Chapter 3 Drilling Survey

3-1 Objective

The main objective of the survey is to discover a profitable ore deposits by the geophysical survey of this year, in Marrakech Tekna area in the Kingdom of Morocco, through drilling survey, and also to pursue technology transfer to the Moroccan counterpart personnel.

3-2 Survey points and members

The Marrakech Tekna area is located in the central part of the Kingdom of Morocco (Fig.1). It is approximately 330km south of Rabat (capital city), north of the Haut Atlas Mountains, and also southwest of Marrakech. The survey area extends from 31° 19’ to 31° 38’ latitude north and from 8° 01’ to 8° 24’ longitude west.

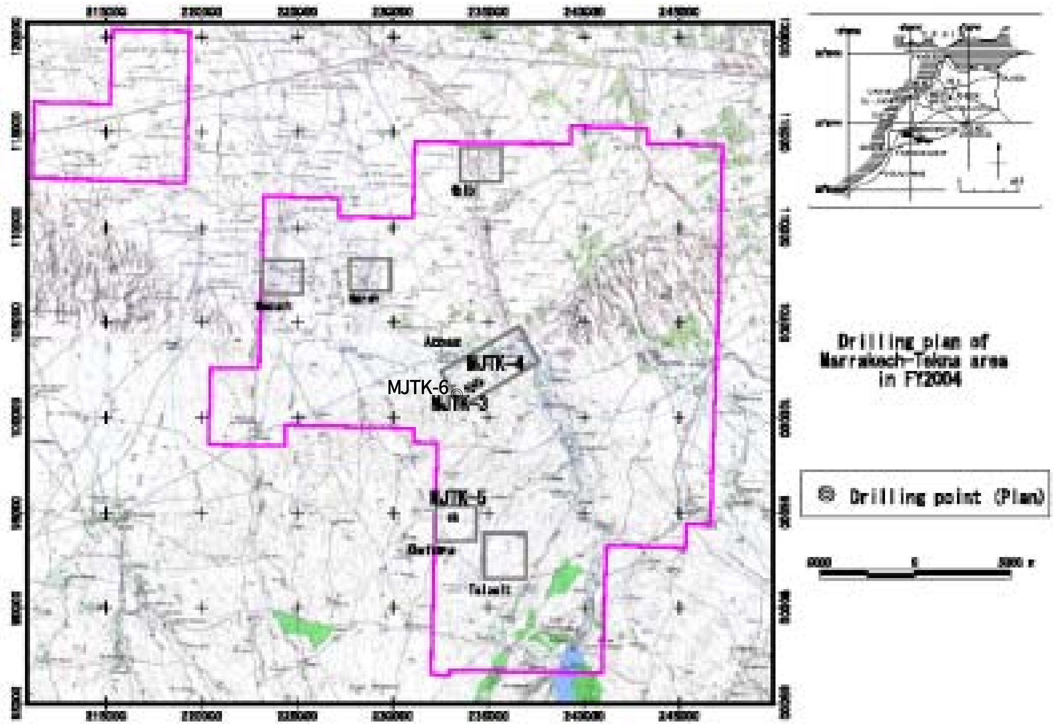


Fig.II-3-1 Locality map of survey area

The survey quantity of this survey is shown in the following table.

（1）Drilling

No.	Inclination	Declination	Length	Coordinates		Altitude
MJTK-3	-70 °	325 °	701.0m	N31 28 30.5	W08 11 49.8	588m
MJTK-4	-55 °	325 °	601.2m	N31 28 40.1	W08 11 34.9	570m
MJTK-5	-70 °	270 °	502.1m	N31 24 59.1	W08 12 22.7	682m
MJTK-6	-70 °	325 °	301.9m	N31 28 10.2	W08 12 11.0	589m
		Total	2106.2m			

（２）Laboratory Tests.

Items	Quantity
Chemical analysis (Ag,Al,As,B,Ba,Be,Bi,Ca,Cd,Co,Cr,Cu,Fe, Ga,Hg,K,La,Mg,Mn,Mo,Na,Ni,P,Pb,S,Sb, Sc,Sr,Ti,Tl,U,V,W,Zn,Au)	16
Microscopic observation (polished sction)	16
X-ray diffraction analysis	40
Resistivity	21
Chargeability	21
Magnetic susceptibility	21
Fluid inclusion（homogenization temp. and Salinity）	1
Isotope（S）	16

The members who participated in the drilling survey is as follows.

Japan	Morocco	
Junichi ISHIKAWA （Geotechnos Co., Ltd.）	El Bachir BARODI	（Directeur de l’Exploration, Bureau de Recherches et de Participations Minieres：BRPM）
	M'hamed ANNICH	（BRPM）
	Abdellah MOUTTAQI	（BRPM）
	Mustapha CHAIB	（BRPM）
	Mohamed NAJAHI	（BRPM）
	Ahmed KORCHI	（BRPM）
	Said QASRI	（BRPM）
	Houcine ABARBACH	（BRPM）

Inspector: Nobuaki ISHIKAWA (Japan Oil, Gas and Metals National Corporation Metals Exploration Group）

The survey period is as follows.

Local stay period: From November 20, 2004 to February 15, 2005

Grilling period: From November 28, 2004 to February 9, 2005

Observation of rock core: From November 29, 2004 to February 10, 2005

3-3 Method and Content of Survey

3-3-1 Outlines

The drilling operation was ordered to Bureau de Recherches et de Participations Minieres (BRPM), and the machine parts used the thing which the company owned in principle. The main machine parts were owned by BRPM.

1/200 columnar figure was arranged about the cores extracted, a reduced scale. Colored photographs are taken about all cores. And geological survey around drilling points was executed for the correlation with a geology of the hole and integrated evaluation. Chemical analysis, the observation of polished sections and isotope analysis were executed, and observed a microscope representation. And X-ray diffraction test was executed in order to know the alteration.

3-3-2 Method and Equipments

The drillings were executed by wire-line method, and casings were inserted as responding the geologic situation. The holes were drilled protecting the walls by regulating the concentration of mud water.

Principal equipment, materials, supplies, diamond bits and reamers was indicated by Table II-3-3 . The operated rigs were Bonne Esperance, L44/I, L38/13 及び L44n/S owned by BRPM.

3-3-3 Survey Team

The penetration work was taken turns at 8-hours shifts, 3-shifts per day. 1 shift is organized of 27 BRPM engineers and 12 workers who live around this area. And Japanese engineer usually directed them about general instruction. The base camp of drilling workers had stayed in Marrakech and near this area. And they commuted to the drilling sites by car.

3-3-4 Transportation and Preparation

The equipments and materials for drilling survey were carried truck from Rabat, to the drilling sites. Some machines were taken from the Draa Sfar mine.

There is no-pavement road in the Survey area. Therefore the road was repaired by bulldozer. As drilling site were far-off from the occurred roads, roads were built anew.

3-3-5 Withdrawal

After the finish of Survey, equipments and materials owned by BRPM were taken out to Rabat. Whole drilling cores were reserved at the Rabat office of BRPM.

3-3-6 Drilling Water

Drilling water was usually pumped up from a river, and was transported to the sites, by a tanker.

3-3-7 Drilling process

The record and itinerary of penetration were indicated in Table II-3-1 and Table II-3-2. Measured deviations are shown in Table II-3-4. Drilling Equipment and Consumption Goods are indicated in Table II-3-3, and the result of measurement of Hole deviation is indicated in Table II-3-4.

(1) MJTK –3 （Direction：325°,Inclination：70°,Length：701.00m）

The drilling period is from November 27 to January 13.

Setting up was carried since November 24 until November 26. Tricone drilling was started on Nov. 27.

Percussion drilling (101mm diameter) was carried out from 3m depth to 221.8m depth till Dec.7. And the order of drill pipes was arranged in order to execute HQ wire-line drilling. And also, the order was arranged for NQ wire-line drilling, just after the hole was drilled to 386.55m on Dec.16. the drilling was stopped at 701.00m depth on Jan.13.

The geology is mainly Paleozoic pelitic schist etc. And pyrrhotite – calcite deposits or veins are often observed. The rock core is more friable in deeper part so that rock fragment stuffed the inner tube with reducing the drilling .

(2) MJTK –4 （Direction：325°,Inclination：55°,Length：601.20m）

The drilling period is from December 5 to January 15.

Setting up was carried since December 2 until December 4. Tricone drilling was started on December 5.

Percussion drilling (101mm diameter) was carried out from 3m depth to 223.70m depth till Dec.16. Cementation was carried out to stop the lost circulation at 37.40m depth on Dec.7. And just after the percussion drilling, the order of drill pipes was arranged in order to execute HQ wire-line drilling. And also, the order was arranged for NQ wire-line drilling, just after the hole was drilled to 348.70m on Dec.24. The drilling was stopped at 701.00m depth on Jan.15.

The geology is mainly Paleozoic pelitic schist. And pyrrhotite – calcite deposits or veins are often observed. Pyrite spots are sometimes observed in the schist.

(3) MJTK –5 （Direction：270°, Inclination：70°, Length：502.10m）

The drilling period is from December 9 to December 31.

Setting up was carried since December 6 until December 8. Tricone drilling was started on December 9.

And the order of drill pipes was arranged in order to execute HQ wire-line drilling at 109.20m depth on Dec.12. Cenozoic conglomerate etc. had been drilled to 142.5m depth. And also, the order was arranged for NQ wire-line drilling at 318.00m depth on Dec.21. The drilling was stopped at 502.10m depth on Dec.31.

The geology is mainly Paleozoic pelitic schist from 142.5 to the bottom hole. And pyrrhotite – calcite deposits or veins are often observed.

(4) MJTK-6 （Direction：325°, Inclination：70°, Length：301.90m）

The drilling period is from January 7 to February 9. Setting up was carried since January 2 until February 6. Tricone drilling was started on Jan. 24th. HQ wire-line drilling was started at 3m depth. The drilling had a rest from Jan.19 to Jan.25, around Eid Al Adha (Feast of Sacrifice).

After then, the drilling bit was stuck at 273.1m depth in a sheared zone. It was not promising to recover the bit and the drill pipes immediately even though variable methods were executed, therefore BQ drill pipes were inserted into HQ drill pipe, and TBW drilling was started on Feb.5. And then, BQ wire-line drilling was started on Feb.7.

The drilling was stopped at 301.90m depth on Feb.9.

The geology is mainly Paleozoic pelitic schist. And pyrrhotite – calcite deposits or veins are often observed. However the rock was friable under 144.0m depth, and faults were at 204.5m and 211.7m depth. fractured or sheared zones were at 215.0-216.8m and 219.0-229.0m depth. Therefore the drilling had to be slower than ordinary drillings. Fractures appeared even in the deeper part, and a sheared zone was at 270.1-276.6m depth.

Table II-3-1 Drilling Schedule

ITEM		NOV.	DECEMBER	JANUARY	FEBRUARY
Mobilization To the sites		21			
MJTK-3	Rig up	24-26			
	Drilling	27		13	
	Tear down				20-24
MJTK-4	Rig up		02-04		
	Drilling		05	15	
	Tear down				20-24
MJTK-5	Rig up		06-08		
	Drilling		09 31		
	Tear down			11-12	
MJTK-6	Rig up			02-06	
	Drilling			07	09
	Tear down				20-24

Table II-3-2 Drilling summary（MJTK-3）

WORKING PERIOD

CLASS	WORKING PERIOD	DAY BREAK DOWN			WORKERS
	PERIOD	TOTAL DAYS	ACTUAL WORKING	DAY OFF	
RIG UP	2004/11/21 - 2004/11/27	6 days	6 days	0 days	72 workers
DRILLING	2004/11/28 - 2005/1/13	35	DRILLING 33	2	396
			REPAIR etc. 2	0	24
TEAR DOWN	2005/2/20 - 2005/2/24	5	5	0	60
TOTAL	2004/11/21 - 2005/2/24	46	46	2	552

DRILLING DEPTH etc.

PLOPOSED DEPTH	500.00 m	OVERBURDEN	3.0 m
ADDITIONAL DEPTH	201.00 m	CORE LENGTH	698 m
INSPECTED DEPTH	701.00 m	RECOVERY	99.14 %

TIME ANALYSIS

CATEGORY	(hr.)	(%)	(%)
DRILLING	792	94.3	71.7
TRIP, CORE RECOVER, CASING, etc	48	5.7	4.3
REPAIR, FISHING	0	0.0	0.0
SUB TOTAL	840	100.0	-
RIG UP	144		13.0
TEAR DOWN	120		10.9
TOTAL	1104		100.0

CORE RECOVERY PER EACH 100m

DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%)	
		SECTION	CUMULATIVE
0 - 100.00	97.00	100.00	97.00
100.00 - 200.00	100.00	100.00	98.50
200.00 - 300.00	100.00	100.00	99.00
300.00 - 400.00	100.00	100.00	99.25
400.00 - 500.00	100.00	100.00	99.40
500.00 - 592.70	100.00	100.00	99.50
600.00 - 701.00	98.00	101.00	99.14

TOTAL DEPTH/TOTAL WORKING DAYS	15.24 m/day
TOTAL DEPTH/ACTUAL WORKING DAYS	15.24 m/day
TOTAL DEPTH/ACTUAL DRILLING DAYS	21.24 m/day
ACTUAL DRILLING WORKERS/TOTAL DEPTH	0.56 worker/m

CASING

SIZE	SET DEPTH (m)	B/A X 100 (%)	RECOVERY (%)
HW	3.00	0.43	100
NW	386.55	55.14	100

REMARKS

A: TOTAL DEPTH
B: SET DEPTH

Table II-3-2 Drilling summary（MJTK-4）

WORKING PERIOD					
CLASS	WORKING PERIOD	DAY BREAK DOWN			WORKERS
	PERIOD	TOTAL DAYS	ACTUAL WORKING	DAY OFF	
RIG UP	2004/12/2 - 2004/12/4	3 days	3 days	0 days	30 workers
DRILLING	2004/12/5 - 2005/1/15	33	DRILLING 33	2	330
			REPAIR etc. 2	0	20
TEAR DOWN	2005/2/20 - 2005/2/24	5	5	0	50
TOTAL	2004/12/2 - 2005/2/24	41	43	2	430

DRILLING DEPTH etc.			
PLOPOSED DEPTH	600.00 m	OVERBURDEN	3.0 m
ADDITIONAL DEPTH	1.20 m	CORE LENGTH	598.2 m
INSPECTED DEPTH	601.20 m	RECOVERY	99.17 %

TIME ANALYSIS			
CATEGORY	(hr.)	(%)	(%)
DRILLING	744	93.9	77.5
TRIP, CORE RECOVER, CASING, etc	48	6.1	5.0
REPAIR, FISHING	0	0.0	0.0
SUB TOTAL	792	100.0	-
RIG UP	72		7.5
TEAR DOWN	96		10.0
TOTAL	960		100.0

CASING			
SIZE	SET DEPTH (m)	B/A X 100 (%)	RECOVERY (%)
HW	3.00	0.50	100
NW	348.70	58.00	100

CORE RECOVERY PER EACH 100m			
DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%)	
		SECTION	CUMULATIVE
0 - 100.00	97.00	100.00	97.00
100.00 - 200.00	100.00	100.00	98.50
200.00 - 300.00	100.00	100.00	99.00
300.00 - 400.00	98.00	100.00	98.75
400.00 - 500.00	100.00	100.00	99.00
500.00 - 601.20	101.20	101.20	99.17

TOTAL DEPTH/TOTAL WORKING DAYS	14.66 m/day
TOTAL DEPTH/ACTUAL WORKING DAYS	13.98 m/day
TOTAL DEPTH/ACTUAL DRILLING DAYS	18.22 m/day
ACTUAL DRILLING WORKERS/TOTAL DEPTH	0.55 worker/m

REMARKS

A: TOTAL DEPTH
B: SET DEPTH

Table II-3-2 Drilling summary（MJTK-5）

WORKING PERIOD

CLASS	WORKING PERIOD PERIOD	DAY BREAK DOWN TOTAL DAYS	ACTUAL WORKING		DAY OFF	WORKERS
RIG UP	2004/12/6 - 2004/12/8	3 days		3 days	0 days	30 workers
DRILLING	2004/12/9 - 2004/12/31	18	DRILLING	18	0	180
			REPAIR etc.	0	0	0
TEAR DOWN	2005/1/11 - 2005/1/12	2		2	0	20
TOTAL	2004/12/6 - 2005/1/12	23		23	0	230

DRILLING DEPTH etc.

PLOPOSED DEPTH	500.00 m	OVERBURDEN	3.0 m
ADDITIONAL DEPTH	2.10 m	CORE LENGTH	598.2 m
INSPECTED DEPTH	502.10 m	RECOVERY	78.17 %

TIME ANALYSIS

CATEGORY	(hr.)	(%)	(%)
DRILLING	552	100.0	82.1
TRIP, CORE RECOVER, CASING, etc		0.0	0.0
REPAIR, FISHING	0	0.0	0.0
SUB TOTAL	552	100.0	-
RIG UP	72		10.7
TEAR DOWN	48		7.1
TOTAL	672		100.0

CASING

SIZE	SET DEPTH (m)	B/A X 100 (%)	RECOVERY (%)
HW	109.20	21.75	100
NW	318.03	63.34	100

CORE RECOVERY PER EACH 100m

DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%) SECTION	CUMULATIVE
0 - 100.00	0.00	100.00	0.00
100.00 - 200.00	90.40	100.00	45.20
200.00 - 300.00	100.00	100.00	63.47
300.00 - 400.00	100.00	100.00	72.60
400.00 - 500.00	100.00	100.00	78.08
500.00 - 502.10	2.10	2.10	78.17

TOTAL DEPTH/TOTAL WORKING DAYS	21.83 m/day
TOTAL DEPTH/ACTUAL WORKING DAYS	21.83 m/day
TOTAL DEPTH/ACTUAL DRILLING DAYS	27.89 m/day
ACTUAL DRILLING WORKERS/TOTAL DEPTH	0.36 worker/m

REMARKS 0 - 142.5m :Cenozoic

A: TOTAL DEPTH

B: SET DEPTH

Table II-3-2 Drilling summary（MJTK-6）

WORKING PERIOD

CLASS	WORKING PERIOD		DAY BREAK DOWN			WORKERS
	PERIOD	TOTAL DAYS	ACTUAL WORKING		DAY OFF	
RIG UP	2005/1/2 - 2005/1/6	5 days		5 days	0 days	45 workers
DRILLING	2005/1/7 - 2005/2/9	34	DRILLING	20	7	180
			REPAIR etc.	7	0	63
TEAR DOWN	2005/2/10 - 2005/2/13	4		2	0	18
TOTAL	2005/1/2 - 2005/2/13	43		34	7	306

DRILLING DEPTH etc.

PLOPOSED DEPTH	400.00 m	OVERBURDEN	3.0 m
ADDITIONAL DEPTH	m	CORE LENGTH	598.2 m
INSPECTED DEPTH	301.90 m	RECOVERY	0.00 %

TIME ANALYSIS

CATEGORY	(hr.)	(%)	(%)
DRILLING	552	100.0	82.1
TRIP, CORE RECOVER, CASING, etc		0.0	0.0
REPAIR, FISHING	0	0.0	0.0
SUB TOTAL	552	100.0	-
RIG UP	72		10.7
TEAR DOWN	48		7.1
TOTAL	672		100.0

CASING

SIZE	SET DEPTH (m)	B/A X 100 (%)	RECOVERY (%)
HW	3.00	0.99	100
BW	270.00	89.43	100

CORE RECOVERY PER EACH 100m

DEPTH (m)			CORE LENGTH (m)	CORE RECOVERY(%)	
				SECTION	CUMULATIVE
0	-	100.00	97.00	100.00	97.00
100.00	-	200.00	100.00	100.00	98.50
200.00	-	300.00	100.00	100.00	99.00
300.00	-	301.90	1.90	100.00	74.73
	-				
	-				

TOTAL DEPTH/TOTAL WORKING DAYS	7.02 m/day
TOTAL DEPTH/ACTUAL WORKING DAYS	8.88 m/day
TOTAL DEPTH/ACTUAL DRILLING DAYS	15.10 m/day
ACTUAL DRILLING WORKERS/TOTAL DEPTH	0.60 worker/m

REMARKS

A: TOTAL DEPTH

B: SET DEPTH

Table II-3-3 List of Drilling Equipment and Consumption Goods

Item	Specifications	Quantity		Unit
		MJTK-3	MJTK-4	
Drilling Machine	Bonne Esperance	1		
	L44/I		1	
Drilling rod HQ	3.05m	129	116	u
Drilling rod NQ	3.05m	232	196	u
Swivel head	25 / 8	1	1	
Core barrel	HQ	1	1	
Core bit	HQ	1	1	
Core bit	NQ	2	1	
Reaming Shell	HQ	1	1	
Outer tube	HQ	1	2	
Inner tube	HQ	1	1	
Core barrel	NQ	1	1	
Reaming Shell.	NQ	1	1	
Inner tube	NQ	1	1	
Inner tube head	HQ	1	1	
Inner tube head	NQ	1	1	
Inner tube head	BQ			
Overshot	HQ	1	1	
Overshot	NQ	1	1	
Wireline rope	Diameter: 6mm	300	300	m
Casing pipe (HW)	3.05m	1	1	u
Casing pipe (NW)	3.05m	128	116	u
Casing pipe (BW)	3.05m			u
Core lifter case	HQ	3	2	
Core lifter case	NQ	2	3	kg
Core lifter case	BQ			
Bentonite	GS550	104	74	kg
Polymer		100	90	kg
Cement	GS550	100	950	kg
Diesel oil		12520	2470	ℓ
Engine oil	HDI40	92	76	ℓ
Gear oil	EP-90	56	58	ℓ
Hydraulic oil	AZ32	120	45	ℓ
Core box	5.6-6.4m	146	110	u

Item	Specifications	Quantity		Unit
		MJTK-5	MJTK-6	
Drilling Machine	L38/13	1		
	L44/5		1	
Drilling rod HQ	3.05m	106	91	u
Drilling rod NQ	3.05m	167	-	u
Drilling rod BQ	3.05m		101	u
Swivel head	25 / 8	1	1	
Core barrel	HQ	1	1	
Core bit	HQ	3	1	
Core bit	TBW		1	
Core bit	NQ	3	1	
Reaming Shell	HQ	1	1	
Outer tube	HQ	1	-	
Inner tube	HQ	1	1	
Core barrel	NQ	1	1	
Reaming Shell.	NQ	1	1	
Inner tube	NQ	1	1	
Inner tube head	HQ	1	1	
Inner tube head	NQ	1		
Inner tube head	BQ		1	
Overshot	HQ	1	1	
Overshot	NQ	.1		
Wireline rope	Diameter: 6mm	600	300	m
Casing pipe (HW)	3.05m	36	1	u
Casing pipe (NW)	3.05m	106		u
Casing pipe (BW)	3.05m		91	u
Core lifter case	HQ	2		
Core lifter case	NQ	1		
Core lifter case	BQ			
Bentonite		52	35	kg
Polymer		90	60	kg
Cement	GS550	200	250	kg
Diesel oil		1925	1770	
Engine oil	HDI40	19	38	
Gear oil	EP-90	10	15	
Hydraulic oil	AZ32		55	
Core box	5.6-6.4m	73	71	u

Table II-3-4 Result of measurement of Hole deviation

MJTK-3

	degree	
depth(m)	inclination	direction
0	70	0
20	71	30
50	70.5	50
100	68.25	100
150	66	150
200	65.5	200
250	64	250
300	63	300
350	63	350
400	63	400
450	61	450
500	60	500
550	59	550
600	59	600
650	59	too magnetic
700	collapse	

MJTK-4

	degree	
depth(m)	inclination	direction
0	55	325
20	54	325
50	53	325
100	52	322
150	52	320
200	52	317
250	51.5	315
300	51	313
350	50	too magnetic
400	50	too magnetic
450	49	too magnetic
500	49	too magnetic
550	49	311
600	47	313

MJTK-5

	degree	
depth(m)	inclination	direction
0	70	175
50	66	too magnetic
120	67	272
150	67	272
200	66	270
250	65	268
300	63	270
350	61.5	266
400	61	270
450	59	266
500	58	268

MJTK-6

	degree	
inclination	inclination	direction
0	70	328
50	69	330
100	69	330
150	68	329
200	67	329
250	67.5	327
300	67.5	too magnetic

3-4 Result of Drilling

3-4-1 Geology, Mineralization and Alteration

The result of this survey (MJTK-3, 4,5 and MJTK-2) is as follows, with Fig.II-3-2 Geological Section, and Fig.II-3-3 Geological Columnar Figures (appendix).

(1)MJTK –3 （Direction：325°,Inclination：70°,Length：701.00m）

The geology consists of Calcareous schist, with pelitic schist layers, foliation (∠40-∠50° dip), , lamination (∠0-∠50° dip) and carbonate veinlet. And also with fractures and calcite -dolomite (?) - quartz veinlets are dominant.

Fine tuff thin layer (∠40° dip) is 31.7 -32.0m depth. Quartz (- calcite) vein is 39.1 -39.55m depth, with ∠45° dip, A fine tuff thin layer is 40.0m depth, with ∠40° dip and 1.5cm thickness.

Calcite (- quartz) vein, with pyrrhotite, sphalerite and chalcopyrite, is 40.4m depth. It has ∠30 - ∠50° dip and 4cm width, partly with pyrite? A calcite vein has ∠55° dip and 10cm width at 40.5m depth. A calcite (- pyrite - pyrrhotite - chalcopyrite - sphalerite) vein is at 41.0 -41.1m depth, with ∠25° dip and 11cm width. It is with barren calcite veins under. Calcite (- chlorite) vein, with 40° dip is at 42.7 -43.1m depth. Pale greenish gray fine sandy tuff is at 43.4 -44.3m depth, with ∠40° dip,

Calcareous schist and black pelitic schist include quartz (- calcite) network- veinlets discordant with foliation, partly with fine sandy schist layers (lamination.∠20 -40° dip). Calcite - pyrrhotite vein, 40° dip and 15cm width is at 52.9m in black calcareous- pelitic schist. The rock core is not so fragile as MJTK-1, even though the color is due to graphite. And calcite is dominant.

Calcite veins are 56.2 -56.6m depth. with ∠45° dip and 3 -20mm width. Calcite (-dolomite?) vein is at 63.0m depth, with sphalerite with parallel calcite veins and calcite veins along foliation.

5 chalcopyrite - pyrrhotite - calcite veins along foliation are under 72.4m depth, with 6 -10cm intervals and 6 -15mm widths. Calcareous schist, with foliation (∠30 -40° dip) is bedded or lamination micro-folded. Pyrrhotite - calcite (- chalcopyrite) veins along foliation are at 70.0, 70.15, and 73.35m with ∠45° dip and 3 -30mm width. And pyrrhotite - calcite veins (width :12 -110mm depth. ∠40° dip) under. Pyrrhotite - calcite vein with ∠40° dip and 35 -40cm width is at 80.0 -80.6m depth. It may be in a fault, and it is with chalcopyrite, sphalerite and galena (rare). The schist is micro-folded at 84m± depth. Calcite veins are under there along foliations, with 40cm intervals, with ∠40° dip, and 2 -9mm width. Some vein is in small faults (reverse faults). Pyrrhotite - calcite vein is under 95.5m depth. It is concordant with foliation (∠40° dip, 40-80m width) and with sphalerite and chalcopyrite. And it also has 80cm length accessory network. Pyrrhotite - calcite vein (∠40° dip, width :10mm) is at 99.1m depth. Calcite - pyrrhotite vein is at 99.6m depth, (∠40° dip, width :130mm). It is with chalcopyrite and brecciated at edges. Pyrrhotite - calcite vein (∠40° dip and 20mm width) is at 100.4m depth. (Pyrrhotite -) calcite vein (∠30 -40° dip,13 -40mm width) is at 100.7m depth. It is with irregular pyrrhotite - chlorite - calcite vein (∠50° dip,160mm). Pyrrhotite - chlorite - calcite vein is under 101.2mdepth, with∠50° dip and 160mm width. Chalcopyrite - pyrite - pyrrhotite vein (∠30° dip) is at 101.6m depth. Calcite and chlorite replace the upper rock. Dark gray calcareous schist is with calcite veinlets along foliation (∠25° dip -40° dip). Lamination

and bedding are micro-folded and have different dip to foliation. Chlorite - calcite - quartz vein (∠30° dip, width :35cm) is at 113.65 -114.10m depth. It is with pyrrhotite (p) and breccia-like with schist and tuff fragments.

Calcareous- pelitic schist, more altered (chlorite, silicified) has foliation(∠40 -45° dip) and is partly black with graphite. Pyrrhotite vein (∠25° dip, width 7mm) is at 140.5m depth. Calcite - pyrrhotite vein (∠40° dip, width 30mm) at 140.9m depth. Pyrrhotite –clay mineral - calcite vein is along foliation with ∠40° dip and width 110mm. (Pyrrhotite -) calcite vein (∠40° dip, width 30mm) is at 142.1 -142.3m depth, with white fine calcite at 143.5 -143.9m depth. Pyrrhotite - calcite network is at 144.6 -144.7m depth. Pyrrhotite - calcite vein (- network) with 15cm mean-interval and generally∠45° dip is at 145.0 -150.6m depth. It is along foliation, with chlorite. For example, chalcopyrite - sphalerite - pyrite - pyrrhotite - chlorite - calcite vein is at 147.8 -148.0m depth with ∠45° dip and 80 -100mm width. Most sulfides are at edges. depth. pyrrhotite - chlorite - quartz - calcite vein at 148.2 -148.5m depth , with chalcopyrite. It has ∠45° dip and 210mm width. sphalerite - pyrrhotite - calcite vein is at 148.8 -149.0m depth, with chalcopyrite and ∠45° dip, Pyrrhotite - calcite vein. With ∠40° dip and sphalerite and rock fragments is at 149.3 -149.6m depth. Pyrrhotite - calcite vein (∠45° dip, width 130mm) 154.7 -154.8m depth. Mineralization weakens under.

Black-pale gray, pelitic- calcareous schist is partly dominant with graphite (foliation:∠20°-∠40° dip). Quartz - calcite vein is at 171.9m depth (∠25° dip, width 30mm). It is with pyrrhotite (p) and pyrite dissemination along foliation. Pyrite has colloform structure even though it is in a fracture. Calcite replaces host rock with chlorite and pyrite (p) at 176.7m depth. Pyrrhotite - (quartz -) calcite vein with sphalerite (∠20° dip, width 9 -20mm) is at 177.6m depth.

Pelitic (partly calcareous) schist (foliation:∠15°-40° dip, Lamination ∠0°-30° dip) is at 183m depth. Pyrite - chlorite veinlet (∠65° dip, width <1mm) is at 182.6m depth. Calcite veinlets along foliation with pyrrhotite (∠30° dip, width <10mm) is at 184.8m depth. Pyrite - calcite vein (∠40° dip, width <3mm) is at 187.0m depth. Pyrite crystallized after calcite. Chalcopyrite - pyrrhotite - calcite vein (∠30° dip, 3mm width) is at 188.3m depth. Calcite - pyrite - pyrrhotite veinlet (∠40° dip, width <3mm) is at 195.5 -195.7m depth. Calcite - pyrrhotite vein (∠15° dip, width 16mm) is at 196.75m depth. Calcite and chlorite replaces rock is at 196.9m depth. Pelitic-calcareous schist (lamination ∠10-30° dip, foliation 20-40° dip) at 205m depth with graphite. Pyrrhotite - calcite veinlet (∠75° dip,2mm) is at 206.3m depth.

Pyrite - chlorite veinlet (∠45° dip, width <1mm) is at 217.1m depth. pyrite - calcite network in small fault (width 40mm), generally ∠30° dip, is at 218.5m depth. Pelitic- sandy- calcareous schist has lamination, ∠0-30° dip, foliation ∠10-40° dip, and is partly with graphite. Bedded (sandy-pelitic) schist is at 222.5m depth, and ∠20° dip, sorted (Not reversed?). Pale greenish gray fine tuff that is silicified with chlorite is at 229.7m-231.9m depth. Sphalerite - chalcopyrite - pyrrhotite (- quartz) - calcite vein. in tuff is at 230.1m depth (with galena?, ∠40° dip,10-40mm). pyrrhotite - chlorite - calcite veinlet (∠50° dip,3mm) is at 231.4m depth. Barren calcite veins are dominant. Pyrite - calcite veinlet.∠20° dip,1mm is at 235.0m depth. Black-pale gray, pelitic- sandy-calcareous schist is with graphite (bedded :∠20-30° dip, foliation:∠10-30° dip). The formation is sorted. is at 258m depth, (Not reversed?). Barren calcite (vein.5° dip) with rock fragments is at 259.7-259.9m depth. Pelitic- sandy- calcareous schist with graphite is at 262m depth (Foliation∠20-30° dip, bedded ∠20-40° dip). Chalcopyrite - pyrite - calcite vein (∠35-40° dip,11mm) is at 272.1m depth. Fault is at 277.3-281.3m depth, also sheared under. Pelitic- (sandy-) calcareous schist is with graphite. Foliation ∠30-45° dip, bedded ∠30-50° dip, Pyrite and chalcopyrite in fault is at 277.3-281.3m depth., and sheared. Calcite network is at 293.7m depth with pyrite. Chlorite (-dolomite?) - calcite - quartz vein (∠35° dip, 20cm) is at 307.0-307.3m depth. Fine tuff thin layer (∠30° dip, chlorite) is at 307.3-307.4m depth with pyrite dissemination. Pelitic- calcareous schist (foliation∠40° dip, bedded 10-∠30° dip, partly calcite network) is at 309m depth. Pyrrhotite - calcite vein, with chalcopyrite, along foliation, is at 317.5-319.9m depth. Fractured zone is under 322.3m depth. Pelitic- calcareous schist (foliation∠15-50° dip, bedded 15-40° dip, partly vertical by micro - folding) is at 327m depth. Pyrrhotite vein.∠35° dip (width :7-16mm. with calcite and pyrite along foliation along foliation) is at 326.85m depth. Pyrrhotite – pyrite dissemination with calcite is at 327.05m depth (Lens like). Pyrrhotite - calcite veinlet (with chalcopyrite.∠15° dip, width 6mm) is at 327.18m depth. Pyrrhotite - calcite veinlet.∠25° dip,4mm is at 327.60m depth.

