Magnetotelluric Survey to Locate the Archean-Proterozoic Suture Zone in the Northeastern Great Basin, Nevada, Utah, and Idaho

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Open-File Report 2013–1252

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2013

Suggested citation:
Sampson, J.A., and Rodriguez, B.D., 2013, Magnetotelluric survey to locate the Archean-Proterozoic suture zone in the northeastern Great Basin, Nevada, Utah, and Idaho: U.S. Geological Survey Open-File Report 2013–1252, 195 p., http://pubs.usgs.gov/of/2013/1252/.

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Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
yard (yd)	0.9144	meter (m)

SI to Inch/Pound

Multiply	By	To obtain
	Length	
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
meter (m)	1.094	yard (yd)

Vertical coordinate information is referenced to the 1866 Clarke Spheroid.
Horizontal coordinate information is referenced to the North American Datum of 1927 (NAD 27).
Elevation, as used in this report, refers to distance above the vertical datum.

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Abstract

North-central Nevada contains a large amount of gold in linear belts, the origin of which is not fully understood. During July 2008, September 2009, and August 2010, the U.S. Geological Survey, as part of the Assessment Techniques for Concealed Mineral Resources project, collected twenty-three magnetotelluric soundings along two profiles in Box Elder County, Utah; Elko County, Nevada; and Cassia, Minidoka, and Blaine Counties, Idaho. The main twenty-sounding north-south magnetotelluric profile begins south of Wendover, Nev., but north of the Deep Creek Range. It continues north of Wendover and crosses into Utah, with the north profile terminus in the Snake River Plain, Idaho. A short, three-sounding east-west segment crosses the main north-south profile near the northern terminus of the profile. The magnetotelluric data collected in this study will be used to better constrain the location and strike of the concealed suture zone between the Archean crust and the Paleoproterozoic Mojave province. This report releases the magnetotelluric sounding data that was collected. No interpretation of the data is included.

Introduction

North-central Nevada contains a large amount of gold in a variety of deposit types (Hofstra, 2002), and the origin of that gold (such as in Carlin-type deposits) is a hotly debated subject (Hofstra and others, 2003; Wallace and others, 2004). Major deposits occur in linear belts (fig. 1) that have long been believed to be controlled by the underlying crust and large tectonically-controlled structures (Hofstra and Wallace, 2006).

Globally, the Archean Eon was the main gold mineralization period (Cameron, 1988). To help constrain the source rocks for gold that may have migrated in hydrothermal fluids along permeable zones as recently as the Miocene (John and others, 2003; Emsbo and others, 2006), it is important to know whether major mining districts in north-central Nevada are underlain by Archean crust known elsewhere to contain orogenic gold deposits (Hausel and Hull, 1990) or by accreted crust of the Paleoproterozoic Mojave province (Whitmeyer and Karlstrom, 2004). The Archean-Proterozoic suture zone that formed during early Proterozoic rifting of the continent and later Proterozoic accretion (Karlstrom and others, 2005) influenced many Phanerozoic events including patterns of sedimentation, deformation, magmatism, and hydrothermal activity (Crafford and Grauch, 2002; Grauch and others, 2003; Hofstra and Wallace, 2006). Determining the location and orientation of the Archean-Proterozoic suture zone between these provinces will help constrain the location of the Archean craton margin.

The nature of the crystalline basement in the Great Basin is relevant to Rodinian reconstructions, crustal development, and ore deposit models (for example, Hofstra and Cline,

2000; Grauch and others, 2003). The suture zone (Cheyenne Belt) is up to 7 kilometers (km) wide at the surface in Wyoming, with multiple zones of deformation (Houston and others, 1989), and up to 100 km wide at depth (Crosswhite and Humphreys, 2003). The suture zone in southern Wyoming strikes southwest in the Medicine Bow Mountains; however, west of the Medicine Bow Mountains, in the Sierra Madre, the suture trends west-northwest. In the Great Basin, the presence and the attitude of the suture zone are unknown because it is concealed below a Neoproterozoic-Paleozoic miogeocline and Cenozoic basin fill. Hart and Nelson (2008) place the southern limit in the northwest corner of Utah. Rodriguez and Williams (2008) place the western limit in the northeast corner of Nevada. Others (Karlstrom and others, 2005; Tosdal and others, 2000) place the southern limit along a southwest projection of the Uinta Mountain axis. To better constrain the location and strike of the suture zone below cover, a regional north-south magnetotelluric sounding profile was acquired along the Utah-Nevada state line that also extends across the southern Idaho state line. An additional short east-west profile was acquired in southern Idaho near the northern terminus of the regional north-south profile.

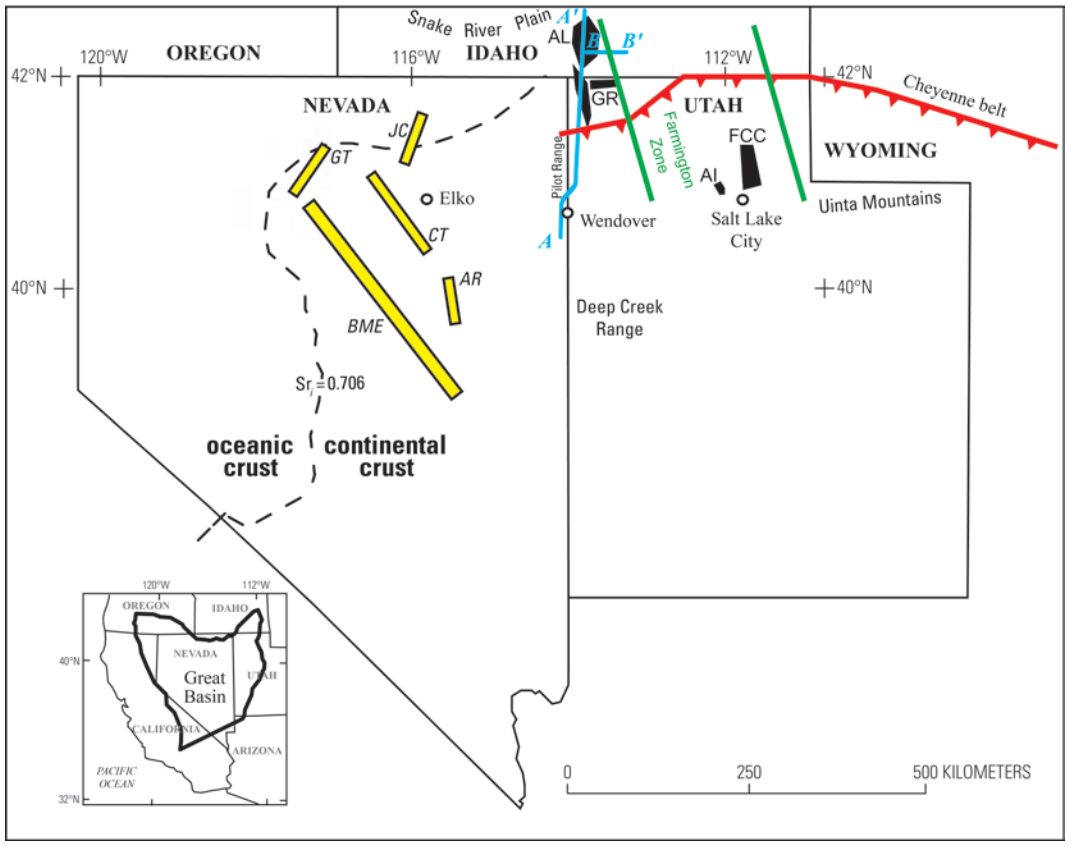


Figure 1. Locations of magnetotelluric profiles in the northeastern Great Basin, Nevada, Utah, and Idaho and relevant geophysical features in the area. Blue A-A' and B-B' lines are magnetotelluric profiles. Black dashed line is initial $^{87}Sr/^{86}Sr$=0.706 isopleth (Sr_i) for the inferred edge of continental crust. Yellow rectangles are major mineral trends and lineaments (AR, Alligator Ridge district; BME, Battle Mountain–Eureka trend; CT, Carlin trend; GT, Getchell trend; JC, Jerritt Canyon district). Green solid lines are Farmington zone boundaries. Red solid line is Cheyenne Belt of Hart and Nelson (2008). Solid black polygons are Precambrian exposures (AL, Albion Range; GR, Grouse Creek/Raft River Range; FCC, Farmington Canyon complex; AI, Antelope Island). Inset map shows the outline of the Great Basin. Modified from John and others (2003).

Electrical Properties of Rock

Electromagnetic geophysical methods detect variations in the electrical properties of rock units—in particular, electrical resistivity in units of ohm-meters or its inverse electrical conductivity in units of siemens per meter. Electrical resistivity can be correlated with geologic units on the surface and at depth by using lithologic logs to provide a three-dimensional picture of subsurface geology. In the upper crust, the resistivities of geologic units largely depend upon their fluid content, pore-volume porosity, interconnected fracture porosity, and the presence of conductive minerals (such as clay, graphitic carbon, and metallic minerals). Fluids in the pore spaces and fracture openings, especially saline fluids, can increase electrical conductance in an otherwise electrically resistive rock matrix (Keller and Frischknecht, 1966; Hearst and Nelson, 1985; Keller, 1987; Palacky, 1987; Hallenburg, 1998). Although no one-to-one relation exists between lithology and resistivity, some general correlations can be made by using typical values, even though different values can be found at other localities (Palacky, 1987) that may fall outside of the ranges presented below. It is common for altered volcanic rocks to contain replacement minerals that have resistivities only one tenth as high as those of the surrounding rocks (Nelson and Anderson, 1992). Fine-grained sediments, such as clay-rich alluvium, marine shales, and mudstones, are normally conductive and have resistivities of a few ohm-meters to tens of ohm-meters (Keller, 1987; Palacky, 1987). Metamorphic rocks (not containing graphite) and unaltered, unfractured igneous rocks are normally moderately to highly resistive (a few hundred to thousands of ohm-meters). Porous carbonate rocks with low fluid content and few impurities can have similarly high resistivities (Keller, 1987; Palacky, 1987). Fault zones may be moderately conductive (tens of ohm-meters) when composed of rocks fractured enough to have hosted fluid transport and consequent mineralogical alteration (Eberhart-Phillips and others, 1995). At greater depths, higher temperatures cause increased ion mobility, which increases fluid conductivity and, in turn, reduces the bulk resistivity (Hallenburg, 1998). Tables of electrical resistivity for a variety of rocks, minerals, and geological environments may be found in Keller (1989) and Palacky (1987).

Magnetotelluric Method

The magnetotelluric method is a passive ground-based electromagnetic geophysical technique that investigates the distribution of electrical resistivity (or its inverse, electrical conductivity) below the surface at depths of tens of meters to tens of kilometers (Vozoff, 1991). It does so by measuring time variations in the Earth's natural electric and magnetic fields. Worldwide lightning activity at frequencies of about 1 to 10,000 hertz and geomagnetic micropulsations at frequencies of 0.001 to 1 hertz provide the main source of signals used by the magnetotelluric method. Electromagnetic waves propagate vertically in the Earth because the very large contrast in the resistivity of the air and the Earth causes a vertical refraction of electromagnetic waves at the Earth's surface (Vozoff, 1972).

The horizontal components of the electric and magnetic fields are recorded in two orthogonal directions; the vertical magnetic field component is also recorded. The resulting time-series signals are used to derive tensor apparent resistivities and phases after first converting them to complex cross-spectra by using fast Fourier transform techniques and least-squares, cross-spectral analysis (Bendat and Piersol, 1971) to solve for a tensor transfer function. If one assumes that the Earth consists of a two-input, two-output linear system in which the orthogonal magnetic fields are input and the orthogonal electric fields are output, then a transfer function

can be calculated that relates the observed electric fields to the magnetic fields. Before it is converted to apparent resistivity and phase, the tensor is normally rotated parallel to geologic strike. Subsurface geologic strike can be estimated by determining the horizontal direction (Hxy or Hyx) in which the vertical magnetic field "tips" (the tipper strike direction).

For a two-dimensional Earth, the magnetotelluric fields can be decoupled into transverse electric and transverse magnetic modes. Two-dimensional resistivity modeling is generally computed to fit both modes. When the geology satisfies the two-dimensional assumption, the magnetotelluric data for the transverse electric mode is assumed to represent the electric field oriented along geologic strike, while the data for the transverse magnetic mode is assumed to represent the electric field oriented across strike. The magnetotelluric method is well suited for studying complicated geological environments because the electric and magnetic field transfer functions are sensitive to vertical and horizontal variations in resistivity. High-resolution shallow-subsurface characterization is possible for closely spaced magnetotelluric stations, but the resolution of the subsurface decreases for deeper measurements and for widely spaced stations. The method is capable of establishing whether the electromagnetic fields are responding to subsurface rock bodies of effectively one, two, or three dimensions. An introduction to the magnetotelluric method and references for a more advanced understanding are contained in Dobrin and Savit (1988) and Vozoff (1991).

Magnetotelluric Survey to Locate the Archean-Proterozoic Suture Zone

Twenty-three magnetotelluric soundings were collected in July 2008, September 2009, and August 2010 by the U.S. Geological Survey as part of the Assessment Techniques for Concealed Mineral Resources project. Those data form a twenty-sounding, 271-km-long north-south profile (A-A', fig. 1) and an additional three-sounding east-west segment (B-B', fig. 1) near the northern profile terminus in Box Elder County, Utah; Elko County, Nevada; and Cassia, Minidoka, and Blaine Counties, Idaho. Profile A-A' begins south of Wendover, Nev., but north of the Deep Creek Range. It continues north of Wendover along the Nevada side of the Nevada-Utah state line and crosses into Utah along the east side of the Pilot Range near 41°N latitude. The profile crosses the Grouse Creek Mountains, which are north of the southernmost projected Archean exposures to the east (Egger and others, 2003; Hintze, 1980). The north terminus of profile A-A' is in the Snake River Plain, Idaho. Sounding locations were chosen to cross the Cheyenne Belt, the suture zone hypothesized from interpretations of Hart and Nelson (2008). The east-west segment (B-B', fig. 1) is 23 km long and is east of station 52 of profile A-A'. The east-west segment sounding locations were chosen to cross into the Farmington zone, a major Paleoproterozoic mobile belt (Hart and Nelson, 2008), to aid with future magneotelluric modeling efforts. Magnetotelluric data were recorded for periods exceeding 60,000 to 80,000 seconds to help characterize the lower crust.

Station locations were chosen for proximity to roads and in order to avoid electrical noise from power lines. All data at the stations were collected with a portable Electromagnetic Instruments, Inc. (EMI) MT24LF system (Electromagnetic Instruments, Inc., 2002). In addition, station 37 was collected as a repeat station in 2009 with an MT-1 system (Electromagnetic Instruments, Inc., 1996) after it was discovered that the 2008 remote reference data (Gamble and others, 1979) for station 37 was too corrupted by nearby traffic and bovine visitors. Horizontal electric fields were measured using copper-sulfate porous pots placed in an L-shaped, three-electrode array with dipole lengths of 30 meters. The orthogonal, horizontal magnetic fields in the direction of the electric-field measurement array were measured using high-magnetic-

permeability, mu-metal-cored induction coils (Electromagnetic Instruments, Inc., 1996). Frequencies were sampled from about 0.002 to 200 hertz using remote reference recordings of the orthogonal, horizontal components of the electric and magnetic fields and the vertical magnetic field. Table 1 lists the twenty-three magnetotelluric station locations. There is no station 38.

Table 1. Magnetotelluric station coordinates.

[Coordinates are referenced to the Clarke Spheroid of 1866 and the North American Datum of 1927–Western United States. Longitude and latitude format is degrees:minutes:seconds. Universal Transverse Mercator northing and easting units and station elevations are in meters (m). Accuracy of north and east coordinate is ±5 m; accuracy for elevation is ±10 m. Remote is remote reference station. X-dir is X direction in degrees clockwise from north. There is no station 38]

Station	Remote	Longitude	Latitude	Northing(m)	Zone	Easting(m)	Elevation (m)	X-dir
37	none	-113:47:32	41:51:24	4,637,427	12	268,230	2,013	127
39	40	-113:52:16	41:29:14	4,596,602	12	260,299	1,534	311
40	39	-113:57:39	41:15:40	4,571,771	12	251,947	1,589	33
41	42	-113:57:55	41:06:35	4,554,975	12	251,009	1,300	0
42	41	-114:04:42	40:55:40	4,534,641	11	745,997	1,353	103
43	44	-114:07:37	40:42:46	4,510,630	11	742,699	1,371	0
44	43	-114:08:02	40:31:26	4,489,628	11	742,792	1,458	10
45	48	-113:52:05	41:22:21	4,583,861	12	260,136	1,377	90
46	47	-113:58:32	41:00:40	4,544,045	12	249,765	1,324	270
47	46	-114:08:08	40:49:19	4,522,735	11	741,578	1,434	270
48	45	-113:51:29	41:38:40	4,614,047	12	261,969	1,627	90
49	50	-113:39:47	41:59:26	4,651,945	12	279,405	1,696	135
50	49	-113:31:30	42:05:17	4,662,436	12	291,160	1,663	36
51	52	-113:23:52	42:07:38	4,666,479	12	301,807	1,542	218
52	51	-113:26:43	42:13:21	4,677,177	12	298,179	1,643	315
53	58	-113:28:49	42:20:59	4,691,364	12	295,707	1,943	9
54	55	-113:34:54	42:27:53	4,704,398	12	287,746	1,495	112
55	54	-113:22:40	42:37:58	4,722,564	12	305,024	1,299	141
56	57	-113:27:05	42:45:21	4,736,403	12	299,381	1,311	45
57	56	-113:24:58	42:53:54	4,752,144	12	302,743	1,396	242
58	53	-113:14:10	42:09:42	4,669,922	12	315,271	1,573	221
59	60	-113:04:52	42:12:07	4,674,071	12	328,182	1,664	323
60	59	-112:57:29	42:12:25	4,674,404	12	338,365	1,682	151

Magnetotelluric Data Collected in the Northeastern Great Basin Survey

The recorded time-series data were converted to the frequency domain and processed to determine the impedance tensor, which is used to derive apparent resistivities and phases at each site. Rotation of the impedance tensor allows for decoupling into the transverse electric and transverse magnetic modes. The data provided here have not been rotated from the original acquisition orientation (X direction) listed in table 1. During the analysis and interpretation process, each station should be rotated to a fixed angle determined by the given nominal profile orientation. Cross-power files were sorted to select optimal signal-to-noise time-series datasets (see appendix).

Cultural features such as fences, pipelines, communication lines, moving vehicles and trains, and other manmade sources of electromagnetic noise can contaminate the magnetotelluric signals. Care was taken to avoid these noise sources during acquisition.

The figures in the appendix represent the field-processed magnetotelluric data for each station, after the time-series data were converted to the frequency domain and the tensor-transfer function was developed.

Data for each station are presented in eight diagrams:

1. Apparent resistivity for the unrotated xy (x symbol) and yx (o symbol) modes,
2. Impedance phase for the unrotated xy (x symbol) and yx (o symbol) modes,
3. Impedance skew for the impedance tensor,
4. Multiple coherency for the xy (x symbol) and minimum (o symbol) modes of the electric field,
5. Impedance polar plots (at 12 selected frequencies),
6. Tipper magnitude for the vertical magnetic field,
7. Tipper strike for the vertical magnetic field, and
8. HzHx (x symbol) and HzHy (o symbol) coherency.

Units of measure for the apparent resistivity, phase, and tipper strike are given on the diagrams. The coherency, skew, tipper magnitude, and polar diagrams have unitless vertical axes. The data for all diagrams are shown over a range of frequencies. Error bars (],[) on the apparent resistivity, impedance phase, skew, tipper magnitude, and tipper strike diagrams represent probable errors within one standard deviation of the sample variance (Gamble and others, 1979).

Apparent resistivity is calculated from the ratio of the electric field magnitude over the magnetic field magnitude for a given frequency. The impedance phase is proportional to the slope of the apparent resistivity curve on a log-log plot, relative to a baseline at −45 degrees (Vozoff, 1991). A measure of the dimensionality for magnetotelluric data is provided by the impedance skew of the impedance tensor (Vozoff, 1972). If the effective, measured resistivity response to the geology beneath an magnetotelluric station is truly one- or two-dimensional, then the skew will be zero. Both instrument and environmental sources of noise contribute to nonzero skew values but are typically small (about 0.1) for relatively low-noise-level recordings. Higher skews (more than 0.2) indicate either the resistivity response to three-dimensional geology or higher levels of noise.

In the study area, noise from a number of small power lines and small moving vehicles was negligible beyond 0.25 km from the noise source. Power-line signal amplitudes were

measured at each site and were typically less than 20 percent of the maximum recorded signals. Noise from larger power lines, power generators, pipelines, and trains was negligible at distances more than 5 km. Local lightning, wind, and rainstorms also can degrade data quality, but these noise sources were avoided by not recording during active thunderstorms. Burying the magnetic induction coils and keeping the electric dipole wires flat on the ground helped to minimize wind noise.

The figures in the appendix represent the field-processed magnetotelluric data at each station, and they include some data scatter and poor signal-to-noise ratios. The only effort aimed at removing noisy data points was to visually inspect and select the best signal-to-noise field data to combine into the final data diagrams.

Predicted values of the electric field can be computed from the measured values of the magnetic field (Vozoff, 1991). The coherence of the predicted electric field with the measured electric field is a measure of the signal-to-noise ratio provided in the multiple coherency diagrams. Values are normalized between 0 and 1, where values at 0.5 signify signal levels equal to noise levels.

For this dataset, a large majority of coherencies for the entire dataset had high coherencies (above about 0.9), so most of the dataset had high signal-to-noise ratios. Exceptions are noted below. On profile A-A', near the town of Wendover, station 46 on the southern part of the profile generally had the lowest coherencies (0.3 to 0.9) but also had high coherencies (above 0.9) for frequencies from about 0.02 to 0.06 hertz. Nearby stations (44, 43, 42, 41, and 45) had higher coherencies than station 46 but also had coherencies that fell below 0.9 for frequencies around 0.04 to 4 hertz and below about 0.005 to 0.01 hertz; station 47, however, had coherencies greater than 0.9 for frequencies below about 0.1 hertz in the XY component.

Coherencies for stations in the central and northern parts of profile A-A' (39–57) were generally higher than those in the southern part of the profile. However, frequencies below about 0.005 hertz and from about 0.03 to 0.5 hertz generally had lower coherencies (below 0.9). Station 57 generally had the worst coherencies in the northern part of the profile, below 0.9 for frequencies from about 0.03 to 20 hertz.

On profile B-B', stations 58, 59, and 60 had some of best coherencies of this entire dataset with nearly all coherencies above 0.9, except for frequencies below 0.004 hertz for station 58 and below 0.002 hertz for stations 59 and 60. Station 58 also had coherencies below 0.9 but above 0.8 for frequencies of about 0.05 to 0.5 hertz.

The impedance polar diagrams provide a measure of the magnetotelluric data dimensionality (Reddy and others, 1977). For one-dimensional resistivity structures, the principal impedance (off-diagonal elements) polar diagram (dashed line) is a circle. For two-dimensional or three-dimensional resistivity structures, the principal impedance polar diagram (dashed line) elongates either parallel to or perpendicular to strike direction. Over resistors, the principal impedance polar diagram elongates perpendicular to strike direction, while over conductors the principal impedance polar diagram elongates parallel to strike direction. For two-dimensional resistivity structures, the additional impedance polar diagram (solid line) attains the shape of a symmetric clover leaf. For three-dimensional resistivity structures, the additional impedance polar diagram (solid line) elongates in one direction, and its amplitude is comparable to that of the principal impedance polar diagram (dashed line), although high noise levels can produce the same effect on the polar diagram. A three-dimensional analysis of polar diagrams at each frequency should also take into account the corresponding coherence and skew values along with their associated error levels. The polar diagrams computed for our data show the

electromagnetic response for most stations was three-dimensional over all frequencies measured at acceptable noise levels. Stations 49 and 50 were either two-dimensional or weakly three-dimensional from about 0.02 hertz to about 0.1 hertz. Station 58 was either two-dimensional or weakly three-dimensional from about 0.03 hertz to 5 hertz. Station 56 was either two-dimensional or weakly three-dimensional for frequencies higher than about 16 hertz.

The tipper can be calculated from the vertical component of the magnetic field. The tipper magnitude is a measure of the tipping of the magnetic field out of the horizontal plane (Vozoff, 1991). The magnitude is zero for the one-dimensional case and typically increases to values between 0.1 and 0.5 as it responds to vertical and subvertical structures, rarely reaching as great as 1.0. The tipper strike typically is used to help resolve the 90-degree ambiguity in the impedance rotation angle. The tipper magnitudes of these stations are all above 0.1, indicating vertical and subvertical structure at depth.

The HzHx and HzHy coherency is a measure of the signal-to-noise ratio of the vertical magnetic field with respect to each of the orthogonal, horizontal magnetic field directions. Values are normalized between 0 and 1, where values of 0.5 signify signal levels equal to noise levels. These three components of magnetic-field coherence provide a check on the quality of the measured values in the tipper magnitude and tipper strike diagrams.

References Cited

Bendat, J.S., and Piersol, A.G., 1971, Random data—Analysis and measurement procedures: New York, Wiley Interscience, 407 p.

Cameron, E.M., 1988, Archean gold—Relation to granulite formation and redox zoning in the crust: Geology, v. 16, p. 109–112.

Crafford, A.E.J., and Grauch, V.J.S., 2002, Geologic and geophysical evidence for the influence of deep crustal structures on Paleozoic tectonics and the alignment of world-class gold deposits, north-central Nevada, USA: Ore Geology Reviews, v. 21, p. 157–184.

Crosswhite, J.A., and Humphreys, E.D., 2003, Imaging the mountainless root of the 1.8 Ga Cheyenne Belt suture and clues to its tectonic stability: Geology, v. 31, no. 8, p. 669–672.

Dobrin, M.D., and Savit, C.H., 1988, Introduction to geophysical prospecting (4th ed.): New York, McGraw-Hill, 867 p.

Eberhart-Phillips, Donna, Stanley, W.D., Rodriguez, B.D., and Lutter, W.J., 1995, Surface seismic and electrical methods to detect fluids related to faulting: Journal of Geophysical Research, v. 100, no. B7, p. 12919–12936.

Egger, A.E., Dumitru, T.A., Miller, E.L., Savage, C.F.I., and Wooden, J.L., 2003, Timing and nature of Tertiary plutonism and extension in the Grouse Creek Mountains, Utah: International Geology Review, v. 45, p. 497-532.

Electromagnetic Instruments, Inc., 1996, MT-1 magnetotelluric system operation manual, version 3.2: Richmond, Calif., Electromagnetic Instruments, Inc., 220 p.

Electromagnetic Instruments, Inc., 2002, MT24/LF System operation and maintenance manual, version 1.0: Richmond, Calif., Electromagnetic Instruments, Inc., 72 p.

Emsbo, Poul, Groves, D.I., Hofstra, A.H., and Bierlein, F.P., 2006, The giant Carlin gold province—A protracted interplay of orogenic, basinal, and hydrothermal processes above a lithospheric boundary: Mineralium Deposita, v. 41, p. 517–525.

Gamble, T.D., Goubau, W.M., and Clarke, John, 1979, Error analysis for remote reference magnetotellurics: Geophysics, v. 44, no. 5, p. 959–968.

Grauch, V.J.S., Rodriguez, B.D., and Wooden, J.L., 2003, Geophysical and isotopic constraints on crustal structure related to mineral trends in north-central Nevada and implications for tectonic history: Economic Geology and the Bulletin of the Society of Economic Geologists, v. 98, no. 2, p. 269–286.

Hallenburg, J.K., 1998, Non-hydrocarbon methods of geophysical formation evaluation: Boca Raton, Fla., Lewis Publishers, 265 p.

Hart, Garret, and Nelson, S.T., 2008, Testing the presence of fundamental crustal boundaries in the western United States: Geological Society of America, Abstracts with Programs, v. 40, no. 1, p. 87.

Hausel, W.D., and Hull, Joseph, 1990, Guide to gold mineralization and Archean geology of the South Pass Greenstone Belt, Wind River Range, Wyoming, *in* Roberts, Sheila, ed., Geologic field tours of western Wyoming and parts of adjacent Idaho, Montana, and Utah: Geological Survey of Wyoming, Public Information Circular, no. 29, p. 178–191.

Hearst, J.R., and Nelson, P.H., 1985, Well logging for physical properties: New York, McGraw-Hill, 571 p.

Hintze, L.F., 1980, Geologic map of Utah: Utah Geological and Mineral Survey, Scale 1:500,000.

Hofstra, A.H., 2002, Diverse origins of sedimentary rock-hosted disseminated gold deposits worldwide—Overview: Geological Society of America, Abstracts with Programs, v. 34, no. 6, p. 140.

Hofstra, A.H., and Cline, J.S., 2000, Characteristics and models for Carlin-type gold deposits, chapter 5 *of* Hagemann, S.G., and Brown, P.E., eds., Gold in 2000: Reviews in Economic Geology, v. 13, p. 163–220.

Hofstra, A.H., John, D.A., and Theodore, T.G., 2003, A special issue devoted to gold deposits in northern Nevada—Part 2, Carlin-type deposits: Economic Geology, v. 98, no. 6, p. 1063–1268.

Hofstra, A.H., and Wallace, A.R., 2006, Metallogeny of the Great Basin—Crustal evolution, fluid flow, and ore deposits: U.S. Geological Survey Open-File Report 2006–1280, 36 p.

Houston, R.S., Duebendorfer, E.M., Karlstrom, K.E., and Premo, W.R., 1989, A review of the geology and structure of the Cheyenne Belt and Proterozoic rocks of southern Wyoming, *in* Grambling, J.A., and Tewksbury, B.J., eds., Proterozoic geology of the southern Rocky Mountains: Geological Society of America, Special Paper 235, p. 1–12.

John, D.A., Hofstra, A.H., and Theodore, T.G., 2003, A special issue devoted to gold deposits in northern Nevada—Part 1, Regional studies and epithermal deposits, Preface: Economic Geology, v. 98, p. 225–234.

Karlstrom, K.E., Whitmeyer, S.J., Dueker, Ken, Williams, M.L., Bowring, S.A., Levander, Alan, Humphreys, E.D., Keller, G.R., and the CD-ROM Working Group, 2005, Synthesis of results from the CD-ROM experiment—4-D image of the lithosphere beneath the Rocky Mountains and implications for understanding the evolution of continental lithosphere, *in* Karlstrom, K.E., and Keller, G.R., eds., The Rocky Mountain region—An evolving lithosphere. Tectonics, geochemistry, and geophysics: American Geophysical Union, Geophysical Monograph 154, p. 421–441.

Keller, G.V., 1987, Rock and mineral properties, *in* Nabighian, M.N., ed., Electromagnetic methods in applied geophysics theory: Tulsa, Okla., Society of Exploration Geophysicists, v. 1, p. 13–51.

Keller, G.V., 1989, Electrical properties, *in* Carmichael, R.S., ed., Practical handbook of physical properties of rocks and minerals: Boca Raton, Fla., CRC Press, p. 359–427.
Keller, G.V., and Frischknecht, F.C., 1966, Electrical methods in geophysical prospecting: Oxford, Pergamon Press Inc., 519 p.
Nelson, P.H., and Anderson, L.A., 1992, Physical properties of ash flow tuff from Yucca Mountain, Nevada: Journal of Geophysical Research, v. 97, no. B5, p. 823–841.
Palacky, G.J., 1987, Resistivity characteristics of geologic targets, *in* Nabighian, M.N., ed., Electromagnetic methods in applied geophysics: Tulsa, Okla., Society of Exploration Geophysicists, v. 1, p. 53–129.
Reddy, I.K., Rankin, David, and Phillips, R.J., 1977, Three-dimensional modelling in magnetotelluric and magnetic variational sounding: Geophysics Journal of the Royal Astronomical Society, v. 51, p. 313–325.
Rodriguez, B.D., and Williams J. M., 2008, Tracking the Archean-Proterozoic suture zone in the northeastern Great Basin, Nevada and Utah: Geosphere, v. 4, no. 2, p. 315–328.
Tosdal, R.M., Wooden, J.L, and Kistler, R.W., 2000, Geometry of the Neoproterozoic continental break-up, and implications for location of Nevadan mineral belts, *in* Cluer, J.K., Price, J.G., Struhsacker, R.F., Hardyman, R.F., and Morris, C.L., eds., Geology and ore deposits 2000—The Great Basin and beyond. Symposium proceedings: Reno, Nev., Geological Society of Nevada, v. I, p. 451–466.
Vozoff, Keeva, 1972, The magnetotelluric method in the exploration of sedimentary basins: Geophysics, v. 37, p. 980–141.
Vozoff, Keeva, 1991, The magnetotelluric method, *in* Nabighian, M.N., Electromagnetic methods in applied geophysics: Tulsa, Okla., Society of Exploration Geophysicists, v. 2, pt. B, p. 641–711.
Wallace, A.R., Ludington, Steve, Mihalsky, M.J., Peters, S.G., Theodore, T.G., Ponce, D.A., John, D.A., and Berger, B.R., 2004, Assessment of metallic mineral resources in the Humboldt River basin, northern Nevada: U.S. Geological Survey Bulletin 2218, 295 p.
Whitmeyer, S.J. and Karlstrom, K.E., 2004, Progressive Proterozoic growth of southern Laurentia by magmatic stabilization of lithosphere: Geological Society of America, Abstracts with Programs, v. 36, no. 5, p. 404.

Appendix 1. Magnetotelluric Data Diagrams

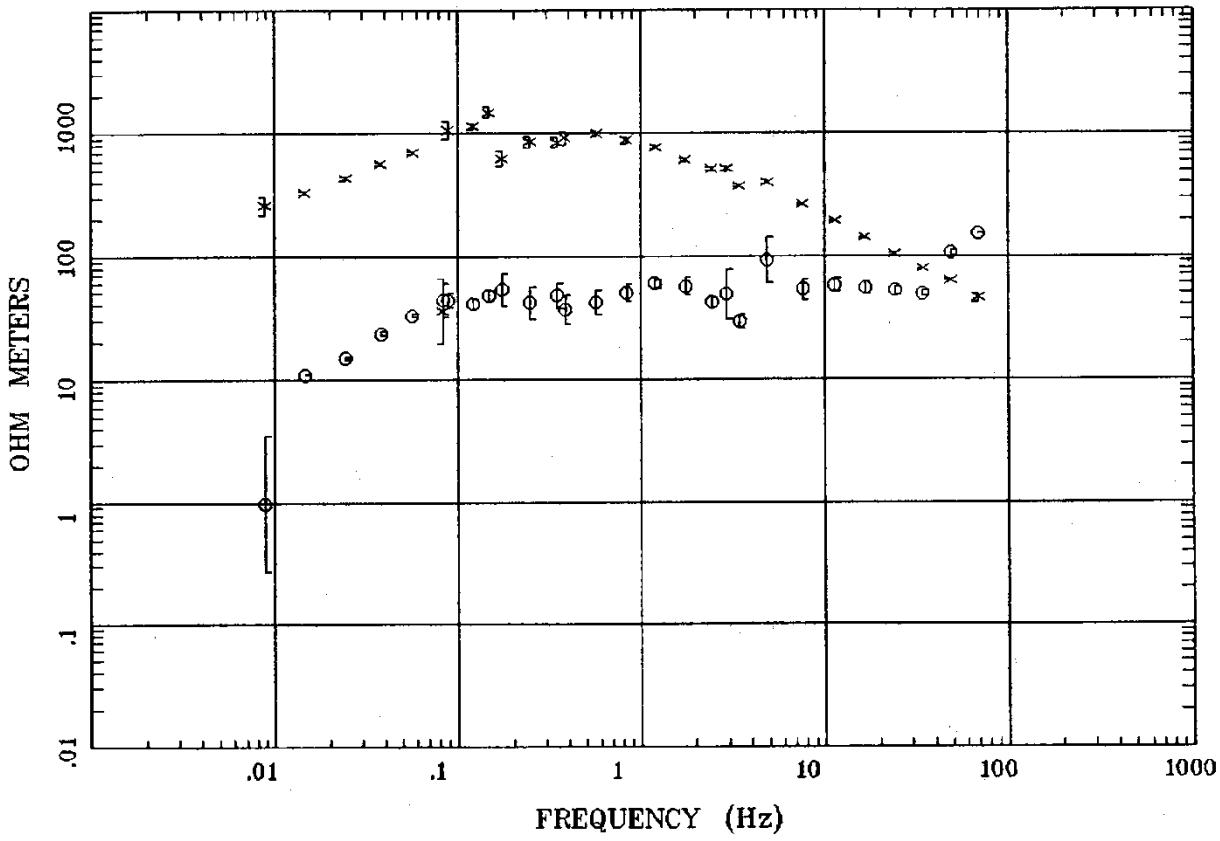
Units of measure for the apparent resistivity, phase, and tipper strike are given on the diagrams. The coherency, skew, tipper magnitude, and polar diagrams have unitless vertical axes. The data for all diagrams are shown over a range of frequencies. Data for each station are presented in eight diagrams:

1. Apparent resistivity for the unrotated xy (x symbol) and yx (o symbol) modes,
2. Impedance phase for the unrotated xy (x symbol) and yx (o symbol) modes,
3. Impedance skew for the impedance tensor,
4. Multiple coherency for the xy (x symbol) and minimum (o symbol) modes of the electric field,
5. Impedance polar plots (at 12 selected frequencies),
6. Tipper magnitude for the vertical magnetic field,
7. Tipper strike for the vertical magnetic field, and
8. HzHx (x symbol) and HzHy (o symbol) coherency.

Refer to the section “Magnetotelluric Data Collected in the Northeastern Great Basin Survey” in this report for an explanation of these parameters. Abbreviations found in the diagrams include Hz, hertz; Coh, coherency; MRP, Mineral Resources Program; and USGS, U.S. Geological Survey. Time is given in hour:minute (hh:mm) on a 24-hour clock.

Station 37

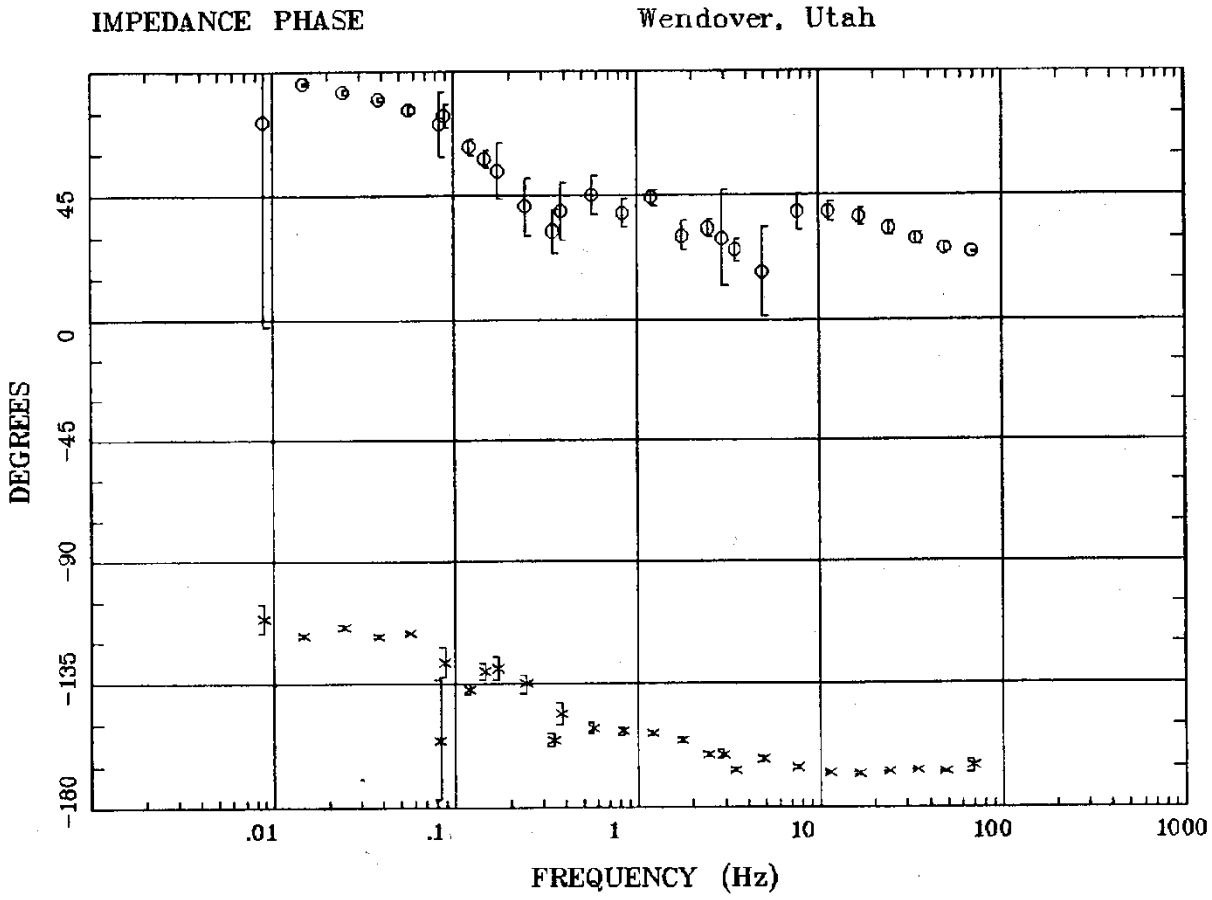
APPARENT RESISTIVITY Wendover, Utah



Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:53 Feb 09, 2011
< EMI - ElectroMagnetic Instruments >

Station 37

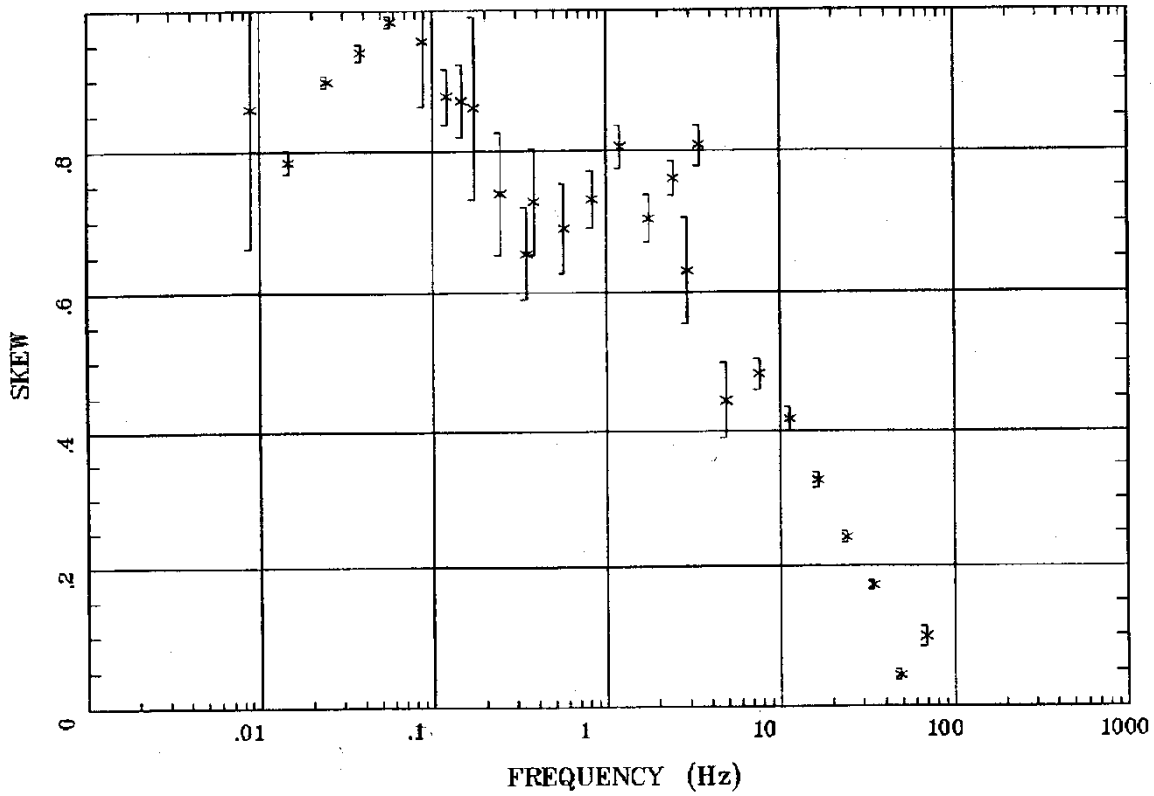


Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:53 Feb 09, 2011
< EMI - ElectroMagnetic Instruments >

Station 37

IMPEDANCE SKEW Wendover, Utah

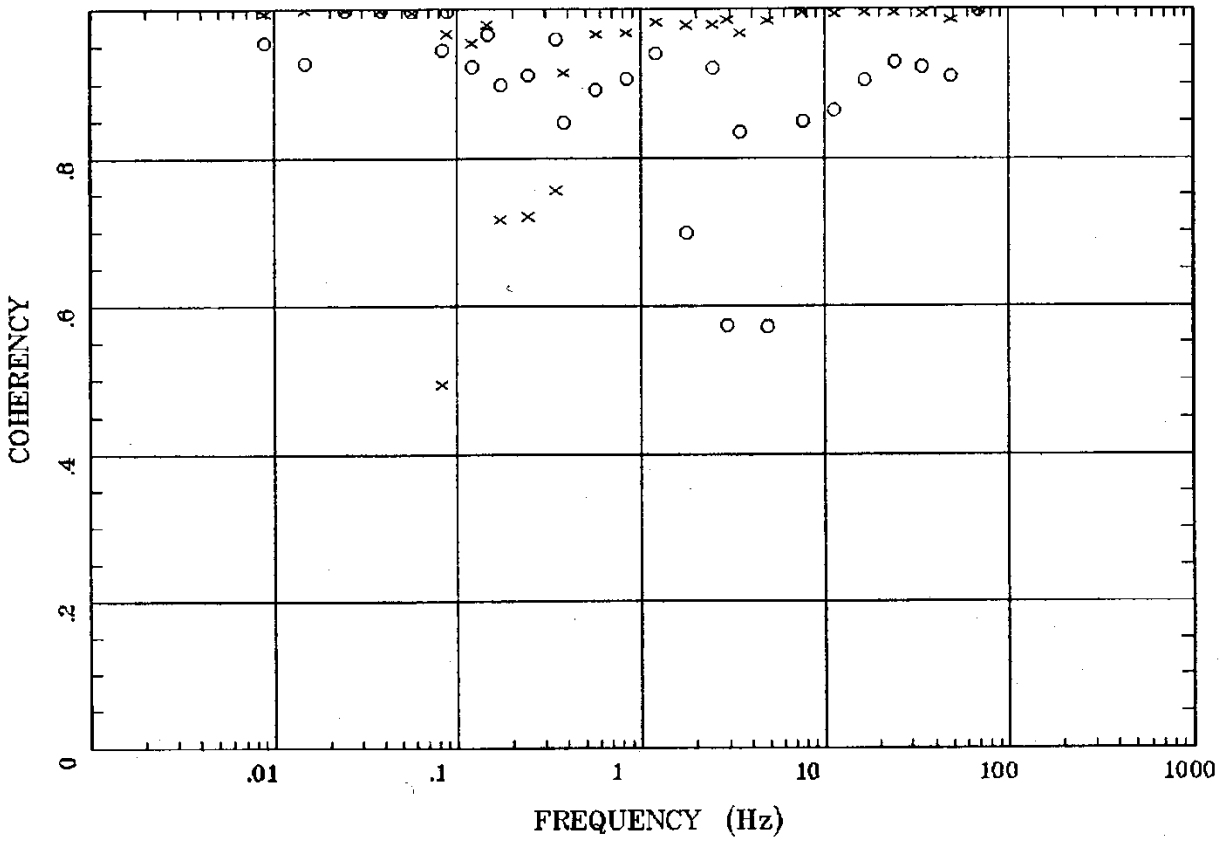


Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:53 Feb 09, 2011
< EMI - ElectroMagnetic Instruments >

Station 37

E MULT Coh. Wendover, Utah

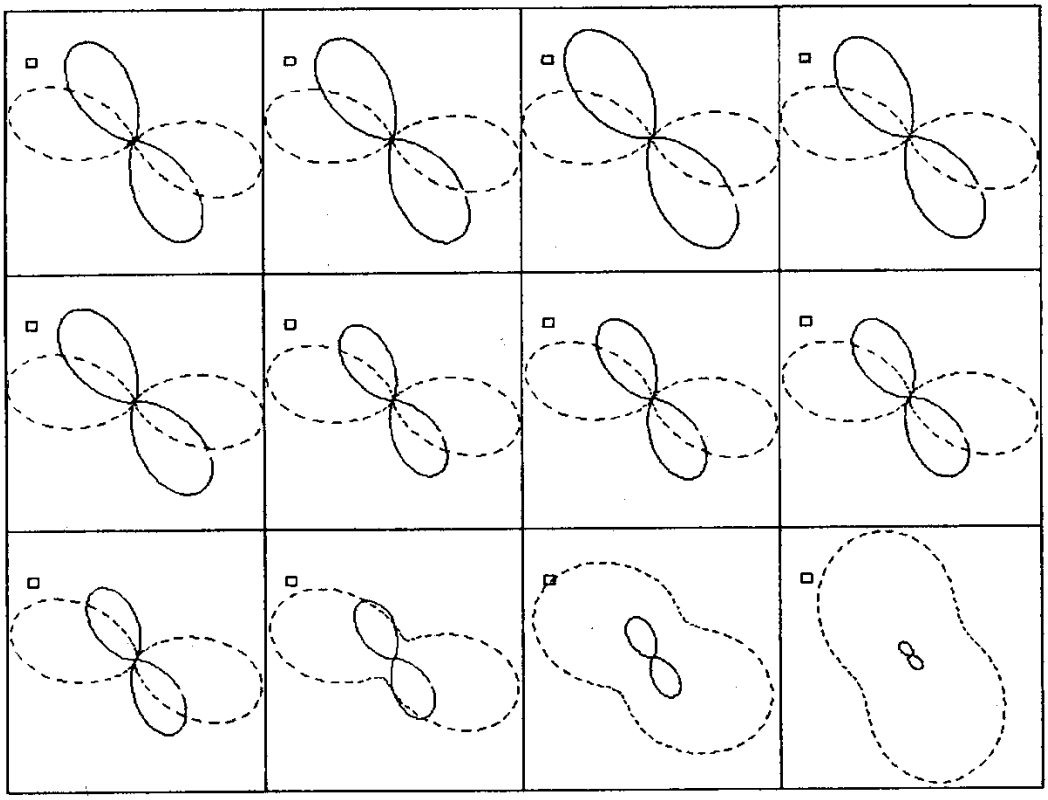


Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:54 Feb 09, 2011
< EMI - ElectroMagnetic Instruments >

Station 37

POLAR PLOTS Wendover, Utah



.0088 Hz	.0244 Hz	.0566 Hz	.120 Hz
.172 Hz	.345 Hz	.566 Hz	1.758 Hz
2.930 Hz	7.617 Hz	16.602 Hz	34.375 Hz

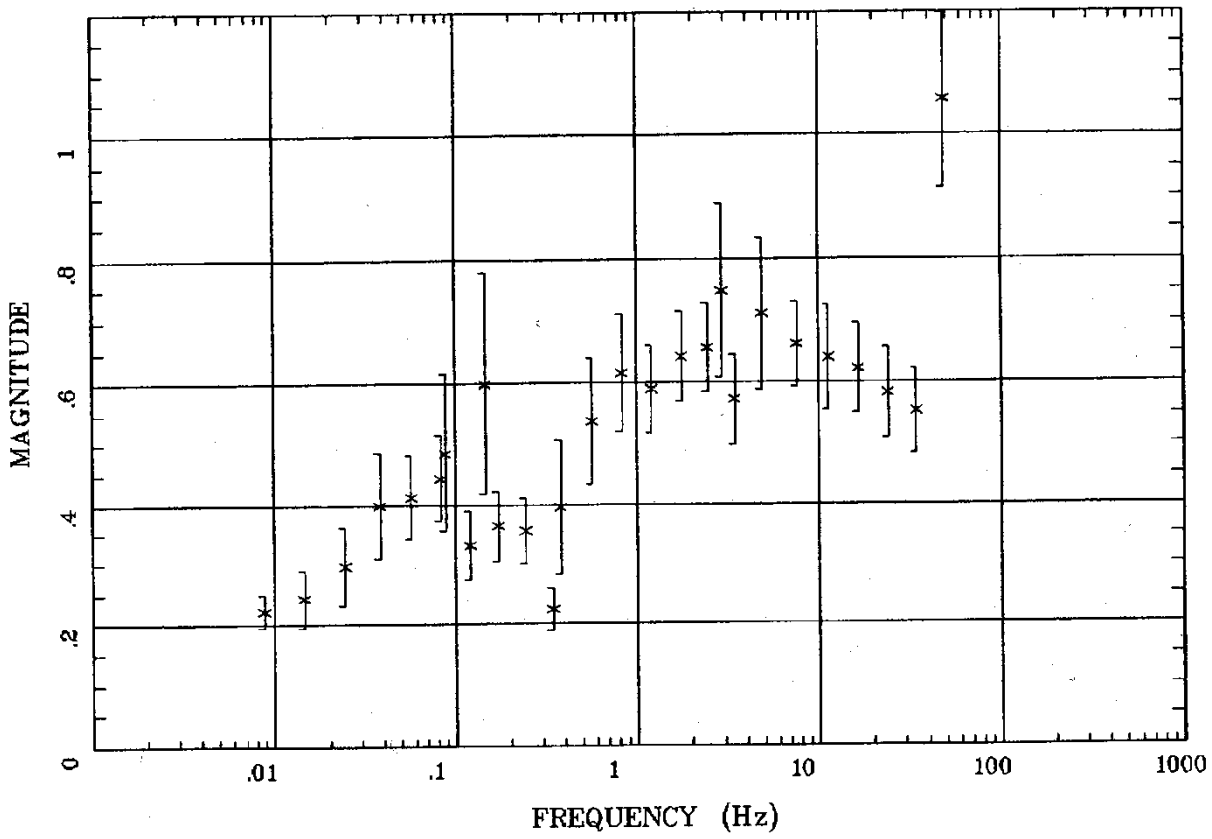
Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:54 Feb 09, 2011
< EMI – ElectroMagnetic Instruments >

Station 37

TIPPER MAGNITUDE

Wendover, Utah



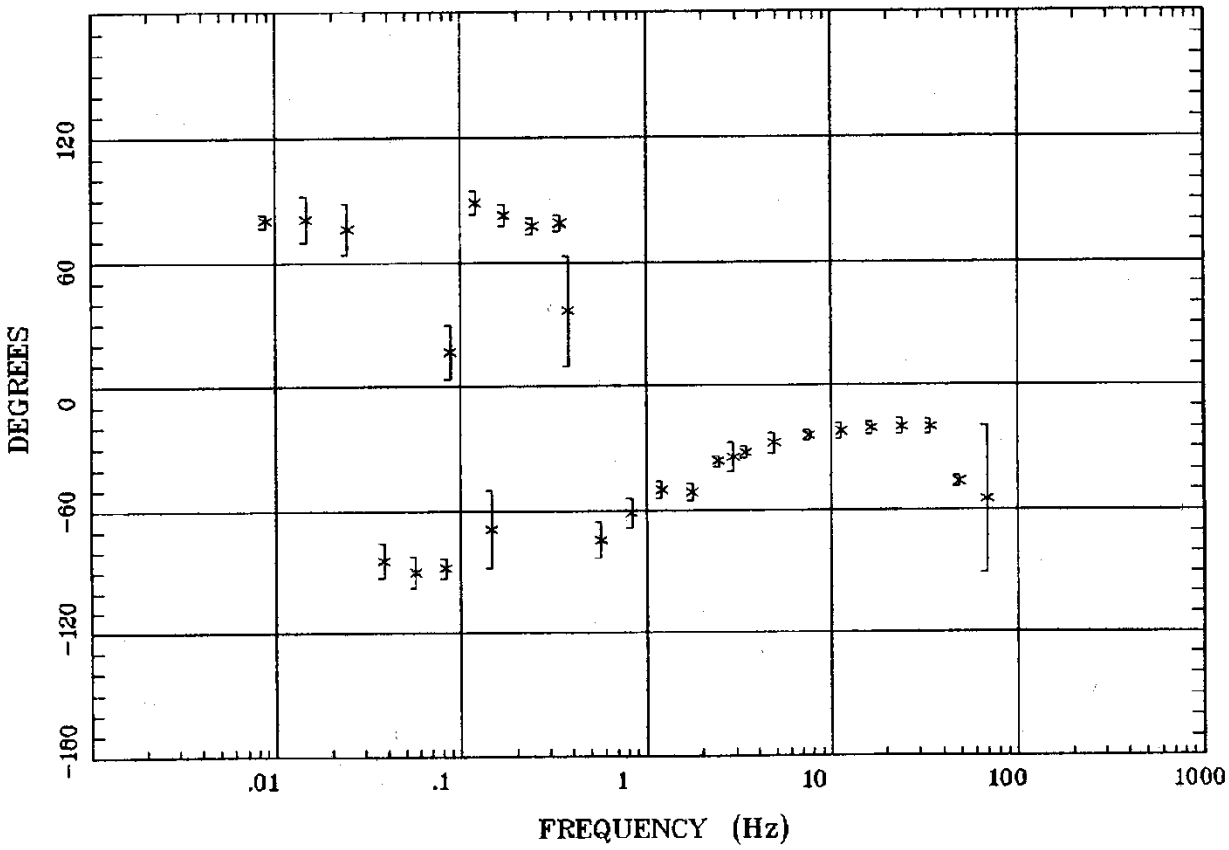
Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:54 Feb 09, 2011
< EMI - ElectroMagnetic Instruments >

Station 37

TIPPER STRIKE

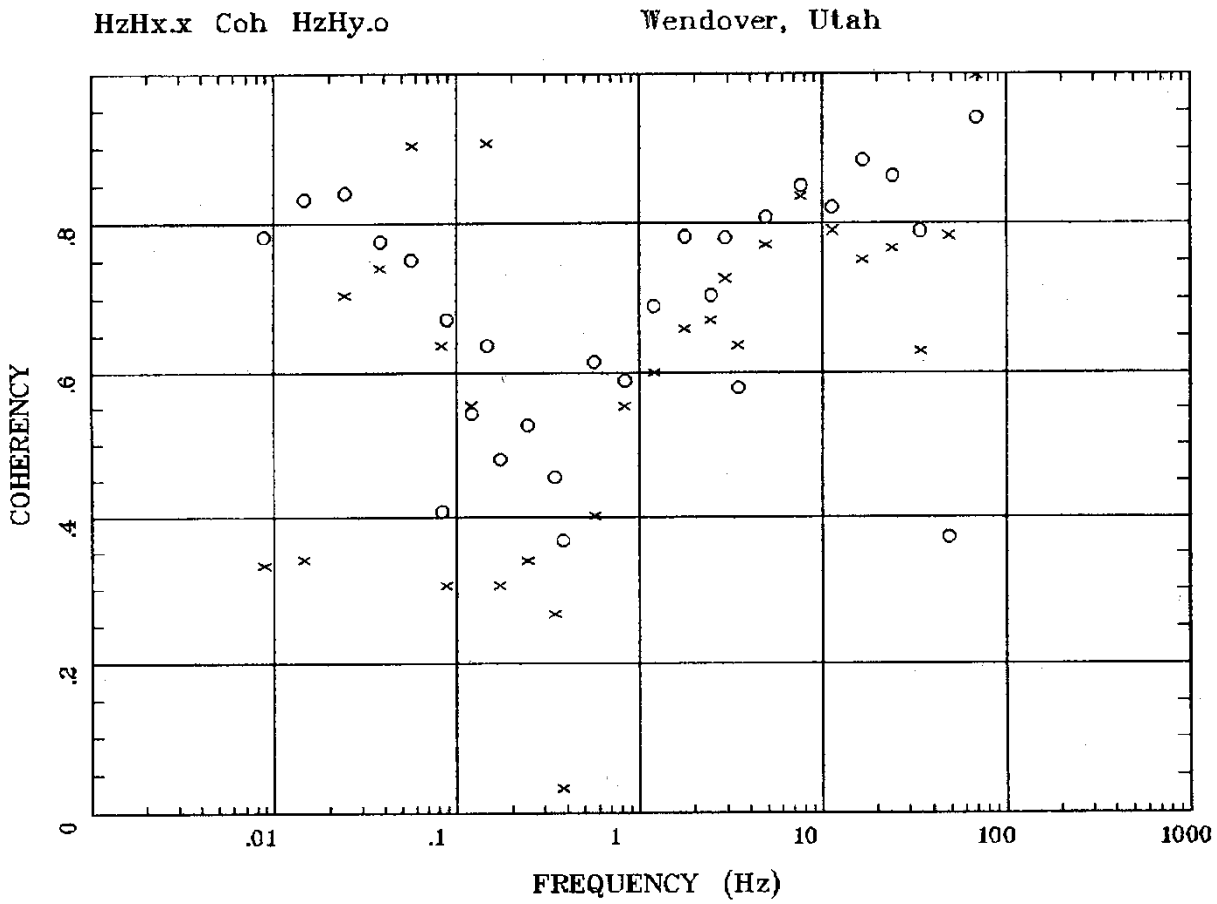
Wendover, Utah



Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:54 Feb 09, 2011
< EMI – ElectroMagnetic Instruments >

Station 37

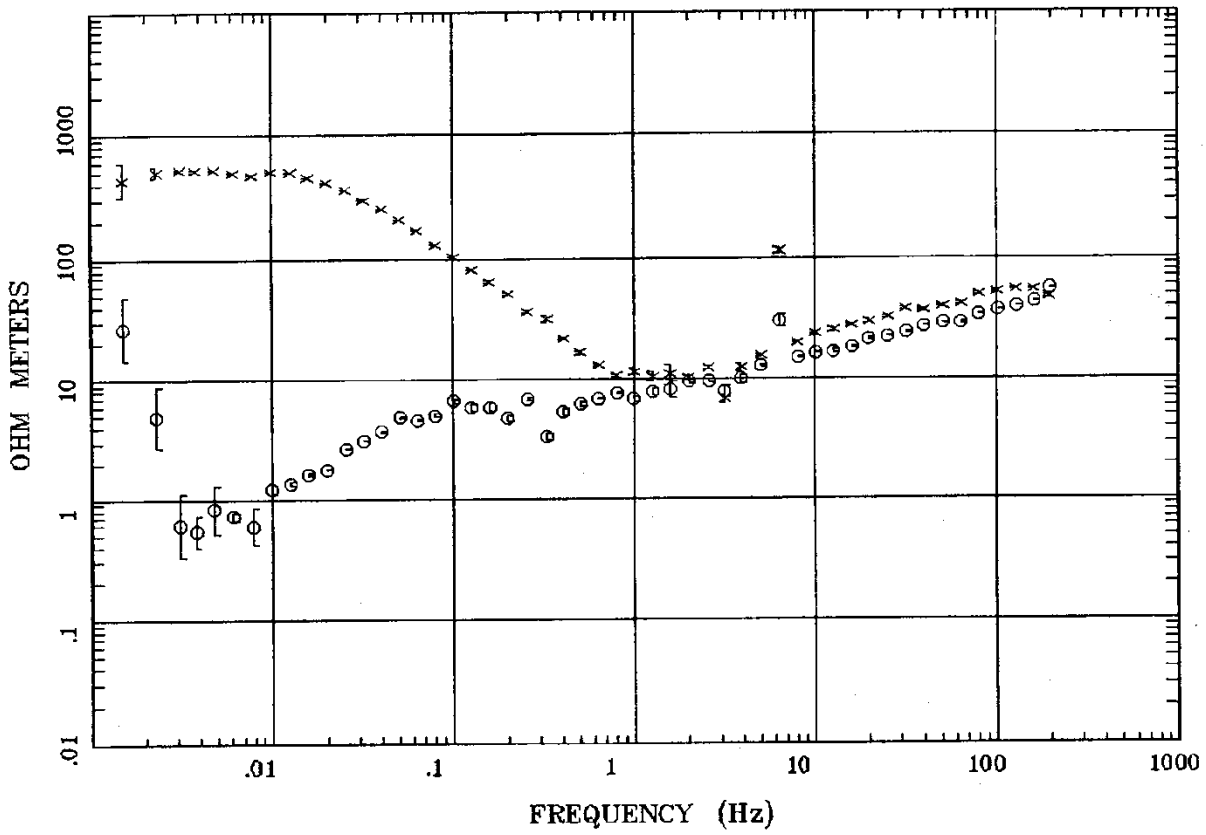


Client: MRP
Remote: none
Acquired: 13:3 Sep 17, 2009
Survey Co:USGS

Rotation:
Filename: ap37.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 14:54 Feb 09, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

APPARENT RESISTIVITY

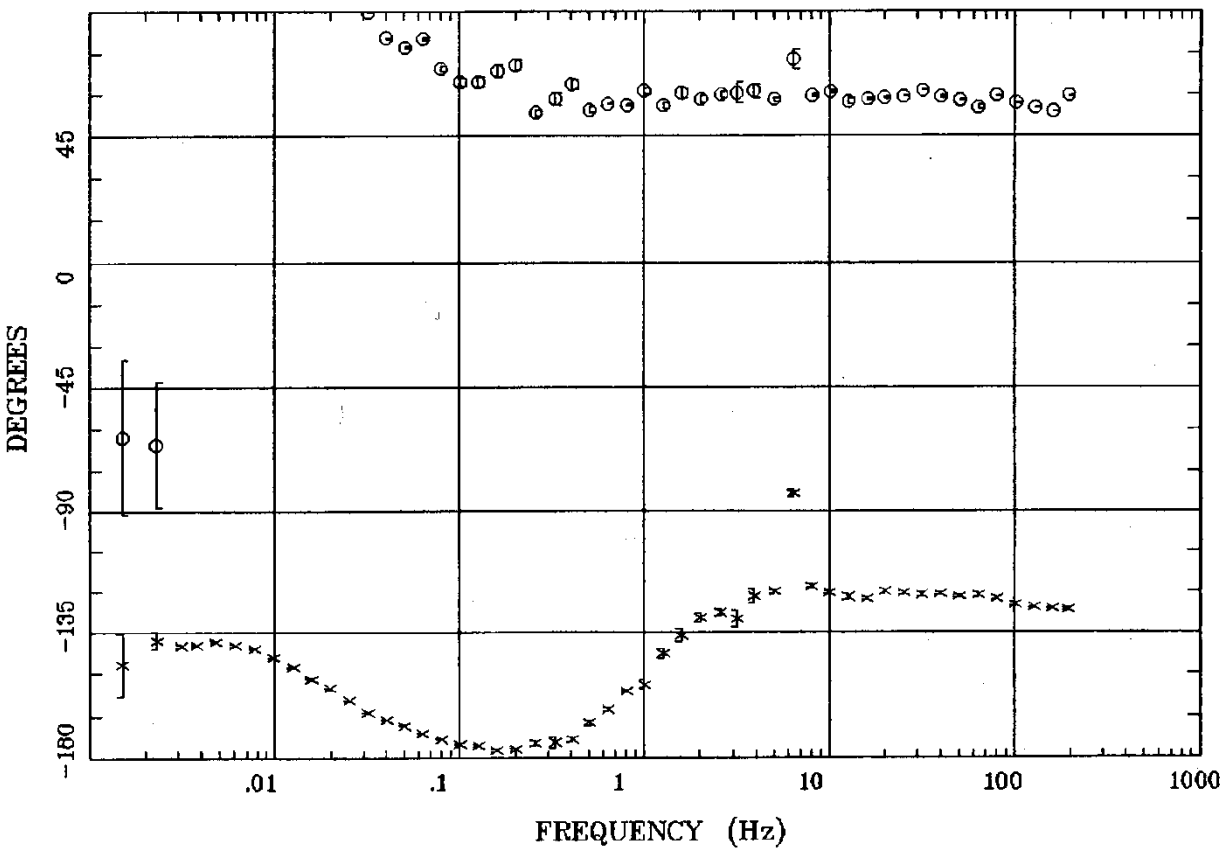


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

IMPEDANCE PHASE

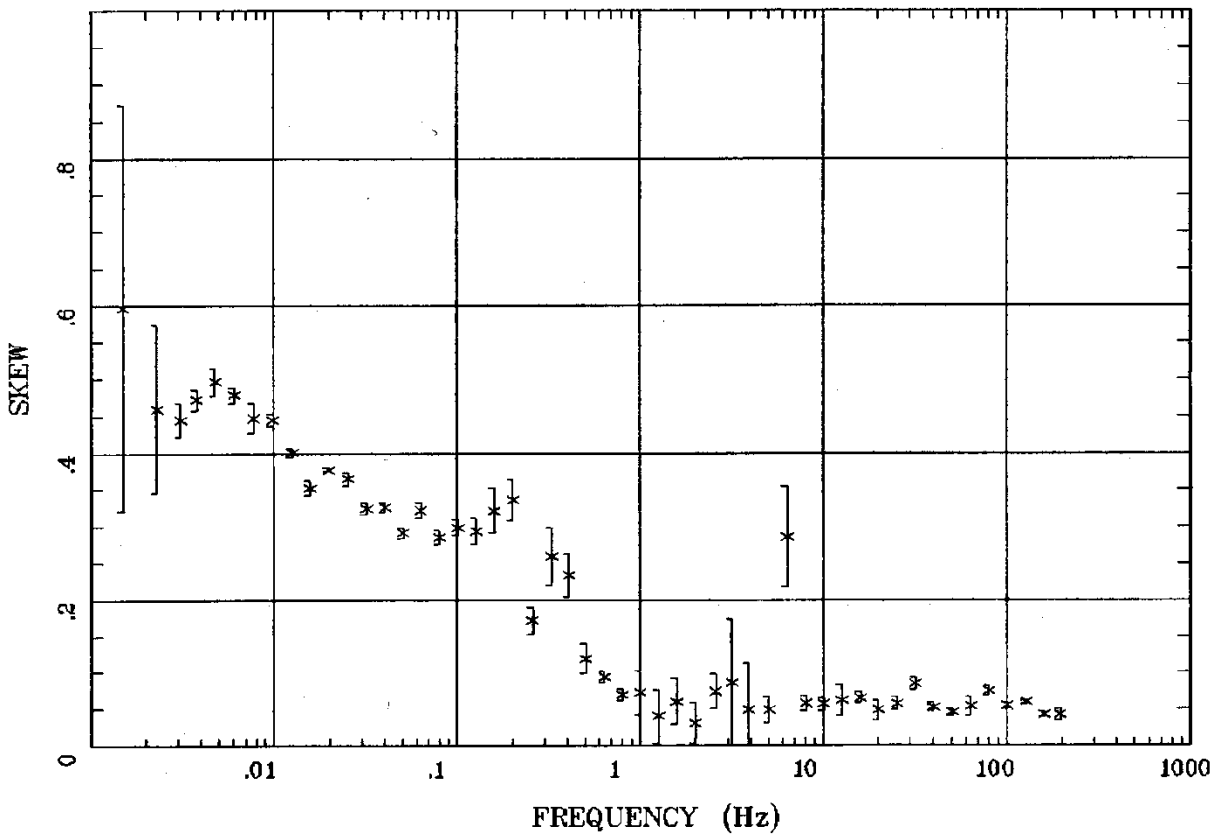


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

IMPEDANCE SKEW

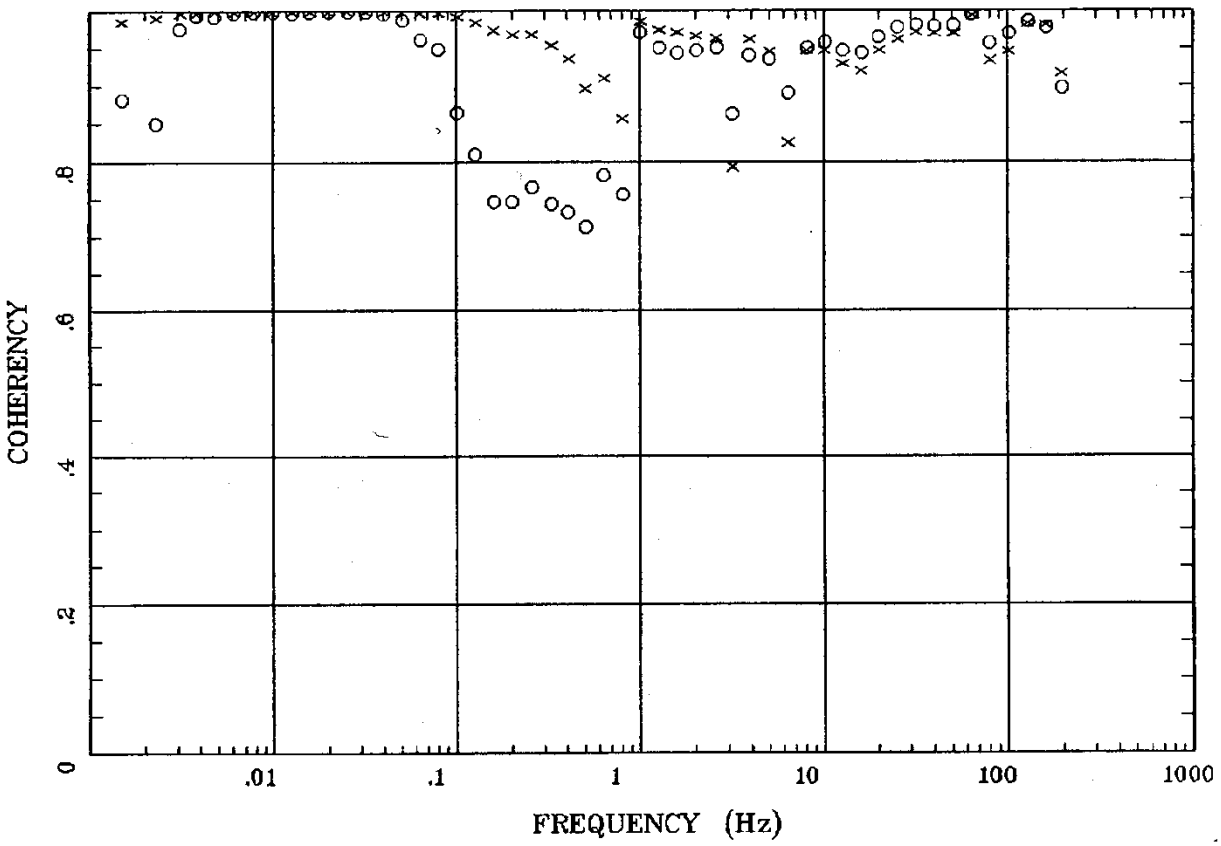


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

E MULT Coh.

