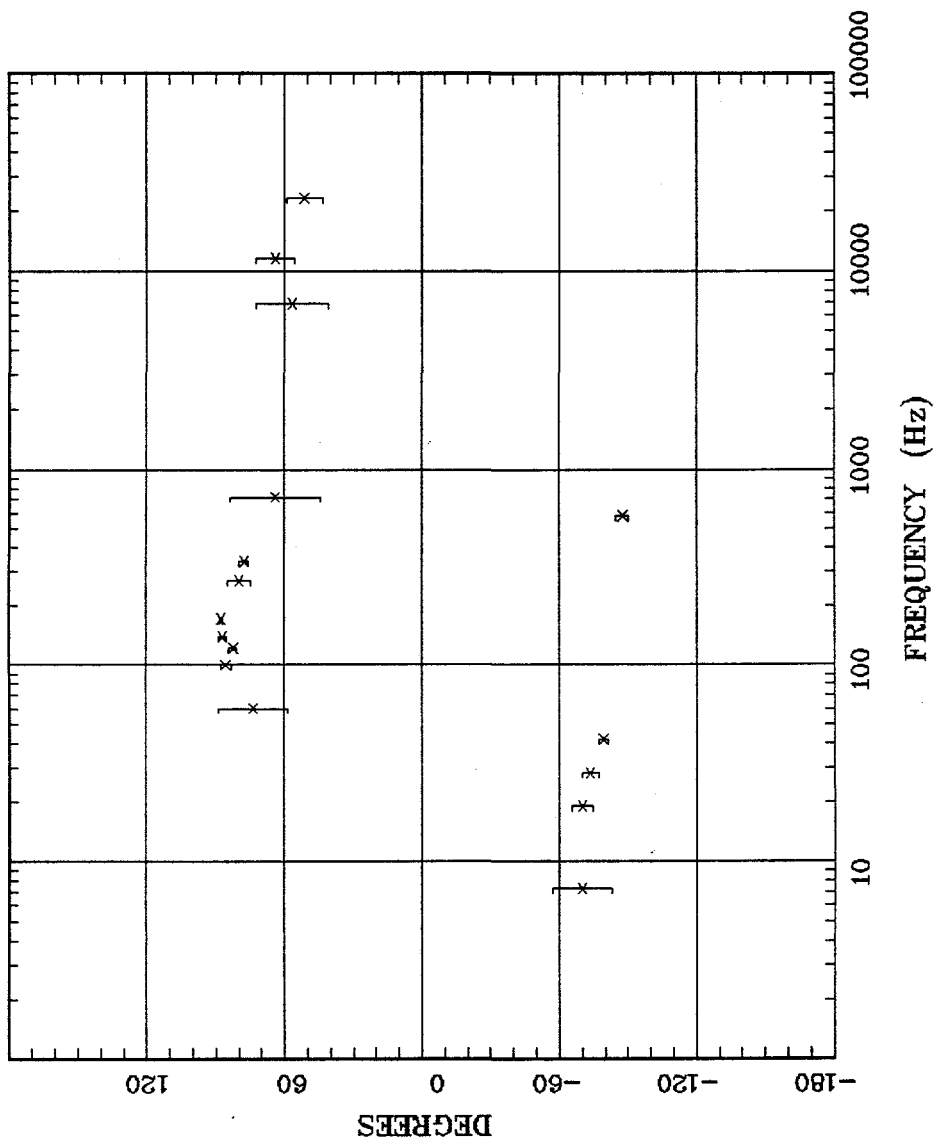
Client: Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS

Rotation: Filename: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:15 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments >

Fig. 16g

TIPPER STRIKE

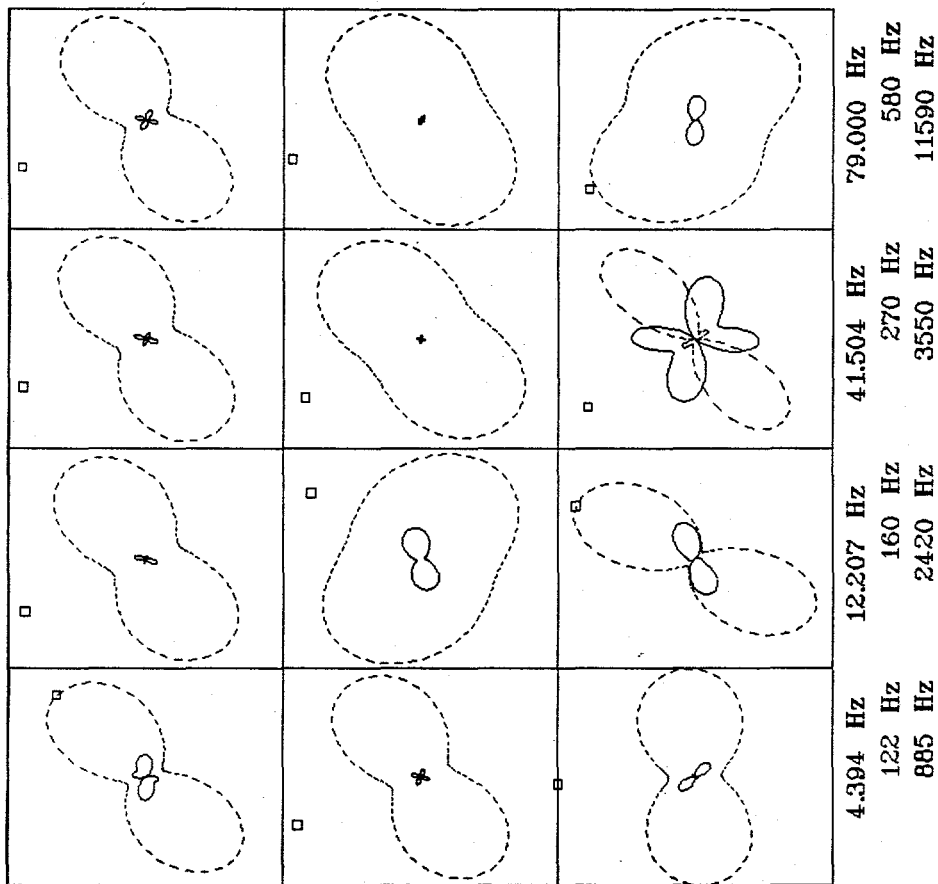
North of Beatty



Client: Remote E
 Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS
 Rotation: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 C
 Plotted: 11:15 Jul 11, 1997
 < EMI - ElectroMagnetic Instruments

Fig. 16h

POLAR PLOTS North of Beatty



Client: Remote E
 Remote: Remote E
 Acquired: 17:4 Jun 14, 1997
 Survey Co:USGS
 Rotation: bba16com.all
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
 Plotted: 11:15 Jul 11, 1997
 EMI - ElectroMagnetic Instruments >

Fig. 16i