Pyrrhotite - calcite veinlet (∠20° dip,4mm) is at 328.00m depth. Chalcopyrite - pyrrhotite - calcite network. (width <8mm) is at 332.5-332.75m depth. Chalcopyrite - (sphalerite -) pyrrhotite veinlet (∠65° dip, width <5mm) is around 333.5m, and pinch out, with micro-faults (normal fault? ∠65° dip). (Marcasite? -) pyrite - pyrrhotite - calcite vein (∠65° dip,30mm) is at 337.65m depth.

Chalcopyrite - pyrrhotite vein.∠30° dip,40mm.is at 339.8m depth. Chalcopyrite - pyrrhotite network is at 340.2m-340.4m depth, and partly replaces schist. (sphalerite? -) chalcopyrite - calcite - pyrrhotite vein is at 341.1m depth, with ∠45° dip and 30mm width. Calcite network and chalcopyrite – pyrrhotite lens are under. chalcopyrite - sphalerite - calcite - pyrrhotite vein (∠40° dip,20-30mm) is at 342.0m depth. Pelitic- calcareous schist has. 5-40° dip foliation. bedded ∠30-50° dip, micro-folded. Chalcopyrite - pyrite - calcite vein (5° dip,20mm) is at 354.6m depth. Pelitic (partly sandy) schist has foliation20-∠30° dip, It is bedded (almost∠20° dip) and with. graphite. Chlorite - calcite vein (∠35° dip,30mm) is at 377.1-377.2m depth, with pyrrhotite.

Pyrrhotite -Chlorite - calcite vein with ∠20° dip and 10mm width is at 377.6m depth. Pale greenish gray fine tuff is at 378.6-379.3m depth (compact.∠20° dip?). It replaces to chlorite and calcite by half. Graphite decreases is under 382.3m. Pyrrhotite - calcite vein with 15cm interval (∠20° dip, width <16mm) is at 382.4-386.0m depth. Sandy (-pelitic) schist is partly with graphite, and with foliation (p) 30-45° dip, It is bedded ∠20° dip and dominant with graphite. Pyrrhotite - calcite vein (∠10° dip,40mm) is at 386.85m depth. Pyrrhotite – calcite dissemination is at 390.10m depth. Calcite – pyrrhotite dissemination (striped along lamination? ∠10° dip) is at 390.20m depth. Pelitic schist is dark gray-black with graphite, and friable. It has ∠20-30° foliation dip, Lamination is almost ∠20° dip , however unstable.

Pelitic schist is with graphite, dark gray-black and friable. It is with ∠10-30° dip foliation and ∠20° dip lamination (p). (Galena? -) sphalerite veinlet (∠25° dip,2mm) is at 404.3m - 404.5m depth. it is surrounded by pale gray rock (tuff?) and friable by graphite lower. Dark gray - black pelitic schist is with graphite and friable (foliation∠10-20° dip, Lamination(p)). Dark gray-black Pelitic schist is with graphite. Sheared zone (fault?) is at 449.5-459.4m depth. The schist is brecciated, with dolomite？ Pyrite, calcite and quartz in matrix at 459.4-460.0m depth. Carbonate vein is under.

Calcareous -silty schist (foliation (p). with lamination-bedding∠35° dip) is under 464.6m. Fine sandy schist layer is at 468.6-469.8m depth, often with calcite vein, hard and with quartz and pyrrhotite. Chalcopyrite-sphalerite-pyrrhotite-calcite vein (∠20° dip, 23mm) is at 471.0m depth. It is with parallel pyrrhotite-calcite veinlet. pyrrhotite-(dolomite？-) calcite vein (∠20° dip, 70mm) is at 472.4m depth. Galena-sphalerite-chalcopyrite-pyrrhotite-quartz vein is at 473.2m-473.8m depth. It has cavities without calcite, ∠25° dip 500mm and parallel chalcopyrite-pyrrhotite-quartz veinlets. Pyrrhotite-quartz vein (∠30° dip, 20mm) is at 475.6m depth. Pyrrhotite-calcite vein (∠30° dip, 25mm) is at 476.4m depth.

Pelitic -silty -sandy schist has ∠10-20° dip foliation, lamination-bedding, and ∠40° dip (average). Pyrite-calcite network is at 487.6m depth. Sandy tuff is at 497.45-498.5m depth, with calcite veinlet. Silty -fine sandy schist has ∠20-40° dip foliation and lamination∠40° dip, It is partly friable with graphite. Silty tuff (tuffaceous schist) thin layers is at 519.4-519.6m depth, with ∠30° dip, Pelitic schist is at -532.2m depth. Silty -finely sandy schist. Foliation (∠40° dip, lamination∠35° dip) is at 523.2m depth. Pelitic schist with graphite is under 533.1m. Fine sandy schist (lamination∠30° dip) is at 534.9m. pelitic schist has foliation∠40-50° dip and lamination∠45° dip, Partly it is friable with graphite.

Pelitic -silty schist has ∠30° dip foliation and ∠45° dip lamination, with calcite veinlet and graphite. Small fault is 545.45m depth. Pelitic schist has ∠45° dip foliation and ∠45° dip(？) lamination. It is calcareous and with graphite. pelitic schist with foliation∠30° dip, even though bedding and lamination are unclear. It is with graphite and fracture zone. Silty schist (foliation∠20° dip, lamination∠55° dip) is under 576.4m. Galena-chalcopyrite-sphalerite-pyrrhotite-calcite vein(∠35° dip, 150mm) is at 581.3-581.5m depth. Chalcopyrite-galena-pyrrhotite vein (∠35° dip, 10mm) is at 581.7m depth.

Sandy (tuffaceous？) schist thin layer (∠35° dip) is at 582.0m-582.15m depth. And silty schist has ∠40° dip foliation and ∠35° dip lamination. Fault is at 584.7m depth, with ∠60° dip and 10cm width. Silty-pelitic schist alternation has ∠40° dip foliation and ∠45° dip bedding. Galena-chalcopyrite-sphalerite-pyrrhotite-calcite vein is at 581.3-581.5m depth. Pyrite dissemination is at 593.9m depth with calcite. Silty-pelitic schist has ∠35° dip foliation and ∠40° dip bedding. Silty-fine sandy schist alternation is around 607m (foliation∠30° dip , bedding ∠40° dip). Silty-fine sandy schists have alternation (foliation∠40° dip, bedding ∠45° dip). Silty-pelitic schist alternation is under 609m (foliation∠40° dip , bedding 50-40° dip). Calcite vein (∠10° dip, 100mm) is at 619.9m depth. Pelitic schist with graphite is friable under 621.2m.

Pelitic-silty schists have ∠45° dip Foliation(p) and bedding with calcite veinlet. It is at 621.5-628.3m depth and friable with graphite. Pelitic-silty. foliation∠30° dip, lamination∠45° dip, It is at 650.20-650.65m depth, with sheared zone, calcite network and friable zone.

Pelitic-silty schist (foliation∠40-∠50° dip, lamination∠45° dip) is calcareous, and it is at

664.0-664.1m depth. Calcareous tuff？ Is at 665.0-665.8m depth. Pelitic schist (foliation30-40° dip, lamination∠45° dip) is with graphite. Sandy schist (∠70° dip？, Folded) is at 674.80m. Sheared zone is at 676.70m. Pelitic schist (foliation∠45° dip ？(p). lamination ∠50-80° dip (p)) is with calcareous. pelitic-silty schist (foliation∠25° dip, lamination∠20° dip). Calcite vein (∠10° dip) is at 694.3-695.1m depth, with specularite. (Drilled to 701.1m depth.)

(2) MJTK –4 （Direction：325°,Inclination：55°,Length：601.20m）

-2.10m depth. Tricon. Calcareous schist.

Calcareous schist -5.45m depth. weathered and friable is at 2.10m depth (foliation ∠45° dip, limonite along foliation).

Calcareous schist is with ∠30-45° dip lamination and 40-45° dip foliation. Oxidized zone is under 20.3m depth. calcite veinlet is along foliation. Pyrite (euhedral - subhedral) spots are under 31.5m depth. Calcite vein (∠45° dip,10mm. with pyrite spots) is at 32.3m depth. Pyrite - calcite network, with chalcopyrite, is at 36.4m depth.

Dark gray-black calcareous schist is with foliation:15-45° dip and micro-folded, and often with calcite veinlets and networks. Pyrite (<2mm) spots in calcareous schist (foliation∠40-50° dip, lamination∠20-45° dip). Calcite vein (∠55° dip, width 30cm+. pyrite and pyrrhotite are at edges) is at 85.9-86.55m depth. Sheared zone is under. Pyrite - calcite vein (∠55° dip, width 4-20mm. and calcite network) is at 87.1m depth.

Calcareous- pelitic schist is with foliation (∠40-50° dip, bedded ∠15-45° dip). Calcite vein (∠30° dip, width 40cm+) is at 98.5-99.1m depth, with pyrrhotite and sphalerite (?). Chlorite - calcite vein (30-45° dip) is at 99.7-100.3m depth, with sphalerite, chalcopyrite and pyrite. It is surrounded by calcite veinlets.

Fault is at 105.65-105.75m depth (with clay. ∠65° dip, Sheared).

Calcite vein (∠40° dip, with pyrite and rock fragments) is at 108.2-108.9 depth. Foliation is almost ∠30° dip,

Calcareous- pelitic schist has foliation and bedding (∠40° dip), partly with calcite network. Pyrrhotite - calcite vein along foliation (alternating with several cm intervals) is at 124.7-126.0m depth, and with averaging calcite veinlet with averaging 1m interval. Calcareous - sandy - pelitic schist (foliation∠35-40° dip, bedded ∠15-40° dip) is often with calcite veinlets. Chlorite - calcite vein (∠40° dip, 50cm) is at 143.75-144.40m depth. Calcite vein is at 151.05m depth, with pyrrhotite and sphalerite (∠30° dip,30-40mm). Chlorite - calcite vein, (with pyrrhotite, sphalerite and chalcopyrite. ∠25-30° dip,180mm) is at 152.3m-152.5m depth. Calcite veinlet – network dominant is under158.7m depth, in calcareous schist (foliation20-45° dip, bedded 25-40° dip). Calcite vein (∠25° dip,40mm) is at 171.3m depth. Calcite vein.∠55° dip,15-35mm is at 174.4m depth. Calcite vein (20-40° dip,<40mm depth. with averaging 15cm interval) is at 175.3-176.2m depth in calcareous schist (foliation∠35-45° dip, bedded 25-45° dip). Chlorite - calcite vein.30-45° dip,250mm is at 213.00-216.00m depth. Calcite vein (∠45° dip,10mm) is at 215.9m depth. Pelitic-silty - calcareous schist (foliation∠40° dip, Lamination) is micro-folded. Sphalerite - pyrrhotite veinlet (.0-∠20° dip,5mm, with calcite) is at 229.9-230.0m depth. Calcite vein.(∠40°

dip,30mm, with pyrrhotite) is at 233.1m depth. Calcite- chlorite- pyrrhotite veinlet (∠40 ° dip, along foliation) is at 233.3m-233.5m depth, partly with sphalerite, chalcopyrite.

Pelitic- sandy- calcareous schist has foliation (∠40-60 ° dip). Lamination is unclear. And it is partly with calcite veinlet along foliation and with graphite, and also partly sheared.

The schist is with calcite veinlet along foliation at 241.1-246.2m depth, with pyrrhotite vein (∠60 ° dip,4mm). pyrrhotite veinlet (∠65 ° dip,3mm) penetrates across foliation at 246.3m depth.

Foliation becomes ∠20 ° dip at 247m depth.

Pelitic-silty - sandy- calcareous schist (foliation∠40-50 ° dip, Lamination vague, friable and partly with graphite) is with calcite veinlet along foliation. Pyrrhotite - calcite dissemination along foliation is at 246m depth. Pelitic- calcareous schist, with ∠30 ° dip foliation and vague lamination, is at 266.9-269.6m depth and friable by graphite. It is harder with calcite veinlets along foliation.

Sheared zone is at 279.9-280.1m depth.

Pyrrhotite - calcite vein, ∠30 ° dip, 30mm, is at 280.69m-280.73m depth. Pelitic -silty -calcareous schist (foliation∠40-∠50 ° dip, lamination20-∠30 ° dip) is with calcite network dominant. Calcite along foliation is at 285.8-285.95m depth.

(Galena-)sphalerite-chalcopyrite-pyrrhotite-pyrite-calcite vein is at 287.3-287.8m depth, with ∠50 ° dip and 30mm width. Pyrrhotite is at the upper edge, and pyrite is at the lower edge. And calcite veinlet is near it. Chalcopyrite-pyrrhotite-calcite vein (∠50 ° dip, 8mm) is at 288.4m depth. It is calcareous under 299.9m depth.

It has clay and pyrite at 299.9-300.3m depth, with fault fragments and in silty -calcareous schist (foliation∠25 ° dip, Lamination is vague.).

Calcite network-veinlet is with graphite in Pelitic -silty -calcareous schist (foliation∠50 ° dip, bedding∠10-30 ° dip).

Sandy schist, ∠10 ° dip bedded, is at 305.25-305.45m depth.

Sheared zone is at 306.6m. Sheared zone is at -312.3m depth in pelitic -silty schist.

Tuffaceous-sandy schist. Calcite is at 312.4-313.8m depth, and silicified. Pelitic -calcareous schist is at 313.8 depth. foliation∠30 ° dip, lamination∠25 ° dip,

Calcite vein (∠70 ° dip, 10mm) is at 317.85m depth, with pyrite.

Dark gray pelitic -silty schist has foliation (∠15-20 ° dip) and lamination(unclear, ∠10 ° dip？) with graphite, and often with calcite networks.

It has foliation, ∠35 ° dip, at 335.3m depth.

In pelitic -silty schist, foliation has ∠45 ° dip(p) and the lamination has averaging ∠10 ° dip, with graphite.

Fine tuff-silty tuff layer (∠25 ° dip, Calcite dominant) is at 343.3-343.5m depth.

Pelitic -silty schist (foliation∠20 ° dip, lamination∠20 ° dip) is under 370.6m depth.

Calcite partly replaces fine tuffaceous schist.

Pelitic -sandy schist is under 374.2m, with graphite.

Pyrite is disseminated along fracture at 374.7-375.0m depth.

chalcopyrite – pyrrhotite - calcite vein (∠40 ° dip, 30mm) is at 378.95m depth in pelitic -sandy (-calcareous) schist (foliation∠40 ° dip, lamination, generally ∠30 ° dip).

And graphite becomes dominant. Foliation is nearly vertical. pyrite dissemination is at 387.7m depth.

Calcite-pyrrhotite vein (∠65° dip, 4-11mm) is at 394.5m depth.

Lamination is folded at 406-407m depth, partly with ∠70° dip (→∠45° dip) in pelitic -silty schist (foliation(p), lamination∠45° dip？, calcareous, with graphite).

Calcareous-pelitic schist (foliation bedding: ∠40° dip) is with dominant calcite and partly with calcite network.

Pyrrhotite-calcite vein along foliation is at 424.7-426.0m depth. Pelitic-calcareous schist is partly with graphite (foliation∠40° dip, Lamination generally ∠25°(folded)). Calcite-chlorite vein (∠45° dip, 90mm) is at 440.75m depth.

Pyrrhotite dissemination and concentration is at 454.2m depth, in medium sandy schist (tuffaceous？). Galena-chalcopyrite-sphalerite-pyrrhotite-chlorite-calcite vein (∠35° dip, 200cm) is at 455.30m-455.60m depth.

Fault (∠30° dip) is at 456.5m depth between silty schist (foliation(p). lamination∠45° dip) and pelitic schist. Sheared zone is at 464.0-464.9m depth.

Silty-pelitic schist is partly sandy and calcareous (foliation∠30-50° dip, lamination∠20-60° dip).

Chalcopyrite-sphalerite-pyrrhotite-calcite vein (∠50° dip, 160mm) along foliation is at 501.8-502.2m depth, with parallel veinlets.

Sulfides are anhedral to calcite. Chalcopyrite-sphalerite-pyrite-pyrrhotite-calcite vein (w: 30mm) along foliation is at 511.3m depth in silty-pelitic schist (foliation∠50° dip, lamination∠35° dip). Chalcopyrite-sphalerite-pyrrhotite-pyrite-chlorite-calcite vein (∠40° dip, 35mm) is at 511.55m depth. Sphalerite-pyrite-pyrrhotite-calcite vein (∠25° dip, 20mm) is at 511.7m depth.

Fault (∠45° dip ？) is at 514.0-514.5m depth, with pyrite dissemination.

The geology becomes silty-fine sandy schist (foliation∠30° dip (p), lamination∠10-70° dip) and partly friable. Chlorite-calcite vein (∠40° dip, 200mm) is at 553.9m depth. Silty-pelitic schist (foliation∠35° dip, lamination∠10-60° dip) is calcareous. Chlorite-calcite vein (∠40° dip, 200mm) is at 553.9m depth.

Pelitic-sandy schist (calcareous, foliation∠30° dip, lamination∠25° dip) is partly friable. Fine and calcareous tuff？layer is at 583.85-584.15m depth. Pyrrhotite-calcite vein (∠25° dip, 20mm) is at 586.65m depth. Pyrrhotite-calcite veinlet (∠30° dip, 6mm, along foliation) is at 588.0m depth. Pyrrhotite-chlorite-calcite vein (∠45° dip, 200m depth) is at 588.5-589.1m depth. Pelitic schist is partly alternated with silty schist (foliation∠25° dip, lamination∠30° dip). Fine tuff layer (∠30° dip) is at 594.2-594.35m depth. (Drilled to 601.20m depth.)

(3) MJTK –5 （Direction：270°, Inclination：70°, Length：502.10m）

The geology of the shallow layer is the Cenozoic sediments, that consist of Sand and gravels (–conglomerate) with soil and limonite (Gravels consist of pelitic schist, sandy schist and tuffaceous schist (φ<35mm), Matrix is sandy and includes limonite.). And weathered basic igneous rock gravels are dominant at 120.3m-142.5m depth. They are brown, partly, dark greenish gray (gabbro or diorite?) and partly magnetic or foliated. The matrix consists of limonite, calcite and clay.

Pelitic-silty schist (foliation: ∠60-70 ° dip) is under 142.5m, and bedded and laminated unclearly. It is weathered to 148.6m depth. Pyrrhotite - calcite veinlet (∠55 ° dip, width <5mm) is at 149.05m depth. Chalcopyrite - pyrrhotite - pyrite - calcite network along foliation is at 151.20m depth. Chalcopyrite - pyrrhotite - pyrite network is at 151.60m depth. Quartz - calcite - pyrite - pyrrhotite veinlet (∠60 ° dip, 6mm) is at 154.45m depth. And the parallel calcite veinlets have 15 cm interval under. Pyrite - pyrrhotite veinlet (∠60 ° dip,5mm, with branch veinlets) is at 162.3m, 162.4m, 162.8m and 162.9m depth. Pyrite dissemination along foliation is at 163.5m-164.0m depth. Chalcopyrite - pyrite vein (∠50 ° dip,6mm. with chlorite) is at 164.7m depth.165.0m depth. Pyrite - calcite veinlet (∠60 ° dip, width <3mm) is at 165.7. And similar veinlets with almost 30cm interval are with chlorite.

Pelitic-silty schist (foliation∠45 ° dip (p), lamination (p) ∠45-65 ° dip) is partly sheared. Pyrite - calcite vein (∠75 ° dip,15mm) is at 177.0m depth. Pyrrhotite - calcite vein (∠60 ° dip,3mm) is at 178.4m depth. Pyrrhotite - calcite vein (∠55 ° dip, <4mm) is at 181.8m depth.

Pelitic- calcareous schist has foliation(∠50 ° dip) and Lamination (unclear, ∠60 ° dip) at 186.7m-196.7m depth. It is altered (calcite, silicified) and dominant with calcite network. Pyrrhotite - calcite network is at 188.3m depth. Quartz vein (∠10 ° dip,11mm) is at 188.9m depth. 3 pyrrhotite - calcite veinlets (∠65 ° dip,3mm) are around 189.15m depth. Pyrrhotite - calcite vein (∠65 ° dip, w<6mm) is at 190.0m depth. Pyrrhotite - calcite vein (∠70 ° dip,1-12mm) is at 191.1m -191.3m depth. Pyrrhotite - calcite vein (90 ° dip,10-40mm) is at 194.8m-195.6m depth and 195.7m depth.

Pyrrhotite - calcite vein (90 ° dip,20-40mm) is at 196.1m depth. Pyrrhotite dissemination (f) is at 196.6m depth. Pyrrhotite - calcite vein (5 ° dip,23mm) is at 201.2m depth, with lamination (∠70 ° dip). Pyrrhotite - calcite veinlet (∠60 ° dip,5mm) is at 205.1m depth.

It is in calcareous- silty schist (partly tuffaceous. Foliation (p) ∠45 ° dip,lamination20-∠70 ° dip) and partly with graphite. Chalcopyrite – pyrrhotite dissemination (with calcite and silicified?) is along foliation at 210.7m depth. Chalcopyrite - pyrrhotite - calcite network is at 213.0-213.3m depth.

Tuffaceous-sandy schist is at 220.5m-224.0m depth. The foliation and lamination are unclear. Calcite vein (∠55 ° dip, 12mm) is at 220.6m depth. Chalcopyrite - pyrrhotite - calcite vein (∠40 ° dip, 40mm) is at 221.0m depth. Chalcopyrite - pyrite - calcite vein (∠65 ° dip, 40mm) is at 222.5m depth. Chalcopyrite - sphalerite - pyrrhotite - calcite vein (∠50 ° dip, 90mm) is at 222.8m-222.9m depth. Pyrite dissemination and sphalerite - chalcopyrite - pyrrhotite network. are under it. Pyrrhotite dissemination is at 223.5-223.9m depth with Dolerite dyke (∠60 ° dip nonmagnetic). Silty - fine sandy schist (tuffaceous? with chlorite) is under 224.0m depth. Pyrite - pyrrhotite network is at 224.7m depth. Pyrite - calcite veinlet along foliation (∠50 ° dip) is at 234.0m depth. Pyrite - calcite vein (∠50 ° dip, w<30mm) is at 234.50m depth, with pyrite - calcite network under.

The geology is calcareous-silty - sandy schist (foliation∠50 ° dip, lamination∠40-90 ° dip) with calcite veinlets along foliation. Pyrite - calcite veinlets with 20cm interval (∠60 ° dip,1mm) is under 244.0m depth. Pyrrhotite - calcite network parallel to foliation is at 246.5-246.7m depth. Calcite - pyrite vein (∠65 ° dip, 5mm) is at 247.4m depth.

Small fault (∠60 ° dip, 20mm) is at 248.55m depth, with breccia.

Pyrite - calcite veinlets, with ∠60° dip and 10cm interval, is to 250.3m depth. Chalcopyrite - pyrrhotite - calcite vein (∠40° dip, 50mm) is at 252.9m depth. Chalcopyrite - pyrrhotite vein (∠60° dip, width <6mm) is at 253.5m depth, and pinch out. Pyrite - pyrrhotite - calcite network is at 255.1m depth, and also, pyrrhotite - calcite veinlets (∠60° dip, width <1mm, 10cm interval). Pyrrhotite dissemination (f), with chalcopyrite and silicified, is at 256.2m-257.9m depth. Chalcopyrite - pyrrhotite - calcite network silicified is under 259.1m, partly with a slight chlorite. The schist is more silicified, and more calcite network.

Calcareous -silty schist (foliation∠50-65° dip(p)) is hard with unclear lamination and with calcite network-veinlet. Chalcopyrite-calcite-pyrrhotite vein-network (∠90° dip, width<70mm, with cavities) is at 285.8m-287.4m depth. Pyrrhotite network is to 288.3m depth, partly with chlorite. (Chalcopyrite-) pyrite-chlorite-calcite veinlet along foliation is in silty -calcareous schist, that is silicified, with calcite veinlets, foliation ∠ 50-70 ° dip(p) and inconstant lamination(p). Pyrrhotite-calcite-quartz vein (∠60° dip, 40mm) is at 292.85-292.95m depth. Calcite-quartz vein (∠65° dip, 120mm) is at 293.1-293.3m depth.

Calcite-pyrite-quartz vein (∠55° dip, 80mm) is at 293.35-293.45m depth. Pyrite-chlorite-calcite vein (∠55° dip, 40mm) is at 294.1-294.15m depth. 2 parallel calcite-pyrrhotite veinlets, with 10 cm interval, are at -294.8m depth.

Fine sandy schist, bedding∠70° dip, is under 295.00m, with calcite-pyrite network. Pyrite-calcite-quartz vein (∠60° dip, 10mm) is at 297.8m depth, with branch veinlets. Calcite-pyrrhotite vein (-network) (∠50° dip, width<11mm) is at 303.1m depth. Pyrrhotite vein (∠10° dip, 6mm) is at 303.75m depth. Pyrrhotite vein (∠50° dip, width<4mm) is at 303.9m depth and pinches out. Pyrrhotite vein (∠40° dip, 3mm) is at 304.75m depth. Calcite-pyrrhotite vein (∠30° dip, 4mm) is at 307.65m depth. Pyrrhotite – pyrite dissemination along foliation(∠50° dip) in sandy schist is under 308.5m depth. The schist is silicified with very slight calcite. Calcite-pyrrhotite vein (∠40° dip, 3-10mm) is at 311.0m depth. Pyrite-calcite vein is at 311.05m depth, with ∠45° dip and width10mm(changeable).

Silty schist has foliation (∠65° dip) and lamination (∠55° dip). It is with chlorite and tuffaceous？ Calcite-pyrrhotite vein (∠30-50° dip, 10mm) is at 315.5-315.9m depth with pyrrhotite vein, ∠50° dip and 8mm width. Pyrrhotite-chlorite-calcite network is at 316.75m depth. with pyrite-pyrrhotite networks under. Chalcopyrite-pyrite vein (∠50° dip, 4mm) is at 318.0m depth. Sheared zone is at 318.2-319.1m depth. Silty schist (foliation∠50° dip, lamination∠60° dip, partly chlorite) is under 319.1m depth. Calcite vein (∠70° dip, 32mm. with dolomite？) is at 321.8m depth. Pyrite-calcite network is at 325.5m depth.

Pyrite-calcite veinlet (∠60° dip, 7mm) is at 329.7m depth, with pyrite dissemination along foliation. Foliation is steeper (∠65° dip). (Pyrite-) pyrrhotite vein (∠60° dip, 8mm) is at 334.9m depth. Pyrrhotite veinlet, along foliation (∠60° dip, 3mm) is at 337.75m depth. Pyrrhotite-calcite vein (∠50° dip, 9mm) is at 339.1m depth. Pyrite vein (∠50° dip, 8mm, chlorite) is at 340.5m depth. Pyrite-pyrrhotite vein (∠50° dip, 6mm) is at 342.3m depth, with calcite and chlorite.

Silty -fine sandy schist has foliation (∠50° dip) and lamination (∠70° dip)？ 2 calcite-pyrrhotite-pyrite veins (∠50° dip, 6mm) are at 343.25m-343.30m depth.

Pyrrhotite-pyrite-calcite vein (∠50° dip, 8mm) is at 344.4m depth. (Sphalerite-chalcopyrite-) pyrrhotite-pyrite vein (∠55° dip, 12mm) is at 345.1m depth. Pyrite vein (∠50° dip, 6mm) is at 346.5m depth. Calcite-pyrrhotite vein (∠55° dip, 30mm and network-like) is at 346.7m depth.

Chalcopyrite-calcite-pyrrhotite vein (∠50° dip, 10mm, network-like) is at 355.1m depth. Chalcopyrite-calcite-pyrrhotite network (width:6mm±) is at 355.3m depth. Calcite-pyrrhotite network (∠65° dip, 10mm) is at 356.9m depth. Chalcopyrite-pyrrhotite vein (∠60° dip, 4mm, with calcite) is at 357.3m depth. Pyrrhotite vein (with calcite, ∠65° dip, 5mm) is at 357.6m depth. (Chalcopyrite-pyrite-) pyrrhotite vein, with calcite, is at 358.0m depth (∠65° dip, 9mm, with branch veinlets). Silicified fine sandy schist is at 358.75-362.0m depth, with mineralization zone. (Sphalerite-) chalcopyrite- pyrite- pyrrhotite network- dissemination has pyrite, pyrrhotite, chalcopyrite and quartz are euhedral in cavities.

Silty -fine sandy schist has foliation(∠50° dip) and lamination (∠60° dip？). White altered chlorite-pyrrhotite-calcite network is to -373.5m).

Micro-diorite dyke (∠70° dip) is at 382.3m-386.0m depth (Green- white alteration, Nonmagnetic). Calcite-chlorite veins dominant in fine sandy schist -pelitic schist alternation, (foliation∠65° dip-∠70° dip, Bedding unclear). Fine secondary quartz is along foliation.

Silty -tuffaceous schist (foliation∠45° dip, lamination∠50° dip？) Is with calcite and chlorite. Tuffaceous schist (coarse tuff- lappili tuff) is under 392.4m, with chlorite. Dolomite vein (∠30° dip？ 190mm?) is at 398.4-398.6m depth. Silty schist is at 398.6-399.4m depth. Tuffaceous schist is under 399.4m. Pyrite-calcite vein is at 406.2-406.3m depth (∠70° dip, 100mm). It is with foliation(∠60° dip) and (lamination∠70° dip). Silty -tuffaceous schist alternation is at 406.3m, and silty schist is dominant. It includes Dolomite-calcite veinlet. Chalcopyrite-pyrrhotite-calcite vein (∠65° dip, 100mm) is under 421.4m. Tuffaceous schist (lamination∠55-60° dip), silty schist , and pelitic schist thin layer are under 423.7m depth.

Fine sandy schist is at -431.7m depth in tuffaceous schist. Silty -fine sandy schist (foliation∠45° dip, bedding∠45° dip) is under 431.7m. (Calcite-dolomite-)quartz vein (∠10° dip, with pyrite and chlorite) is at 443.35-443.45m depth. Lamination is steeper as deeper (∠60-65° dip). Pyrite dissemination-network is at 446.7m depth. Calcite-quartz vein (∠10° dip) is at 448.2-448.8m depth in silty -fine sandy schist with foliation(∠60° dip), lamination(∠45° dip), and it may be Reverse-bedded under it. Pyrite dissemination is at 451.2m depth. Chlorite-calcite vein (∠20° dip, 60mm) is at 459.35m depth.

silty -fine sandy schist has foliation (∠55° dip), unclear bedding-lamination. Pyrrhotite dissemination with calcite along foliation is at 463.4-468.6m depth. Chlorite is concentrated at 472.3m depth. Chalcopyrite-pyrite-pyrrhotite veinlet is at 473.35m-473.80m depth (∠50° dip, width<20mm, with calcite and chlorite). Pyrrhotite dissemination-network is dominant at 475.5m depth (lamination∠65° dip).

For example, pyrrhotite network is at 478.4-478.6m depth. pyrrhotite dissemination-network is at 479.2m depth. (chalcopyrite-)pyrrhotite veinlet-network is at 479.4-480.8m depth, with averaging 15cm interval. (chalcopyrite-)pyrrhotite network is at 480.15-480.80m depth. pyrrhotite network is at 481.4-481.6m depth with averaging 10cm interval. pyrrhotite dissemination-network is under

482.2m depth, and silicified with calcite and chlorite. Quartz vein (∠10° dip, 40mm) is at 482.3m depth, with pyrite, calcite and dolomite(?).

Silty - fine sandy schist has foliation(p), lamination (∠50-80° dip), (chalcopyrite-)pyrrhotite dissemination, network and veinlet with calcite. Pyrite veinlet (>∠75° dip, 2mm) is at 483.30m depth. it passes across quartz vein(∠10° dip, 40mm) with pyrrhotite dissemination(f).

Dolomite-calcite vein (∠20° dip, 70mm) is at 484.80m depth. Chlorite is concentrated at the edges. Calcite vein (∠35° dip, 250mm) is at 486.0-486.3m depth. Pyrrhotite and chlorite are at edges. Pyrrhotite network is dominant around 493.3m. Pyrrhotite-calcite irregular vein is at 501.25m depth. pyrrhotite-calcite vein (∠55° dip, 9-15mm) is at 501.90m depth. (Drilled to 502.1m depth.)

(4) MJTK-6 （Direction：325°, Inclination：70°, Length：301.90m）

The geology is pelitic schist (foliation∠35° dip, lamination∠20° dip).

Calcite vein with galena and sphalerite is at 34.0m depth (∠35° dip, 40mm).

Pelitic-silty schist is calcareous （foliation∠35° dip, lamination10-∠25° dip）is at 28.5m depth, with calcite vein. ∠35° dip, 140mm. calcite vein (∠35° dip, 50mm) is at 30.5m depth, with specularite. Sandy schist thin layer is at 50.2m depth (∠10° dip, 50mm).

Coarse sandy schist layer is at 56.5-56.7m depth (∠20° dip, pyrite dissemination). Calcite vein (∠35° dip, 15mm. with specularite, sphalerite？) is at 59.0m depth.

Chalcopyrite-galena-sphalerite-pyrrhotite-calcite vein is at 69.55m depth (∠30° dip, 50mm). Sheared zone is at 78.7-79.4m depth. Pelitic-silty schist. Alternation has foliation (∠45-25° dip). bedding (∠45-25° dip). Pyrrhotite -calcite vein (∠25° dip, 12mm) is at 90.25m depth.

Chalcopyrite-galena-sphalerite-pyrrhotite-calcite vein (∠35° dip, 200mm) is at 91.1m depth.

Pyrite-calcite vein (∠20° dip, 40mm) is at 92.0m depth.