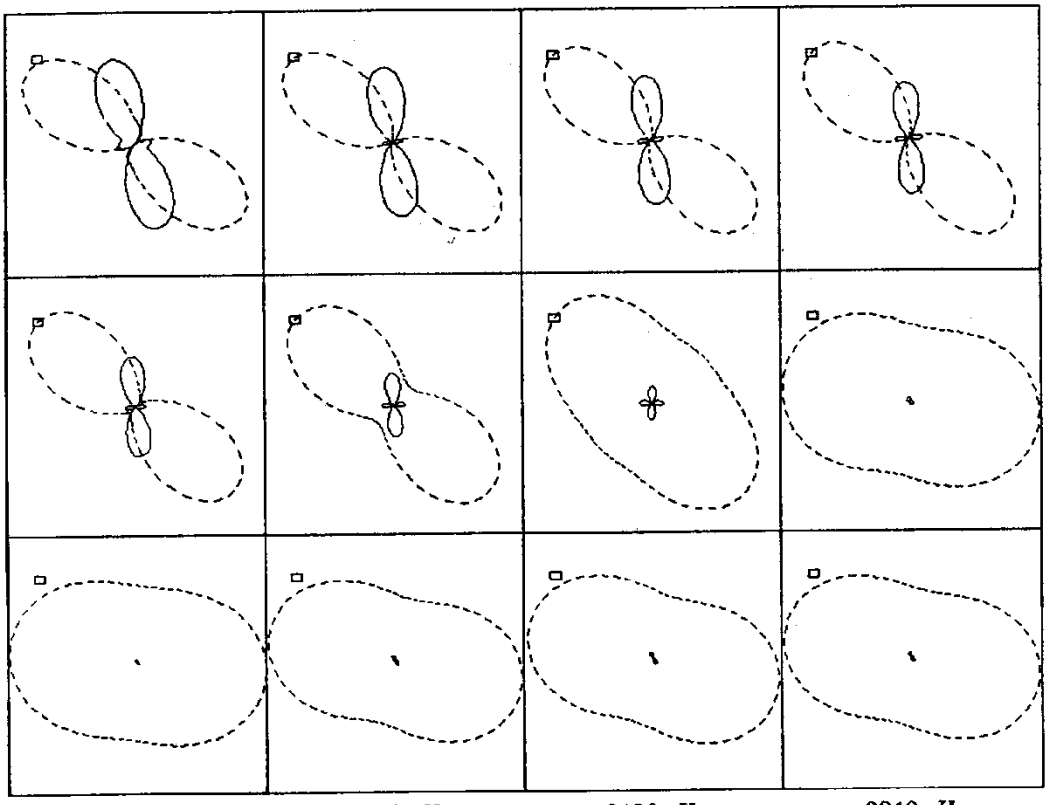


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

POLAR PLOTS



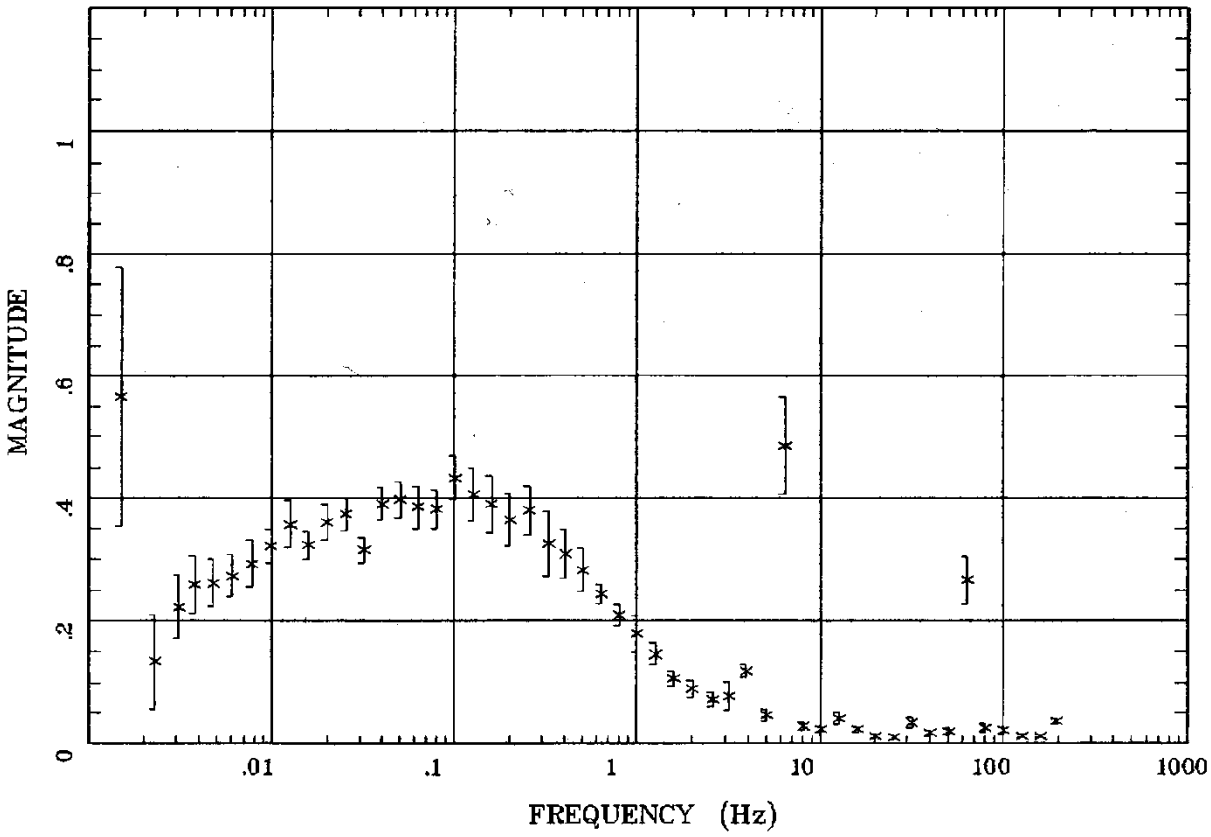
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.587 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

TIPPER MAGNITUDE

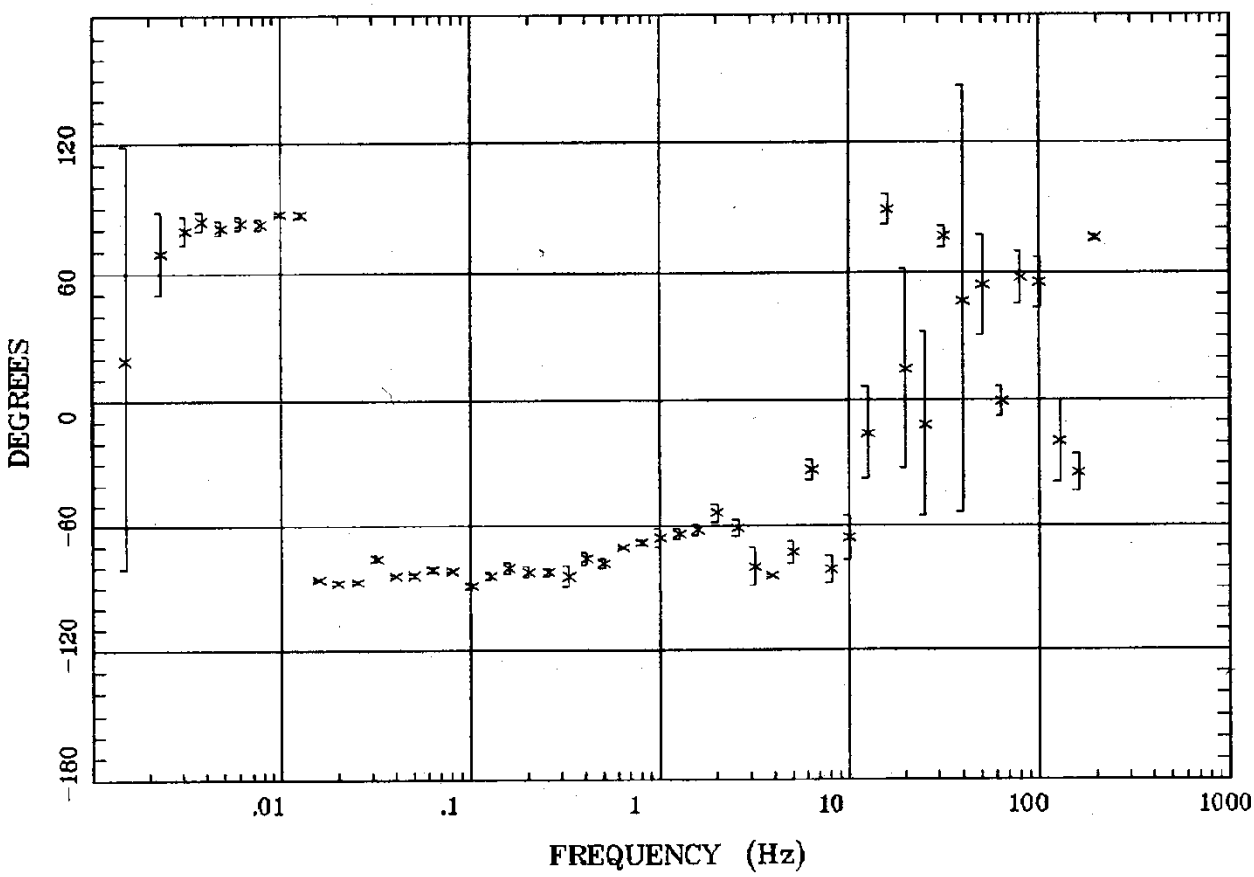


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

TIPPER STRIKE

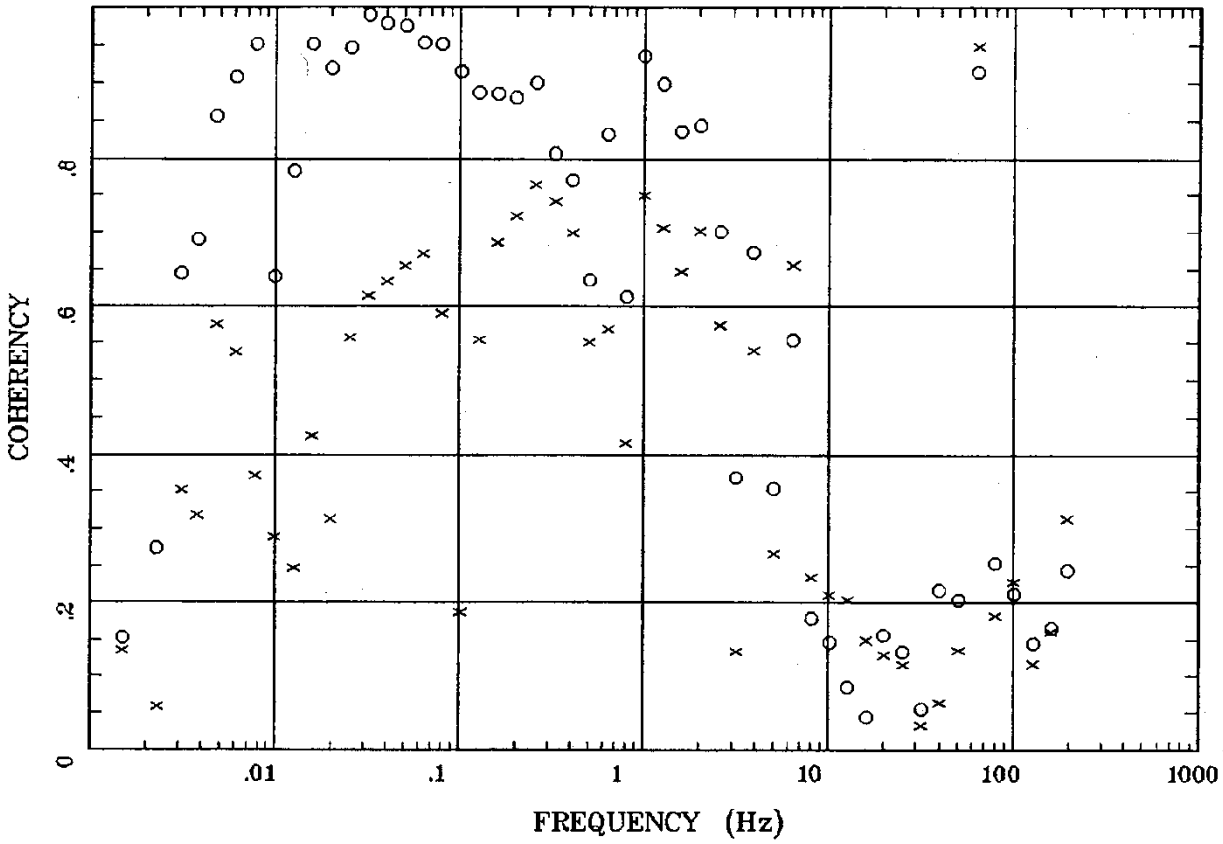


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 39

HzHx.x Coh HzHy.o

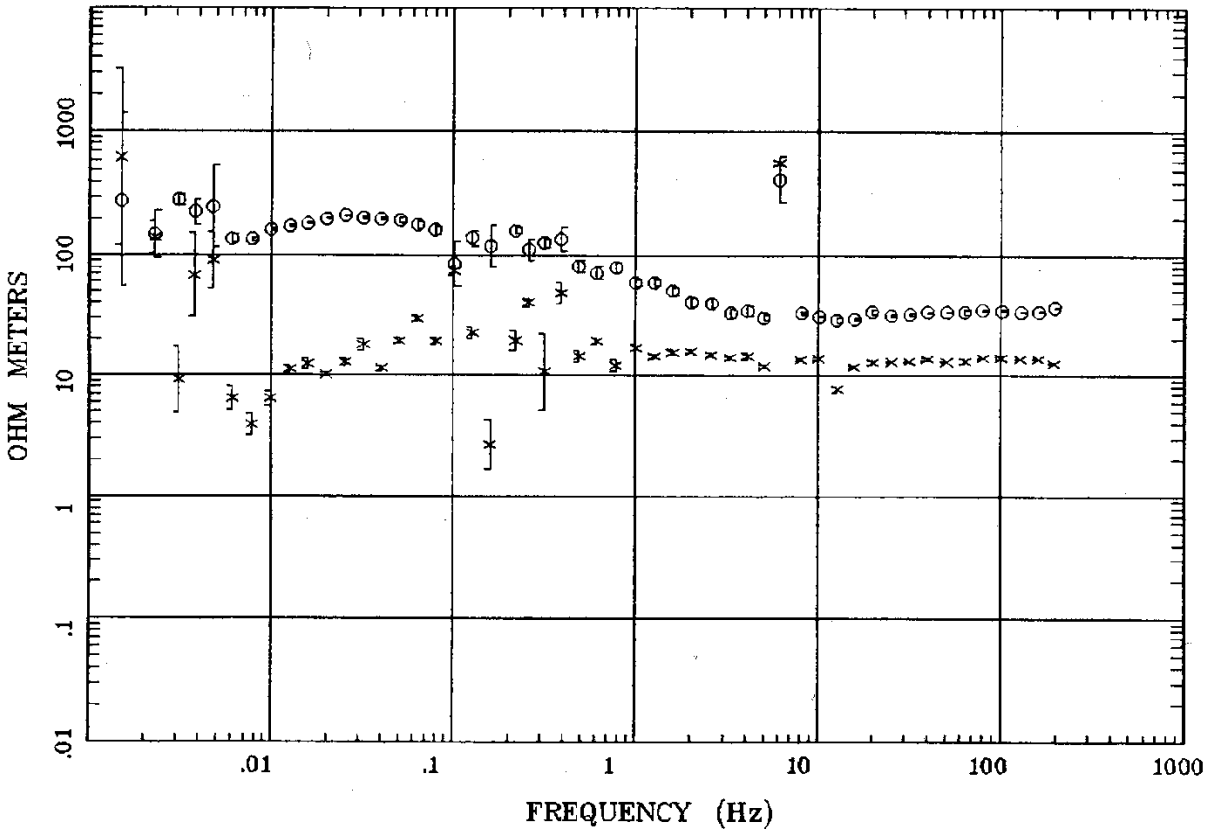


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap39-40s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:52 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

APPARENT RESISTIVITY

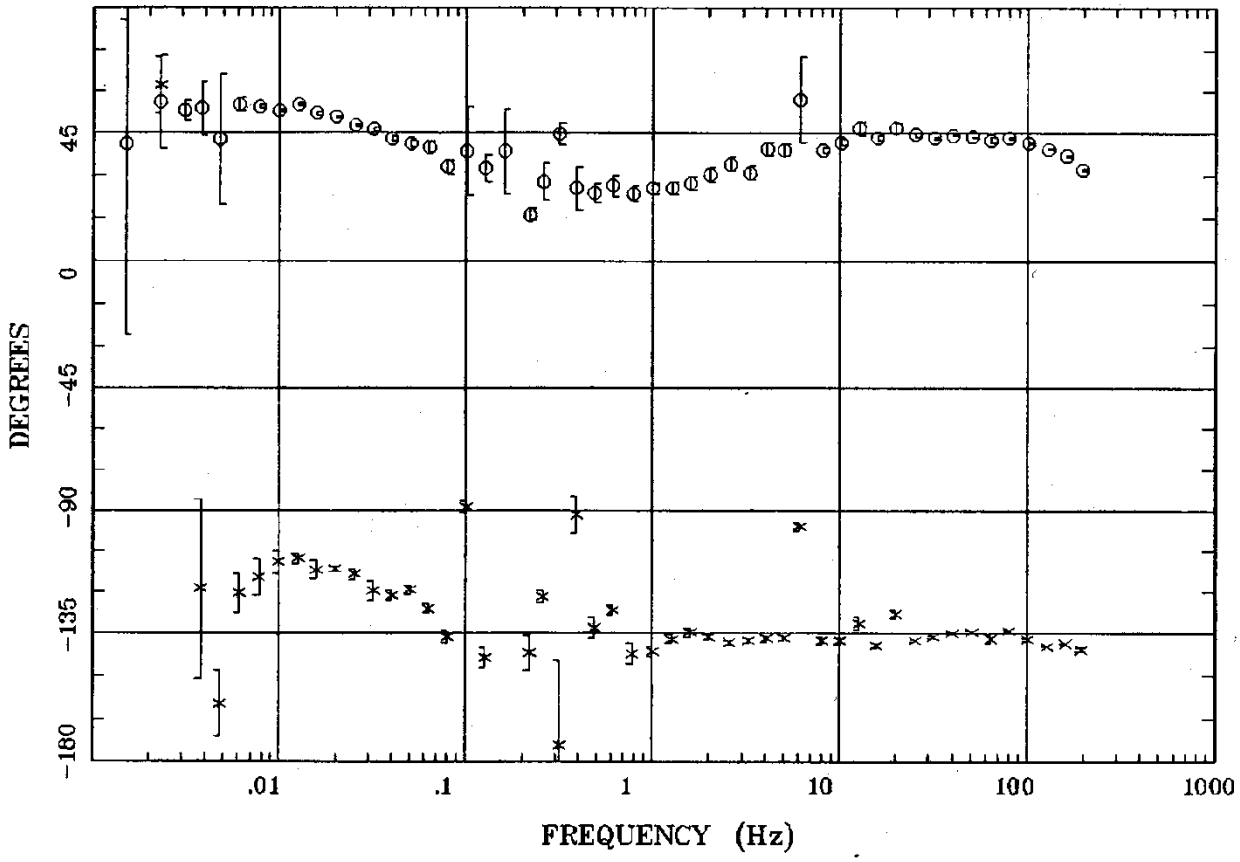


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

IMPEDANCE PHASE

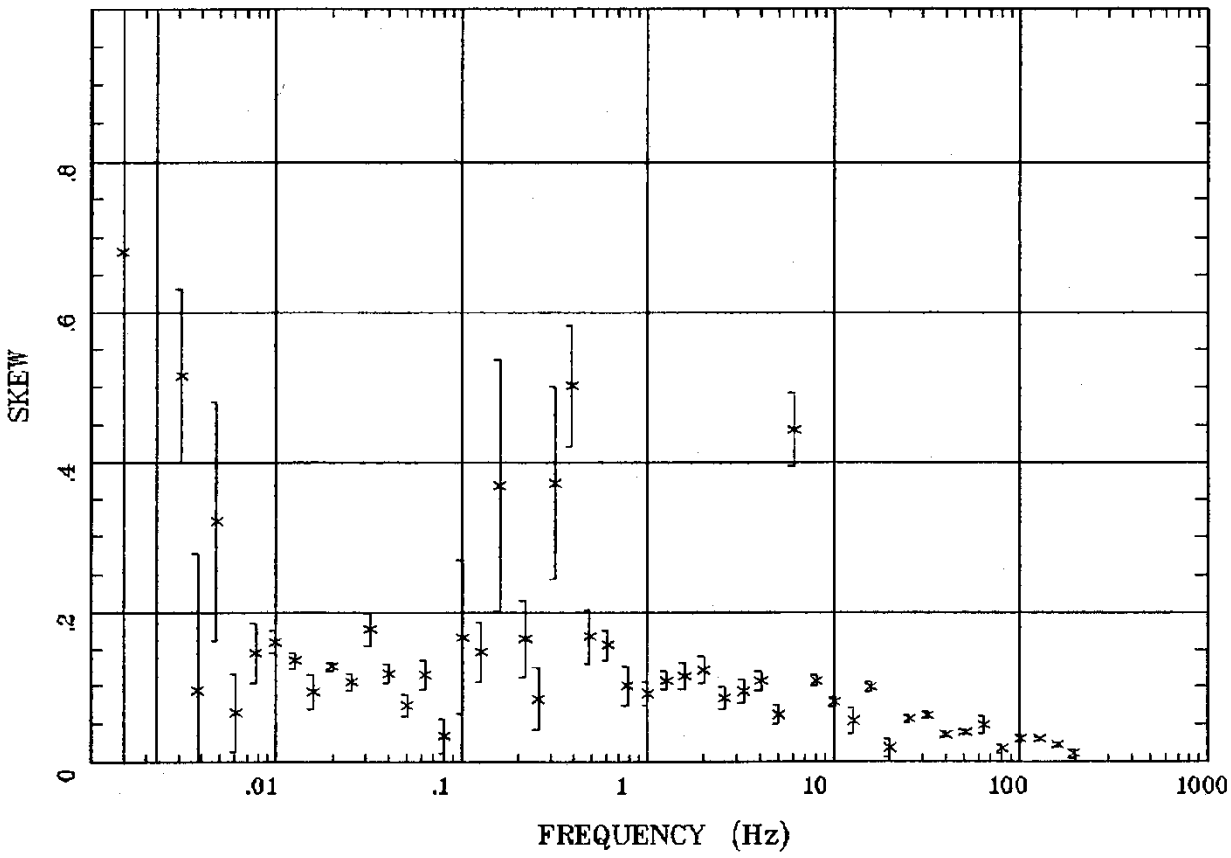


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

IMPEDANCE SKEW

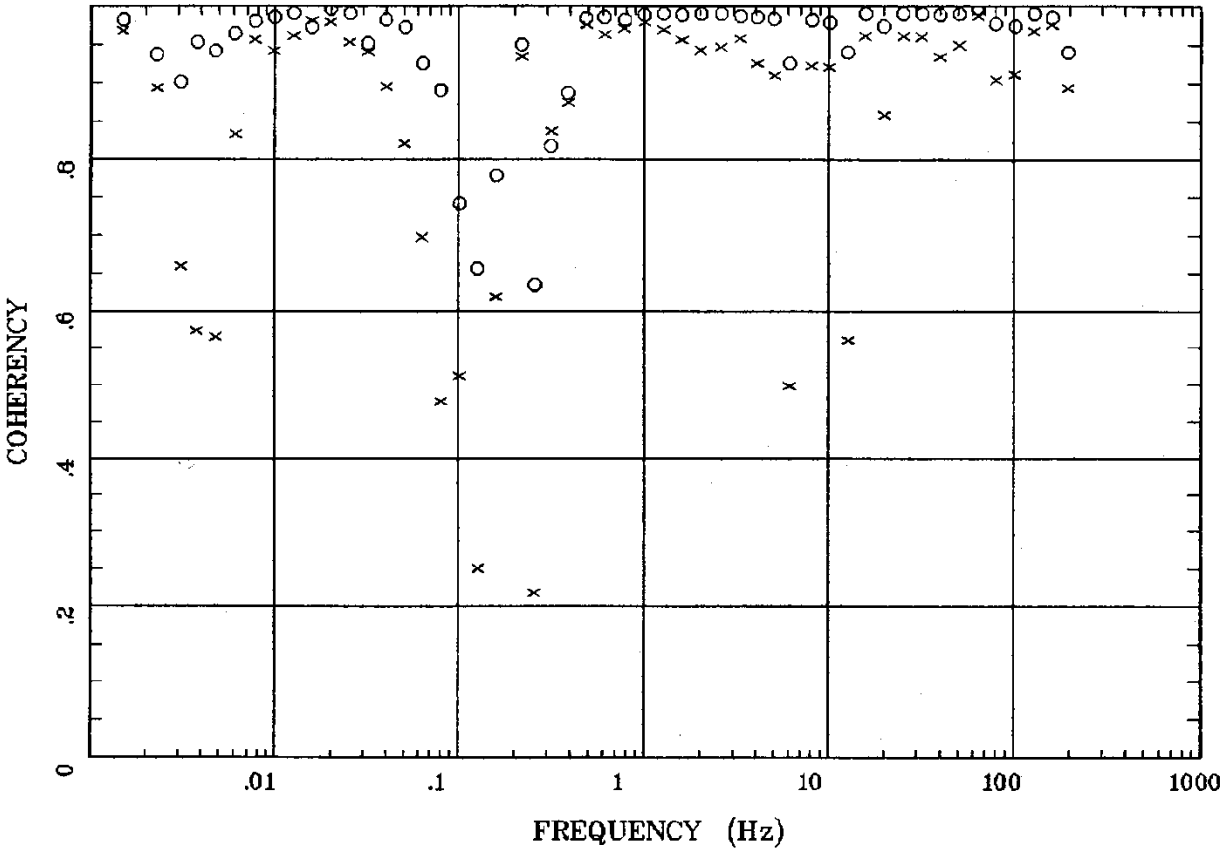


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

E MULT Coh.

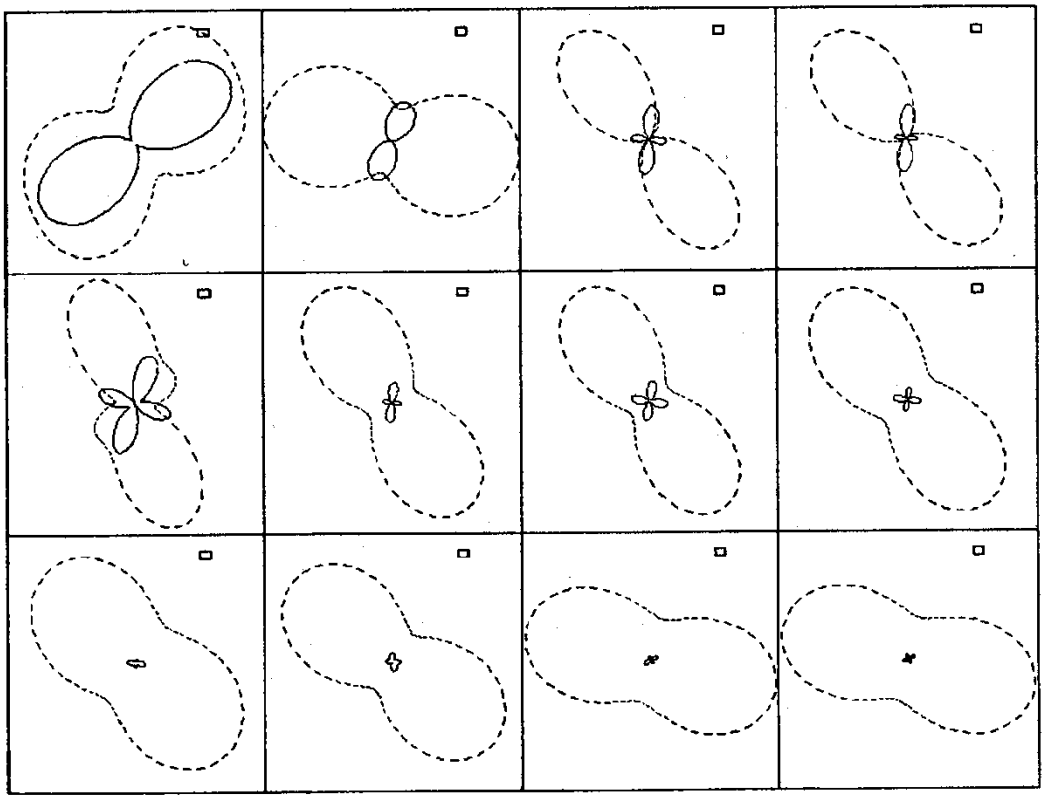


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

POLAR PLOTS



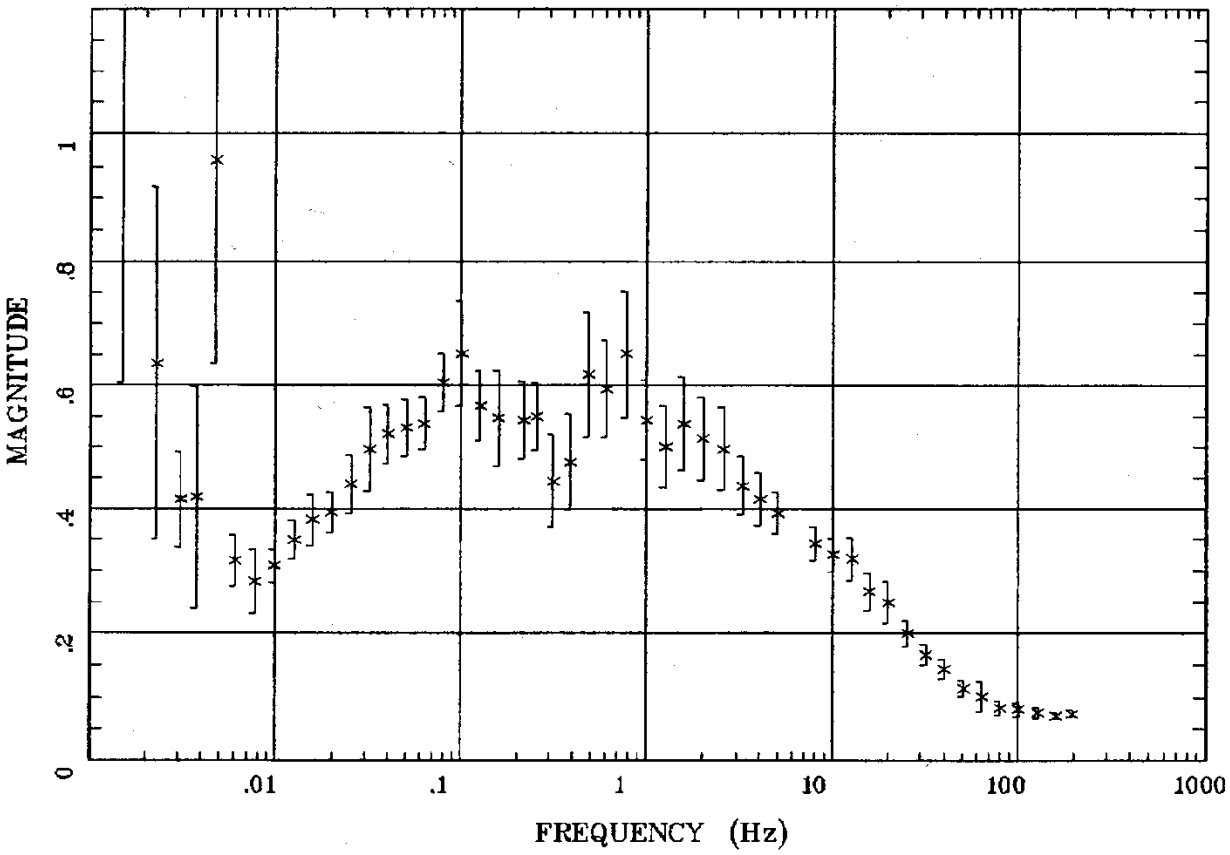
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.610 Hz	1.587 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

TIPPER MAGNITUDE

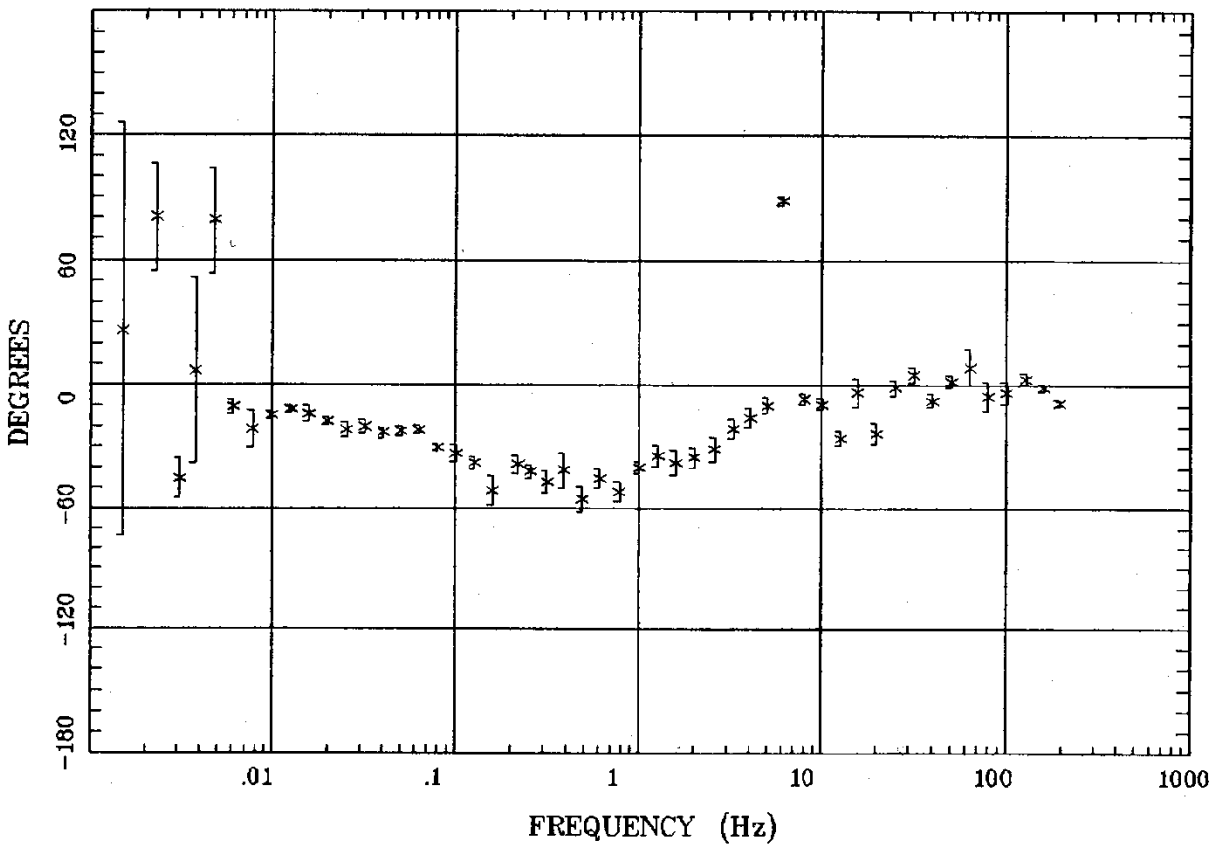


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

TIPPER STRIKE

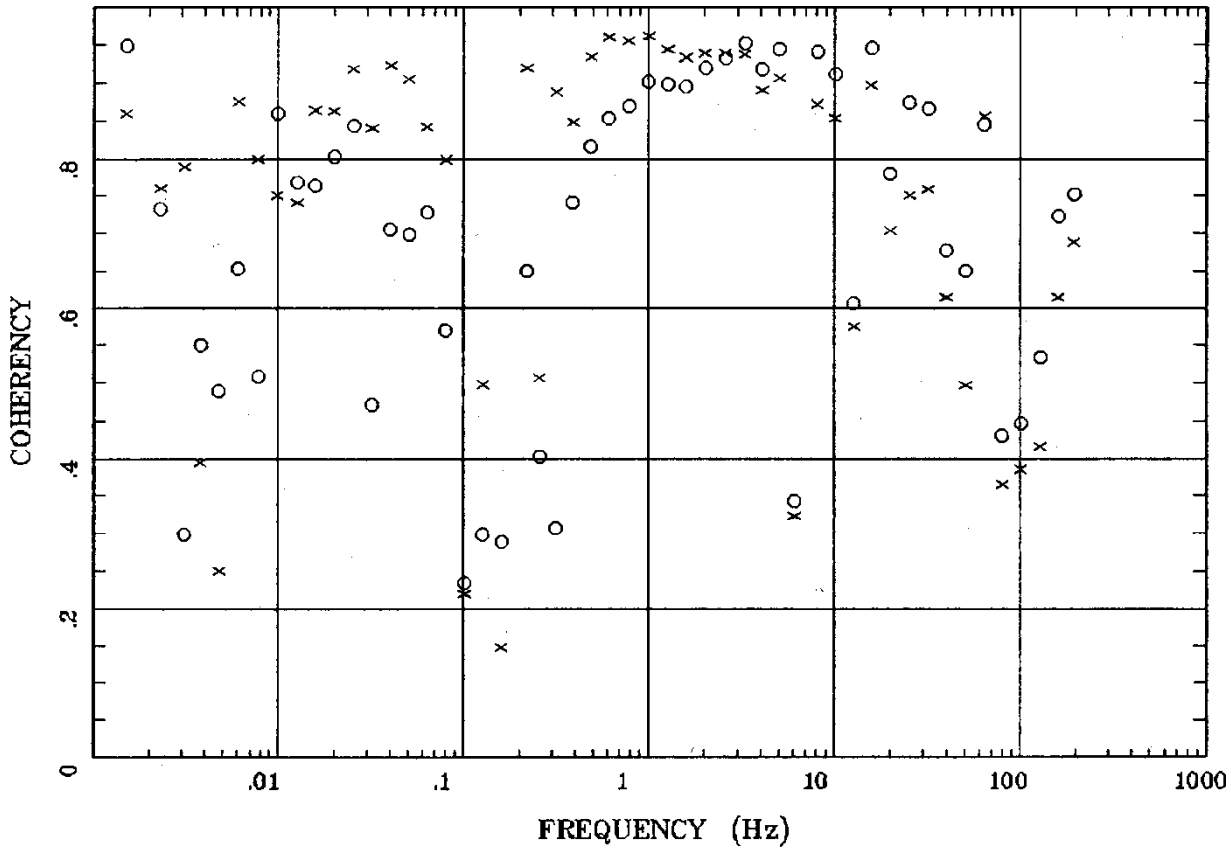


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 40

HzHx.x Coh HzHy.o

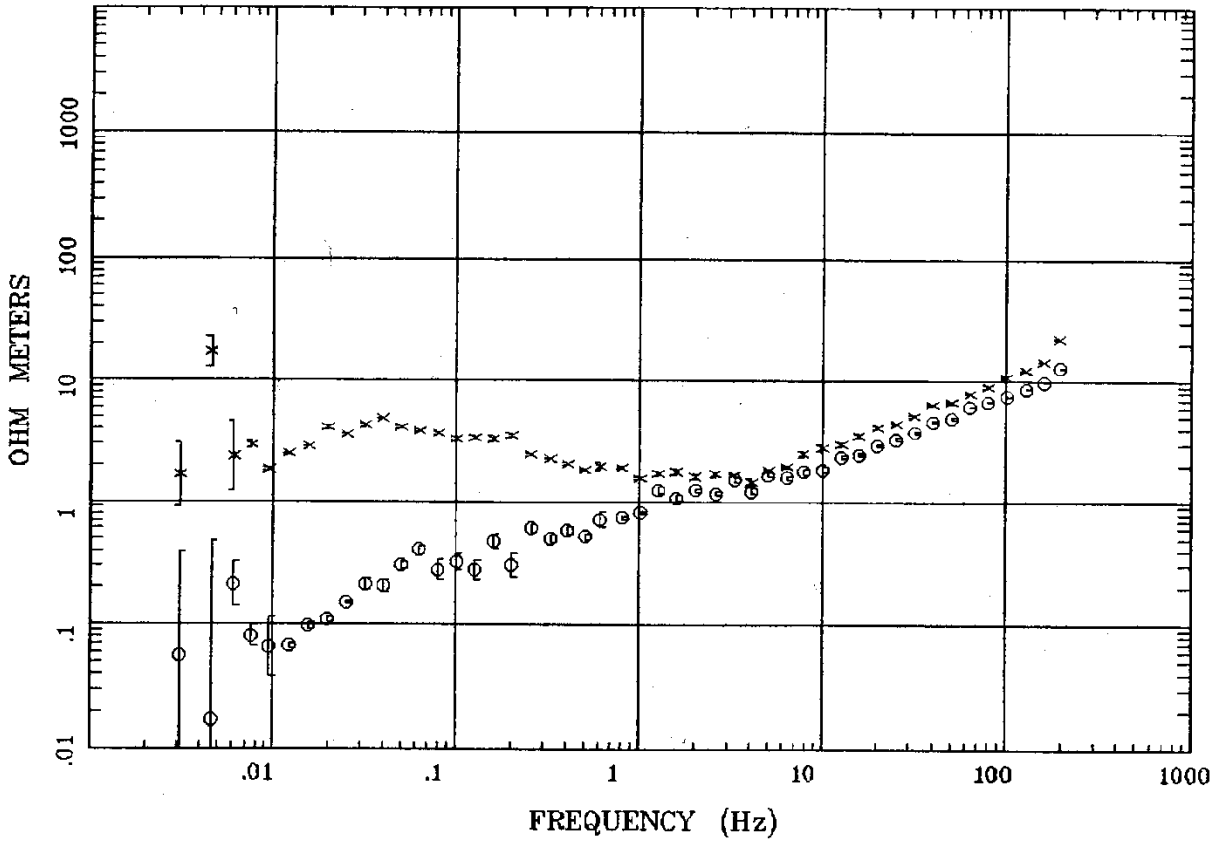


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap40-39s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

APPARENT RESISTIVITY

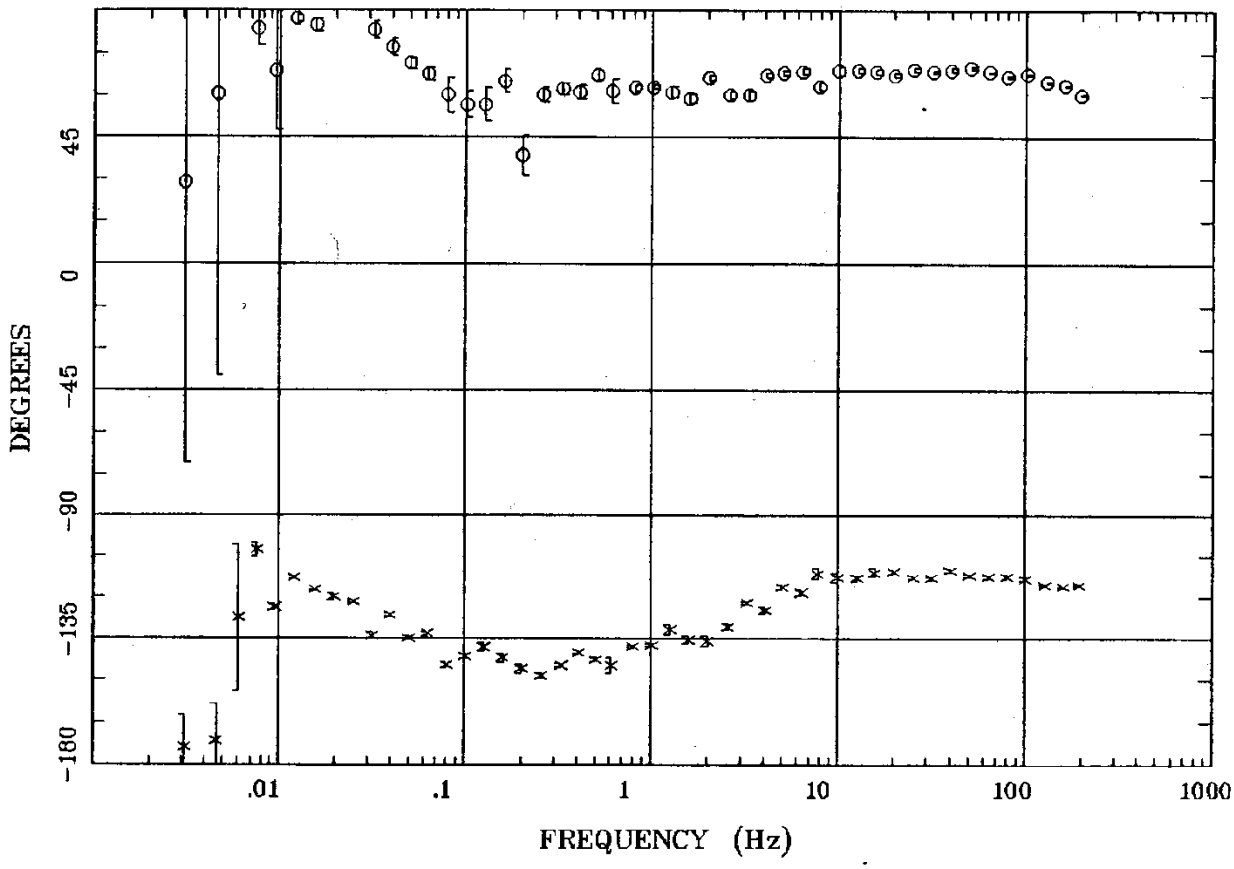


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

IMPEDANCE PHASE

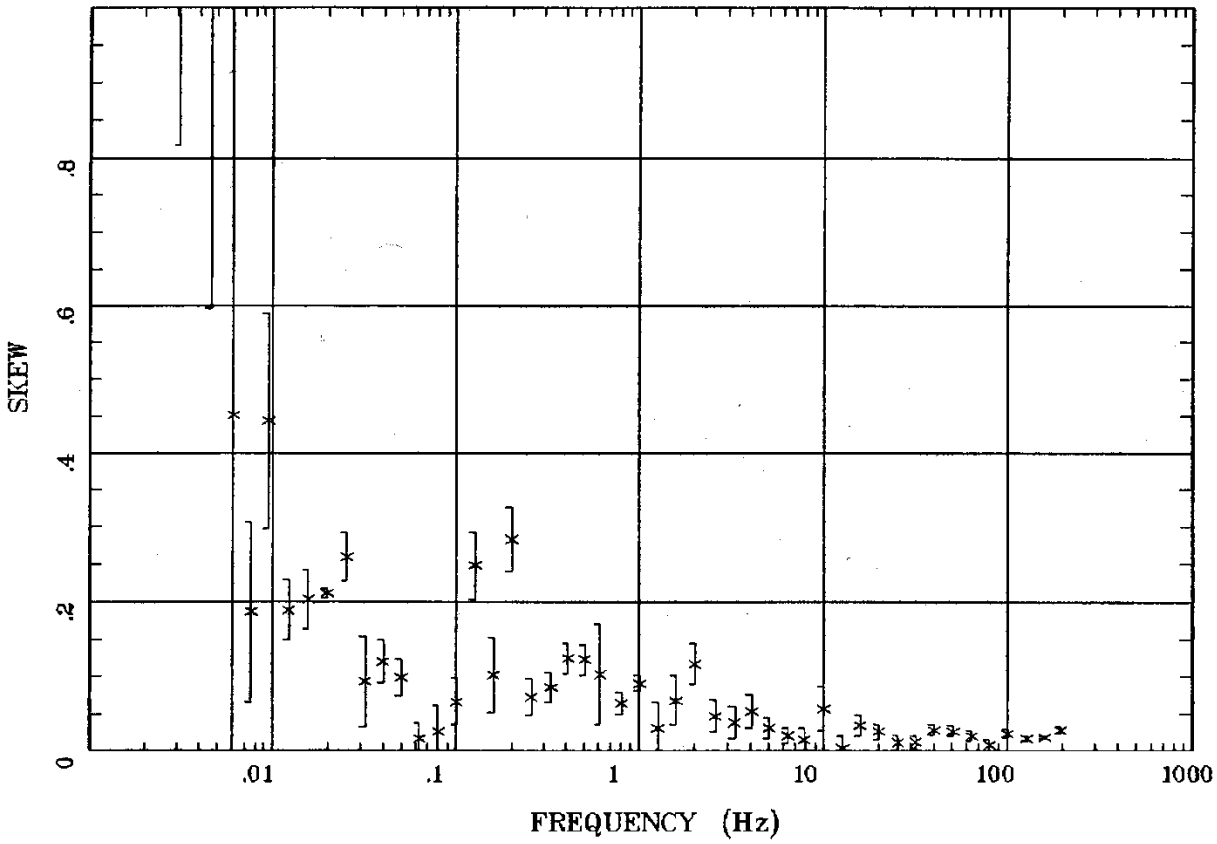


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

IMPEDANCE SKEW

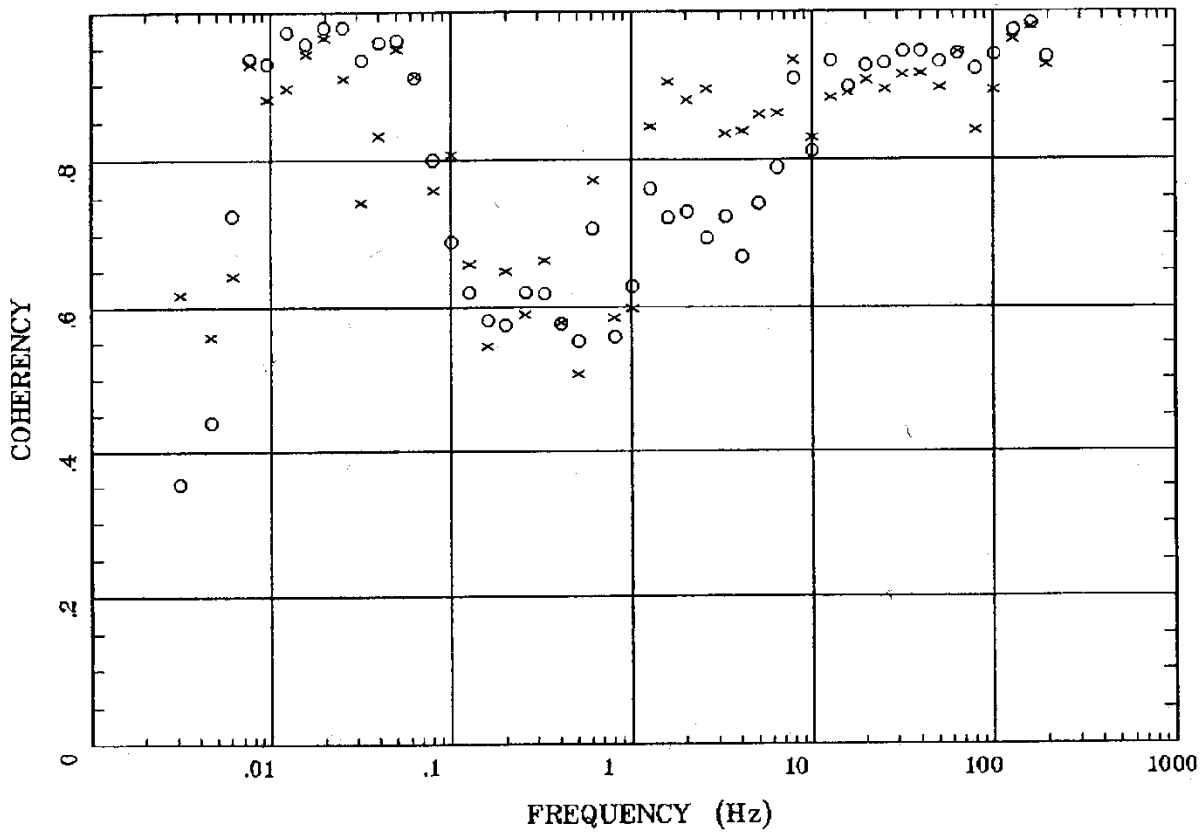


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

E MULT Coh.

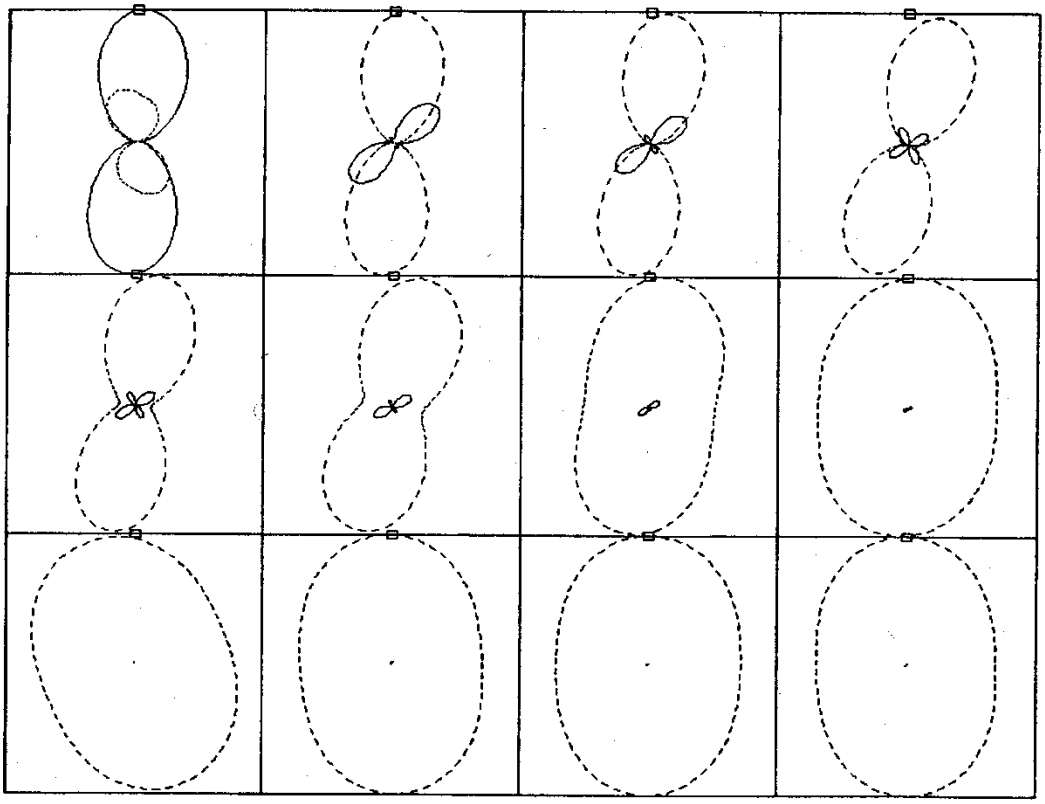


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

POLAR PLOTS



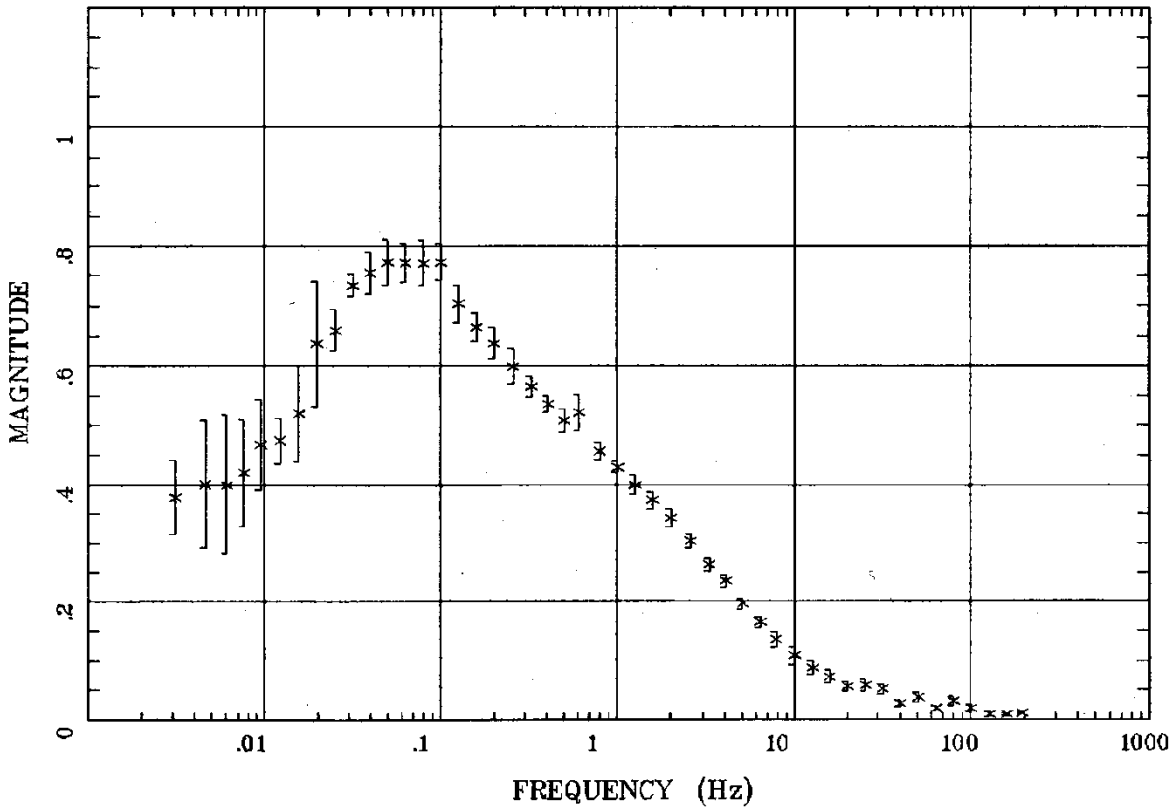
.0031 Hz	.0095 Hz	.0252 Hz	.0629 Hz
.160 Hz	.408 Hz	1.013 Hz	2.588 Hz
6.372 Hz	15.869 Hz	40.283 Hz	101 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

TIPPER MAGNITUDE

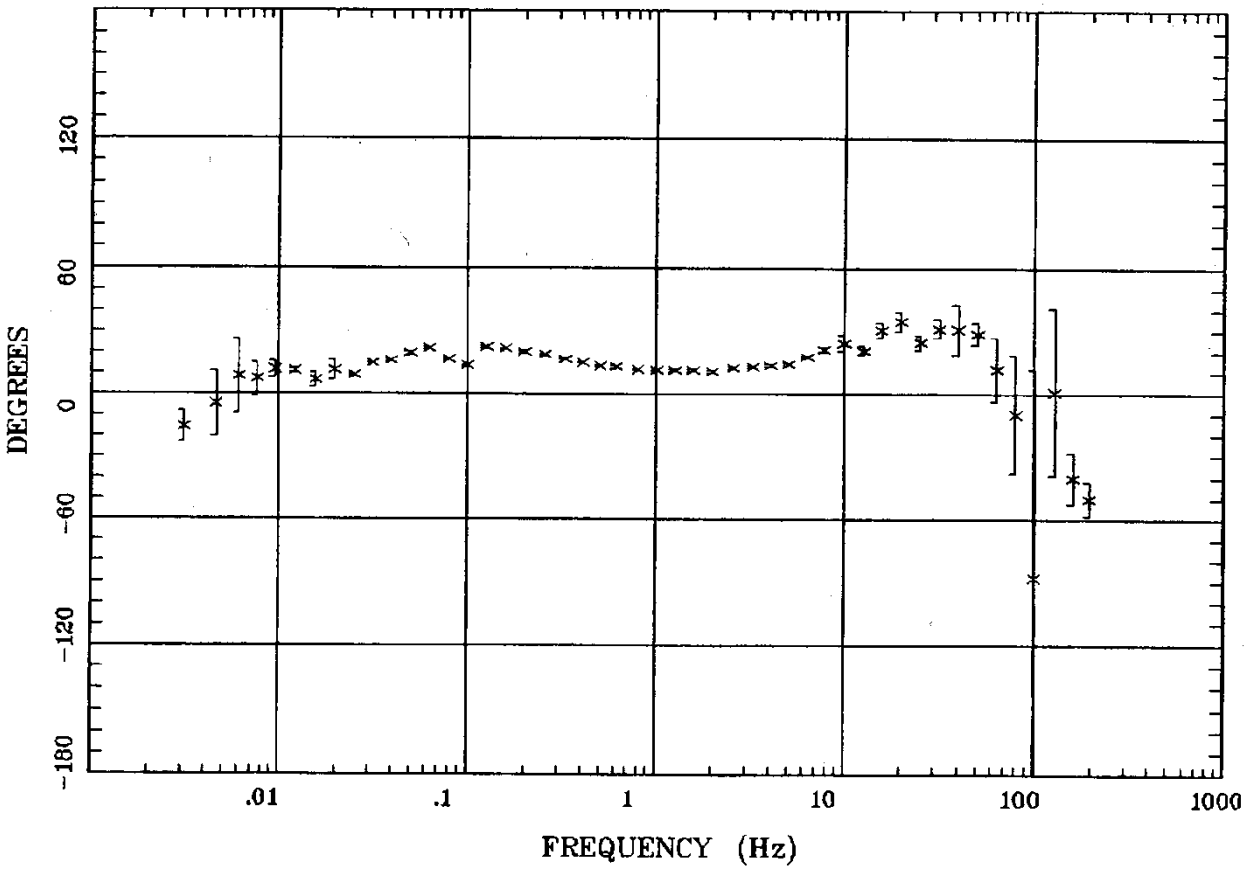


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

TIPPER STRIKE

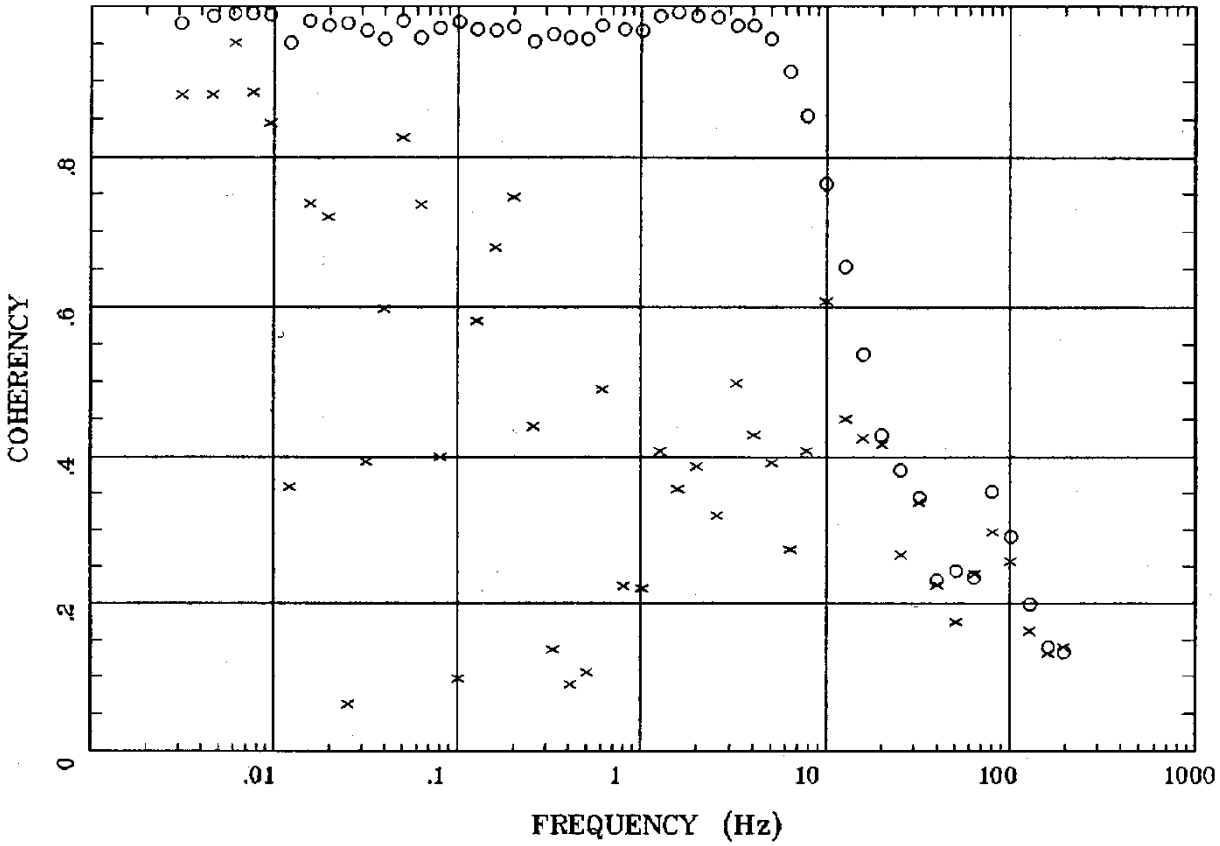


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 41

HzHx.x Coh HzHy.o

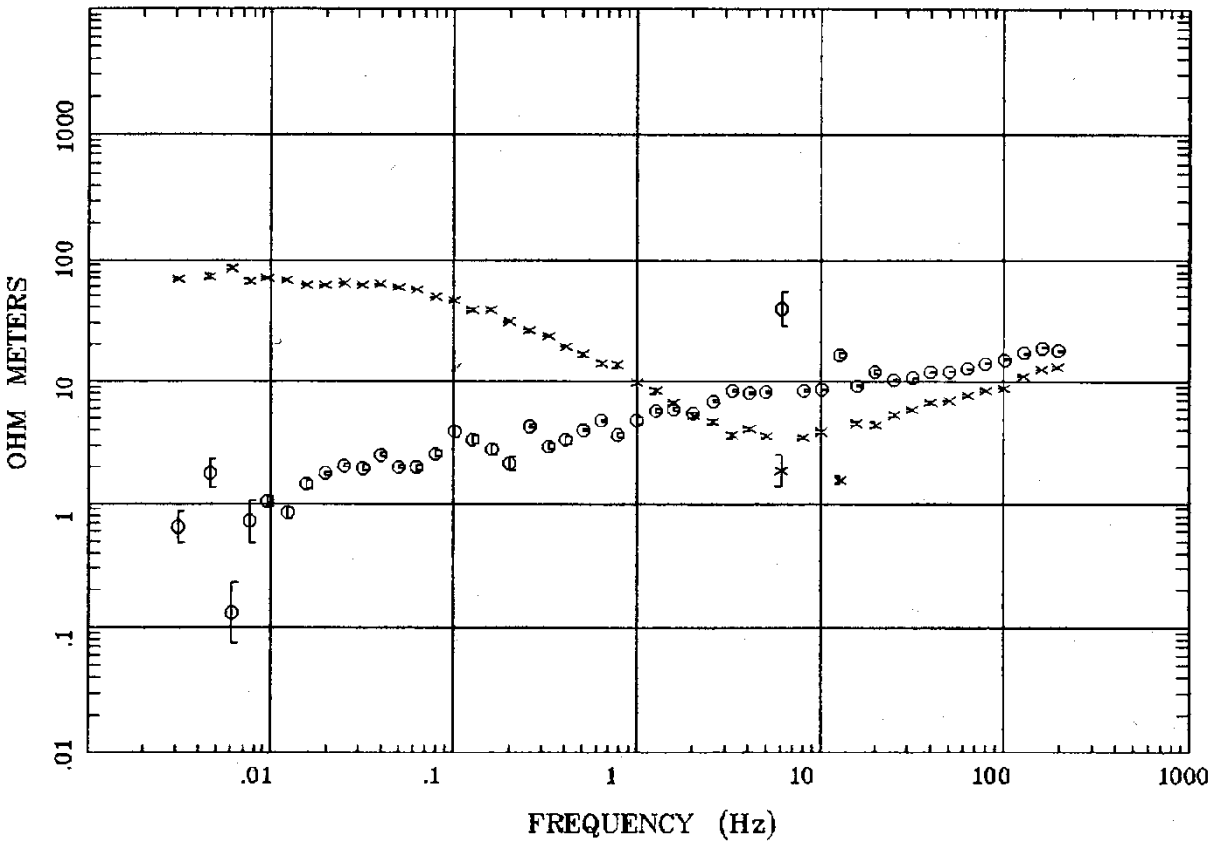


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap41-42s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:53 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 42

APPARENT RESISTIVITY

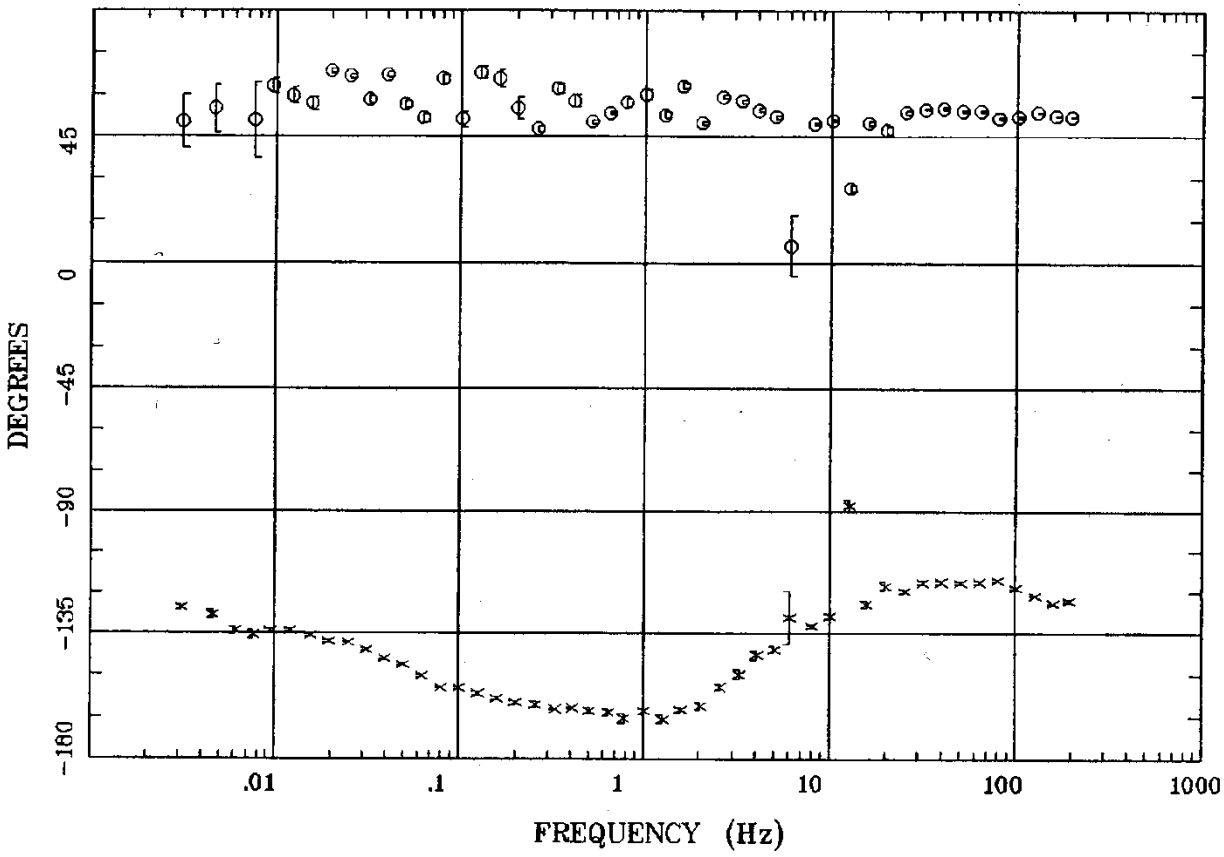


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

IMPEDANCE PHASE

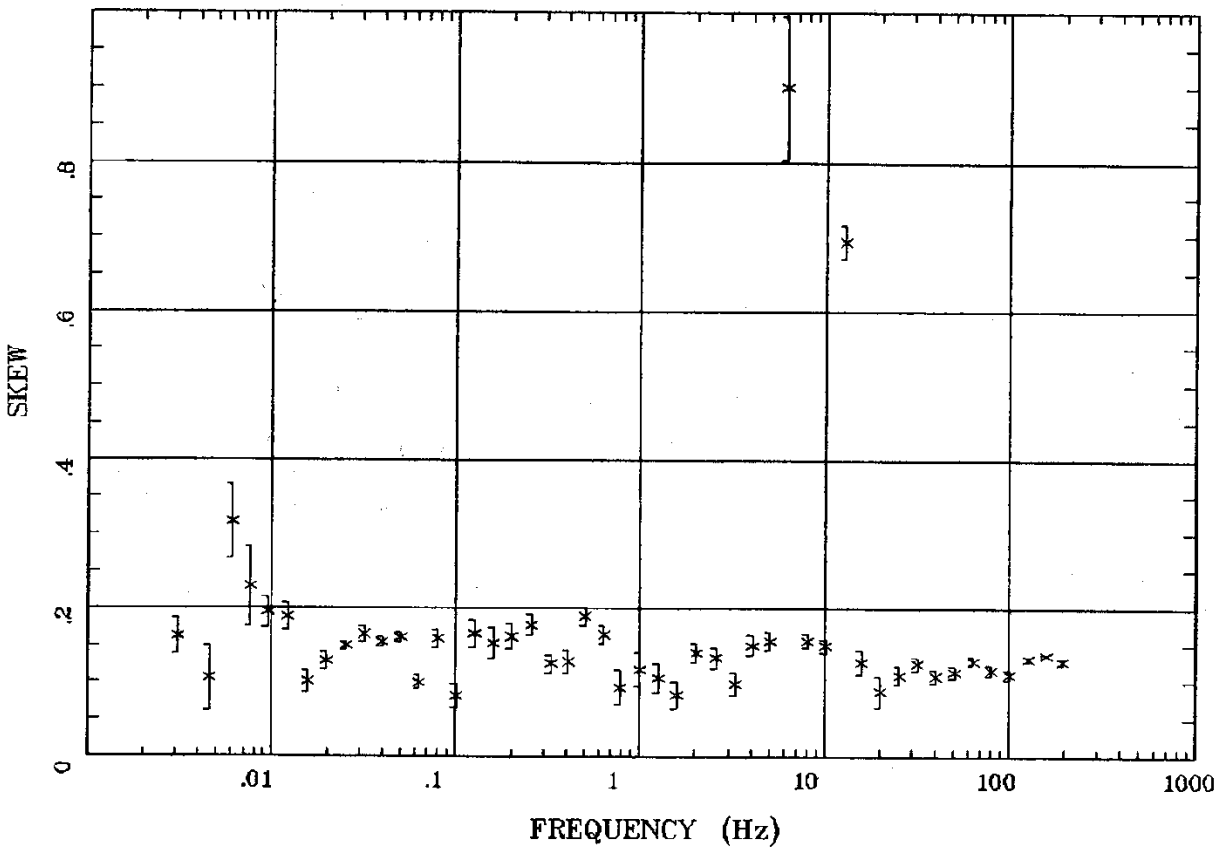


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

IMPEDANCE SKEW

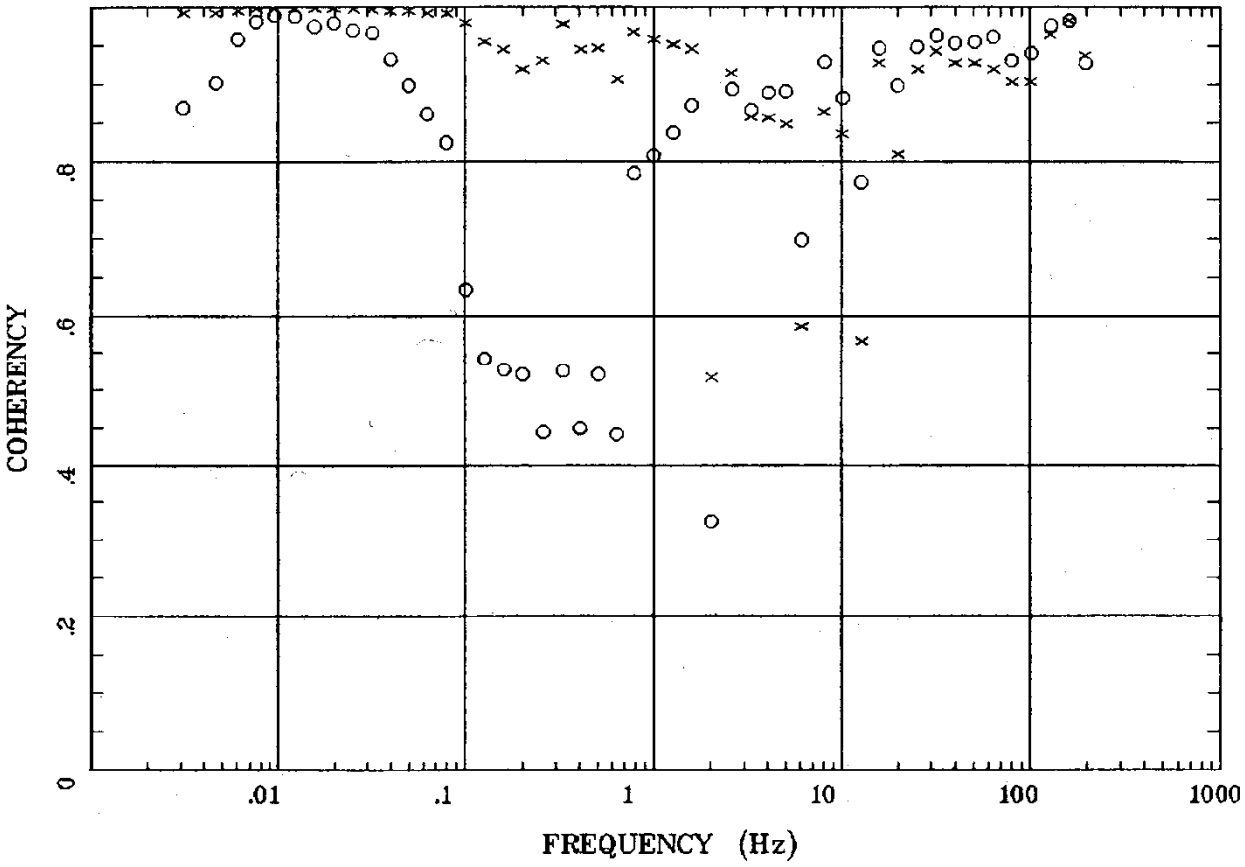


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

E MULT Coh.