Chalcopyrite-sphalerite-pyrite-chlorite-pyrrhotite-calcite vein is at 99.7-101.45m depth and it is with ∠35-40° dip and dolomite-quartz？ Pyrrhotite network in silty schist is under.

Pelitic-silty schist with foliation (25-40° dip) and unclear lamination.

(Chalcopyrite-sphalerite-)pyrite-pyrrhotite-Calcite vein is under 111.6m depth with 3cm-50cm interval (∠15-25° dip, 2-30mm). Pelitic schist is friable by foliation under 111.6m depth (Foliation=lamination=∠30° dip). Pyrrhotite-calcite vein is at 133.95m depth, in silty - calcareous schist (foliation∠20° dip, lamination∠25° dip,).

Chalcopyrite-galena-sphalerite-pyrite-pyrrhotite-calcite vein (∠20° dip) is at 134.25-134.80m depth.

It is continuously changed to silty schist . (calcareous. foliation∠25° dip, lamination∠25° dip : parallel with foliation). Pyrrhotite-calcite vein is at 137.9m depth (∠25° dip, 9mm). Calcite vein with pyrrhotite is at 138.5m depth (∠25° dip, 30mm). Calcite vein with pyrrhotite is at 143.5m depth(∠35° dip, 25mm).

Silty-pelitic schist is calcareous with ∠25° dip foliation (lamination∠25° dip (=foliation) with calcite veins along foliation).

Small fault (∠80° dip) is at 204.50m depth with pyrite-calcite vein (w:9-18mm). Fault is at 211.7m (∠40° dip) .

Tuff layer is at 211.3〜211.7m depth(∠15 °). Sheared zone is at 215.0〜216.8m depth.

Pelitic schist is with foliation∠20 ° and bedded (∠20 °).

Fractured zone-sheared zone is at 219.0-229.0m depth with quartz vein fragments.

Pelitic-sandy schist is with foliation∠30 ° and lamina〜bed 10 ° .

Chlorite - calcite network is along fractures, with pyrite dissemination.

(Pyrite-) chlorite- quartz- calcite vein(∠35 ° .120mm) is at 226.70〜226.85m depth, and pyrite is at edges.

Pyrite- calcite vein is at 230.90m depth.(∠30 ° .8mm.). pelitic〜 silty schist. foliation∠45 ° .bedded∠45 ° .

pelitic(〜sandy) schist is friable with foliation ∠30〜45 ° and bedded∠45 ° . Fault(?) is at 243.6〜256.5m depth(∠35 °). Pyrite - pyrrhotite dissemination and replacement along foliation is at 257.1〜257.85m depth. (Silicified in the upper zone, and calcite network in the lower zone)

Sulfides are disseminated along foliation(p).

pelitic〜sandy schist is with foliation∠25 ° and bedded∠25 ° .

Chalcopyrite- pyrite- quartz- calcite network is at 260.65〜260.70m depth.

It is friable, and partly sheared.

The geology is pelitic〜 silty schist with foliation(∠60 °) and bedding(∠60 °).

Sheared zone is at 270.1m (sheared pelitic schist, calcareous with graphite) and partly spotted pyrite. Pyrrhotite vein is at 276.85〜277.40 with chalcopyrite (p) , silicified(p) and pyrrhotite network for 25cm.

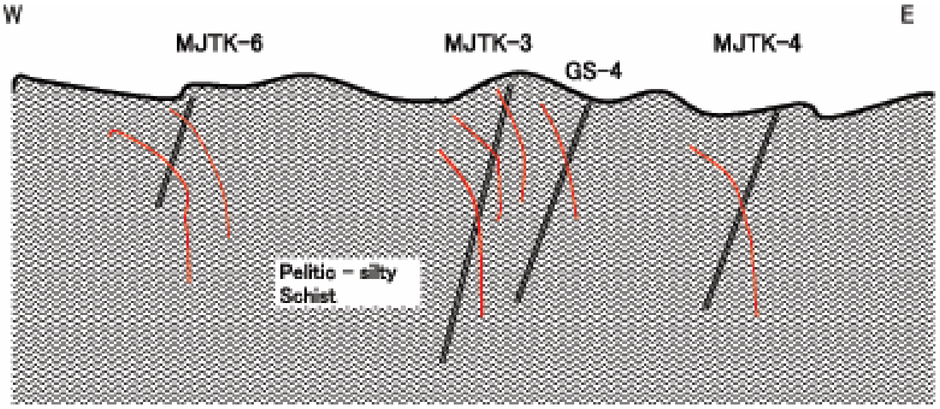
Silty - fine sandy schist has foliation (∠30 °) and bedding (∠0〜50 °).

Calcite veins are with chlorite at 280.6〜281.2m depth with dominant pyrrhotite in the lower part (281.0〜281.2m), and with chalcopyrite, pyrite and chlorite. The schist is sorted to sandy schist (calcareous).

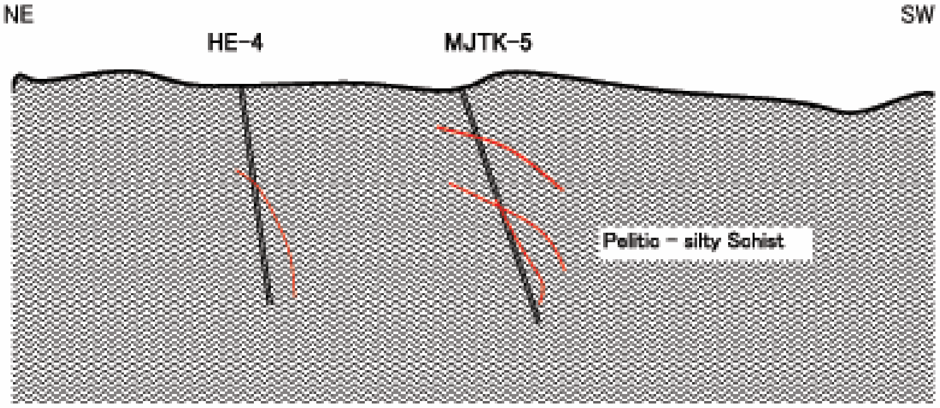
Calcite veins (w: 8〜40mm) are with averaging 25cm interval.

Silty schist is at 283.9m depth (foliation = bedding ∠20〜30 °). Sphalerite－pyrite－calcite vein is at 285.5m depth.(∠35 ° . 20mm).

Fractured and friable is at 286.95m depth. (Drilled to 301.9m depth.)



Azzouz Area



Khefawna Area

Fig.II-3-2 Geological section

3-4-2 Analysis and Tests

3-4-2-1 Selection of samples

The samples for analysis were chosen into the following 16 parts with typical mineralization of sulfide among each rock cores. Such sulfides have not only vein structure but also stratified structure; therefore they are regarded as “sulfide concentration”

SP-1：MJTK-3　62.70-62.75m

Sulfides of around 1mm thickness are included in stratified formation. Sulfides of the stratified formation continue from 62.7m to 63.7m. Pyrrhotite, sphalerite, galena and pyrite are seen with the naked eye.

SP-2：MJTK-3　76.30-76.40m

Vein-like or stratified sulfide concentration with calcite, sphalerite, pyrrhotite, pyrite and chalcopyrite with mainly 10cm wide in pelitic schist. Alteration is not observed in border with host rock.

SP-3：MJTK-3　80.50-80.60m

Vein-like or stratified sulfides (mainly pyrrhotite) concentrate in pelitic schist with 50cm wide. The sulfides contain chalcopyrite, sphalerite, galena and pyrite. Calcite is smashed irregularly. Wedge-shaped or irregularity-like fragments of non-altered pelitic rock and tuff are in pyrrhotite.

SP-4：MJTK-3　99.50-99.60m

Turbidite-like sulfide of around 1mm (partly 1cm) is mainly included in pelitic schist. It mainly consists of pyrrhotite, sphalerite, chalcopyrite and galena. The stratified sulfide continues from 96.6m to 103.3m.

SP-5：MJTK-3　99.60-99.70m

10cm wide vein-like or stratified sulfides (mainly pyrrhotite) concentrate in pelitic schist. It mainly consists of chalcopyrite, sphalerite, galena and pyrite. Calcite is smashed irregularly. Wedge-shaped or irregularity-like fragments of non-altered pelitic rock and tuff are in pyrrhotite, with same direction with boundary.

SP-6：MJTK-3　148.20-148.30m

Vein-like or stratified sulfides concentrate in pelitic schist. The sulfides continue from 148.20m to 150.20m. Pyrrhotite, sphalerite, chalcopyrite and galena are seen with the naked eye.

SP-7：MJTK-3　340.30-340.40m

Pyrrhotite concentrates in pelitic schist. sulfides concentrate into the matrix of brecciated pelitic rock like hydrothermal breccia. It consists of sphalerite, galena in pyrrhotite. The concentration is from 340.00 to 341.00m.

SP-8：MJTK-3　319.20-319.40m

Vein-like sulfides of 100cm wide concentrate from 318.90 to 319.40m. Pyrrhotite, chalcopyrite, sphalerite, galena and pyrite seem to fill up in calcite.

SP-9：MJTK-3　473.40-473.60m

Vein-like sulfides of 100cm wide concentrate between 473.40-474.50m. It consists of pyrrhotite, chalcopyrite, sphalerite, galena and pyrite. The sulfide fill up in quartz and they are sometimes with cavities.

SP-10：MJTK-6　90.70-90.80m

Stratified or vein-like sulfides concentrate into 90.70-93.00m. they consist of pyrrhotite, chalcopyrite, sphalerite, galena and pyrite. Calcite is smashed irregularly. Wedge-shaped or irregular fragments of non-altered pelitic rock and tuff are in calcite.

SP-11：101.10-101.30m

Stratified or vein-like sulfides concentrate into 99.60-111.50m. They consist of idiomorphic pyrite, pyrrhotite and chalcopyrite.

SP-12：125.20-125.30m

Stratified or massive sulfides concentrate into 125.20-127.00m. They consist of idiomorphic pyrite and chalcopyrite. Wedge-shaped or irregular fragments of non-altered pelitic rock and tuff are in sulfides.

SP-13：134.60-134.70m

Stratified or massive sulfides concentrate into 134.60-135.00m. They consist of idiomorphic chalcopyrite, sphalerite, galena and chalcopyrite. Calcite is smashed irregularly. Wedge-shaped or irregular fragments of non-altered pelitic rock and tuff are in pyrrhotite.

SP-14：MJTK-5　256.70-256.80m

Filling up-shaped sulfides concentrate into sheared pelitic between 255.50-258.20m.

They consist of pyrrhotite and chalcopyrite.

SP-15：MJTK-5　358.90-359.00m

Stratified or lamina-shaped sulfides concentrate between 355.00-372.40m. They consist of pyrrhotite and chalcopyrite.

SP-16：MJTK-5　466.60-466.70m

Disseminated sulfides concentrate into 466.60-466.70m. They consist of pyrrhotite and chalcopyrite.

The conditions of these sulfides can be divided into following types.

① massive
② stratified
③ thin-layered

These types are probably due to a series of mineralization.

3-4-2-2 Results of laboratory test

The result of Chemical analysis of rock samples is indicated to Table II-3-5.

Result of Chemical analysis of rock samples

(1) Chemical analysis

The results of chemical analysis (SP-1 - SP-16) are indicated to Table II-3-5 Result of Chemical analysis of rock samples. The samples for analysis are chosen 10cm length samples homogeneous as possible among each 10cm sections.

SP-1 indicates typical analyzed values between 62.70-62.75m of thin-layered sulfides with high zinc content. SP-4 also indicates analysis of thin-layered sulfides between 96.5m - 96.6m of MJTK-3, with high zinc content.

SP-5, SP-6 and SP-7 show contents of typical parts among stratified or vein-shaped sulfide concentrations (MJTK-3: 96.6m - 103.3m, 148.20m - 150.20m, 340.00-341.00m), and indicate high lead contents.

SP-9 shows contents of 473.40-473.60m of the vein-like sulfide concentration (MJTK-3 : 473.40-474.50m), and indicates high zinc and lead contents.

SP-10 shows contents of 90.70-90.80m of stratified or vein-like sulfide concentrations formation of MJTK-6 - 90.70-9300m, and indicates high zinc and lead contents.

These ores contain so much lead and zinc as (Cu:1%, Pb:3%, Zn:10%) Hajar deposit, that is around the survey area, despite the shortage of Cu.

Table II-3-5 Result of Chemical analysis of rock samples

	Au-ICP21	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	ME-ICP41	Pb-AA46	Zn-AA46
SAMPLE	Au	Ag	Al	As	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Ti	Tl	U	V	W	Zn	Pb	Zn
DESCRIPTION	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%
MJTK 3 62.7-62.75	0.035	2.4	0.72	<2	<10	20	<0.5	<2	3.45	173	27	9	202	5.1	<10	2	0.15	10	0.35	1350	1	<0.01	16	420	205	4.3	<2	1	94	<0.01	<10	10	7	10	>10000		8.45
MJTK 3 76.3-76.4	0.73	6	0.28	>10000	<10	10	<0.5	15	24.1	11.7	21	2	91	4.45	<10	<1	0.04	30	0.34	24100	<1	0.02	12	110	2580	3.6	26	1	566	<0.01	10	10	3	<10	5820		
MJTK 3 80.5-80.6	0.022	6.8	0.03	1605	<10	<10	<0.5	9	6.58	7.3	45	<1	787	>50	<10	1	0.01	<10	0.07	4620	1	0.02	77	<10	3180	8.83	4	1	86	<0.01	<10	<10	8	<10	4050		
MJTK 3 99.5-99.6	0.038	6.1	1.09	287	<10	20	<0.5	<2	2.46	206	43	7	6460	19.8	<10	<1	0.1	50	0.61	1425	1	<0.01	34	230	470	7.26	<2	1	64	<0.01	<10	<10	13	<10	>10000		8.07
MJTK 3 99.6-99.7	0.146	6	0.08	1795	<10	<10	<0.5	9	1.32	51.1	176	<1	2470	>50	<10	<1	0.02	30	0.03	635	1	0.01	88	20	586	7.75	<2	1	17	<0.01	<10	<10	10	40	>10000		2.15
MJTK 3 148.2-148.3	0.114	7.4	0.21	1095	<10	10	<0.5	9	8.07	136	89	<1	483	20.3	<10	<1	0.04	10	0.17	6520	1	0.01	56	140	769	>10.0	4	1	189	<0.01	<10	<10	2	<10	>10000		6.96
MJTK 3 319.2-319.4	0.033	18.7	0.14	1380	<10	<10	<0.5	9	7.59	48.6	61	<1	1210	38.3	<10	1	0.03	10	0.06	4830	1	0.01	158	80	>10000	9.32	10	1	169	<0.01	<10	<10	5	30	>10000	1.51	2.58
MJTK 3 340.3-340.4	NSS	8.8	0.06	5510	<10	<10	<0.5	21	1.66	2.4	52	<1	792	>50	<10	<1	0.02	<10	0.02	952	1	<0.01	97	40	1450	7.12	5	1	27	<0.01	<10	<10	6	<10	2260		
MJTK 3 473.4-473.6	0.101	10.3	0.02	1075	<10	<10	<0.5	4	0.71	53.6	43	<1	1530	31.8	<10	<1	0.01	40	0.04	409	<1	<0.01	50	10	>10000	>10.0	30	<1	7	<0.01	<10	<10	2	20	>10000	1.07	3.22
MJTK 6 90.7-90.8	0.042	18.2	0.38	47	<10	10	<0.5	33	14.6	29.3	49	<1	4900	23.9	<10	<1	0.01	20	0.53	3690	<1	0.01	34	350	>10000	>10.0	10	1	428	<0.01	<10	<10	5	<10	>10000	2.41	1.65
MJTK 6 101.2-101.3	0.096	3	0.34	695	<10	20	<0.5	6	0.37	6.3	25	3	429	18.3	<10	<1	0.09	<10	0.16	1960	1	<0.01	24	180	2410	>10.0	3	1	10	<0.01	<10	<10	5	<10	3300		
MJTK 6 125.2-125.3	0.112	3.5	0.22	338	<10	<10	<0.5	3	1.02	<0.5	171	<1	2900	42.1	<10	<1	0.03	<10	0.3	8230	1	0.01	44	40	452	>10.0	3	1	20	<0.01	<10	<10	7	<10	993		
MJTK 6 134.6-134.7	0.087	19.7	0.22	1055	<10	<10	<0.5	33	14.2	5.7	67	<1	3210	25.7	<10	<1	0.02	<10	0.28	13050	<1	0.01	28	10	8400	>10.0	7	3	434	<0.01	<10	<10	5	<10	3460		
MJTK 6 146.6-146.7																																					
MJTK 5 256.7-256.8	0.15	1	1.19	40	10	40	<0.5	7	0.41	<0.5	168	6	5770	38	<10	<1	0.08	10	0.48	2050	1	<0.01	76	160	257	8.76	4	3	10	0.03	<10	<10	18	<10	218		
MJTK 5 358.9-359.0	0.322	1	3.28	19	<10	50	0.6	28	0.63	<0.5	95	39	2160	29.6	10	<1	0.14	10	1.42	1600	1	0.04	55	360	211	7.25	<2	6	26	0.1	<10	<10	58	<10	182		
MJTK 5 466.6-466.7	0.03	0.5	1.27	7	<10	90	<0.5	5	0.64	<0.5	228	20	2020	25.5	<10	<1	0.29	10	0.45	637	1	0.01	219	280	70	7.57	2	4	11	0.08	<10	<10	24	<10	106		

(2) Polished section

The result of observation of Polished sections shown in Table II-3-6. Result of microscopic observation of polish section of above mentioned SP-1 - SP-16.

Table II-3-6 Result of microscopic observation of polish section

NO.	DRILLING NO.	Depth (m)	MINERALS											Remarks
			Chalcopyrite	Pyrite	Marcasite	Galena	Sphalerite	Electrum	Pyrrhotite	Rutile	Arsenopyrite	Carbonate	Quartz	
1	MJTK-3	62.70	・			△	△		○	△		◎		Veinlet-network
2	MJTK-3	76.30	・	・	・	△	○	・	○		◎	◎		Network
3	MJTK-3	80.30	○	・		△	△		◎		△	◎		Veinlet, dissemination.
4	MJTK-3	99.50	△	△		・	○		◎	△	・	◎		Veinlet, dissemination.
5	MJTK-3	99.60	△	・		△	○		◎		△	◎		Massive
6	MJTK-3	148.20	・	◎	・	・	○		○		△	◎		Veinlet-network
7	MJTK-3	319.20	・	・		△	○		◎		△	◎		Veinlet
8	MJTK-3	340.30	△	・		・	△		◎		△	◎		Massive
9	MJTK-3	340.30		△	△	・	△		◎				◎	
10	MJTK-6	90.70	△	◎	・	・	・		・			◎		Sheared
11	MJTK-6	101.20	・	◎		・	・		・			◎		Banded
12	MJTK-6	125.20	・	◎		・	・		・					Massive
13	MJTK-6	146.60	△	◎		・	・		○		△	◎		Massive
14	MJTK-6	256.70	・	・					◎					Massive, with pelitic fragments
15	MJTK-5	358.90	△	・			・		◎					Banded
16	MJTK-5	466.60	・						◎					Banded?

Legend ◎:Abundant ○:Medium △:Minor ・:Rare

The samples are chosen as homogeneously as possible among each sections.

Pyrrhotite is dominant with sphalerite, galena, chalcopyrite and pyrite. Pyrrhotite seems to be vein-like or network-like, however it can be thin-layered texture.

(3) X-ray diffraction analysis

The result is shown in Table II-3-7. Every sample are altered with sericite and chlorite. And some samples are silicified. Calcite is the main carbonate.

Table II-3-7 Result of mineral determination of X-ray diffraction test

No.	孔名	深度(m)	Silicate Minerals								Carbonate Minerals			Other Minerals			
			Quartz	Plagioclase	Albite	K-feldspar	Smectite	Sericite/Smectite	Sericite	Chlorite	Calcite	Dolomite		Pyrite	Pyrrhotite		Remarks
1	MJTK-3	50.00	16	2		<1			6	7	11						With 3T sericite
2	MJTK-3	100.00	13	2		<1			7	5	8						With 3T sericite
3	MJTK-3	149.30	30			<1			3	1	4			<1	1		With 3T sericite
4	MJTK-3	150.00	25			<1			14	6	<1						With 3T sericite
5	MJTK-3	200.00	23	3		<1			6	10				<1			With 3T sericite
6	MJTK-3	250.00	16	2		<1			13	15	<1			<1			With 3T sericite
7	MJTK-3	300.00	18	2		<1			6	>17	<1			<1			With 3T sericite
8	MJTK-3	350.00	22	3		<1			6	11	<1						With 3T sericite
9	MJTK-3	400.00	17	2		<1			6	9	2						With 3T sericite
10	MJTK-3	450.00	21	2		<1			9	11	4						With 3T sericite
11	MJTK-3	473.70	23						<1					1	2		
12	MJTK-3	500.00	17	2					7	13	1			<1			With 3T sericite
13	MJTK-3	550.00	26	2		<1			9	11	<1			<1			With 3T sericite
14	MJTK-3	600.00	28	2		<1			5	6	5						With 3T sericite
15	MJTK-3	650.00	22	3		<1			4	6	8						With 3T sericite
16	MJTK-3	700.00	32	2		<1			7	7	1						With 3T sericite
17	MJTK-4	50.00	20	2		<1			8	8	7			<1			With 3T sericite
18	MJTK-4	100.45	4	<1		<1			7	8	>17			<1			With 3T sericite
19	MJTK-4	150.00	66	1		<1			5	5	10			<1			With 3T sericite
20	MJTK-4	200.00	22	2		<1			13	12	<1						With 3T sericite
21	MJTK-4	250.00	37	<1		<1			2	2	12						With 3T sericite
22	MJTK-4	300.00	16	2		<1			7	8	9						With 3T sericite
23	MJTK-4	350.00	19	2		<1			12	9							With 3T sericite
24	MJTK-4	379.00	14	<1		<1			3	5	10				1		With 3T sericite
25	MJTK-4	400.00	17	4		<1			14	10	<1			<1			With 3T sericite
26	MJTK-4	450.00	21	2					10	>17	<1						With 3T sericite
27	MJTK-4	500.00	50	2		<1			2	4	<1			<1			
28	MJTK-4	514.40	11			<1			6	2	<1	7		4			With 3T sericite. 25.9°(?),38.8°(?)
29	MJTK-4	550.00	41	5					4	5	<1						With 3T sericite
30	MJTK-4	600.00	18	2					6	12				<1			With 3T sericite
31	MJTK-5	150.00	14	4					2	6	2			<1			With 3T sericite
32	MJTK-5	180.20	3	<1					<1	1	<1	5		6			30.6°Dolomite(?)
33	MJTK-5	200.00	17	5					6	2	<1				1?		33.9°Pyrrhotite(?)
34	MJTK-5	250.00	27	2		<1			5	9	<1			<1			With 3T sericite
35	MJTK-5	300.00	35	7					<1	6							
36	MJTK-5	350.00	13	3					5	<1	12						
37	MJTK-5	359.00	13	2		<1			1	8				1			With 3T sericite
38	MJTK-5	400.00	9	8		2			2	5	<1						With 3T sericite
39	MJTK-5	450.00	30						5	7	<1						With 3T sericite
40	MJTK-5	500.00	18	3		<1			6	9	<1						With 3T sericite

(4) measurement of resistivity and chargeability and magnetic susceptibility

The resistivity, chargeability and magnetic susceptibility of the core samples from MJTK-3,4 and 5 were measured. was the sample were immersed in 90 Ω･m resistivity water for 48 hours, and became filled with water. The number of the samples is 21. The resistivity and the chargeability were measured by TDIP method.

The result of the measurement is shown in Table II-3-8. And related figures are shown in Fig.II-3-5 and Fig.II-3-6.

Table II-3-8 Result of measurement of resistivity and chargeability and magnetic susceptibility

Num	S.Num.	Bor. Num.	Depth(m)	Rock name	Resistivity Rho[Ω･m]	Chargeability [mV/V]	Magnetic susceptibility *10^-3 SI
1	1	MJTK-3	50.00	Pelitic-silty schist	9856.1	2.91	0.32
2	2	MJTK-3	150.00	Pelitic-silty schist	614.5	111.07	2.21
3				∗	867.1	5.20	
4	3	MJTK-3	200.00	Pelitic-silty schist	14755.2	0.85	1.10
5					1579.5	3.49	
6	4	MJTK-3	250.00	Pelitic-silty schist	1396.4	282.59	1.10
7				∗	10894.0	32.41	
8	5	MJTK-3	300.00	Pelitic-silty schist	27440.9	2.37	0.97
9				∗	25320.3	1.90	
10	6	MJTK-3	325.00	Pelitic-silty schist	2226.4	39.17	2.44
11	7	MJTK-3	350.00	Pelitic-silty schist	9584.5	18.71	1.40
12	8	MJTK-3	375.00	Pelitic-silty schist	24639.9	6.95	0.88
13	9	MJTK-3	400.30	Pelitic-silty schist	14436.0	2.00	1.34
14	10	MJTK-3	425.10	Pelitic-silty schist	10591.3	1.18	1.48
15	11	MJTK-3	459.45	Pelitic-silty schist	232.1	54.06	2.80
16				∗	223.2	22.80	
17	12	MJTK-3	460.20	Pelitic-silty schist	5991.4	15.41	0.91
18	13	MJTK-4	103.00	Pelitic-silty schist	12290.7	9.19	1.60
19				∗	984.8	15.07	
20	14	MJTK-4	207.40	Pelitic-silty schist	11167.2	27.24	0.71
21				∗	2502.0	16.16	
22	15	MJTK-4	301.90	Pelitic-silty schist	10115.8	8.99	0.19
23				∗	2402.0	8.05	
24	16	MJTK-5	120.30	Tuffaceous schist (calcareous)	151.2	5.64	10.16
25				∗	178.6	3.72	
26	17	MJTK-5	156.00	Pelitic-silty schist	7041.3	10.61	1.08
27				∗	7273.6	7.70	
28	18	MJTK-5	200.00	Pelitic-silty schist	14257.3	1.18	0.58
29	19	MJTK-5	250.00	Pelitic-silty schist	1274.9	29.07	3.32
30	20	MJTK-5	299.90	Pelitic-silty schist	16818.8	4.48	1.02
31	21	MJTK-5	324.50	Pelitic-silty schist	15401.6	2.33	0.54

∗:an isotropic measurement or same position sample

The resistivity is generally high even though the pelitic - silty schist samples from MJTK-3,4 and 5 consist of graphite. The chargeability is higher in the samples that include foil-like sulfide, and the maximum is 280mV/V. However it is changeable with the kind of method. The magnetic susceptibility is high in the calcareous tuff in MJTK-5 (max:10 x 10^{-3} Si unit).

The resistivity inversely correlates with the chargeability in general. And the chargeability slightly correlates with the magnetic susceptibility. Therefore the chargeability is due to pyrrhotite more than graphite.

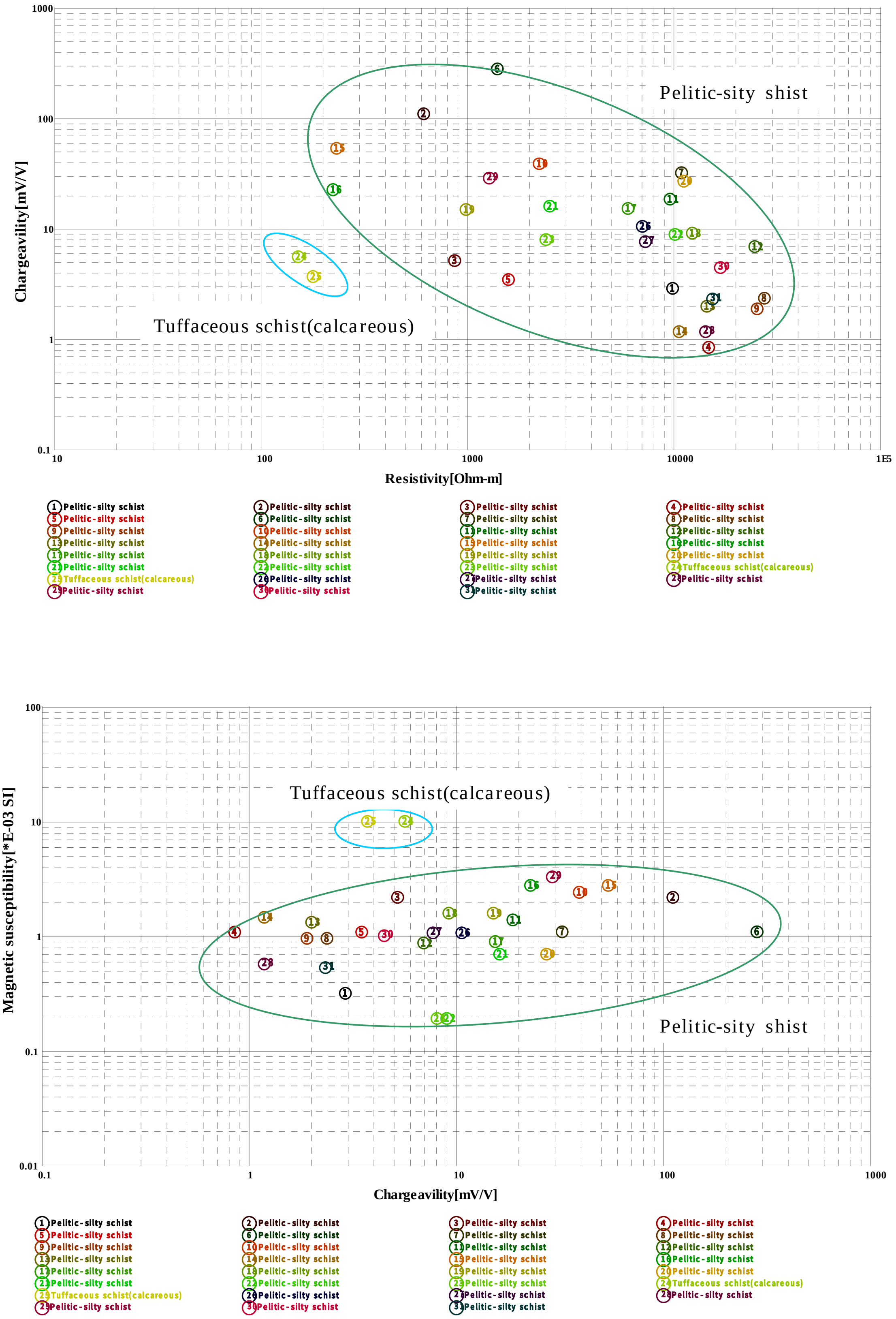


Fig.II-3-6 Chargeability and magnetic susceptibility of rock core

(5) Fluid inclusion（homogenization temperature and Salinity）

The measurement of fluid inclusion was carried out about a sample (MJTK-3, 473.4-473.6m). the result is shown in Table II-3-9.

Most of fluid inclusions are with necking down. And gaseous phase is generally dominant. Homogenization temperature is higher and Salinity is lower than Hajar deposit.

Table II-3-9 The result of measurement of fluid inclusion

Mineral	Shape	Size μm	Homogenization temperature ℃	Melting temperature ℃	Salinity NaCl eq.%
Quartz	Irregular	27	373	-5.2	9.2
Quartz	Irregular	15	341	-4.9	8.7
Quartz	Anhedral-Irregular	45	-	-5.1	9.0
Quartz	Irregular	5	310		
Quartz	Anhedral	5	290		
Quartz	Irregular	12	313		
Quartz	Irregular	6	324	-2.5	4.4
Quartz	Irregular	9	372		
Quartz	Anhedral	12	198	-2.8	5.0

(6) Isotope（S）

The result of measurement of sulfur isotope is shown in Table II-3-10 Result of measurement of S Isotope.

Table II-3-10 Result of measurement of S Isotope

Sample ID	Approx%S	d34S(CDT)
1	26	-1.5
2	45	-1.5
3	38	-0.9
4	51	-0.3
5	41	-1.0
6	42	-2.4
7	35	-0.8
8	40	-0.4
9	40	-2.4
10	30	-0.1
11	54	-0.7
12	35	-0.4
13	51	-0.3
14	29	-3.1
15	34	-4.0
16	31	-2.5

The samples were chosen from homogeneous part as possible, among each 5cm sections.

The values are generally as follows

MJTK-6:-0.1～-0.7‰
MJTK-3: -0.3～-2.4‰
MJTK-5: -2.5～-4.0‰

Sulfur is comparatively heavy in MJTK-6, and light in MJTK-3 and MJTK-5.

The sulfur isotope ratio of sulfide in massive sulfide deposits is heavier near the hydrothermal deposit originated from volcanic rocks, and is lighter at distant place (JICA/MMAJ, 2002).

Therefore MJTK-6 is probably closer to a hydrothermal deposit originated from volcanic rocks than MJTK-3. MJTK-3 may be farther from it, and may contain more sedimentary (probably biological) sulfur isotope. These values are similar to Hajar deposit.

3-5　Discussions

MJTK-3,4,5 and 6 captured many concentrations of pyrrhotite and calcite with Sphalerite, chalcopyrite, arsenopyrite, and galena.

The magnetic anomaly around MJTK-5（Khefawna-N district）is due to pyrrhotite in such a mineralization zone.

The magnetic anomalies around MJTK-3,4 and 6 are also probably due to such zones in Azzouz district.

The concentration of pyrrhotite seems to affect the distribution of resistivity and chargeability more than graphite in the survey area.

Chapter 4 Integrated Interpretation

4-1 Survey result

1) Airborne magnetic and ground magnetic survey

The result of the airborne magnetic survey and ground magnetic survey previously performed by BRPM has revealed that the anomalies in the Hbibi, Harch, Maouch, Khefawna, and Talzelt districts are of relatively monotonous magnetic variation, but the anomaly in the Azzouz district is of complicated variation.

In the Azzouz district, a tectonic line presumably exists in the northern a eastern district where great magnetic variation is seen.

No direct relation between the magnetic anomalies and mineralized zones has been found in the previously performed ground magnetic analysis.