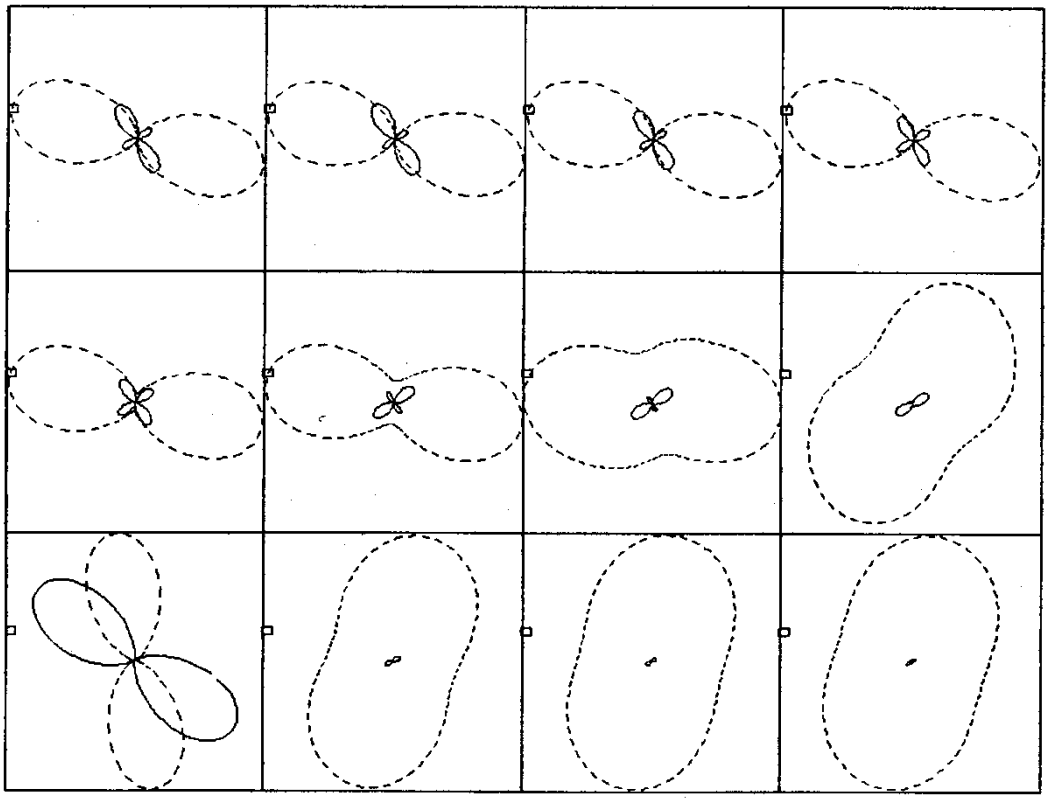


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

POLAR PLOTS



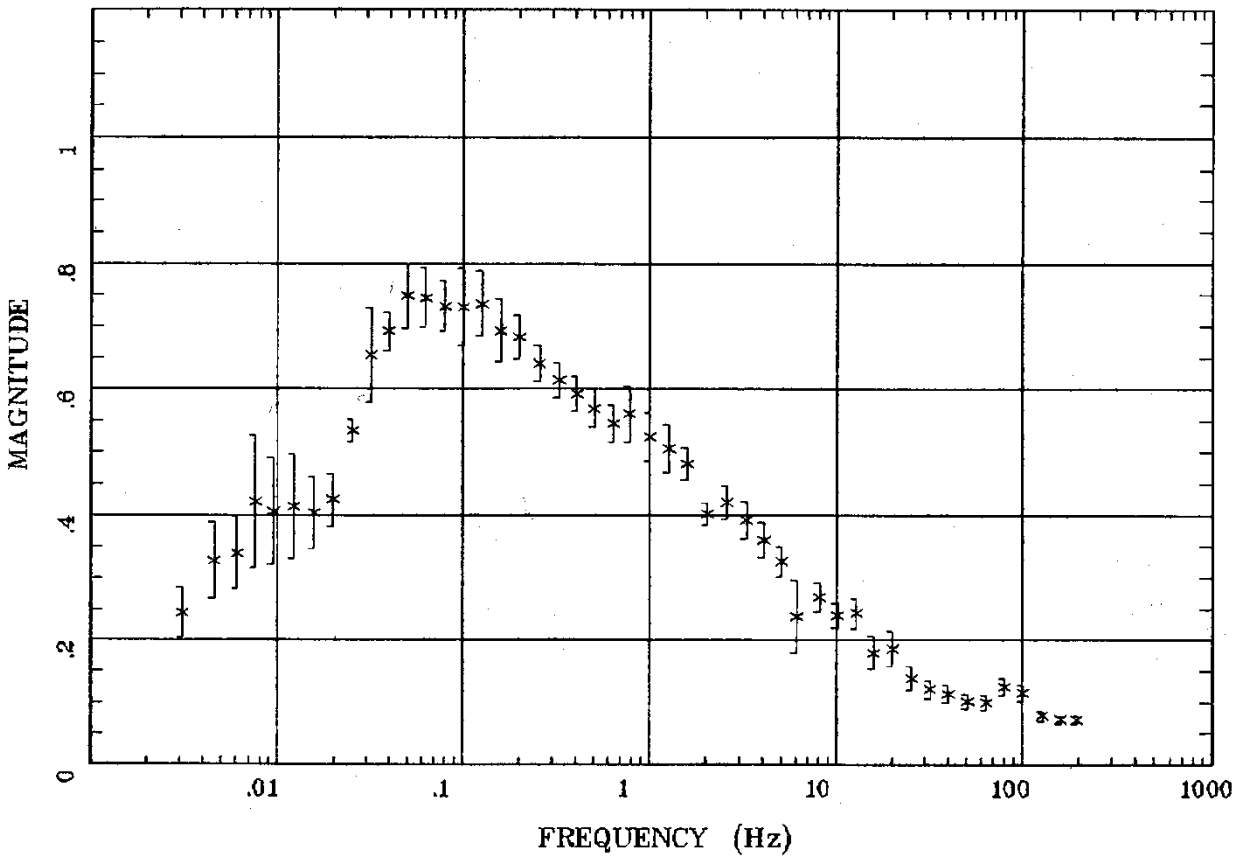
.0031 Hz	.0095 Hz	.0252 Hz	.0629 Hz
.160 Hz	.408 Hz	1.001 Hz	2.588 Hz
6.103 Hz	15.869 Hz	40.263 Hz	101 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

TIPPER MAGNITUDE

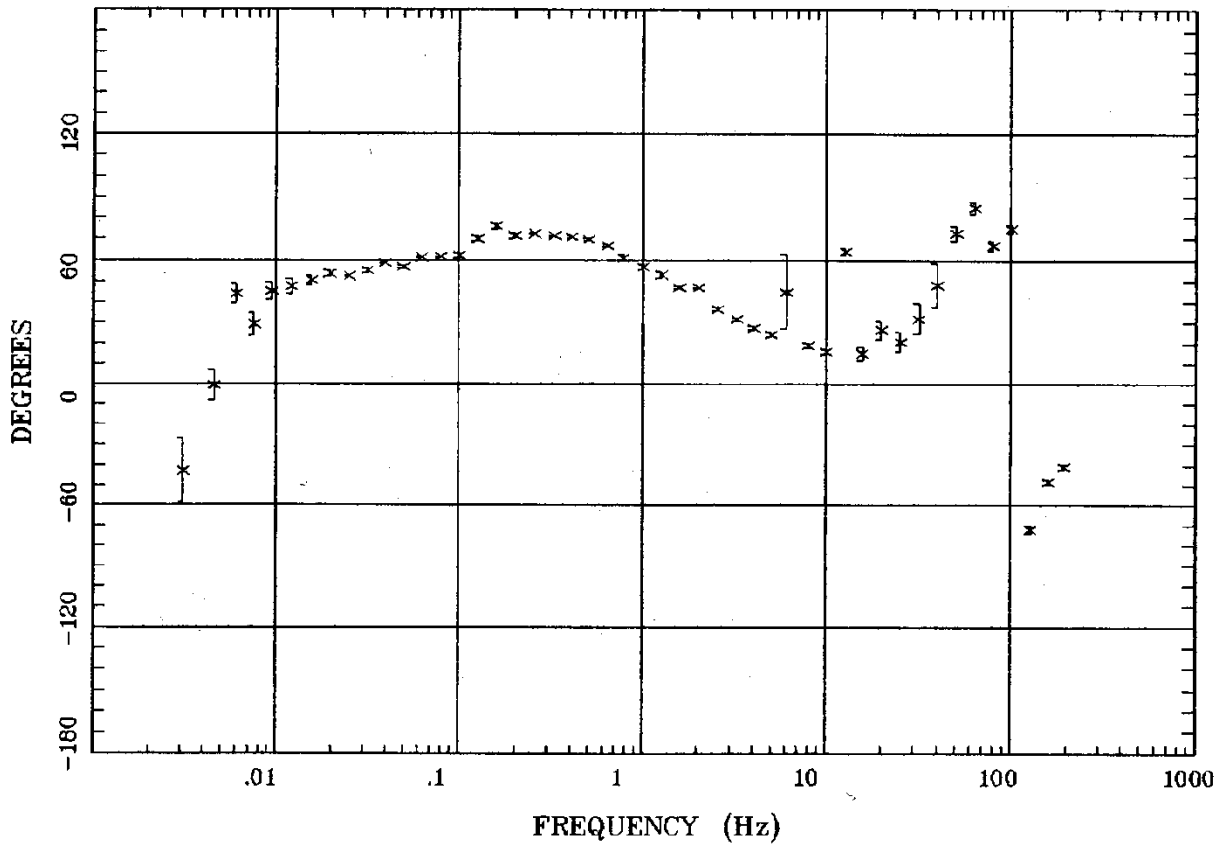


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

TIPPER STRIKE

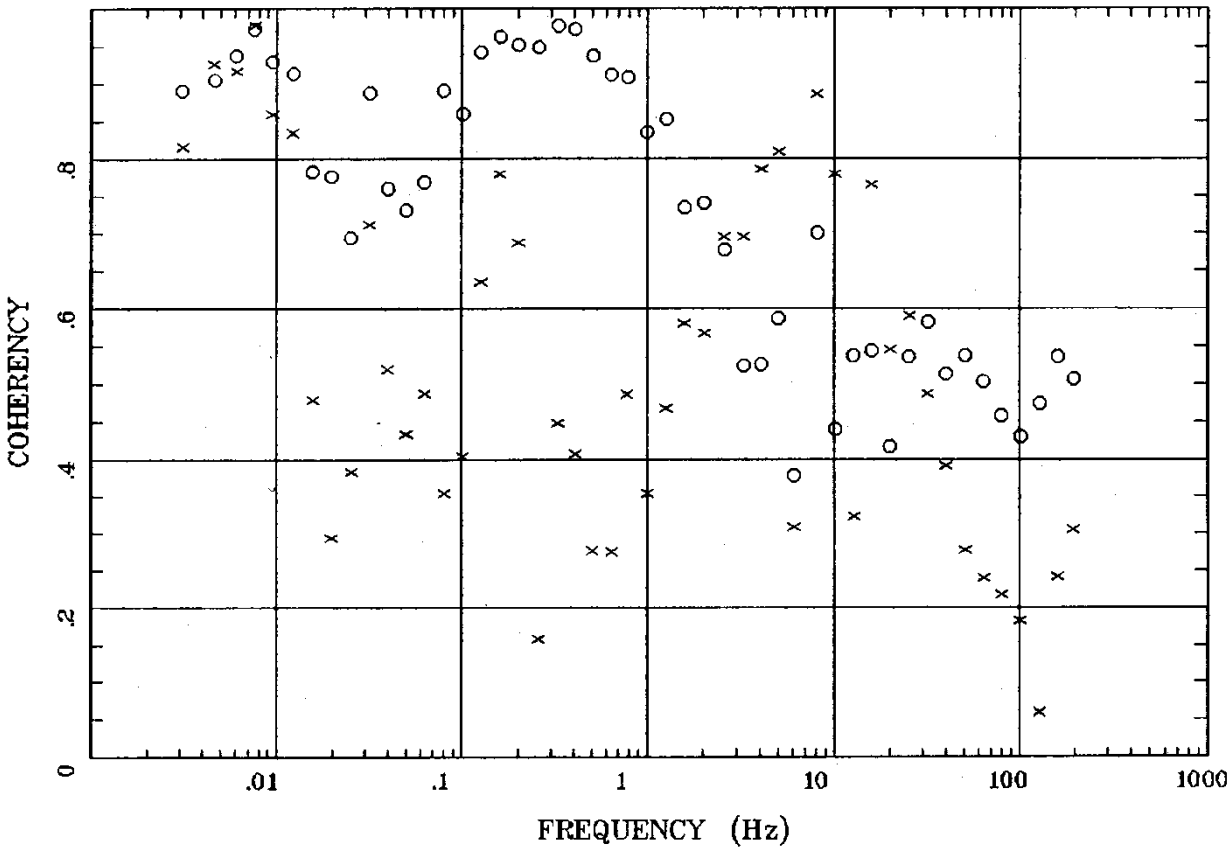


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 42

HzHx.x Coh HzHy.o

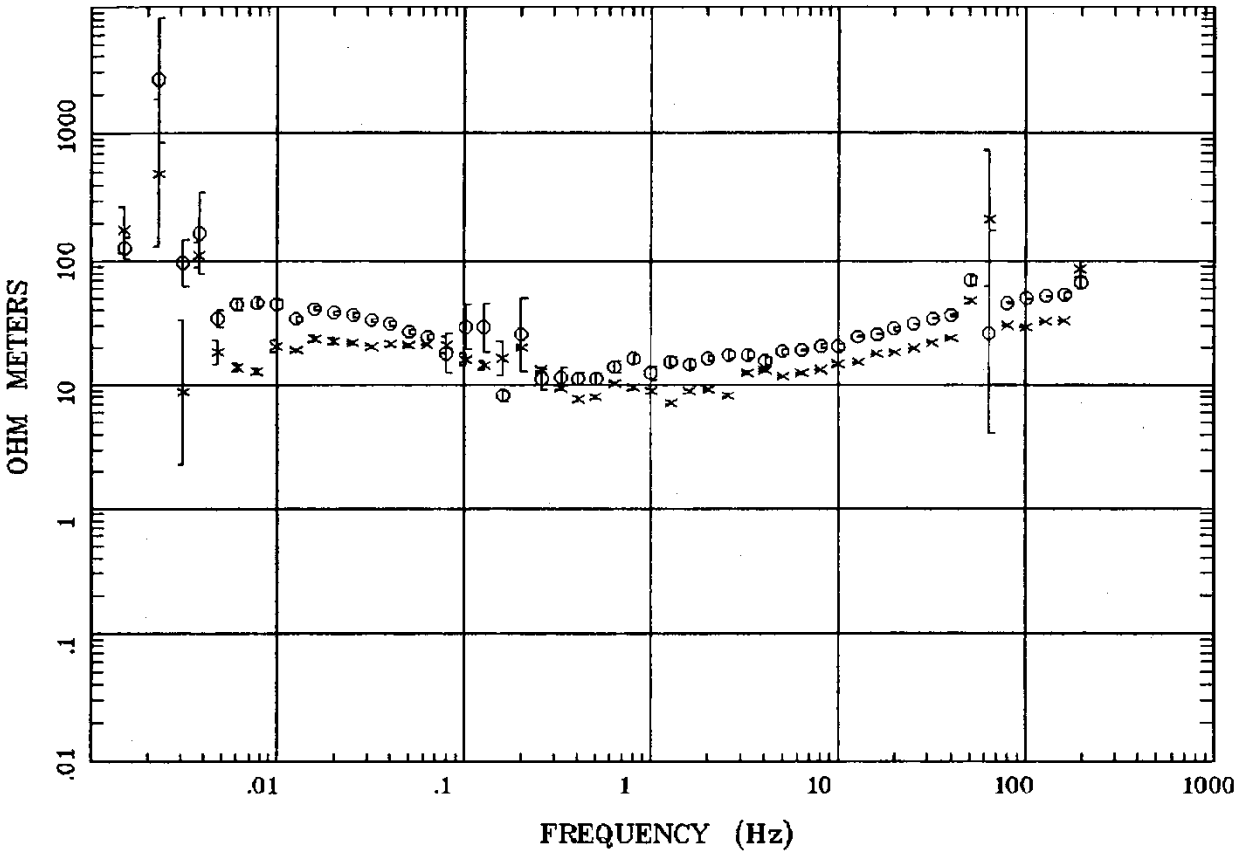


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap42-41s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 43

APPARENT RESISTIVITY

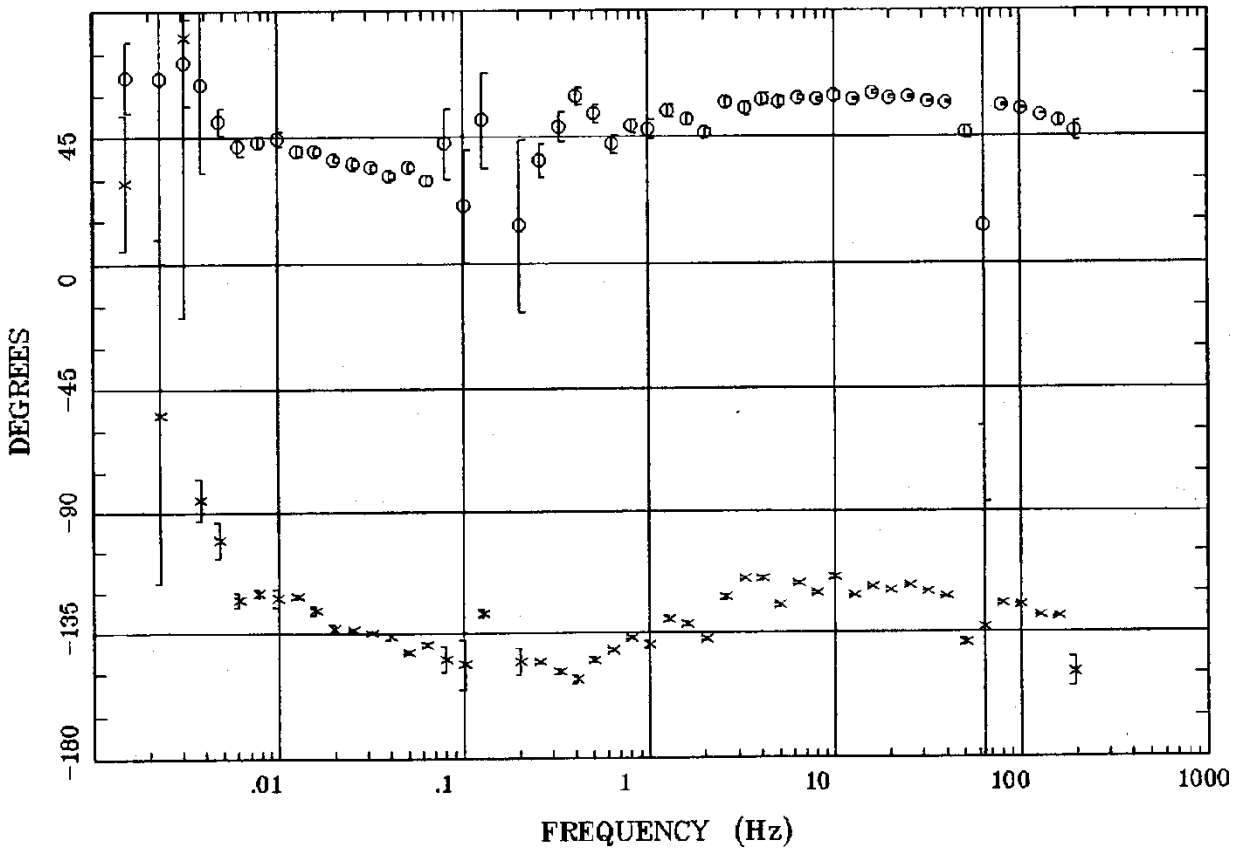


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 43

IMPEDANCE PHASE

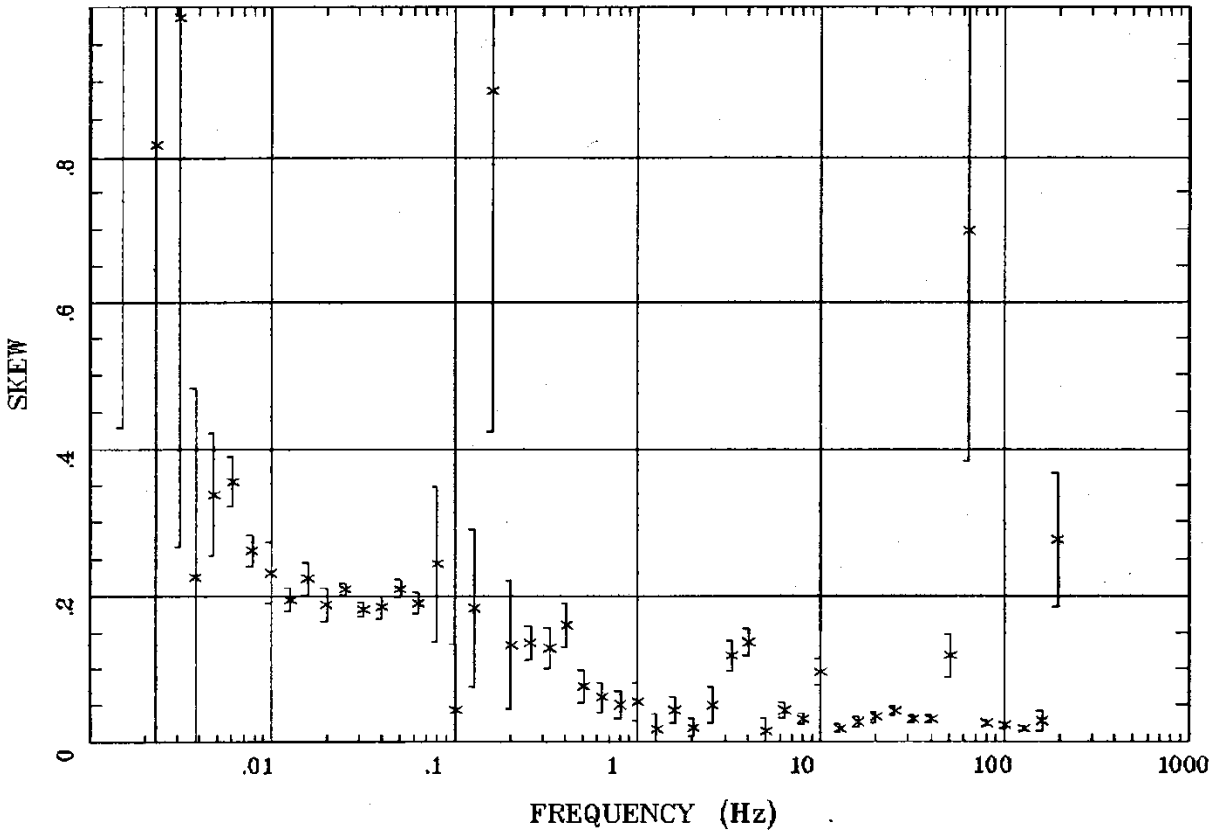


Client:
Remote:
Acquired: 19:5 Mar 08, 1996
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 43

IMPEDANCE SKEW

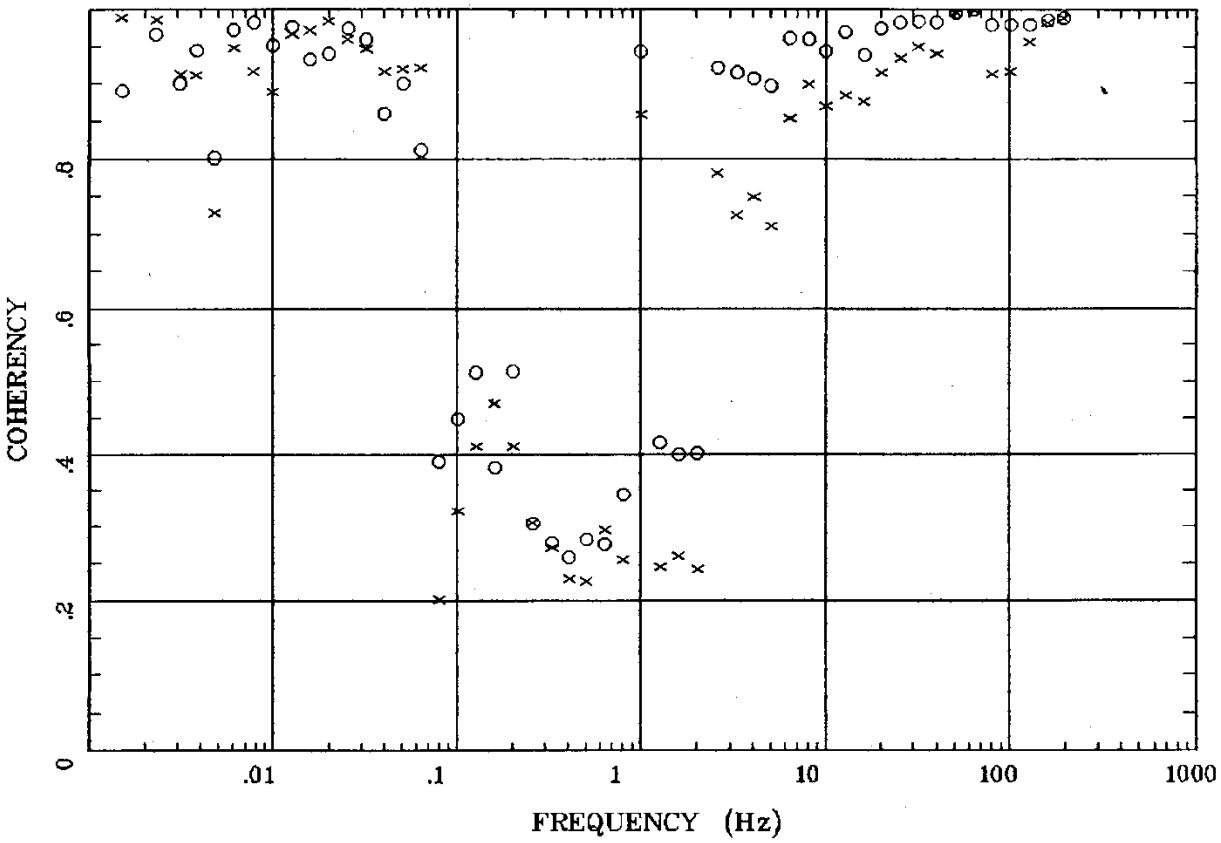


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 43

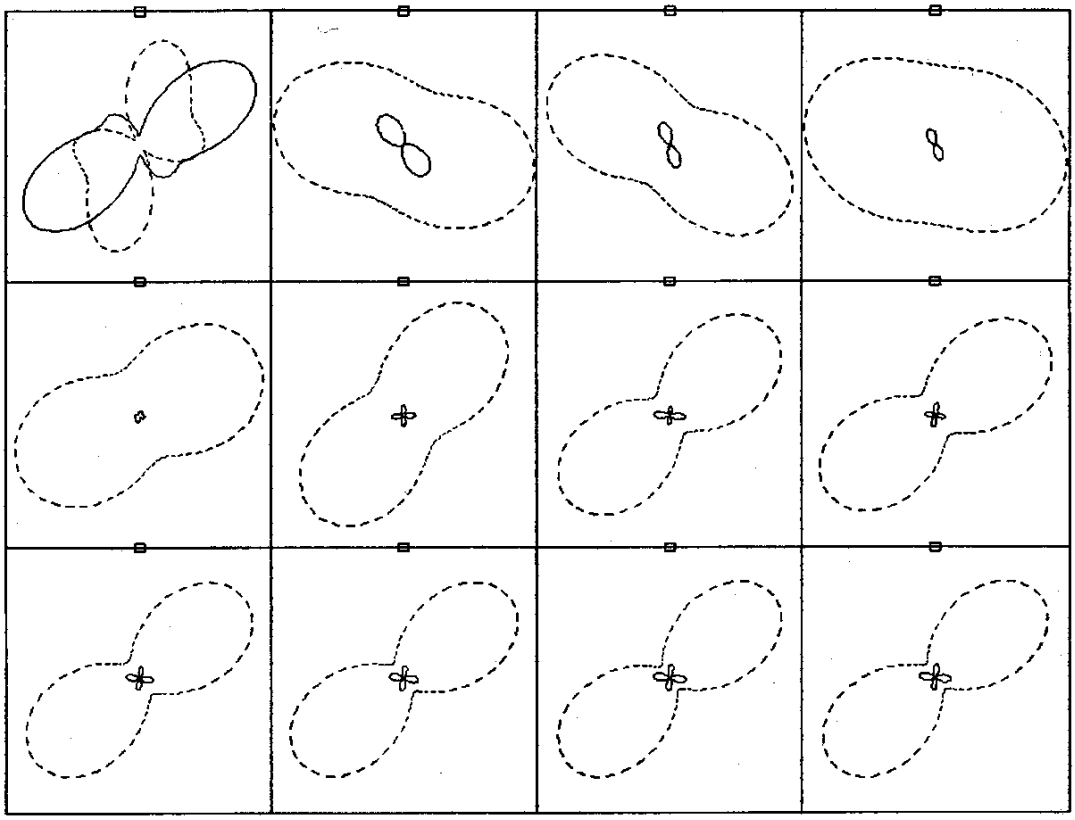
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



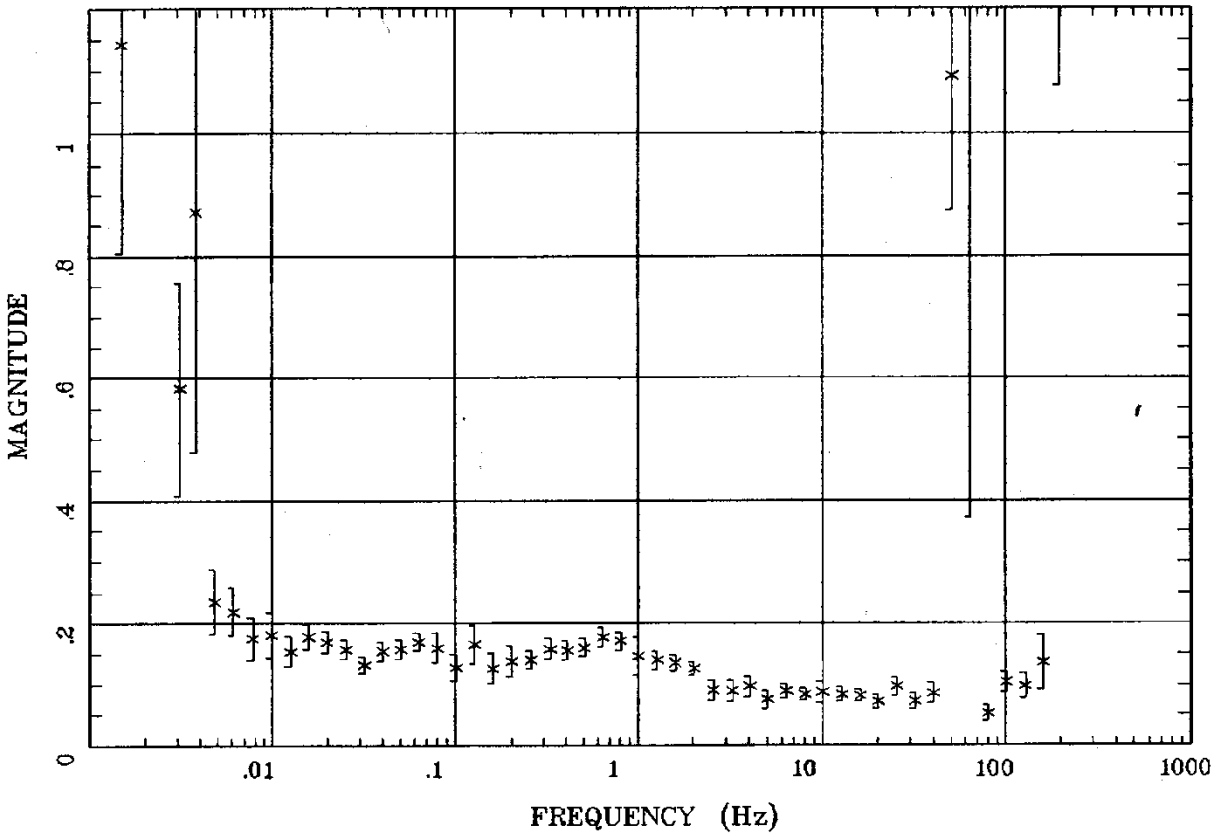
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.607 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 43

TIPPER MAGNITUDE

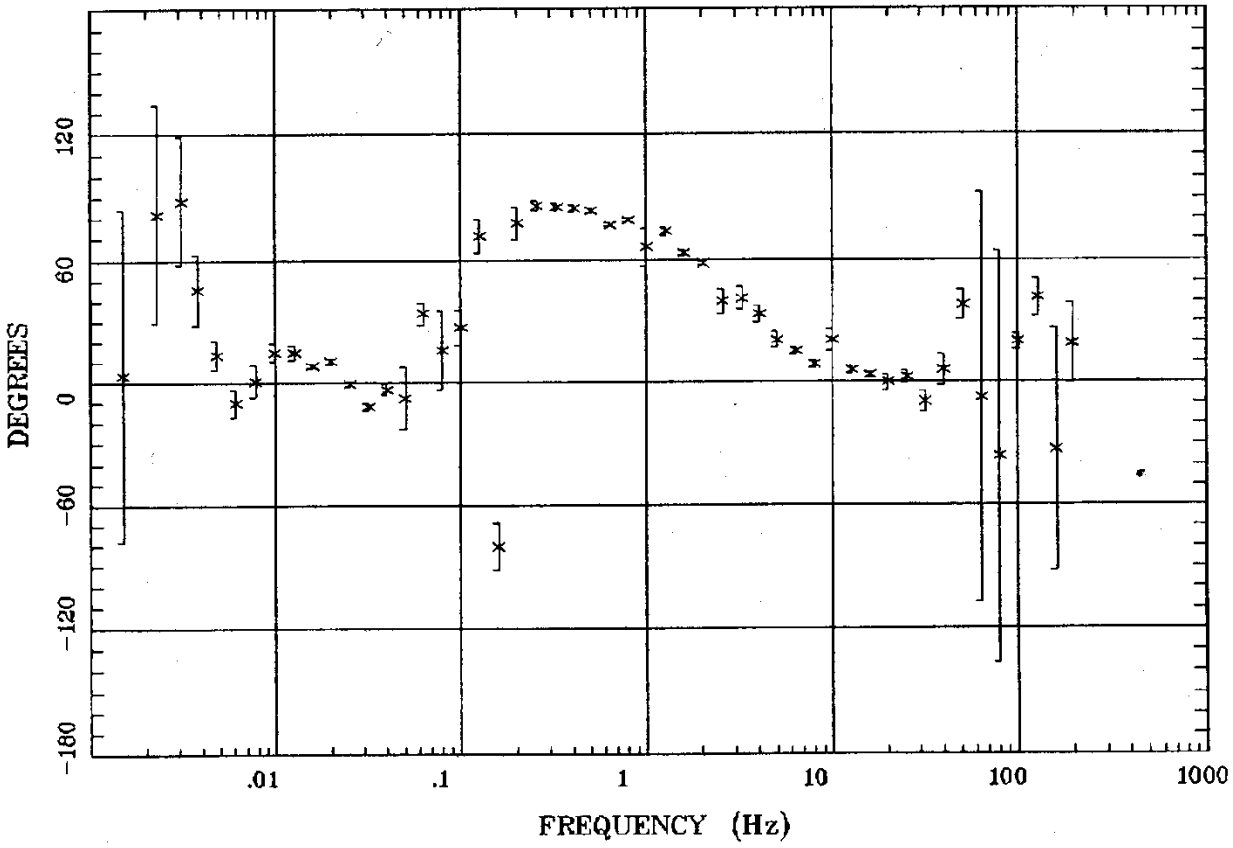


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 43

TIPPER STRIKE

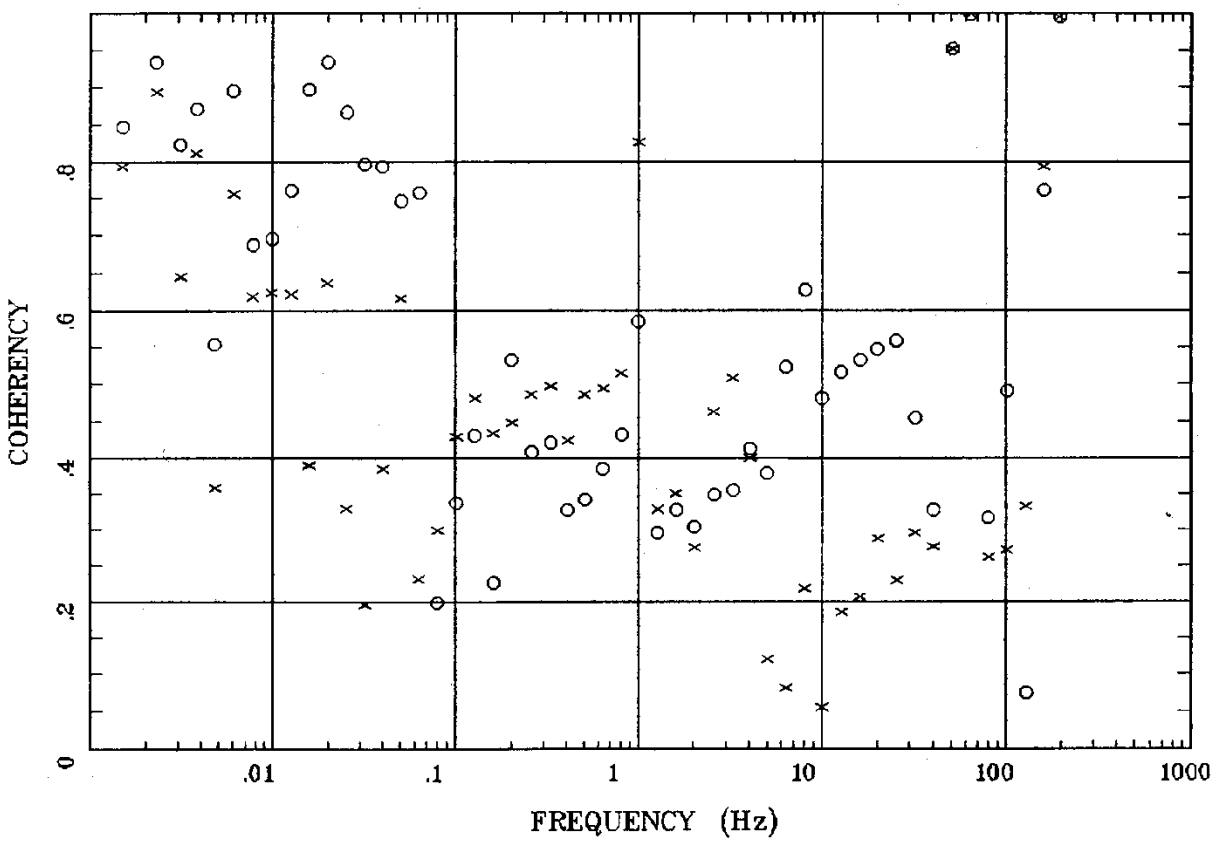


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 43

HzHx.x Coh HzHy.o

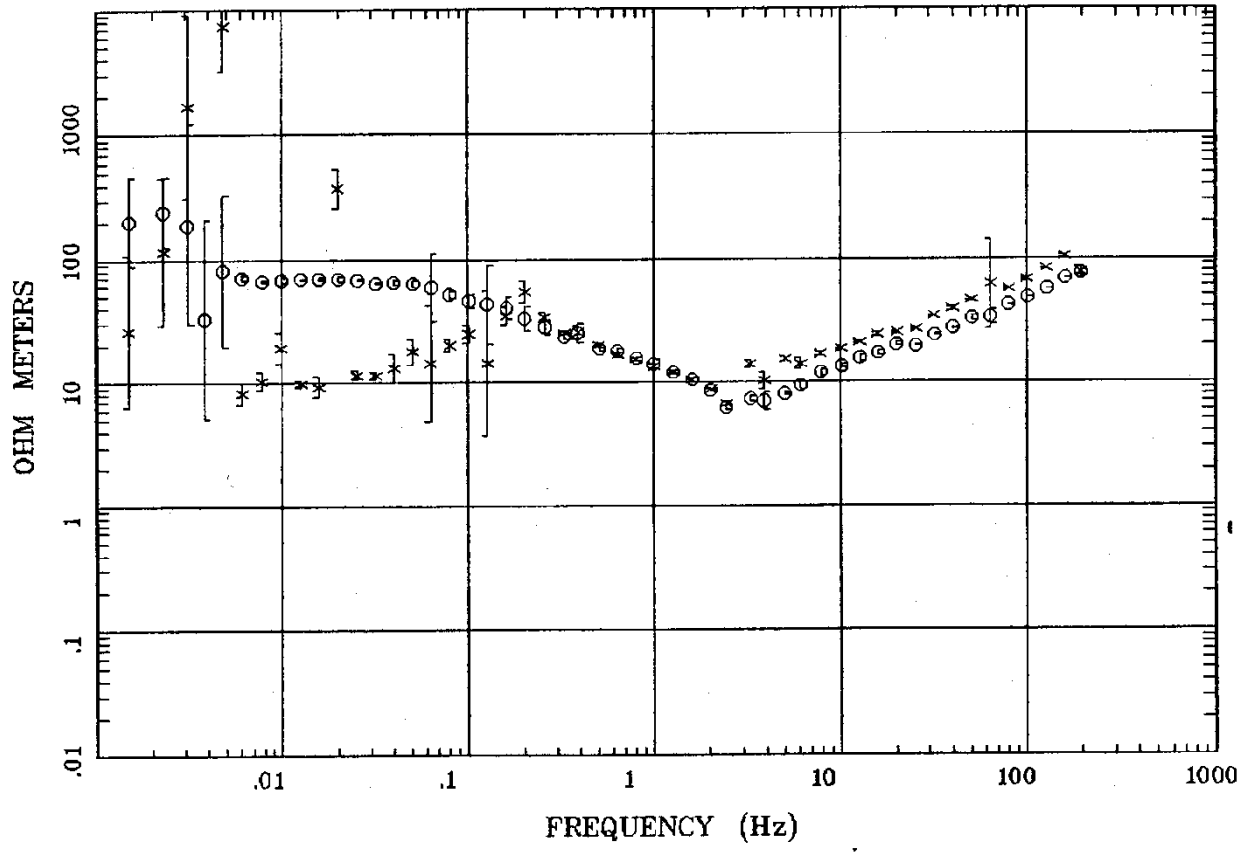


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap43.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

APPARENT RESISTIVITY

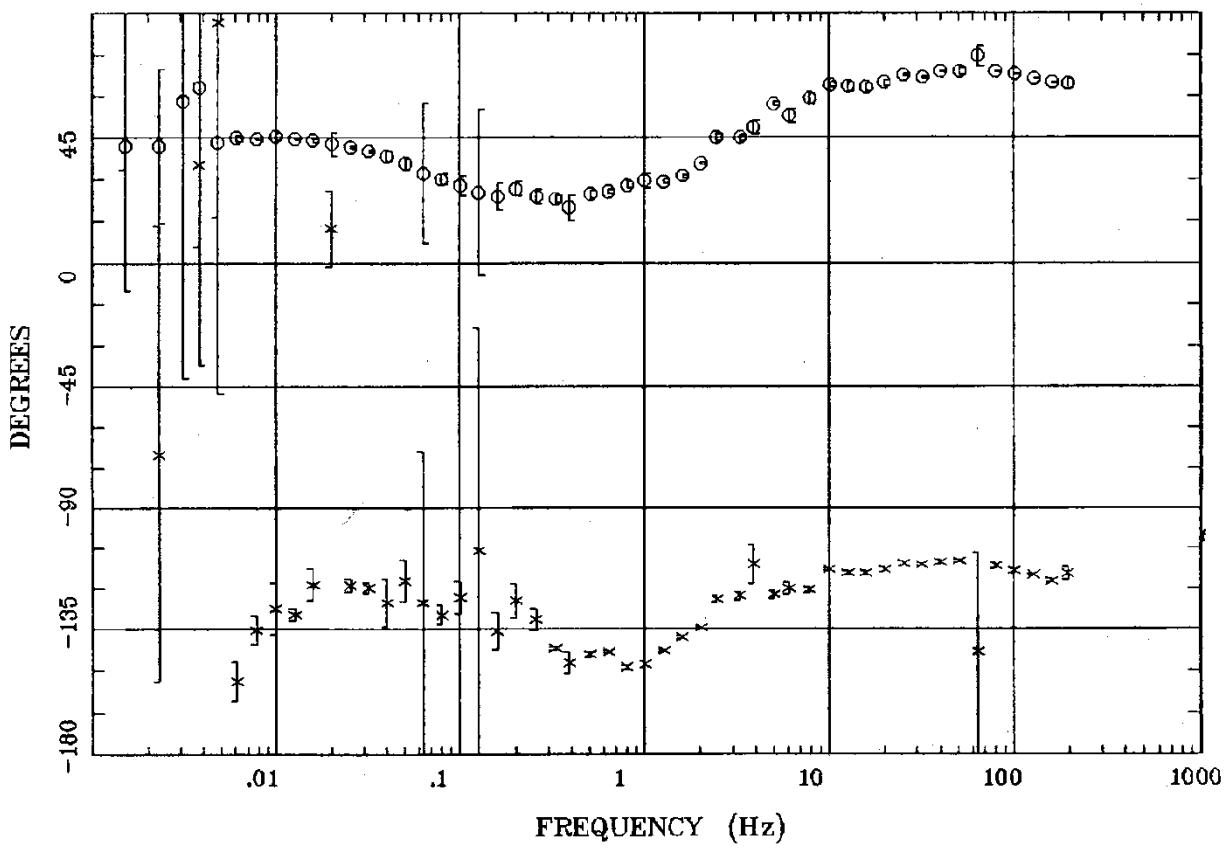


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

IMPEDANCE PHASE

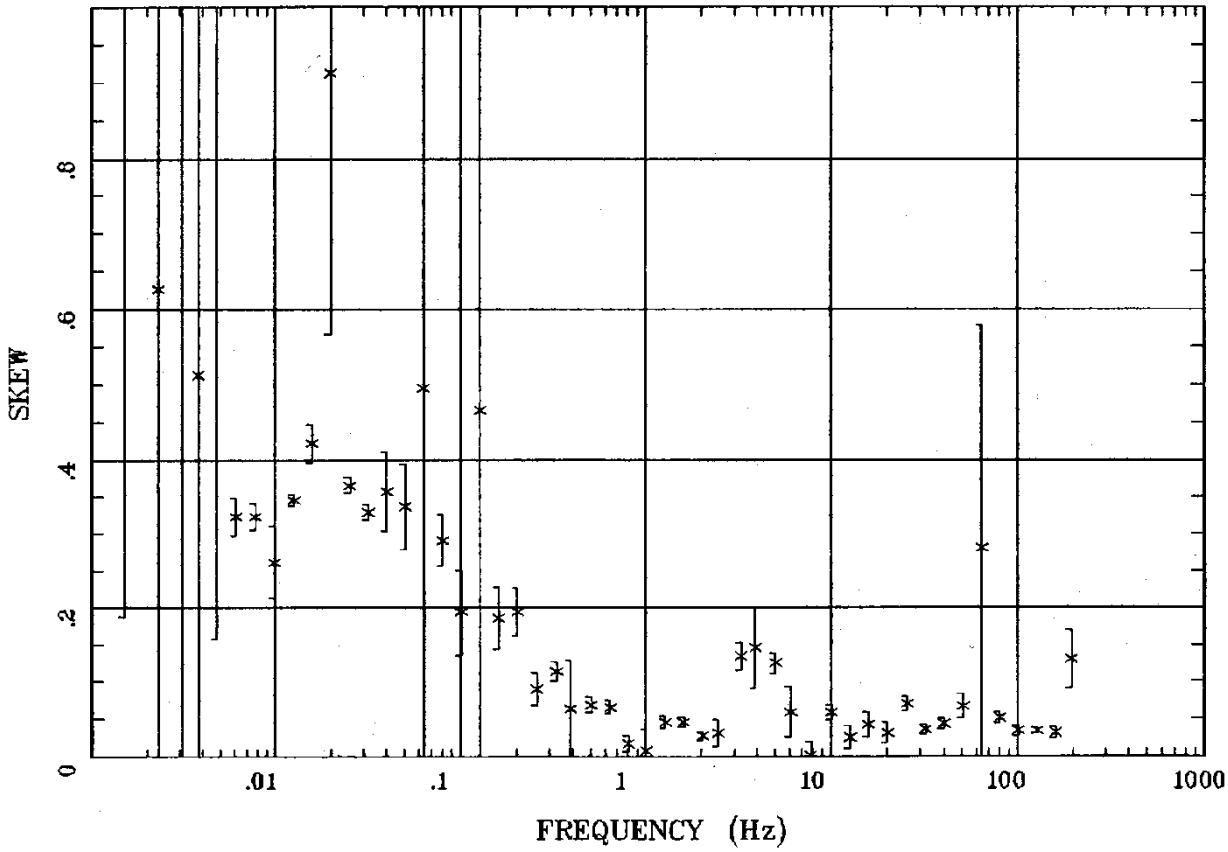


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

IMPEDANCE SKEW

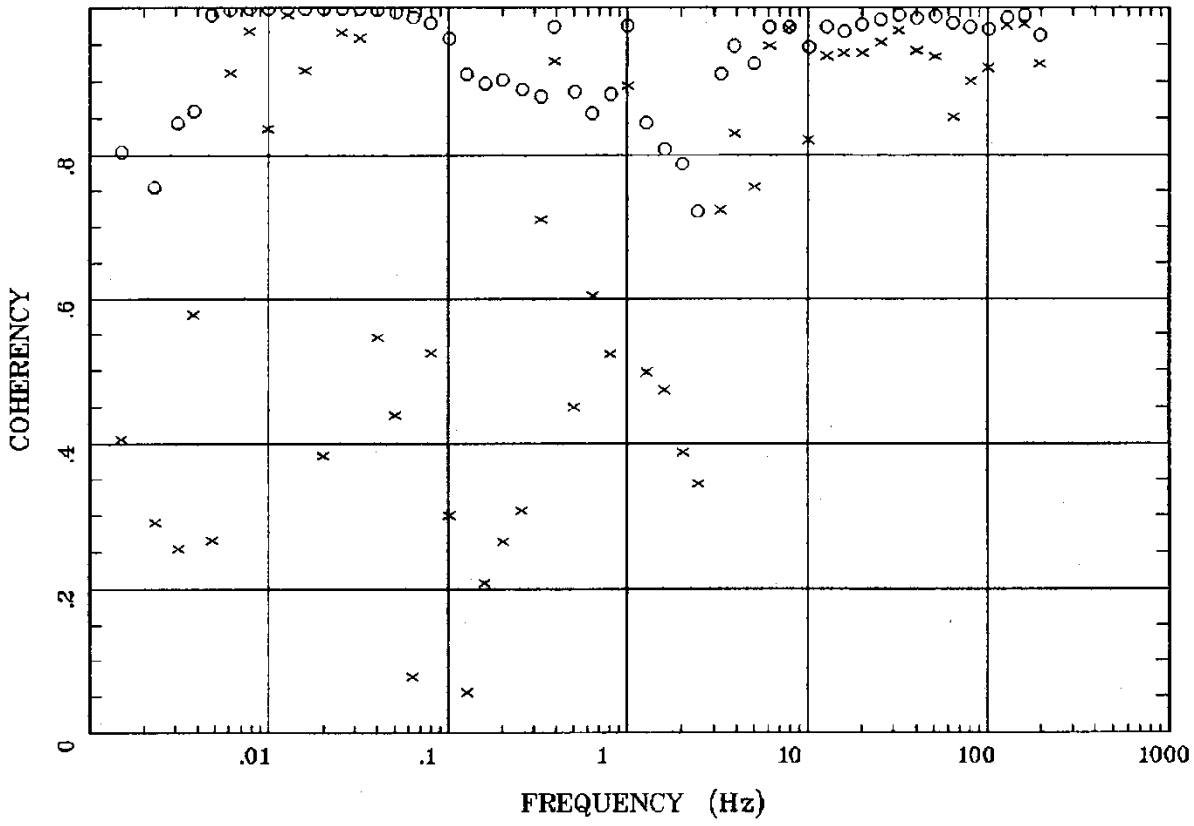


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

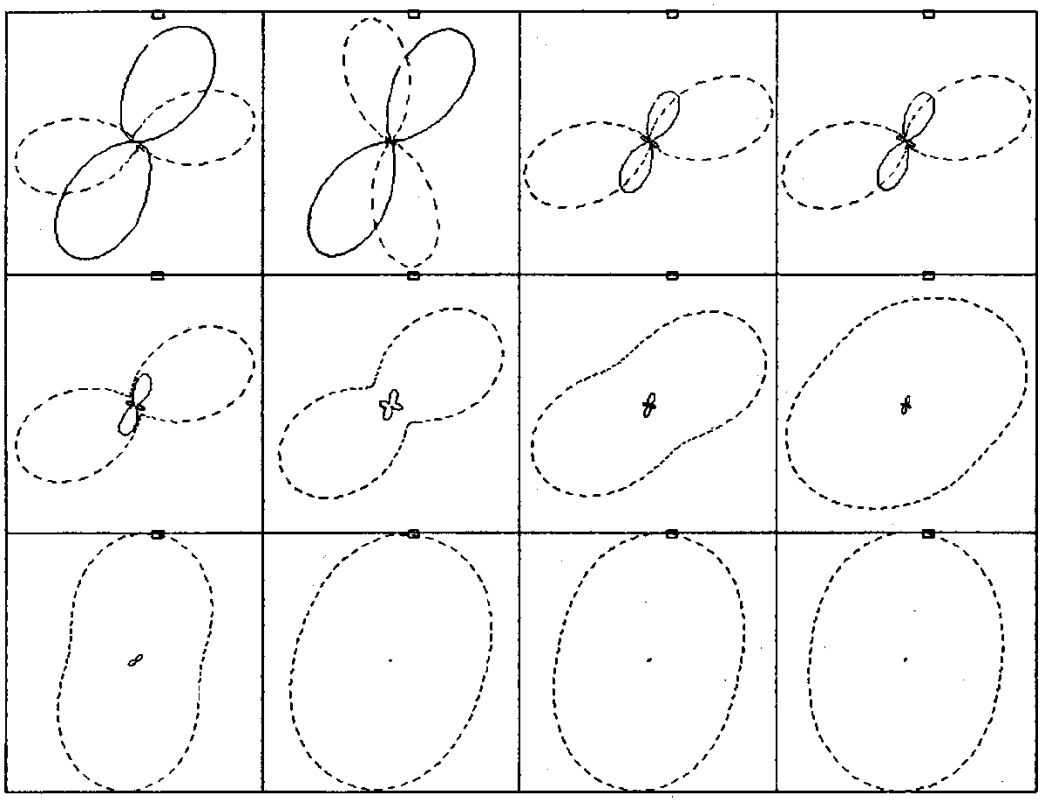
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



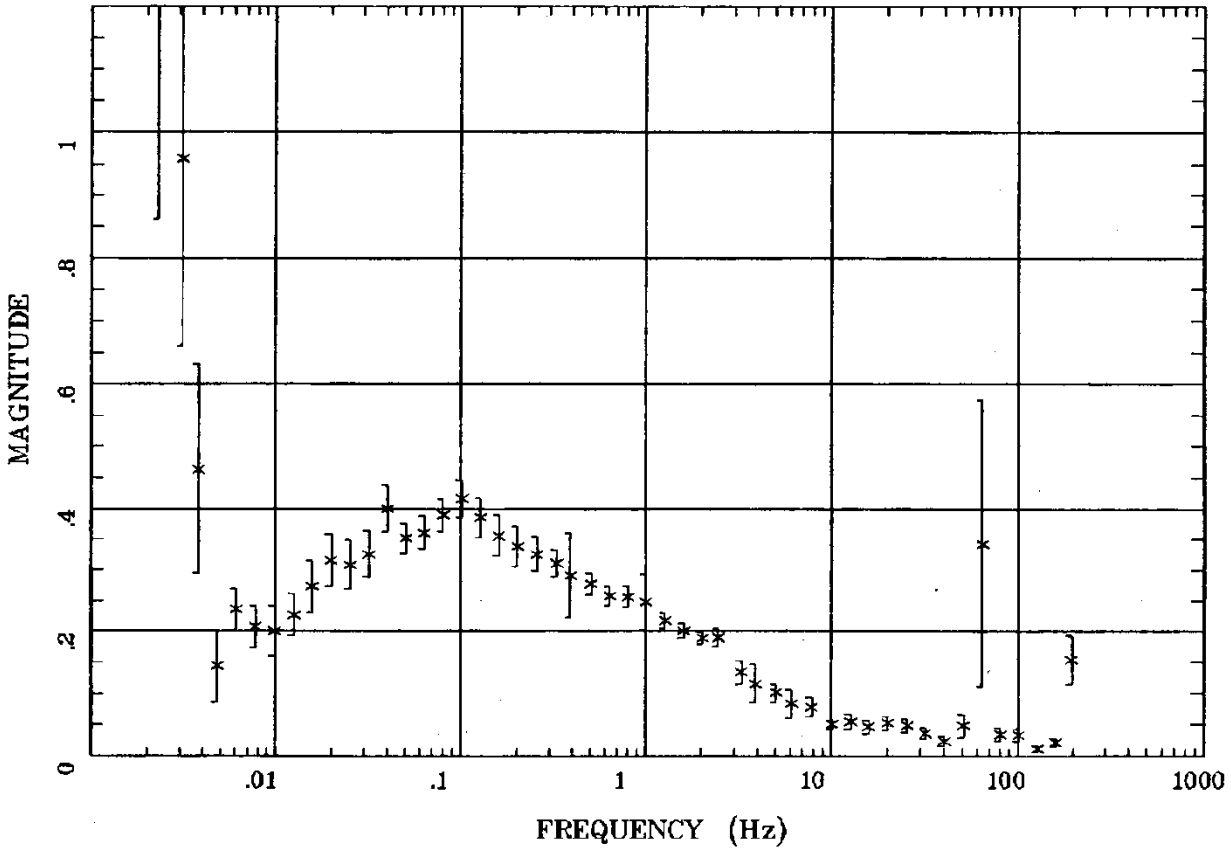
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.607 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

TIPPER MAGNITUDE

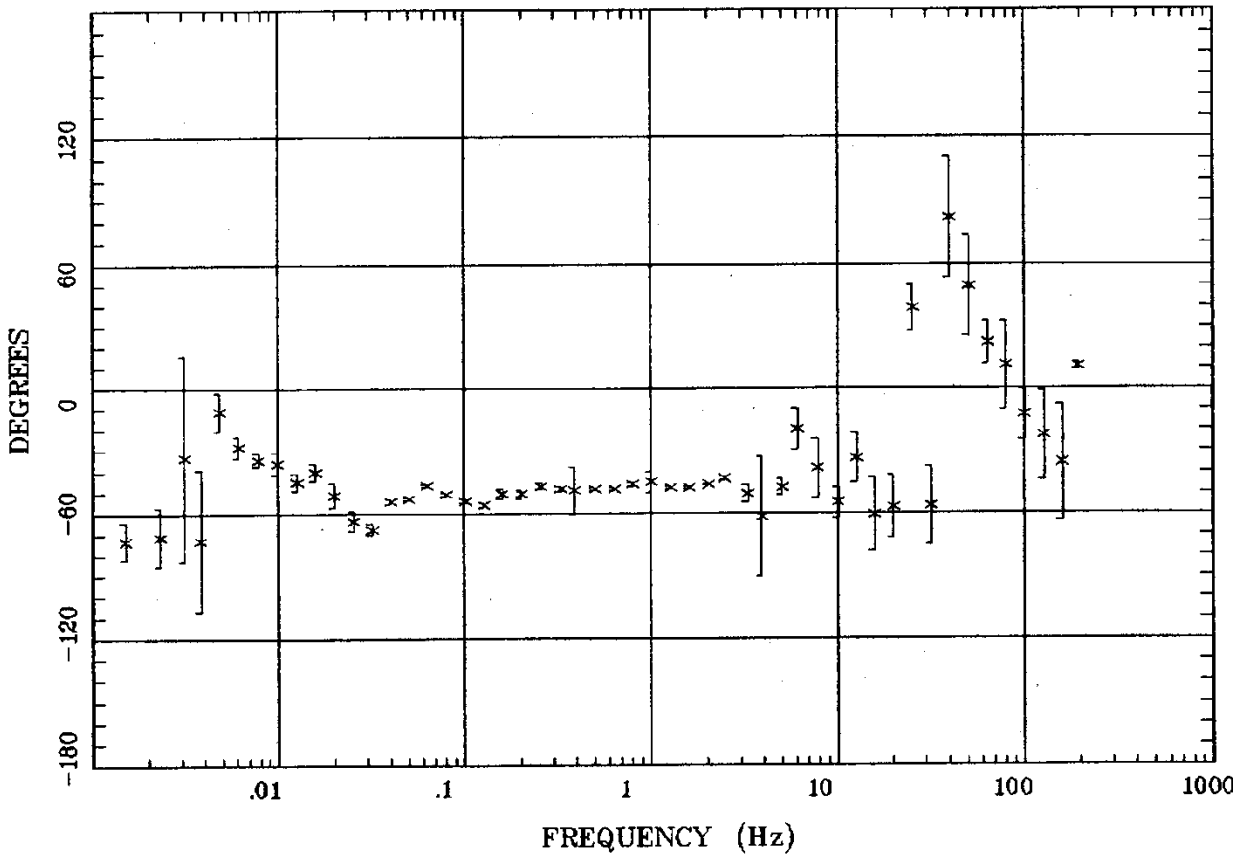


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

TIPPER STRIKE

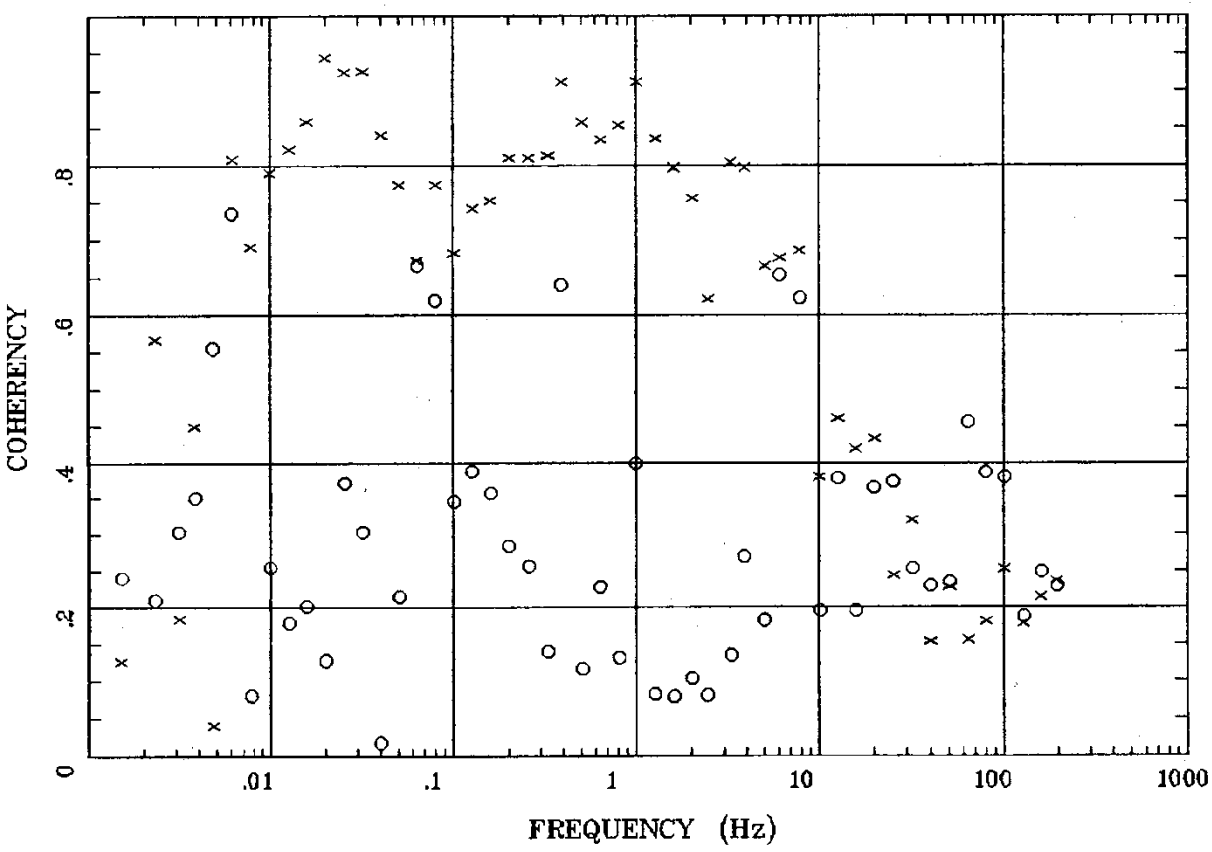


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:11 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 44

HzHx.x Coh HzHy.o

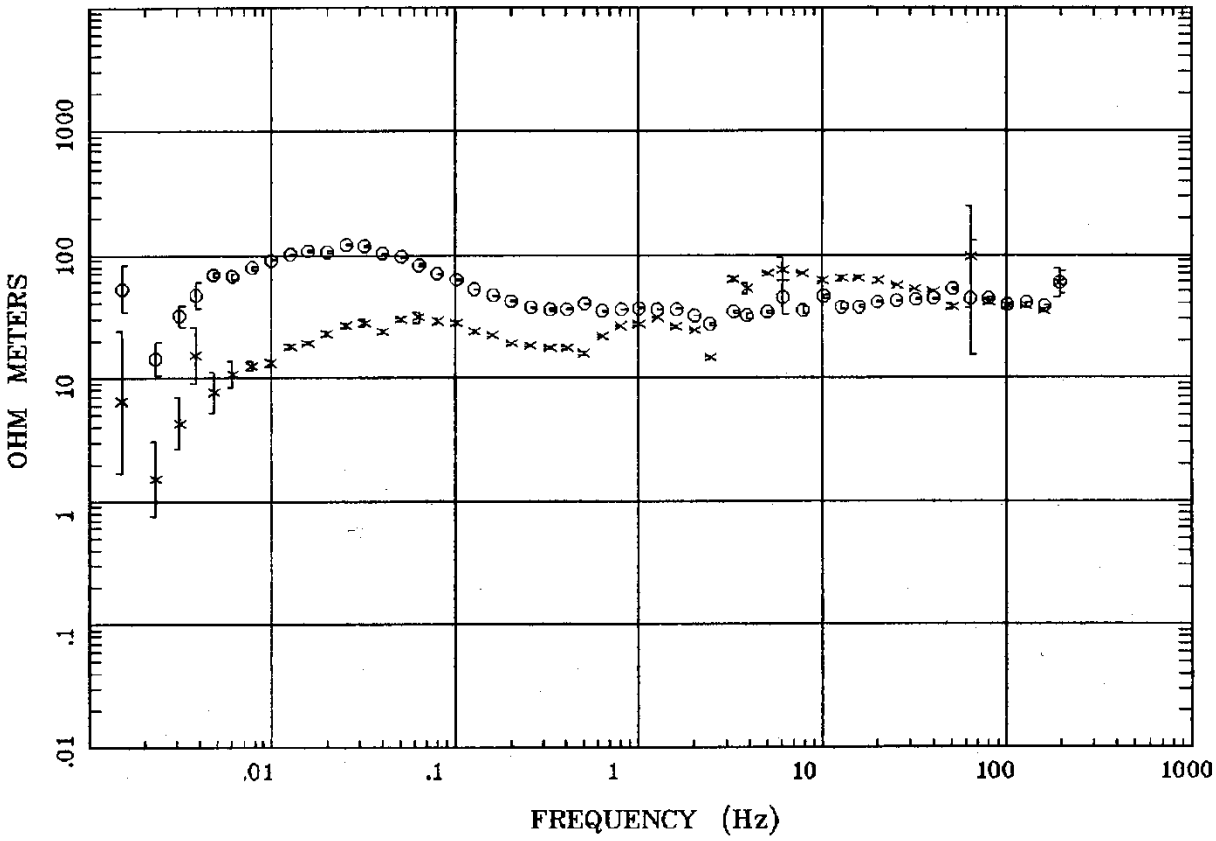


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap44.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 45

APPARENT RESISTIVITY

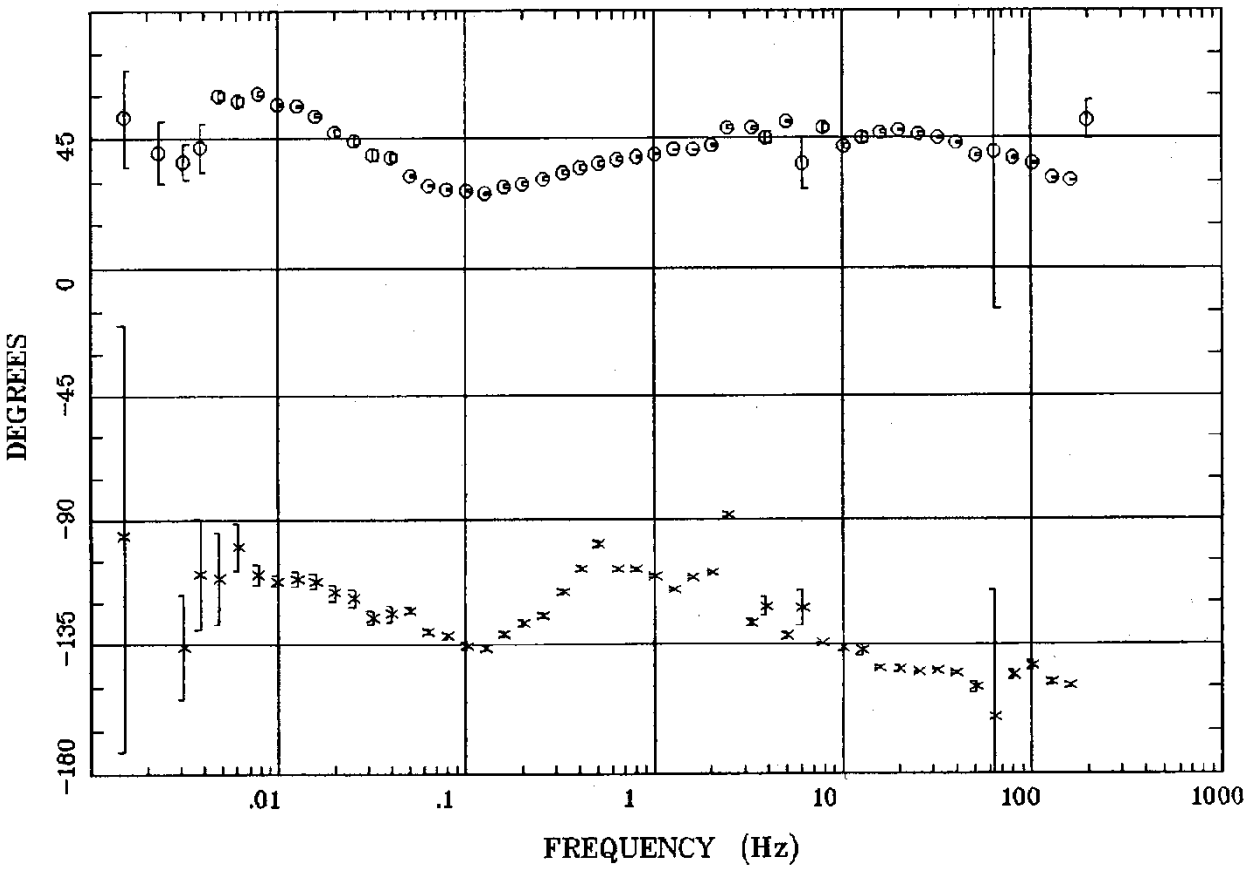


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 45

IMPEDANCE PHASE

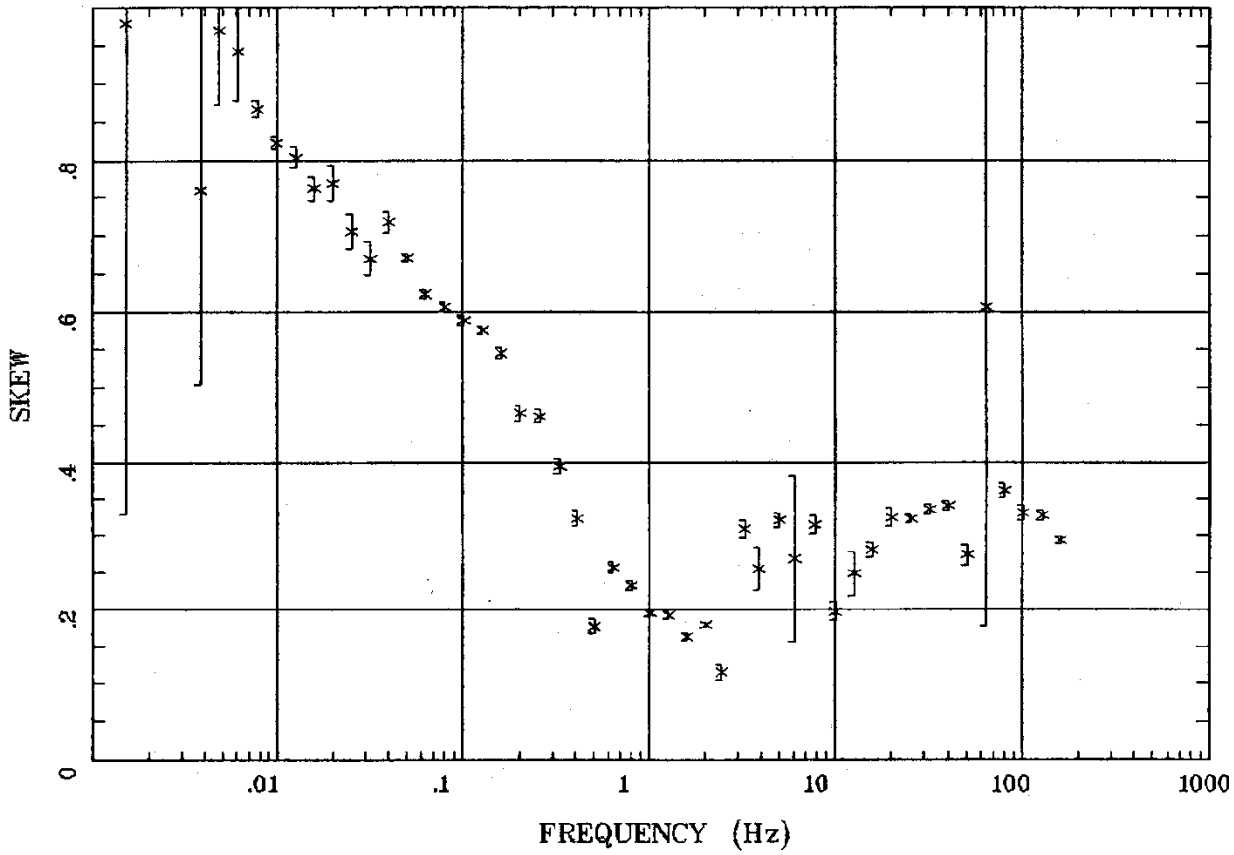


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 45

IMPEDANCE SKEW

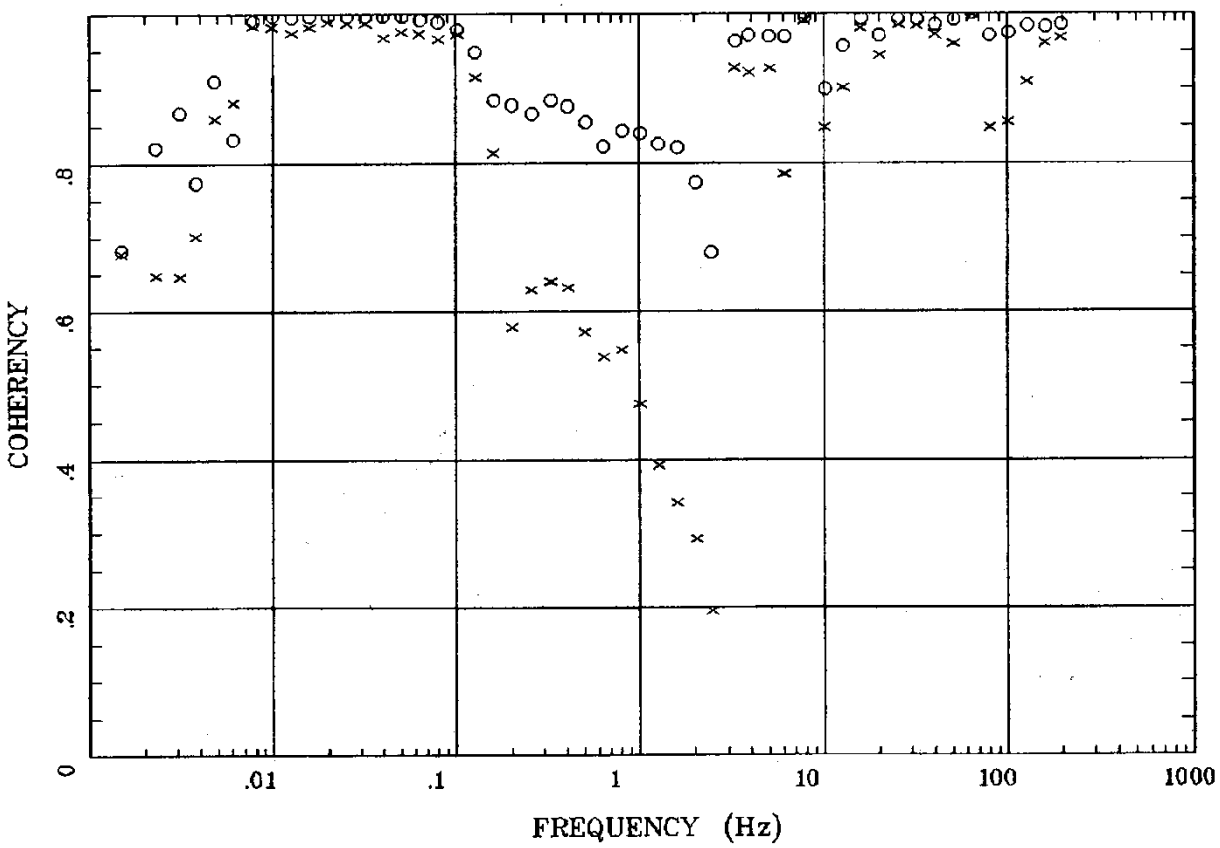


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 45

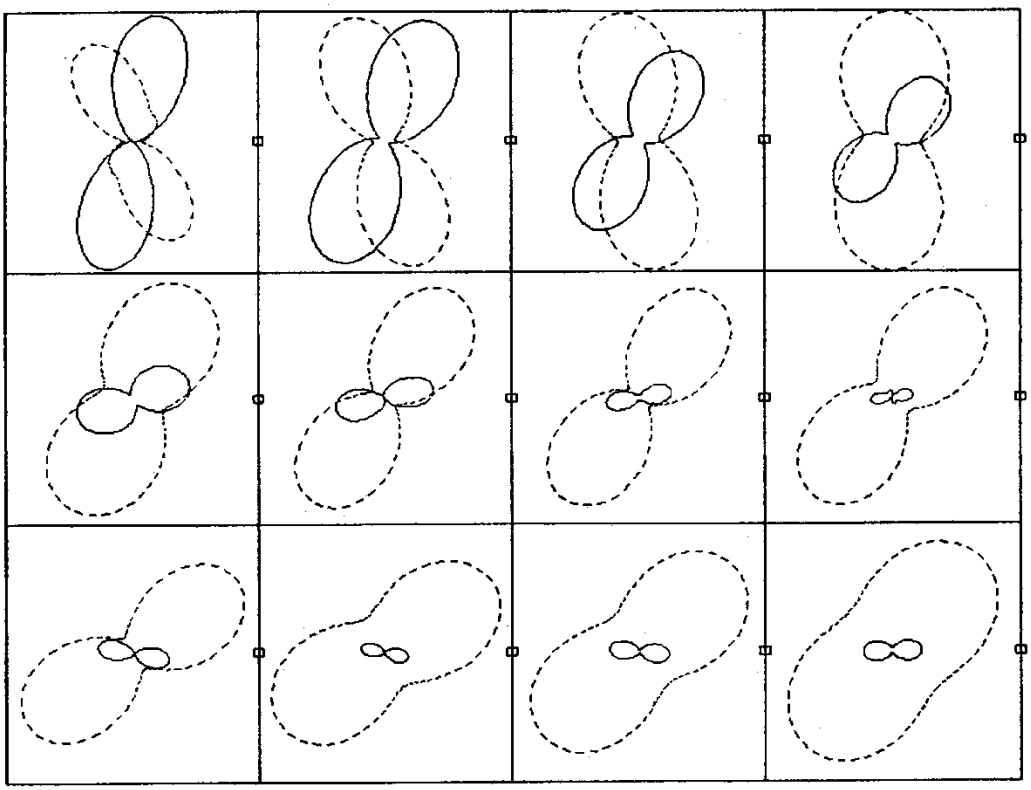
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



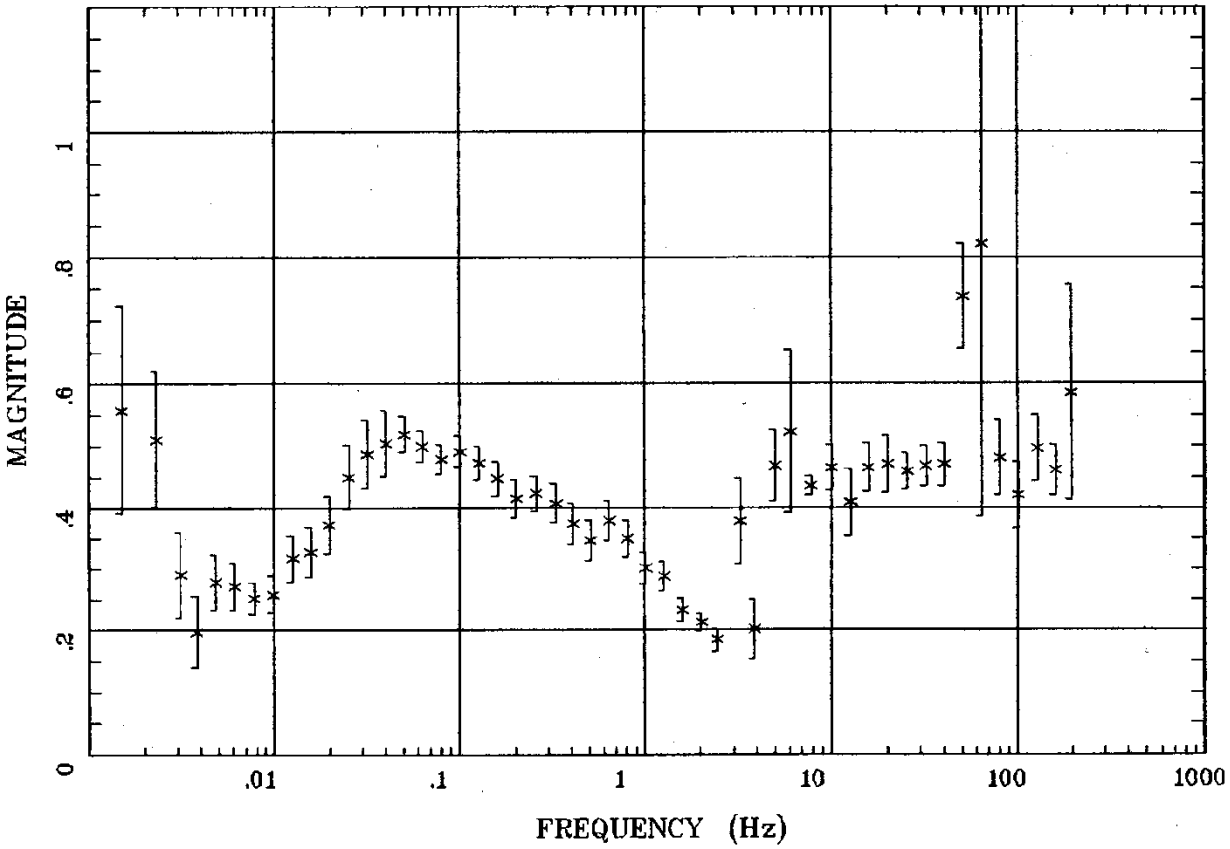
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.607 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 45