2) Resistivity

The resistivity for the young sediments distributed the whole area of the districts is presumably lower than 50 Ω・m. The sediments generally shows a horizontal stratiform structure, based on the resistivity structure analysis, and that of the Hbibi, Harch, Maouch, Khefawna, and Talzelt districts is more than 150 meters in thickness, and That of the Azzouz district is presumably thicker in the eastern part.

Other low resistivity structures, lower than 50 Ω・m, in the Azzouz are recognized in the northern district around the survey lines (i,j,k), g(No.7), h(No.10), I(No.13), j(No.16), and k(No.16). The resistivity structure in the northern district is presumably correlated with the tectonic line, probably extending to the depth.

The low resistivity structure in the survey lines g(No.7), h(No.10), I(No.13), j(No.16), and K(no.16) is presumably of a plate shape, extending northeast to southwest and dipping almost vertically to the depth.

3) Chargeability

The chargeability measured is maximum 20 mV/V in the Hbibi, Harch, Maouch, Khefawna, and Talzelt districts, and no anomaly exists here. The chargeability is maximum 78 mV/V in the Azzouz district.

The relatively high chargeability structure is clearly seen around the No.14 of the survey lines j and k at the depth of 50 meters and in the survey lines d to r at the depth of 80 meters, extending northeast to southwest. In deeper part below 110 meters, it tends to show higher value to the depth, and divided by complicated tectonic lines.

4) Metal factor

The low resistivity and high chargeability zone extracted in the area below 110 m level show the maximum value around the survey lines g(No.7), h(No.10), i(No.13), j(No.16), and k(No.16), trending its structure northeast to southwest.

The highest metal factor 1,222 is around seen around the survey line k, points

No.15 and 16. The low resistivity and high chargeability zone is corresponded with a part of the northeast to southwest trending ground magnetic anomaly zone.

4) TEM

The target districts for the TEM survey are the Azzouz and Khefawna.

Azzouz district

In the district, the magnetic field inversion has been observed in the central and southern parts, simultaneously some data indicating some affection of the IP effect has been observed. Based on the result of the one dimensional analysis, it has revealed that the resistivity structure in the district is different in the northern side and southern side of the survey line 1000N. The three continuous layer structure, the medium resistivity layer (around 150 Ω・m), high resistivity layer (1,000 Ω・m), and slightly low resistivity layer (100 Ω・m) from the surface, exists in the northern side. The horizontally discontinuous structure, 200 Ω・m in the northwestern side and 100 Ω・m in the southeastern side, is recognized below 400 meters depth. In the southeastern side of the cross sections 400N and 300N, the low resistivity zone below 50 Ω・m has been analyzed around the level 300 m in altitude. The conductive plate has been analyzed at the point, where the polarity inversion was observed.

Khefawna district

The gentle dome-like high resistivity layer higher than several hundreds Ω・m has been detected by the survey, and its extension to the southeast has been confirmed. The low resistivity layer lower than 50 Ω・m broadly overlies the high resistivity layer. The high resistivity layer is presumably correlated to the syncline folding structure trending east to west, however further investigation is needed to verify the hypothesis.

5) Drilling survey

Mineralization of calcite and pyrrhotite was mainly found at MJTK-3,4,5 and 6. Pyrrhotite is usually along schistosity (foliation).

Pelitic and silty schist is friable with graphite even though the schist is with calcareous and sandy schist.

However, the lithofacies do not change so much, and sometimes alternate with several mm unit. Therefore it is difficult to simply divide the lithofacies by the repetition of same lithofacies.

The schistosity (foliation) sometimes has a different direction from bedding. the schistosity was formed by structural movement metamorphism, and schistosity usually has similar direction to axis of a fold. Therefore bedding is often different to schistosity near anticline or syncline.

Pyrrhotite was metamorphosed from pyrite, however it is often along foliation. Metamorphism was not at a time.

Pyrite was formed more than twice, and the latter mineralization was much weaker.

In other words, most pyrite were brought by early mineralization. The earlier mineralization is with sphalerite, and a considerable part of pyrite changed to pyrrhotite through metamorphism.

The resistivity inversely correlates with the chargeability in general. And the chargeability slightly correlates with the magnetic susceptibility. Therefore the chargeability is due to pyrrhotite more than graphite.

Pyrrhotite concentrate at 360m depth in MJTK-5 and this mineralization zone probably form the magnetic anomaly. The chargeability may be due to pyrrhotite even around other drilling holes. It is likely that there are a wide pyrrhotite zone around MJTK-3,4 and 6. Pyrrhotite is dominant with sphalerite, galena, chalcopyrite and pyrite in microscope. It can be regarded not only as vein-like and network-like but also as thin layered type. The ratio of sulfur isotope is similar to Hajar mine. Probably, MJTK-6 is near a volcanic hydrothermal ore deposit, and MJTK-3 is affected by biological isotope circulation.

4-2 Summary

Azzouz district

The IP anomaly, low resistivity and high chargeability, shows the highest value around the survey lines g(No.7), h(No.10), i(No.13), j(No.16), and k(No.16), trending northeast to southwest. The magnetic field inversion is observed by the TEM survey around in this area, furthermore, the data reflecting the IP effect is also seen. In the plate model analysis, the conductive plate is analyzed in the point where the magnetic field inversion is observed.

The conductive plate is situated in the central district 090N050E, southern district 040N055E and 030N060E. The plate is apparently surrounded by the IP anomaly zone. Figure II-4-1 shows the summary of the ground magnetic, IP, and TEM anomaly zones.

The trend of the detected IP anomaly zone, the direction of the conductivity zone, and some part of magnetic anomaly distribute concordantly. The existence of some complicated tectonic lines have presumed in the analyzed resistivity and chargeability structure that distribute deep underground.

Khefawna district

The resistivity structure obtained by the IP and TEM surveys is the gentle dome-like structure in the deep part of the central district. The TEM survey has revealed the southeast extension of the resistivity structure to the depth. It is thought that the magnetic anomaly is related with the high resistivity structure. The high resistivity layer is supposed to be the anticline holding structure extending east to west, however further investigation is necessary to verify it.

The low resistivity layer lower than 50 Ω・m broadly overlies the high resistivity layer.

The known existing ore deposits in the surrounding area of the districts are mainly composed of pyrrhotite, chalcopyrite, arsenopyrite, and accompanied, therefore both the high magnetism and the low resistivity-high chargeability should be considered for the prospecting.

The magnetic anomaly, IP anomaly, and TEM anomaly zones exist concordantly each other, therefore it is hard to think that graphite is associated with the IP and TEM anomalies. However, the existence of graphite is not negligible due to the surrounding geological environment.

It is necessary to perform a drilling program to verify the geological setting in the area around the IP and TEM anomaly zone.

Drilling survey

Sulfide concentrations that contain pyrrhotite, calcite, sphalerite, chalcopyrite and galena are observed in the rock cores. They are vein-like or secondary sediment like ore deposits in the surrounding area.

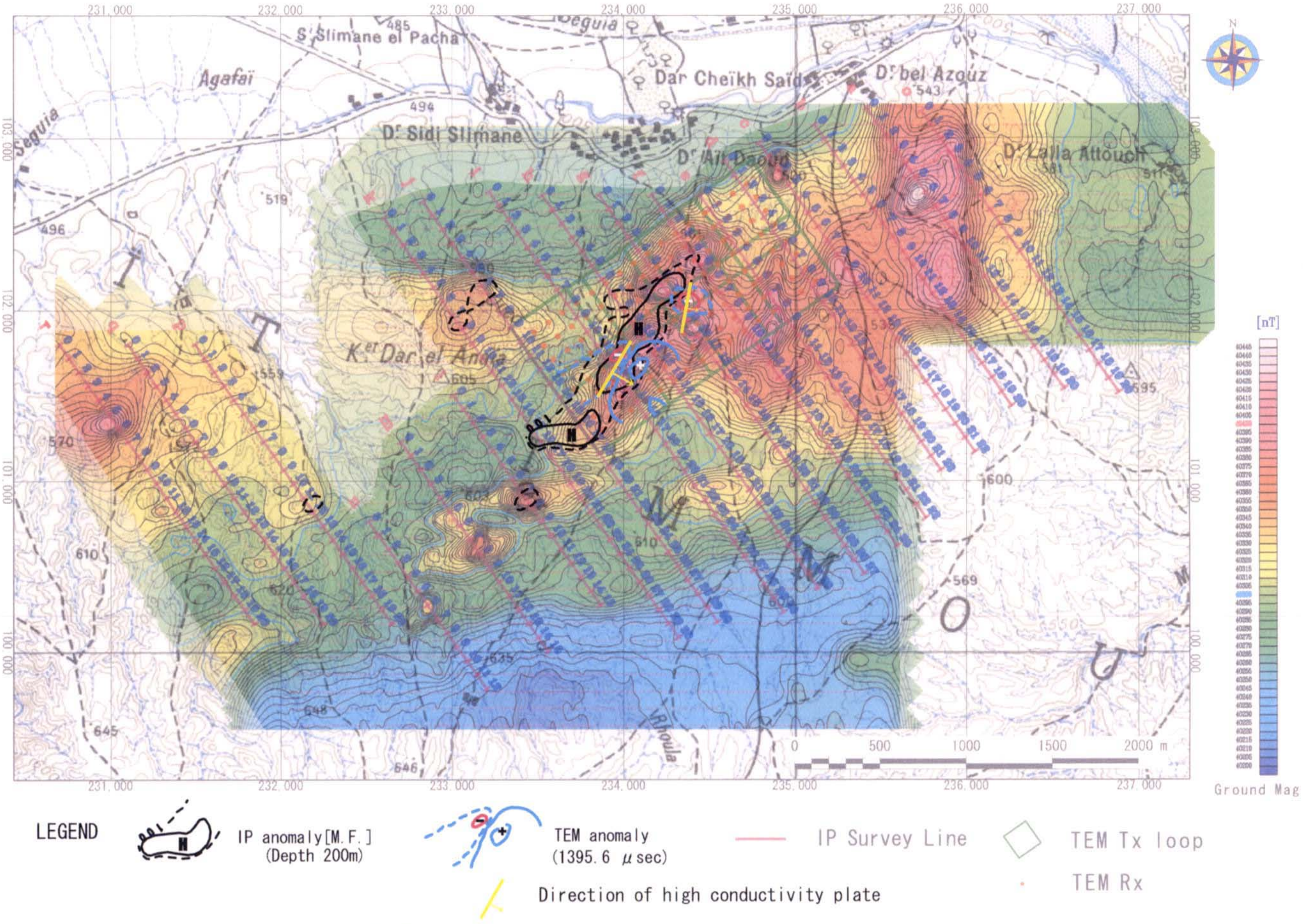


Fig.II-3-1 Integrated analysis map

Part III　Conclusion and Recommendation

Chapter 1 Conclusion

1-1 Geophysical survey

The distributions of the shallow stratigraphic formation and magnetic rocks near the surface have been revealed by the first year's airborne magnetic and electromagnetic surveys.

The second and third year's programs have aimed to chose potential zones for strongly magnetic ores such as pyrrhotite ore within the airborne magnetic anomaly zones. Furthermore, the electric prospecting IP method has been applied for the magnetic anomaly zones detected by the detailed ground survey, then the resistivity and chargeability structures have been made clear, and low resistivity-high chargeability IP anomaly zones have been extracted. The electromagnetic prospecting TEM method has been successfully applied for the IP anomaly zones to clarify their conductivity, to narrow down anomaly zones, and to make clear their forms. The TEM method has been able to clarify the deep sitting low resistivity structure by the adoption of the adequate loop.

In the Azzouz district, a conductivity anomaly zone has been detected in the IP anomaly zone by the TEM survey, and the distribution of these anomaly zones are duplicated in the same part. The IP anomaly zone is coincident with a part of the magnetic anomaly zone detected by the ground survey, continuously extending northeast to southwest.

Azzouz district

The IP anomaly, low resistivity and high chargeability, shows the highest value around the survey lines such as g(No.7), h(No.10), i(No.13), j(No.16), and k(No.16), trending northeast to southwest. The magnetic field inversion is observed by the TEM survey in this area, furthermore, the data reflecting the IP effect is also seen. In the plate model analysis, the conductive plate is analyzed in the point where the magnetic field inversion is observed.

The conductive plate is situate in the central district 090N050E, southern district 040N055E and 030N060E. The plate is apparently surrounded by the IP anomaly zone.

The trend of the detected IP anomaly zone, the direction of the conductivity zone, and some part of magnetic anomaly distribute concordantly. The existence of some complicated tectonic lines have presumed in the analyzed resistivity and chargeability structure that distribute deep underground.

Khefawna district

The resistivity structure obtained by the IP and TEM surveys is the gentle dome-like structure in the deep part of the central district. The TEM survey has revealed the southeast extension of the resistivity structure to the depth. It is thought that the magnetic anomaly is related with the high resistivity structure. The high resistivity layer is supposed to be the anticline holding structure extending east to west, however further investigation is necessary to verify it.

The low resistivity layer lower than 50 Ω・m broadly overlies the high resistivity layer.

The known existing ore deposits in the surrounding area of the districts are mainly composed of pyrrhotite, chalcopyrite, arsenopyrite, and accompanied, therefore both the high magnetism and the low resistivity/high charge rate should be considered for the prospecting.

The magnetic anomaly, IP anomaly, and TEM anomaly zones exist concordantly each other, therefore it is hard to think that graphite is associated with the IP and TEM anomalies. However, the existence of graphite is not negligible due to the surrounding geological environment.

It is necessary to perform a drilling program to verify the geological setting in the area around the IP and TEM anomaly zone.

1-2 Drilling Survey

(1) Drilling points

Judging from the various geophysical prospecting results, the geological structure and the status of the mineralized zones in the Azzouz and Khefawna districts would be as follows.

In the Azzouz district, it is possible that pyrrhotite rich massive sulfide ore bodies exist underneath the anomaly zones of the high chargeability parts of the electric prospecting IP method, the high conductivity parts of the electromagnetic prospecting TEM method, and magnetic anomaly zone. If it is of the kuroko type, acidic volcanic rocks such as rhyolite could be the foot wall side of those ores (Figure I-5-1 Concepts).

In the Khefawna-N district, some indications for metallic mineral potential has been obtained, however no magnetic body was found in the past drill hole HE1 conducted by BRPM. No evidence has been found telling the cause of the magnetic anomaly. There is some limitation for depth of prospecting ability because of the covered thick young sediments, therefore the potential for massive sulfide ores in the deep part is not negligible.

The intensity and scale of the IP anomalies and the high conductivity of the TEM method in the Azzouz district exceeds those of small scale dissemination.

Therefore, it is indicated that there is some potential for sulfide ores in the district. Several drill holes program is recommended to confirm the potential.

From the above mentioned reason, the following drilling survey was carried out

Table III-2-1 The scheme of the drilling

District	Hole	Drilling length	Dipping	Direction	Target
Azzouz	MJTK-3	701.0m	-70 deg	325 deg	Mg., H- cond. H.C.R
	MJTK-4	601.2m	-55 deg	325 deg	Mg., H-cond. H.C.R
	MJTK-6	301.9m	-70 deg	325 deg	Mg., H.C.R
Khefawna	MJTK-5	502.1m	-70 deg	270 deg	Mg

Whereas Mg: magnetic anomaly
H-cond: high conductivity
H.C.R: high charge rate

MJTK-3 and MJTK-4 are to confirm the potential zones of highly concentrated pyrrhotite because of high conductivity, and high charge rate, accompanied with magnetic anomaly.

MJTK-5 is to confirm the potential zone for pyrrhotite rich ores interpreted by BRPM.

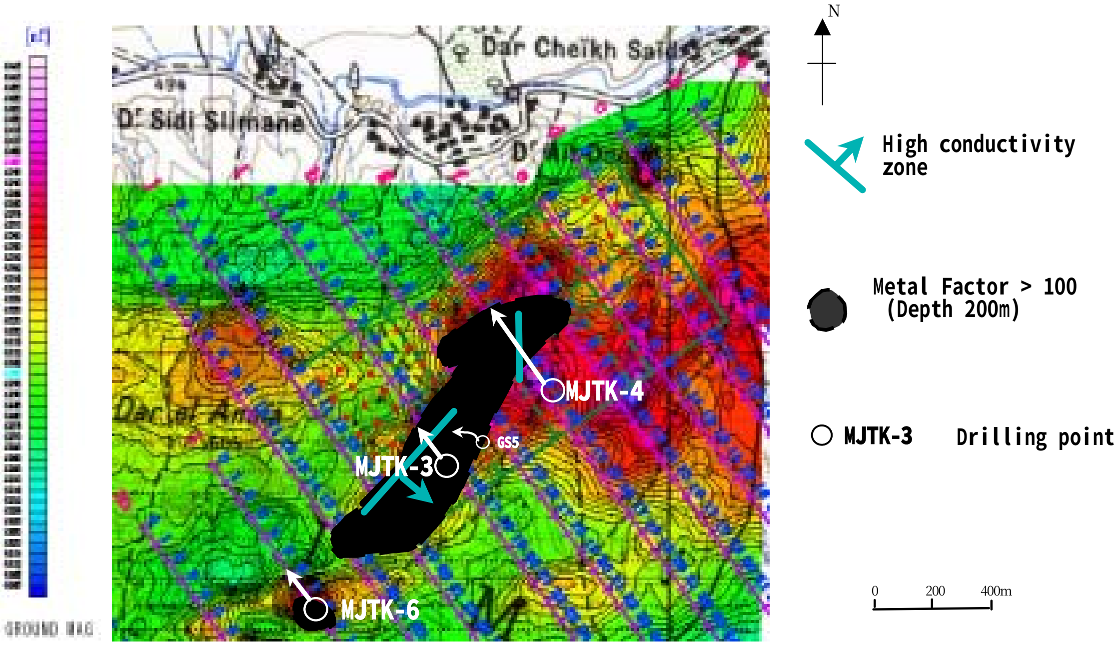


Fig.III-2-1 Concepts of MJTK-3 and MJTK-4 (Azzouz)

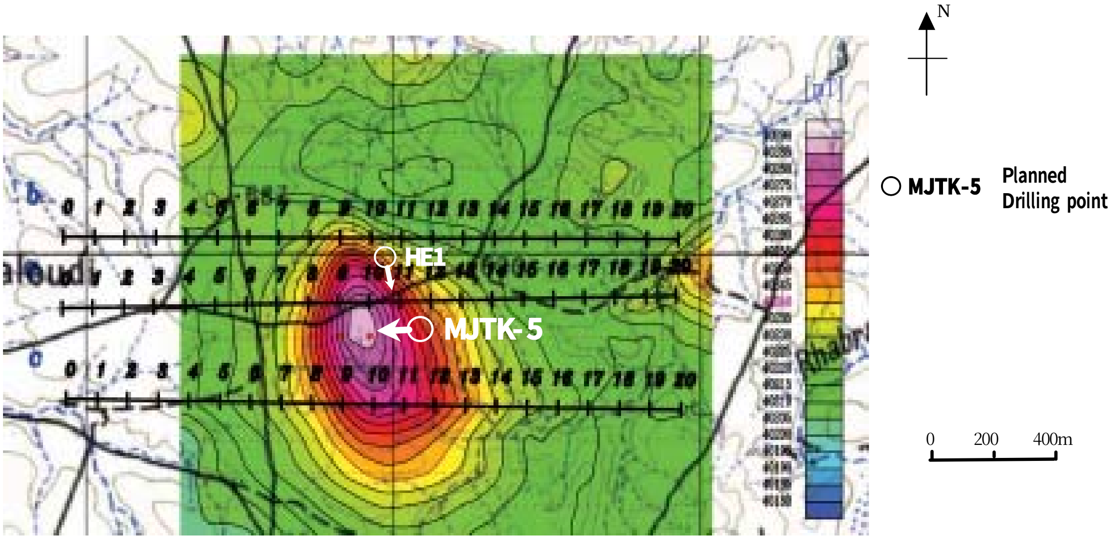


Fig.III-2-2 Concepts of MJTK-5 (Khefawna)

(2) Result

Metamorphic sedimentary rocks are distributed over the surface and in the drilling cores. The sedimentary rocks are mainly pelitic - silty, partly sandy and also calcareous. They are alternated with several mm unit layers and repeated.

The schistosity (foliation) sometimes has a different direction from bedding. the schistosity was formed by structural movement metamorphism, and schistosity usually has similar direction to axis of a fold. Therefore bedding is often different to schistosity near anticline or syncline.

As a result of drilling survey, sulfide concentration that mainly consist of pyrrhotite, calcite, sphalerite, chalcopyrite and galena was found in sedimentary rocks (pelitic – silty schist. The ore minerals may be secondary sediments or vein-like. Although they are similar to surrounding ore deposits, the process of mineralization is not known well even now.

Wedge-shaped and irregular-shaped fragments (heterogeneous; pelitic rock, tuffaceous rock) are in concentrated sulfide.

Sulfide concentrations are linearly distributed or like trailing. And there are many parts where sulfides are observed in thin-layer in turbidite-like mudstone. This situation indicates the re-sedimentation of the host rock and mineralization may several secondary sediments. Sulfide concentrations are apt to be in firm rocks with plane fractures. And some sulfide is along foliation. Some pyrite was metamorphosed to pyrrhotite, as some mineralization preceded metamorphism.

Pyrrhotite is dominant with sphalerite, galena, chalcopyrite and pyrite. Pyrrhotite seems to be vein-like or network-like, however it can be thin-layered texture.

Sulfur isotope ratio in the survey area resembles to Hajar deposit. MJTK-6 is probably closer to a hydrothermal deposit originated from volcanic rocks than MJTK-3 in Azzouz district.

And the resistivity of rock cores inversely correlates with the chargeability in general. And the chargeability correlates with the magnetic susceptibility. Therefore the chargeability is due to the quantity of pyrrhotite. Pyrrhotite concentration around 360m of MHTK-5 is regarded as the cause of the regional magnetic anomaly. Other mineralization zones probably occur IP anomalies. Low resistivity zone in deeper part of MJTK-3 is due to the sequence of sheared zones.

Therefore the characters of mineralization in MJTK-3,4,5 and 6 can be summarized as follows.

1. Mineralization zones dominant in pelitic – silty schist consist of second sedimentary or vein-like sequence of concentrated sulfide of pyrrhotite, calcite, sphalerite, chalcopyrite and galena

2. Alterations of the host rocks indicate that the rocks are hanging wall and surrounding parts.

3. Sulfur isotope ratio indicates the possibility hydrothermal activity originated from Volcanism. And blind volcanic massive sulfide deposits may be near this survey area.

4. Magnetic, resistivity and chargeability anomalies mean the concentration of sulfide and mineralization zones.

Chapter 2　Recommendation for the future

It is difficult to distinguish the main ore deposit and surrounding sulfide concentration only by magnetic anomalies. The existence of the volcanic rocks as the footwall may indicate main ore body, therefore it is necessary to know the underground structure by gravity survey. And the method of sulfide isotope is effective to consider the drilling survey method of the part under the Cenozoic sediments.

Isotope ratio indicates some past hydrothermal activity with volcanism in Azzouz area (MJTK-6). Some magnetic anomalies distribute even in west area from the Azzouz area, therefore the gravity survey in the expanded area may indicate volcanic rocks as the footwall of volcanic massive sulfide deposit.

The magnetic anomaly in Khefawna area is not large and the pyrrhotite concentration in MJTK-5 can be regarded as the cause of the anomaly. Therefore Khefawna area can hardly have any more promising part.

Reference

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Figure and Table

Figures

Tables

Appendix

IP Survey Line Data

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    700.00     369.00     7 234091.39    113169.95
    800.00     365.00     8 234170.31    113231.38
    900.00     387.00     9 234249.22    113292.80
   1000.00     384.00    10 234328.14    113354.22
   1100.00     383.00    11 234407.05    113415.64
   1200.00     383.00    12 234485.97    113477.06
   1300.00     383.00    13 234564.87    113538.48
   1400.00     383.00    14 234643.80    113599.90
   1500.00     383.00    15 234722.70    113661.32
   1500.00     383.00    15 234722.70    113661.32
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    200.00     649.00     2 234532.00    93355.16
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    800.00     643.00     8 235131.98    93358.62
    900.00     637.00     9 235231.98    93359.20
   1000.00     633.00    10 235331.98    93359.78
   1100.00     626.00    11 235431.98    93360.36
   1200.00     624.00    12 235531.98    93360.94
   1300.00     614.00    13 235631.98    93361.52
   1400.00     628.00    14 235731.98    93362.09
   1500.00     604.00    15 235831.97    93362.67
   1600.00     593.00    16 235931.97    93363.25
   1700.00     607.00    17 236031.97    93363.83
   1800.00     611.00    18 236131.97    93364.41
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   2000.00     606.00    20 236331.97    93365.56
tal   alt_b.dat
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    300.00     652.00     3 234638.98    93138.04
    400.00     653.00     4 234738.98    93139.05
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    700.00     638.00     7 235038.97    93142.09
    800.00     641.00     8 235138.95    93143.11
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   1000.00     639.00    10 235338.95    93145.13
   1100.00     635.00    11 235438.94    93146.15
   1200.00     630.00    12 235538.94    93147.16
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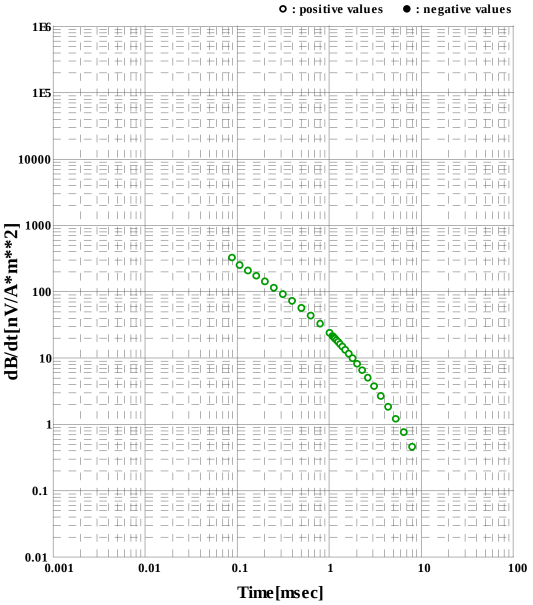
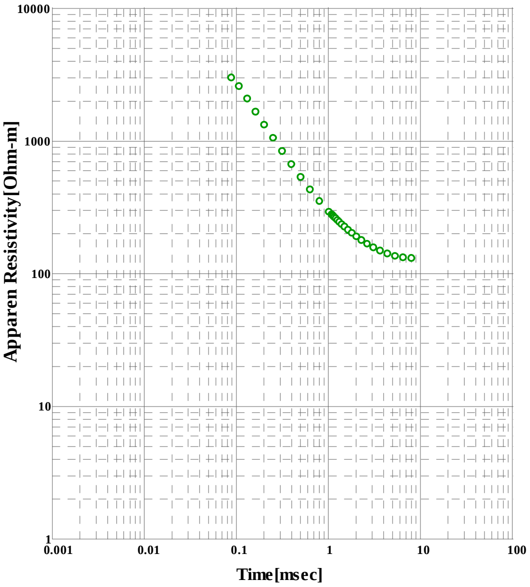
Azzouz Area

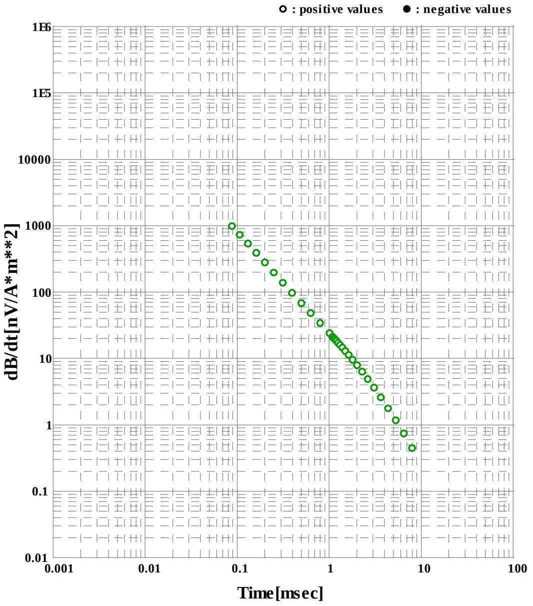
Time-Response
Time-App.Resistivity

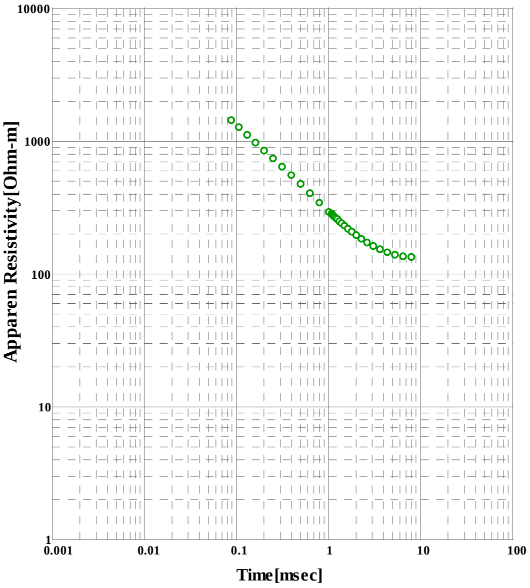
AZZ site : 010N010E [1]



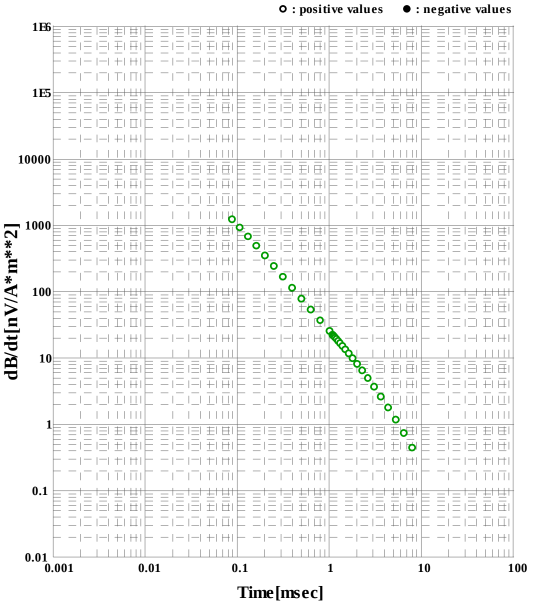


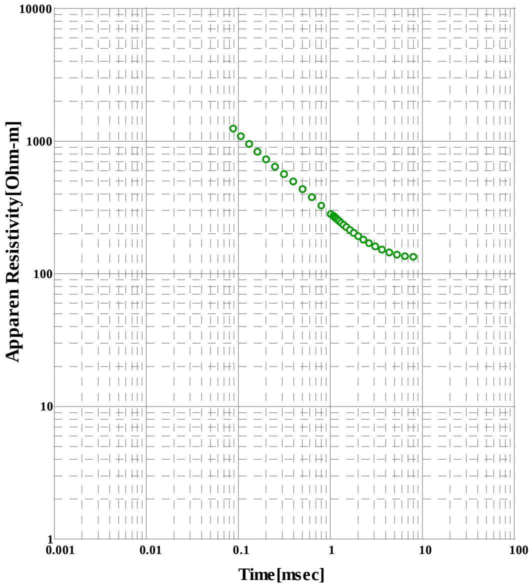
AZZ site : 010N020E [2]



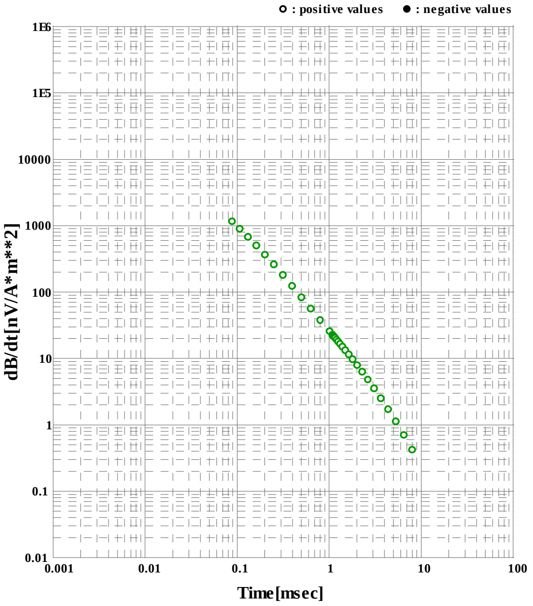


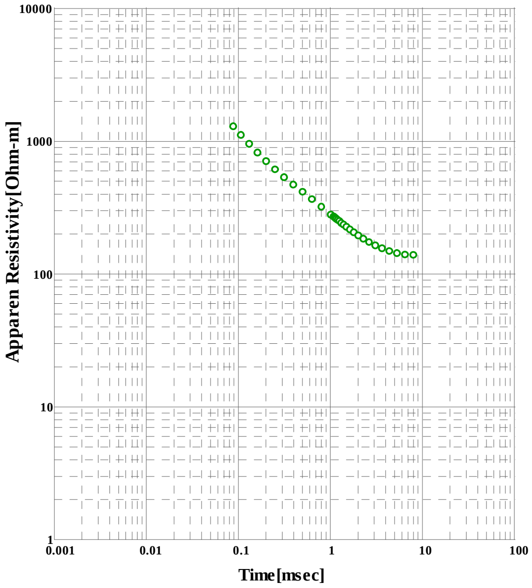
AZZ **site : 010N030E** **[3]**





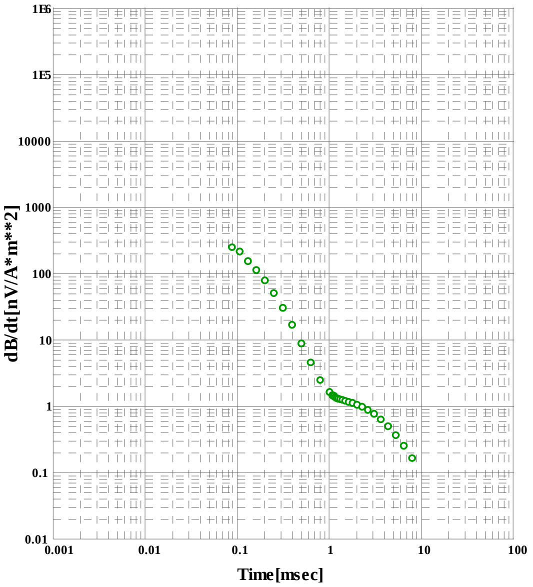
AZZ **site : 010N040E** **[4]**

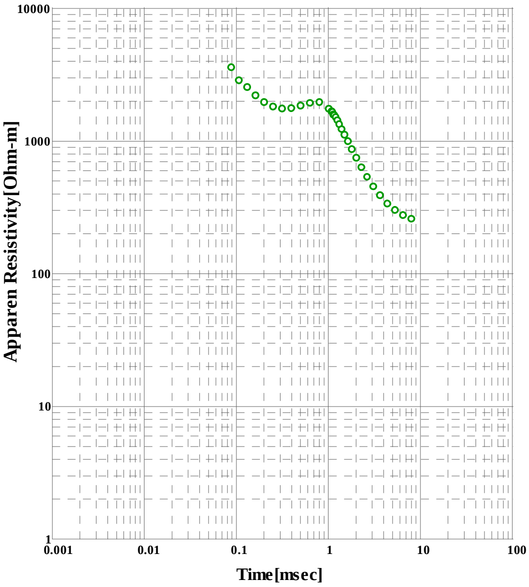




AZZ **site : 010N045E** **[5]**

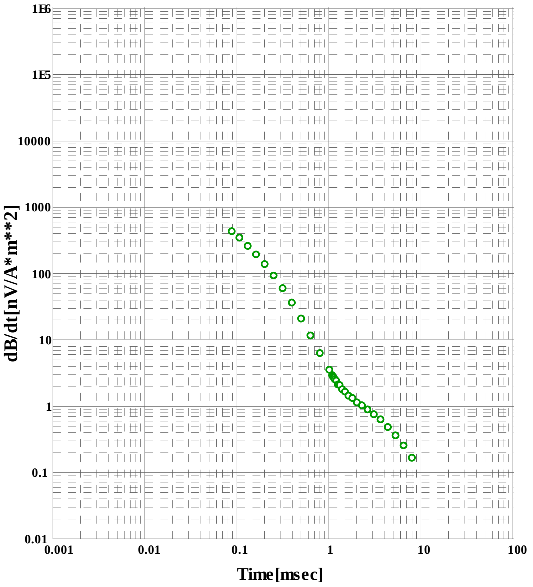
○ : positive values ● : negative values

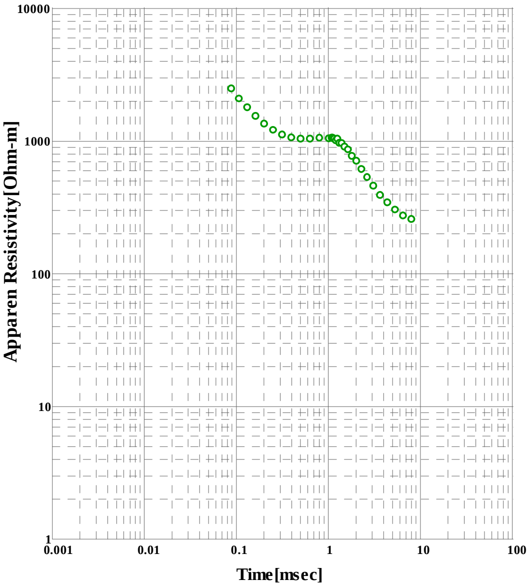




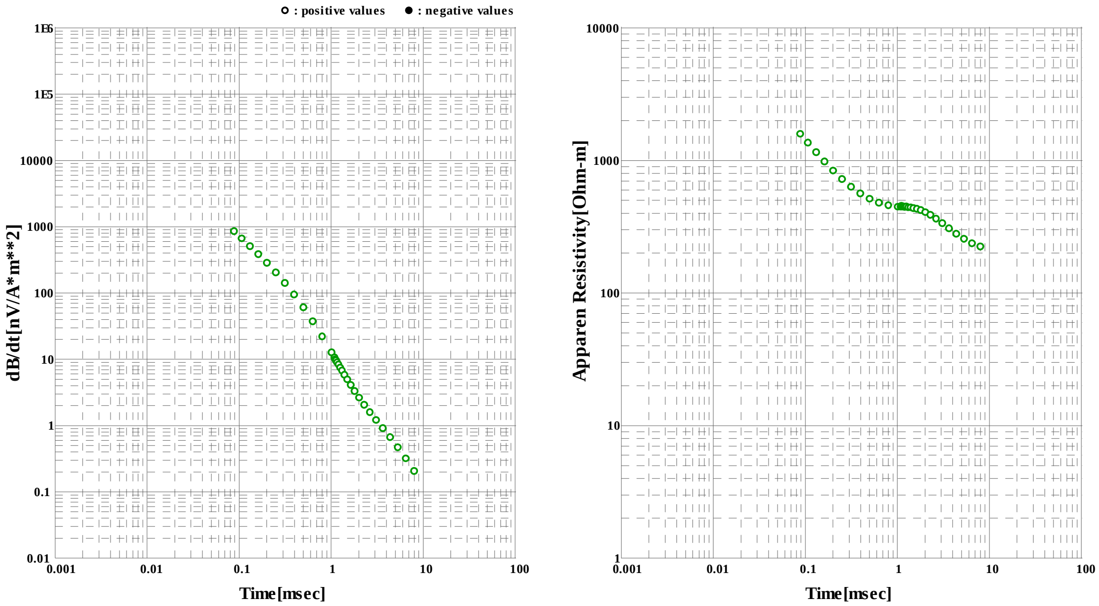
AZZ **site : 010N050E** **[6]**

○ : positive values ● : negative values

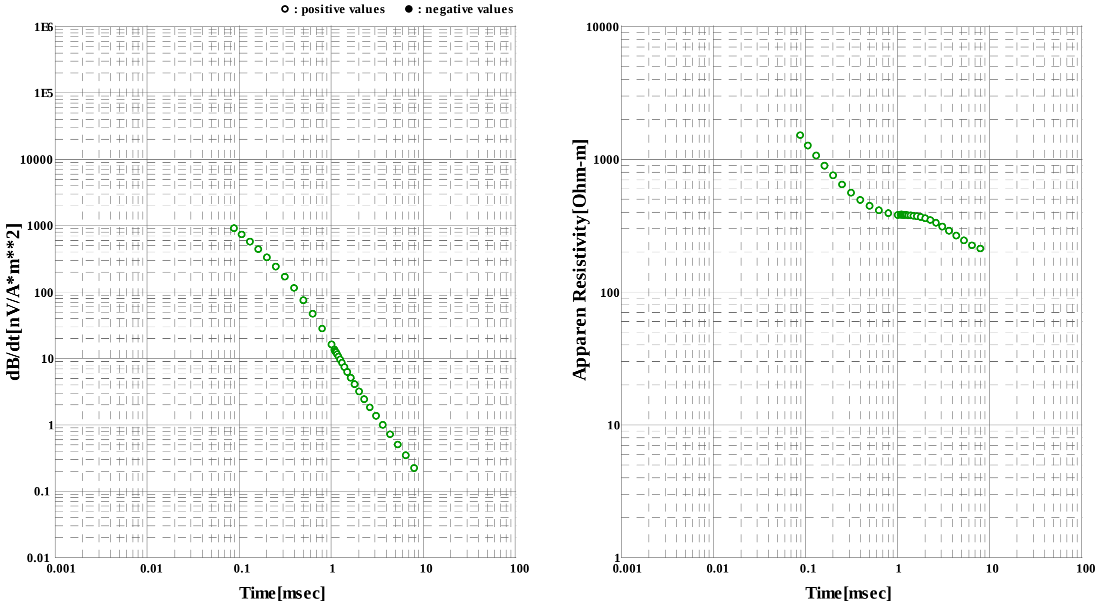




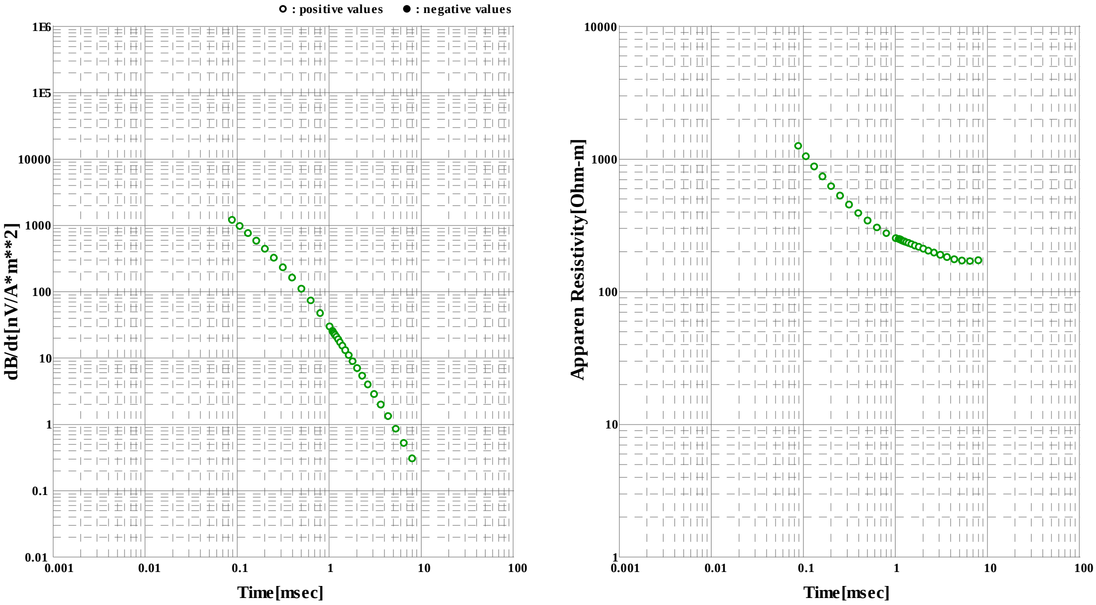
AZZ **site : 010N055E [7]**



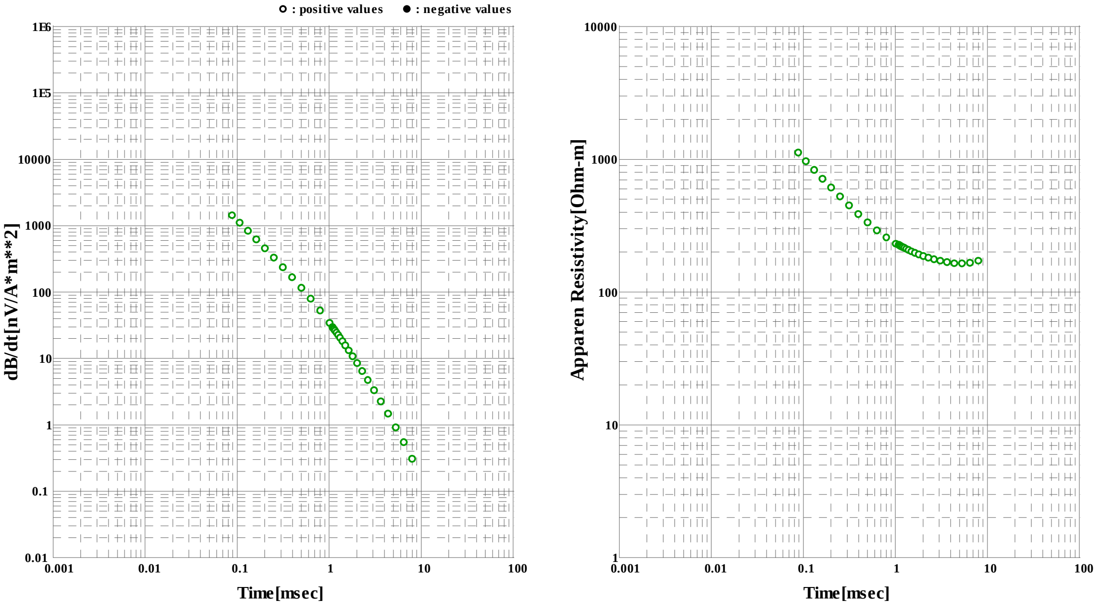
AZZ **site : 010N060E [8]**



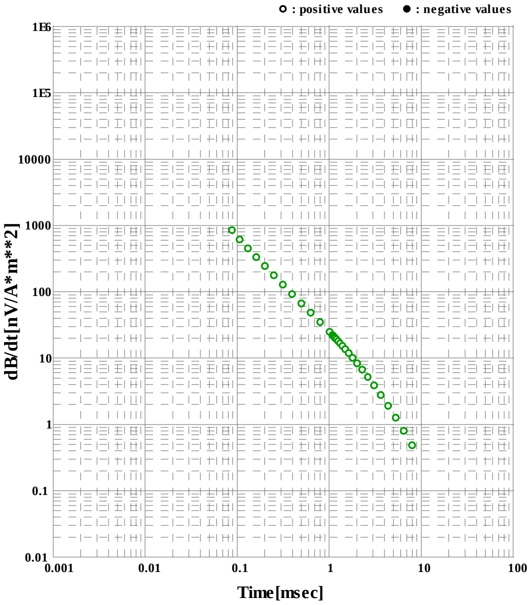
AZZ site : 010N070E [9]

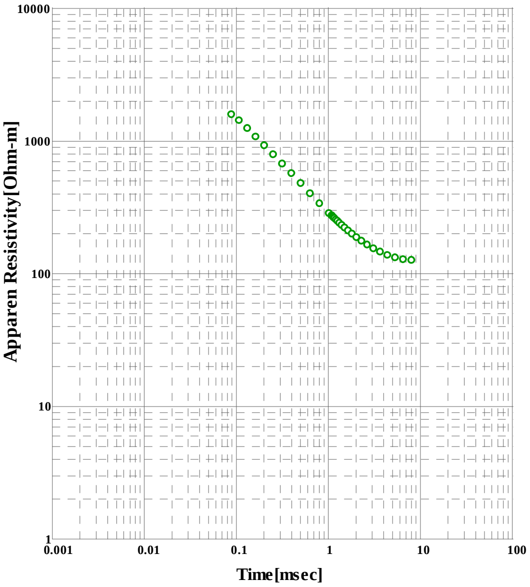


AZZ site : 010N080E [10]

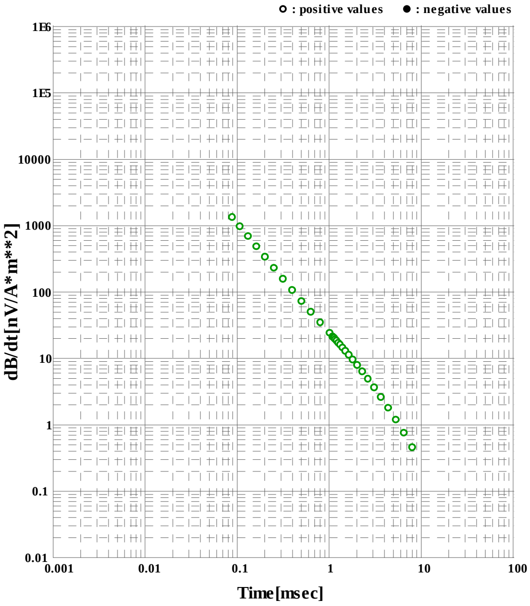


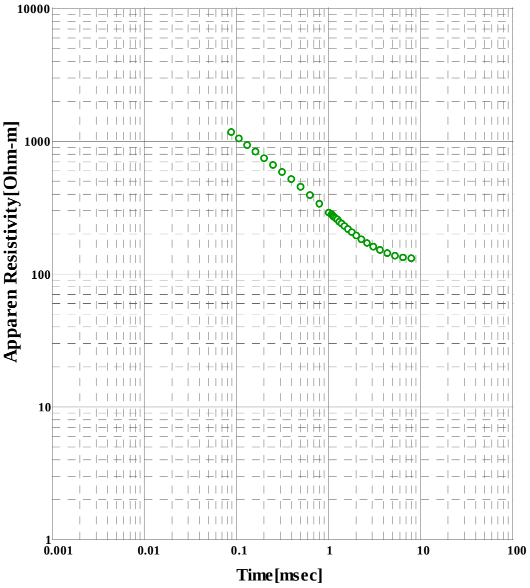
AZZ **site : 020N010E** **[11]**



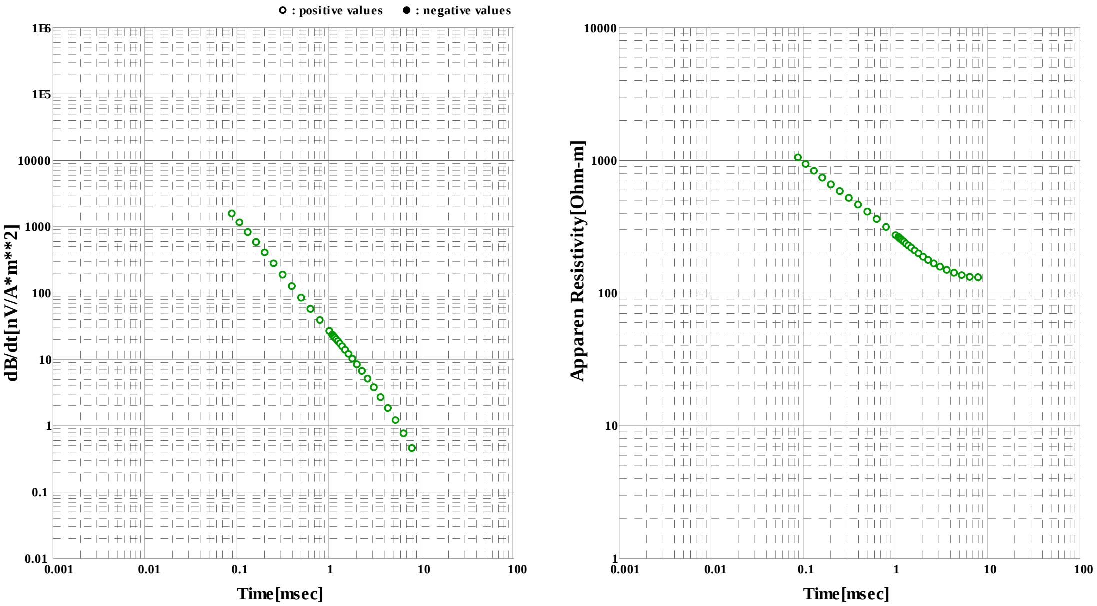


AZZ **site : 020N020E** **[12]**

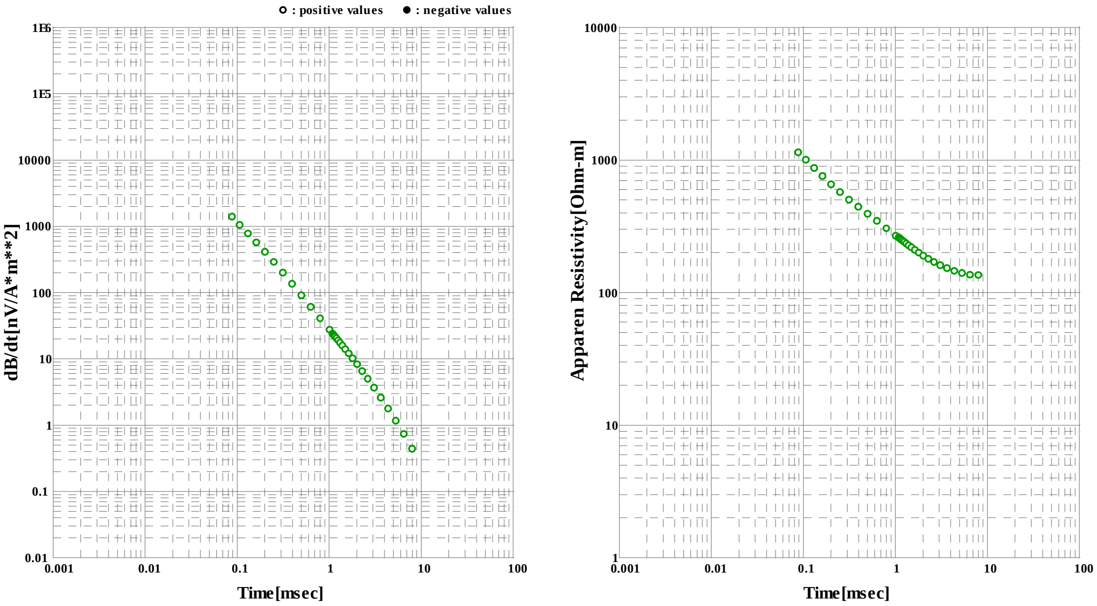




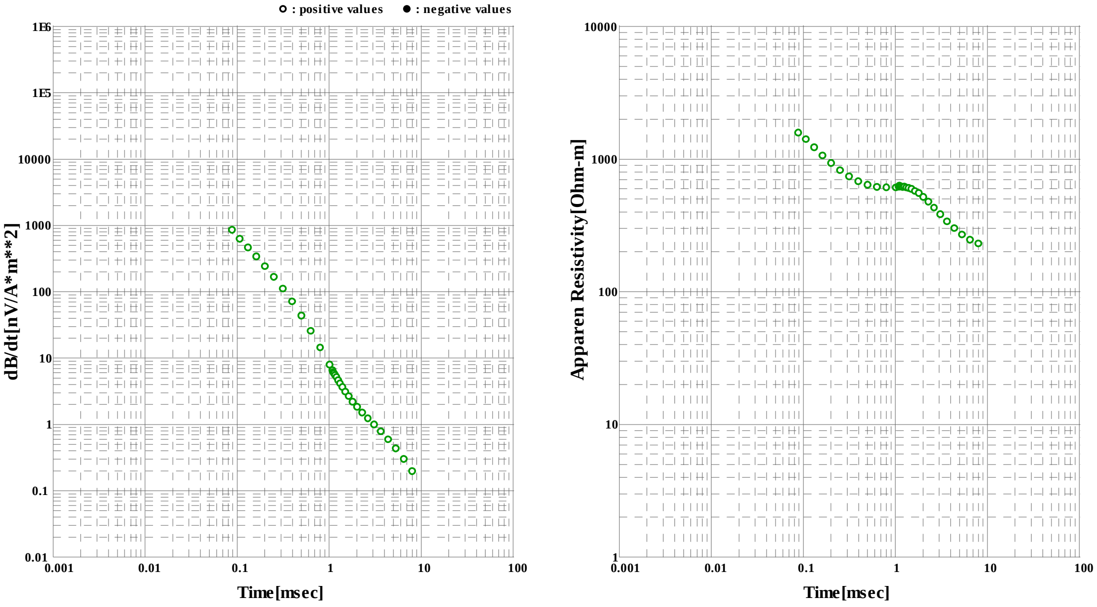
AZZ site : 020N030E [13]



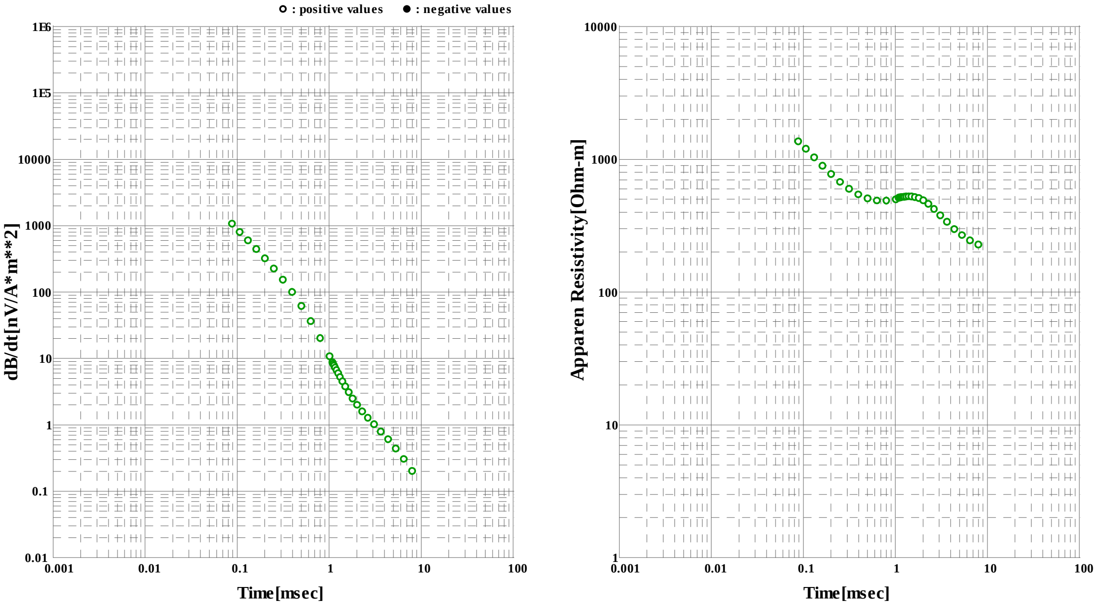
AZZ site : 020N040E [14]



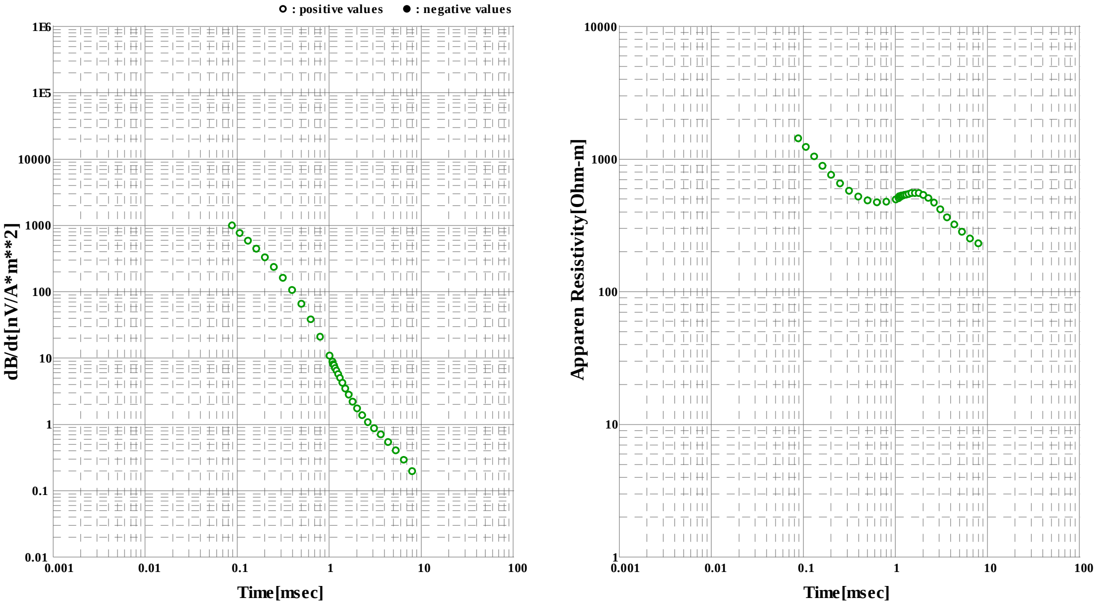
AZZ **site : 020N045E** **[15]**



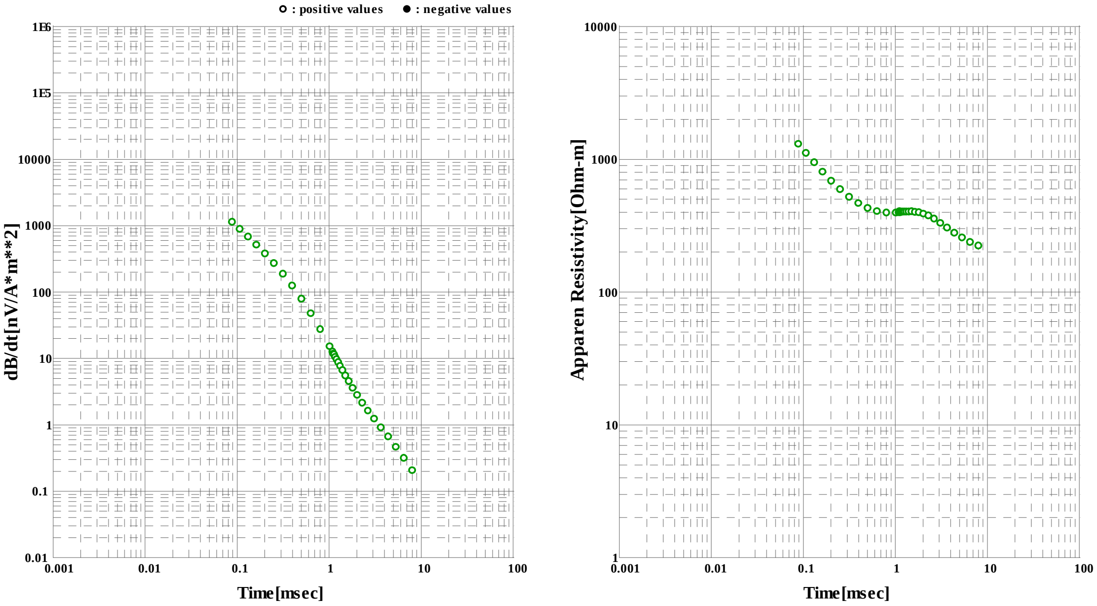
AZZ **site : 020N050E** **[16]**



AZZ site : 020N055E [17]

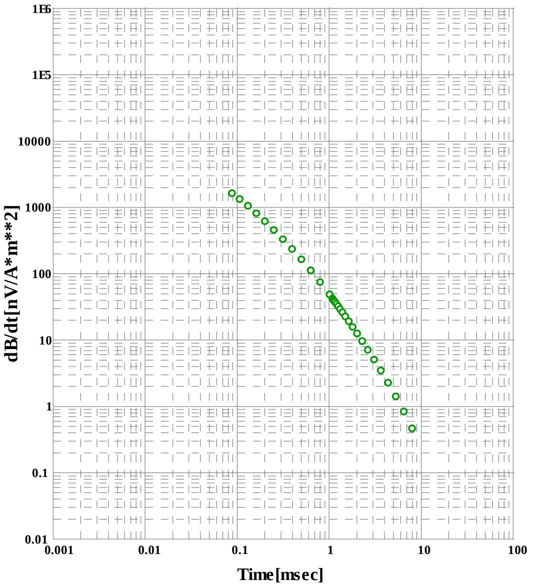


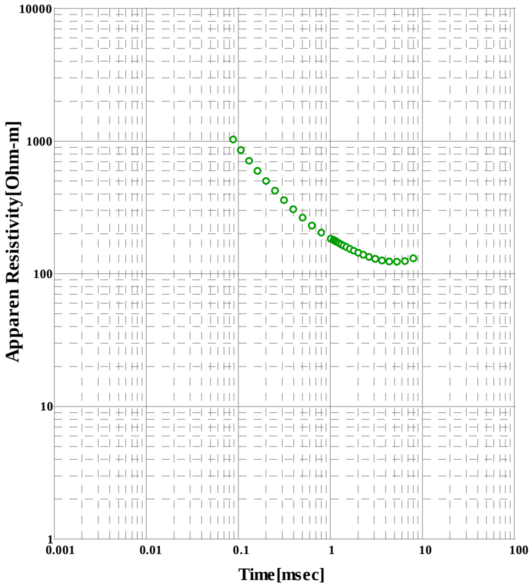
AZZ site : 020N060E [18]



AZZ site : 020N070E [19]

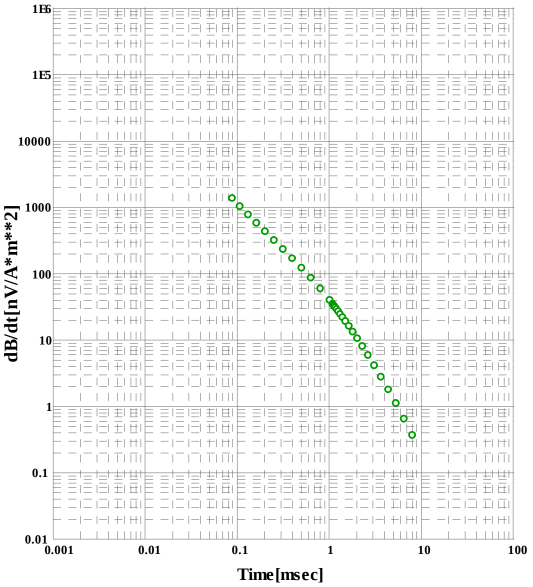
○ : positive values ● : negative values

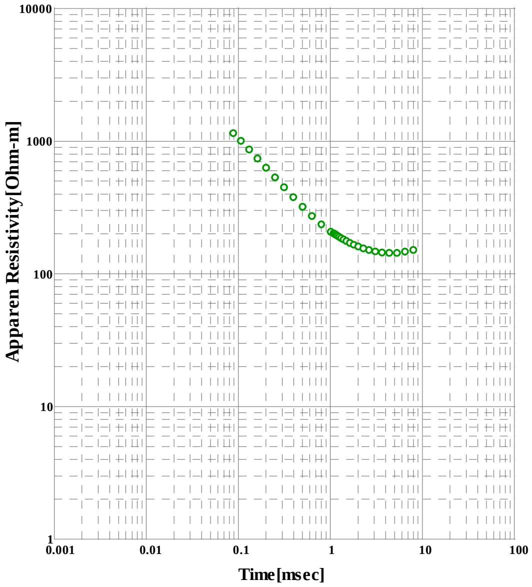




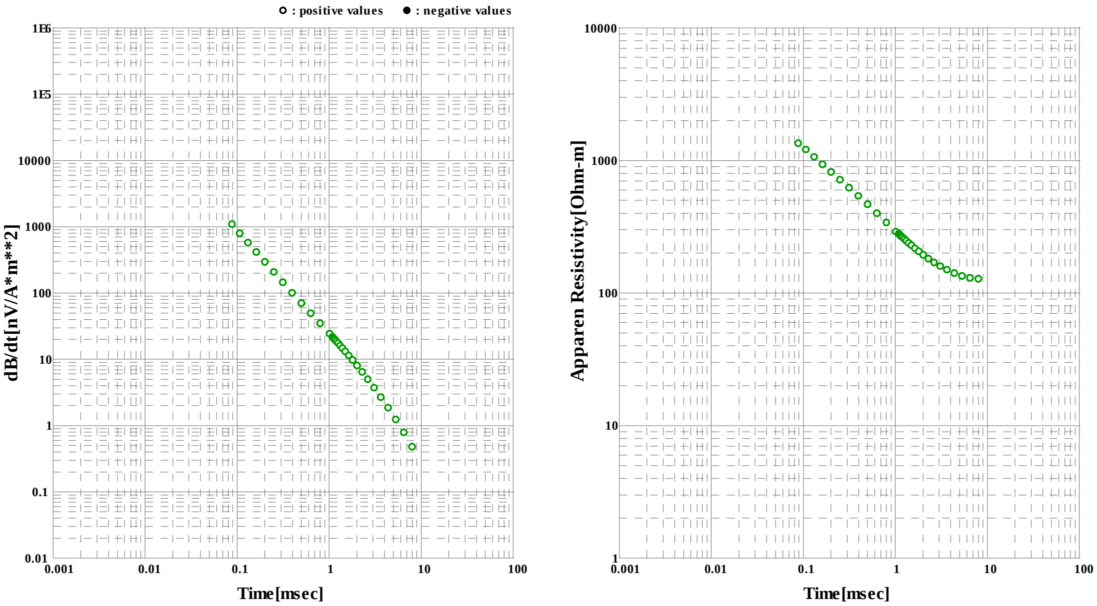
AZZ site : 020N080E [20]