TIPPER MAGNITUDE

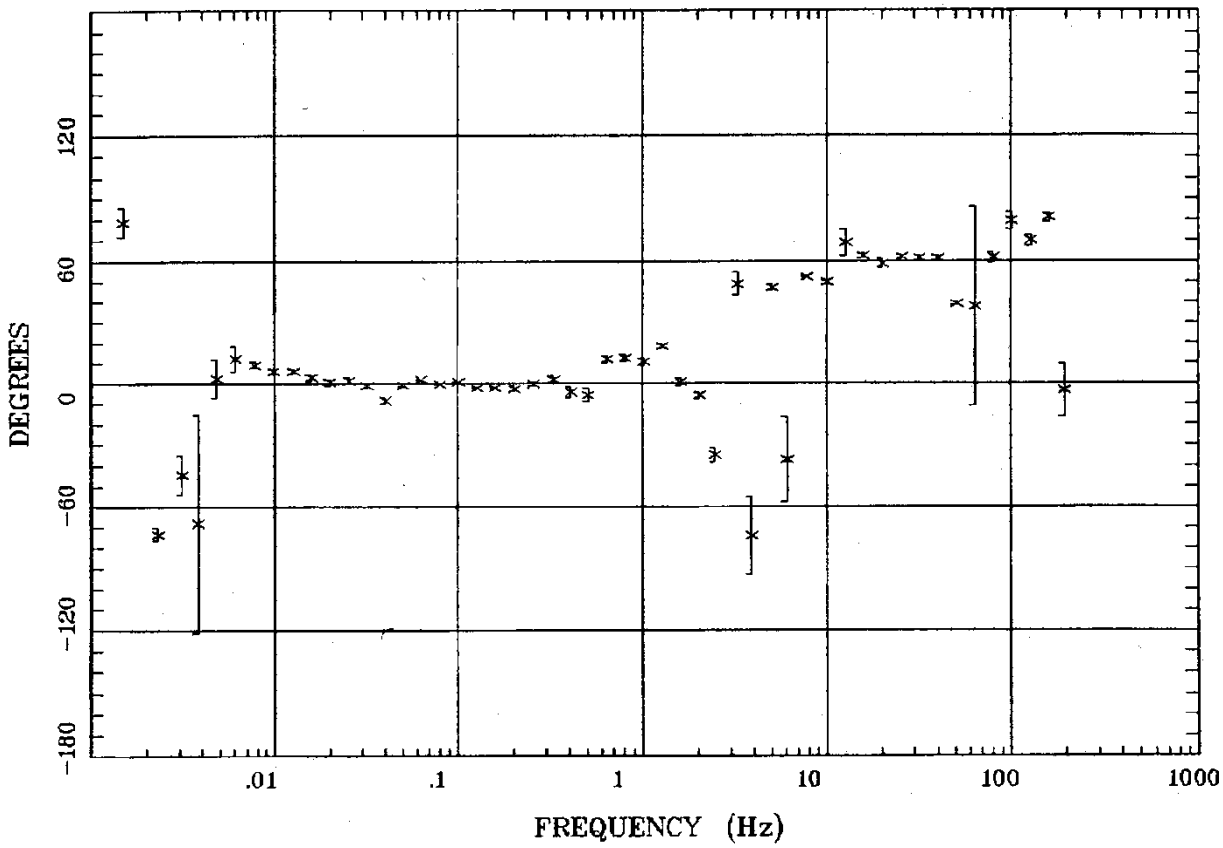


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 45

TIPPER STRIKE

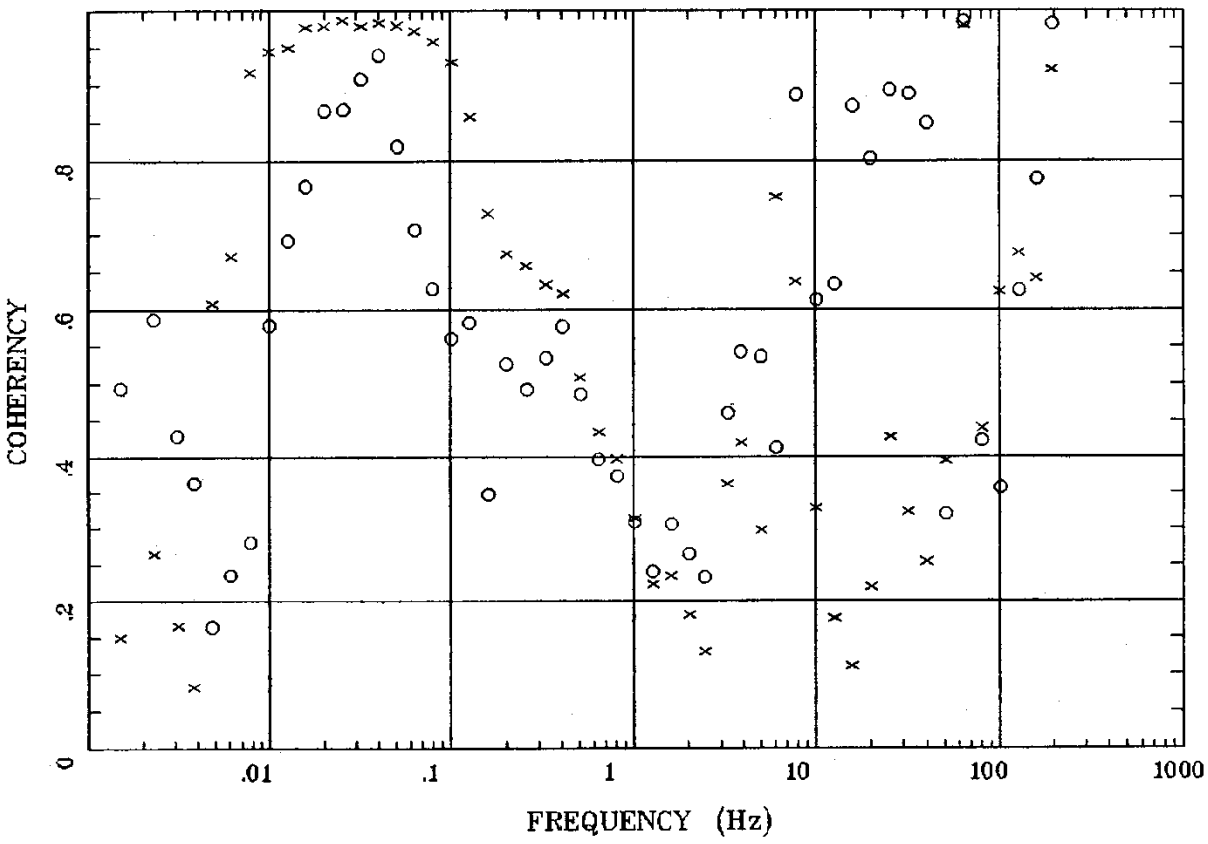


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 45

HzHx.x Coh HzHy.o

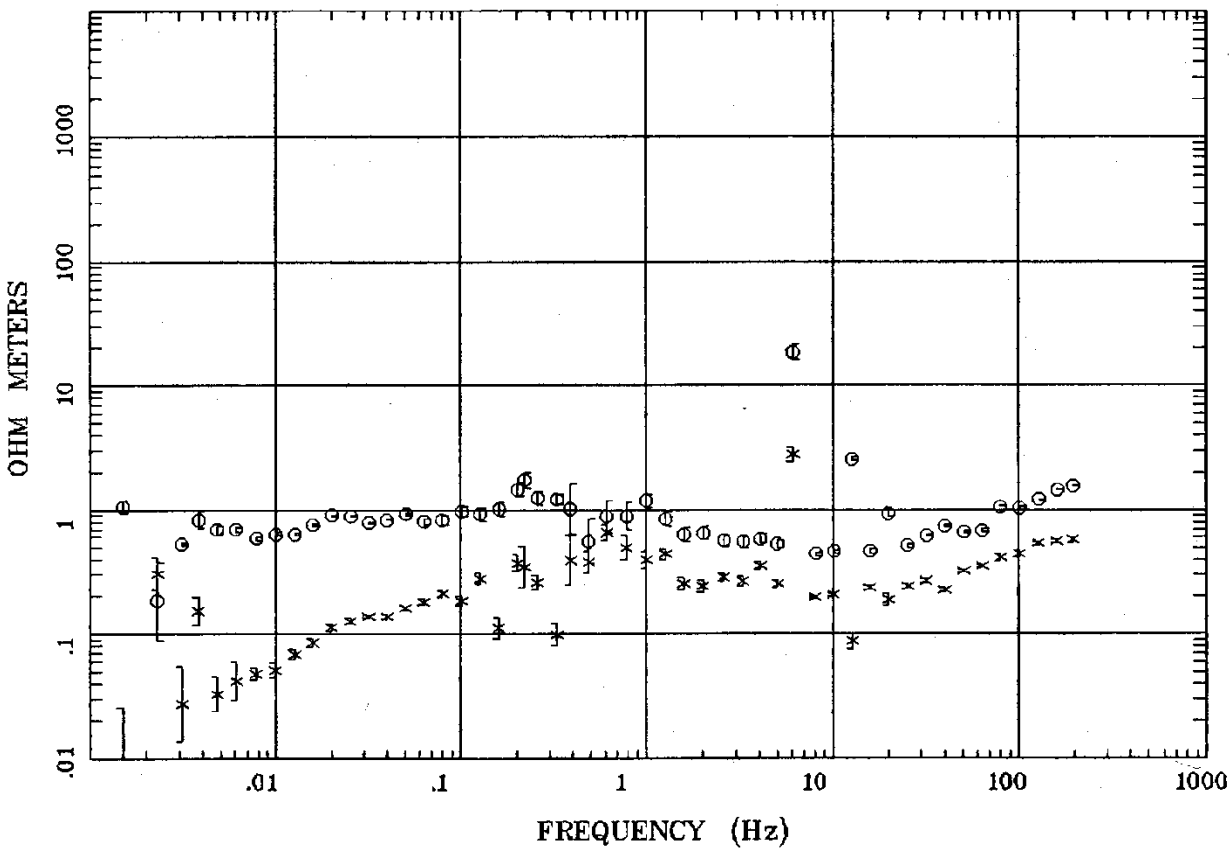


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap45.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 46

APPARENT RESISTIVITY

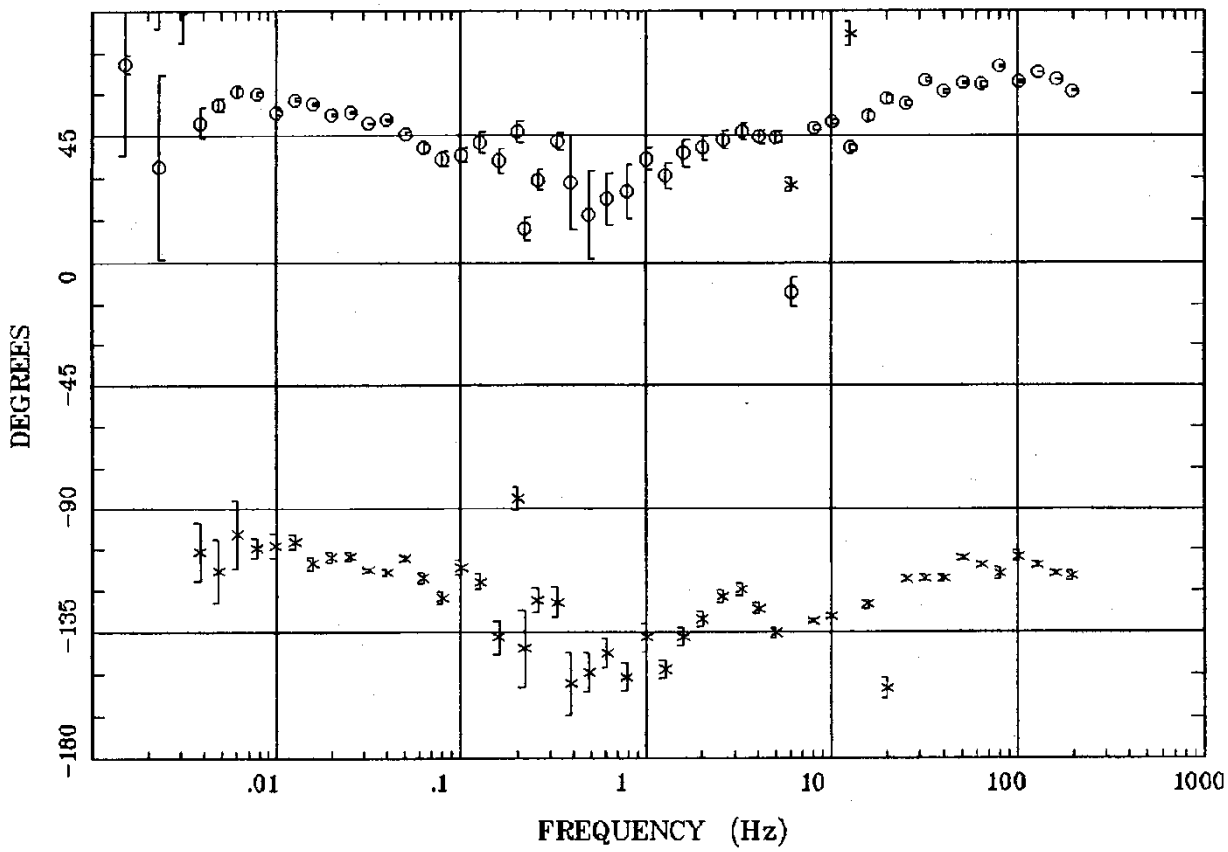


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 46

IMPEDANCE PHASE

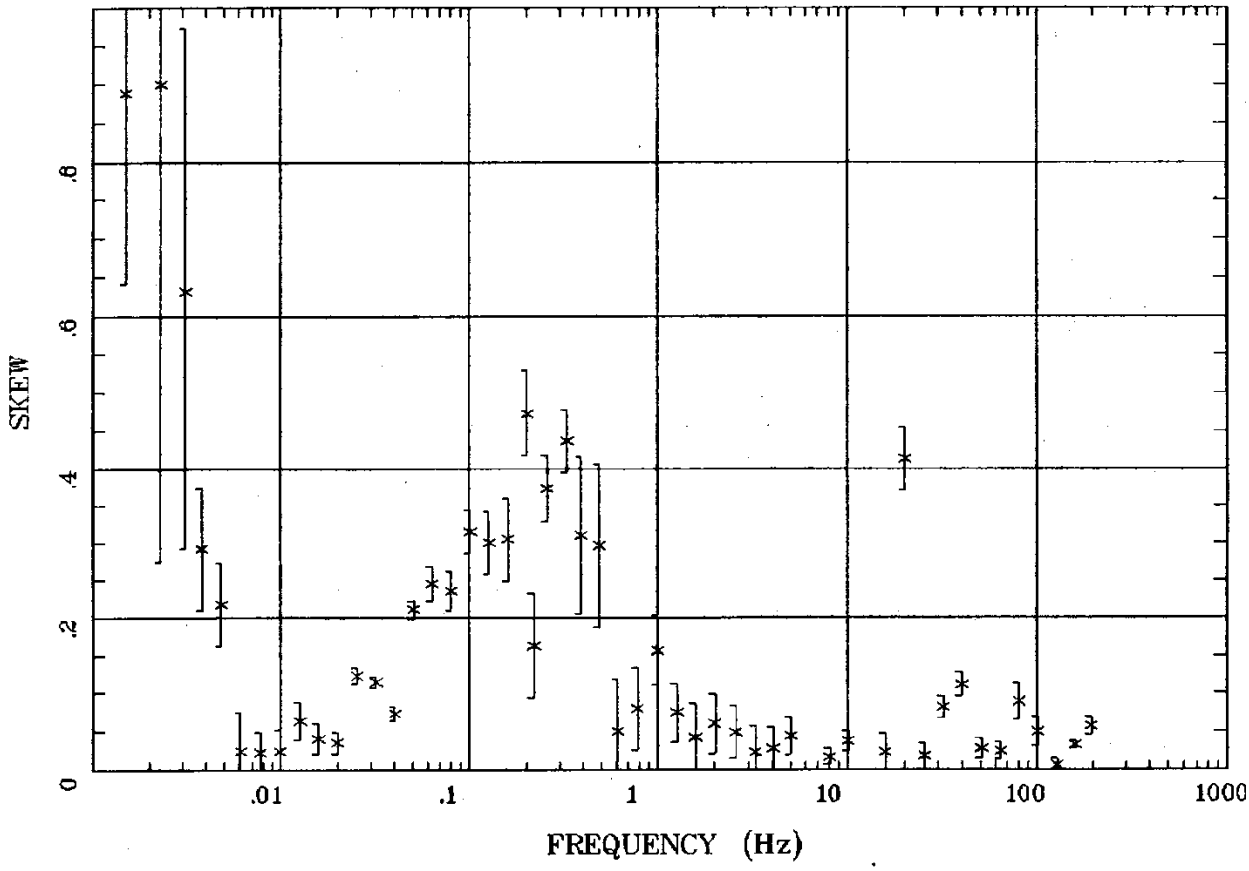


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 46

IMPEDANCE SKEW

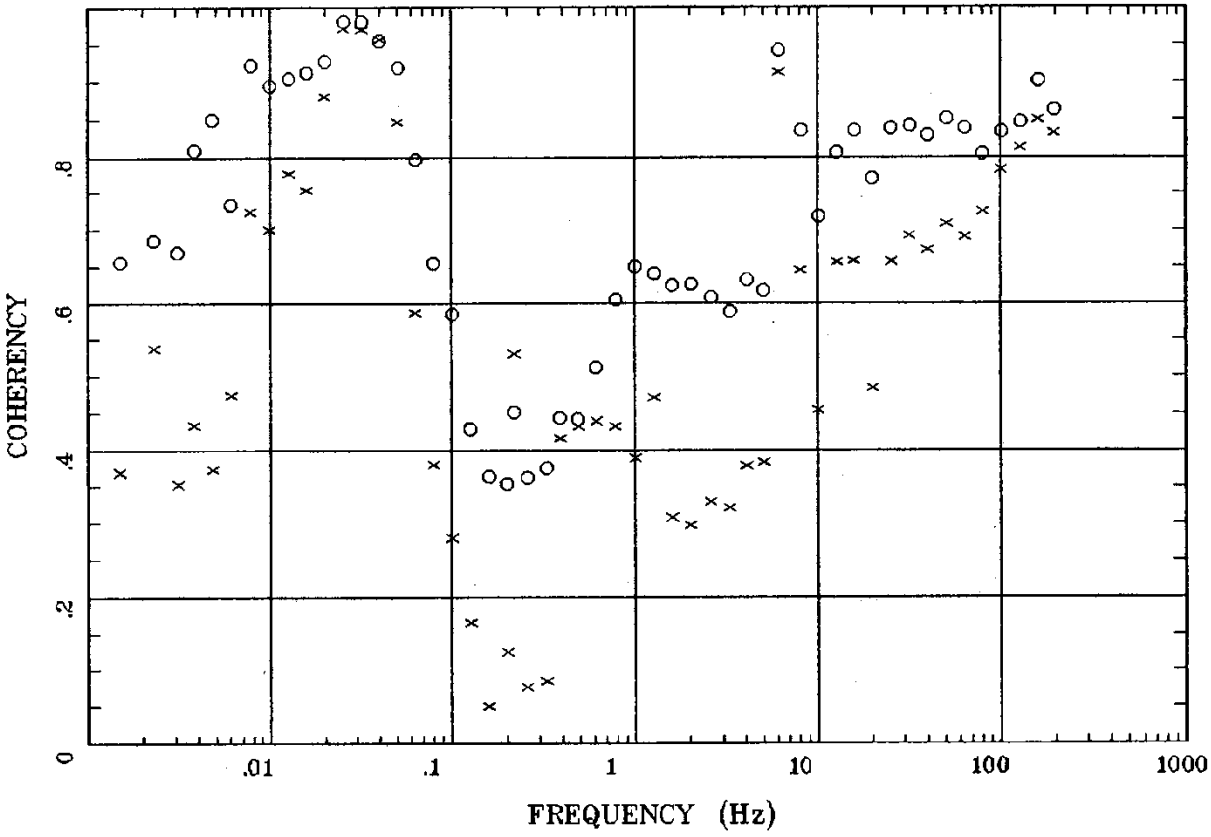


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 46

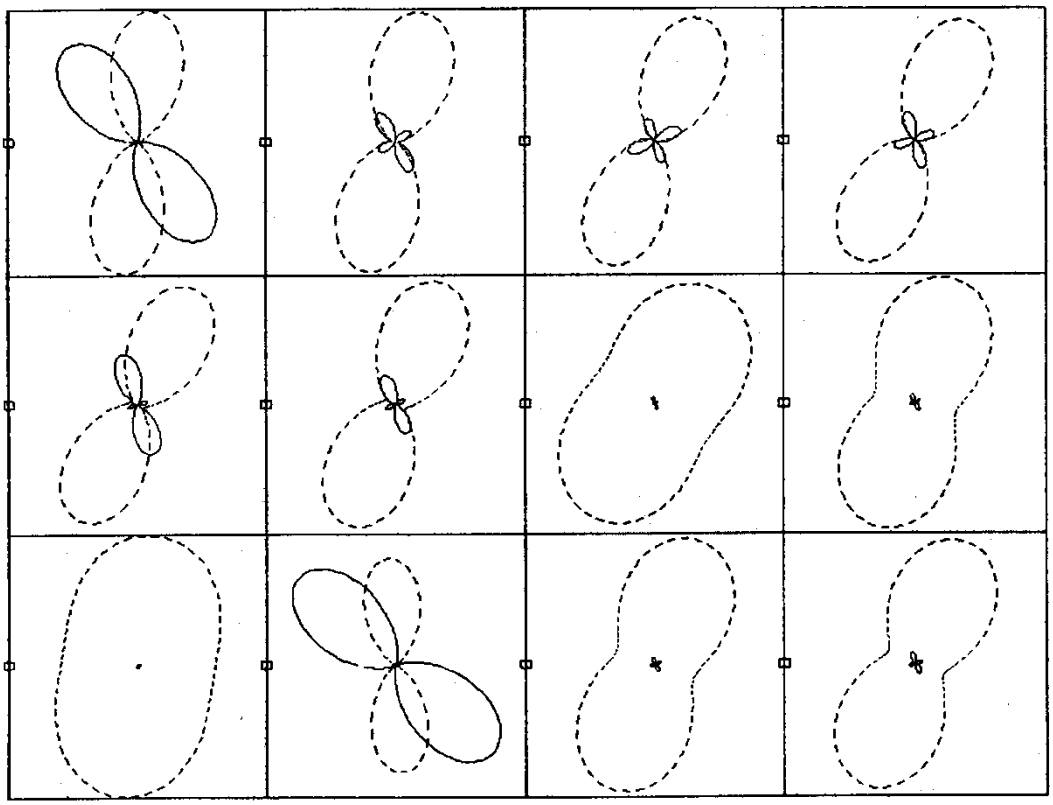
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



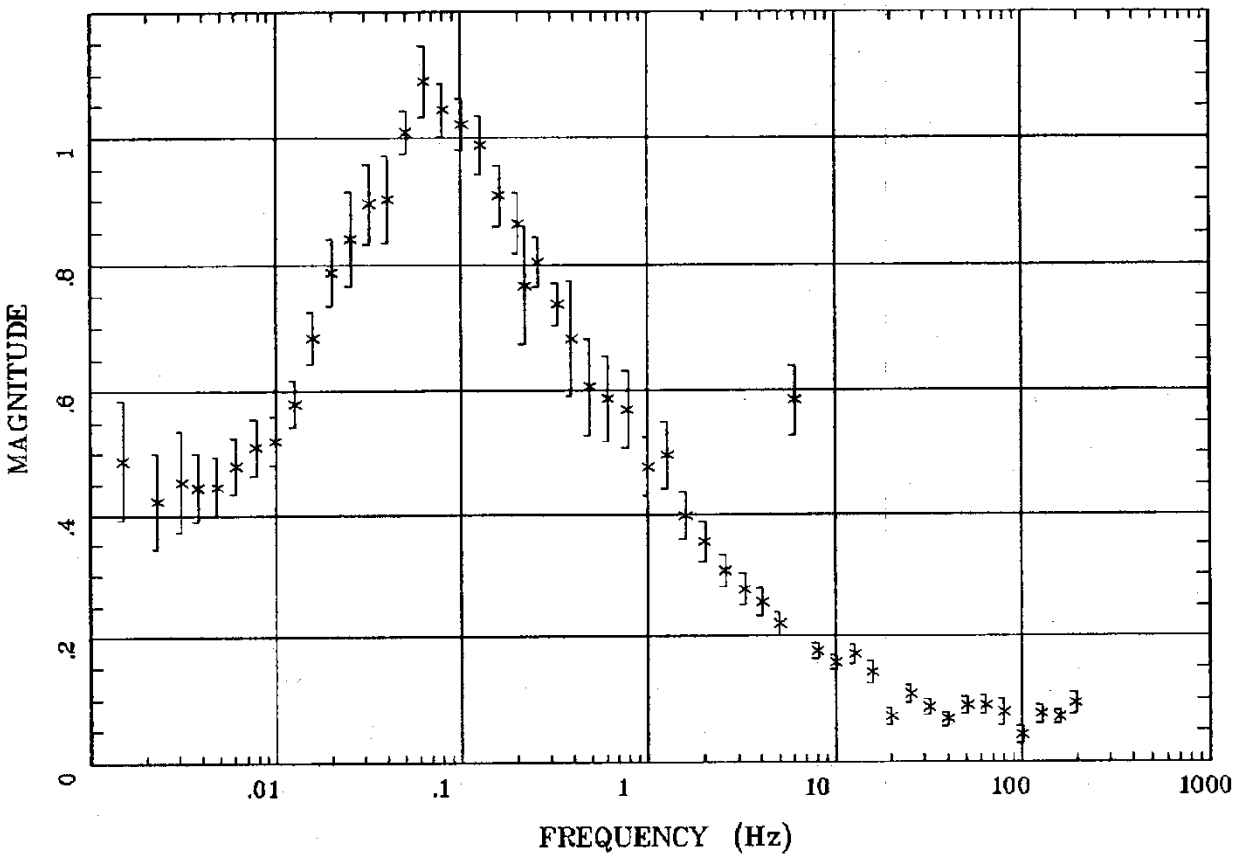
.0015 Hz	.0048 Hz	.0126 Hz	.0401 Hz
.101 Hz	.220 Hz	.610 Hz	1.587 Hz
4.077 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 46

TIPPER MAGNITUDE

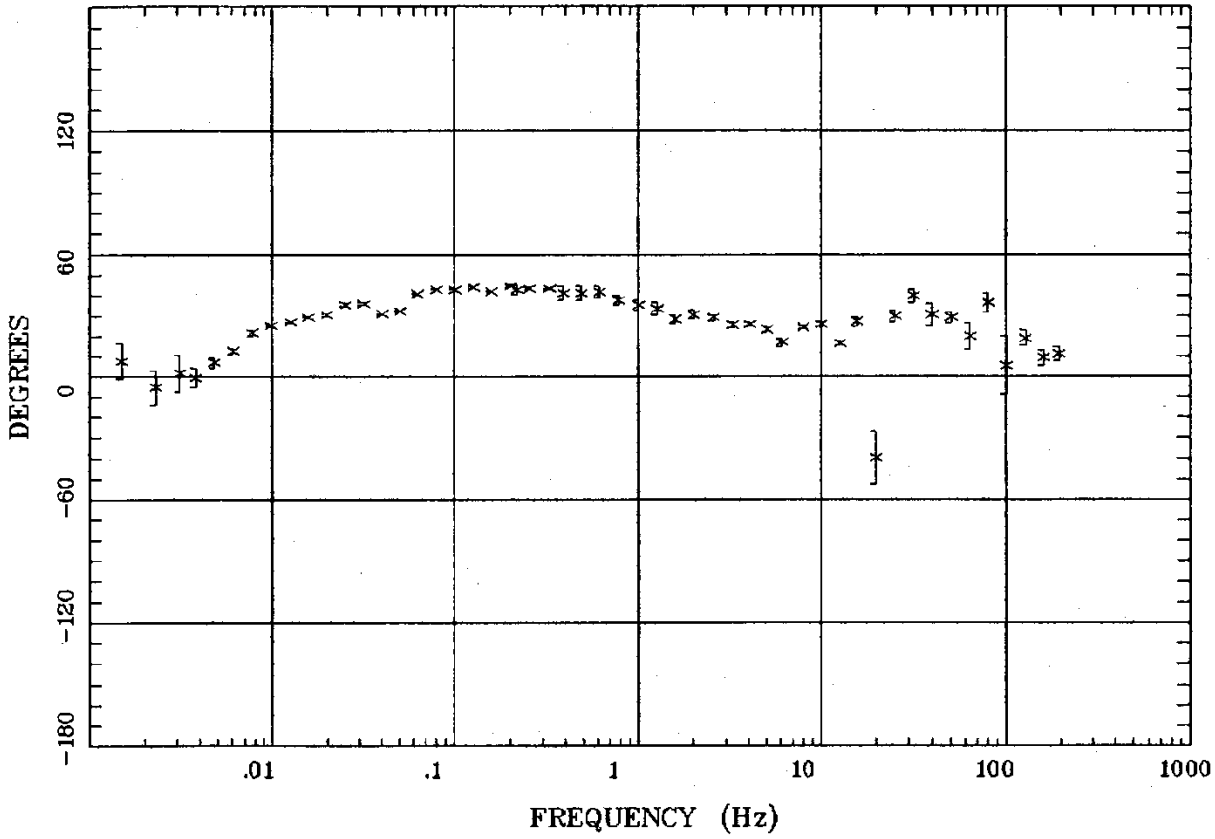


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 46

TIPPER STRIKE

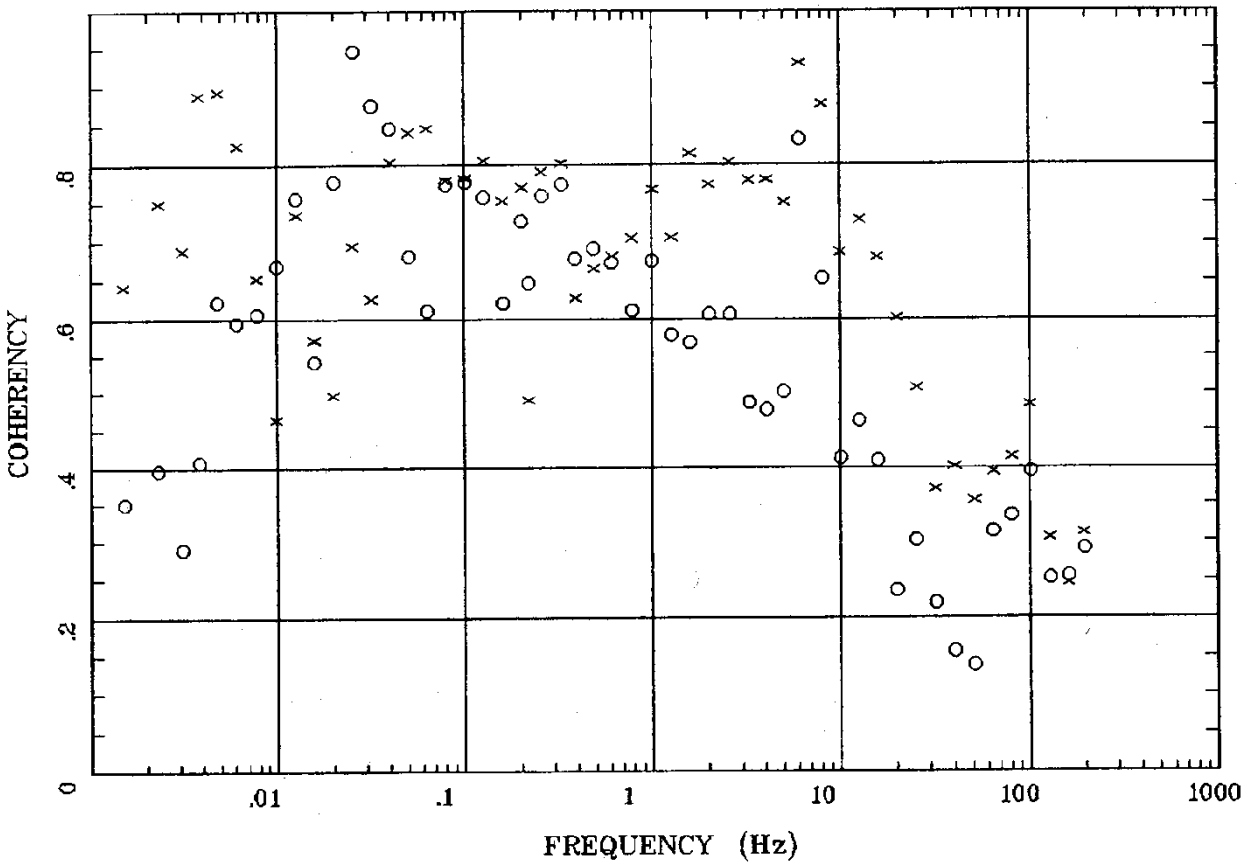


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 46

HzHx.x Coh HzHy.o

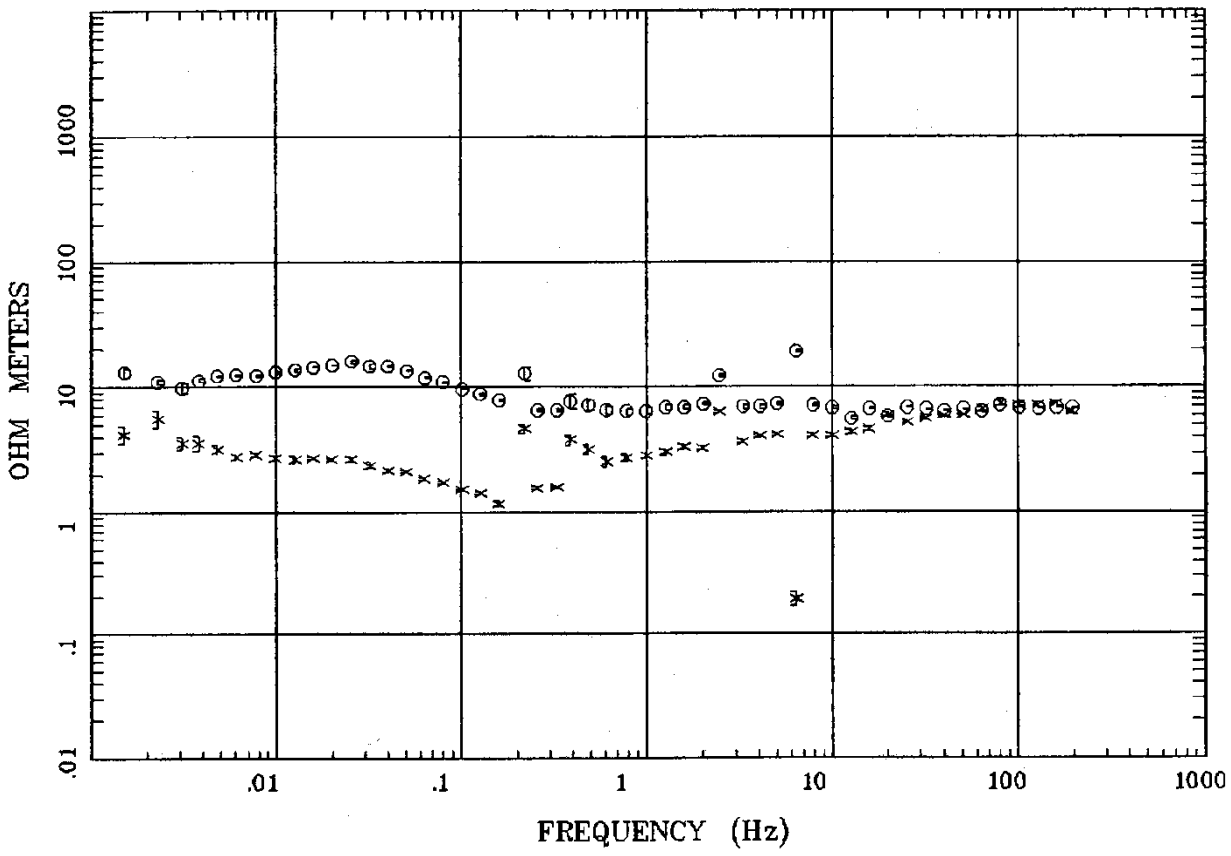


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap46.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 47

APPARENT RESISTIVITY

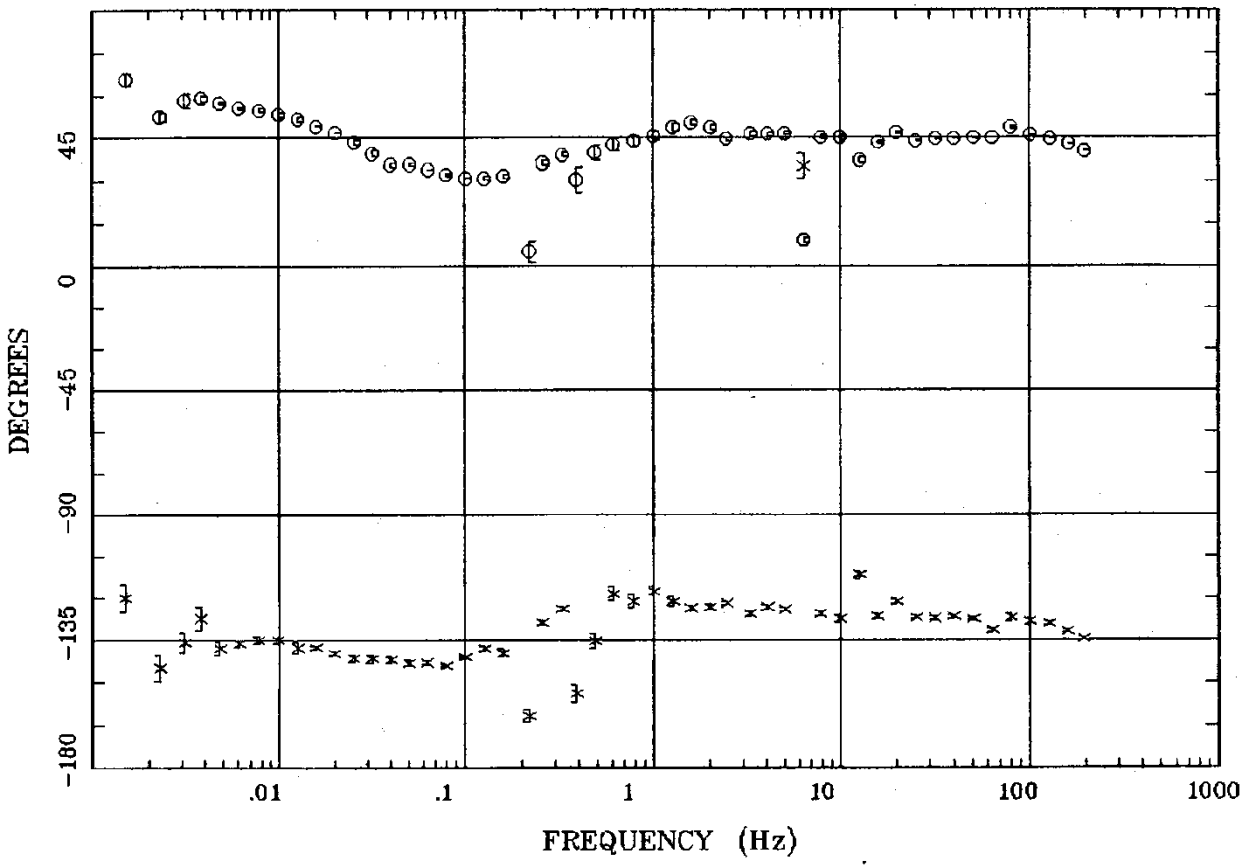


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 47

IMPEDANCE PHASE

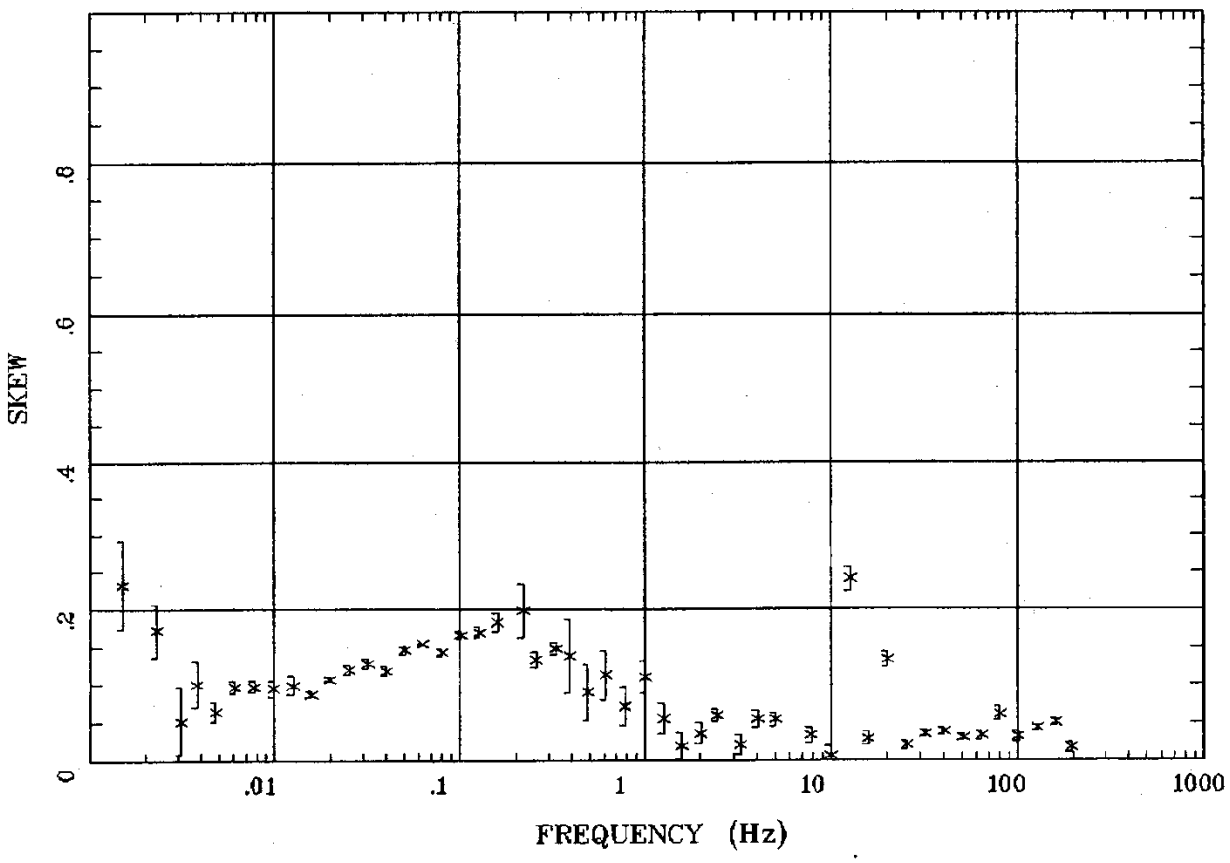


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 47

IMPEDANCE SKEW

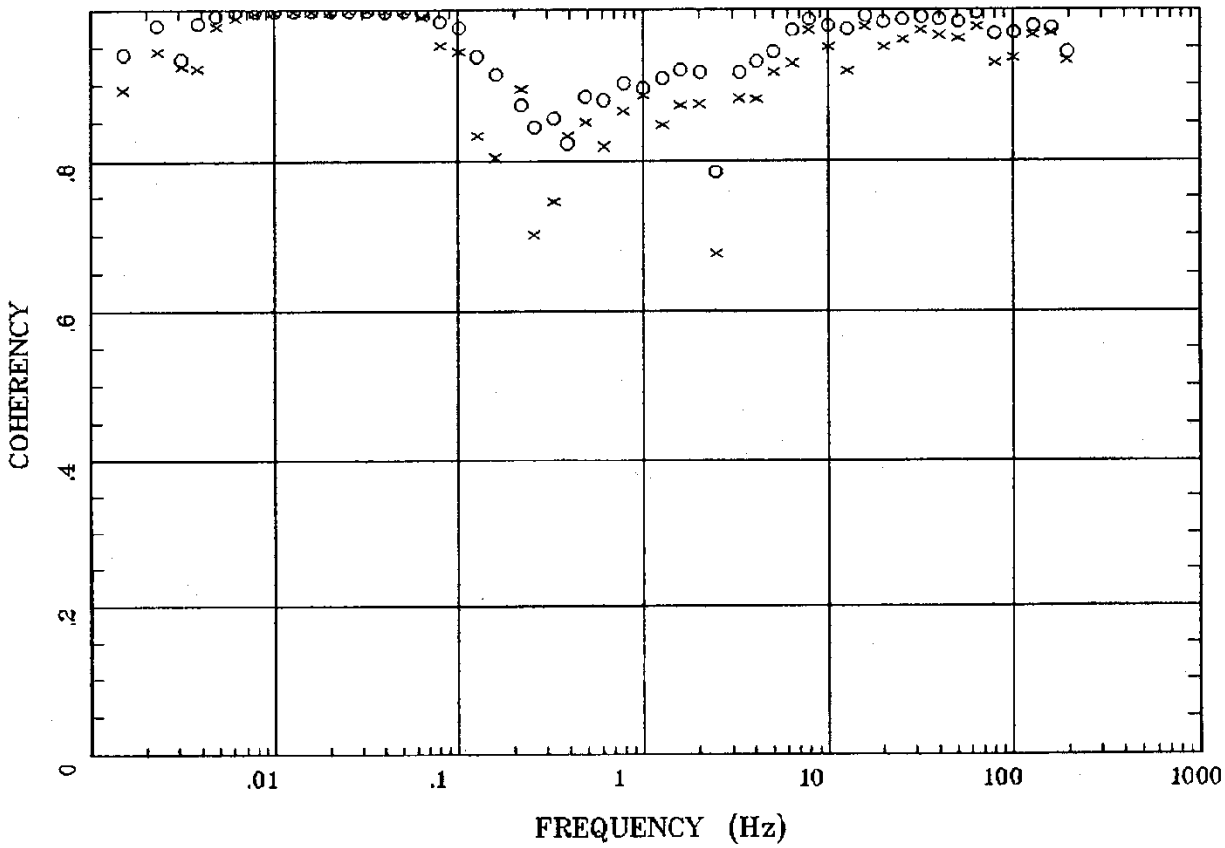


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 47

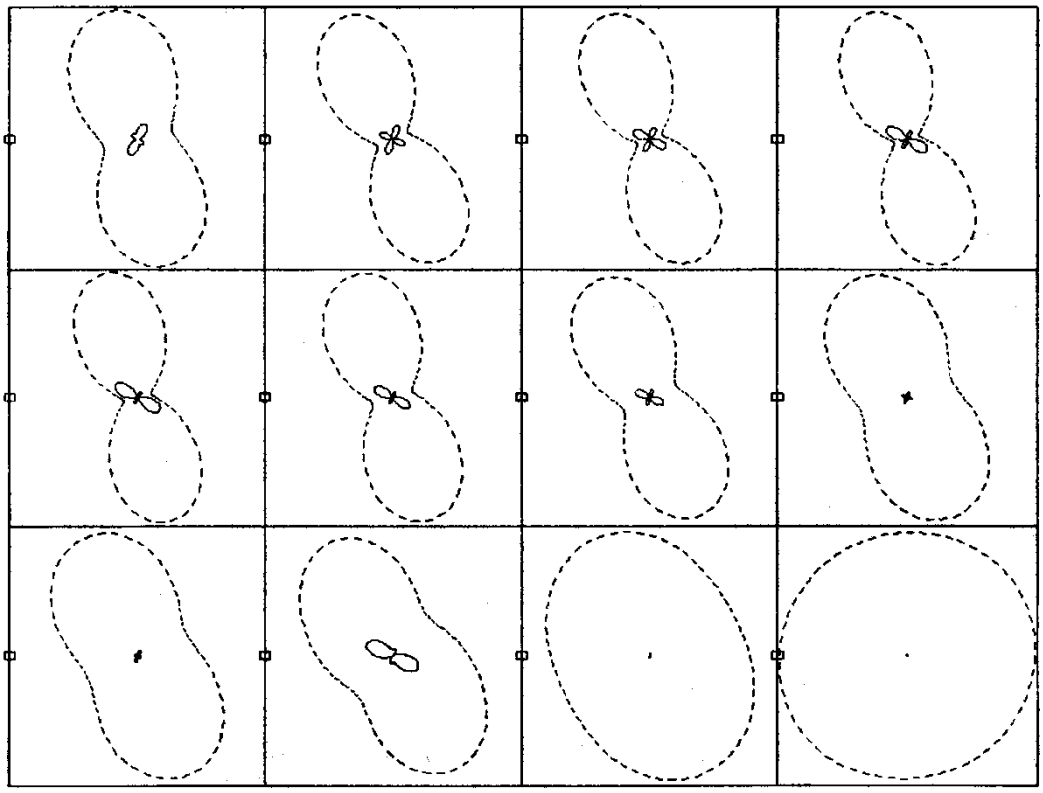
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



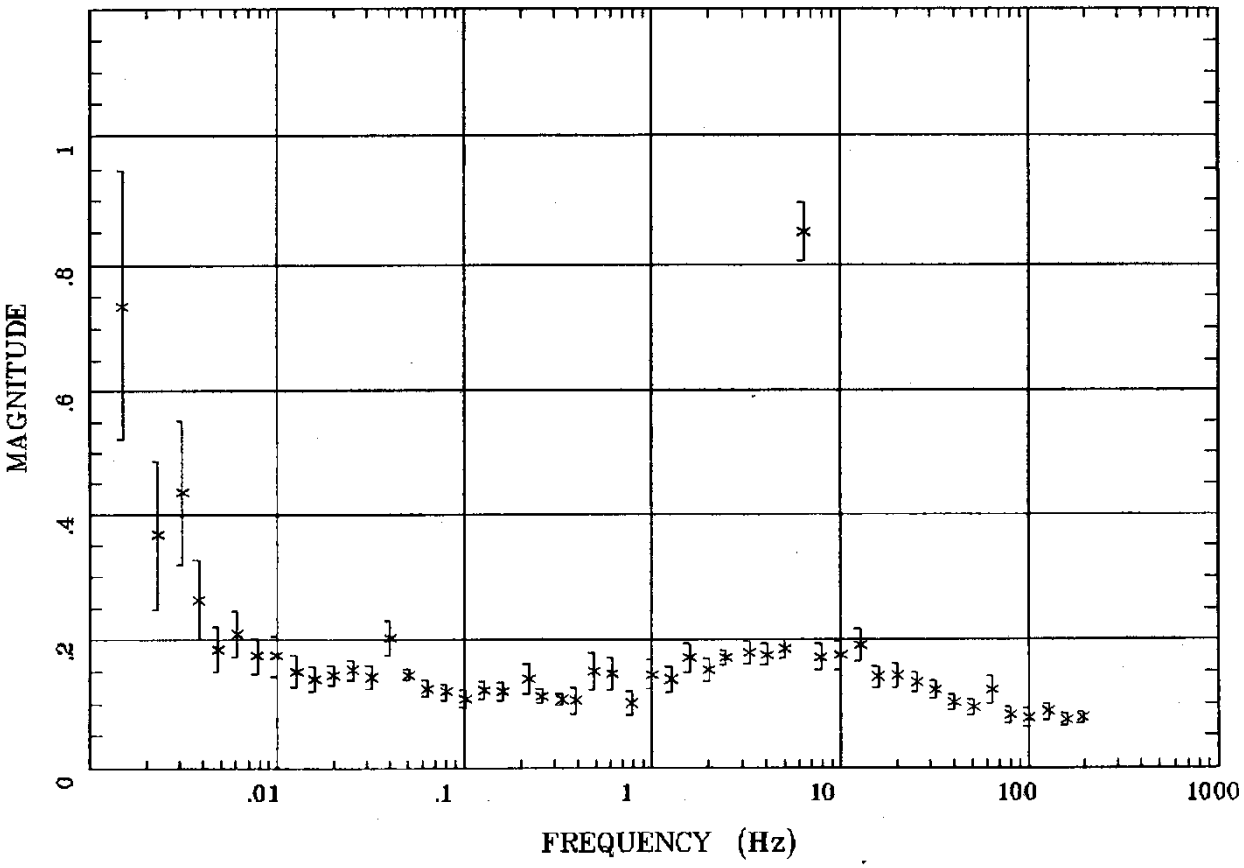
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.610 Hz	1.587 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 47

TIPPER MAGNITUDE

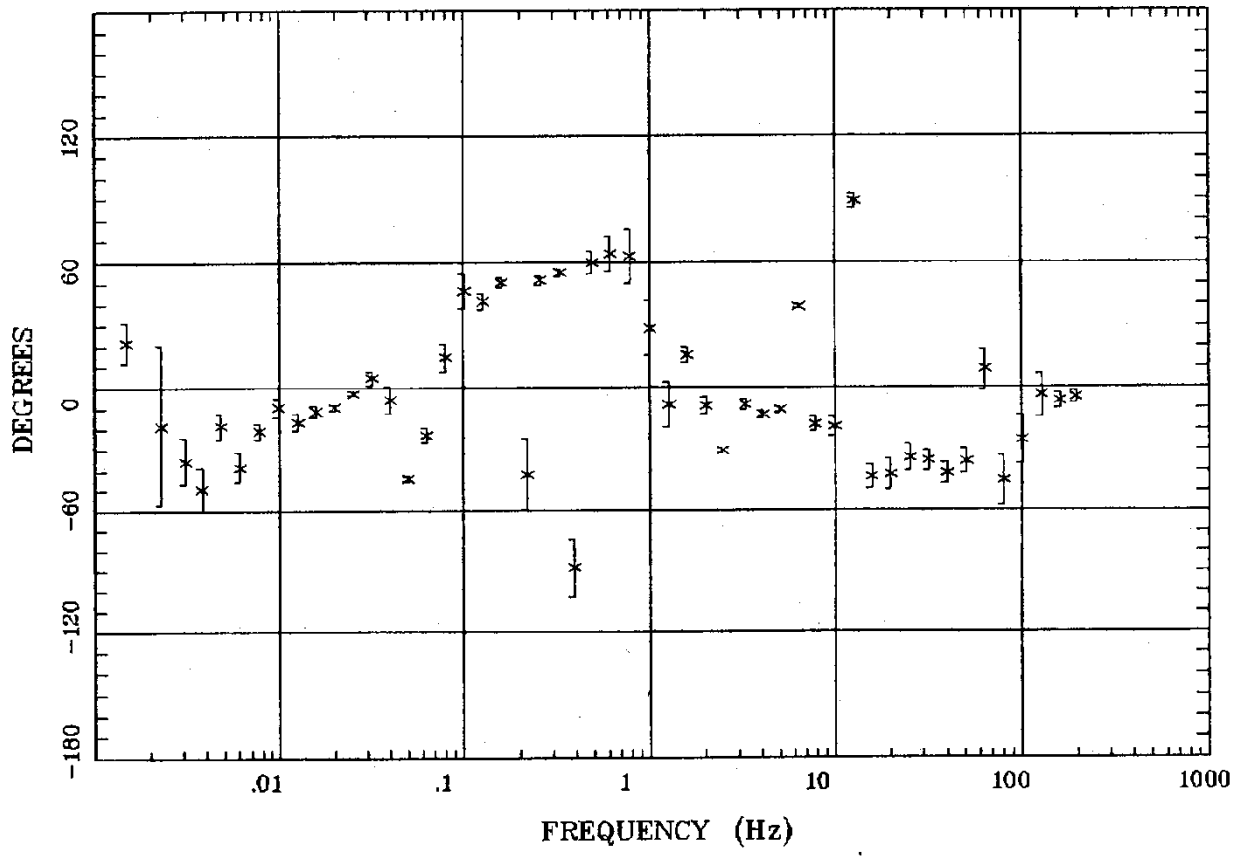


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 47

TIPPER STRIKE

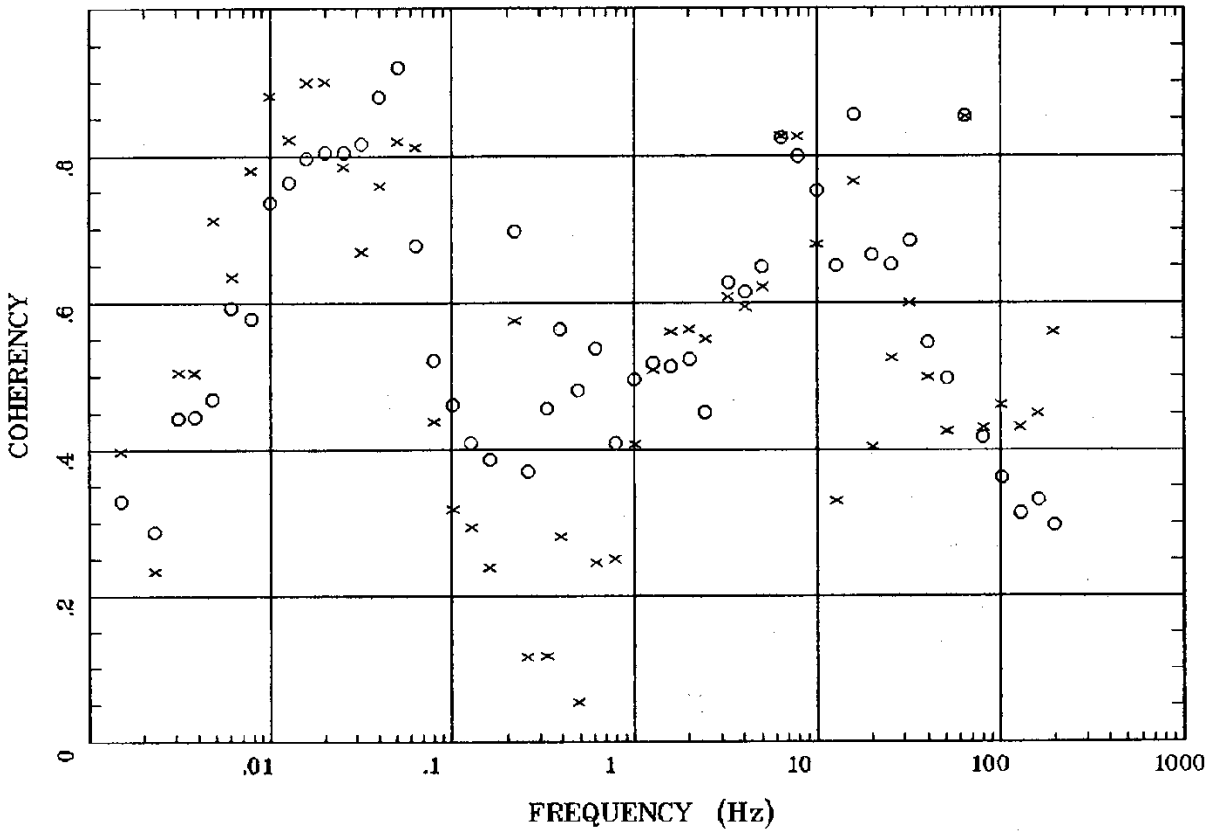


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 47

HzHx.x Coh HzHy.o

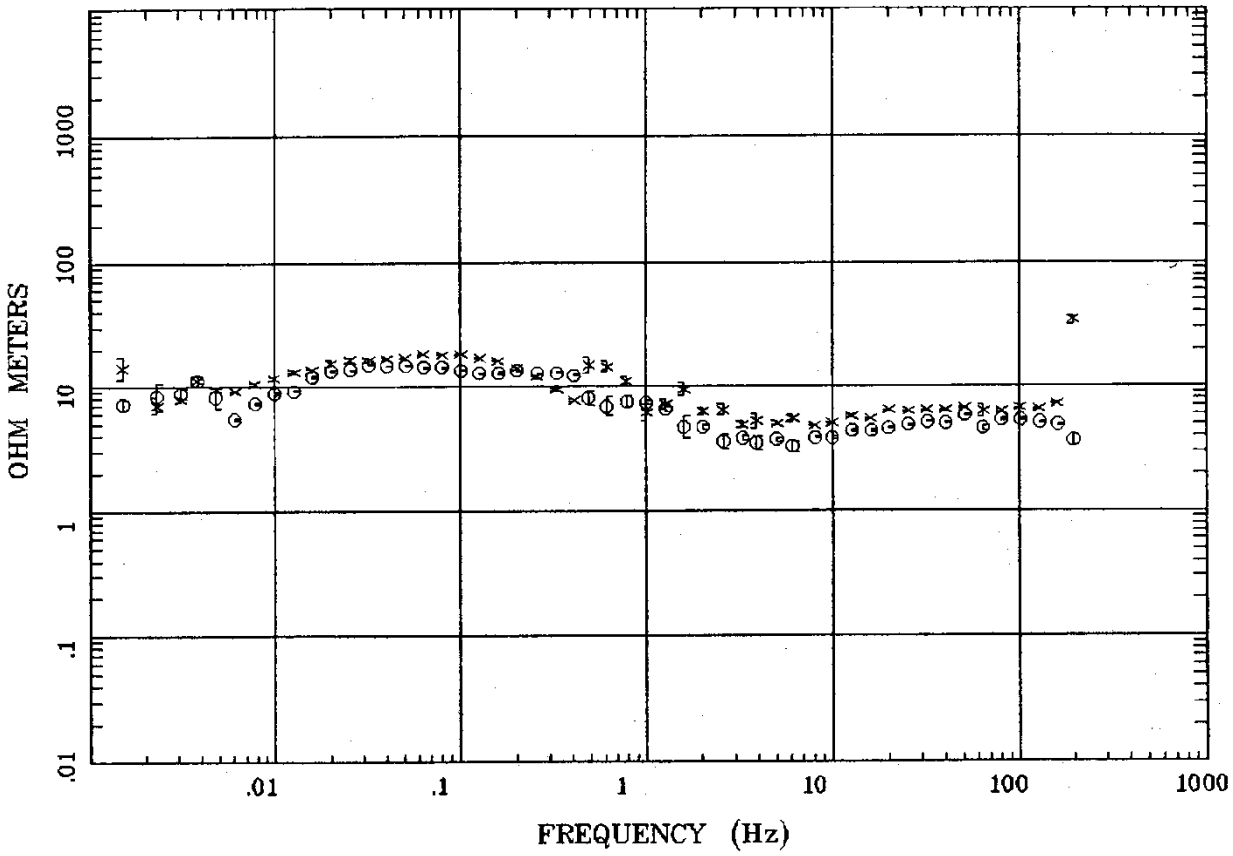


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap47.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:13 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 48

APPARENT RESISTIVITY

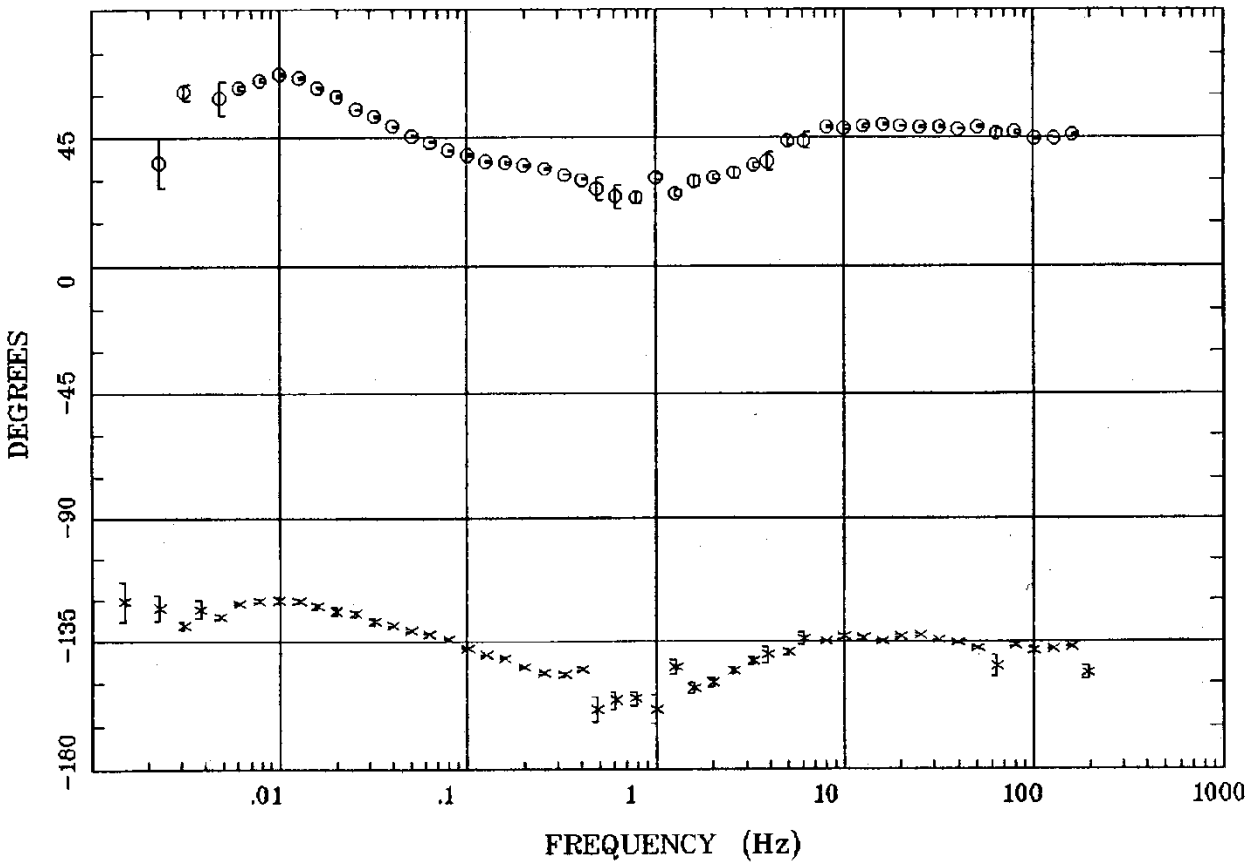


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 48

IMPEDANCE PHASE

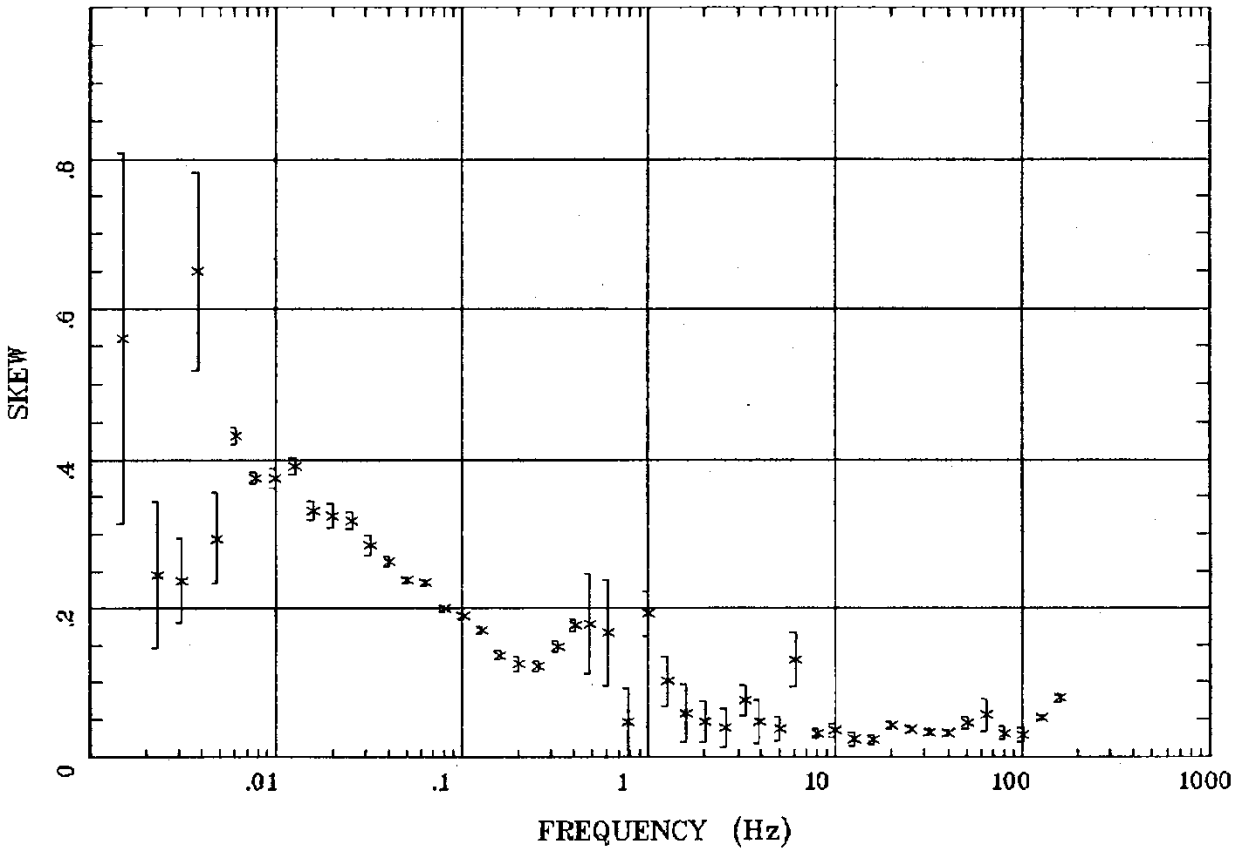


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 48

IMPEDANCE SKEW

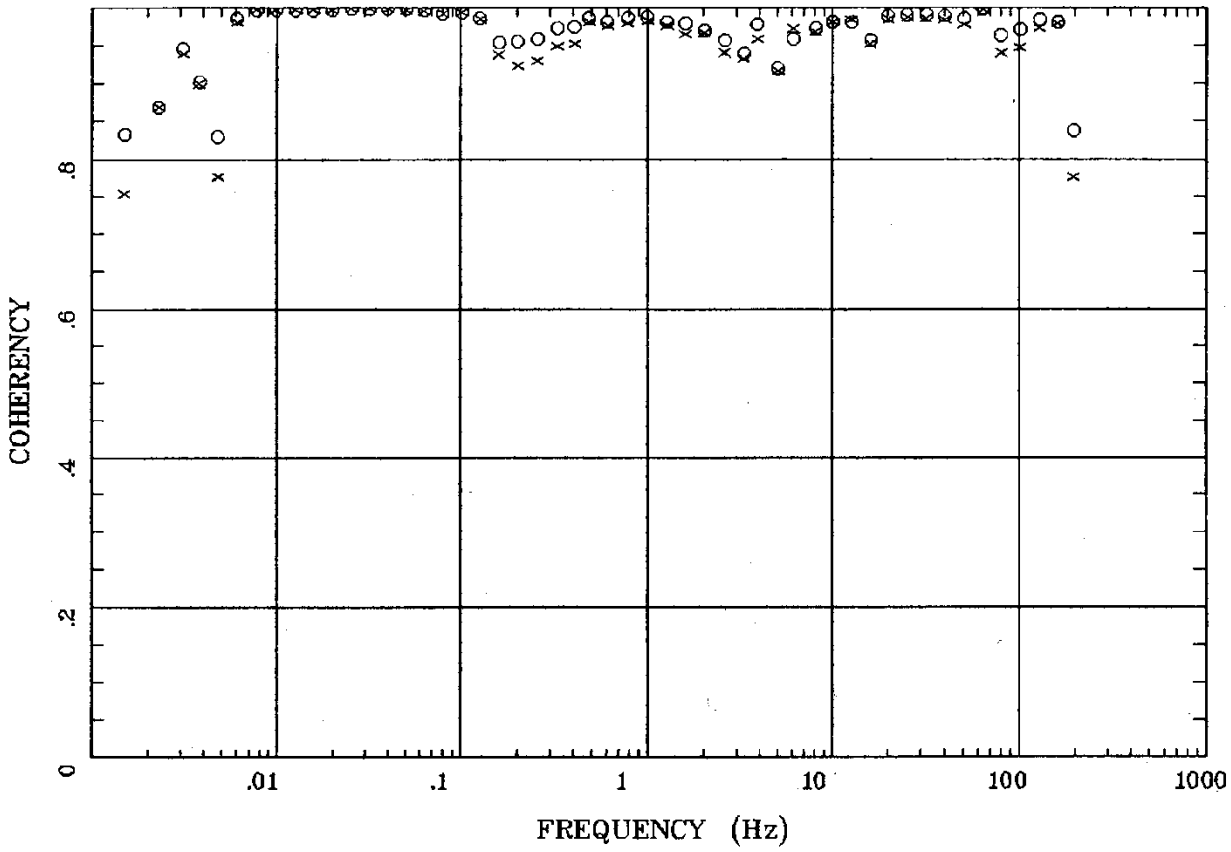


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 48

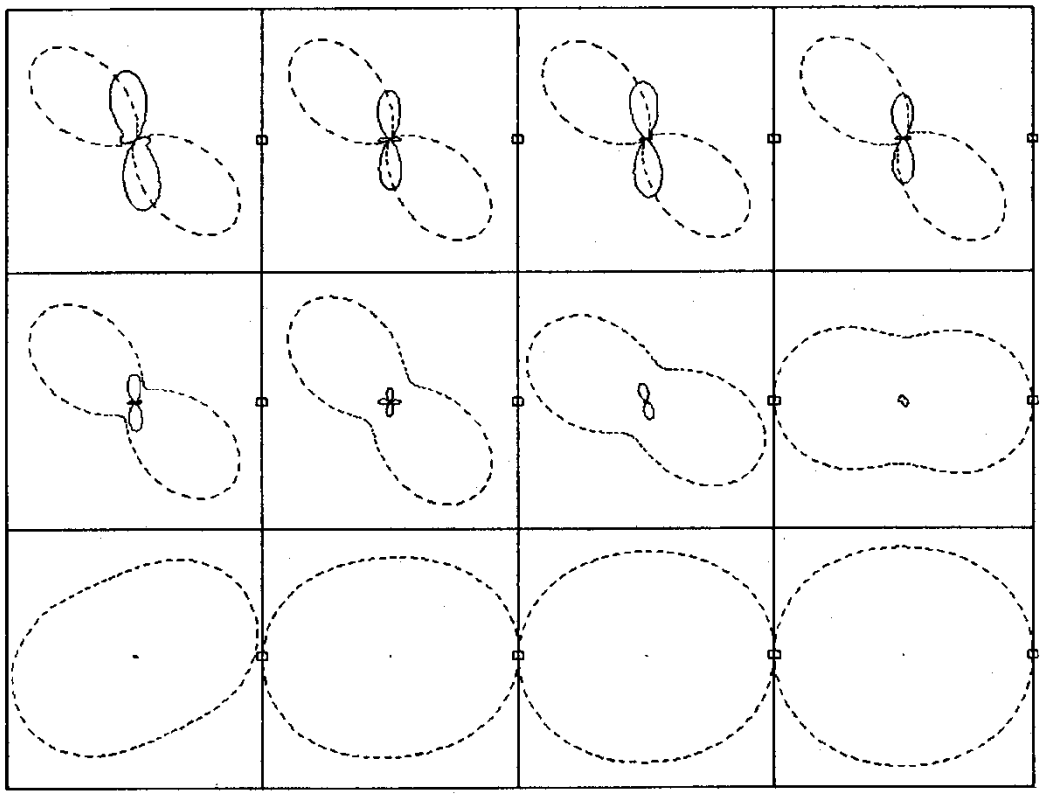
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



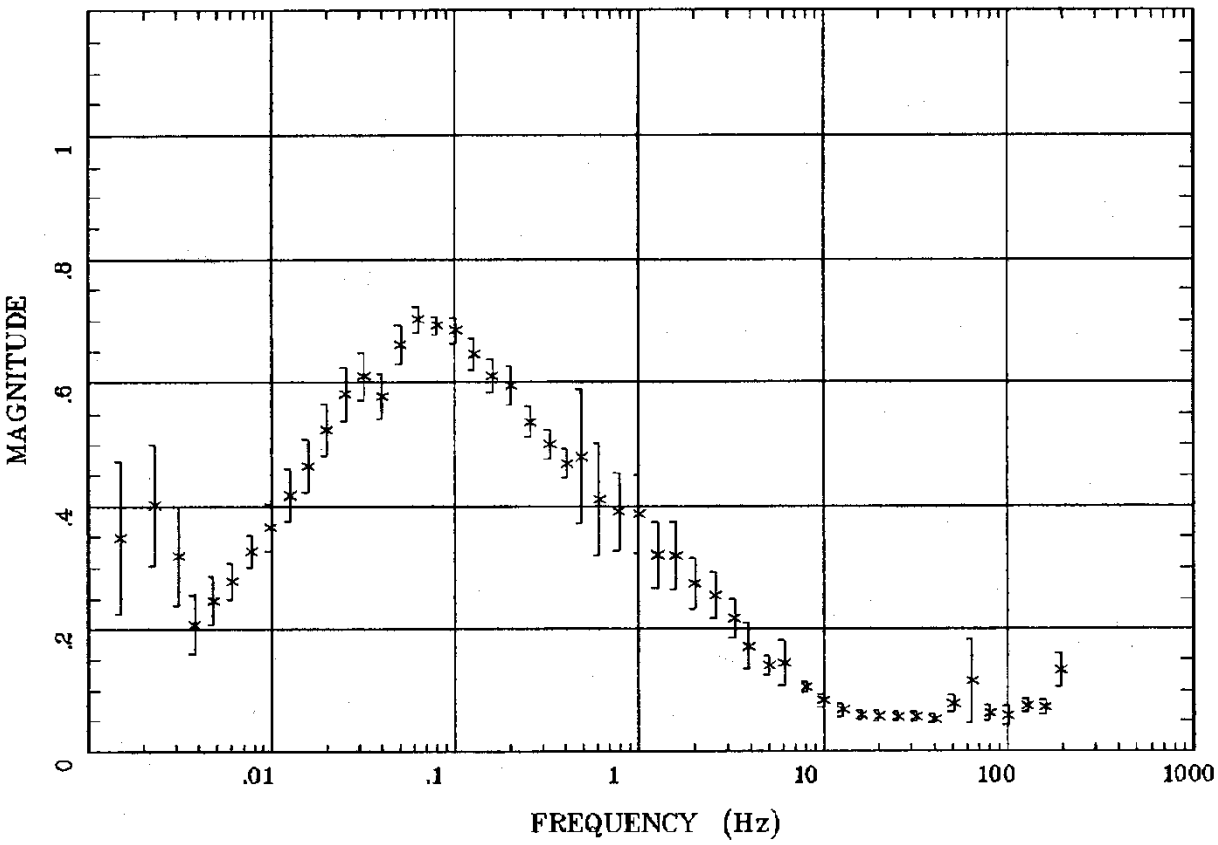
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.610 Hz	1.587 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 48