○ : positive values ● : negative values

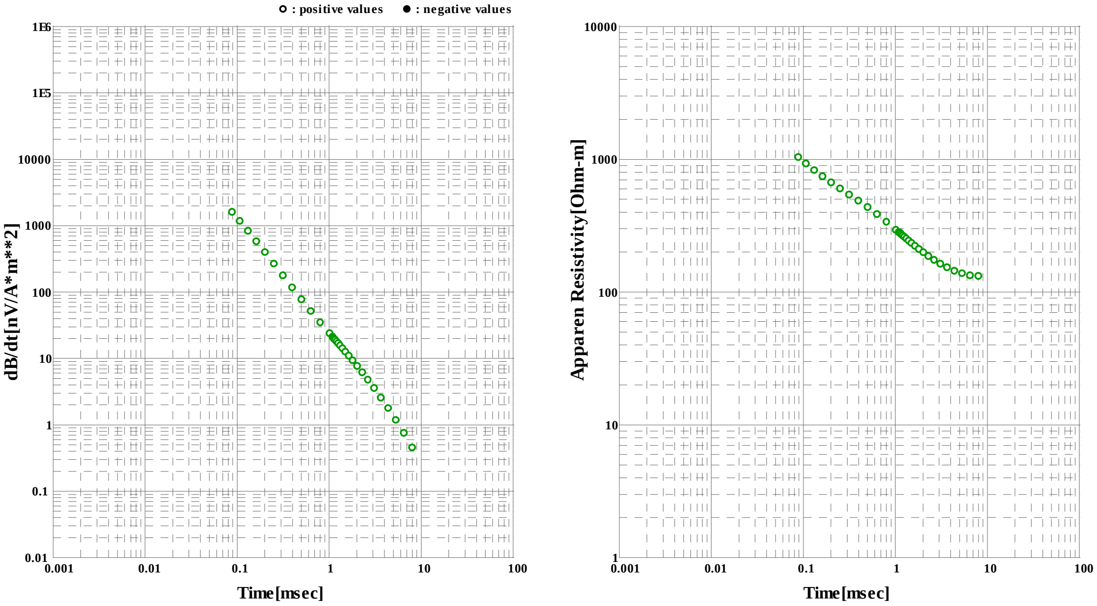




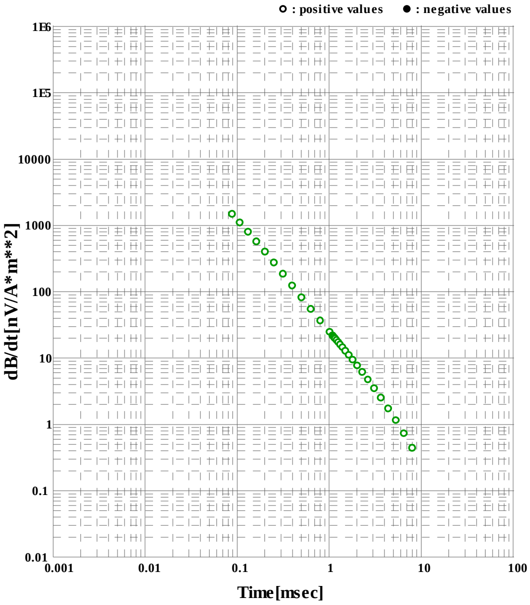
AZZ site : 030N010E [21]

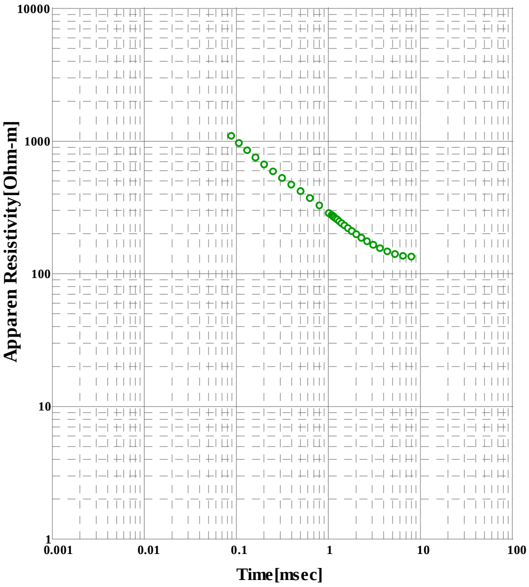


AZZ site : 030N020E [22]

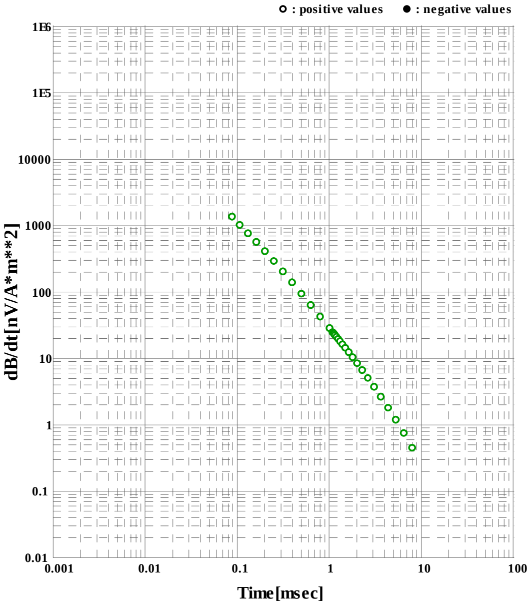


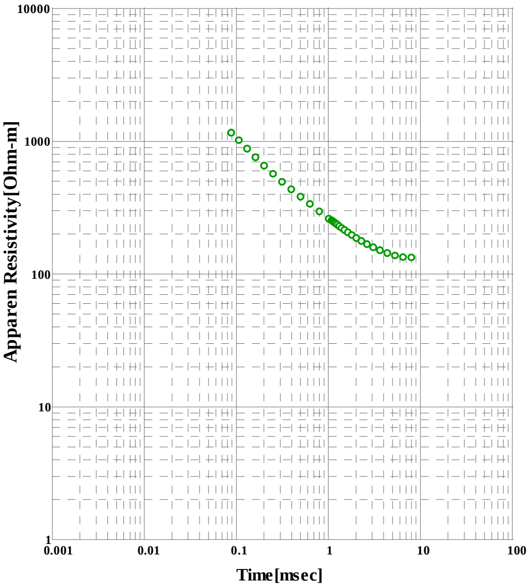
AZZ **site : 030N030E [23]**



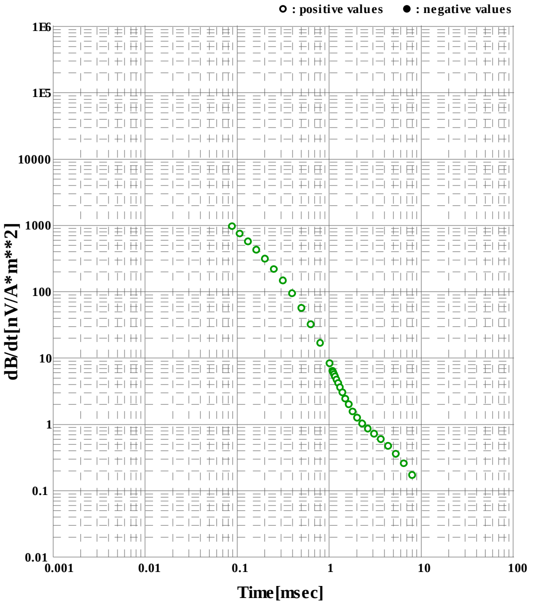


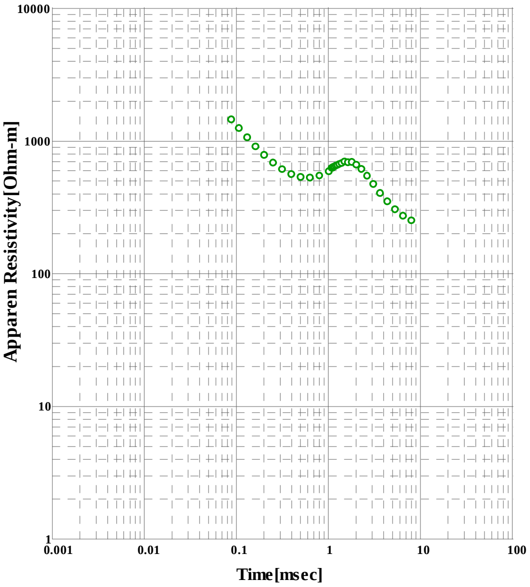
AZZ **site : 030N040E [24]**



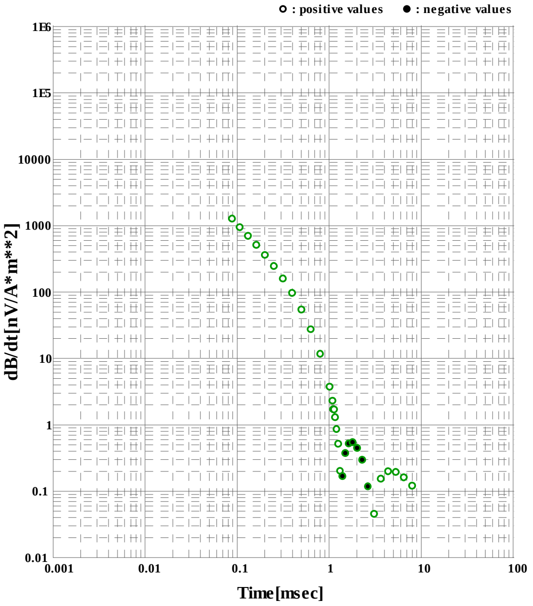


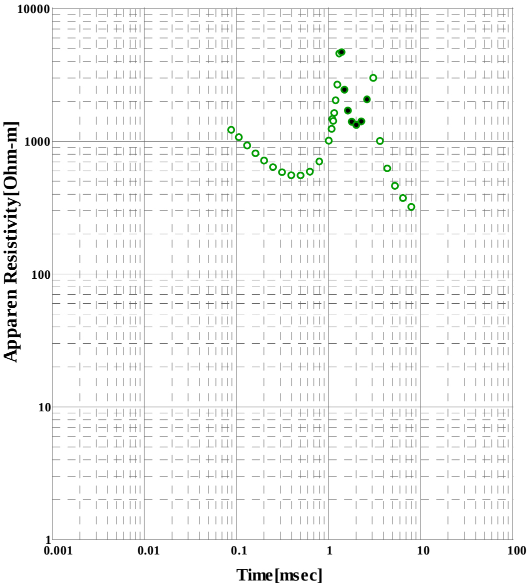
AZZ **site : 030N045E [25]**



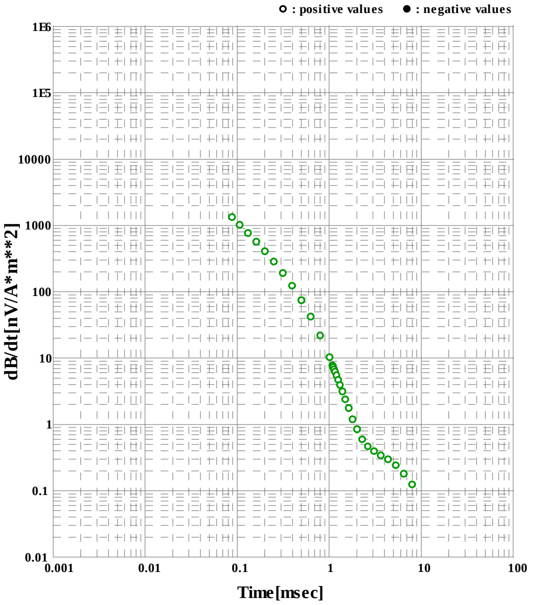


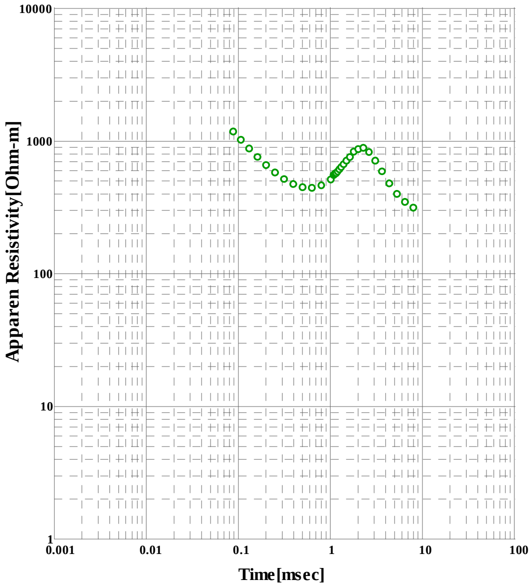
AZZ **site : 030N050E [26]**



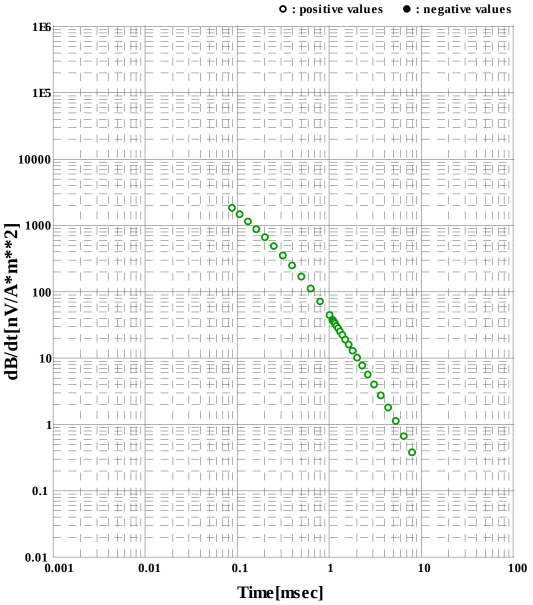


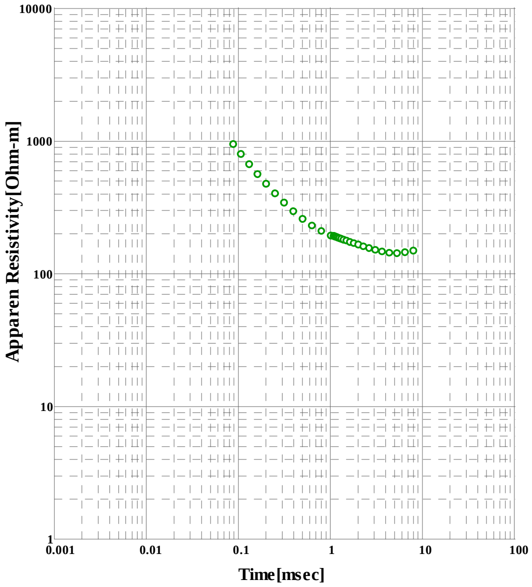
AZZ **site : 030N055E** **[27]**





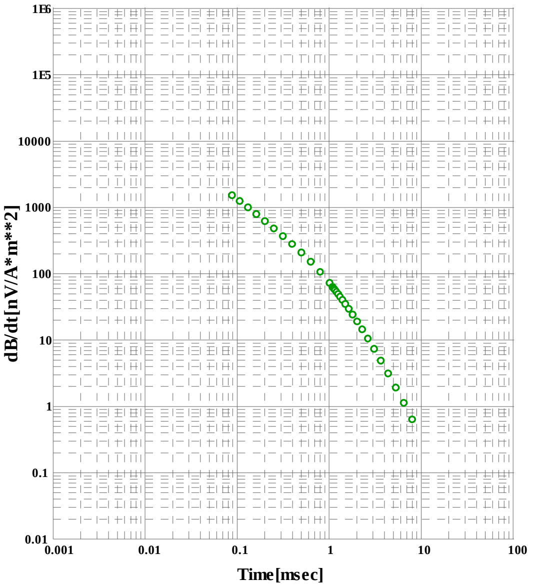
AZZ **site : 030N060E** **[28]**

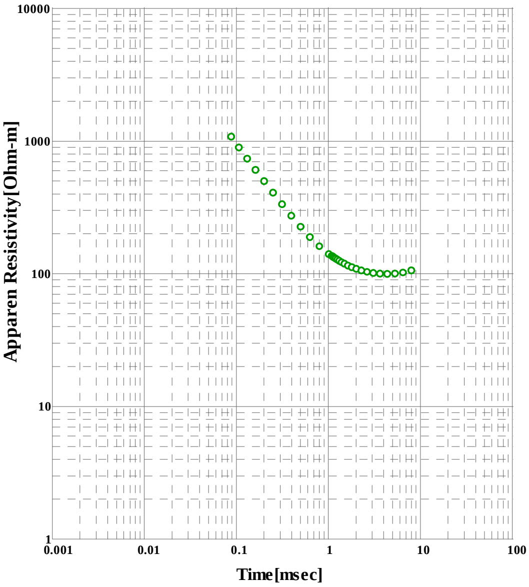




AZZ site : 030N070E [29]

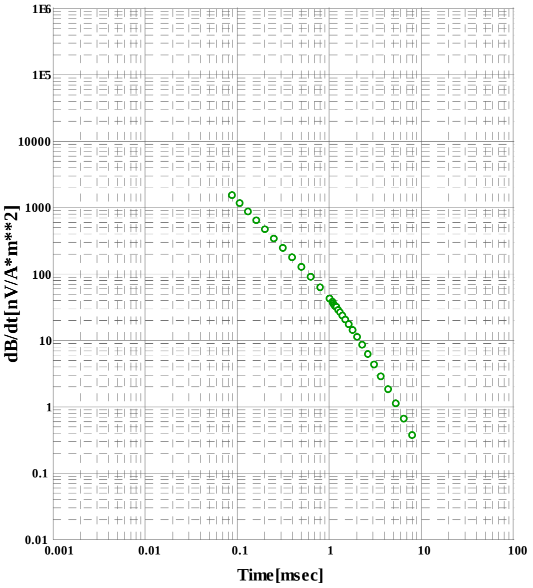
○ : positive values ● : negative values

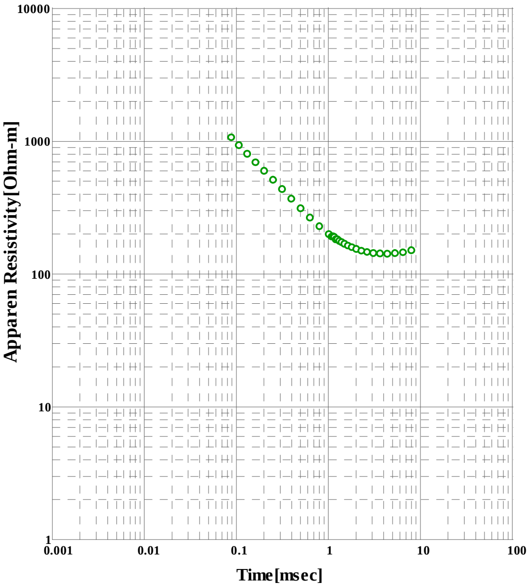




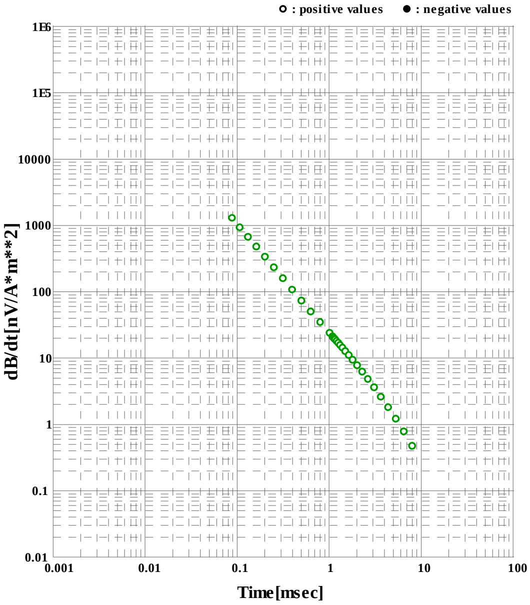
AZZ site : 030N080E [30]

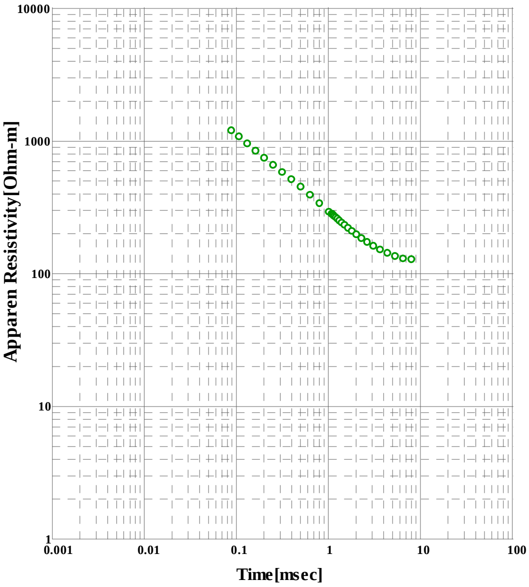
○ : positive values ● : negative values



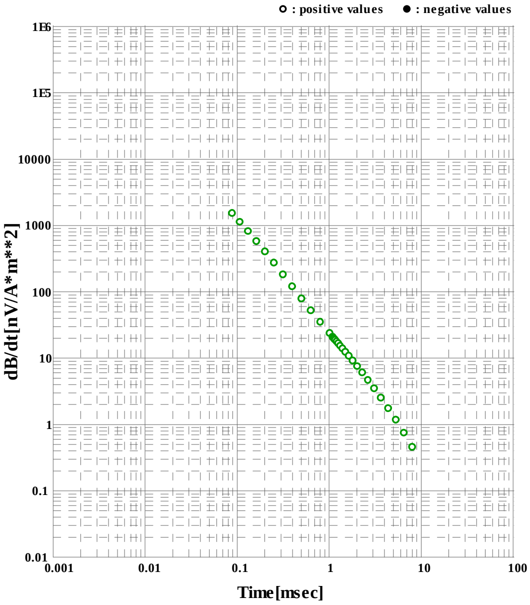


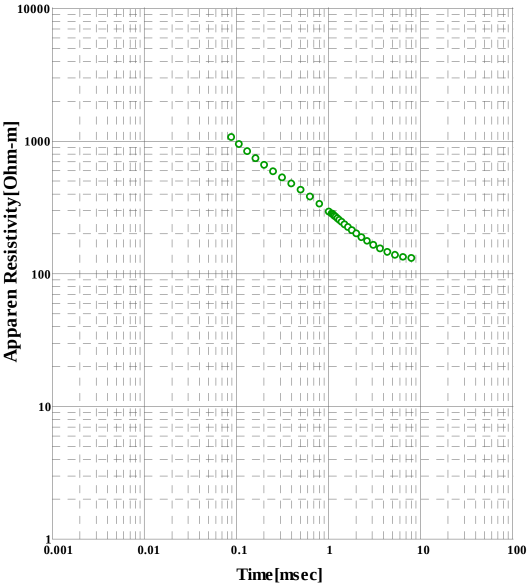
AZZ **site : 040N010E** **[31]**



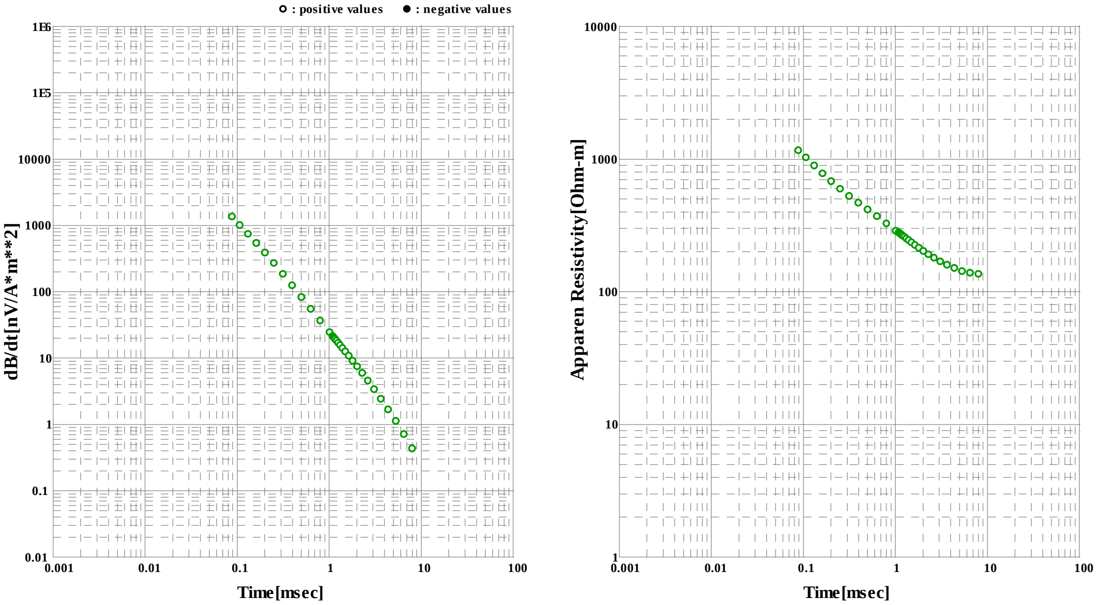


AZZ **site : 040N020E** **[32]**

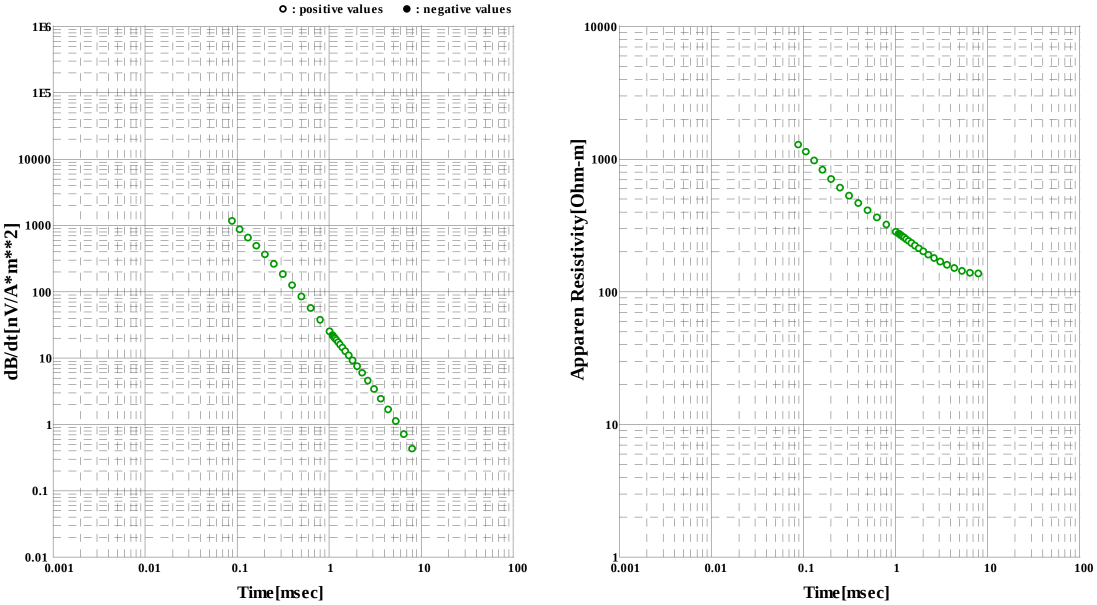




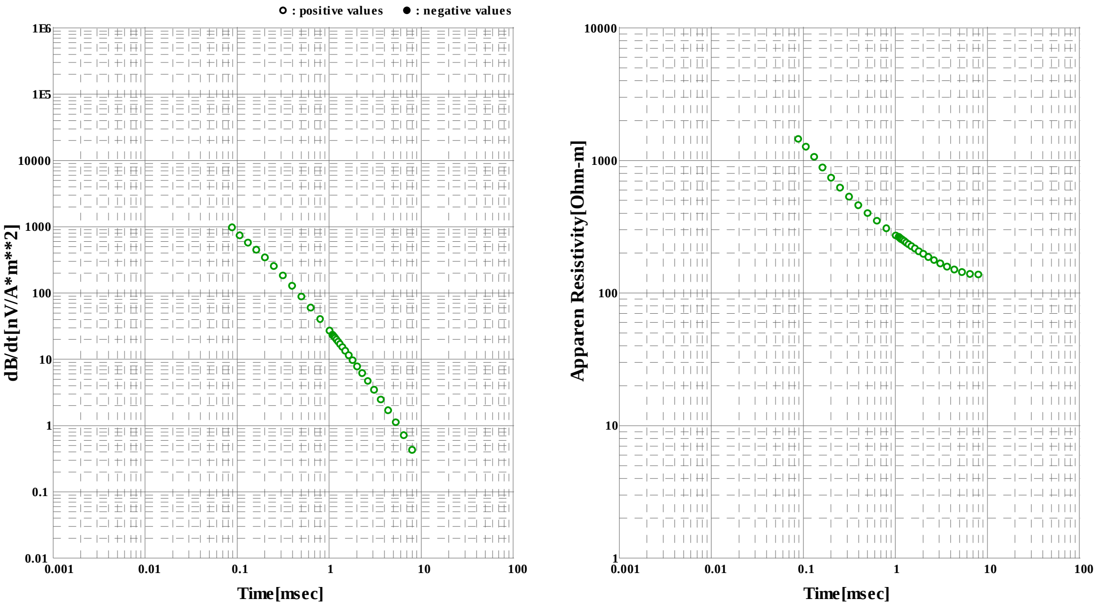
AZZ site : 040N030E [33]



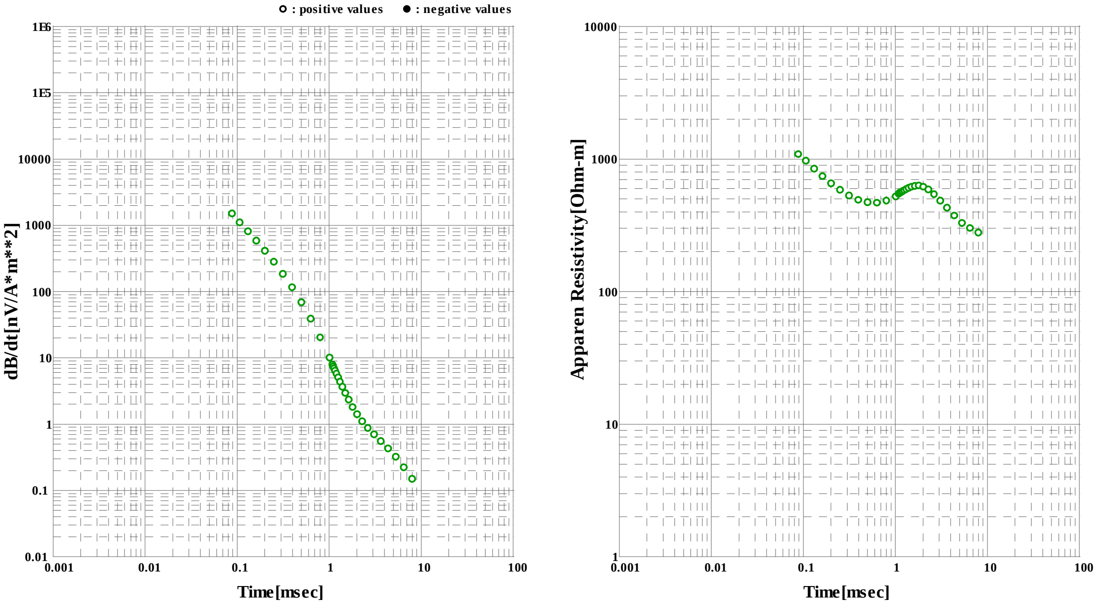
AZZ site : 040N035E [34]



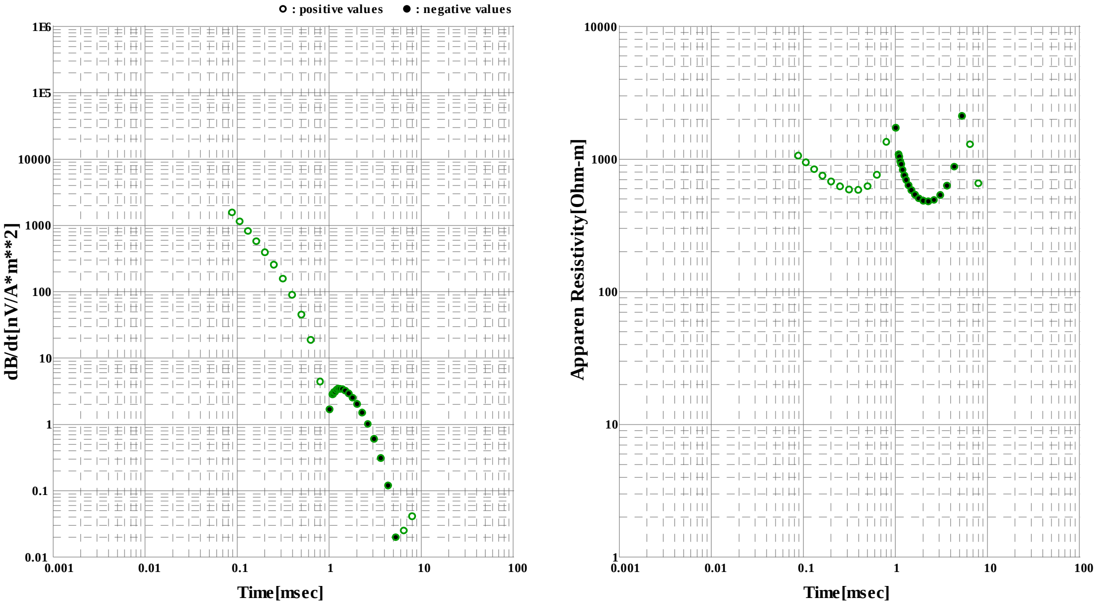
AZZ site : 040N040E [35]



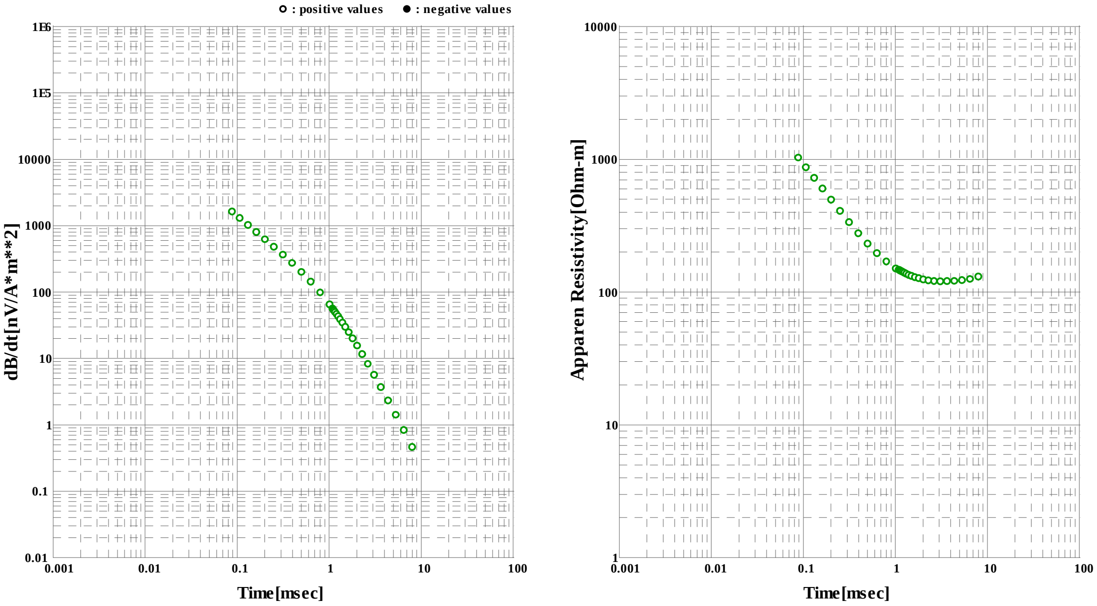
AZZ site : 040N045E [36]



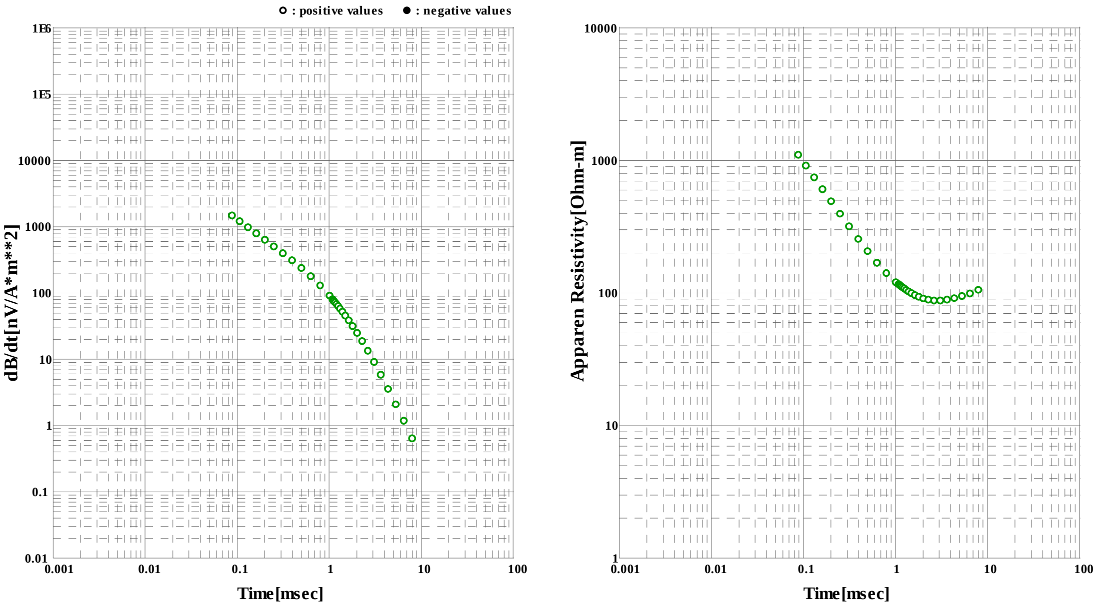
AZZ **site : 040N050E** **[37]**



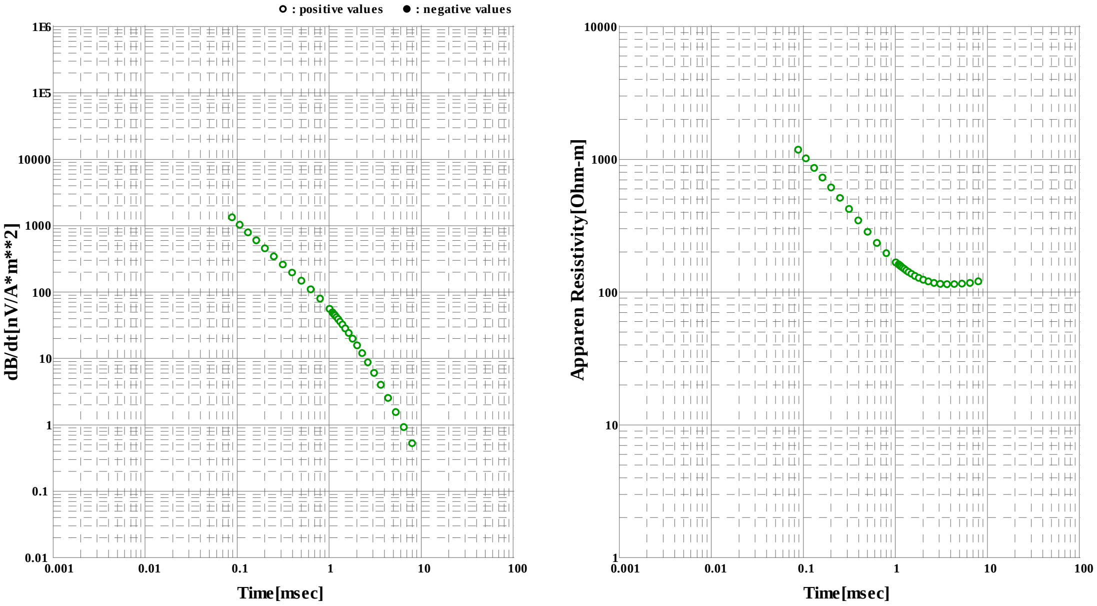
AZZ **site : 040N055E** **[38]**



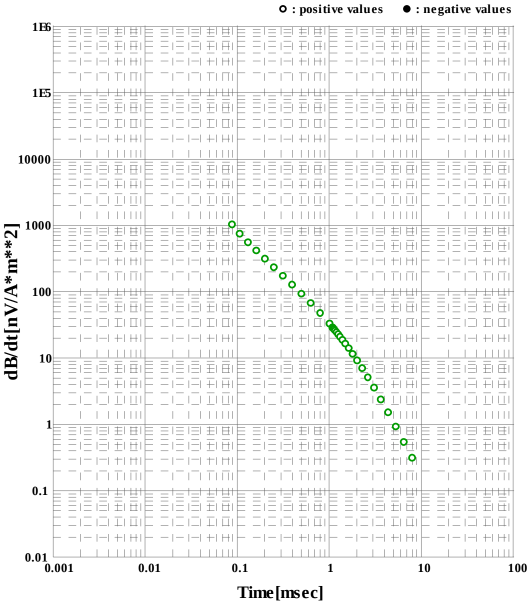
AZZ **site : 040N060E** **[39]**

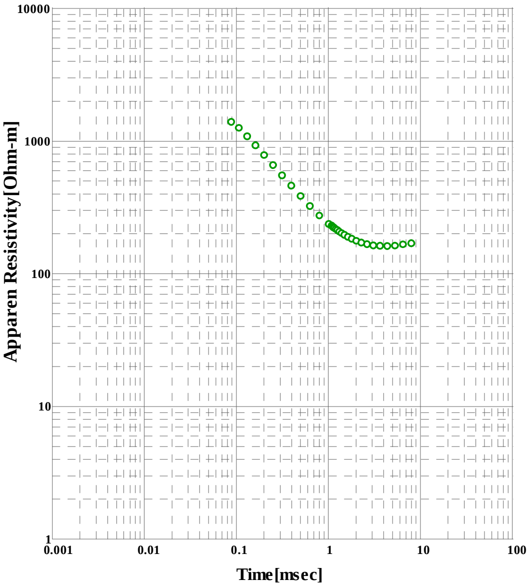


AZZ **site : 040N070E** **[40]**

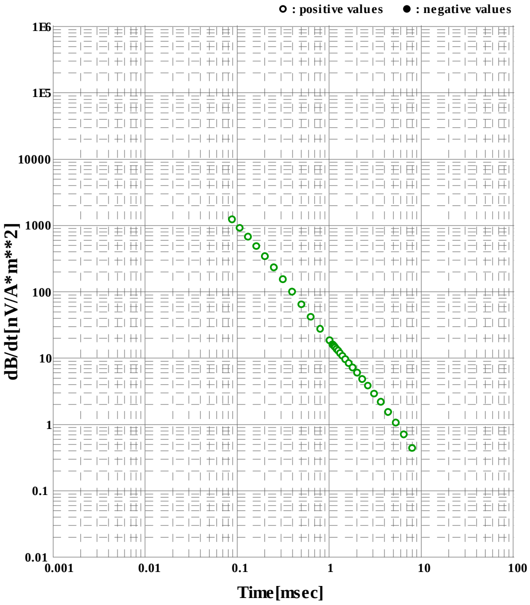


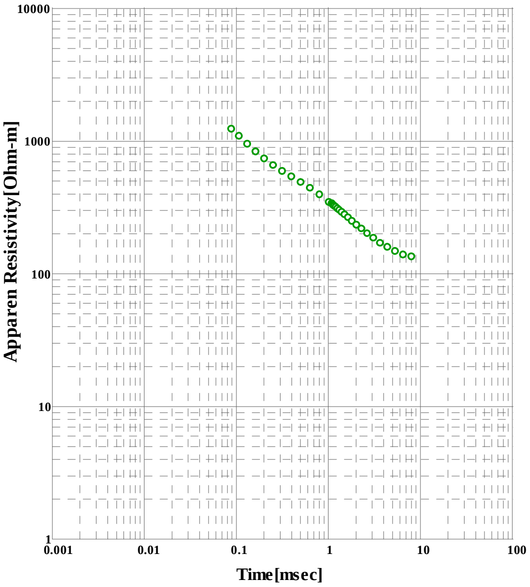
AZZ **site : 040N080E [41]**



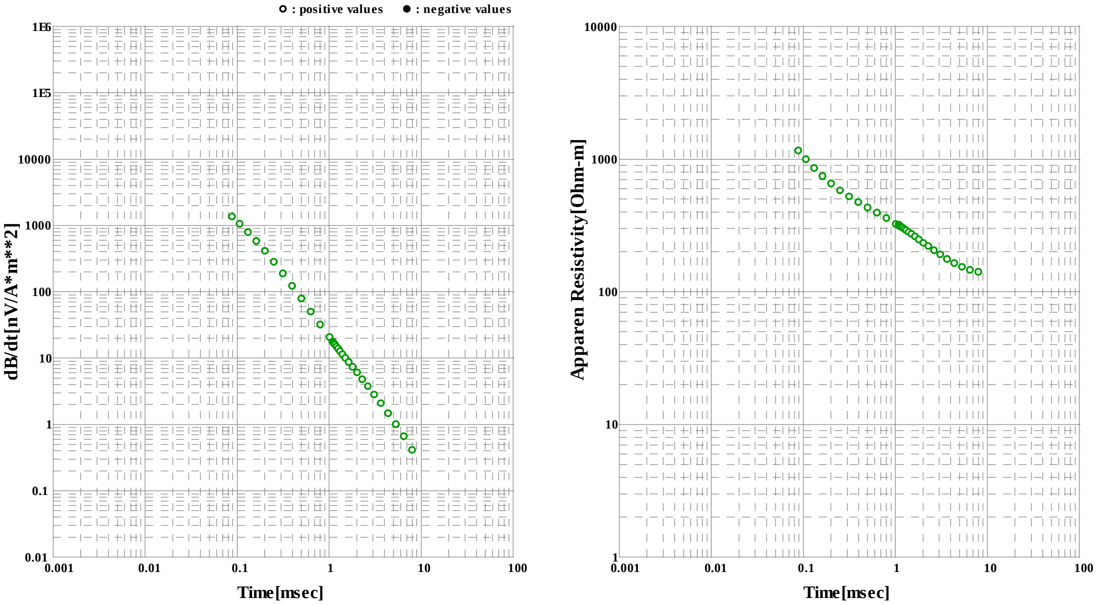


AZZ **site : 050N010E [42]**

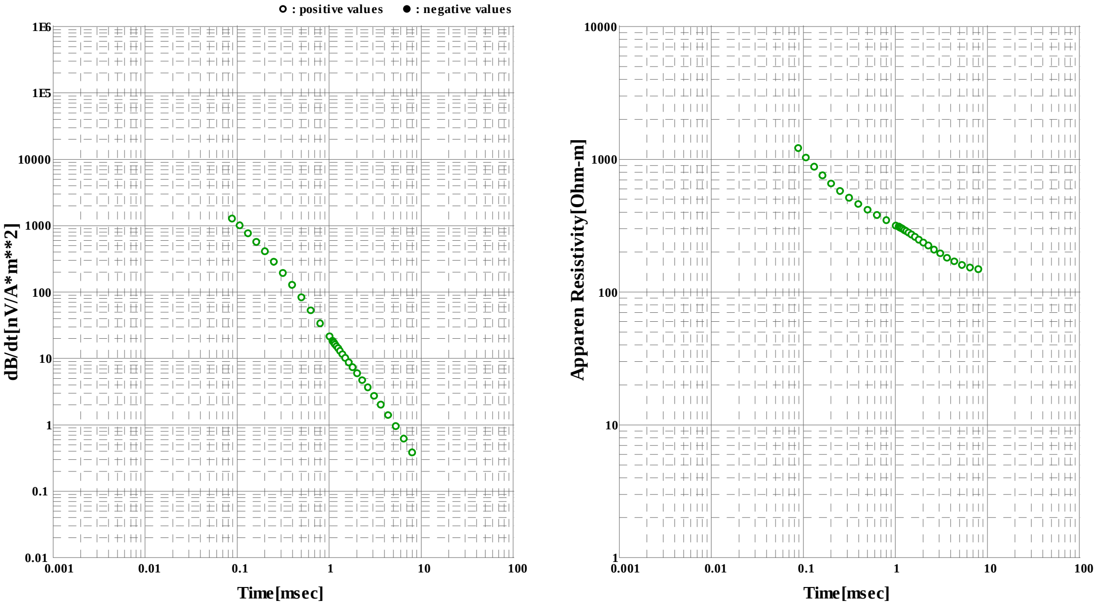




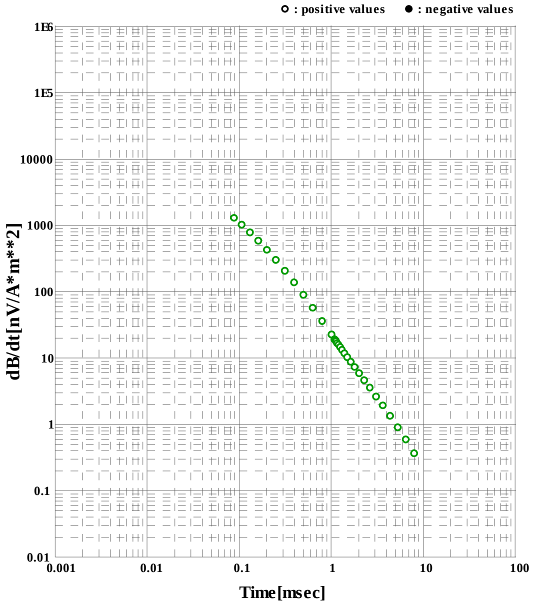
AZZ **site : 050N020E [43]**

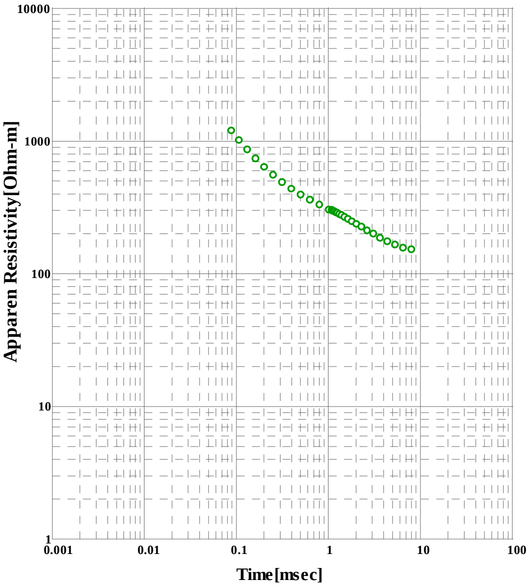


AZZ **site : 050N025E [44]**

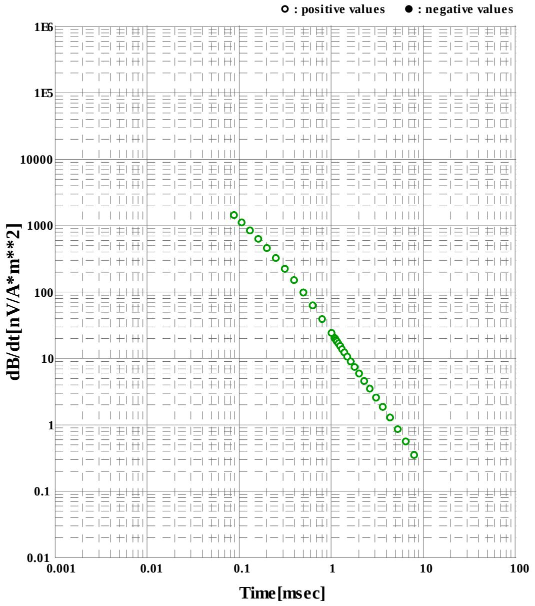


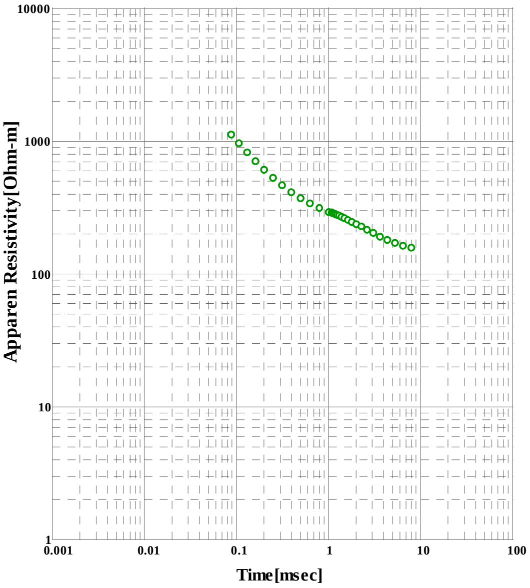
AZZ **site : 050N030E [45]**





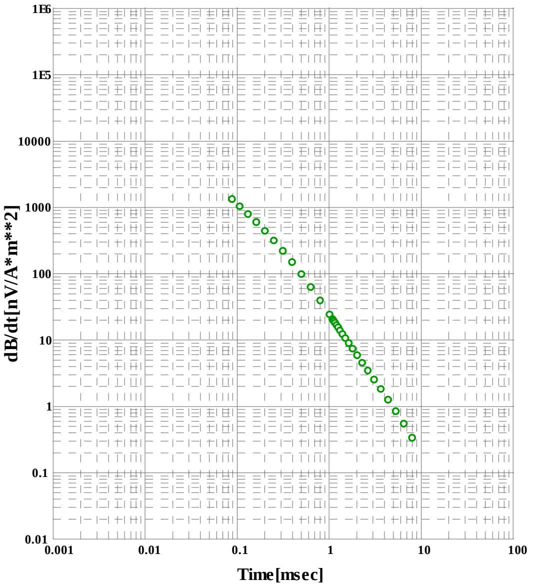
AZZ **site : 050N035E [46]**

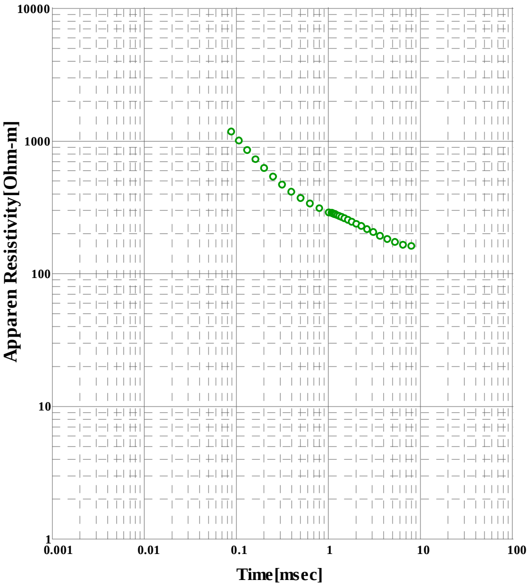




AZZ site : 050N040E [47]

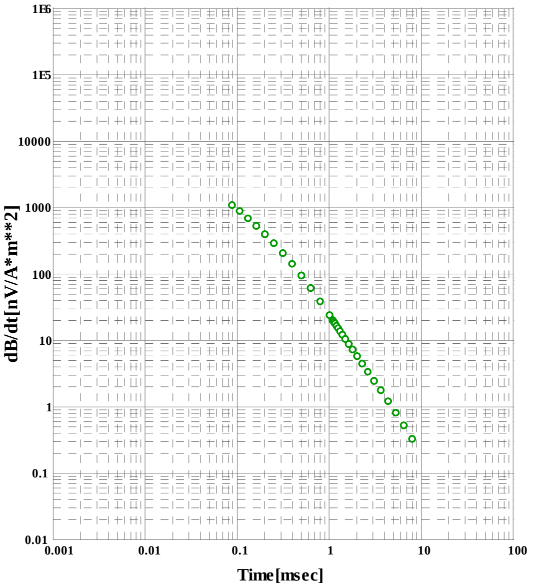
○ : positive values ● : negative values

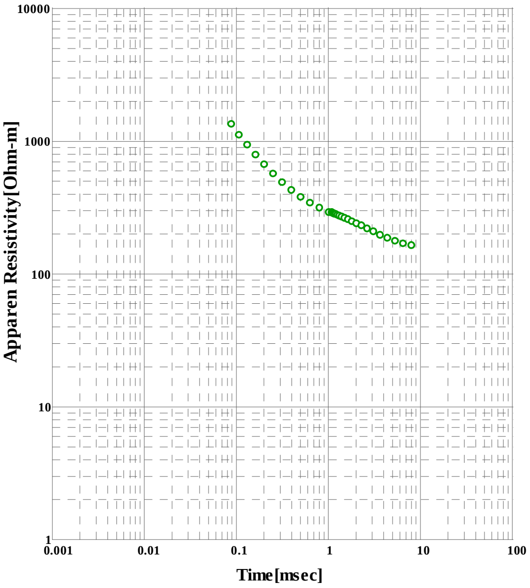




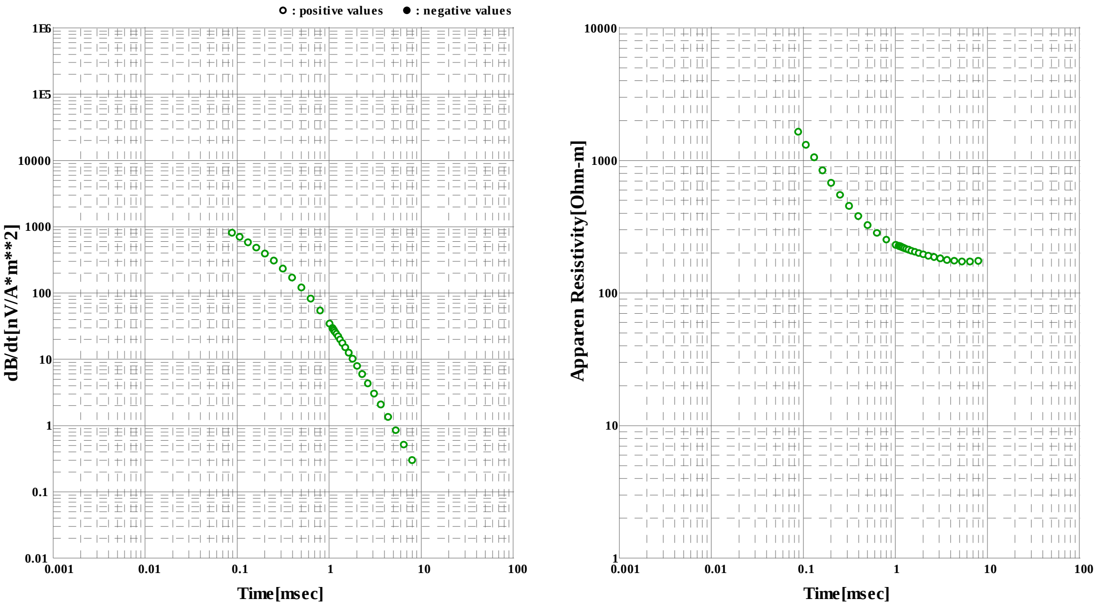
AZZ site : 050N045E [48]