TIPPER MAGNITUDE

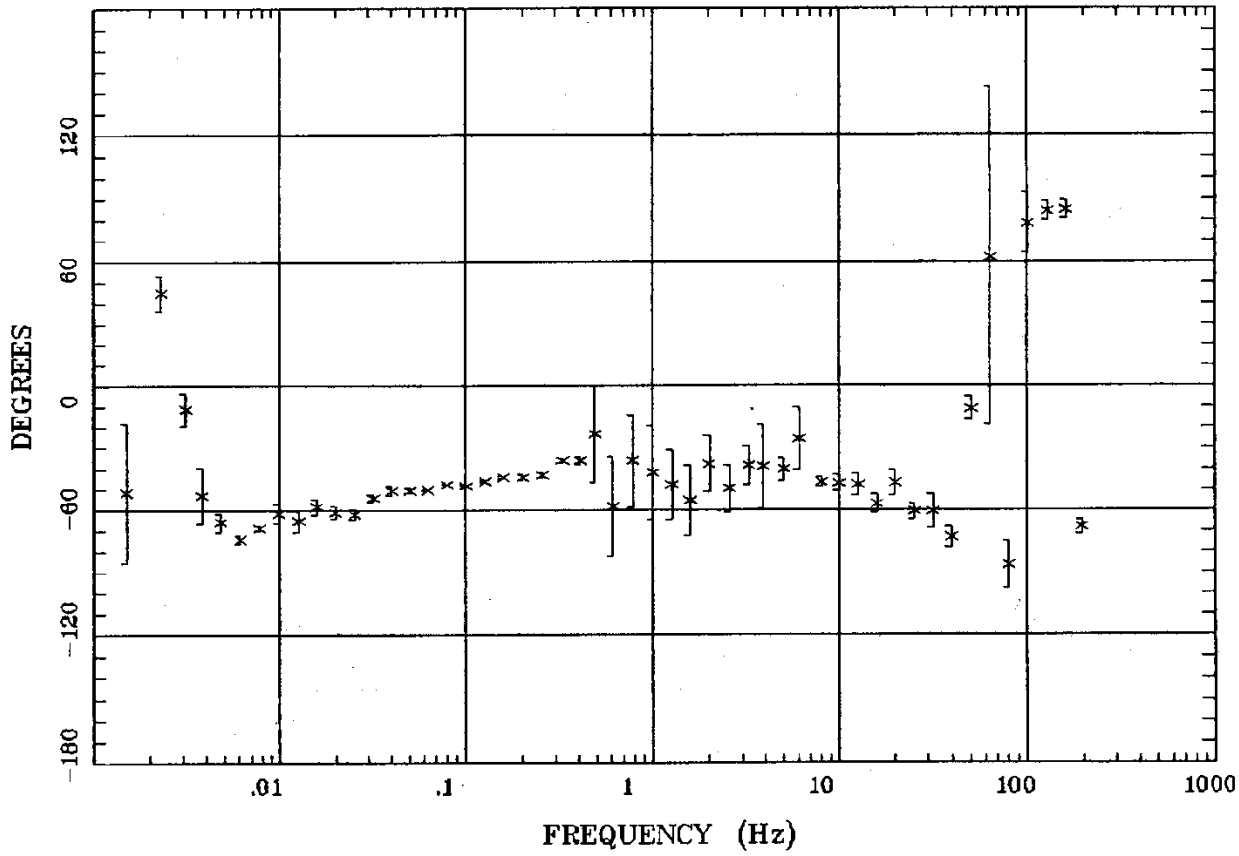


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 48

TIPPER STRIKE

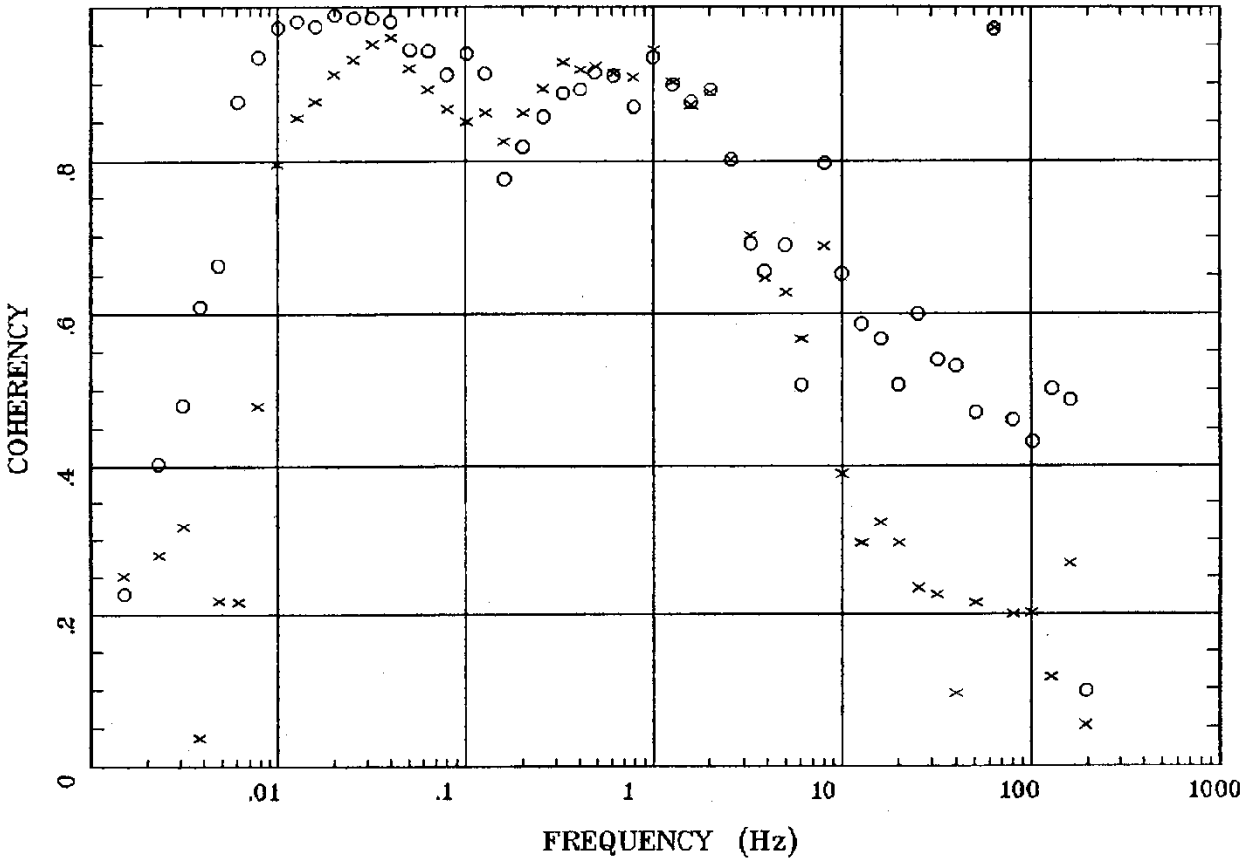


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 48

HzHx.x Coh HzHy.o

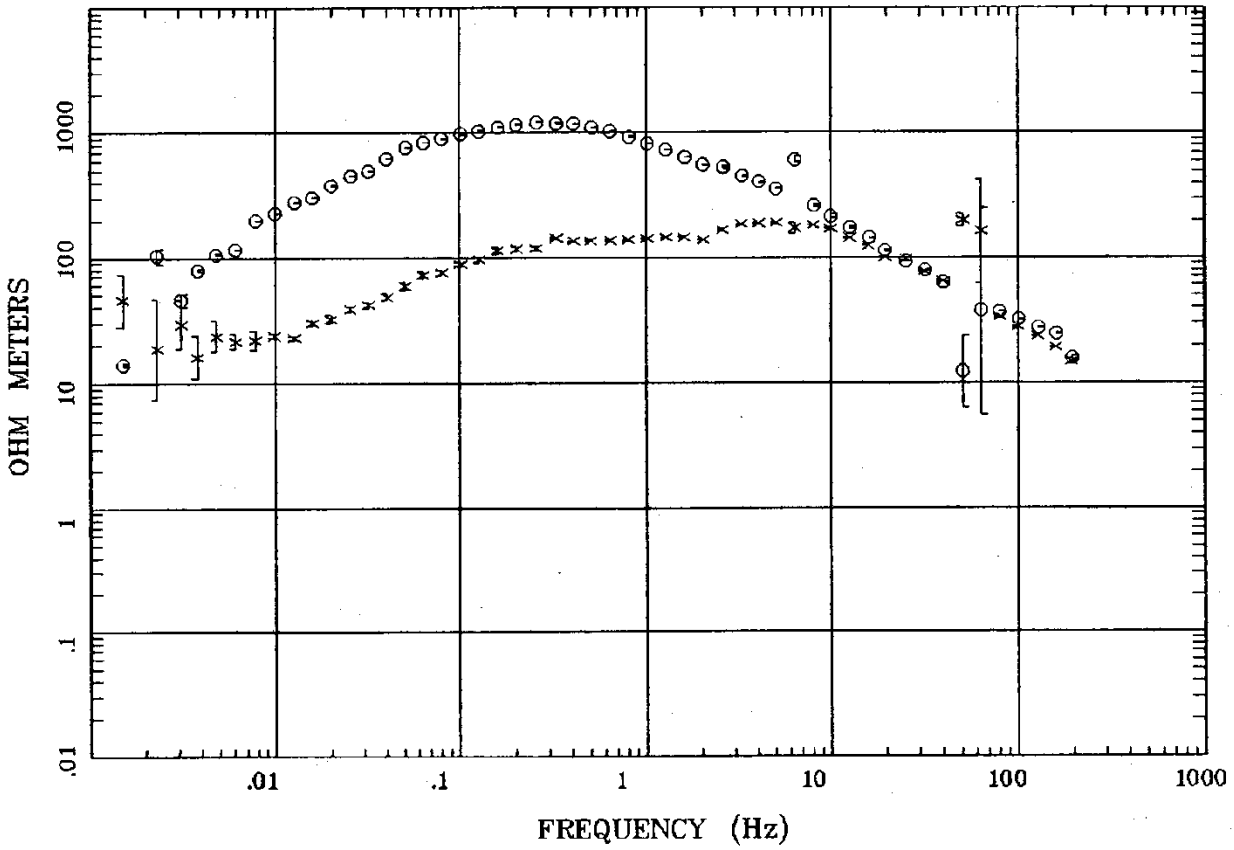


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap48.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:12 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

APPARENT RESISTIVITY

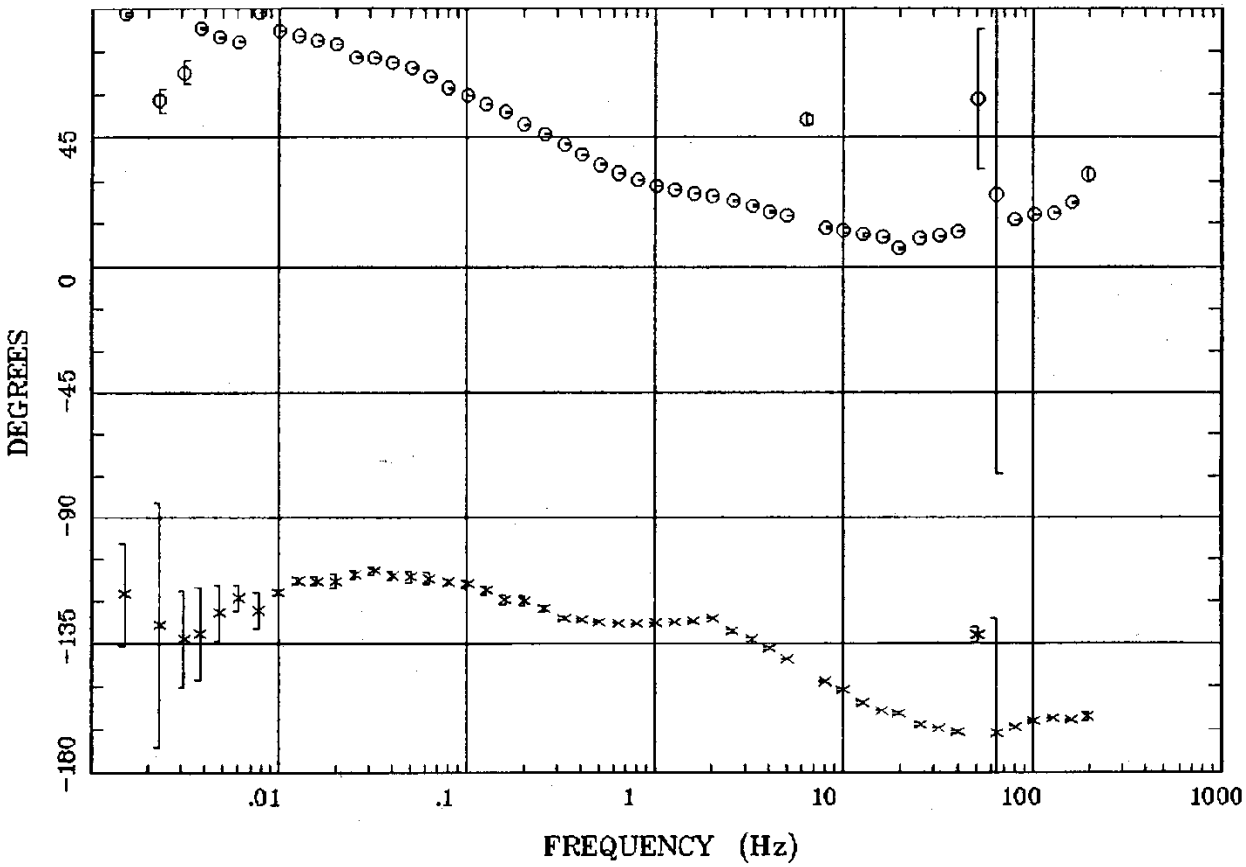


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

IMPEDANCE PHASE

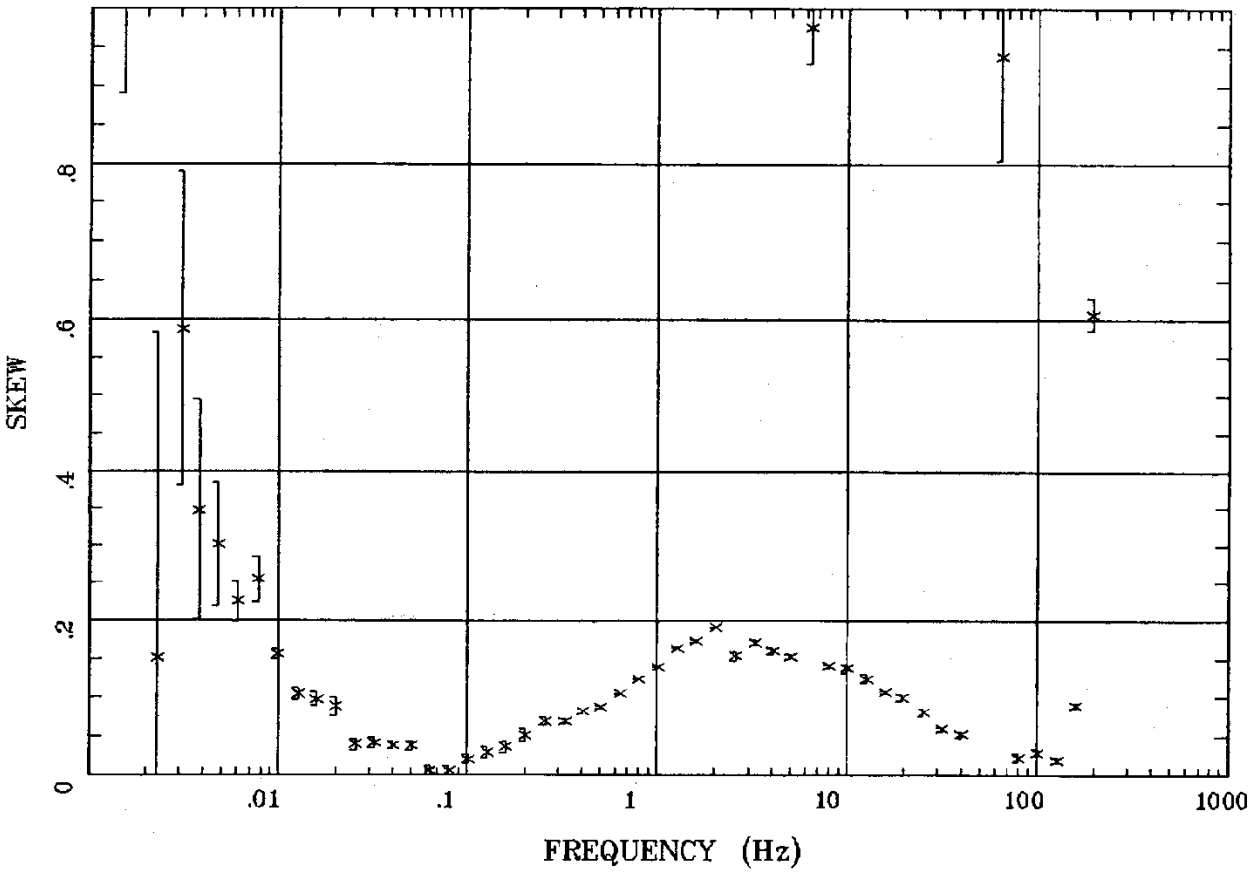


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

IMPEDANCE SKEW

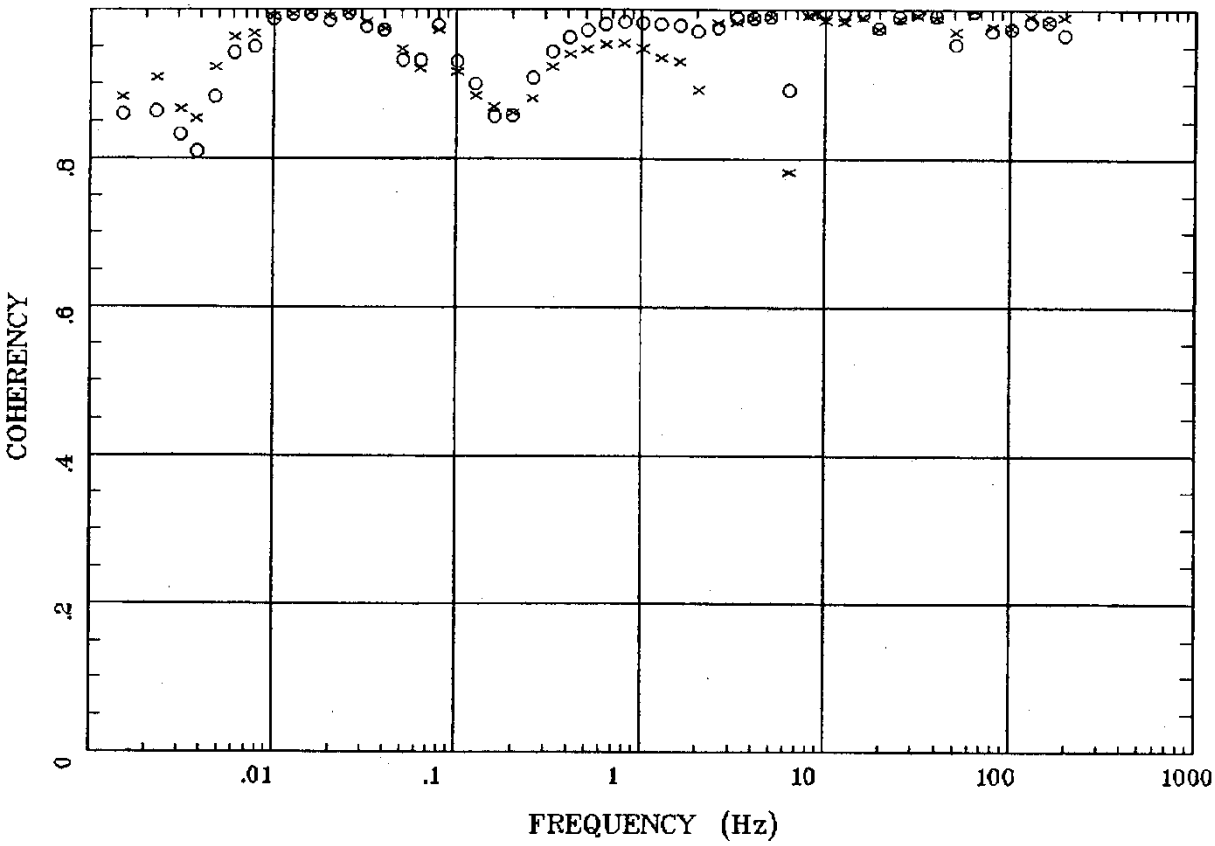


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

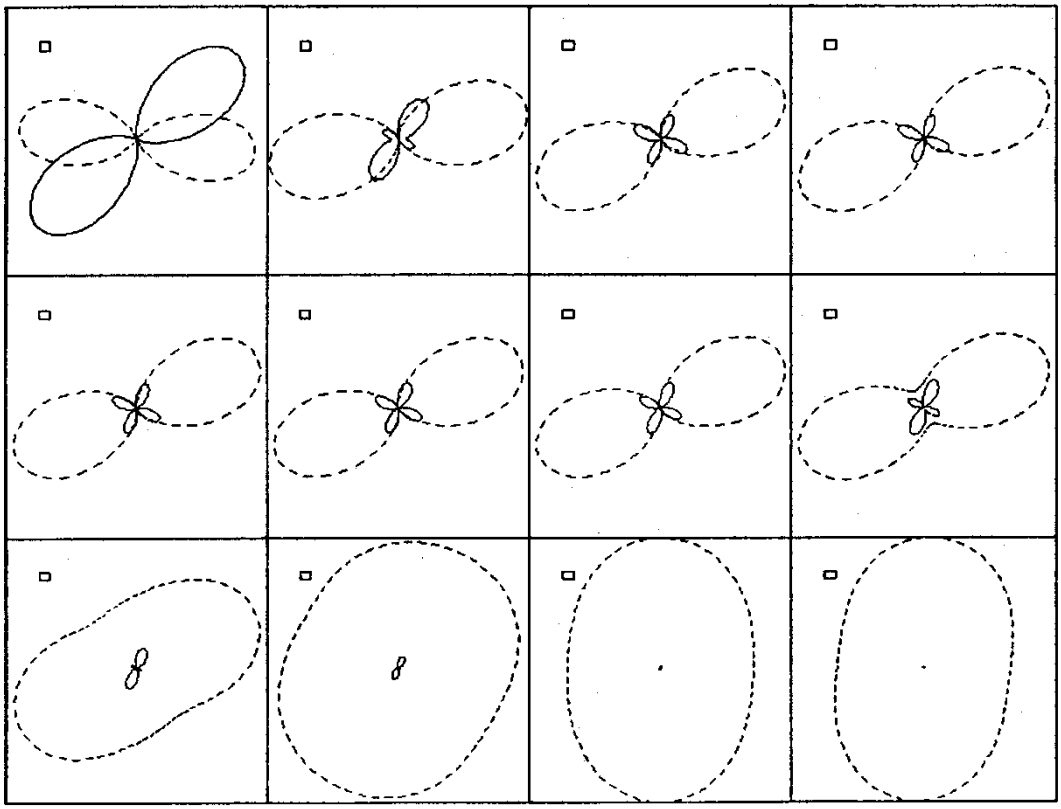
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



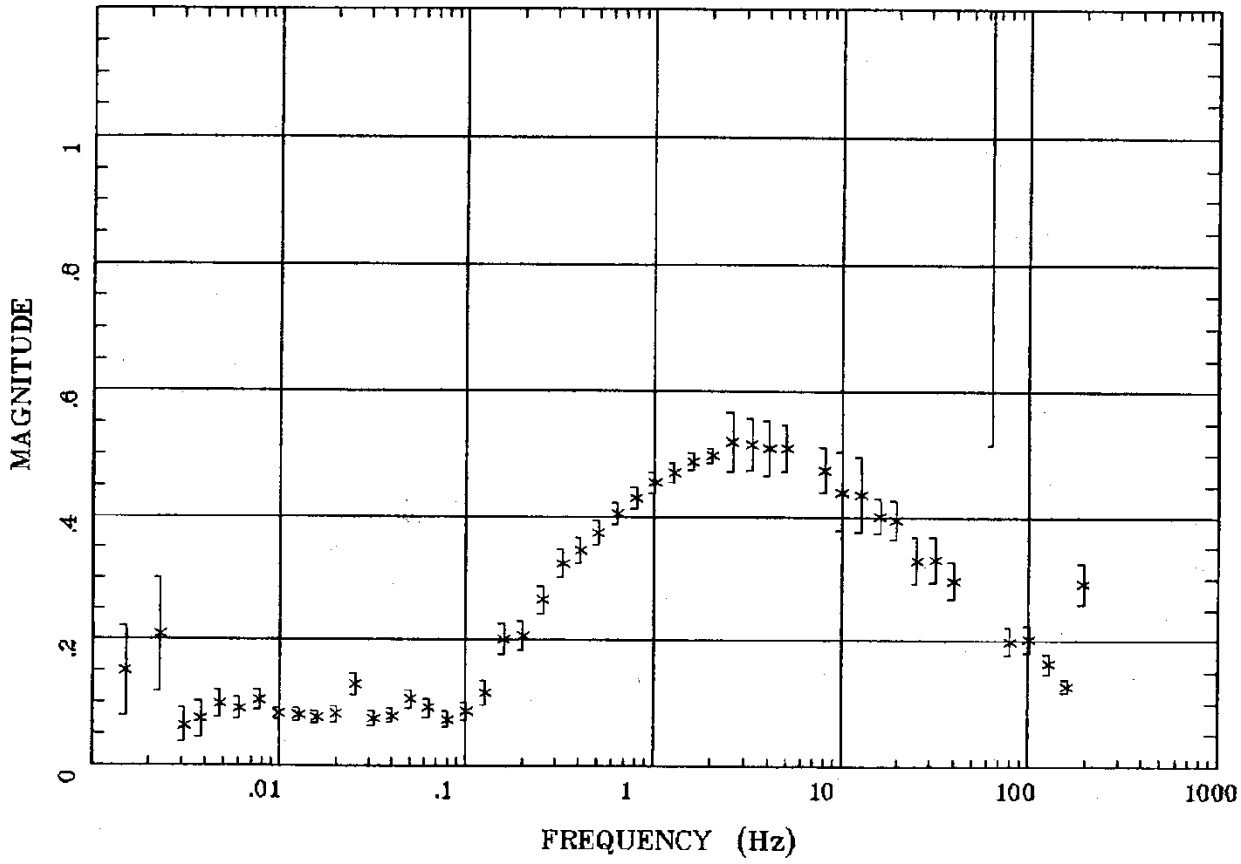
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.607 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

TIPPER MAGNITUDE

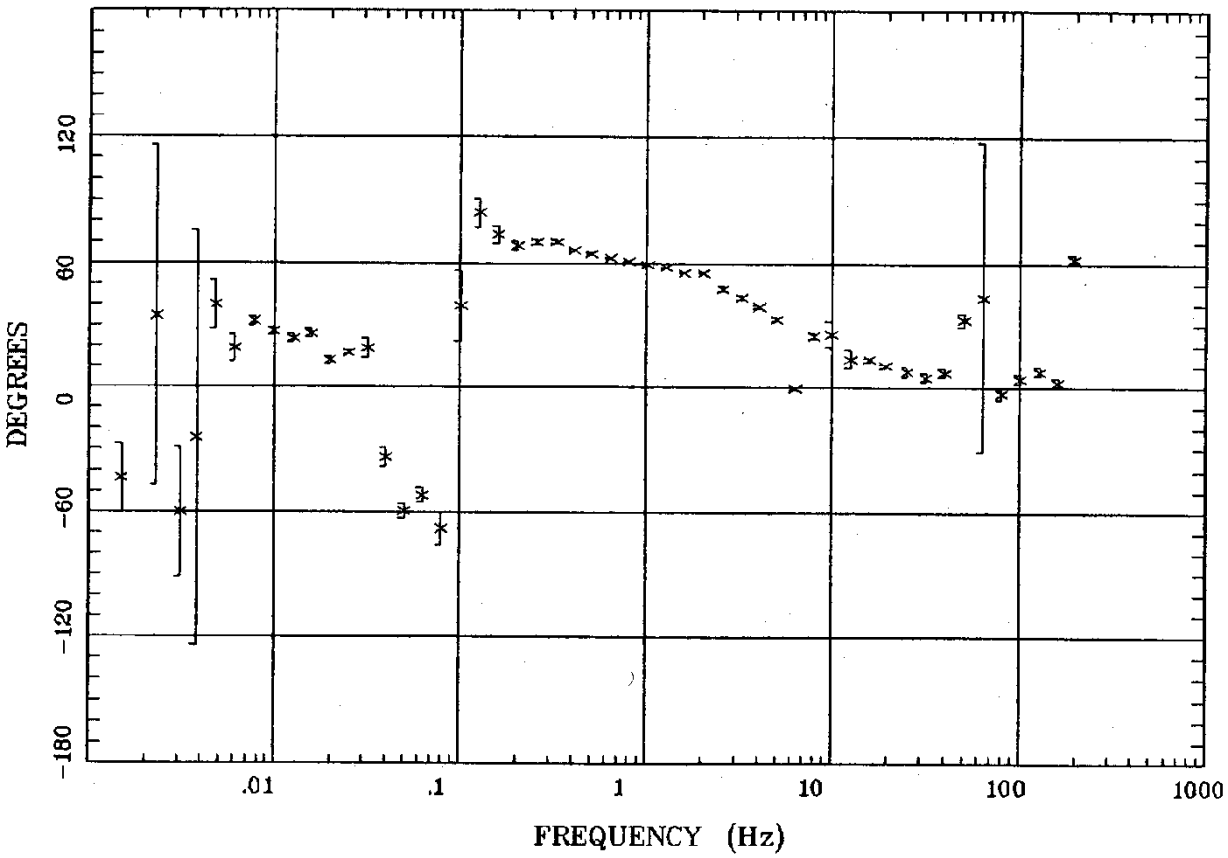


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

TIPPER STRIKE

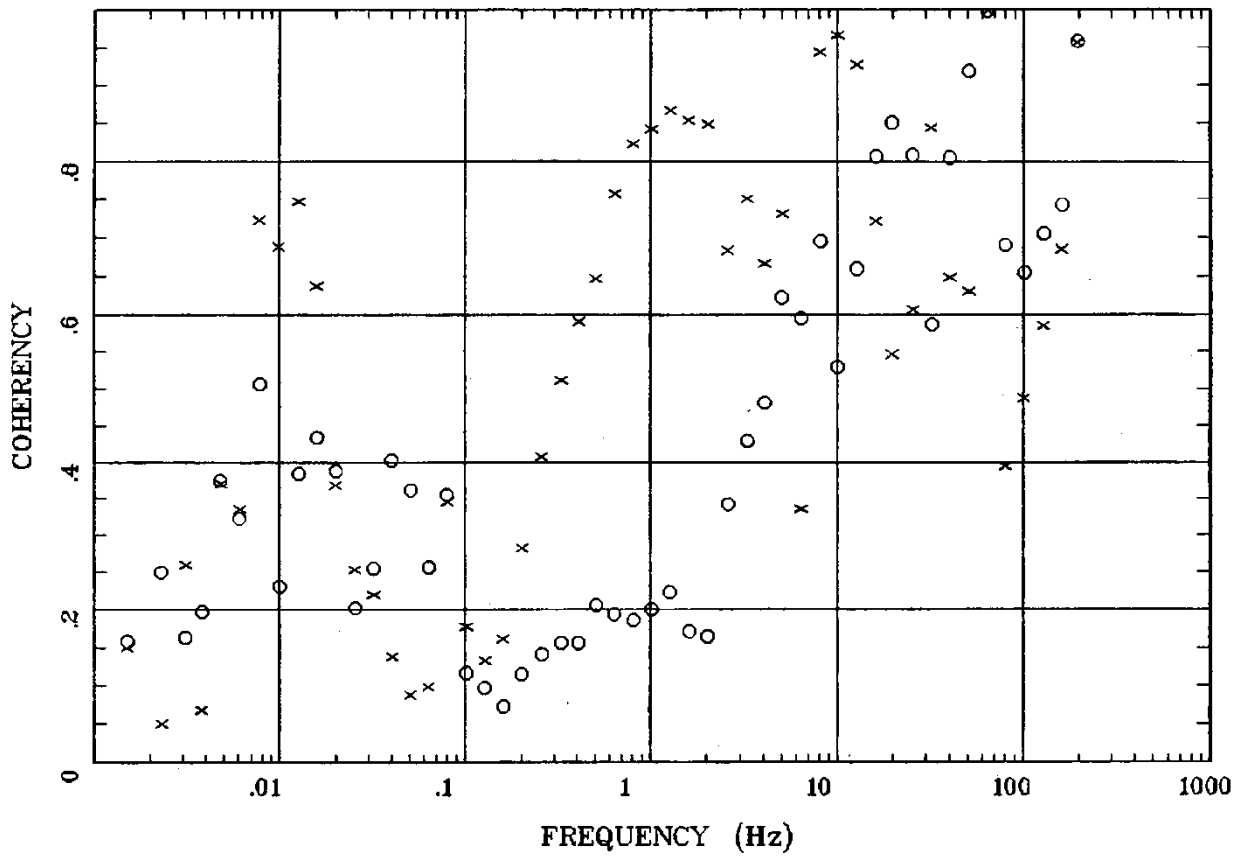


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 49

HzHx.x Coh HzHy.o

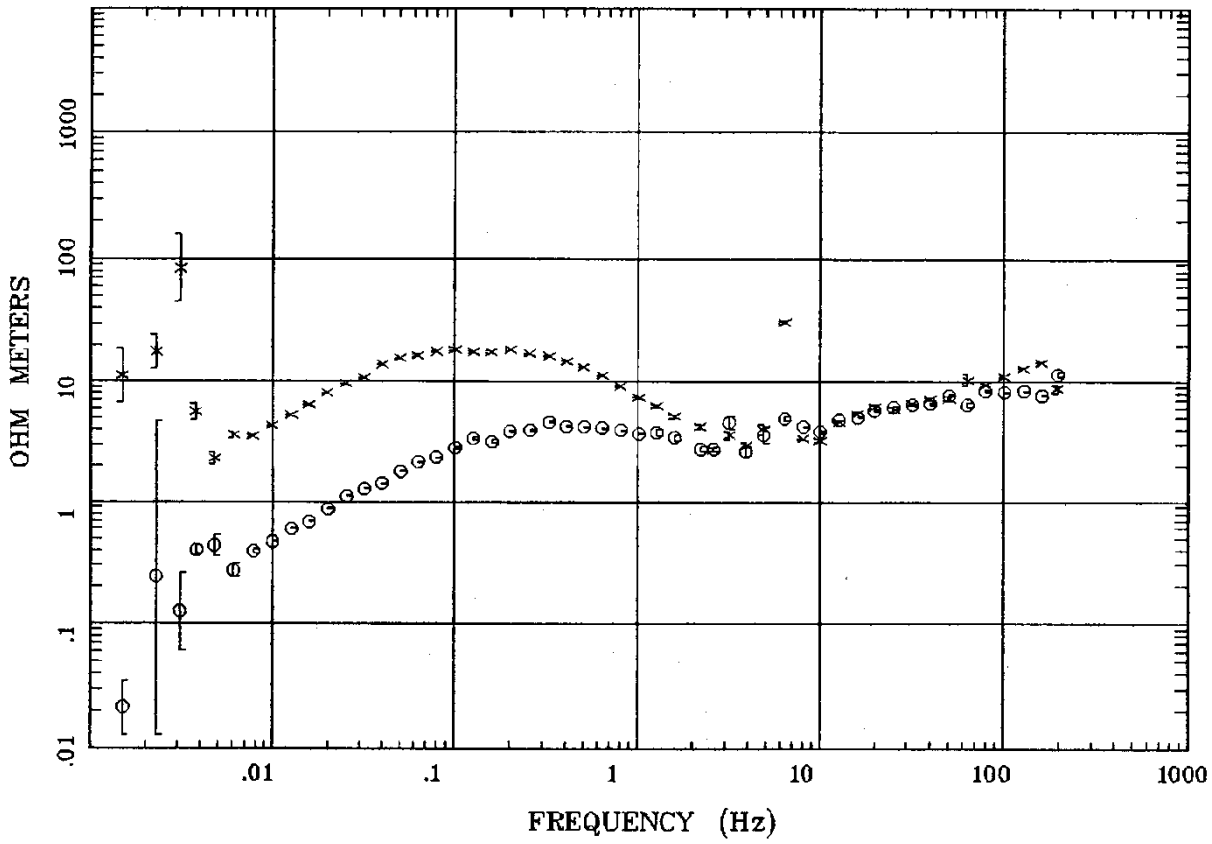


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap49-50s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:54 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 50

APPARENT RESISTIVITY

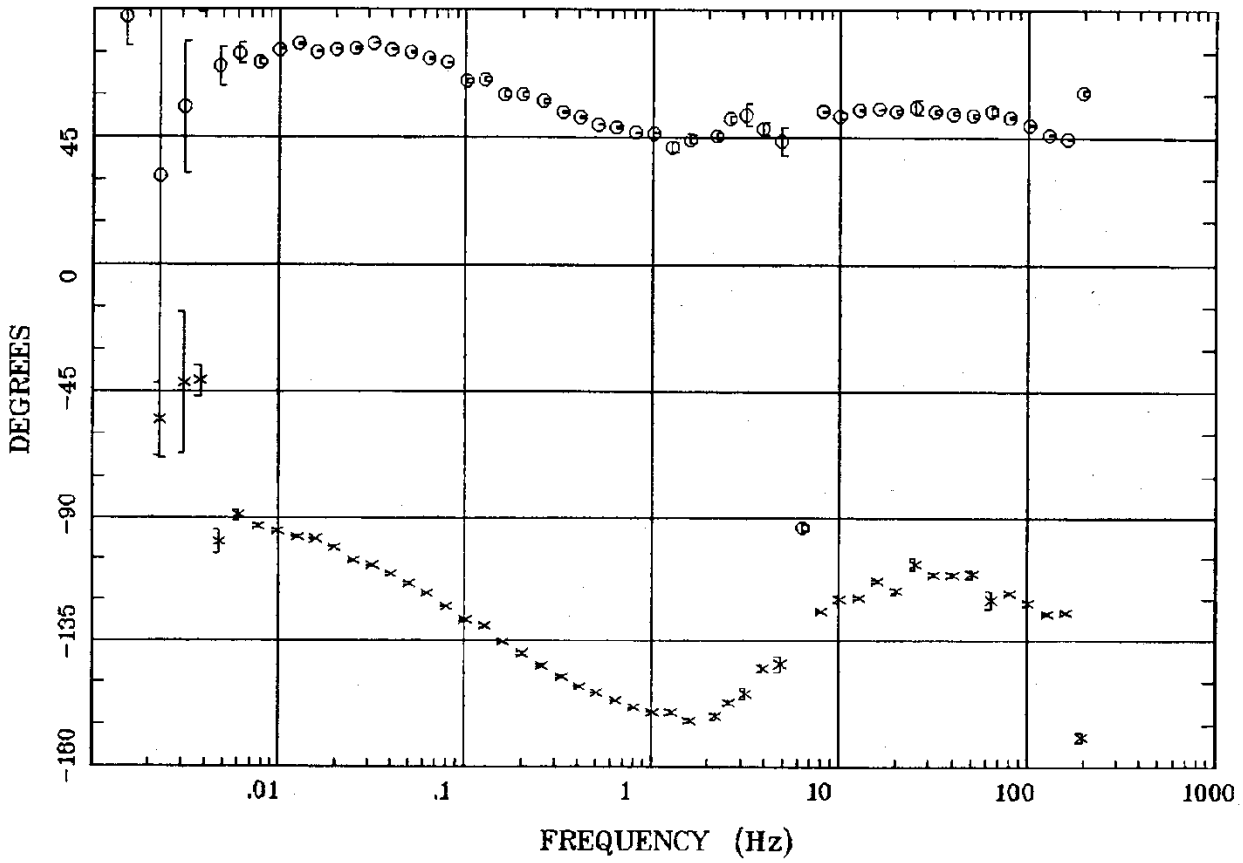


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 50

IMPEDANCE PHASE

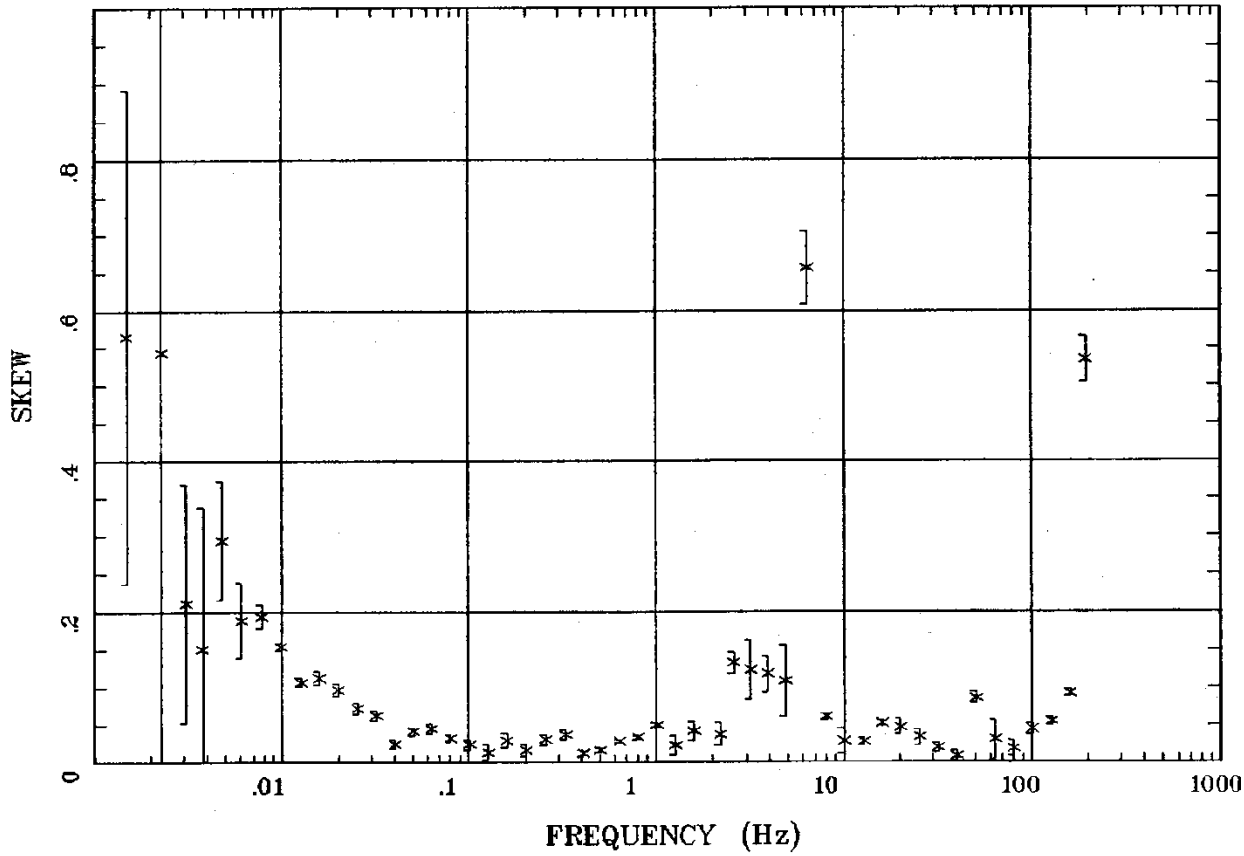


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 50

IMPEDANCE SKEW

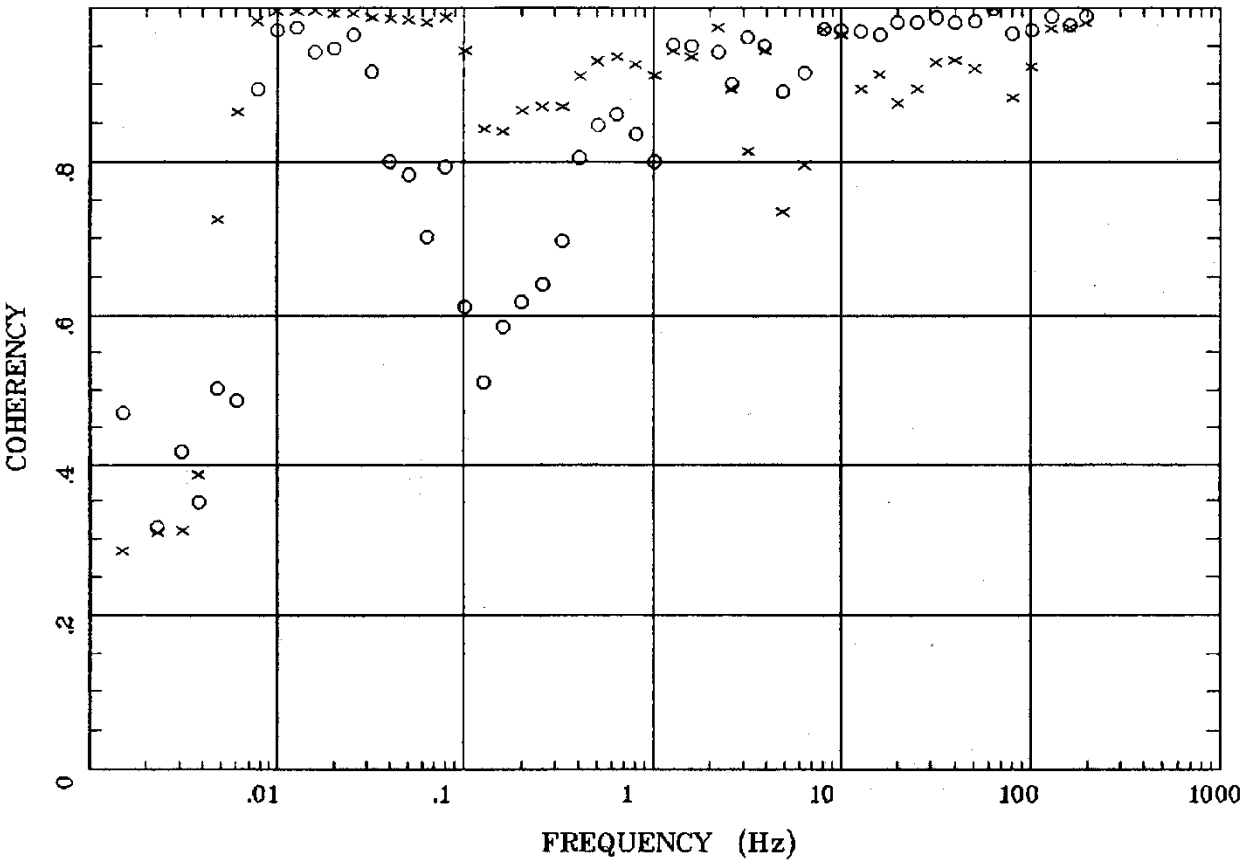


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 50

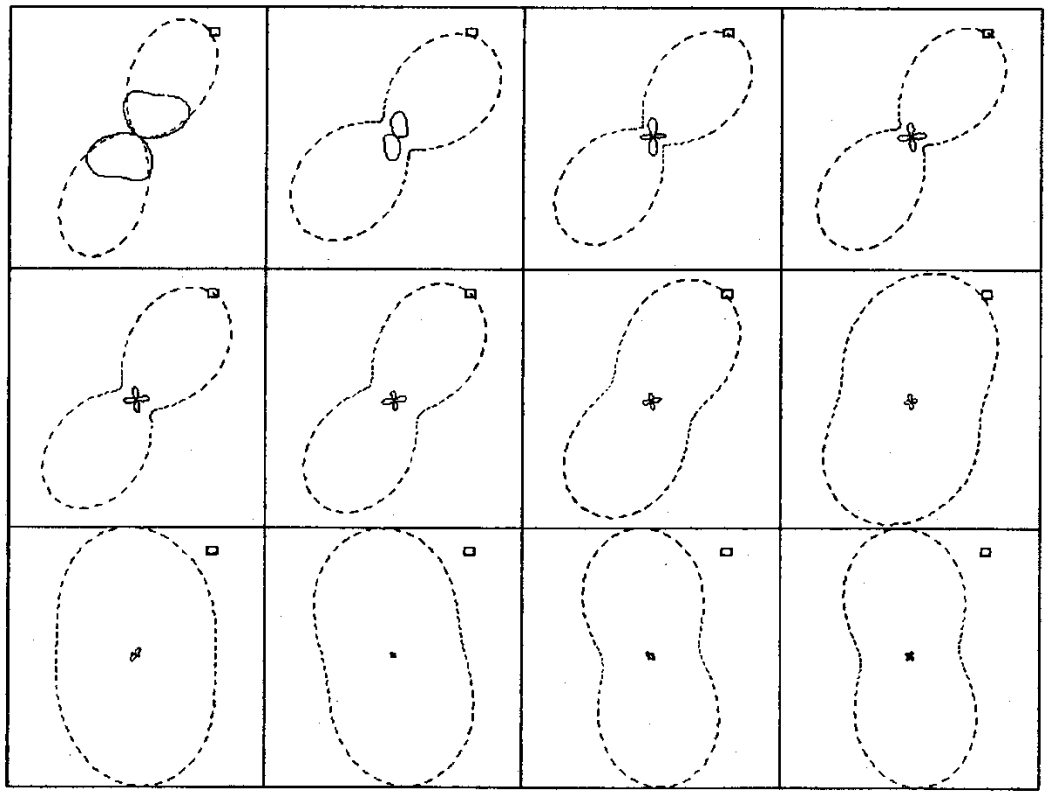
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS

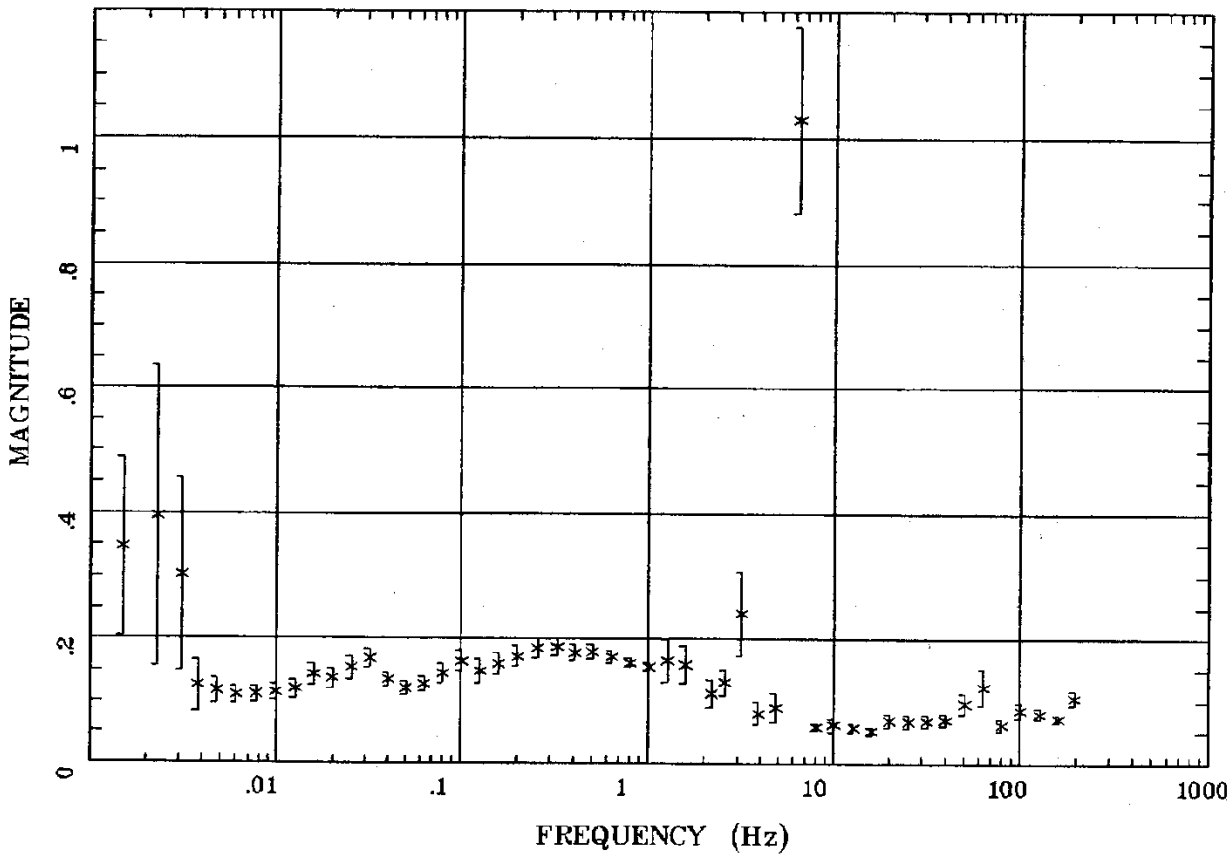


.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.587 Hz
4.883 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

TIPPER MAGNITUDE

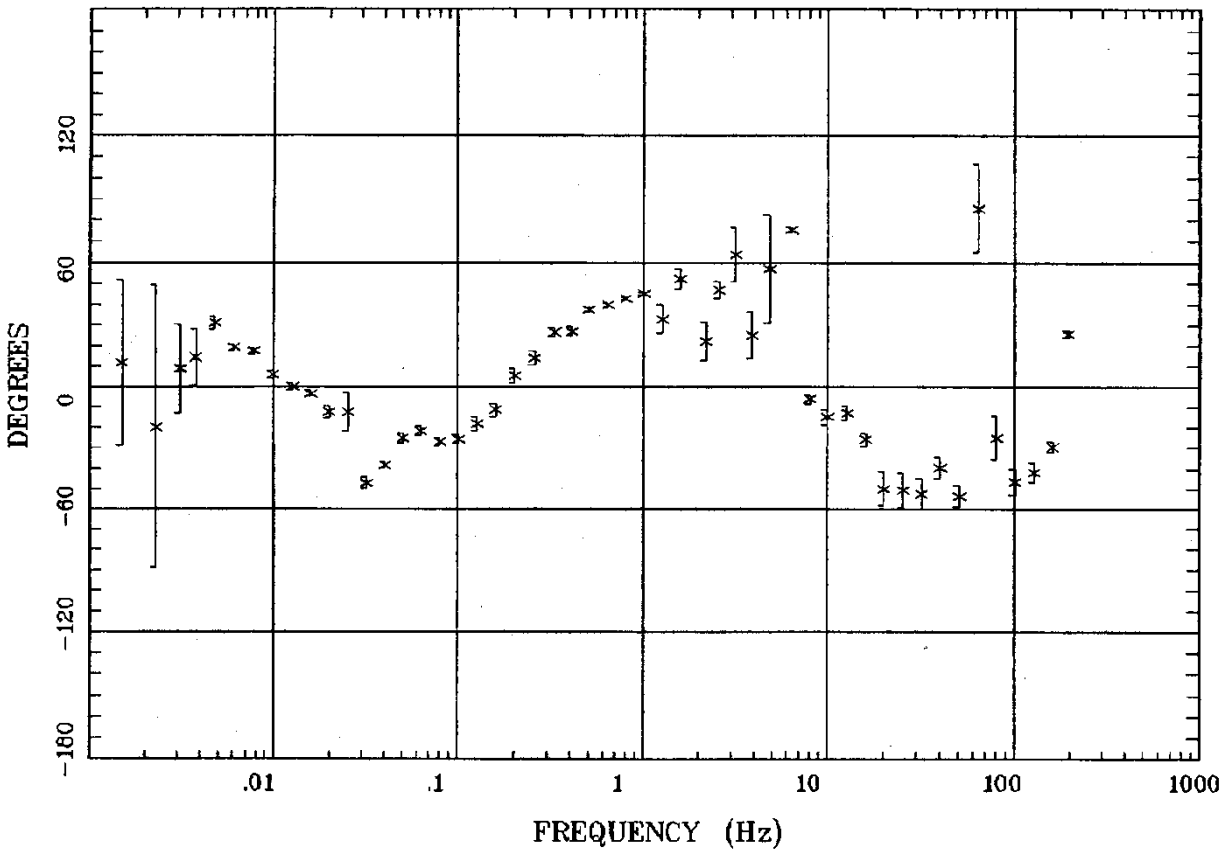


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 50

TIPPER STRIKE

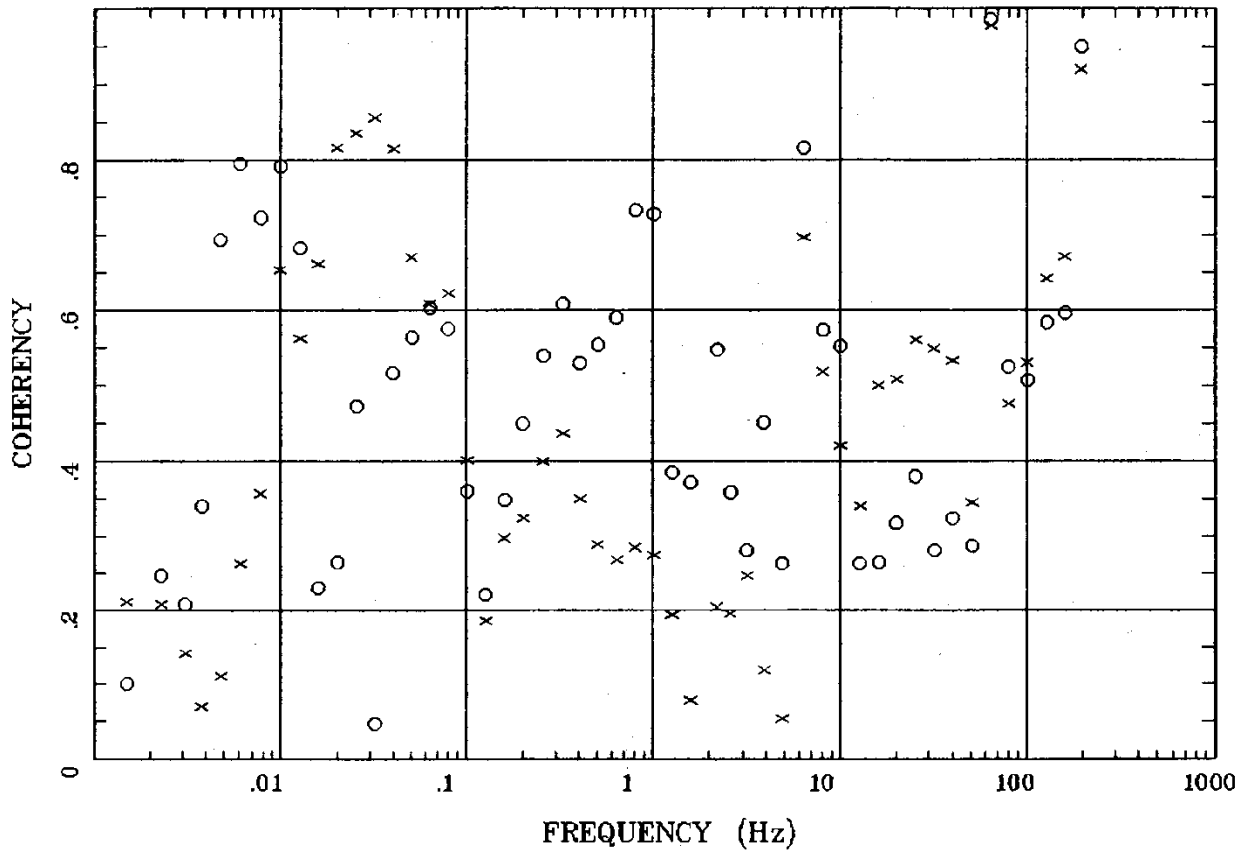


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 50

HzHx.x Coh HzHy.o

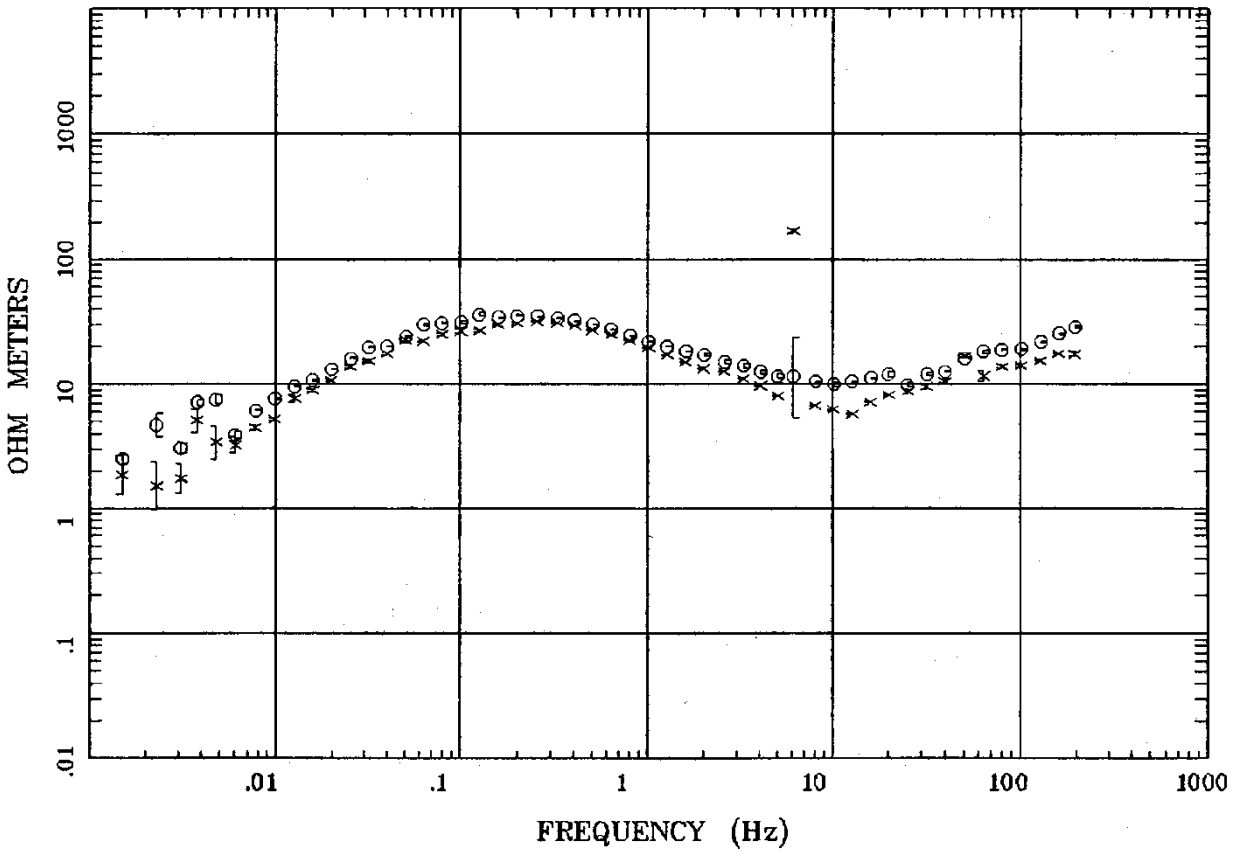


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap50-49s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:55 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

APPARENT RESISTIVITY

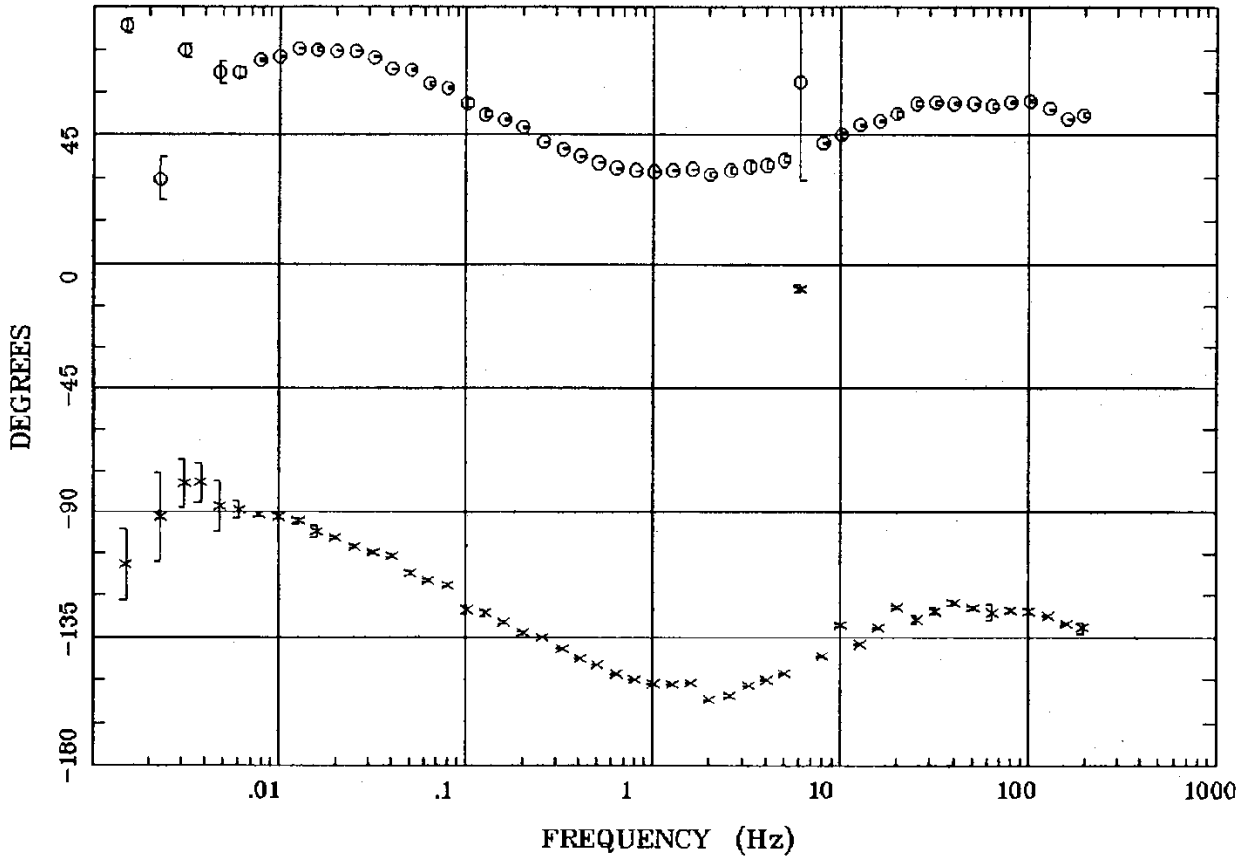


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

IMPEDANCE PHASE

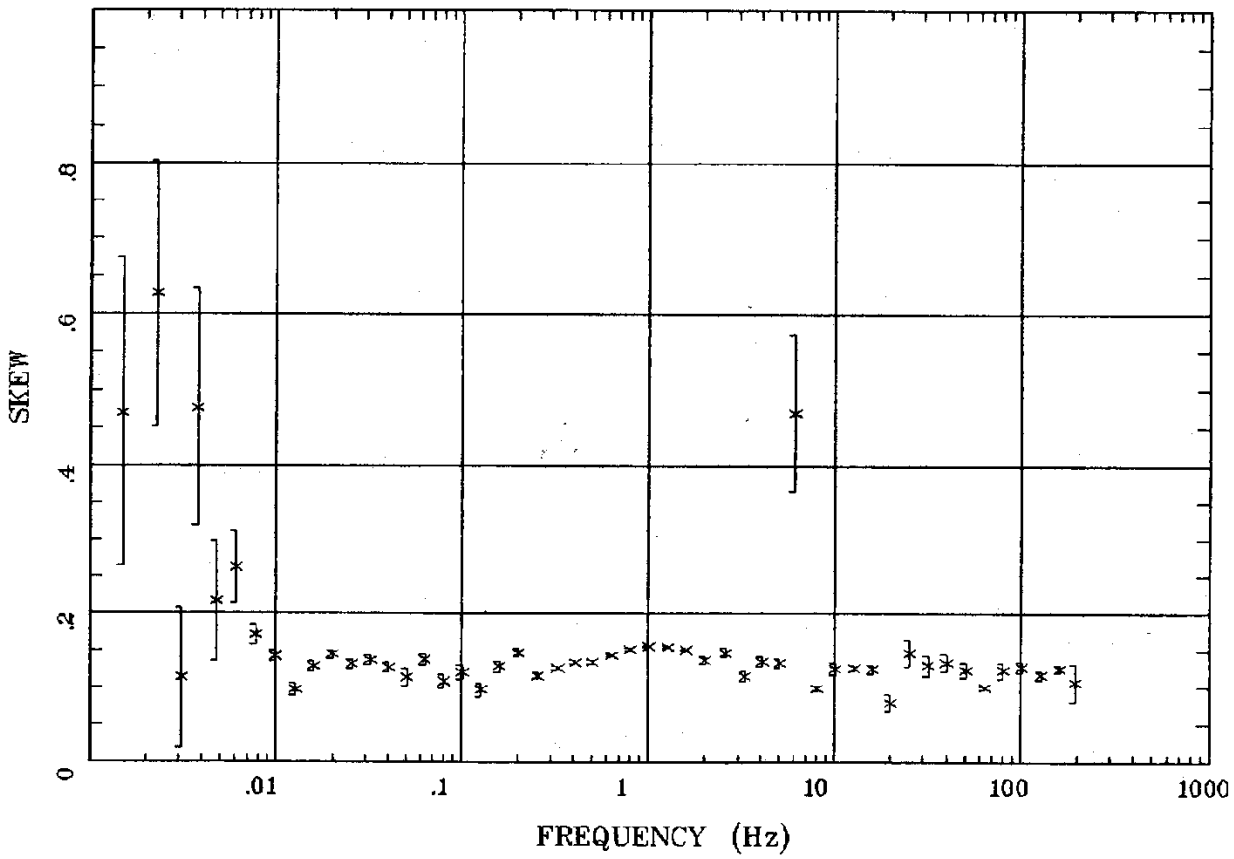


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

IMPEDANCE SKEW

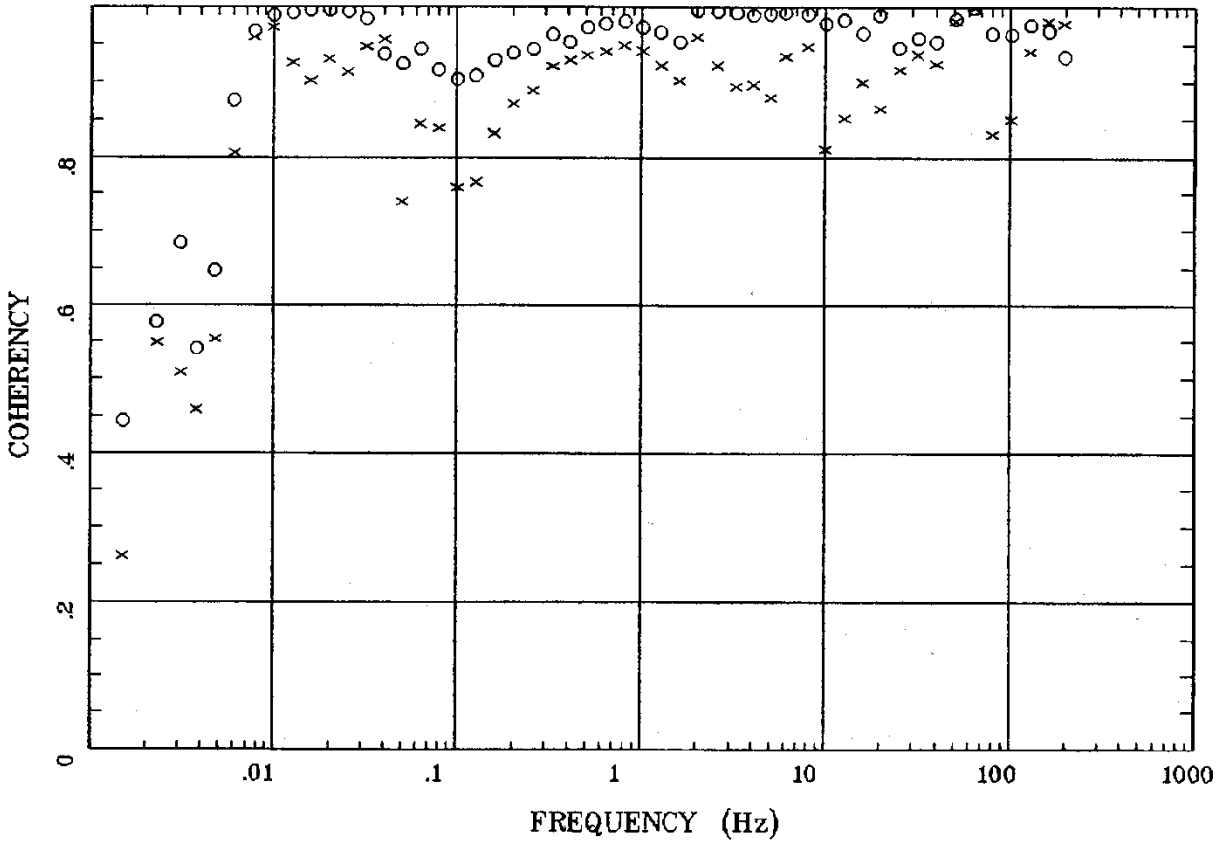


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

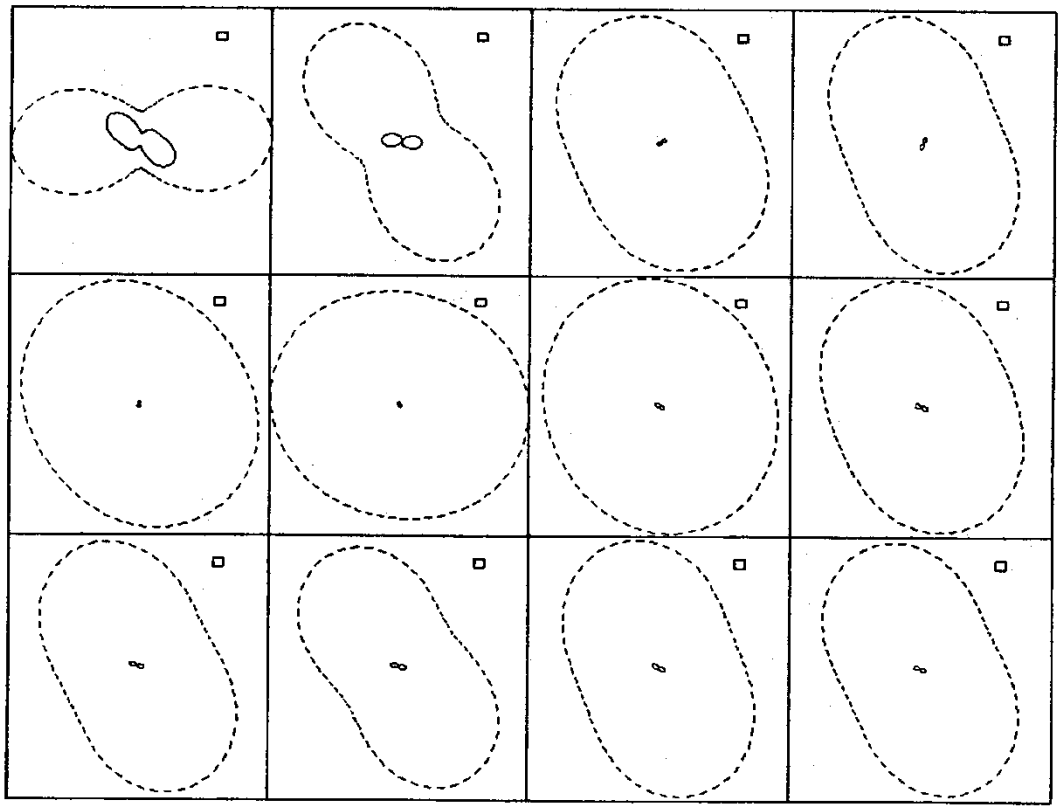
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



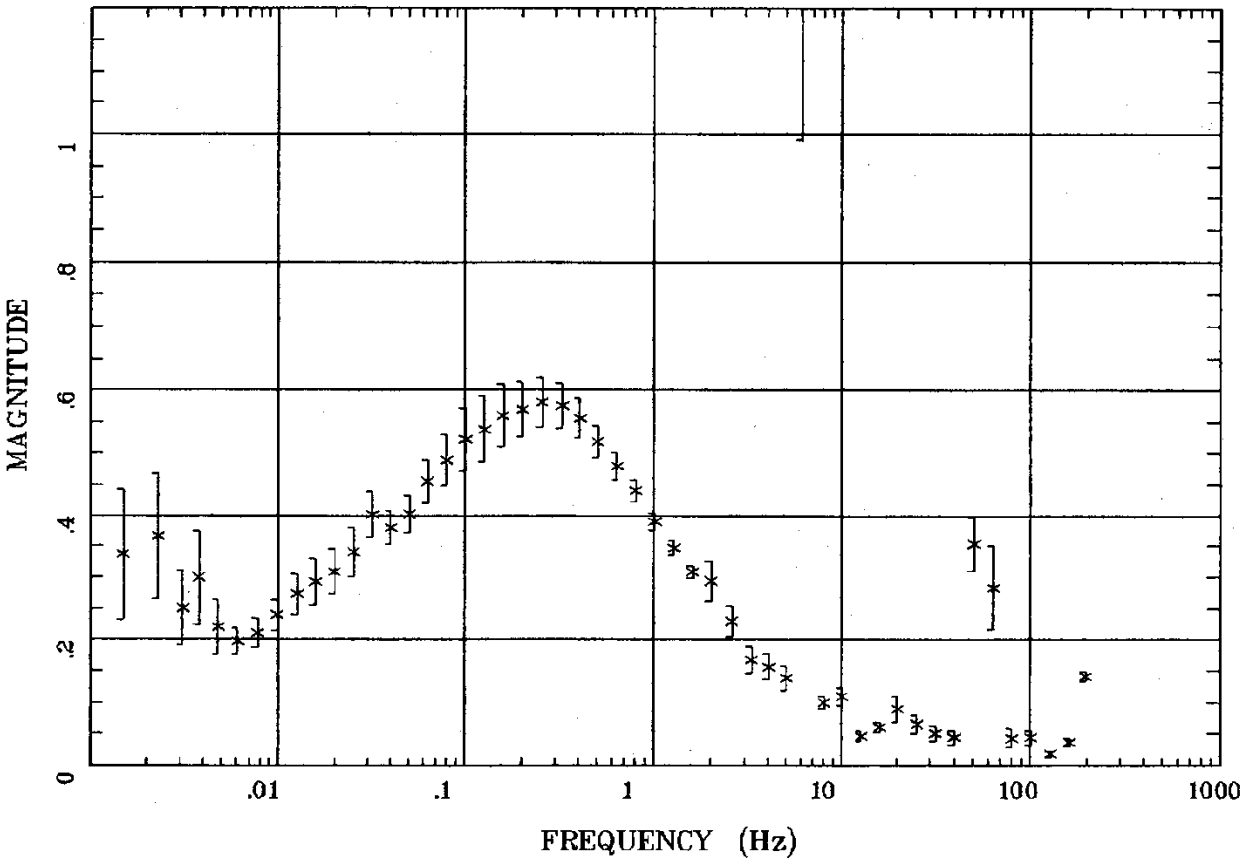
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.607 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

TIPPER MAGNITUDE

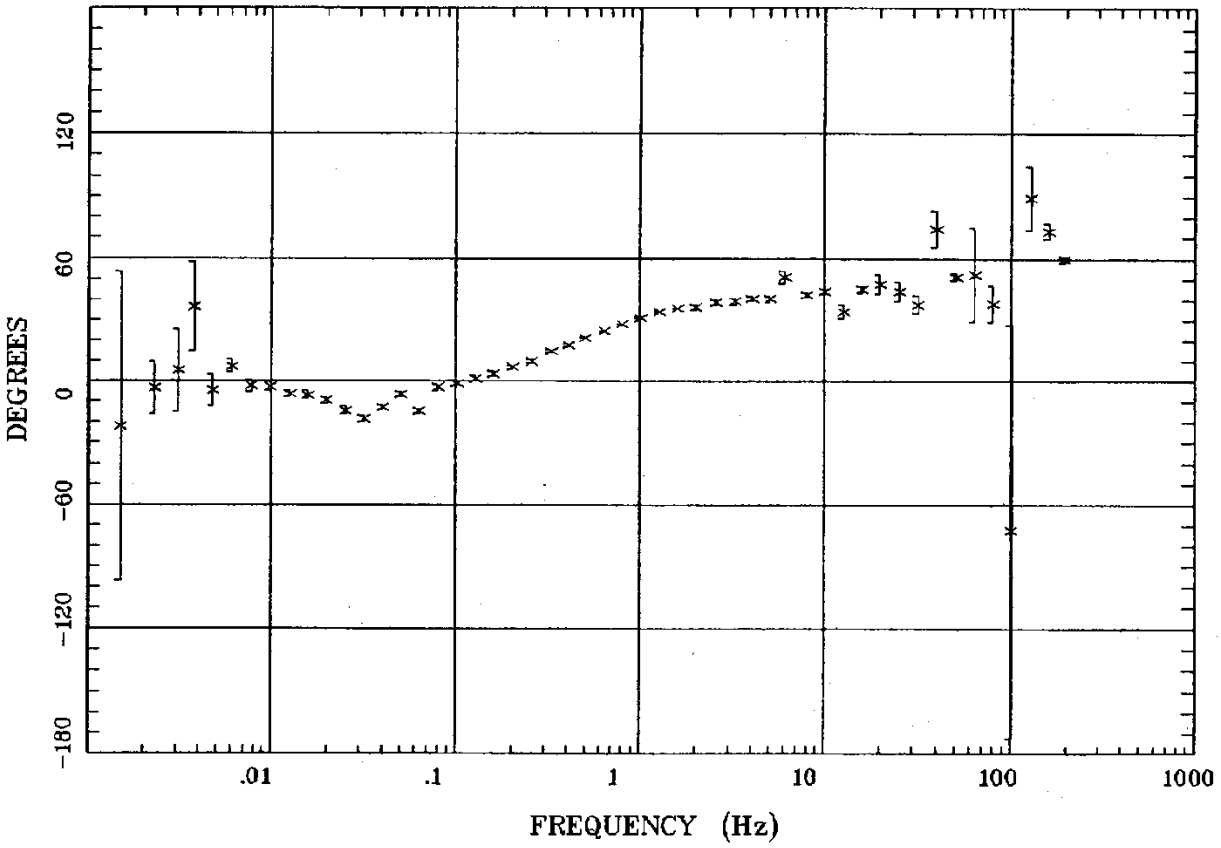


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

TIPPER STRIKE

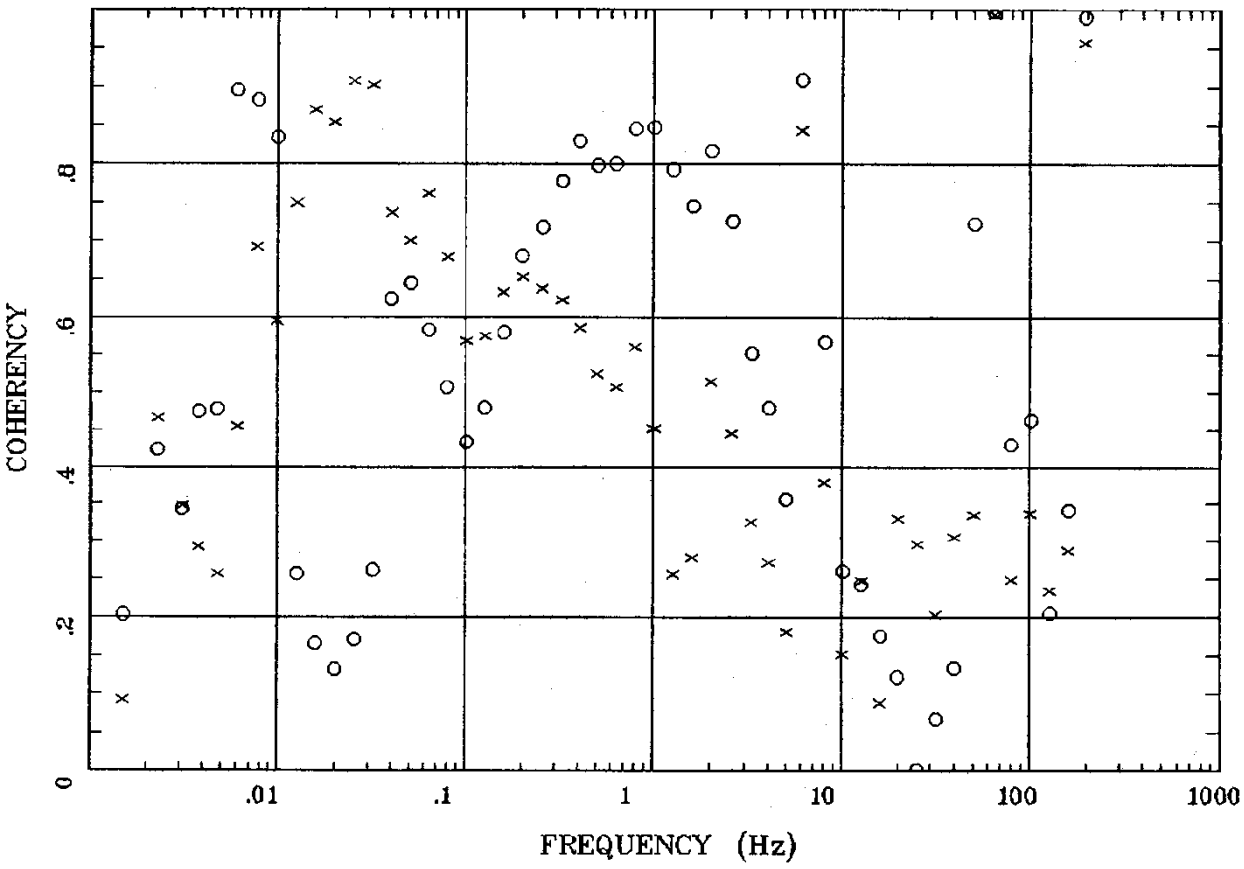


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 51

HzHx.x Coh HzHy.o

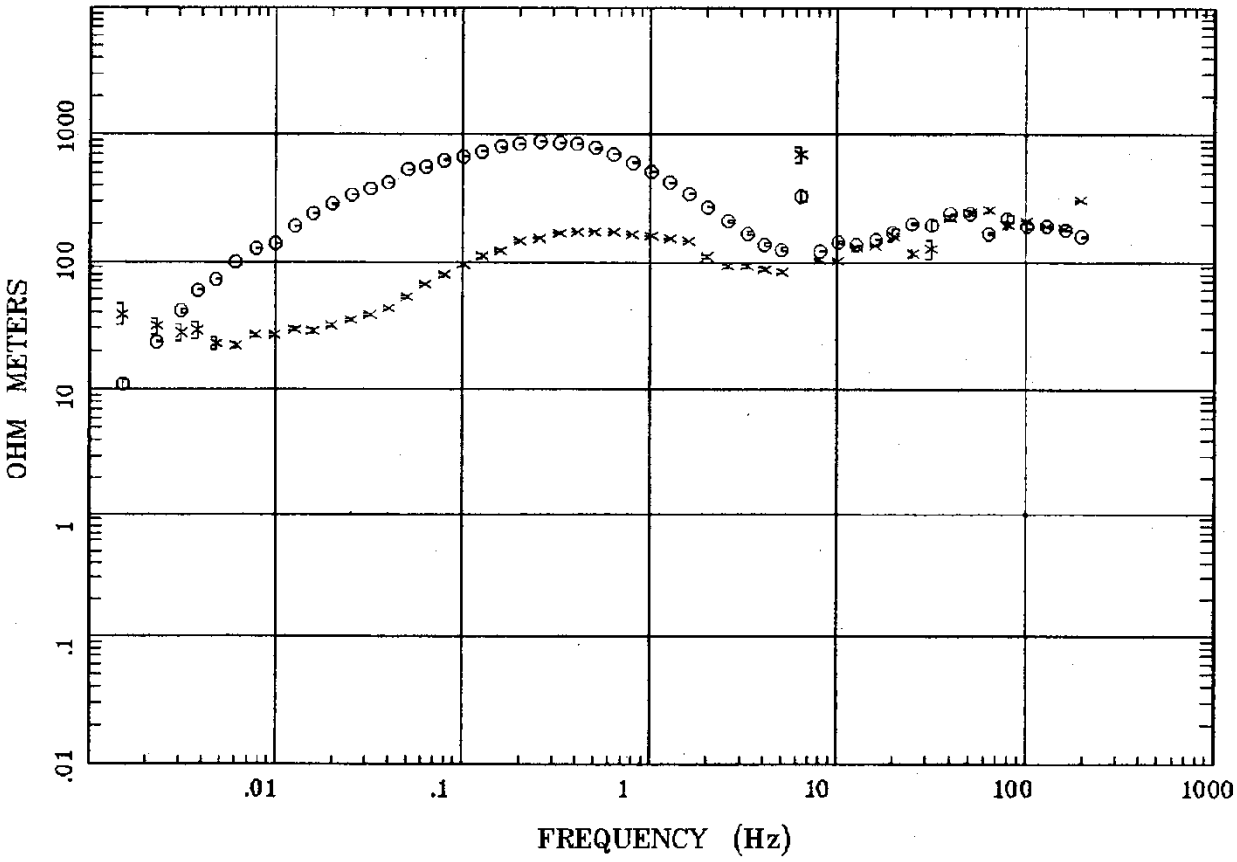


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap51-52s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

APPARENT RESISTIVITY

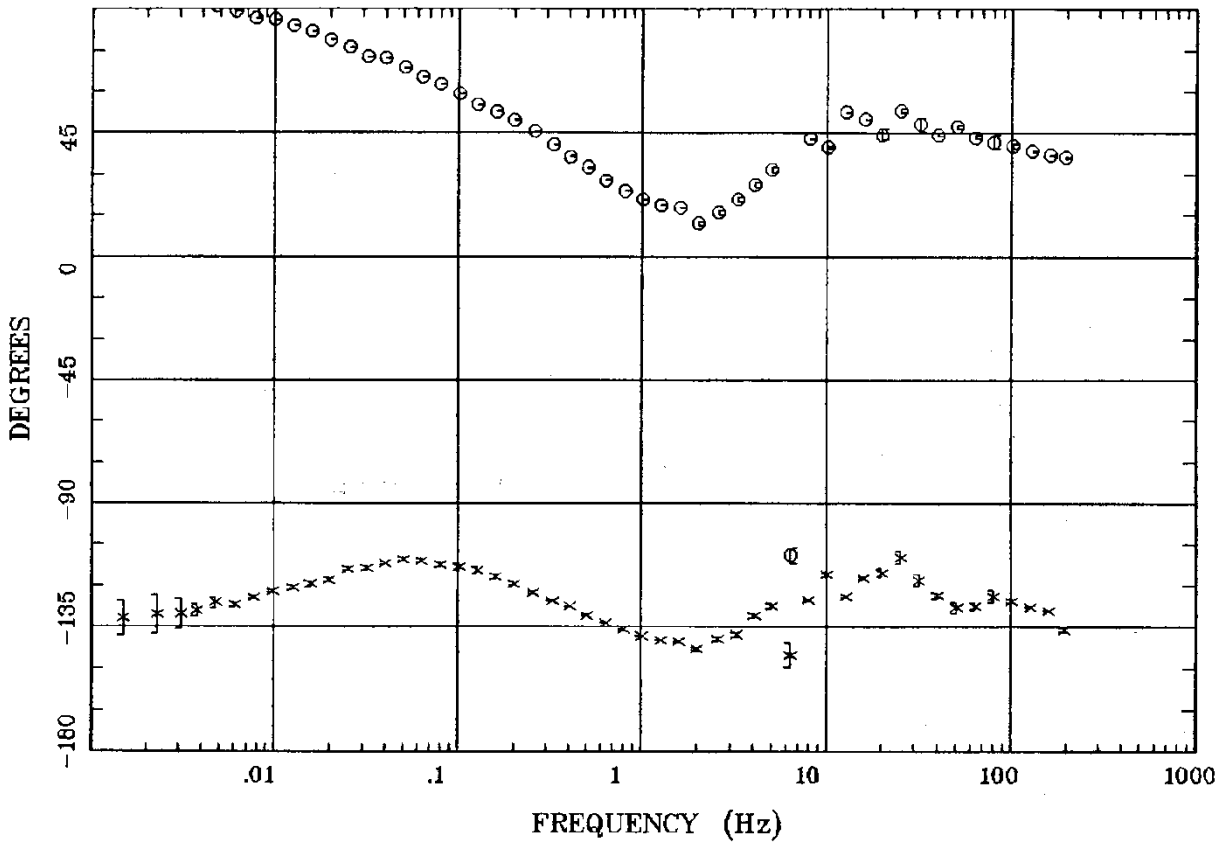


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

IMPEDANCE PHASE

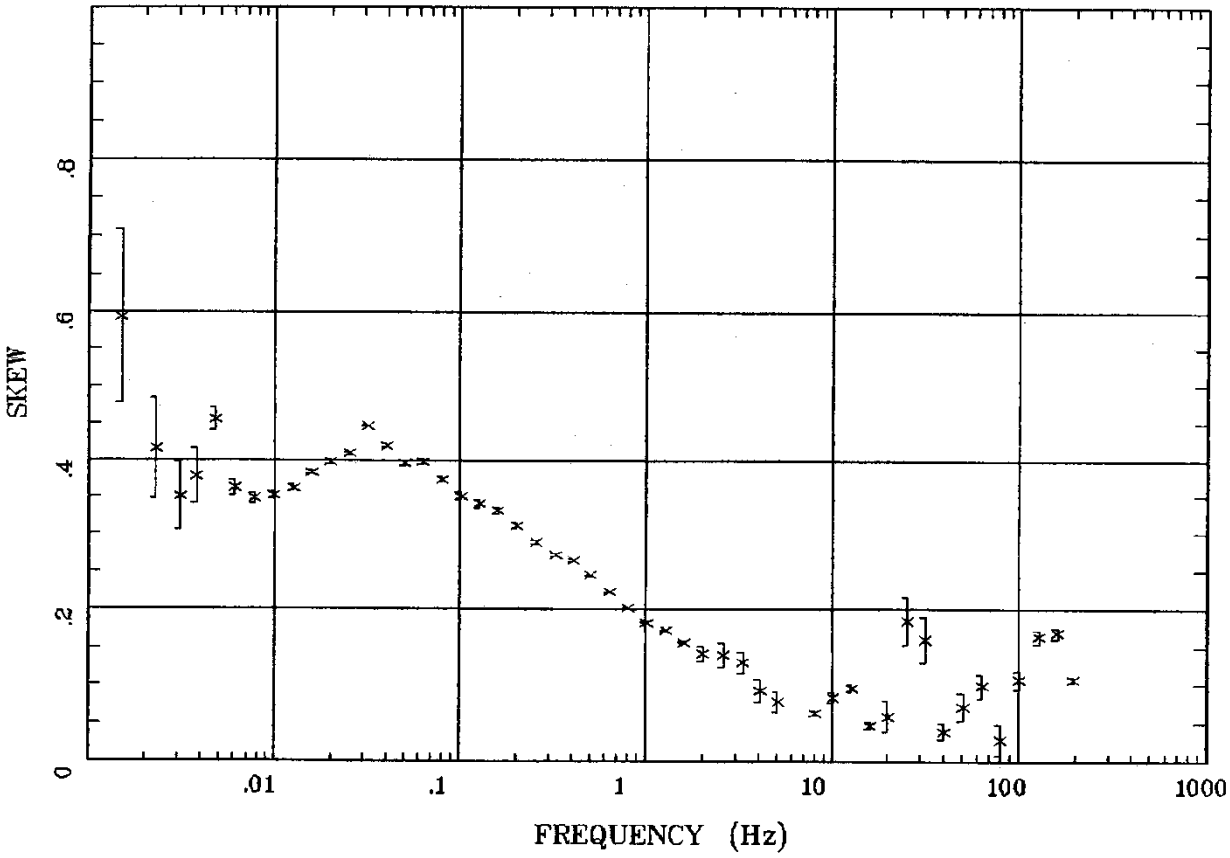


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

IMPEDANCE SKEW

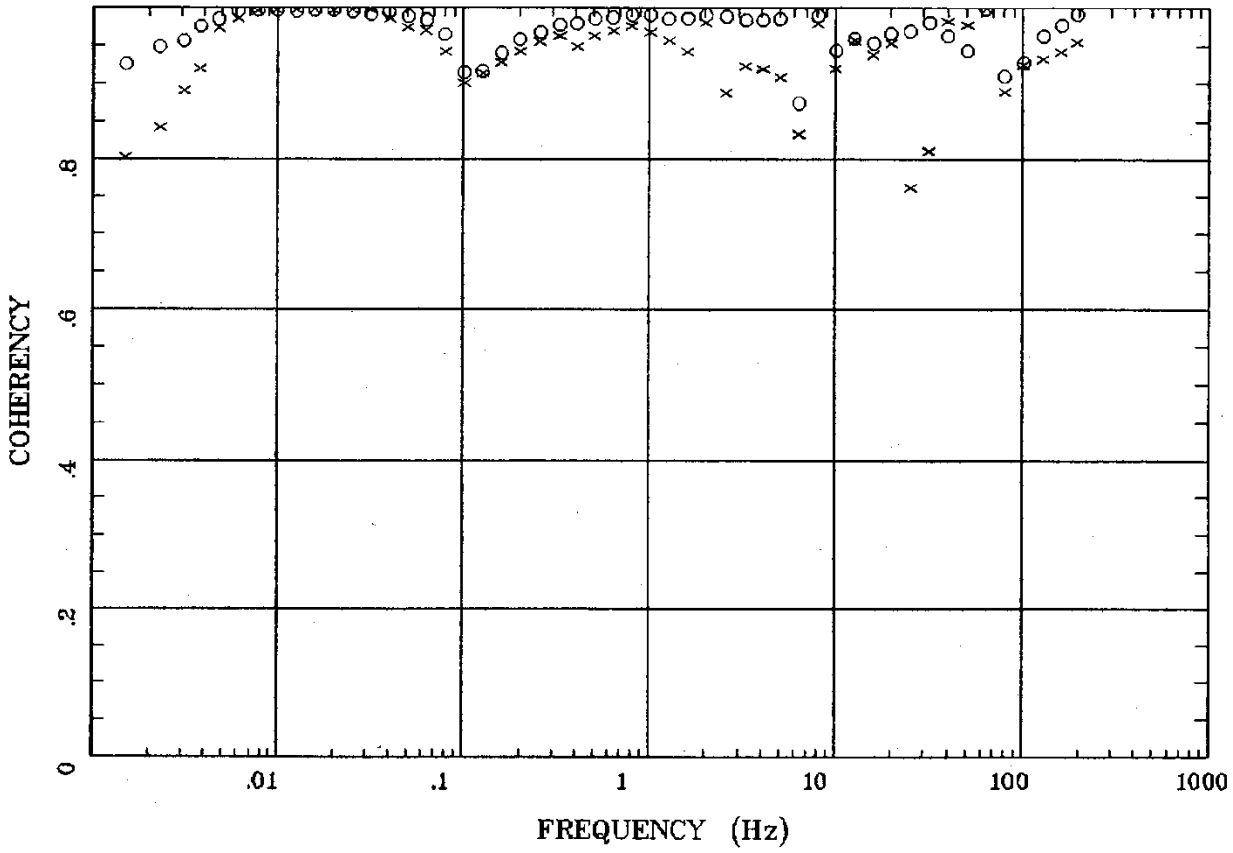


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

E MULT Coh.

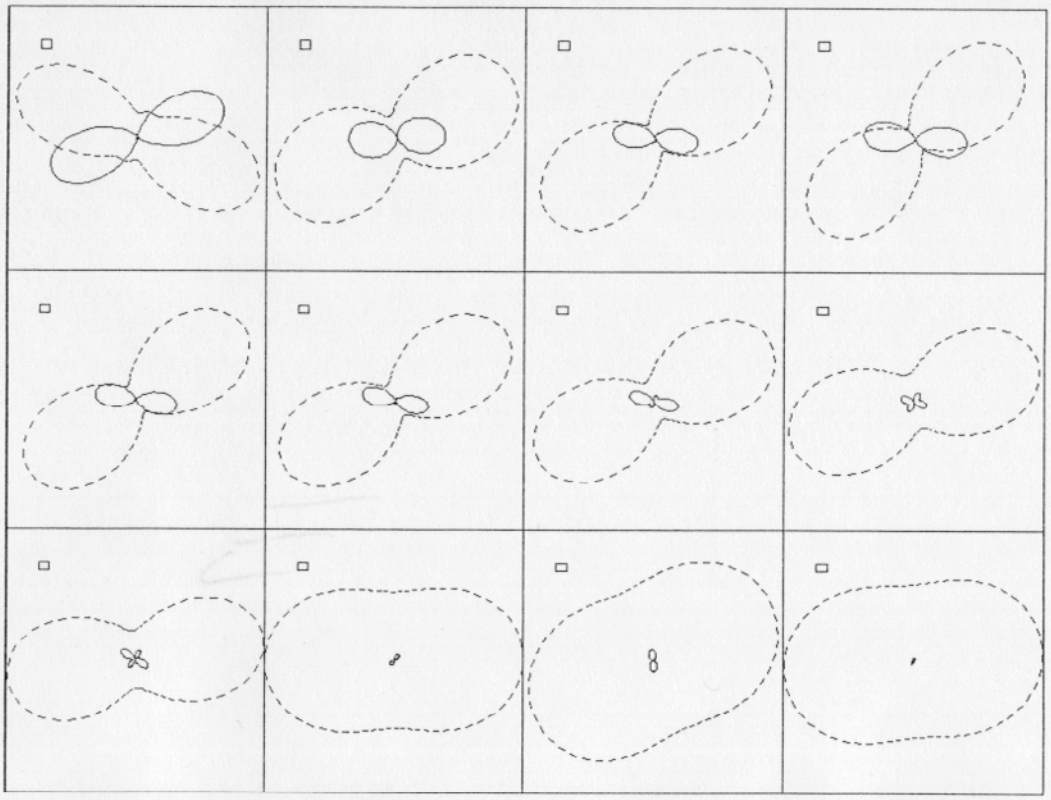


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

POLAR PLOTS



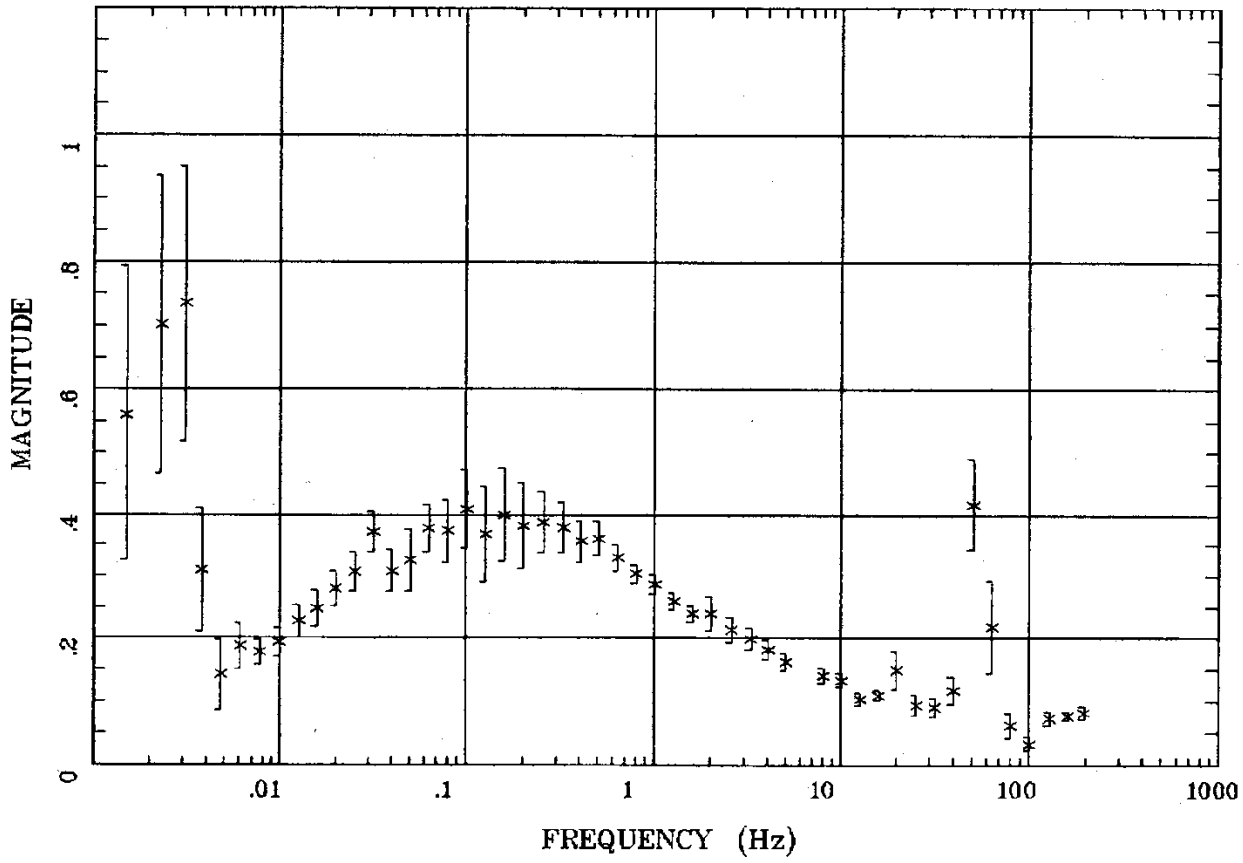
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.607 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

TIPPER MAGNITUDE

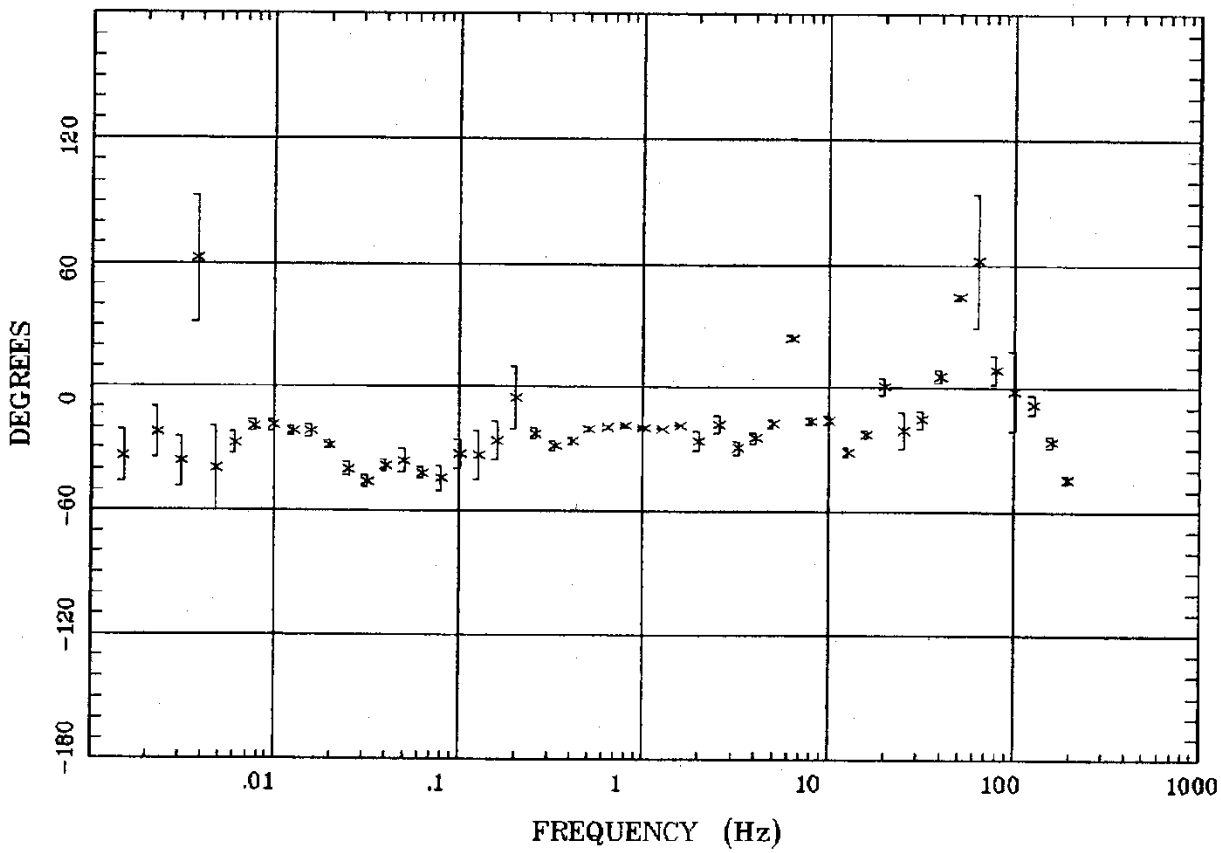


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

TIPPER STRIKE

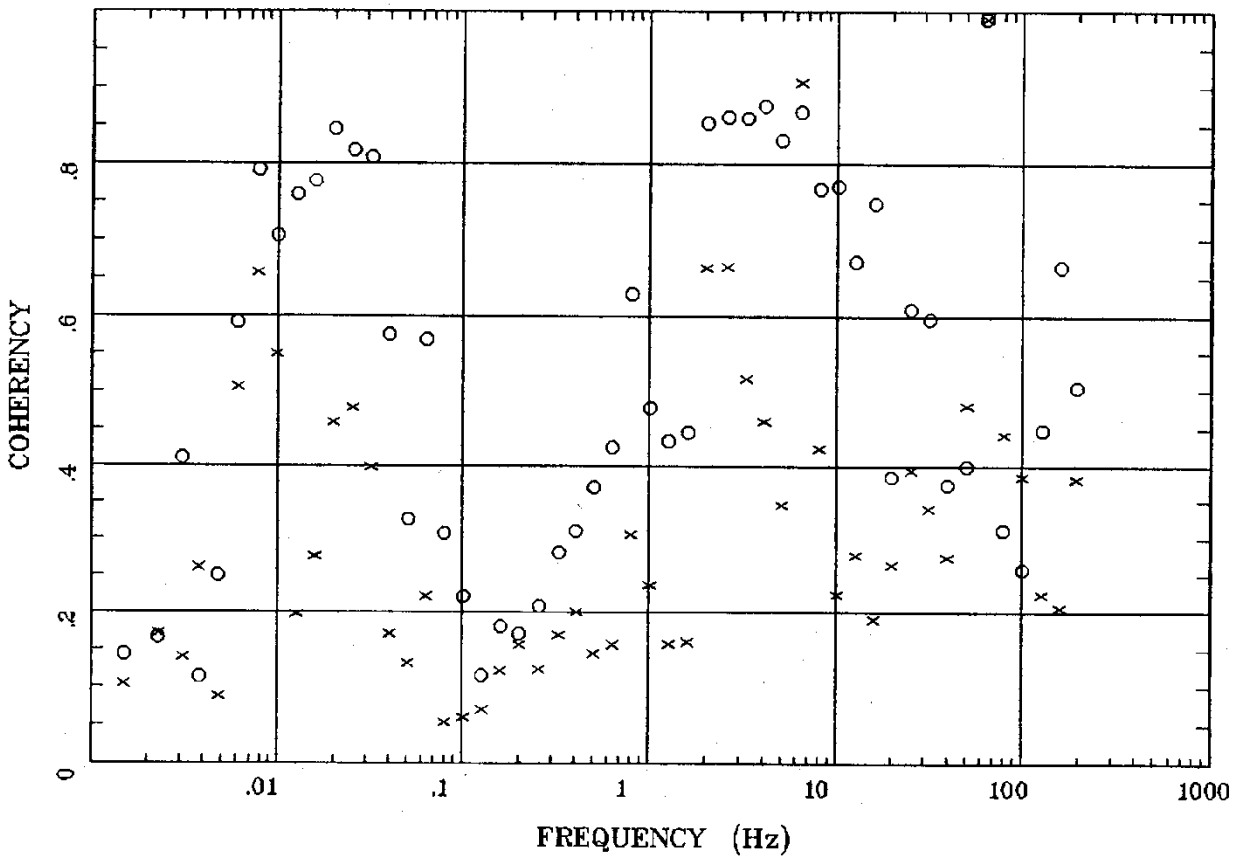


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 52

HzHx.x Coh HzHy.o

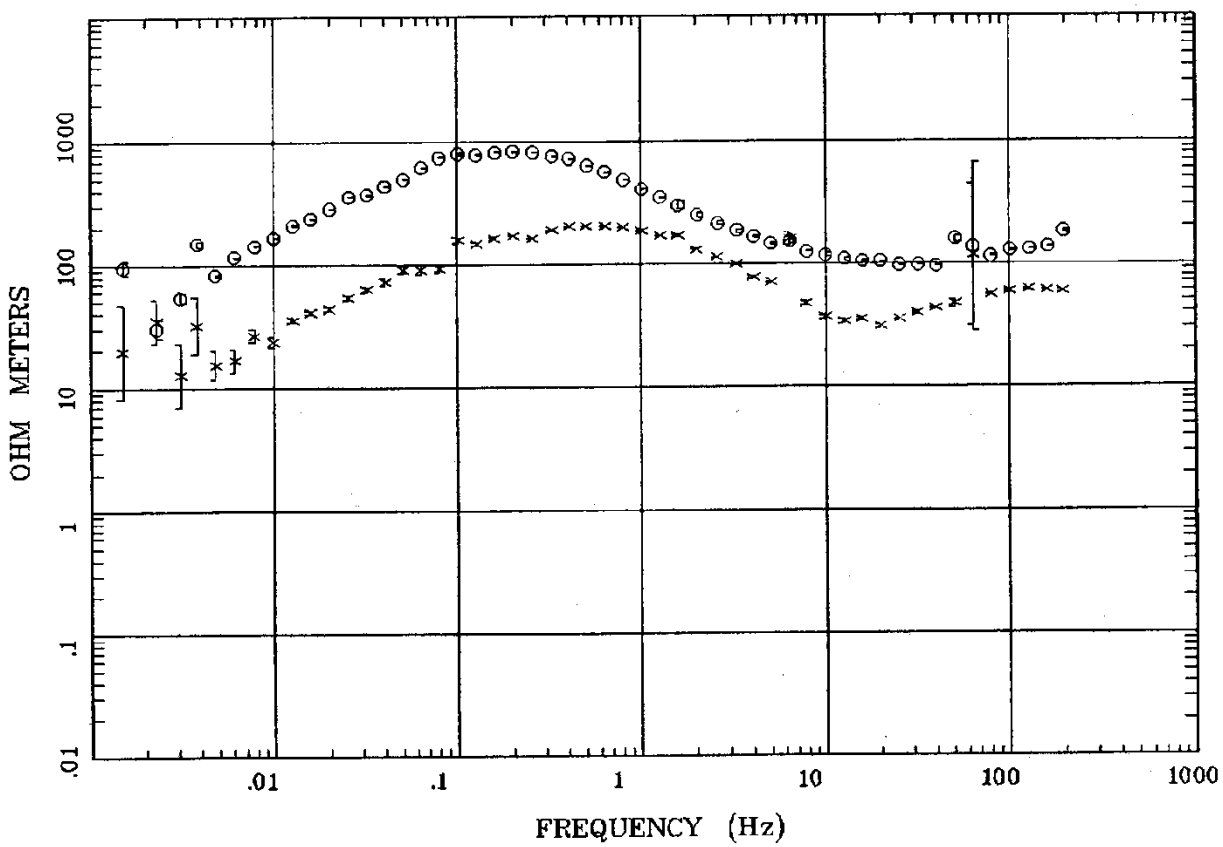


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap52-51s.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch7 Ch6
Plotted: 08:56 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 53

APPARENT RESISTIVITY

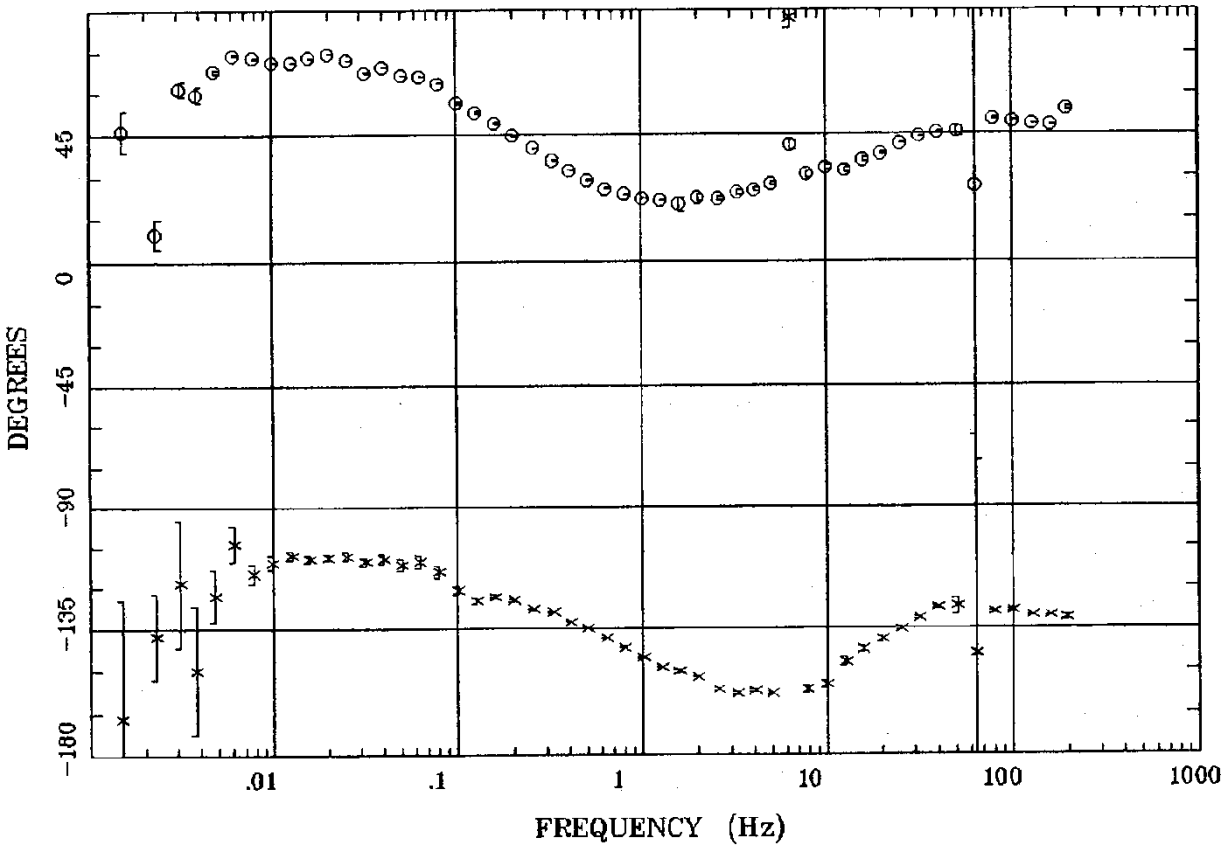


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 53

IMPEDANCE PHASE

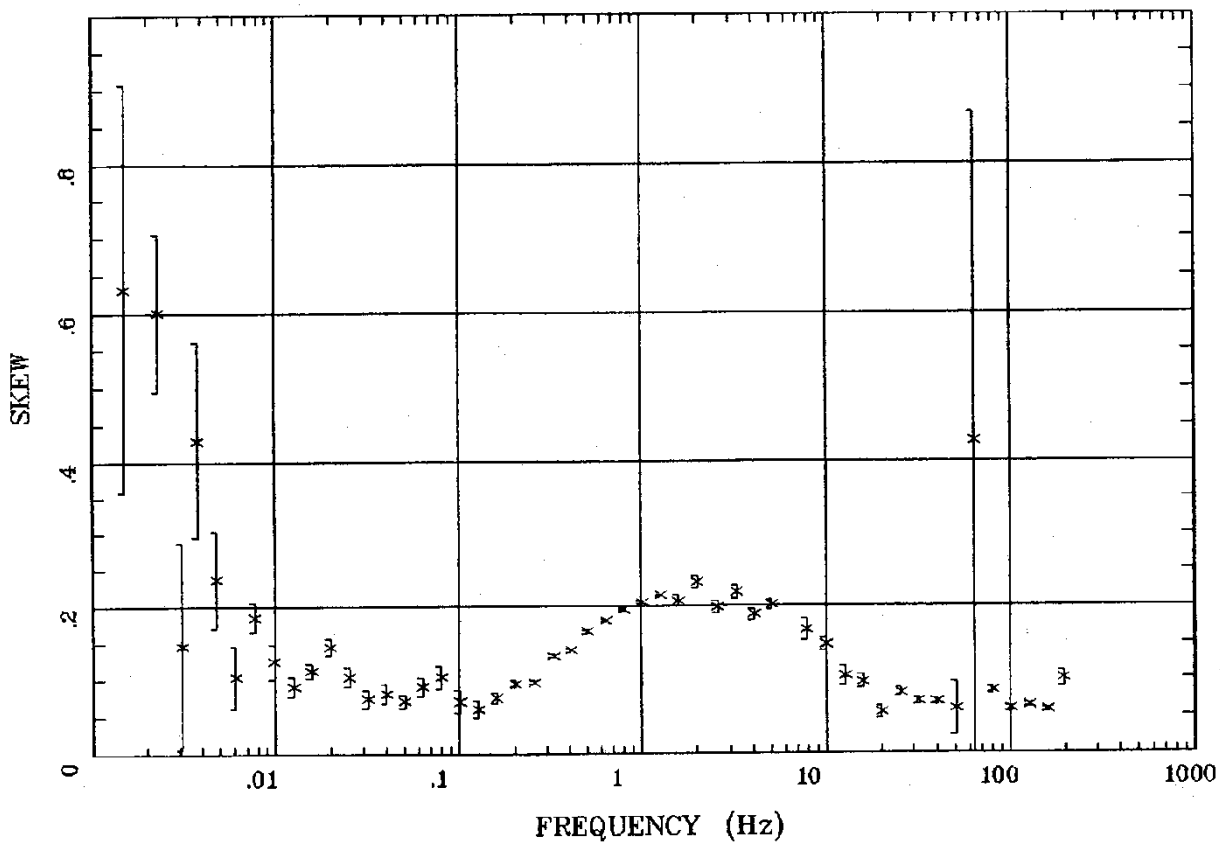


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 53

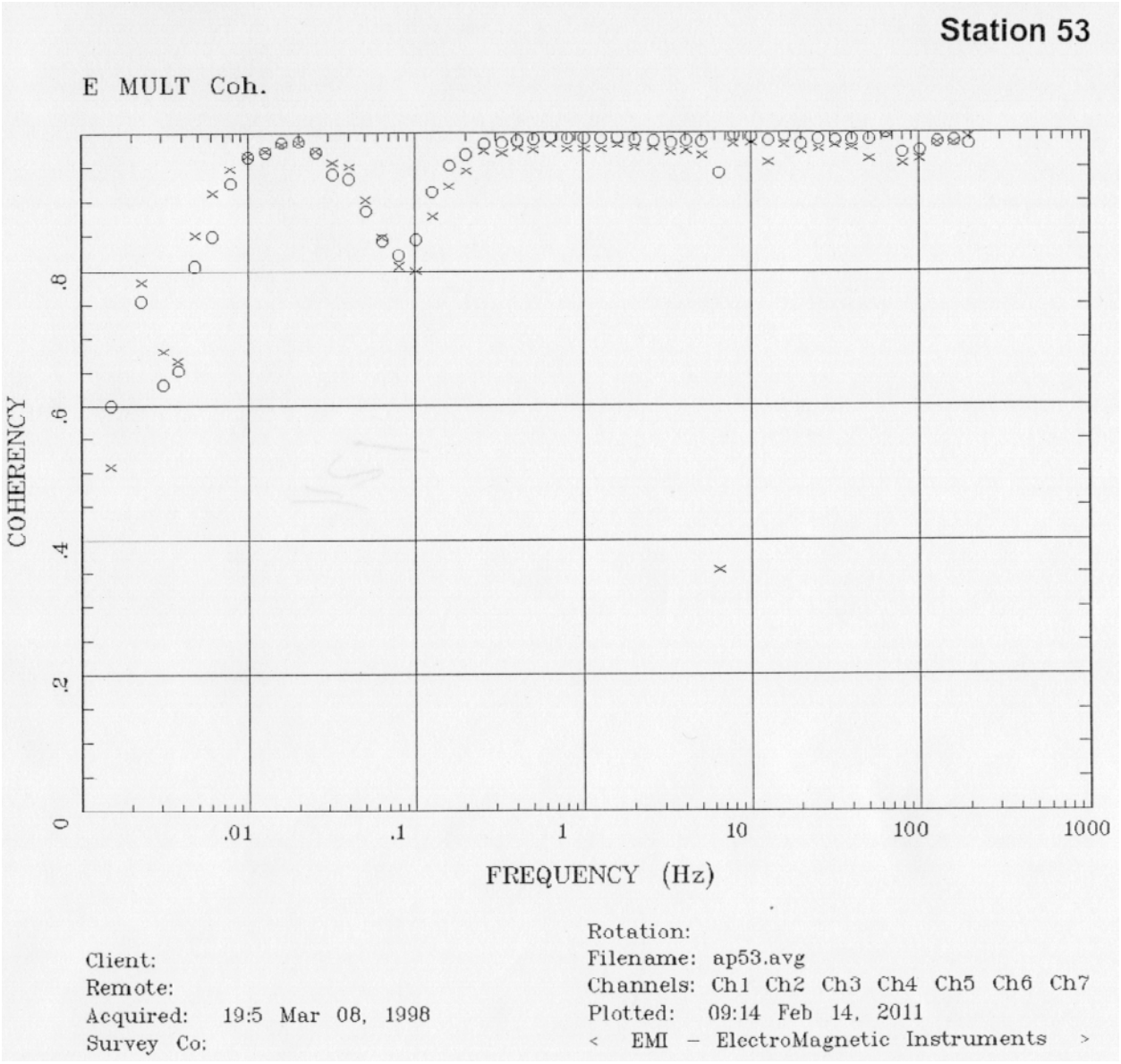
IMPEDANCE SKEW



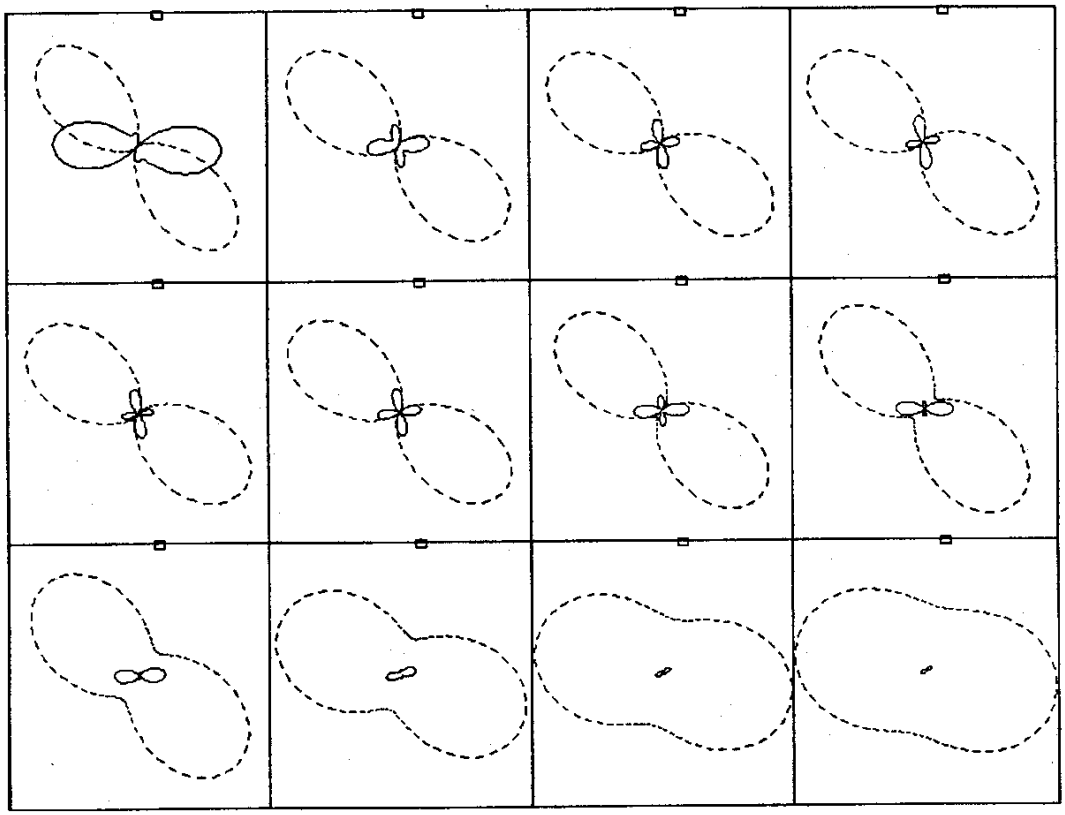
Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 53


E MULT Coh.
COHERENCY
0
.2
.4
.6
.8
.01
.1
1
10
100
1000
FREQUENCY (Hz)
Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:
Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS

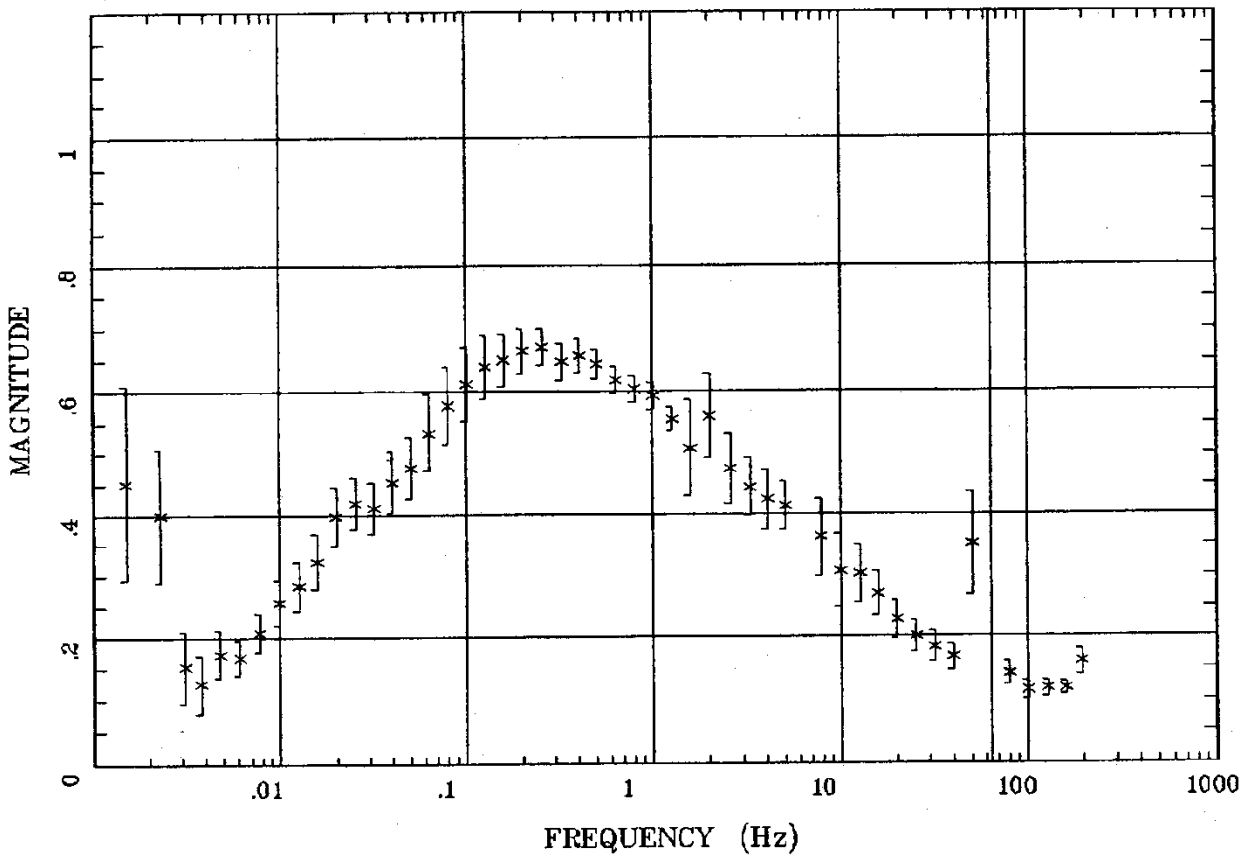


.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.587 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

TIPPER MAGNITUDE

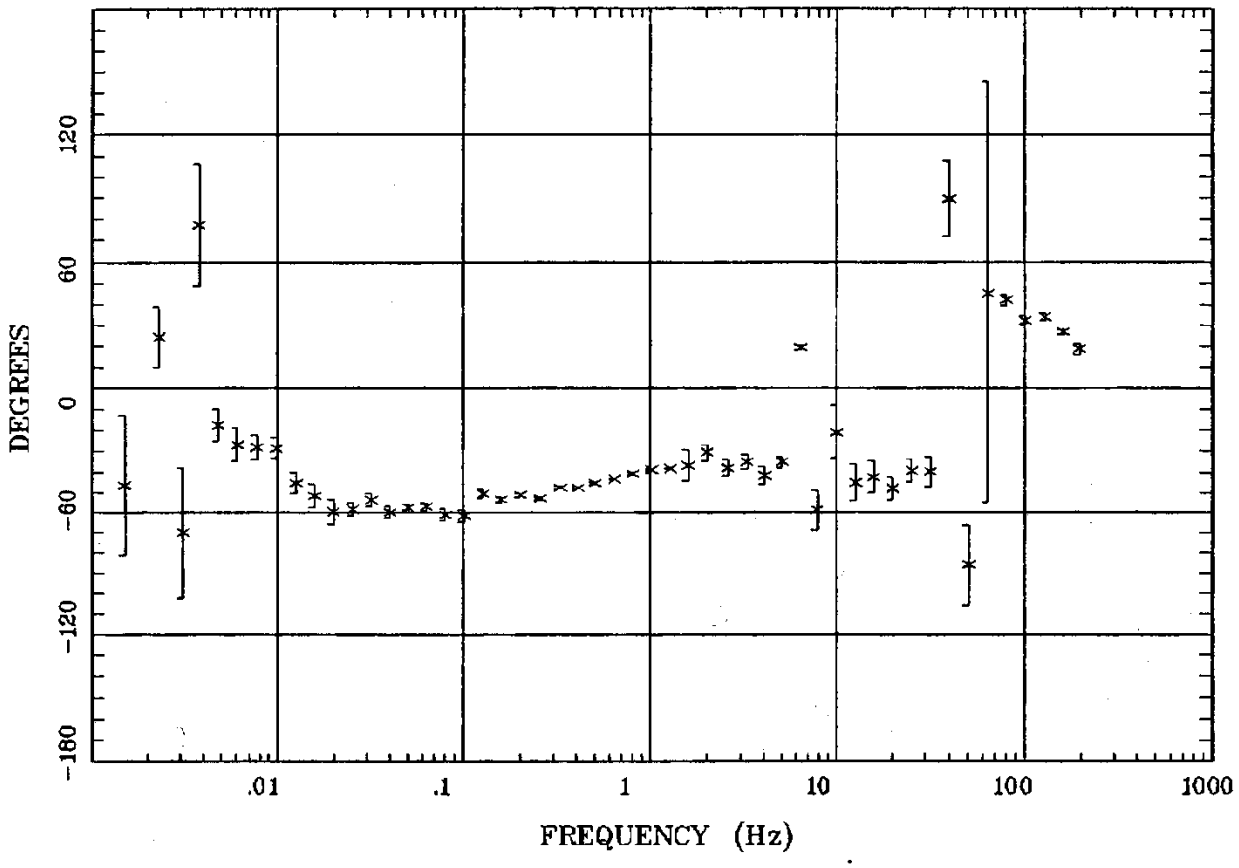


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 53

TIPPER STRIKE

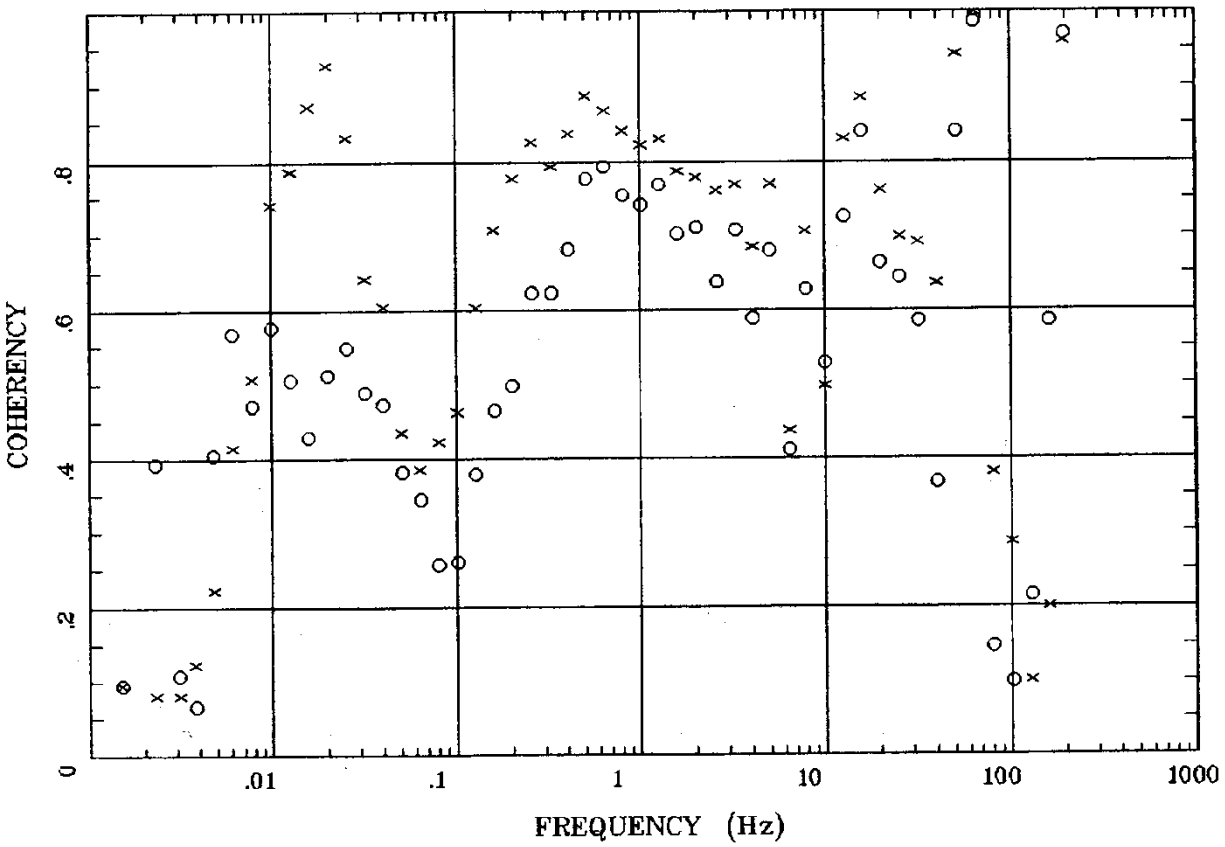


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 53

HzHx.x Coh HzHy.o

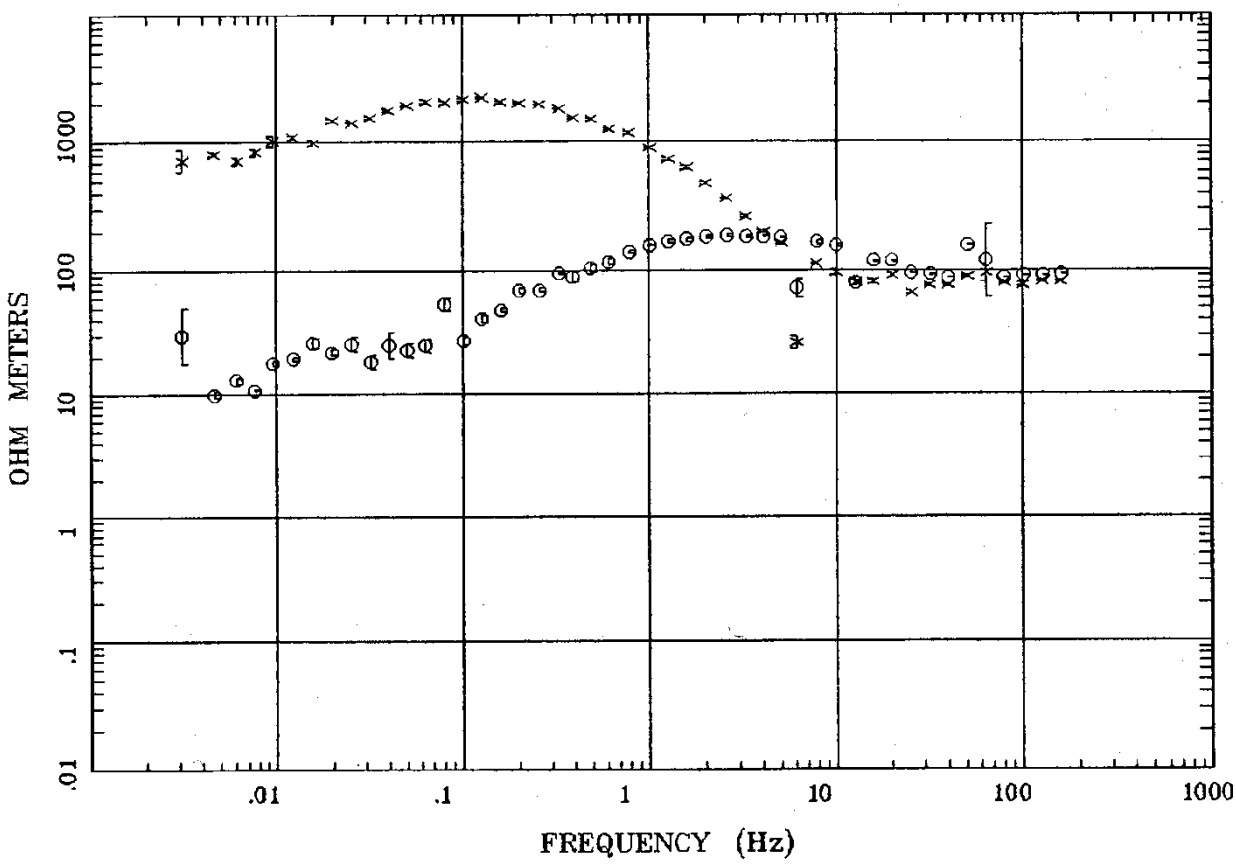


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap53.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 54

APPARENT RESISTIVITY

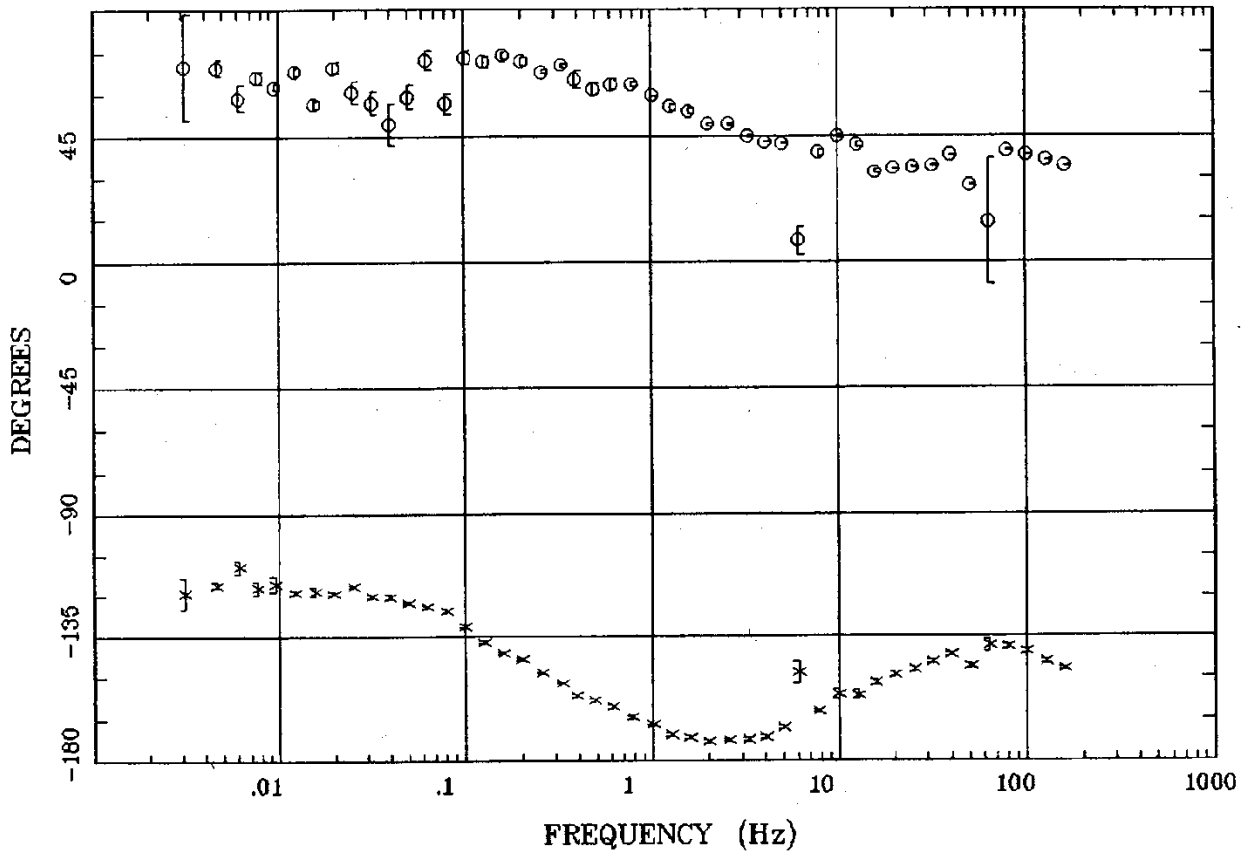


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 54

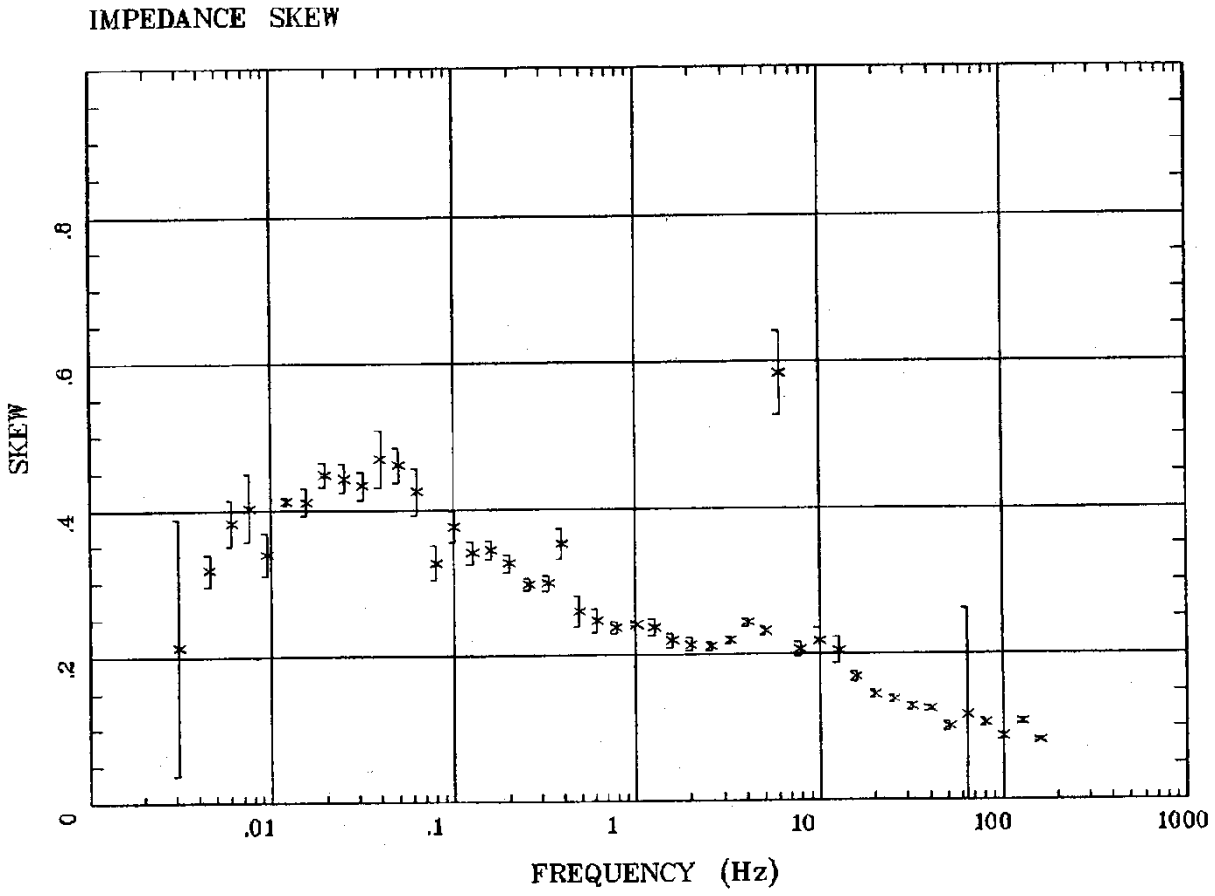
IMPEDANCE PHASE



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 54

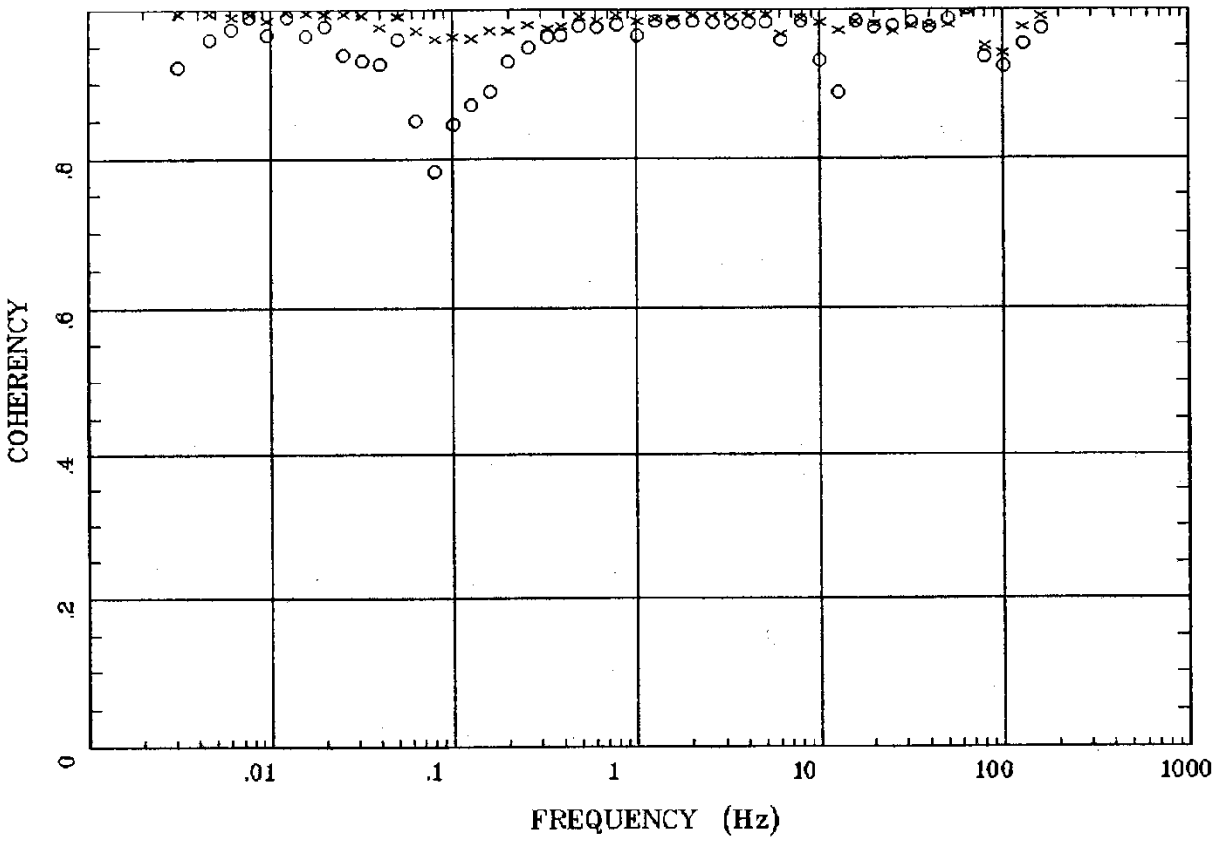


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 54

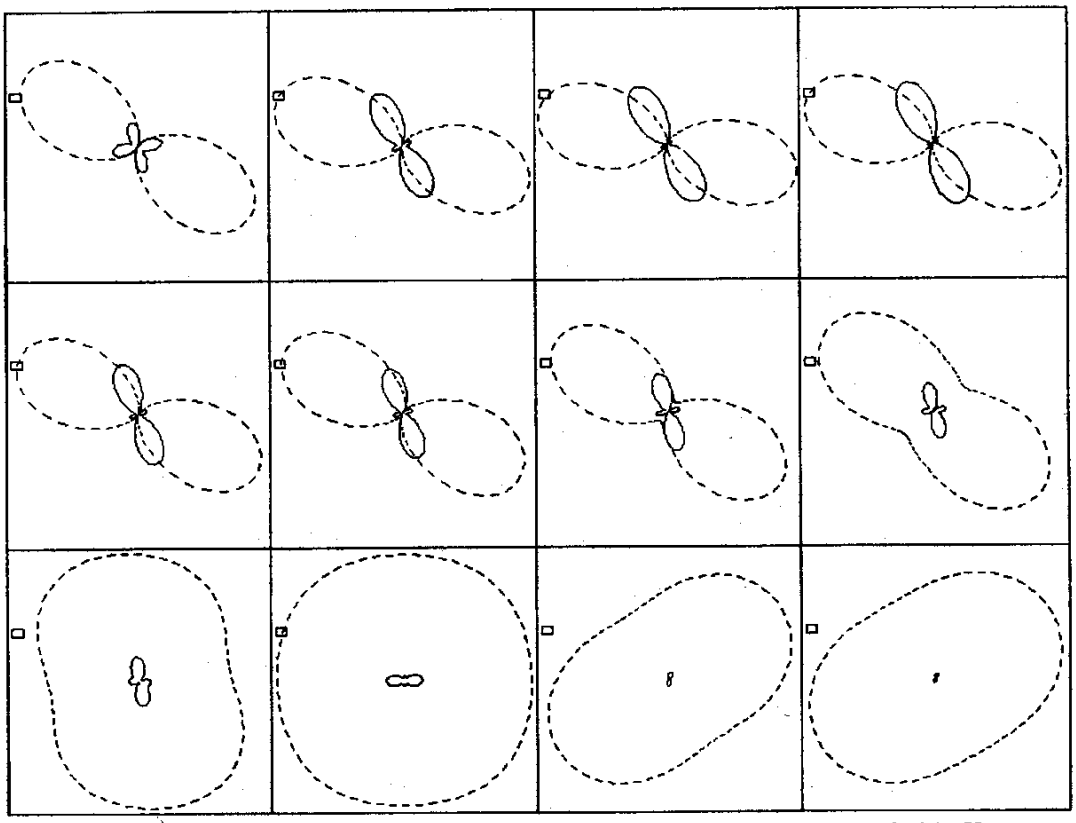
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



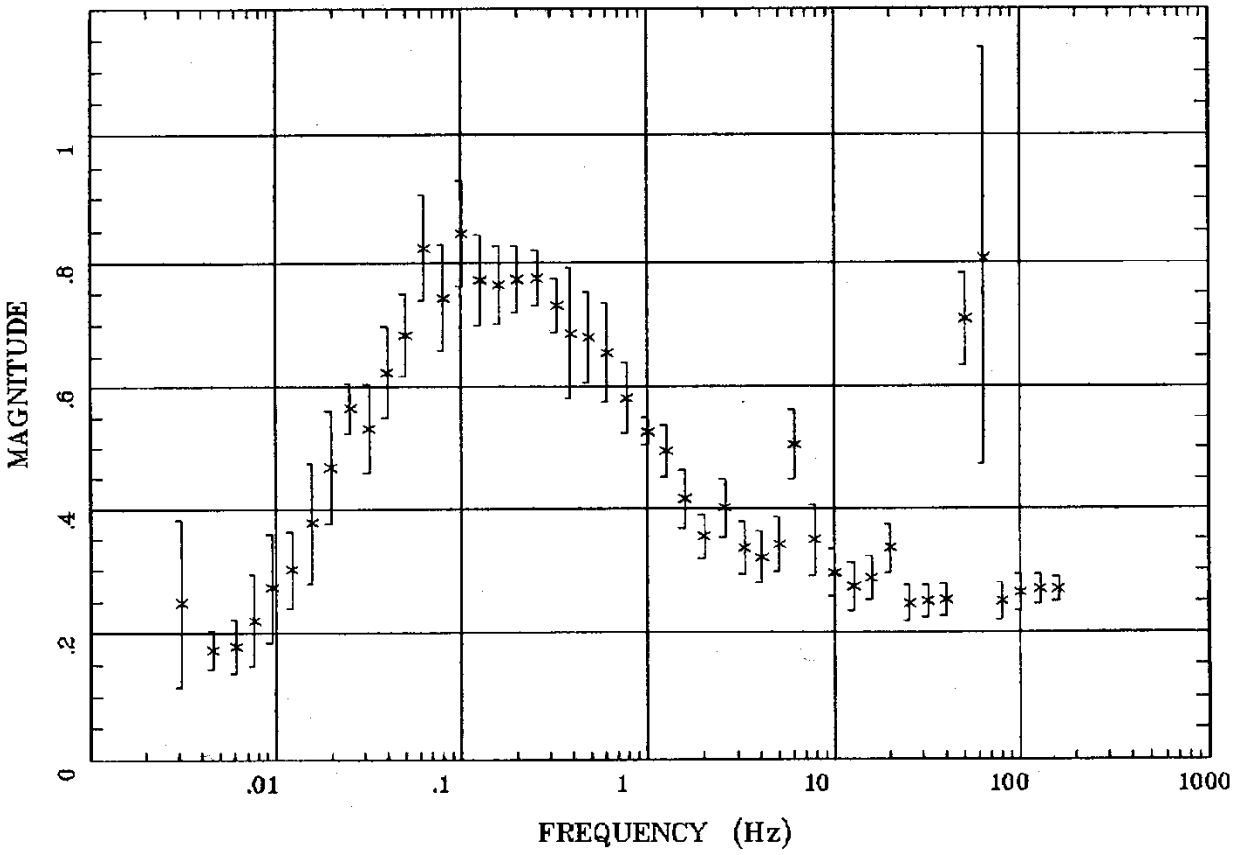
.0031 Hz	.0076 Hz	.0198 Hz	.0500 Hz
.127 Hz	.330 Hz	.781 Hz	2.002 Hz
5.054 Hz	12.695 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 54

TIPPER MAGNITUDE

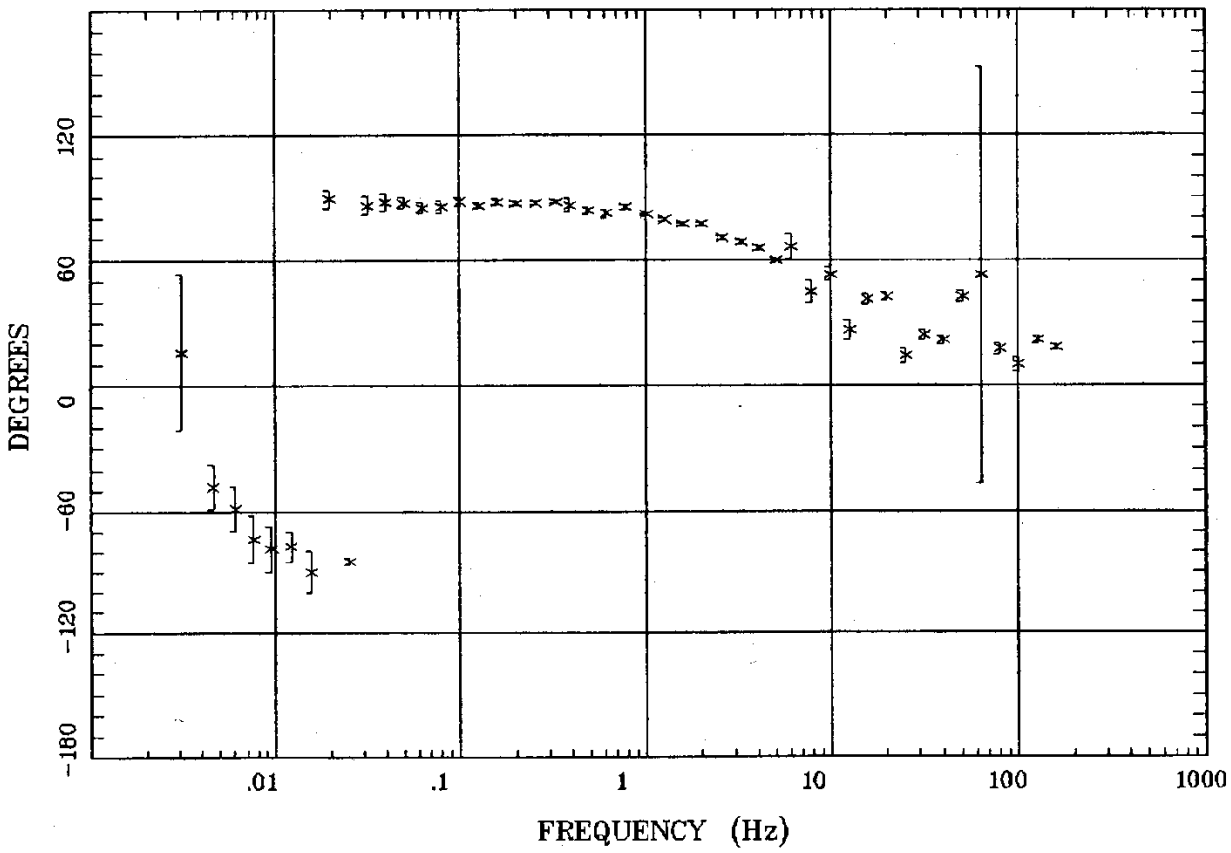


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 54

TIPPER STRIKE

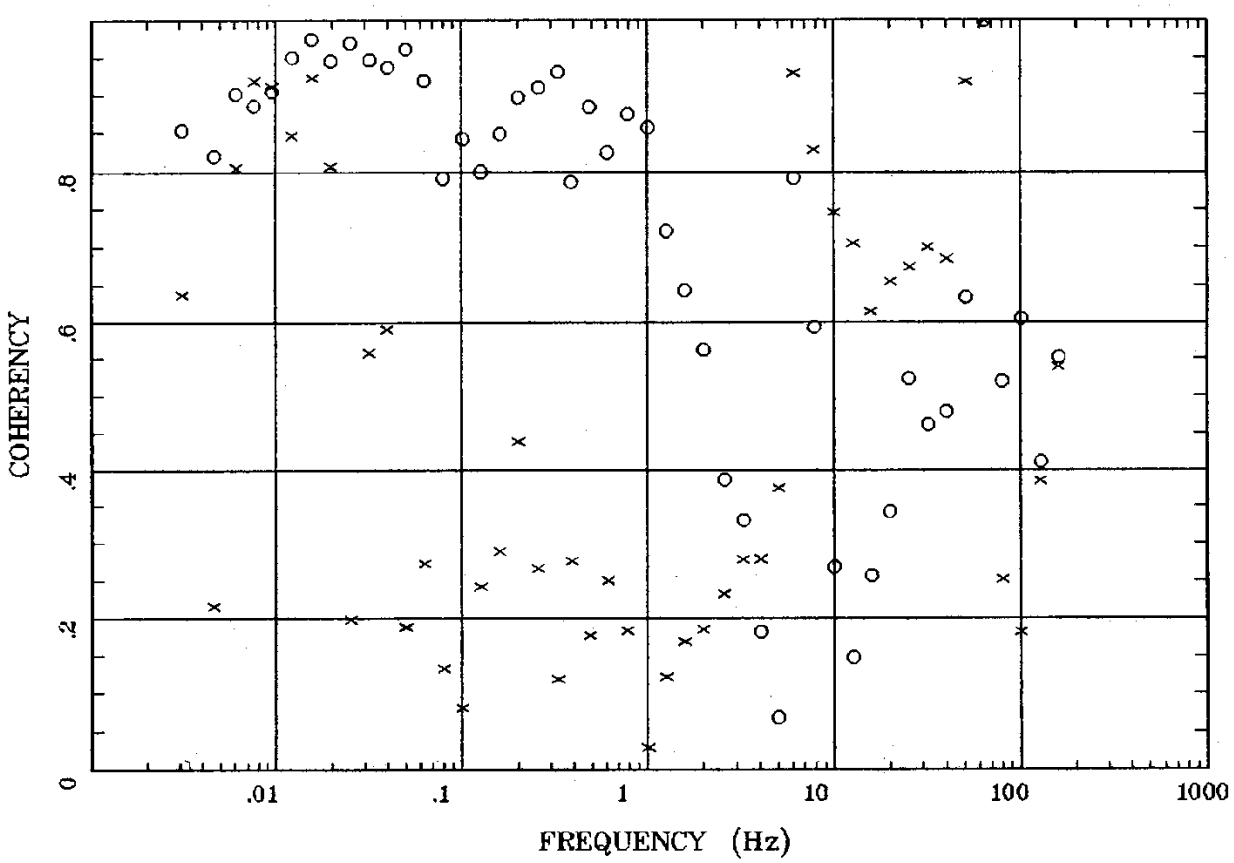


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 54

HzHx.x Coh HzHy.o

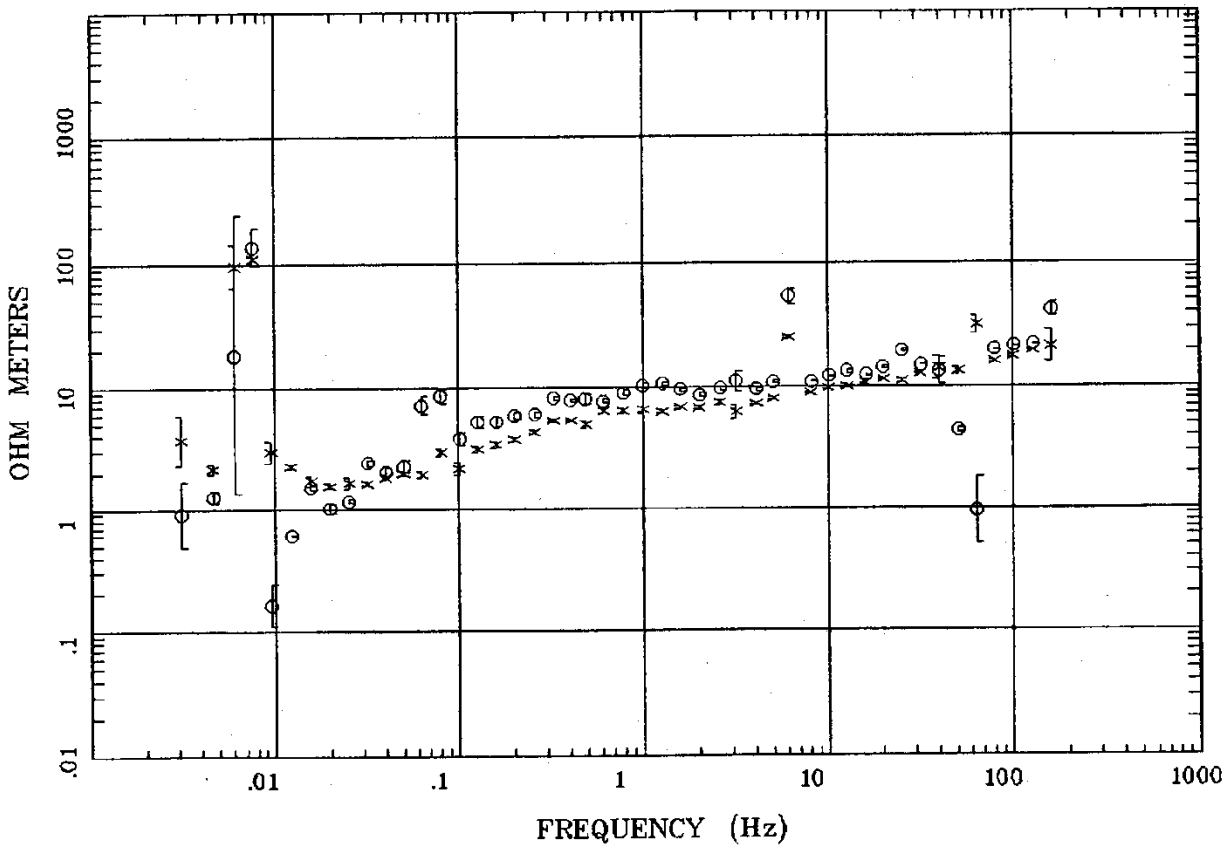


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap54.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 55

APPARENT RESISTIVITY

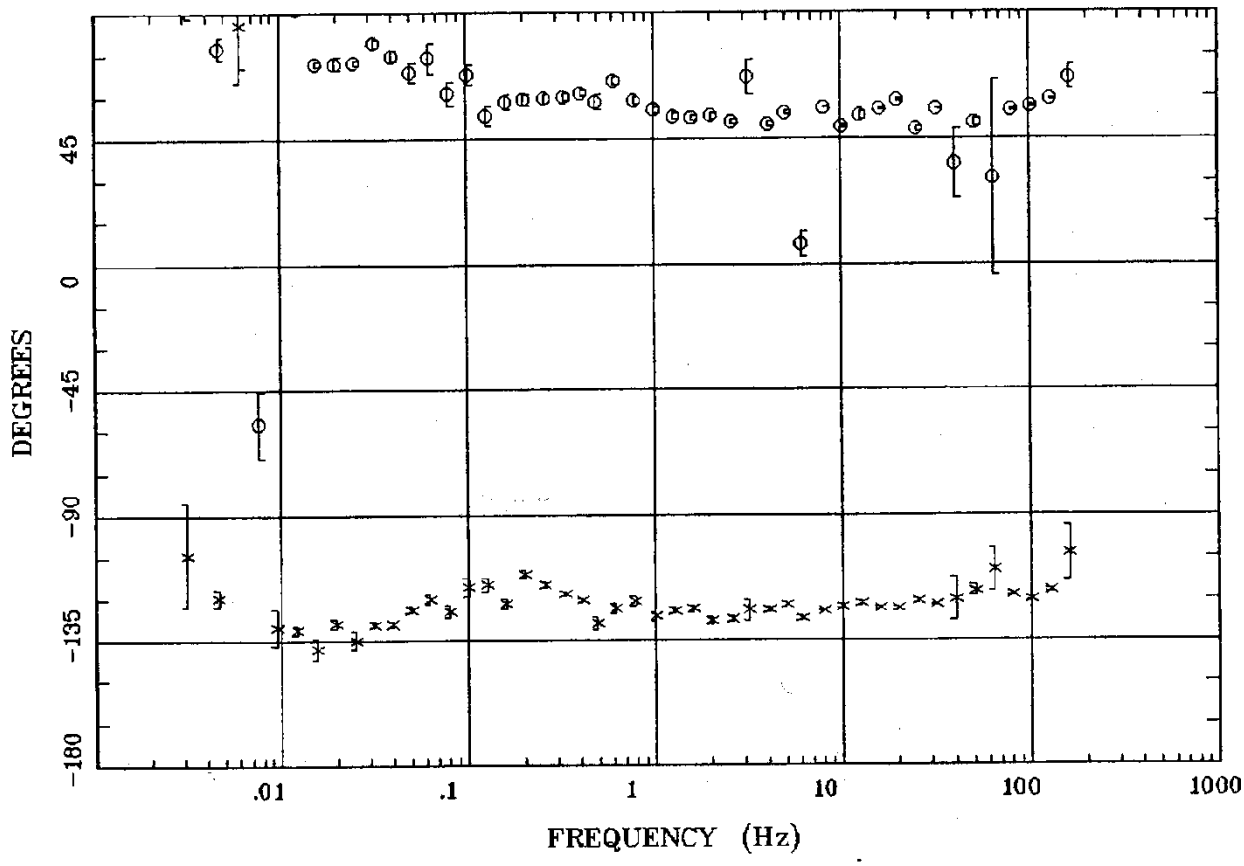


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 55

IMPEDANCE PHASE

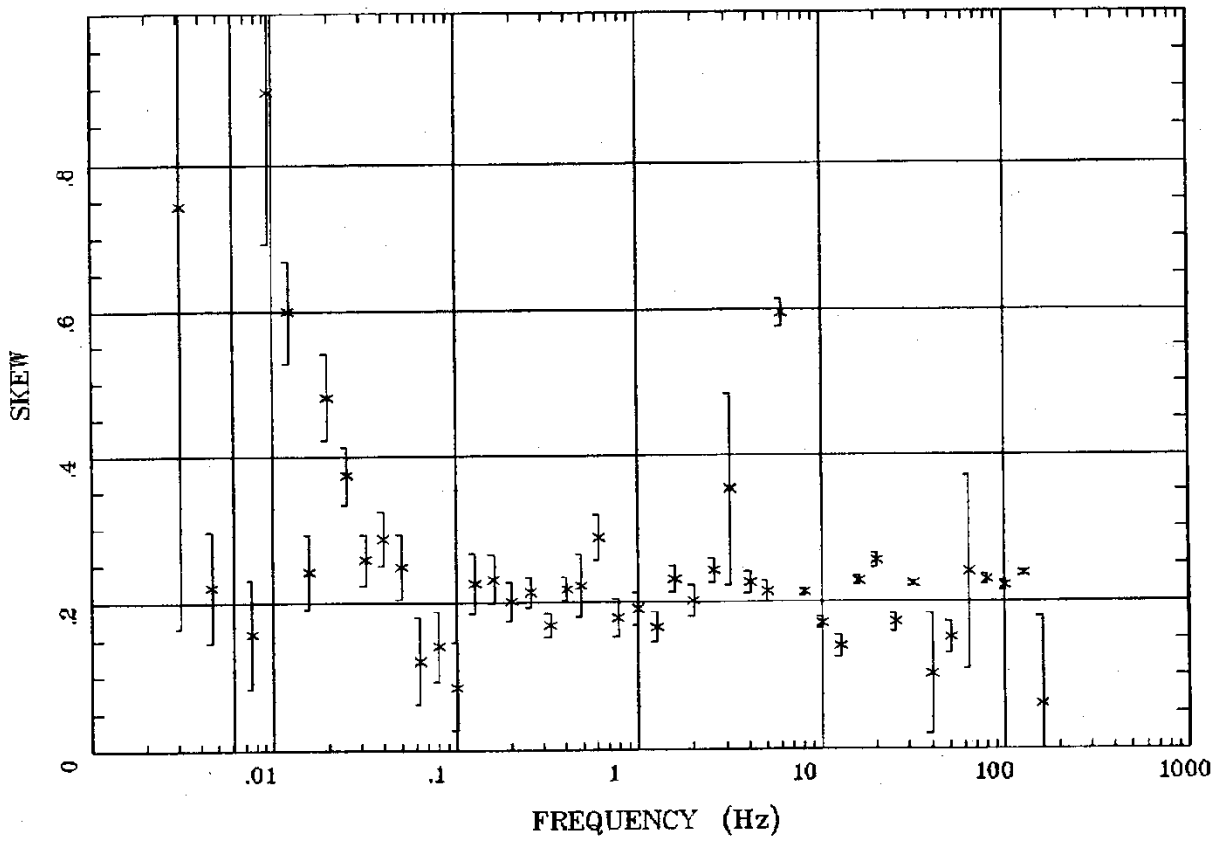


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 55

IMPEDANCE SKEW

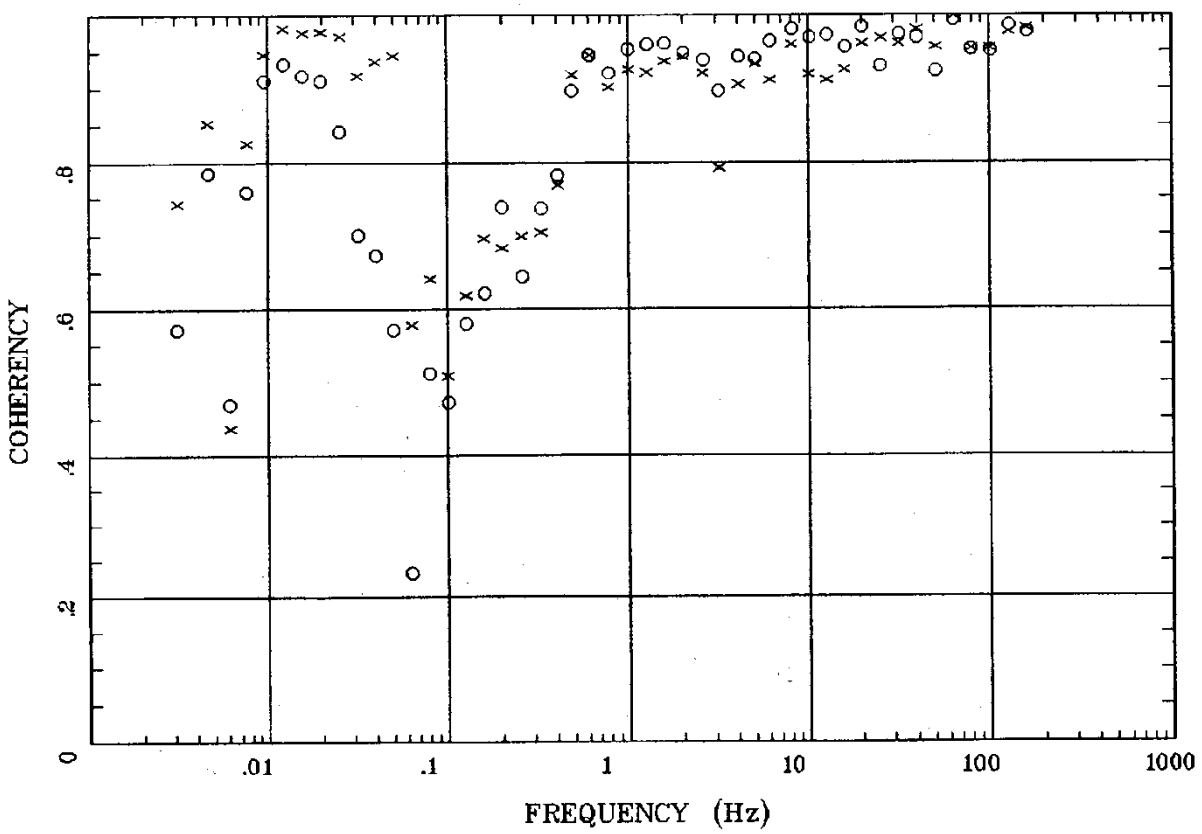


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 55

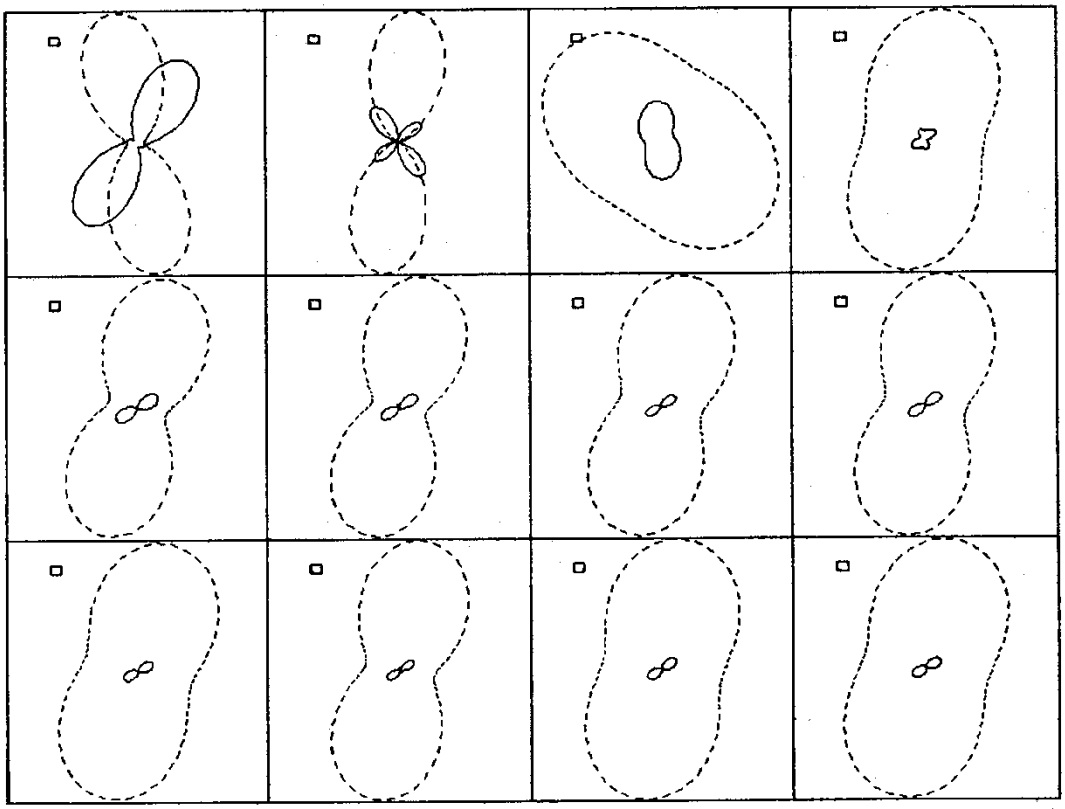
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



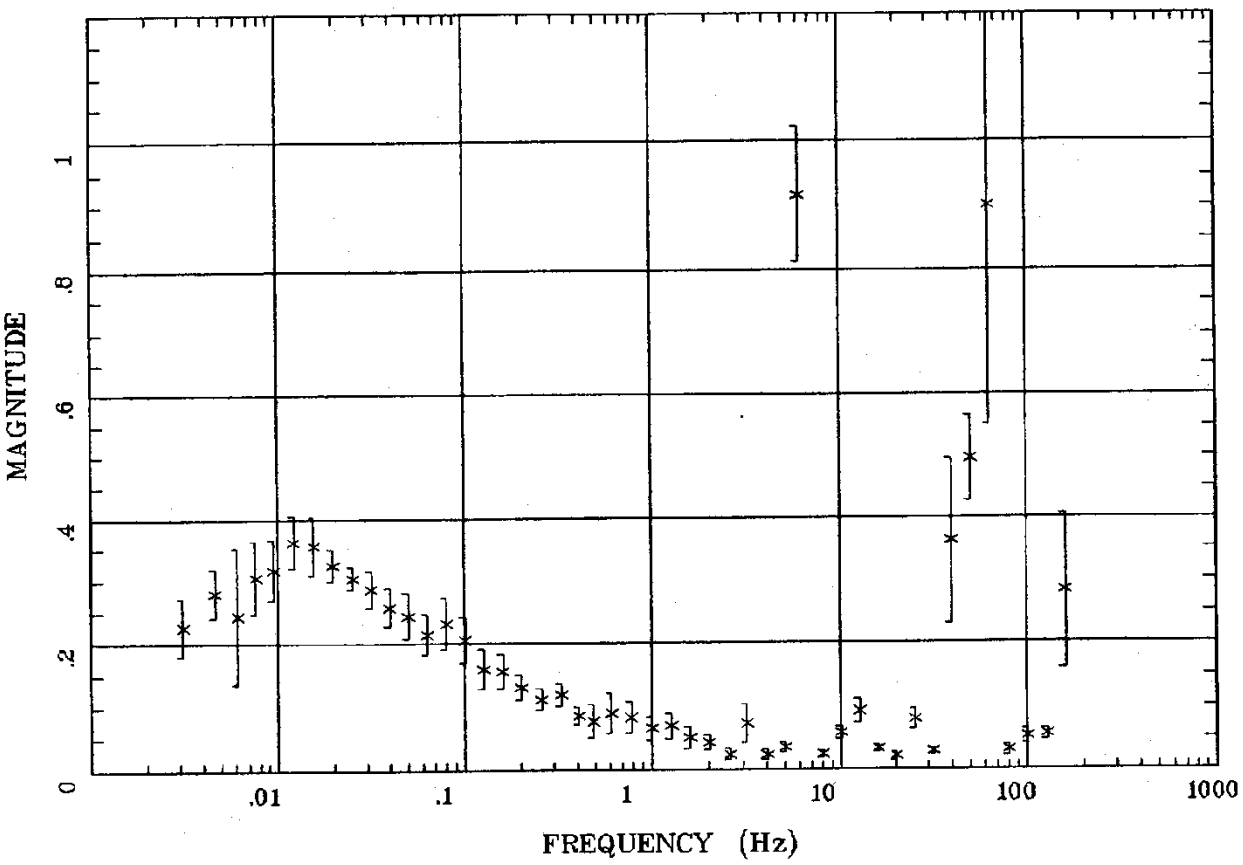
.0031 Hz	.0076 Hz	.0198 Hz	.0500 Hz
.127 Hz	.330 Hz	.781 Hz	2.002 Hz
5.054 Hz	12.695 Hz	31.962 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 55

TIPPER MAGNITUDE

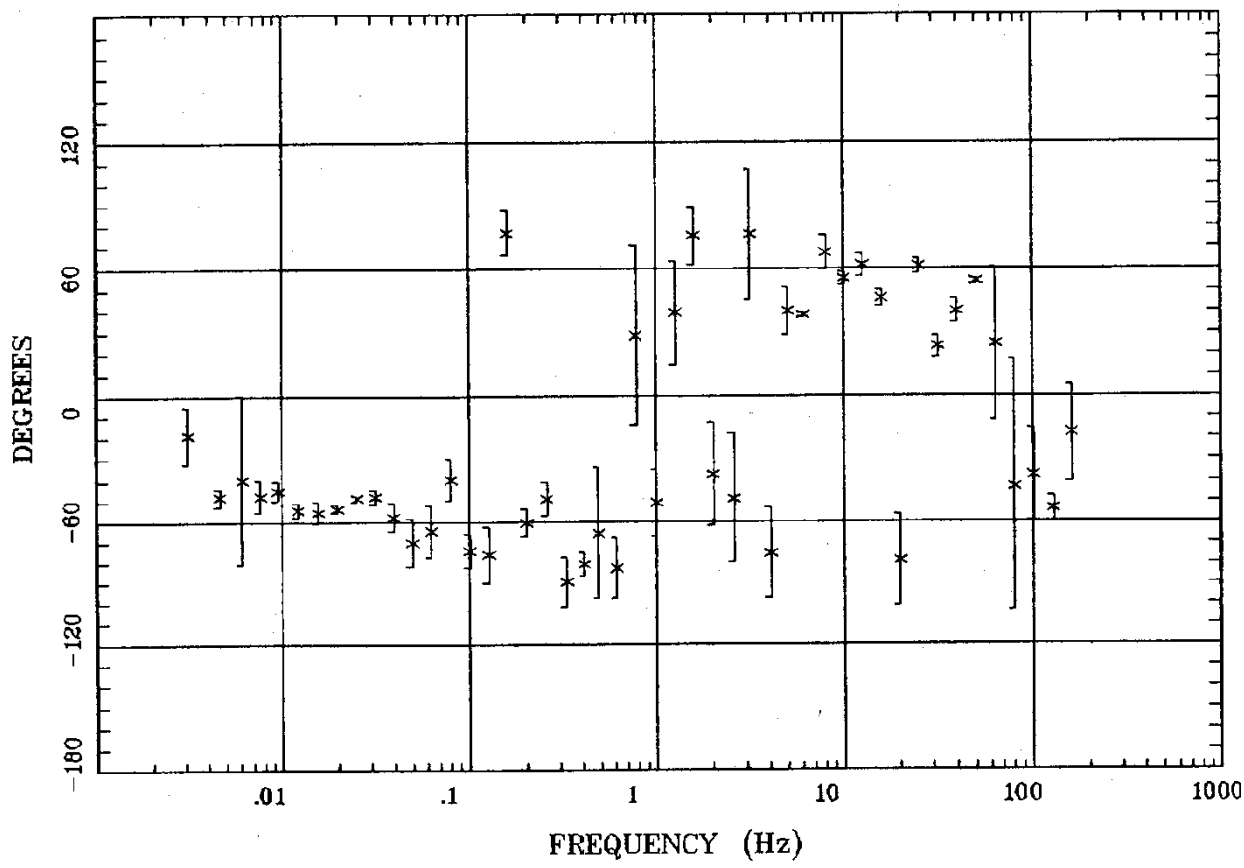


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 55

TIPPER STRIKE

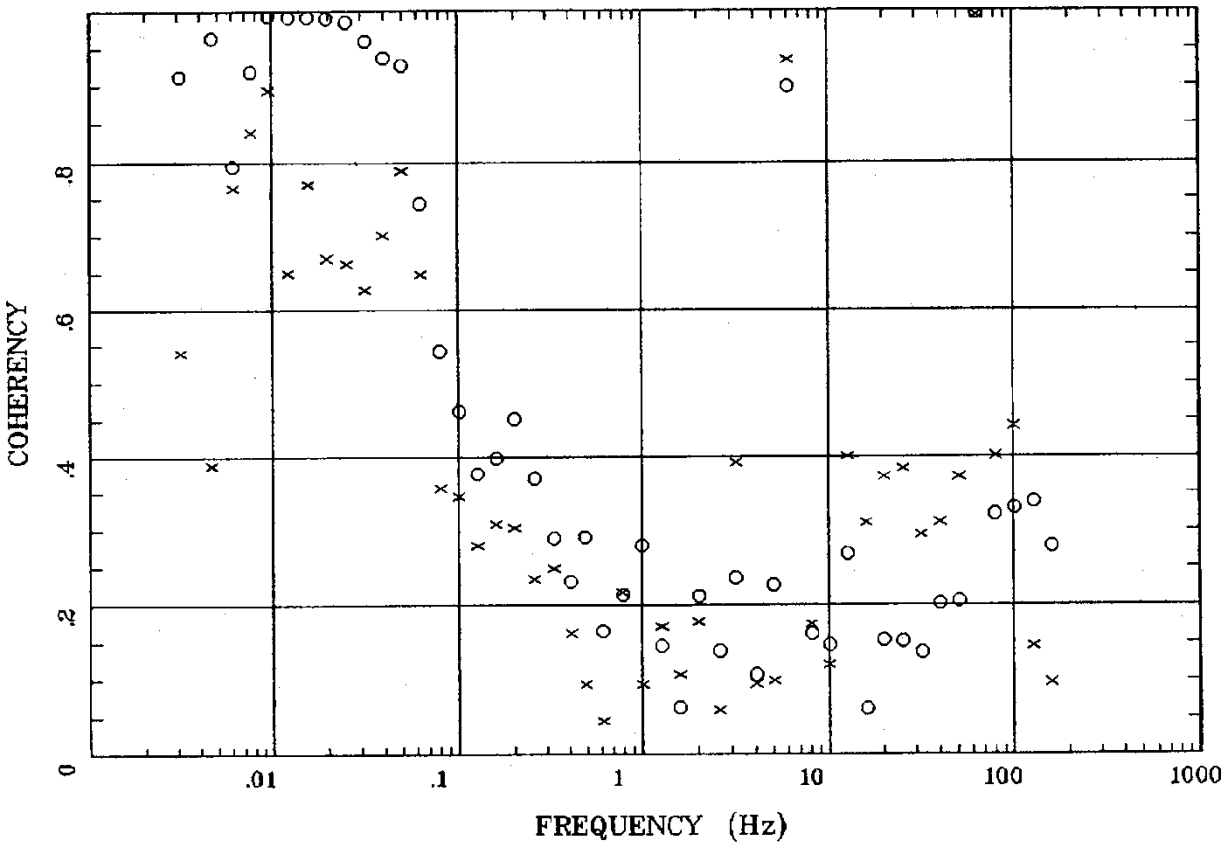


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 55

HzHx.x Coh HzHy.o

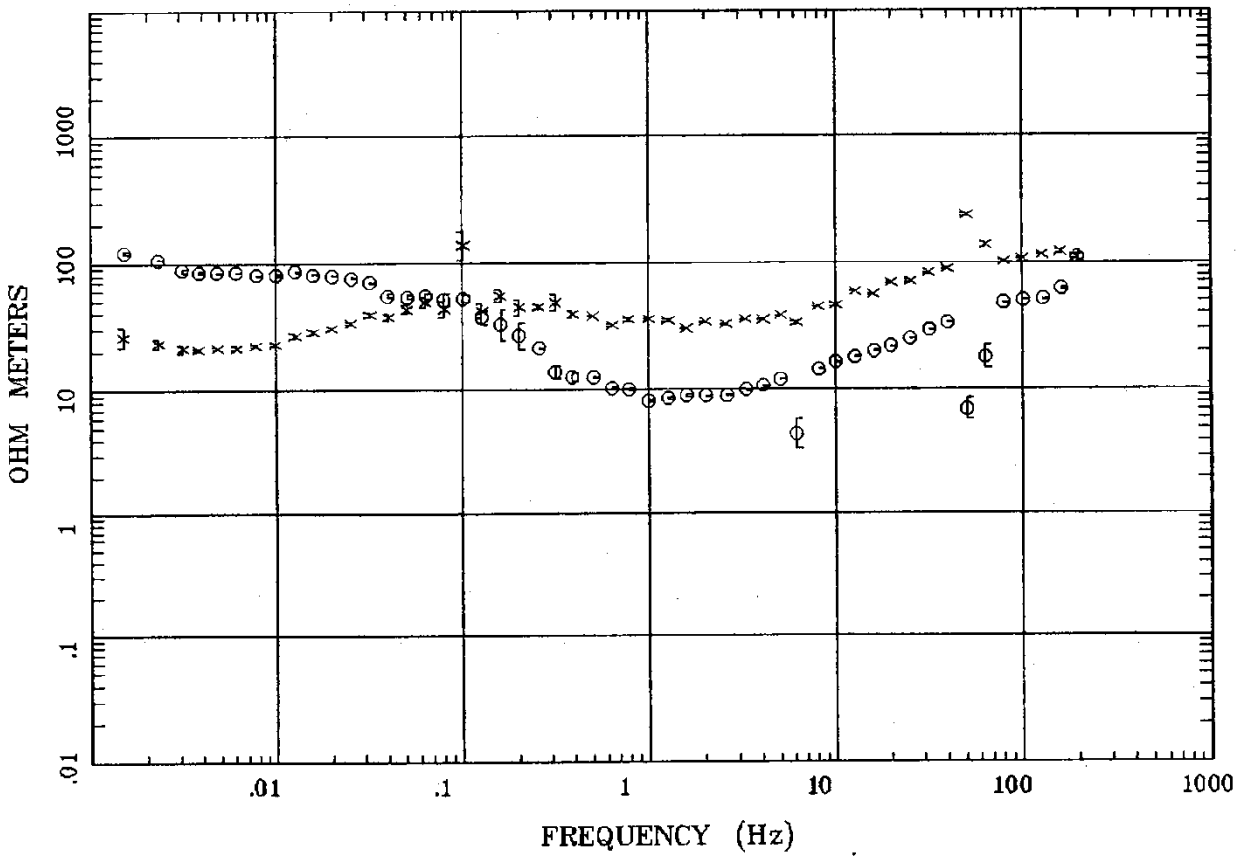


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap55.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 56

APPARENT RESISTIVITY

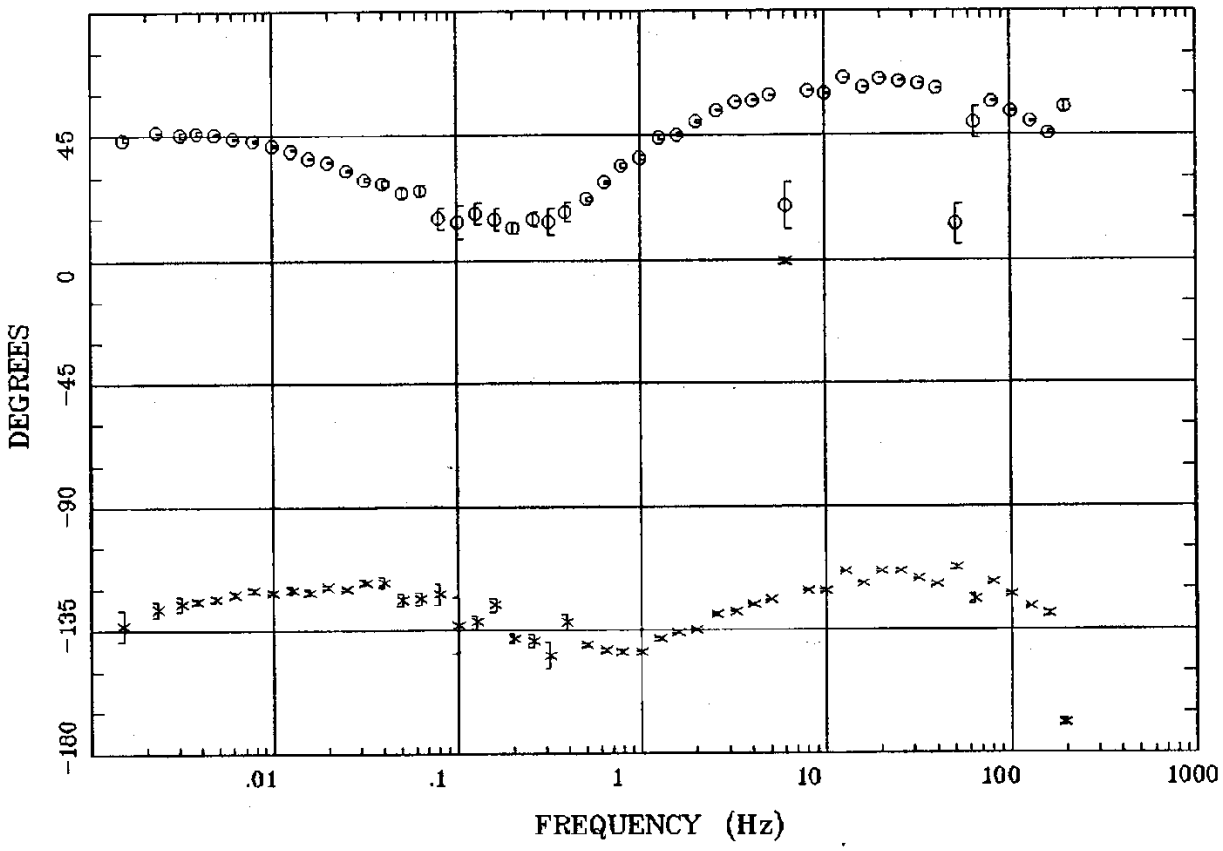


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 56

IMPEDANCE PHASE

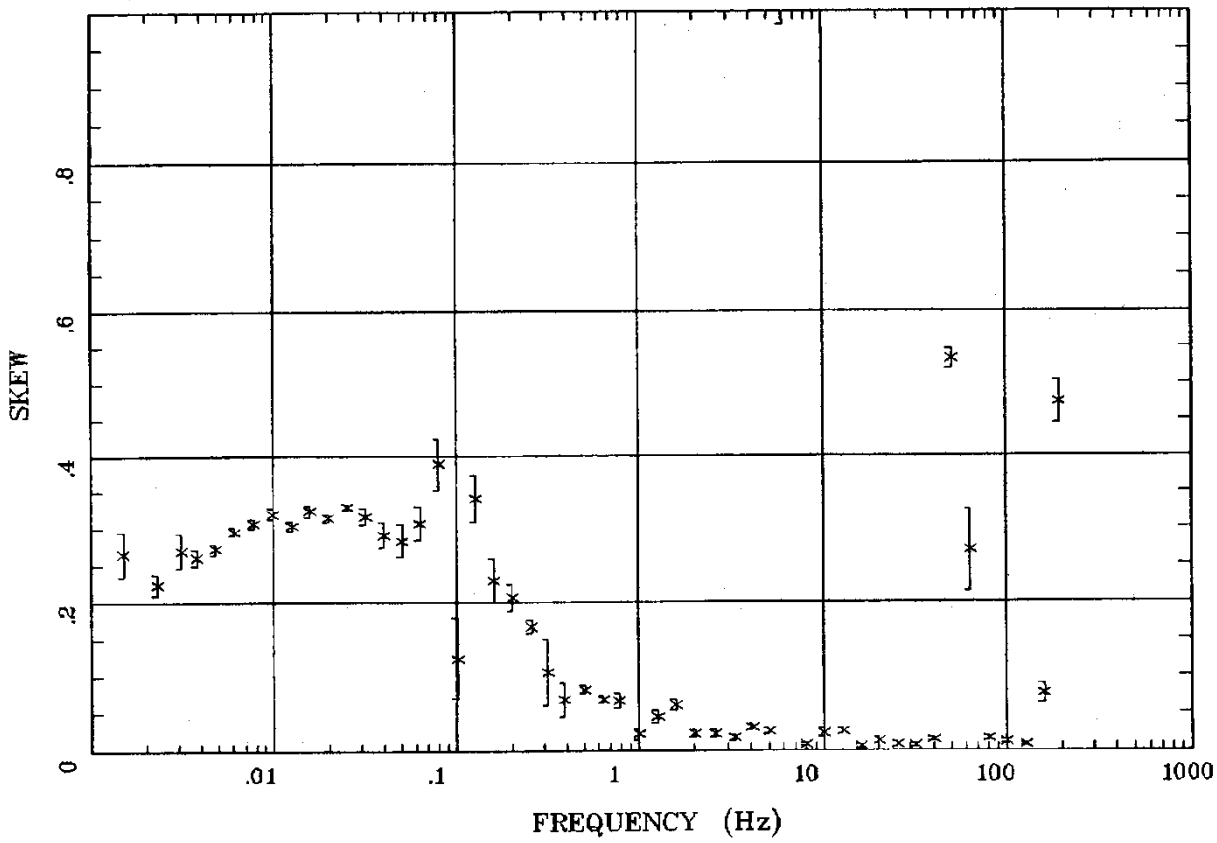


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 56

IMPEDANCE SKEW

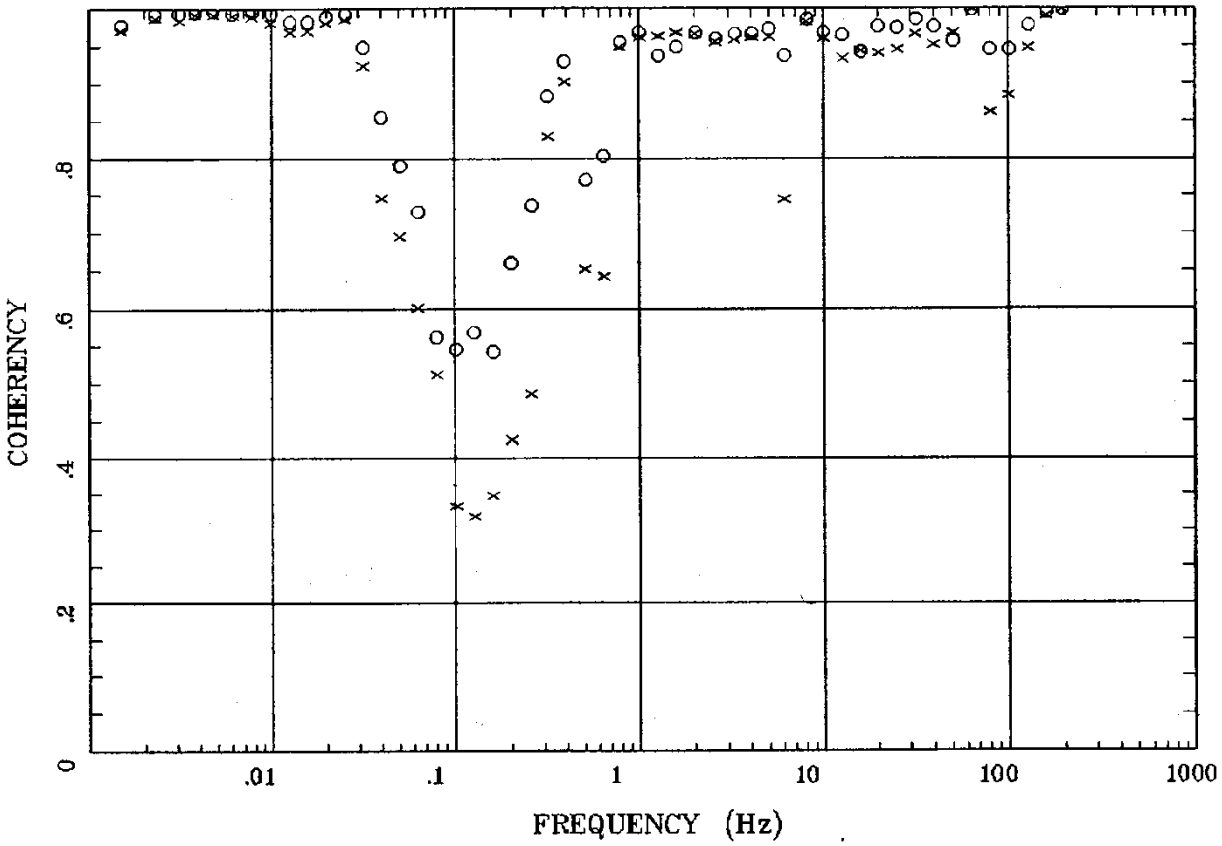


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 56

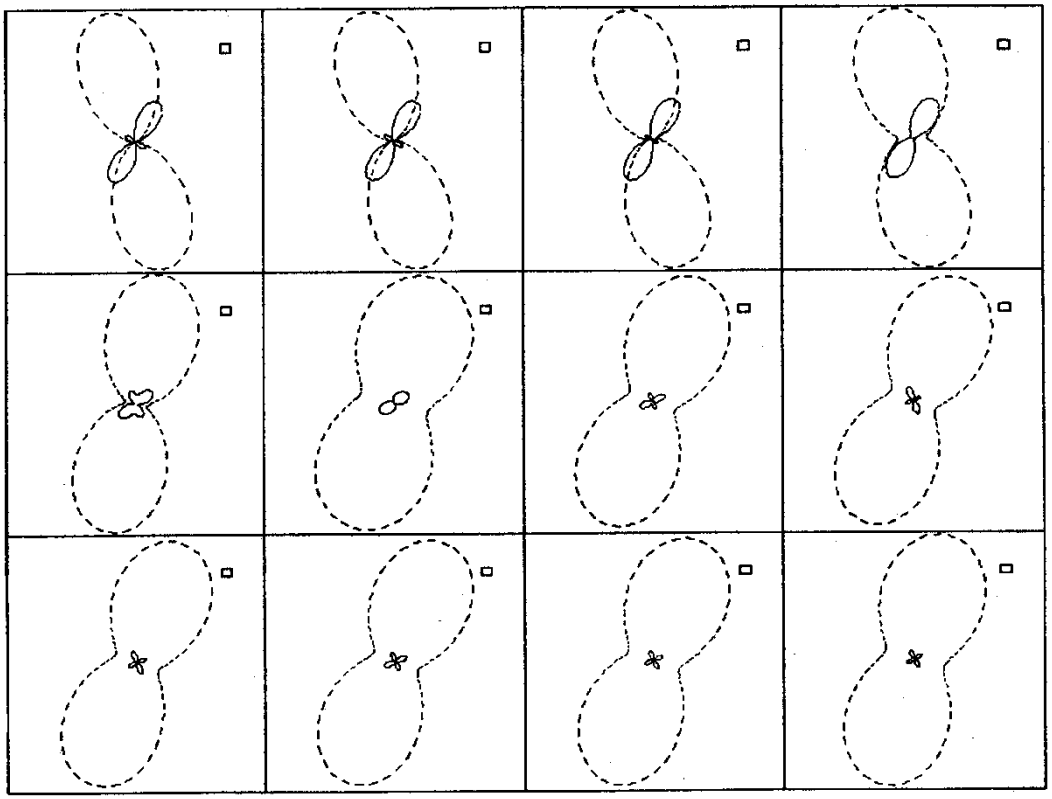
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



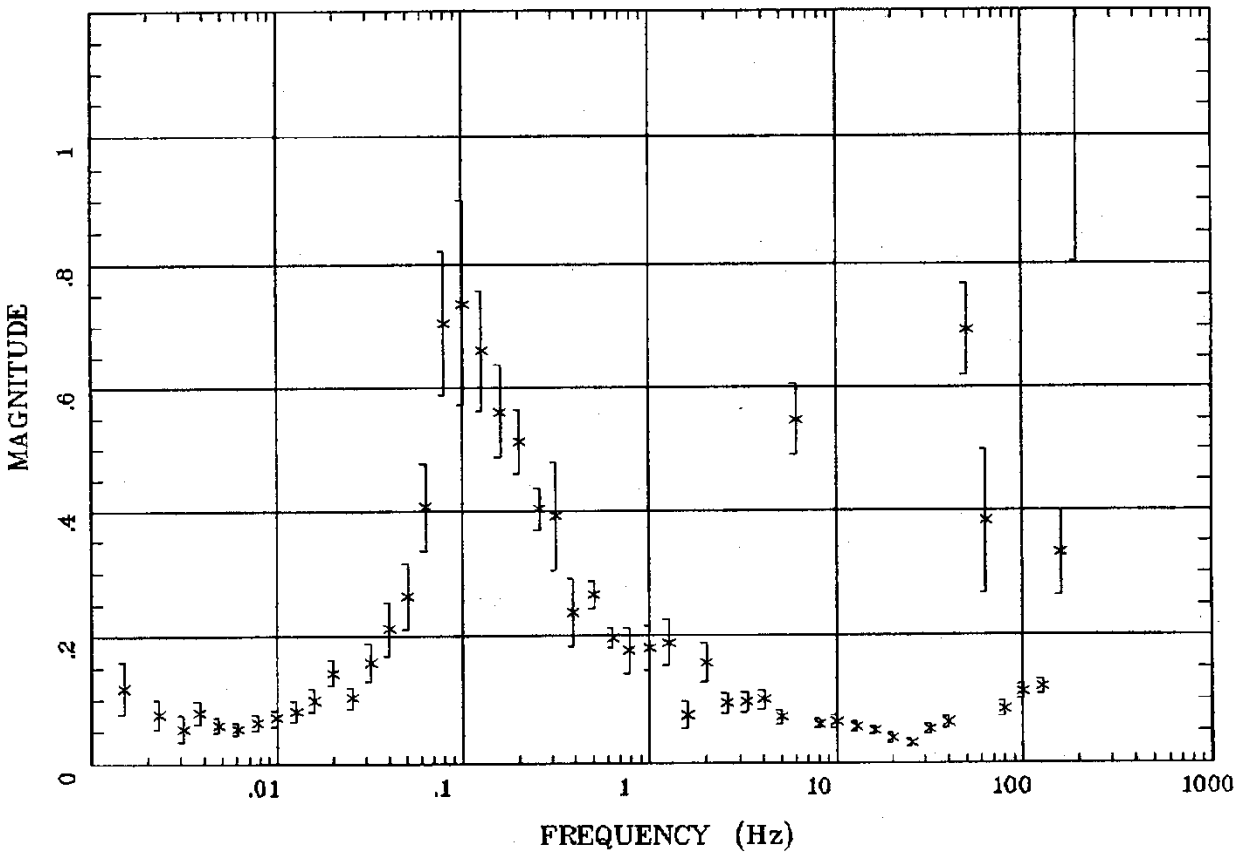
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.587 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 56

TIPPER MAGNITUDE

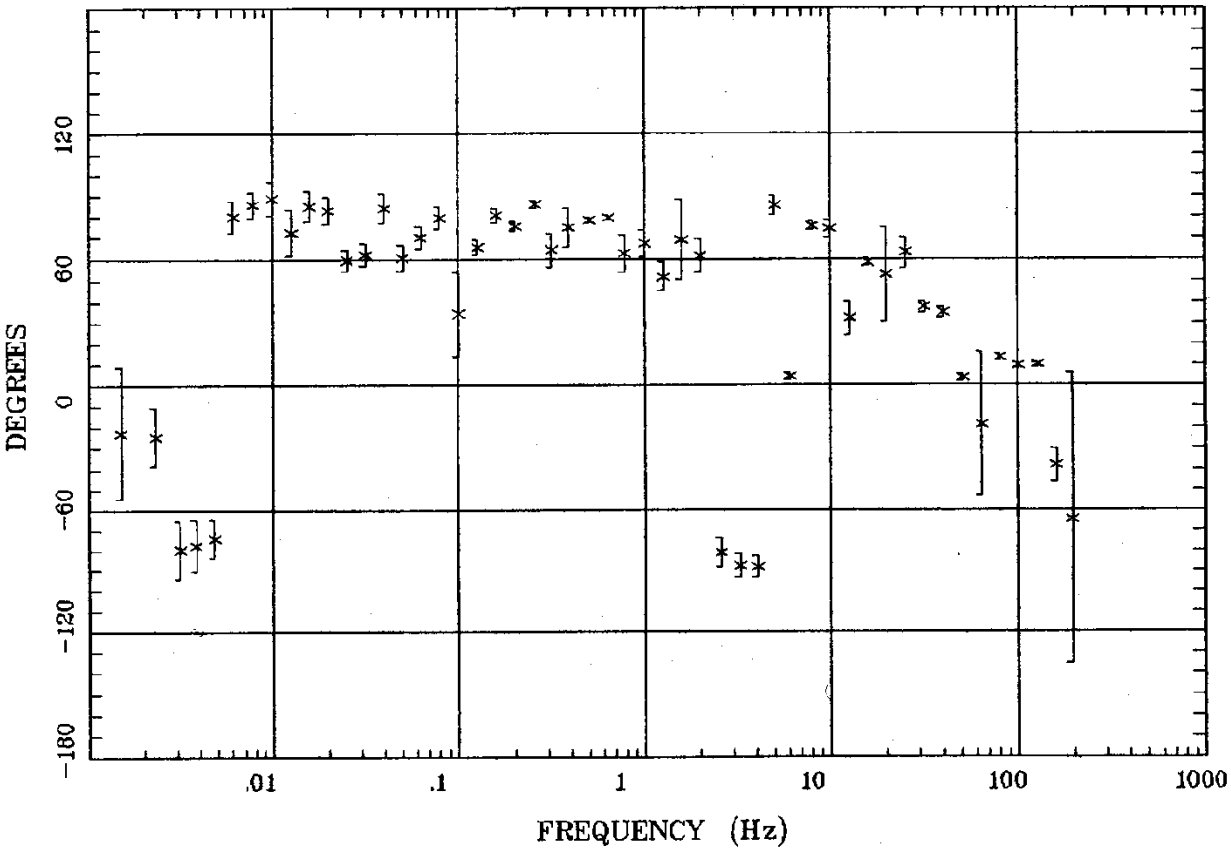


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 56

TIPPER STRIKE

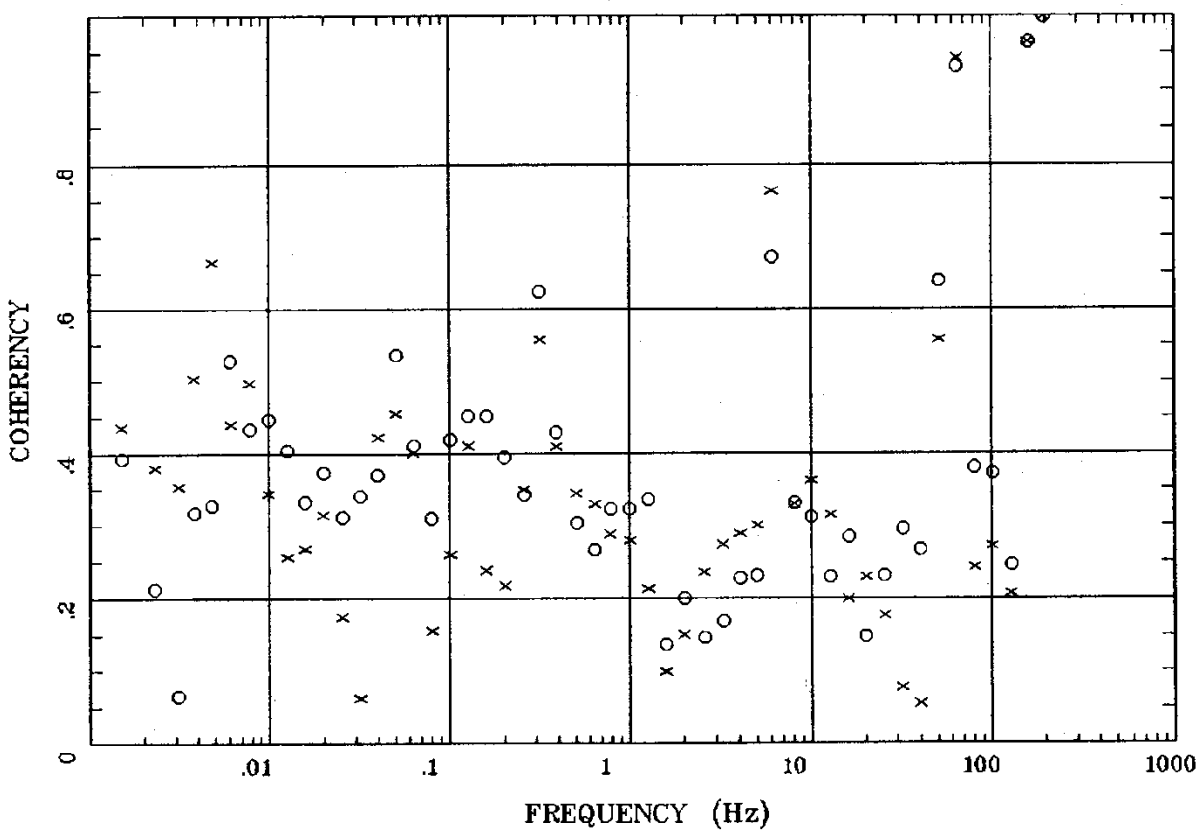


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 56

HzHx.x Coh HzHy.o

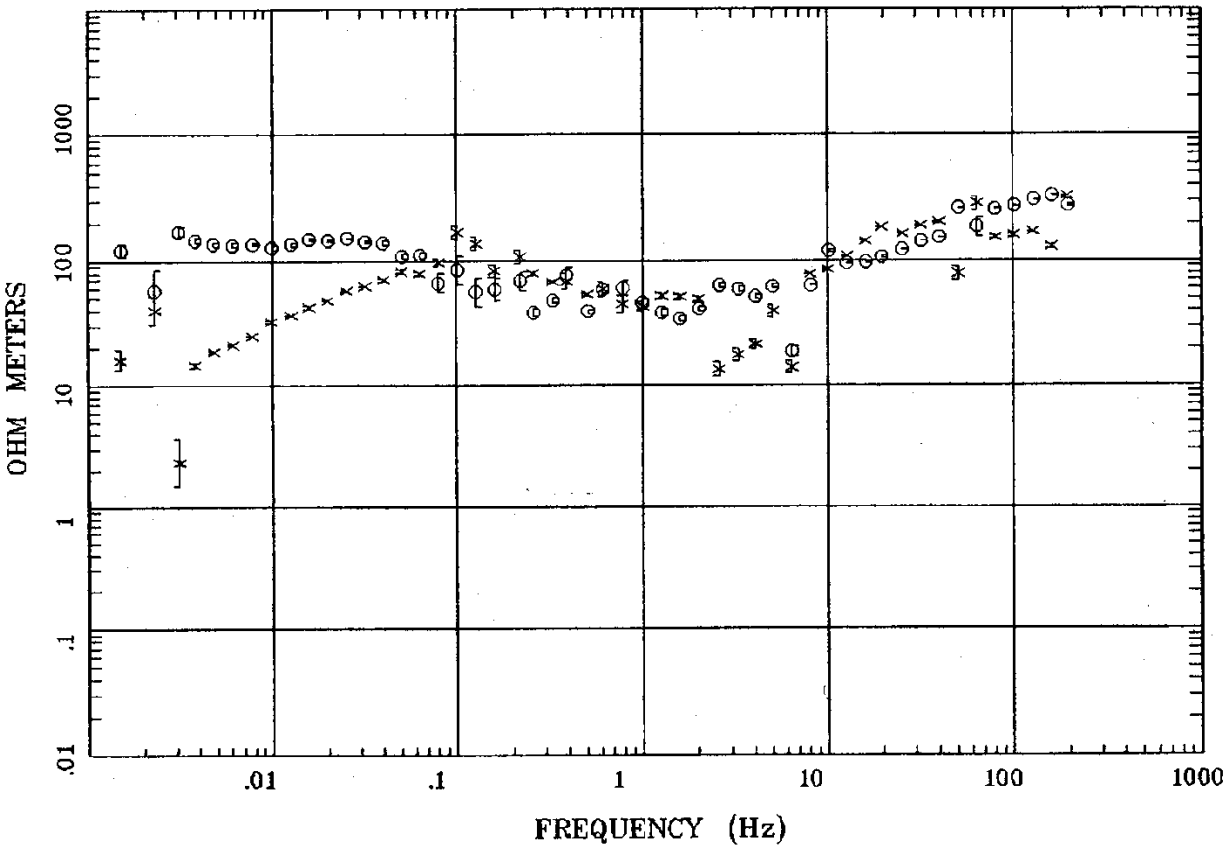


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap56.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:15 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

APPARENT RESISTIVITY

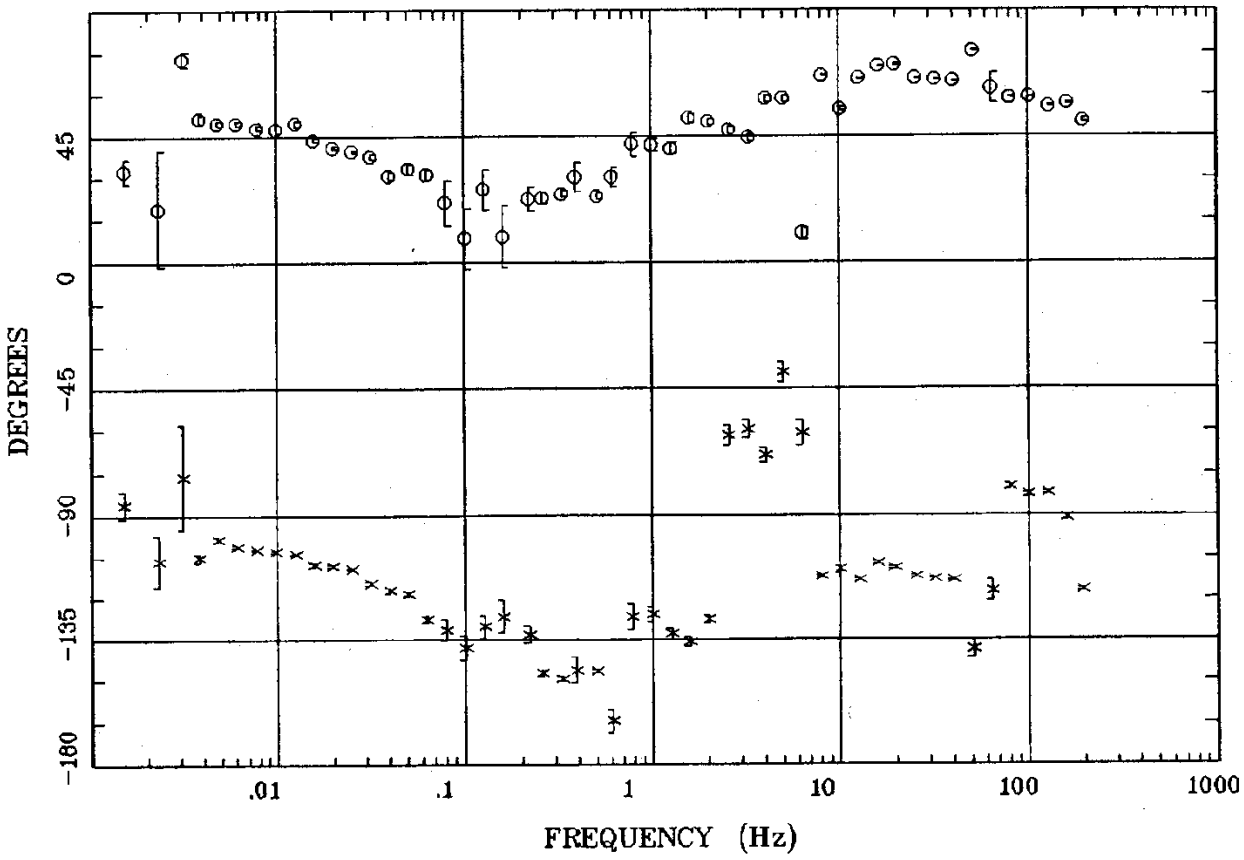


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

IMPEDANCE PHASE

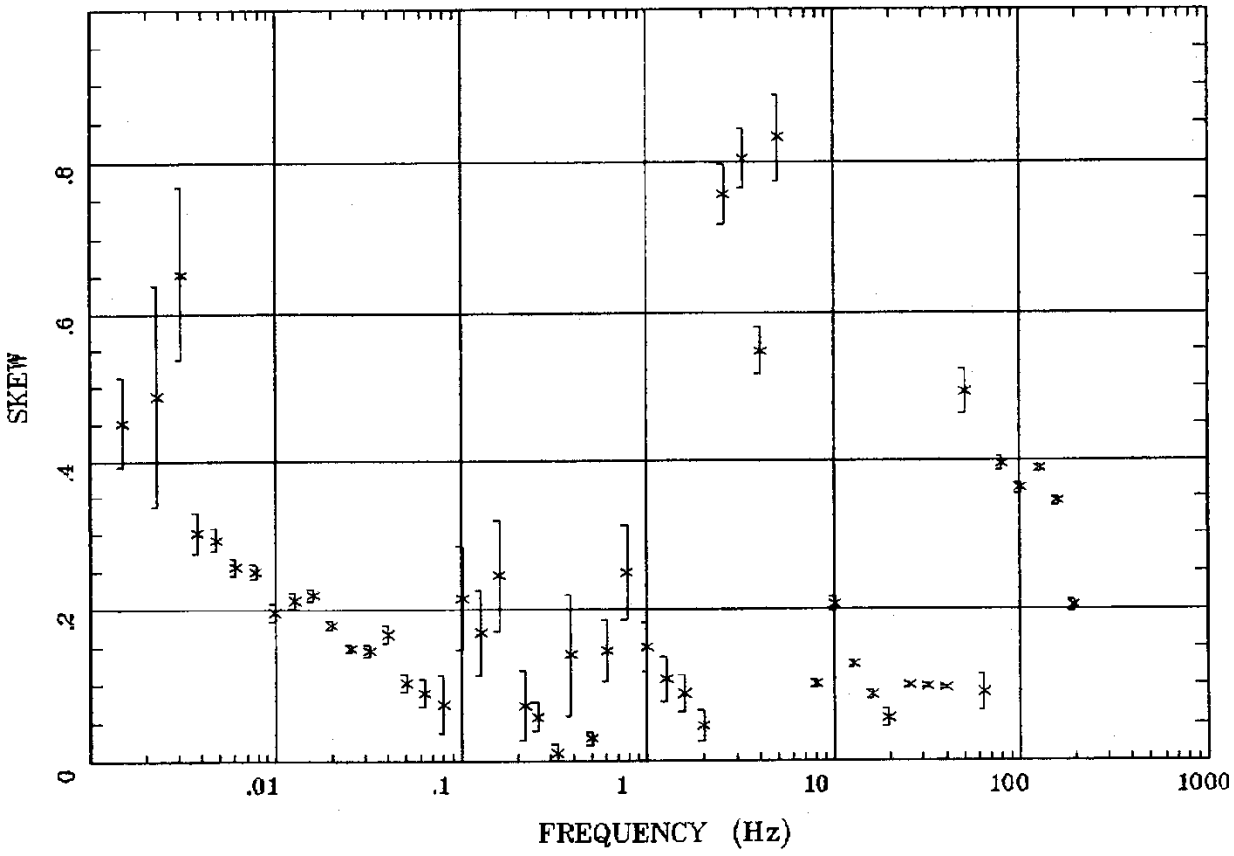


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

IMPEDANCE SKEW

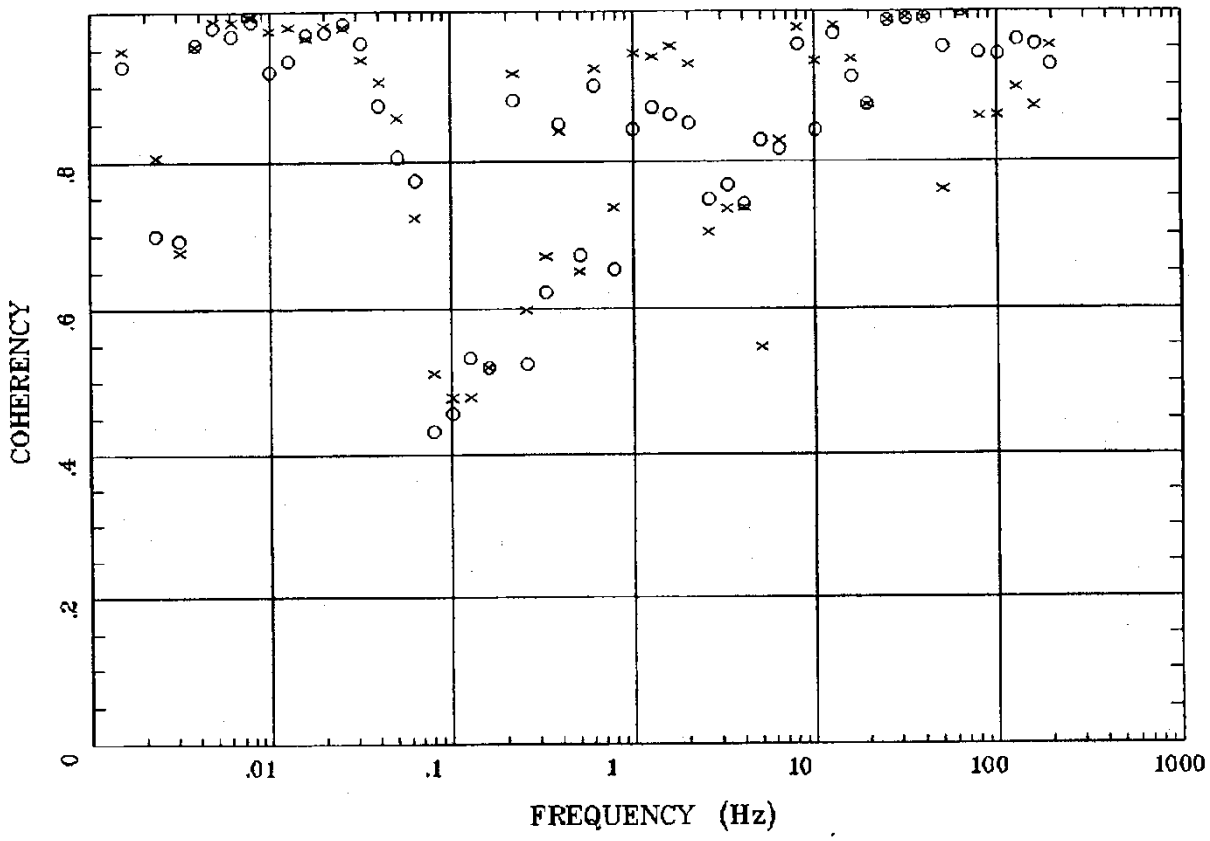


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

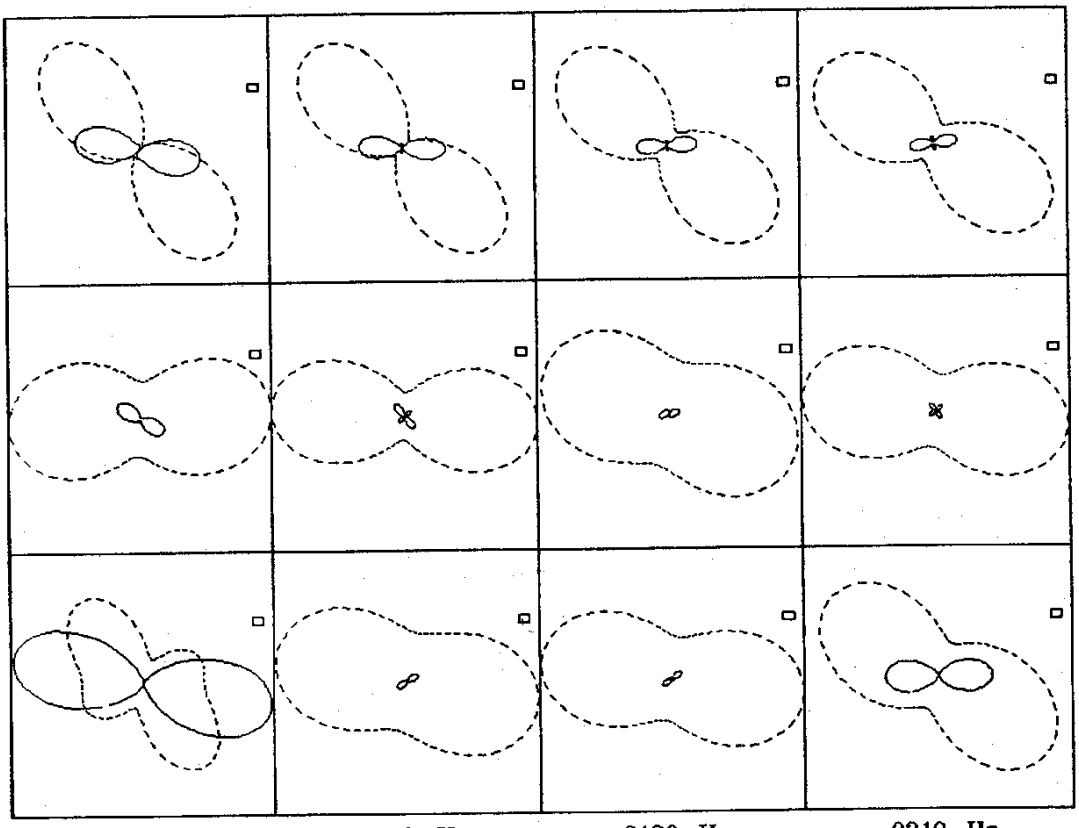
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



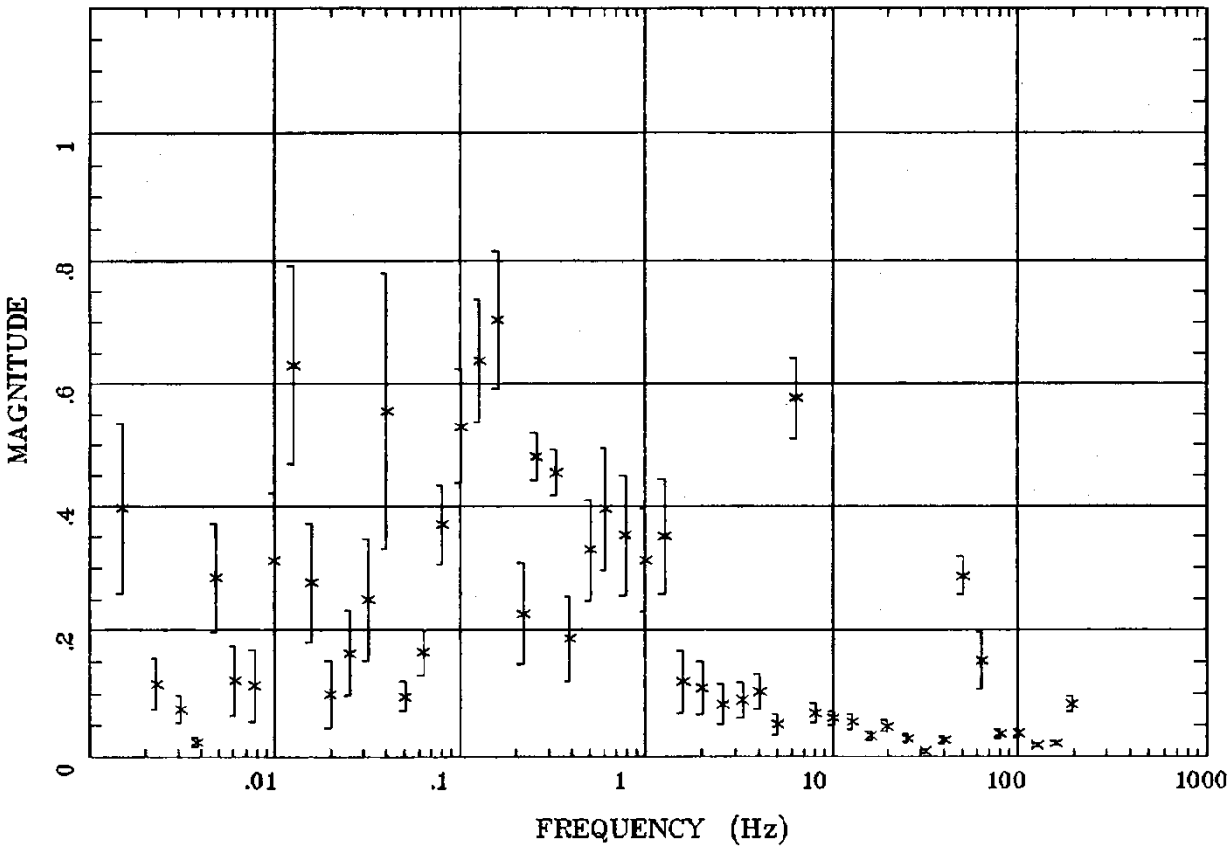
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.610 Hz	1.587 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

TIPPER MAGNITUDE

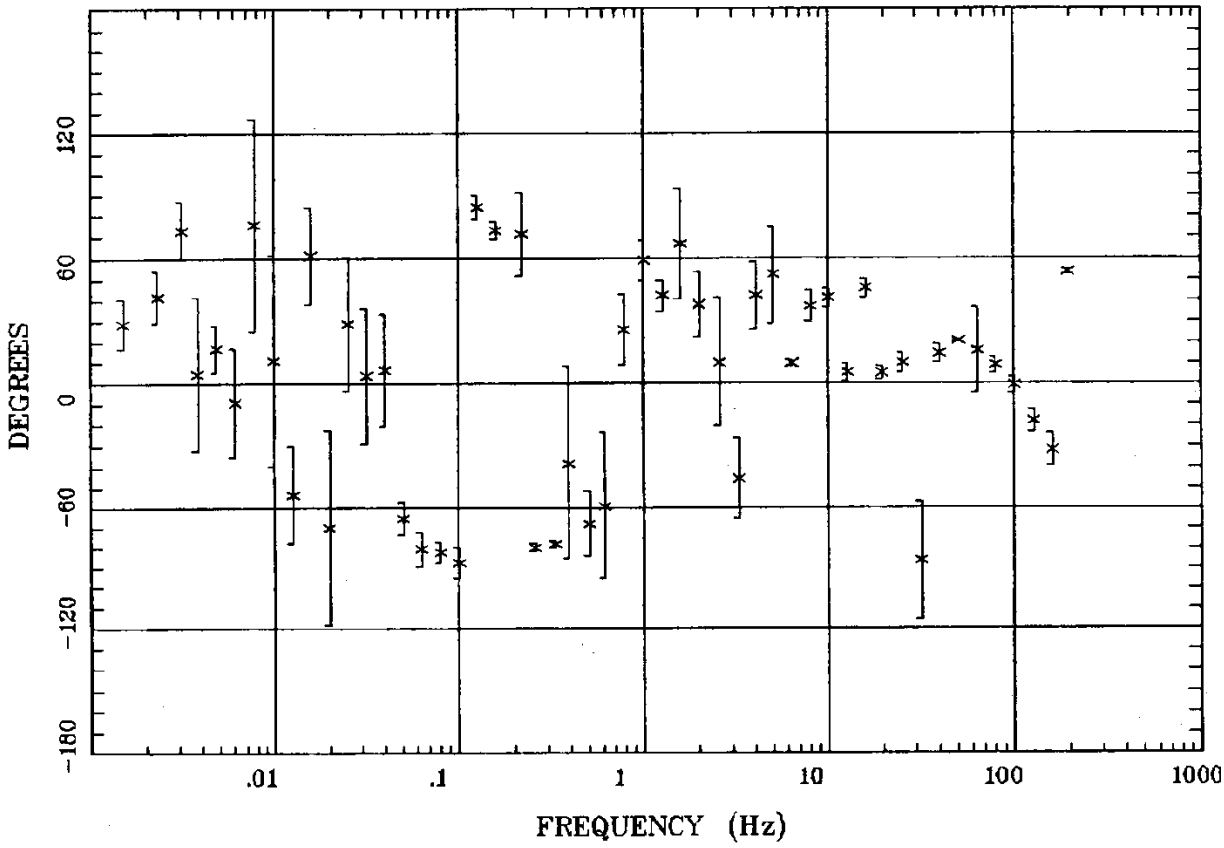


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

TIPPER STRIKE

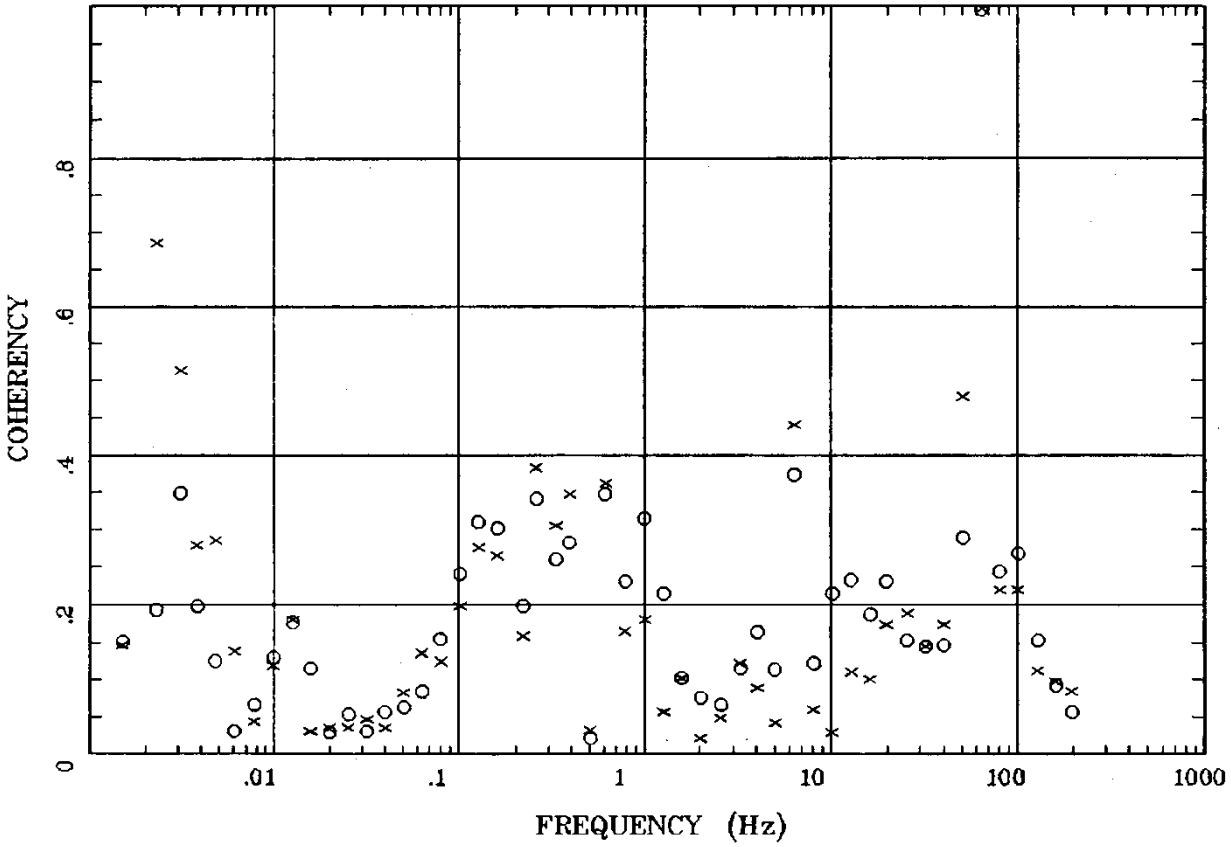


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 57

HzHx.x Coh HzHy.o

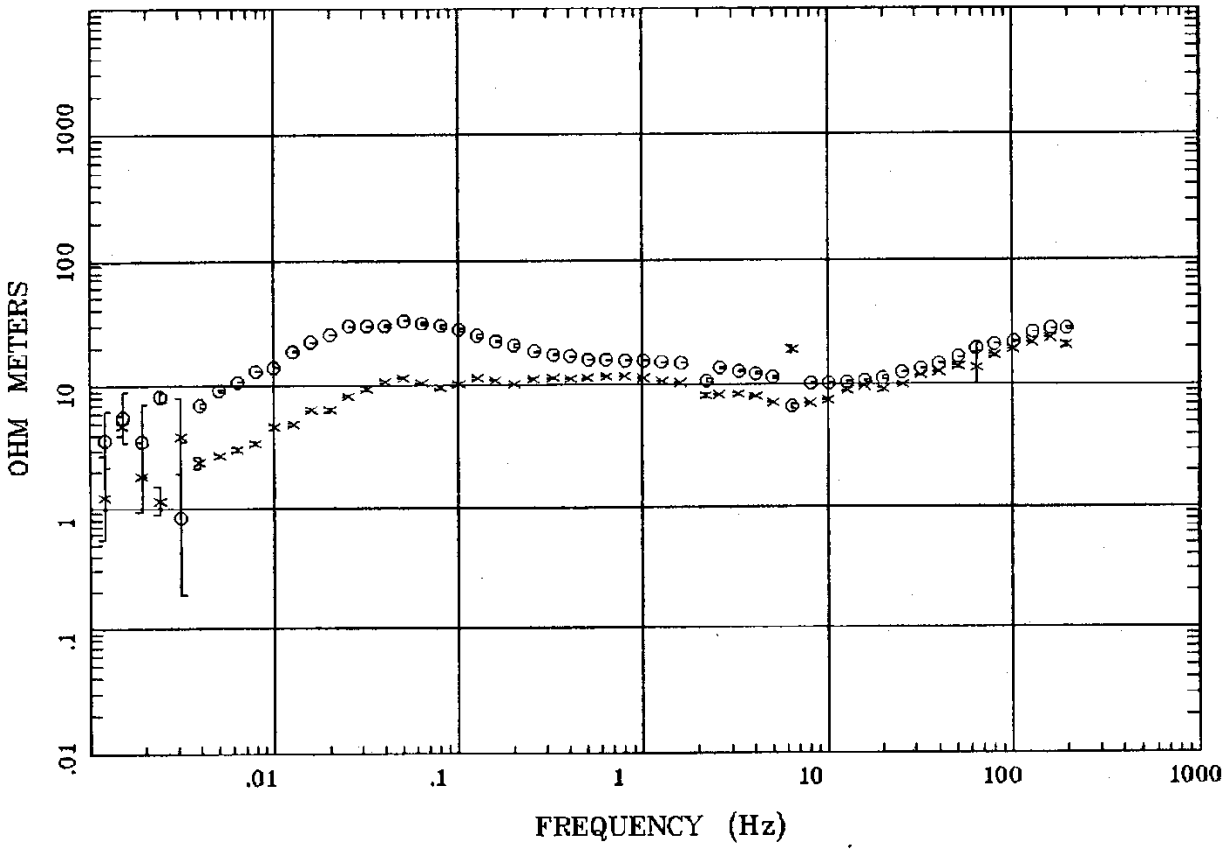


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap57.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 58

APPARENT RESISTIVITY

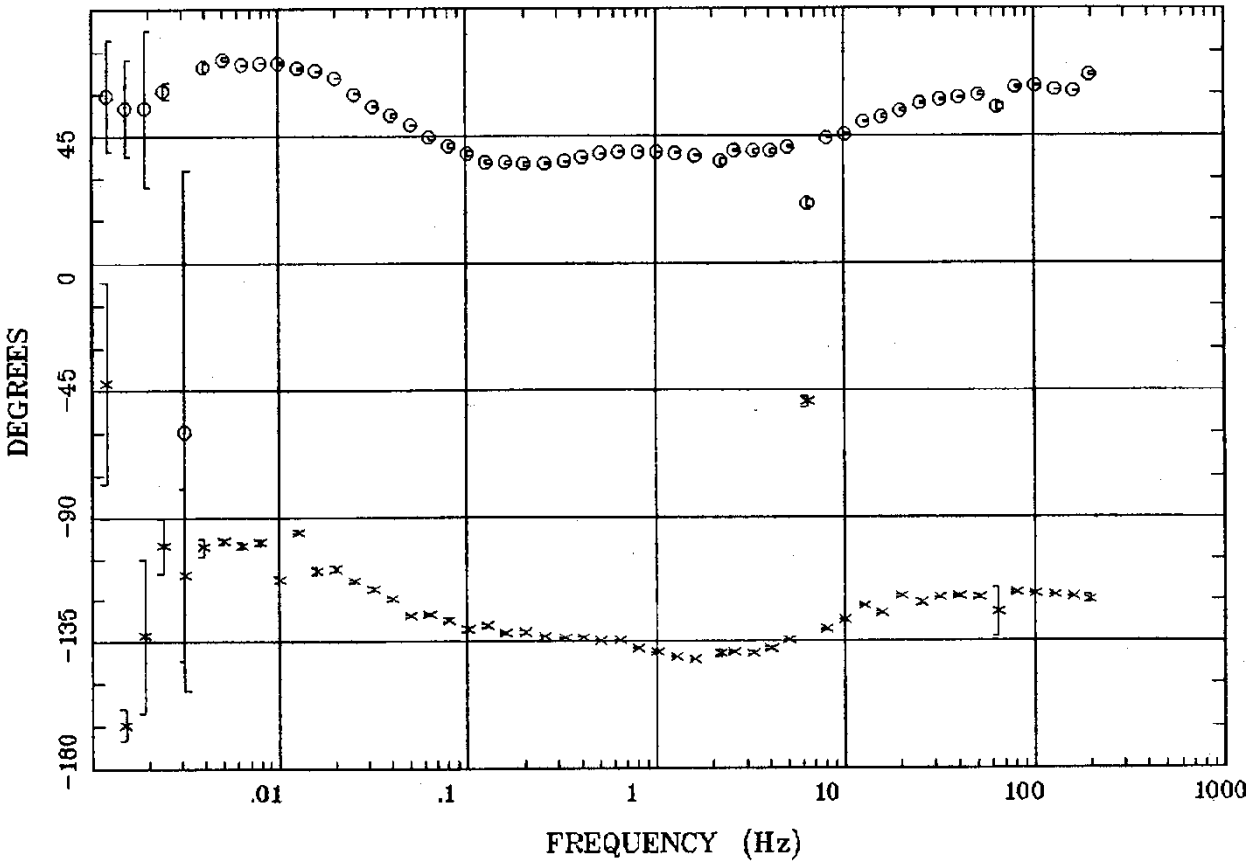


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 58

IMPEDANCE PHASE

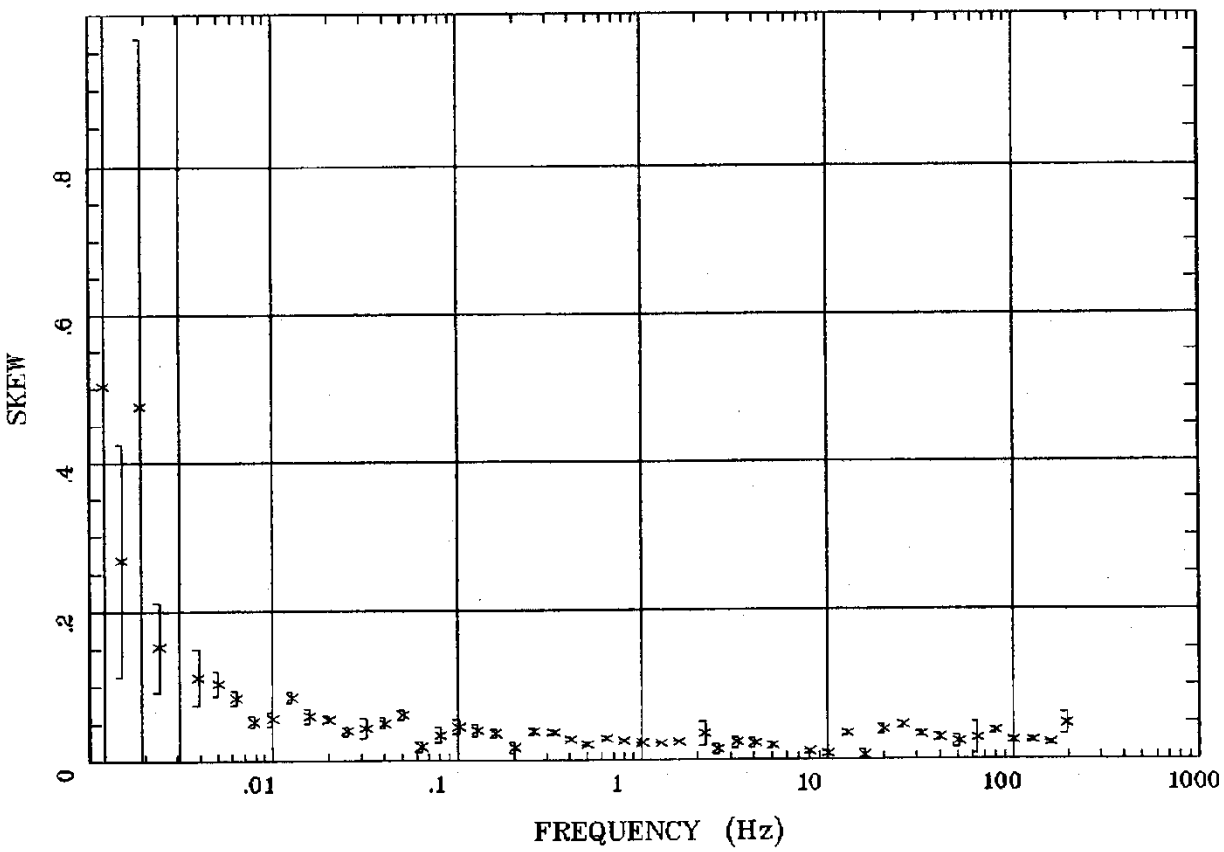


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 58

IMPEDANCE SKEW

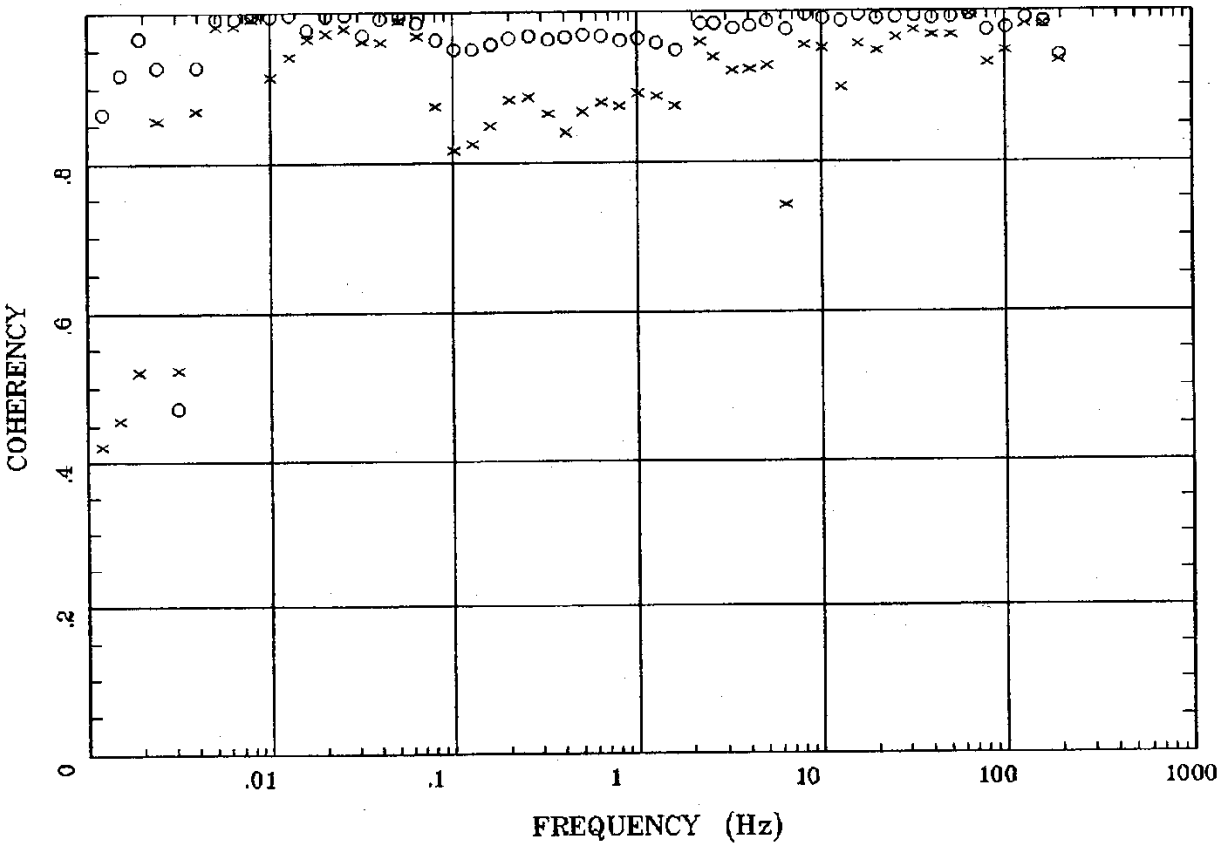


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 58

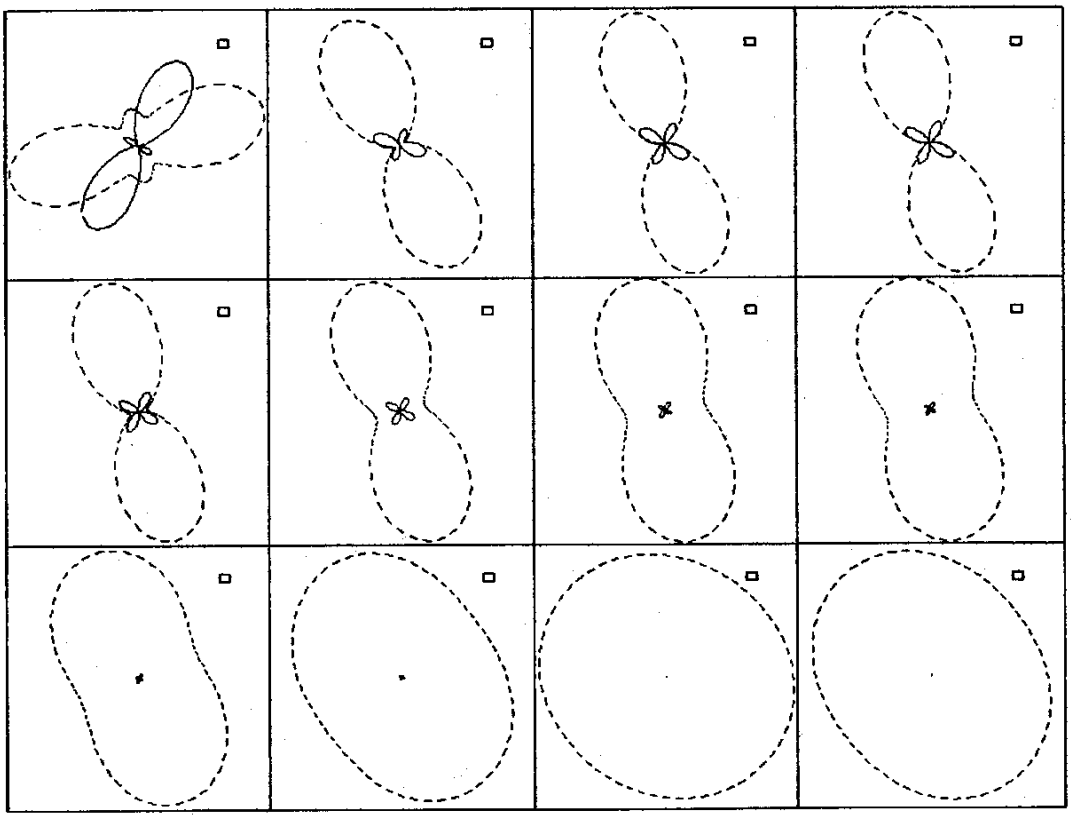
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

POLAR PLOTS

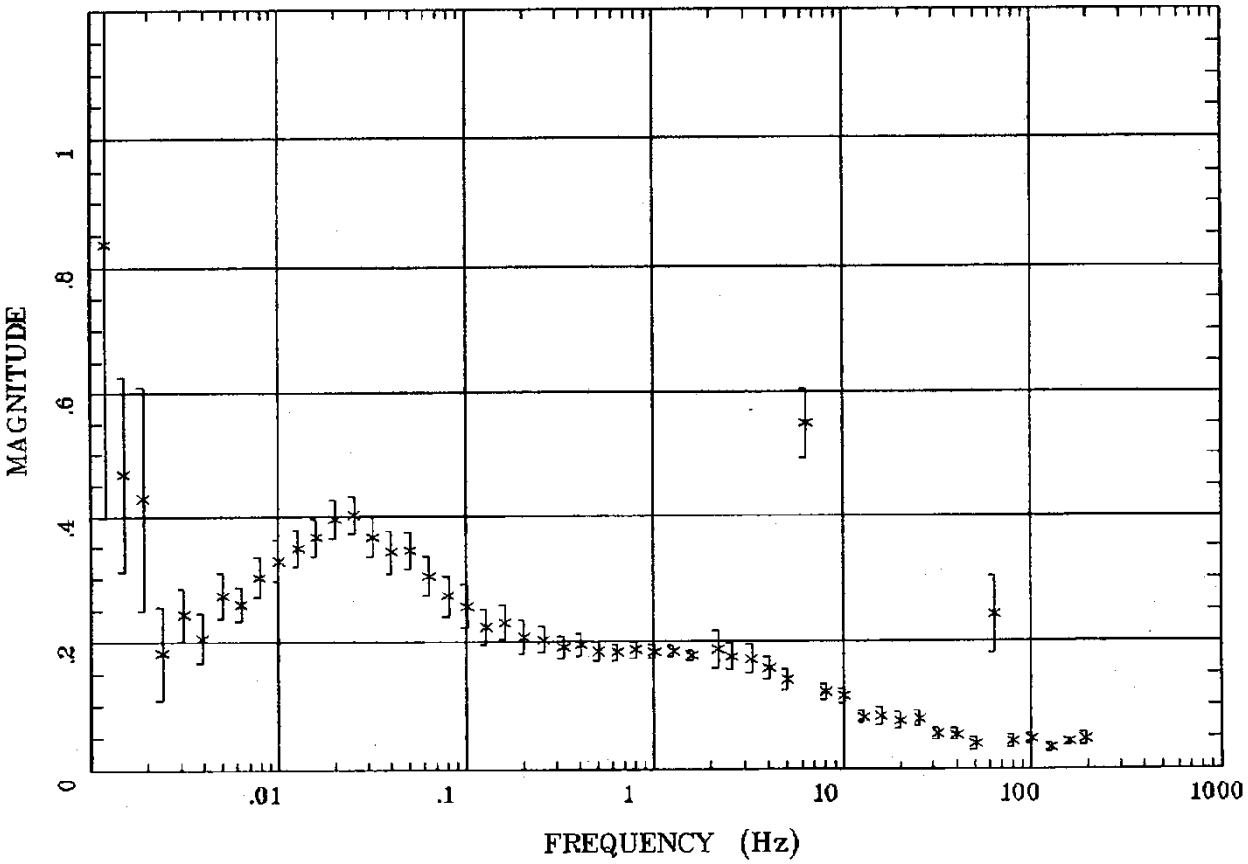


.0009 Hz	.0024 Hz	.0079 Hz	.0201 Hz
.0635 Hz	.160 Hz	.507 Hz	1.276 Hz
4.077 Hz	10.132 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

TIPPER MAGNITUDE

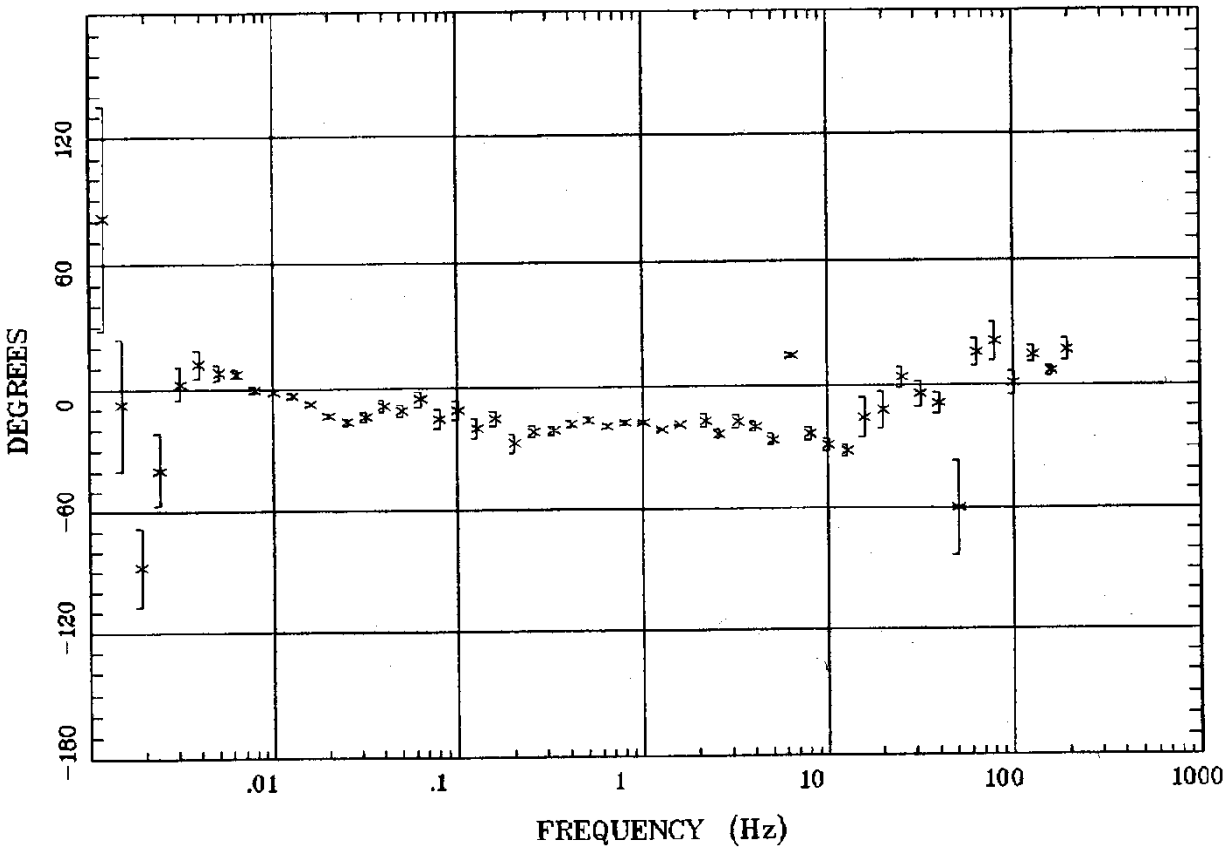


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 58

TIPPER STRIKE

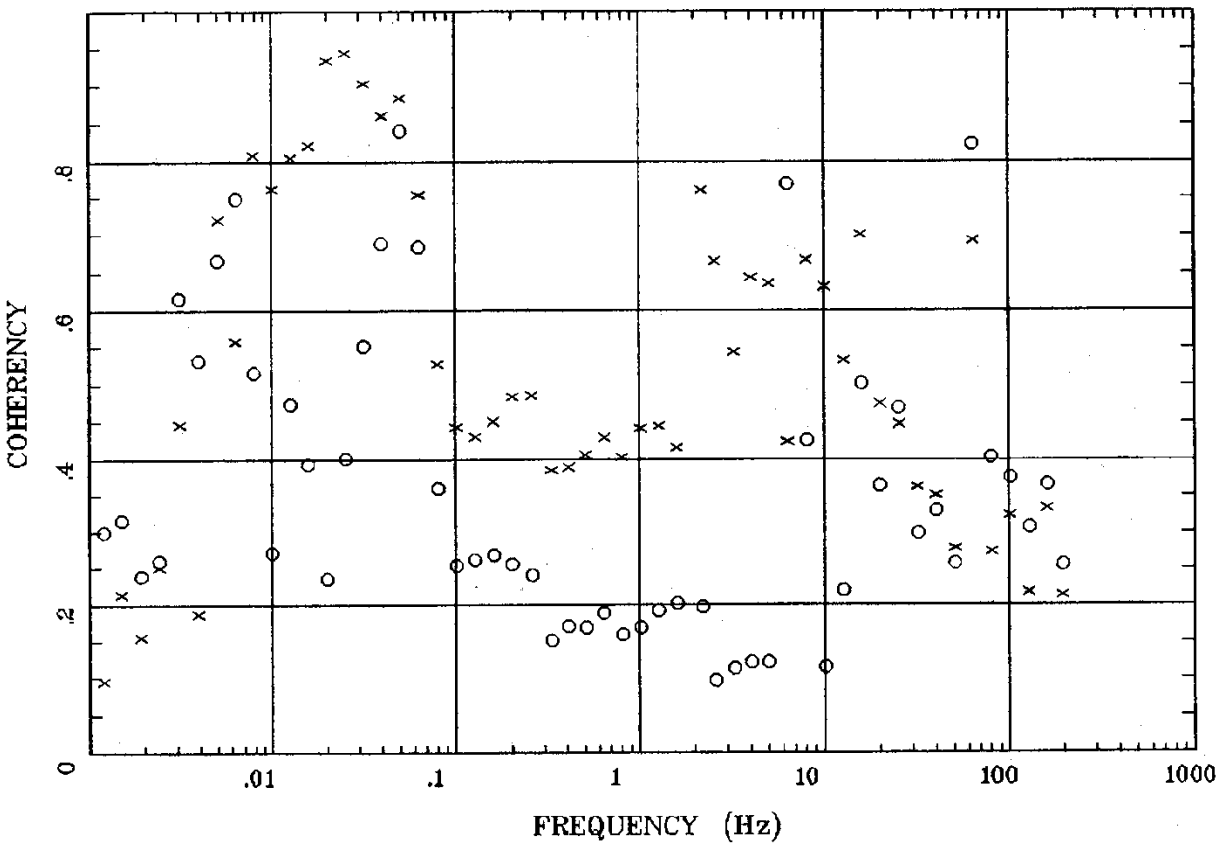


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 58

HzHx.x Coh HzHy.o

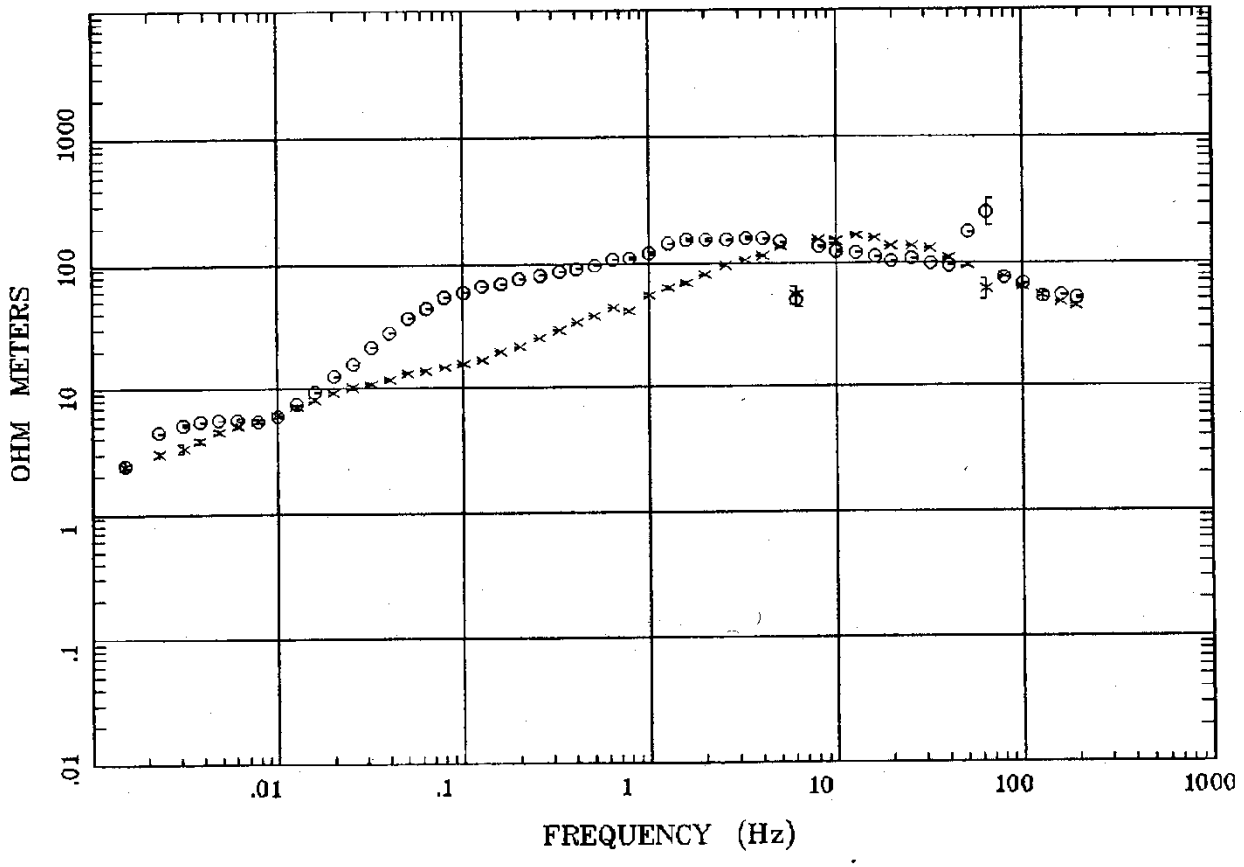


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap58.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:14 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 59

APPARENT RESISTIVITY

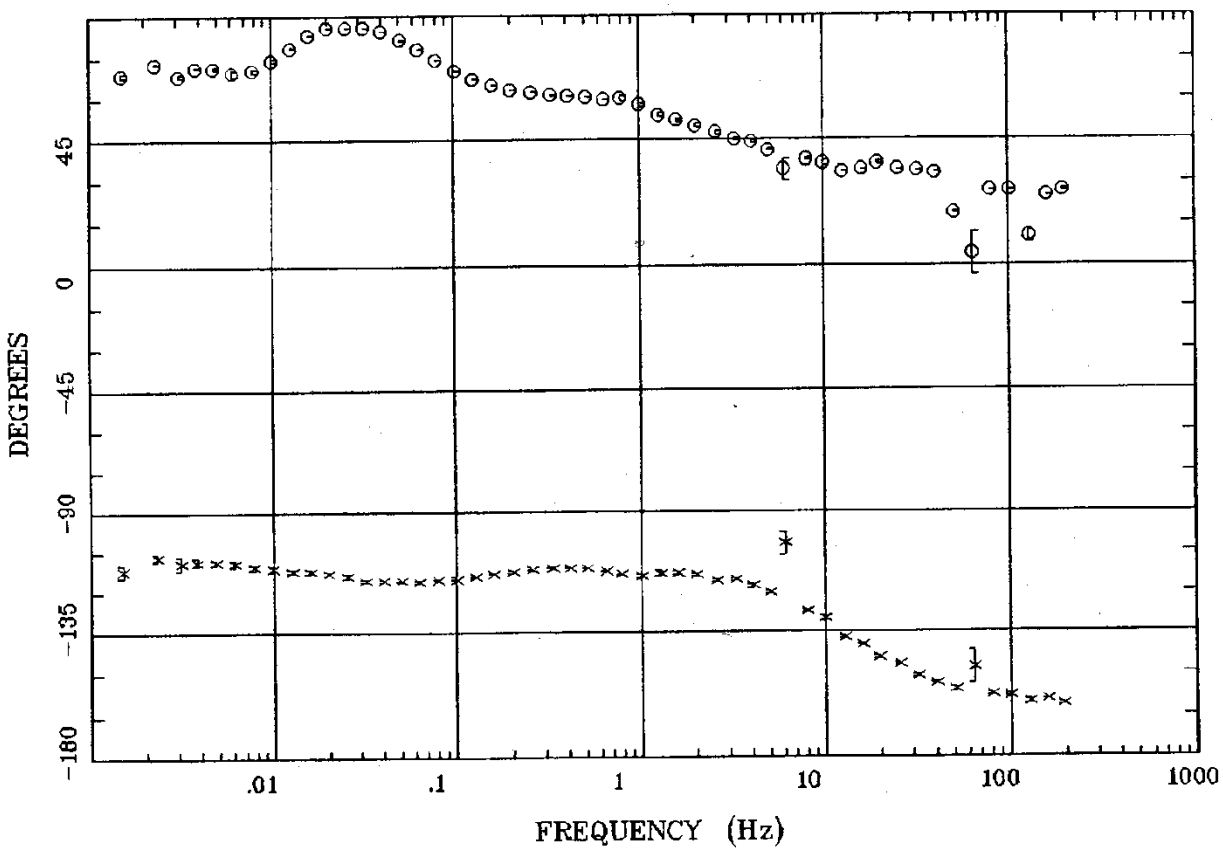


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 59

IMPEDANCE PHASE

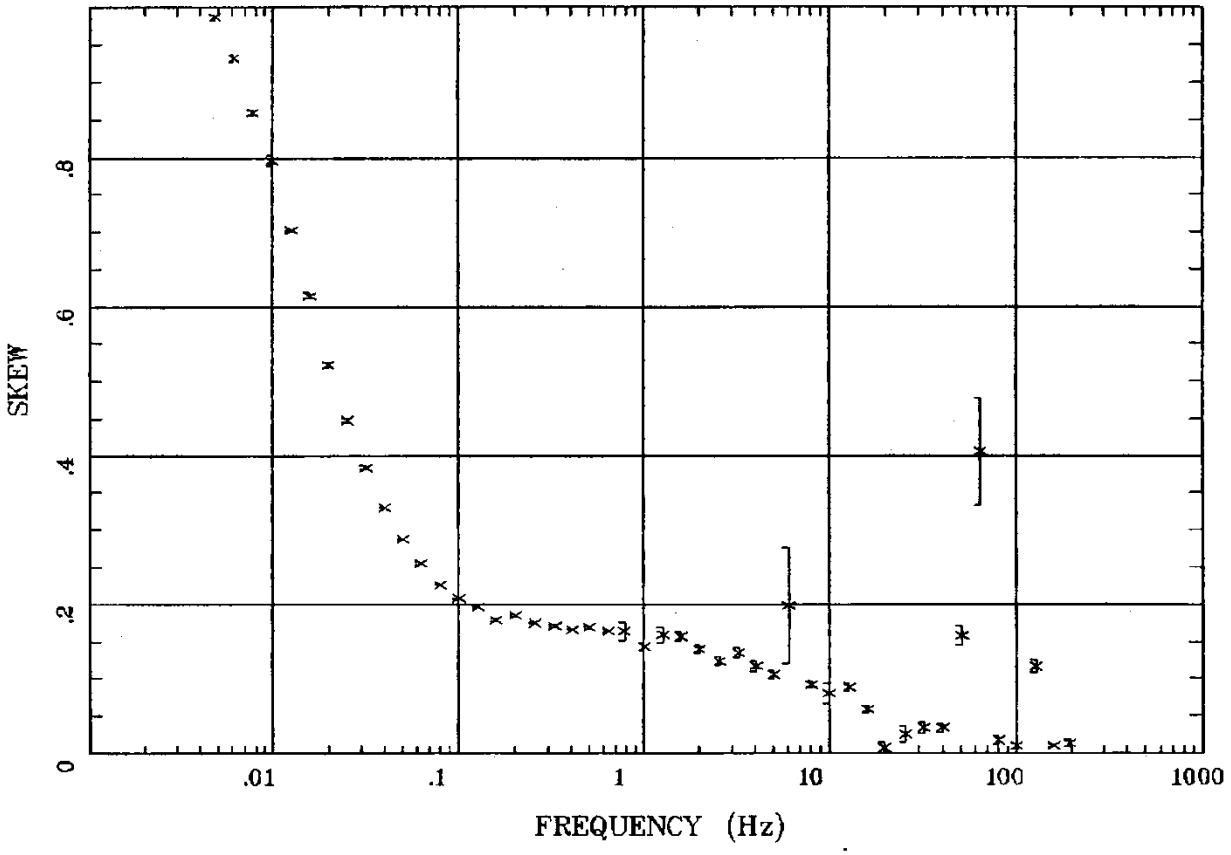


Client:
Remote:
Acquired: 19:5 Mar 06, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 59

IMPEDANCE SKEW

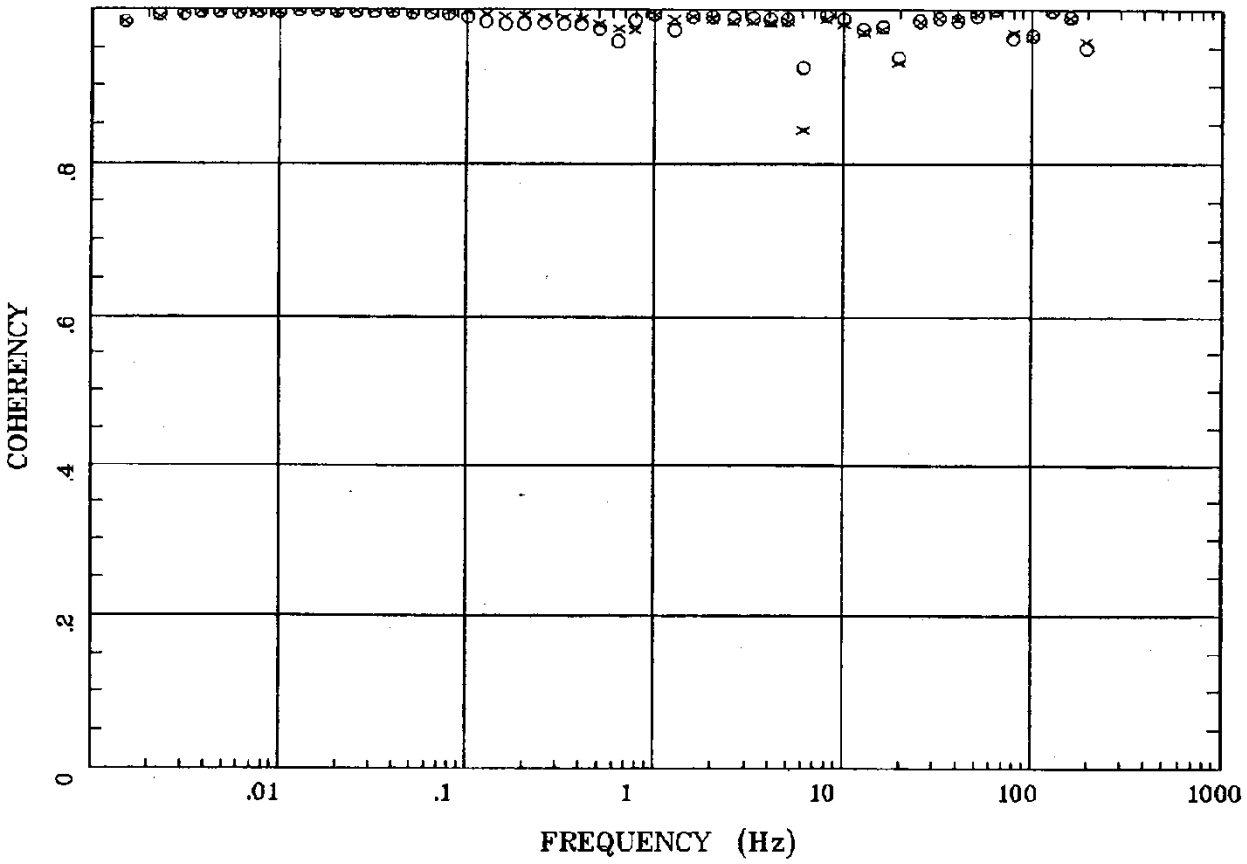


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 59

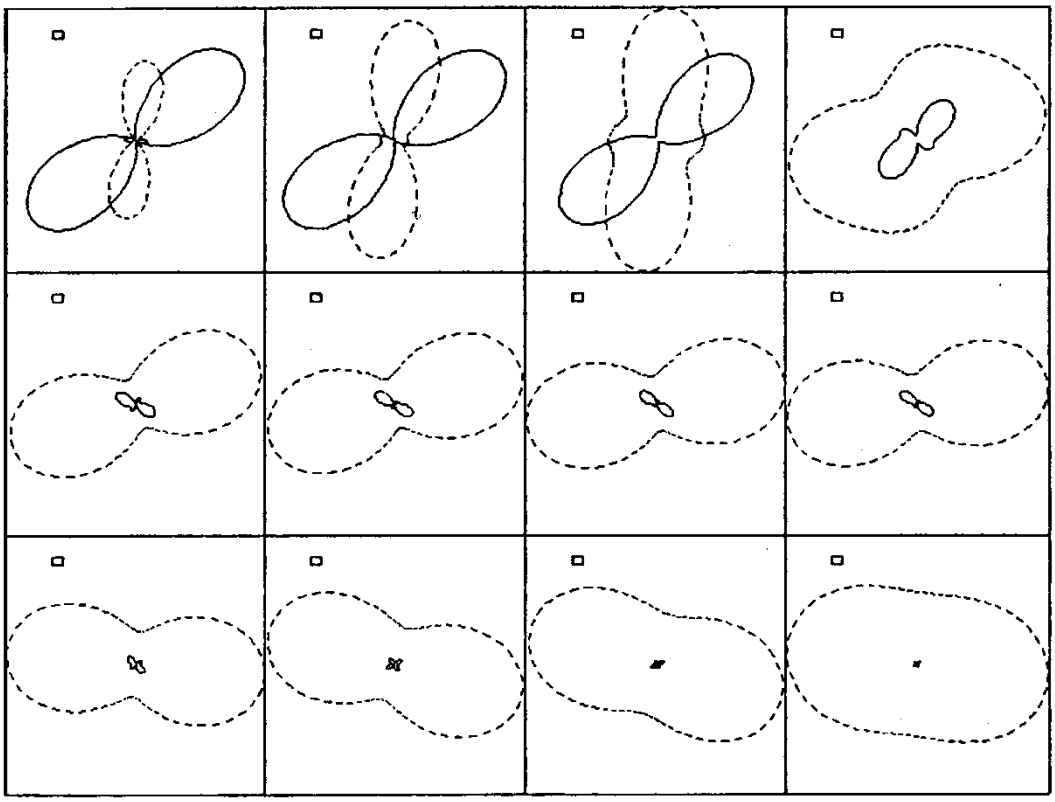
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



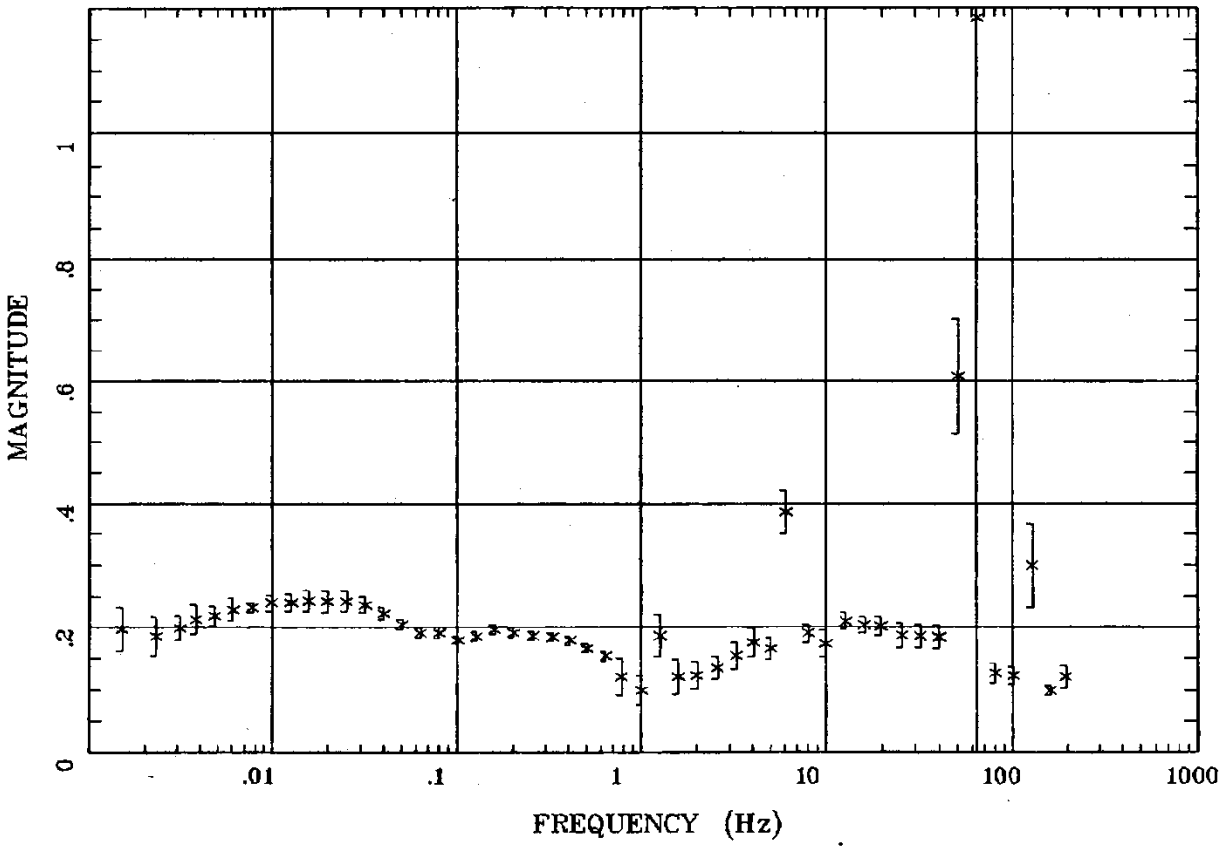
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.587 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 59

TIPPER MAGNITUDE

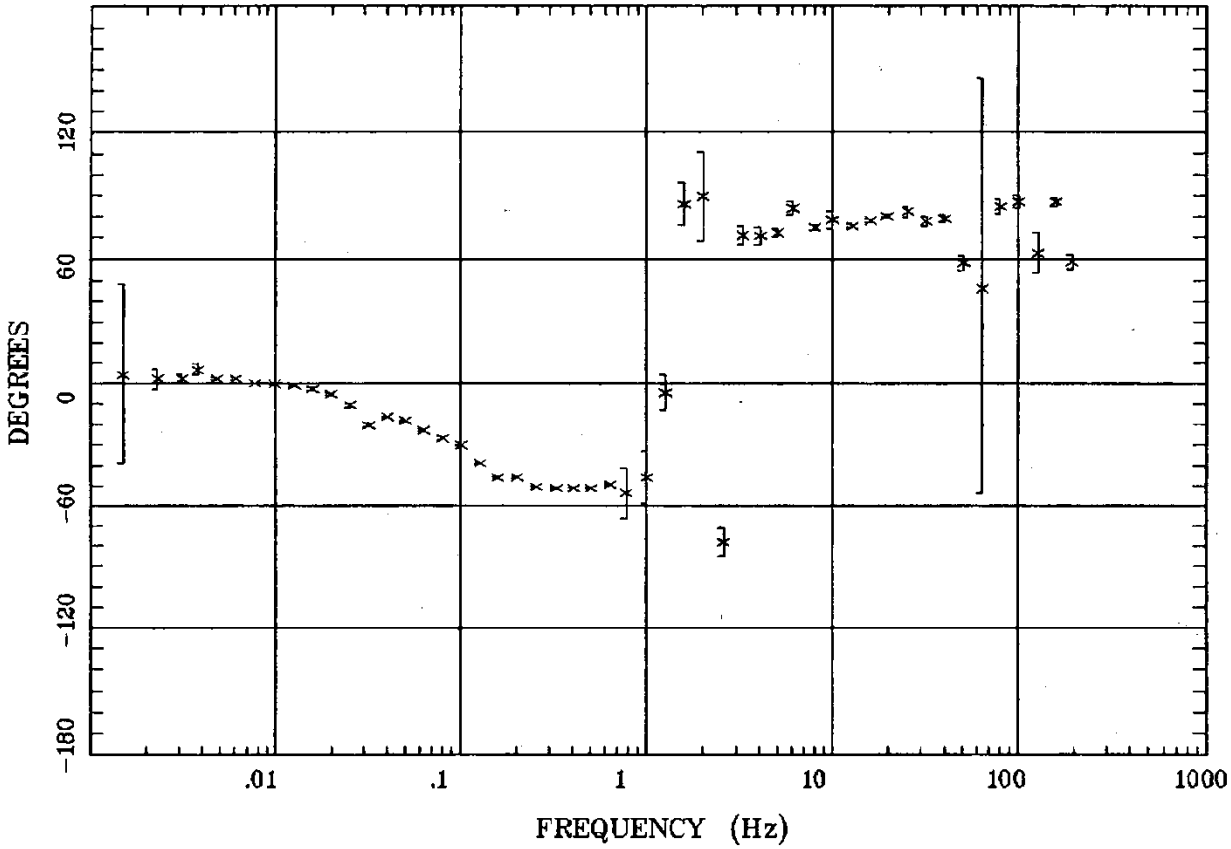


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 59

TIPPER STRIKE

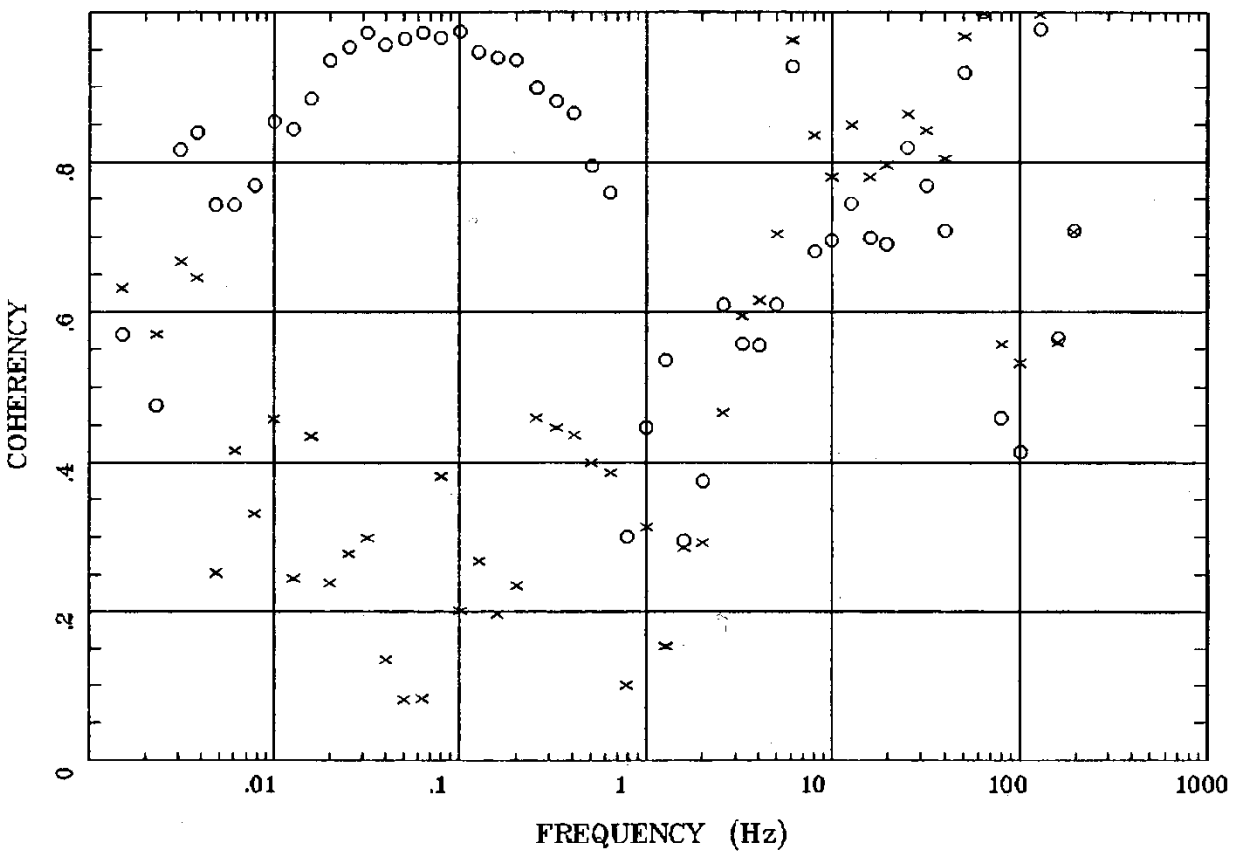


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 59

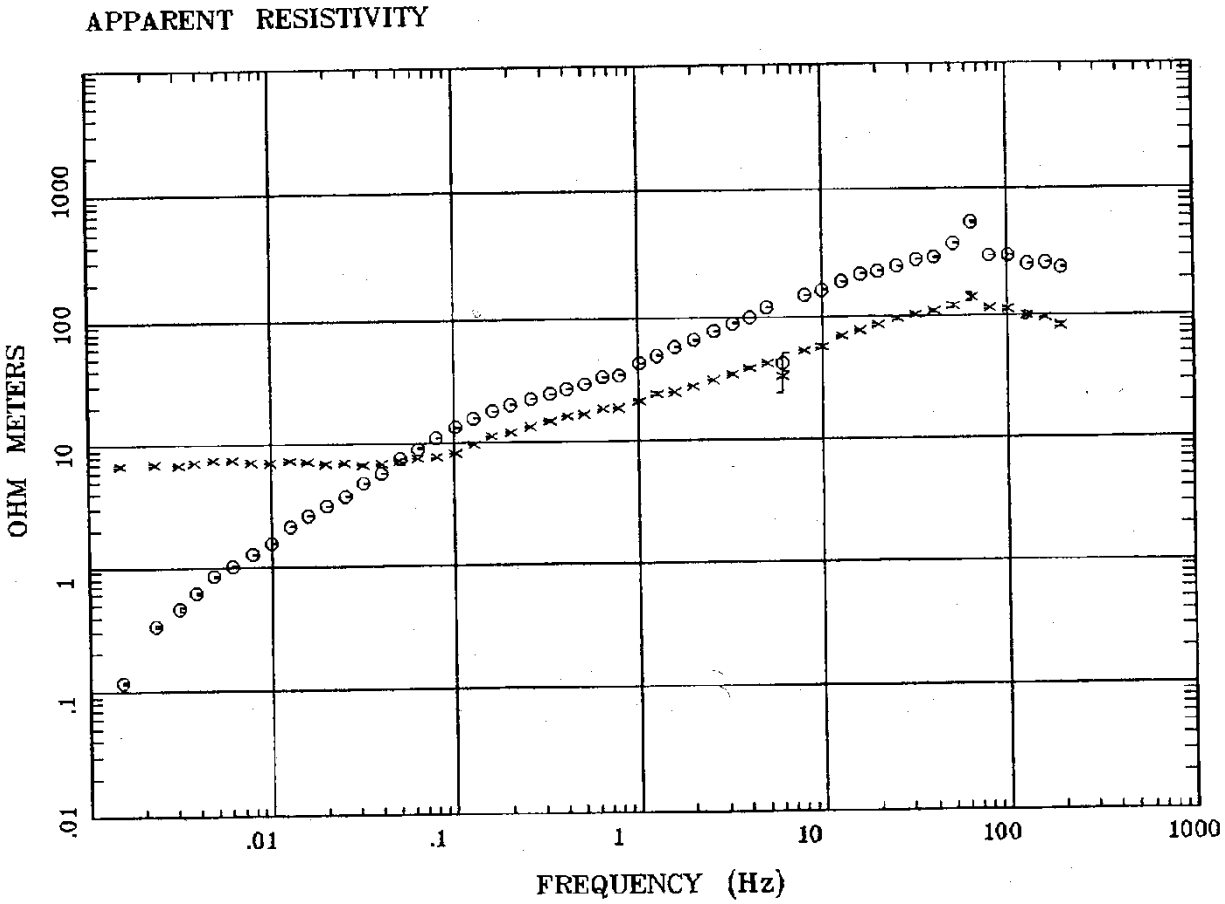
HzHx.x Coh HzHy.o



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap59.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 60

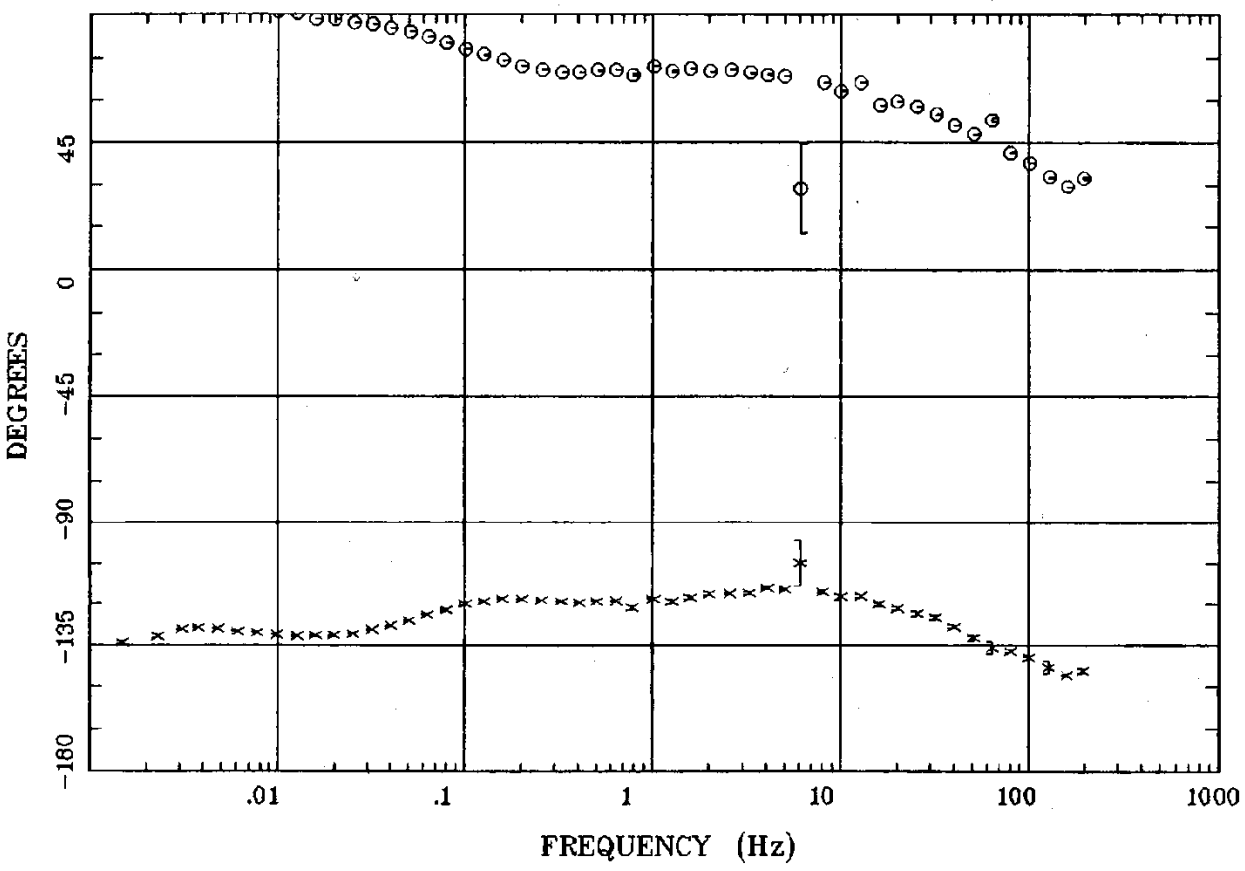


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 60

IMPEDANCE PHASE

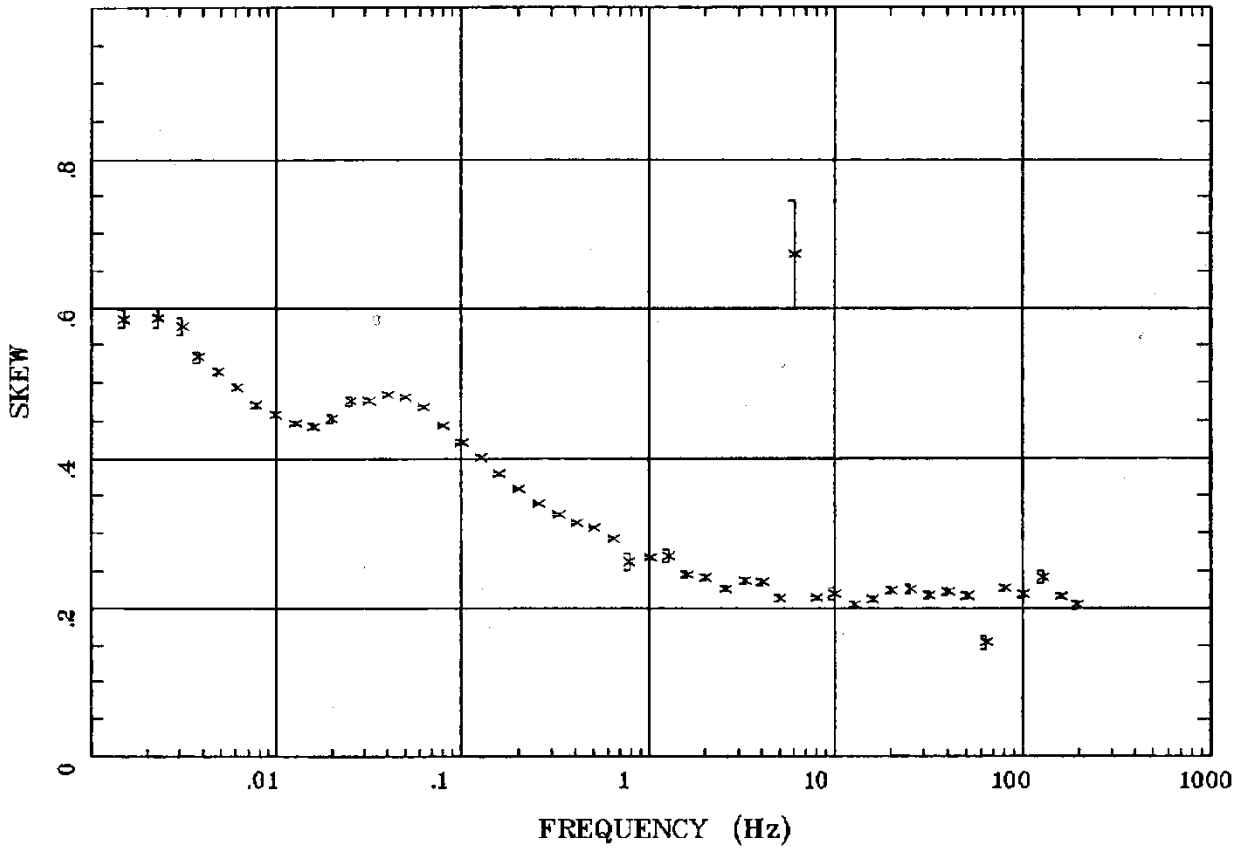


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 60

IMPEDANCE SKEW

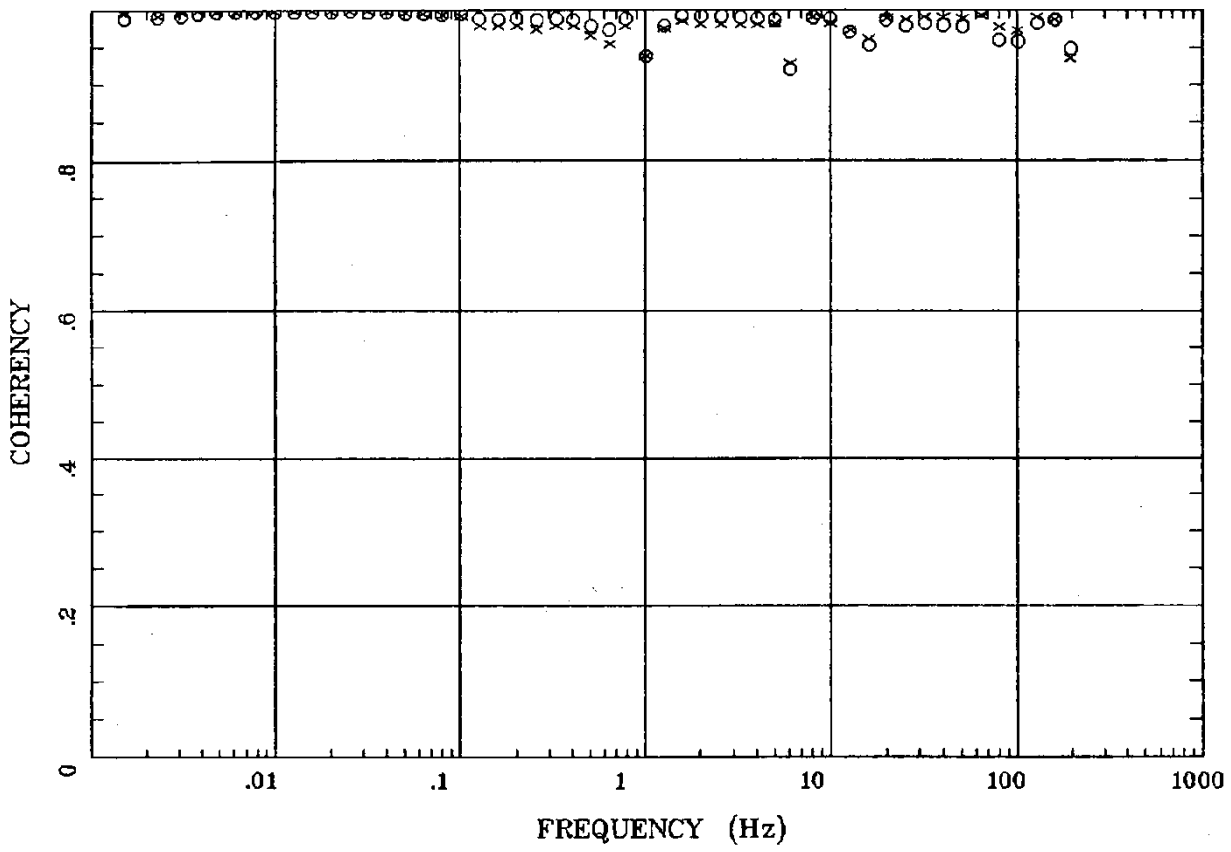


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 60

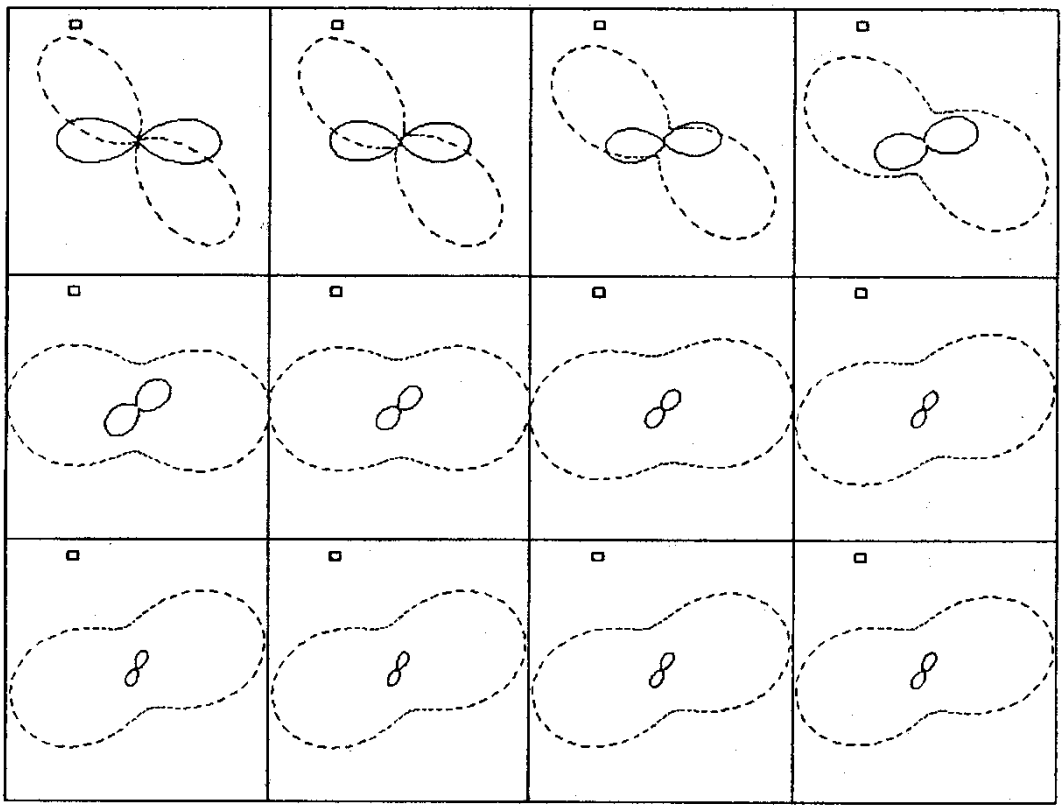
E MULT Coh.



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

POLAR PLOTS



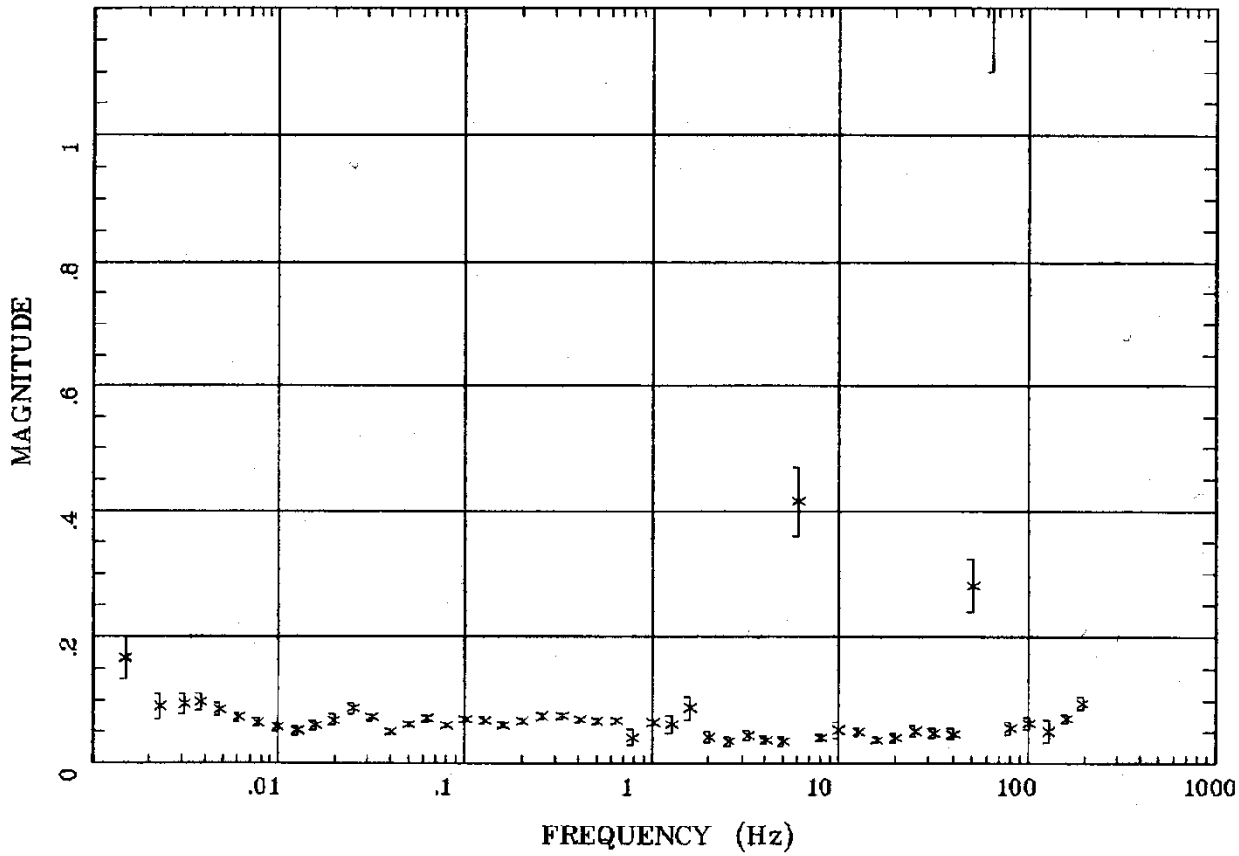
.0015 Hz	.0048 Hz	.0126 Hz	.0319 Hz
.101 Hz	.259 Hz	.639 Hz	1.587 Hz
5.054 Hz	12.769 Hz	31.982 Hz	80.322 Hz

Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI – ElectroMagnetic Instruments >

Station 60

TIPPER MAGNITUDE

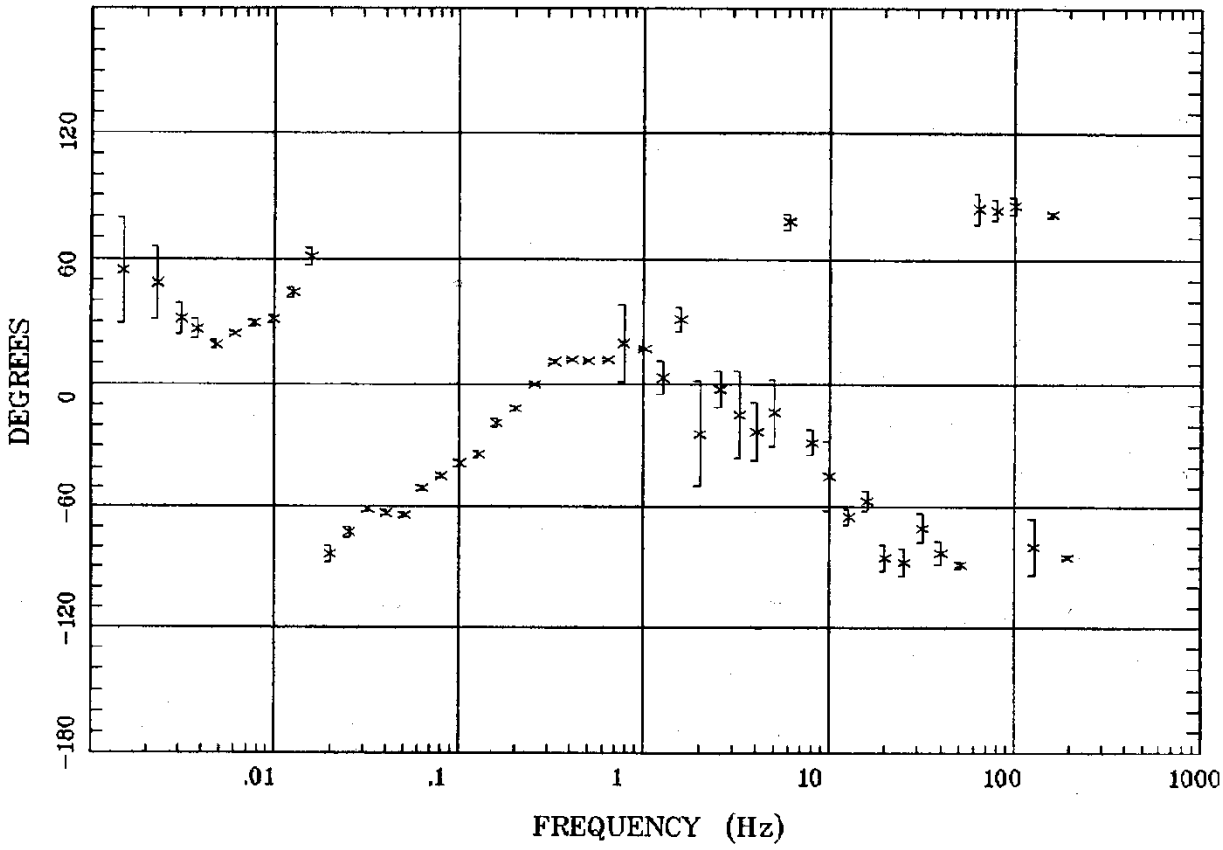


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 60

TIPPER STRIKE

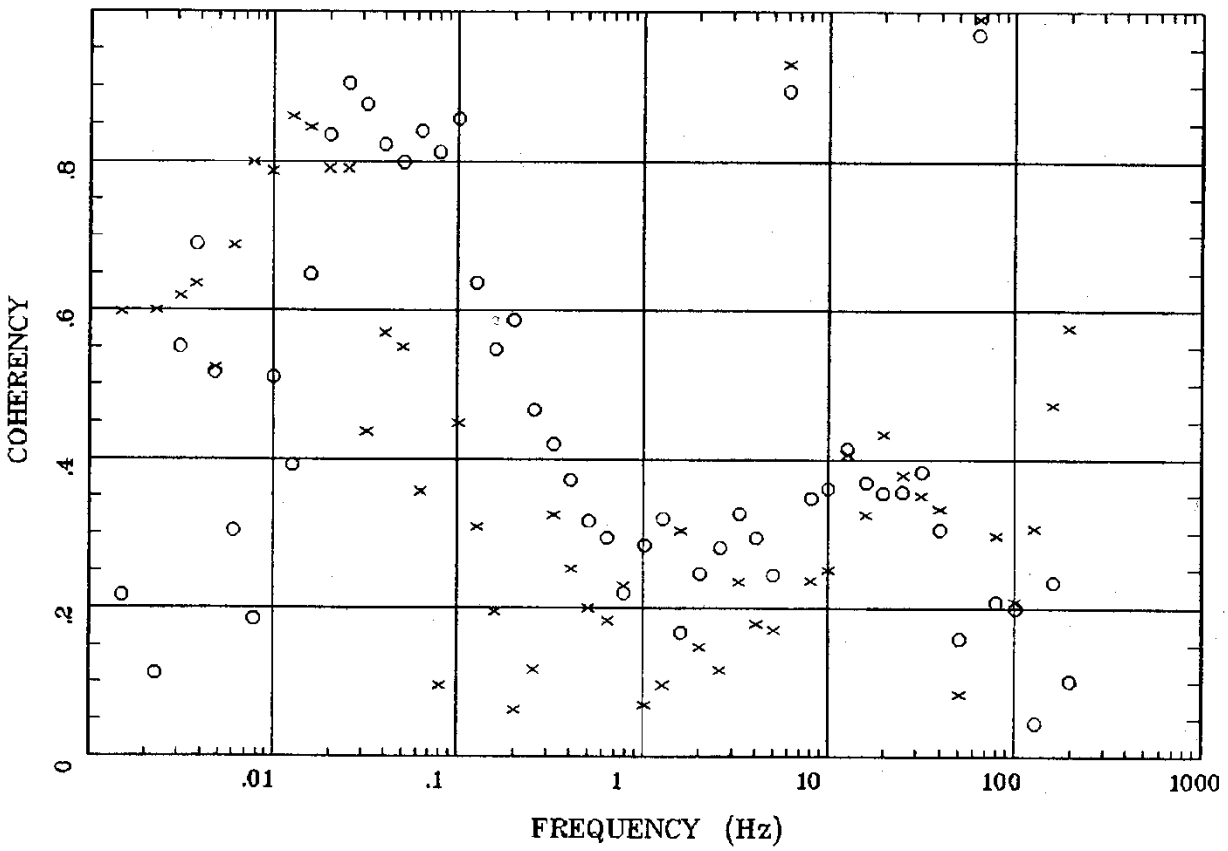


Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >

Station 60

HzHx.x Coh HzHy.o



Client:
Remote:
Acquired: 19:5 Mar 08, 1998
Survey Co:

Rotation:
Filename: ap60.avg
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch6 Ch7
Plotted: 09:16 Feb 14, 2011
< EMI - ElectroMagnetic Instruments >