○ : positive values ● : negative values

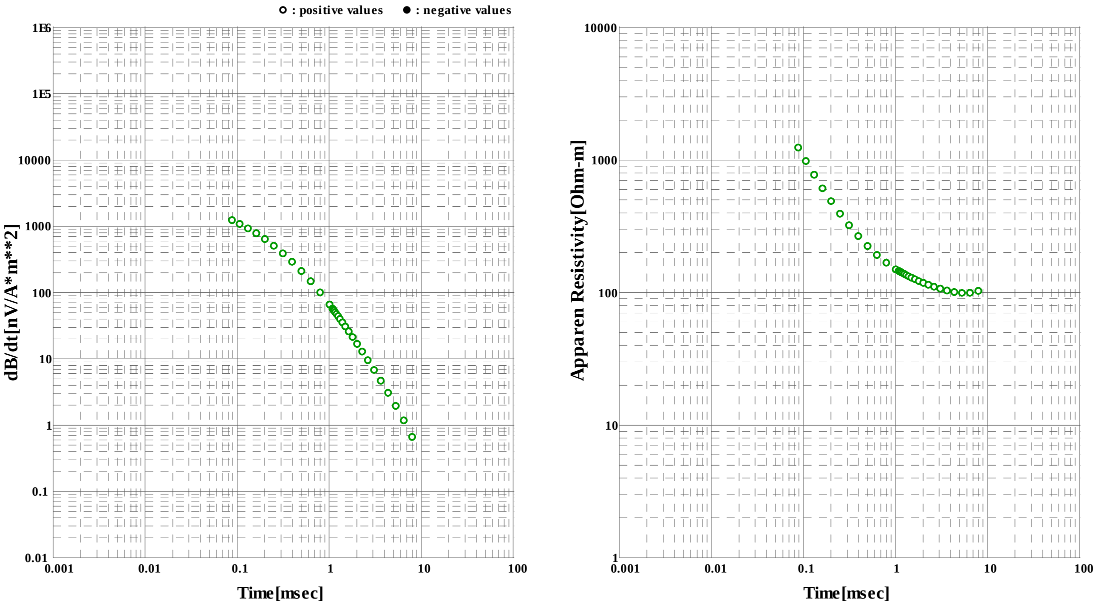




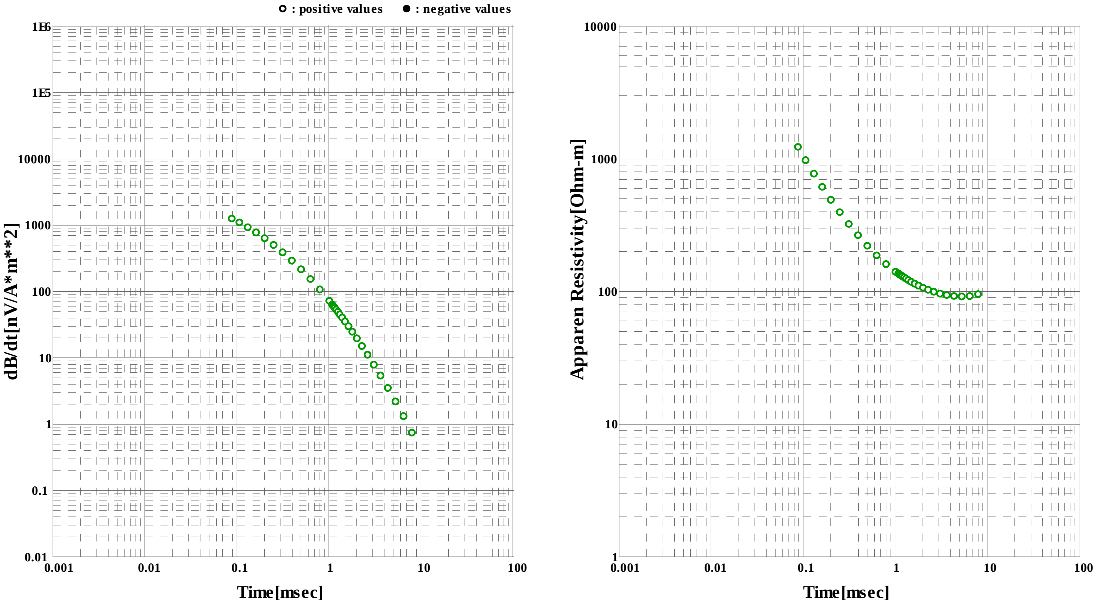
AZZ **site : 050N050E [49]**



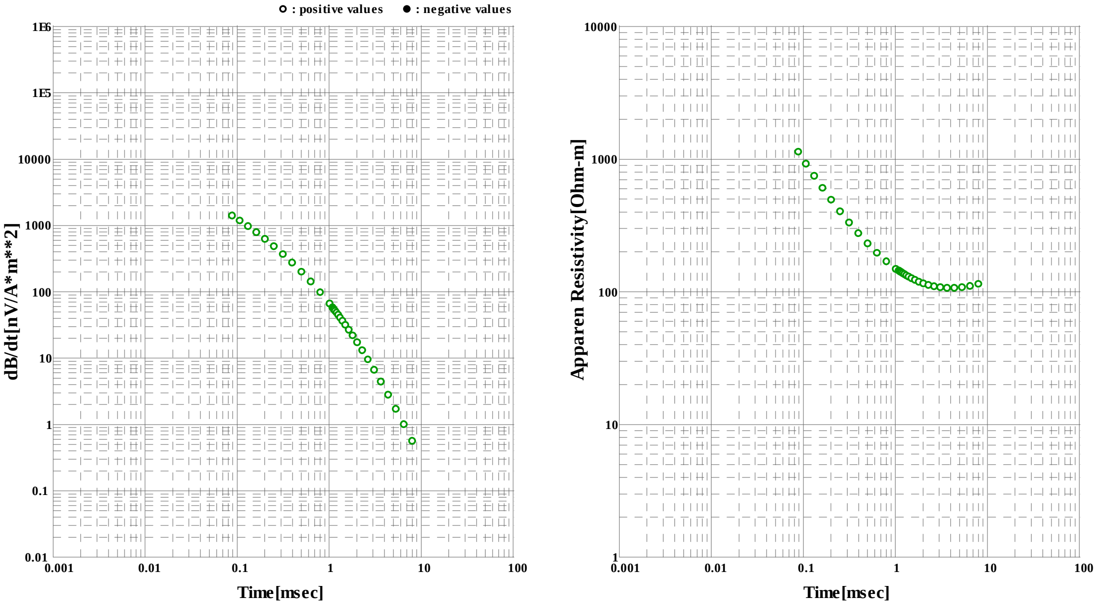
AZZ **site : 050N055E [50]**



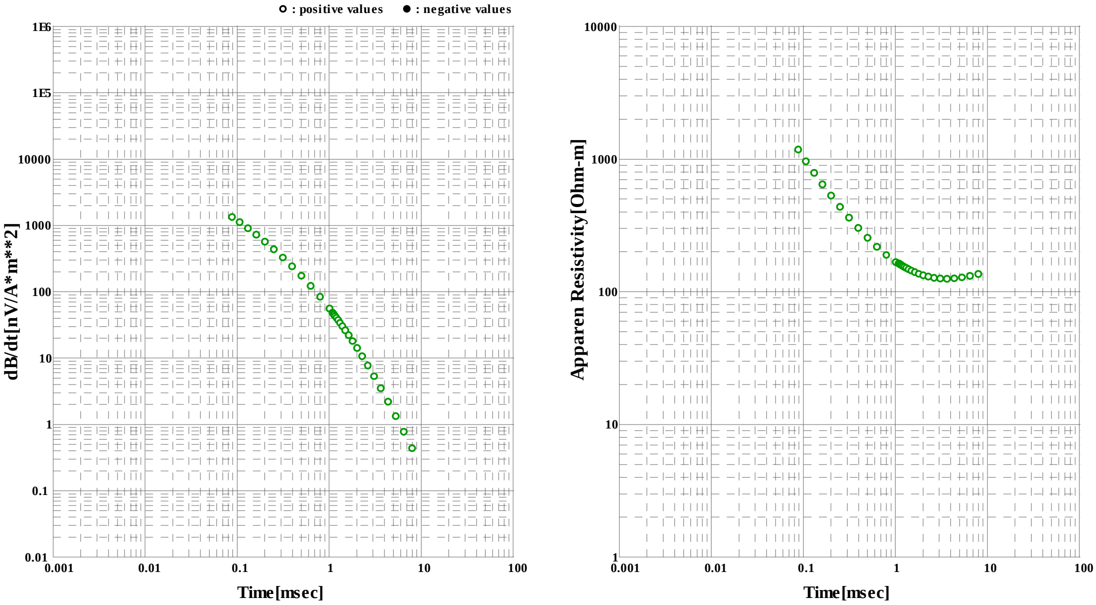
AZZ **site : 050N060E [51]**



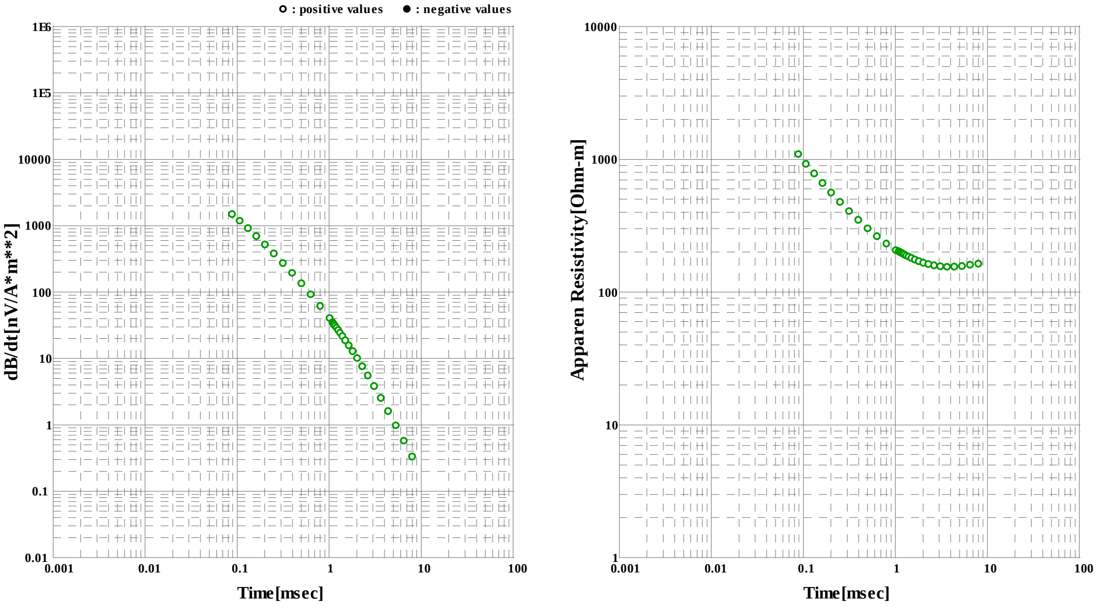
AZZ **site : 050N065E [52]**



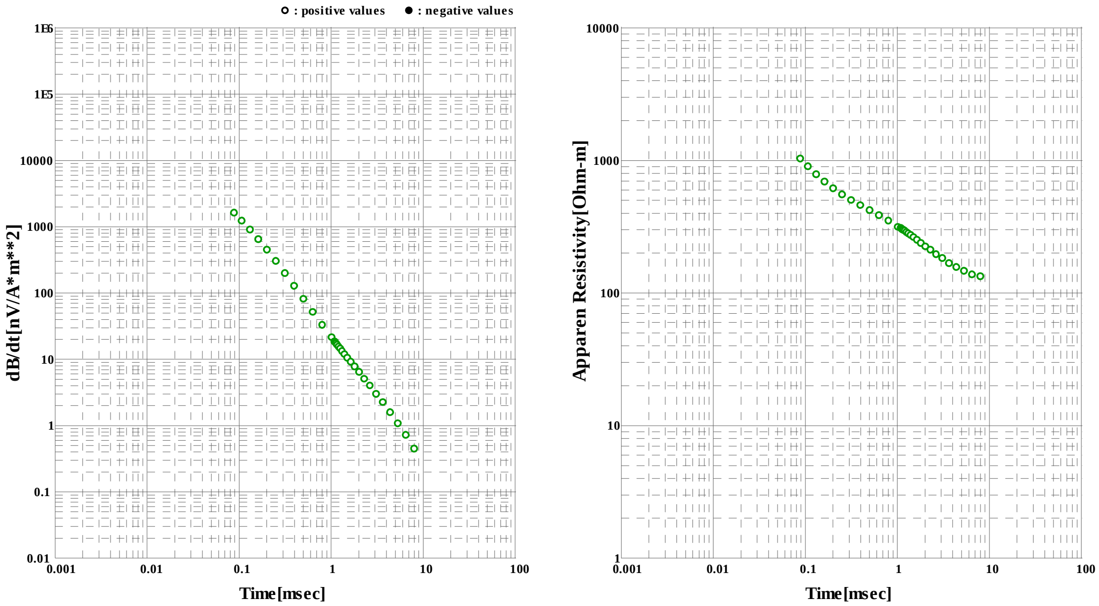
AZZ site : 050N070E [53]



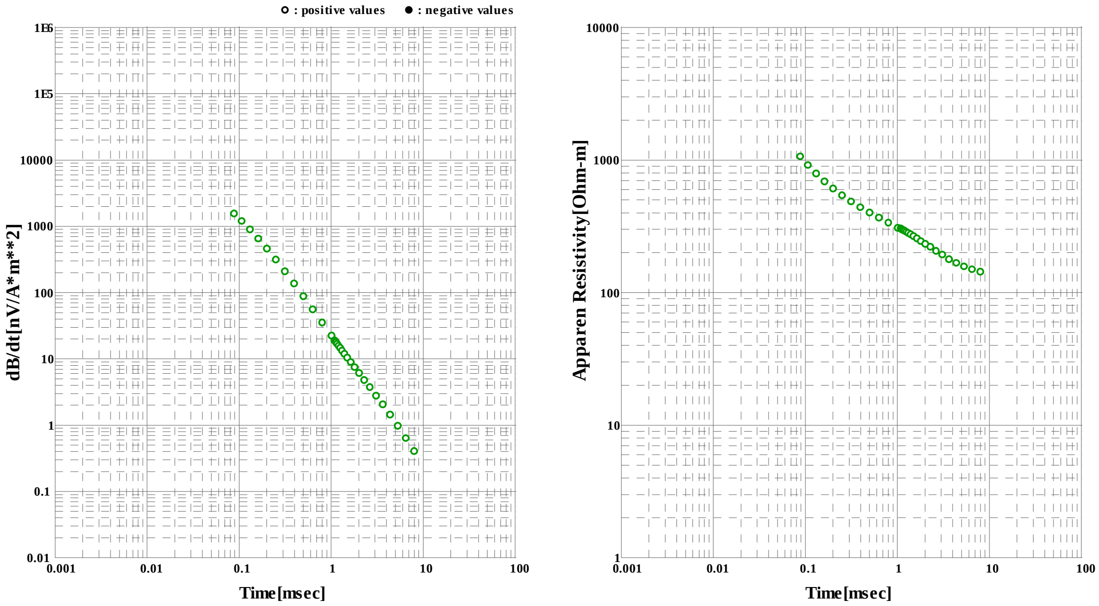
AZZ site : 050N080E [54]



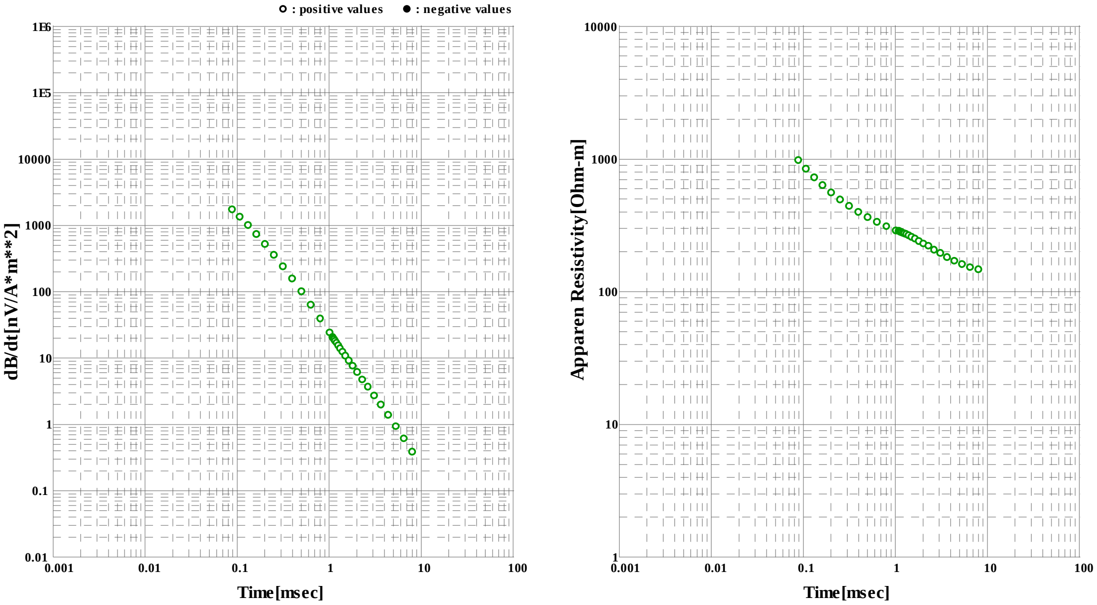
AZZ **site : 060N010E** **[55]**



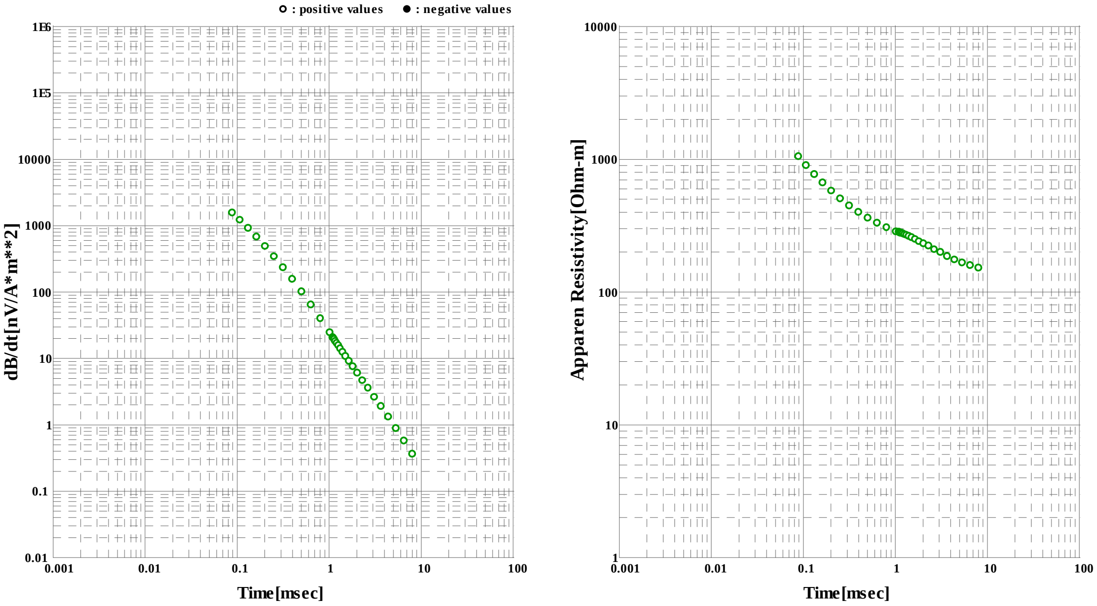
AZZ **site : 060N020E** **[56]**



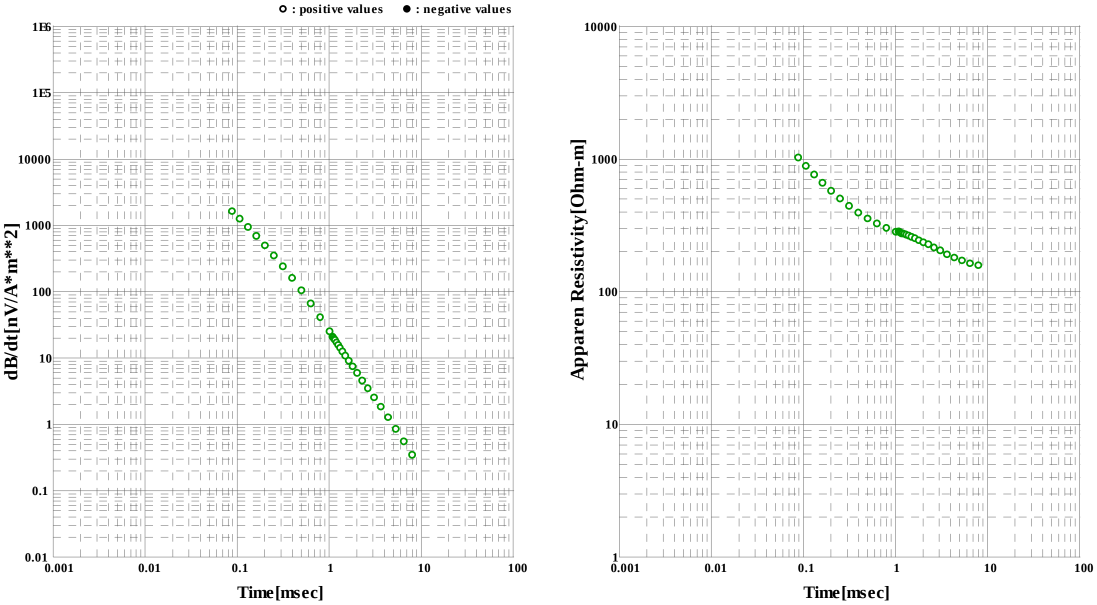
AZZ　　　　**site : 060N025E**　　**[57]**



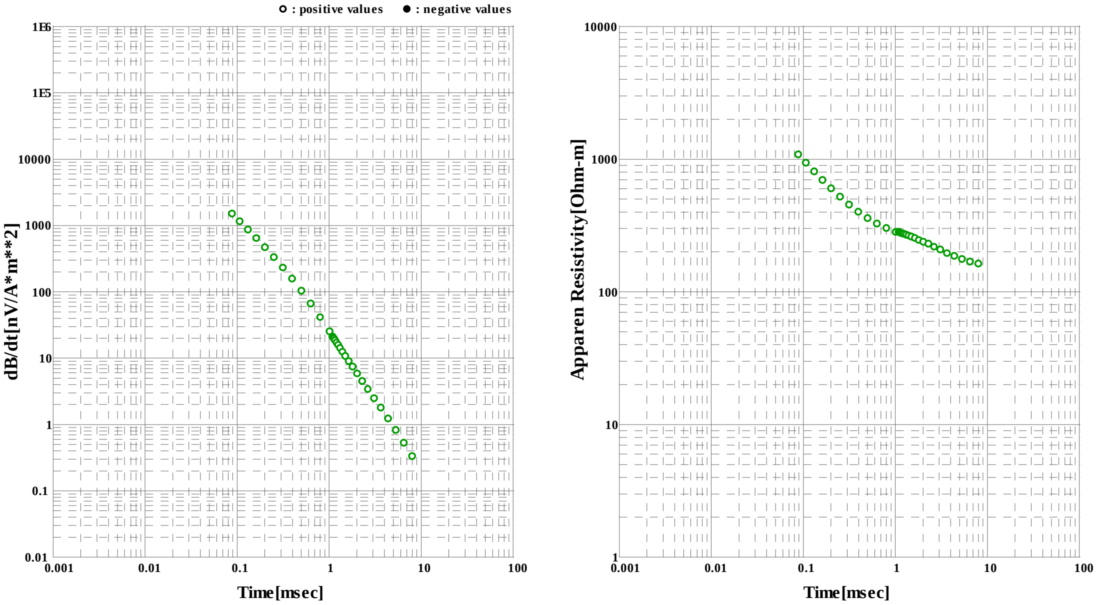
AZZ　　　　**site : 060N030E**　　**[58]**



AZZ site : 060N035E [59]

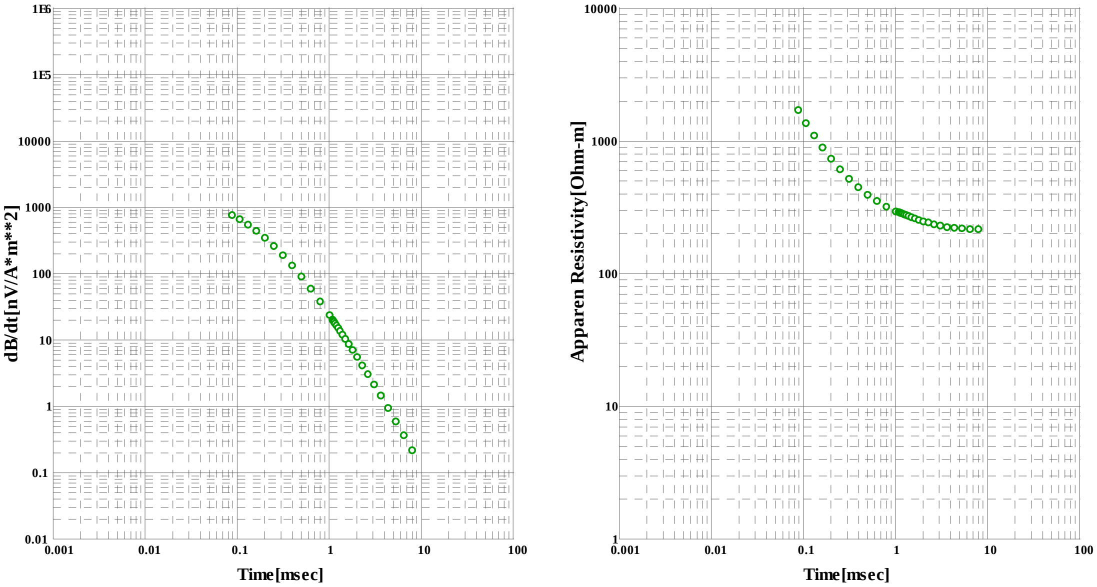


AZZ site : 060N040E [60]



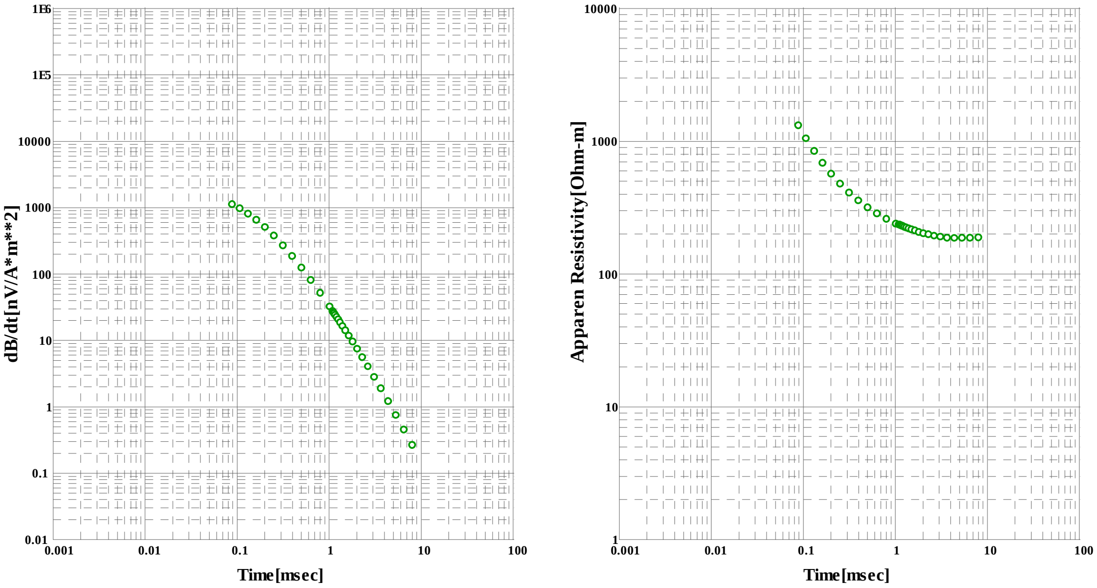
AZZ site : 060N045E [61]

○ : positive values ● : negative values

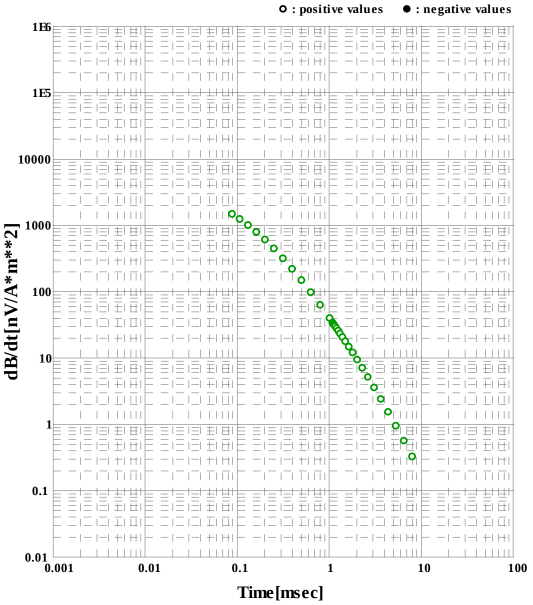


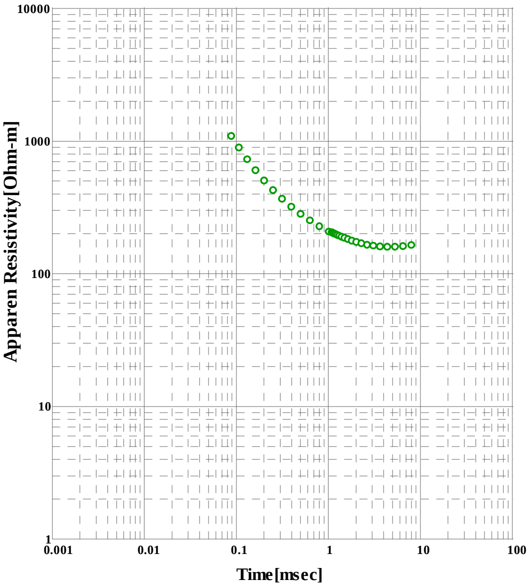
AZZ site : 060N050E [62]

○ : positive values ● : negative values

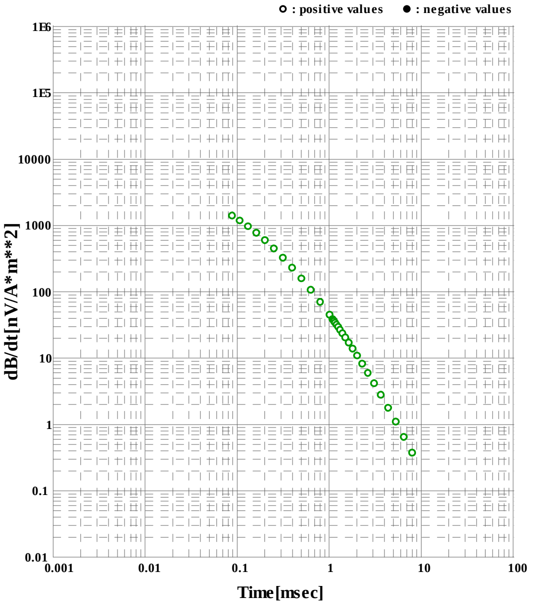


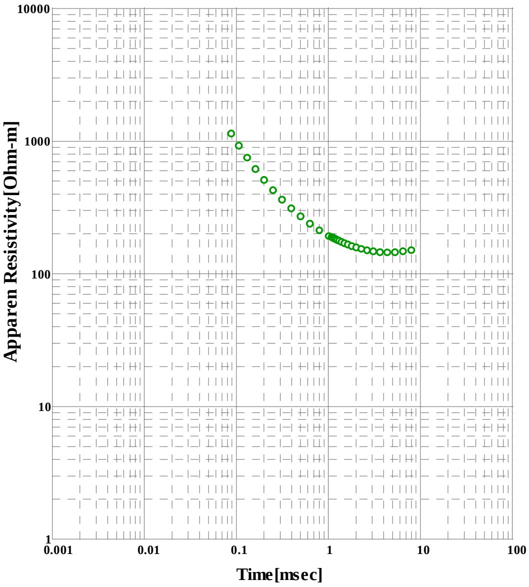
AZZ **site : 060N055E** **[63]**



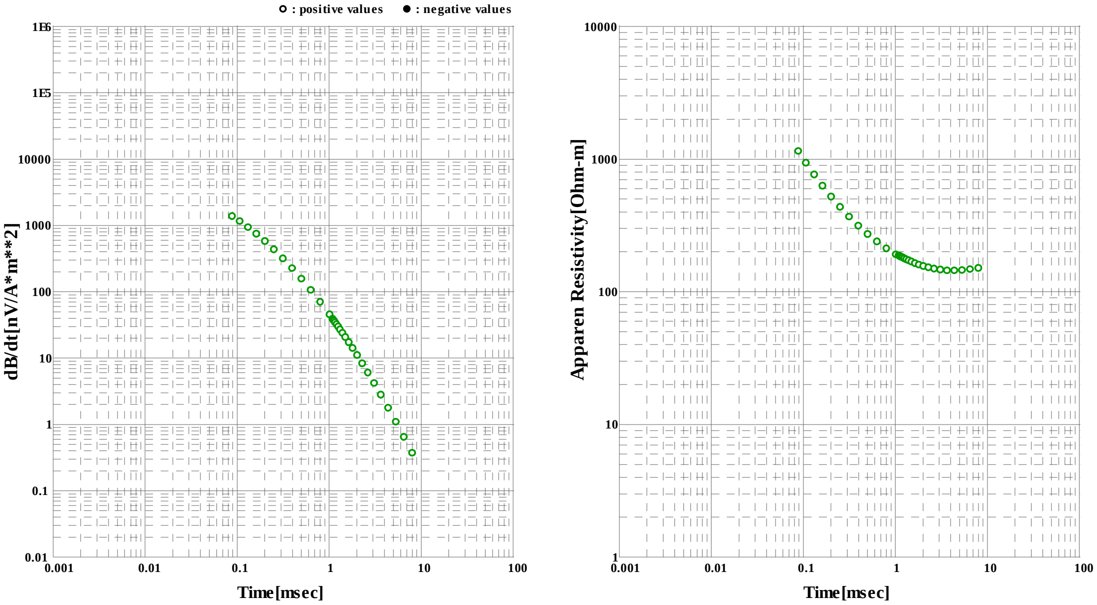


AZZ **site : 060N060E** **[64]**

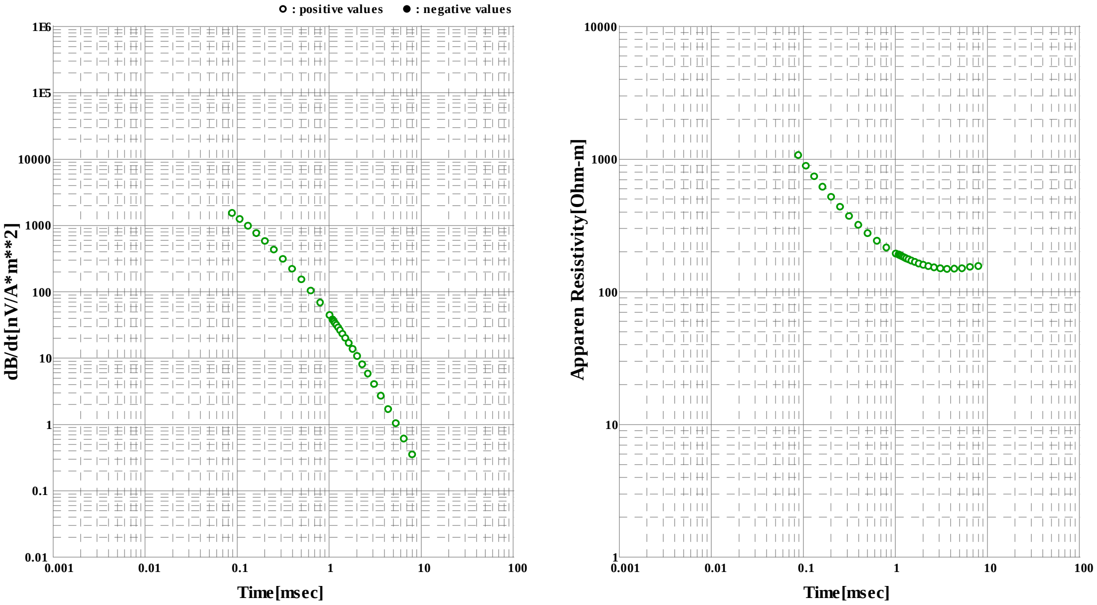




AZZ site : 060N065E [65]

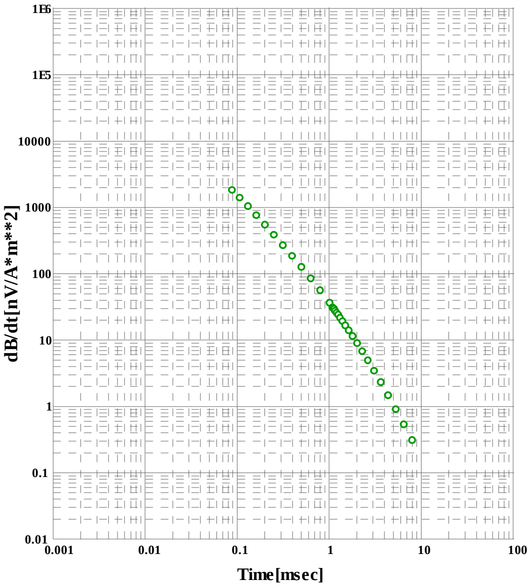


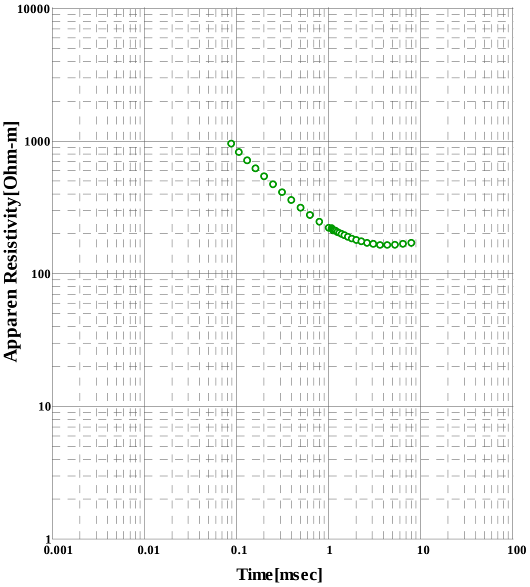
AZZ site : 060N070E [66]



AZZ **site : 060N080E** **[67]**

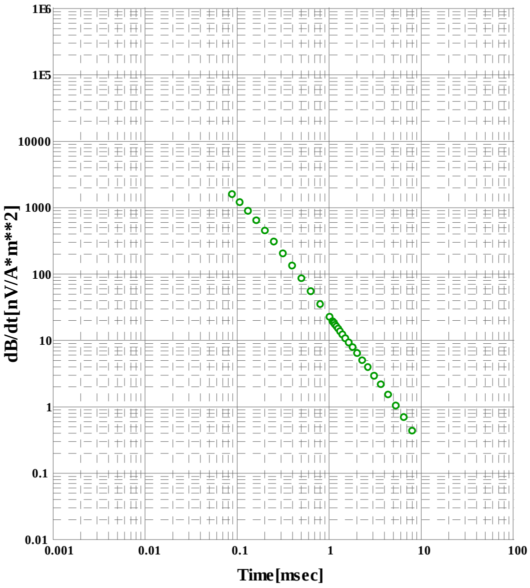
○ : positive values ● : negative values

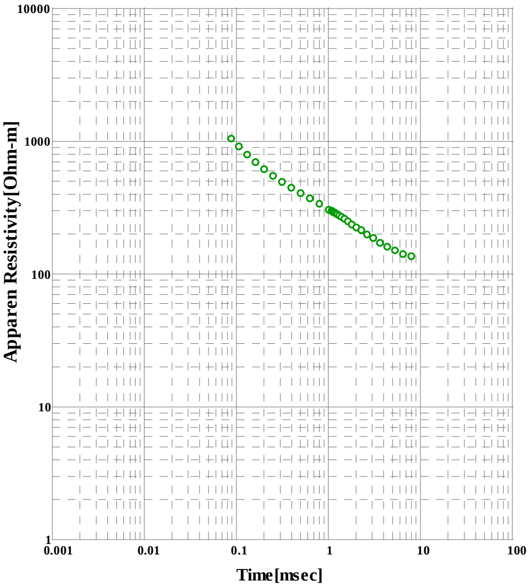




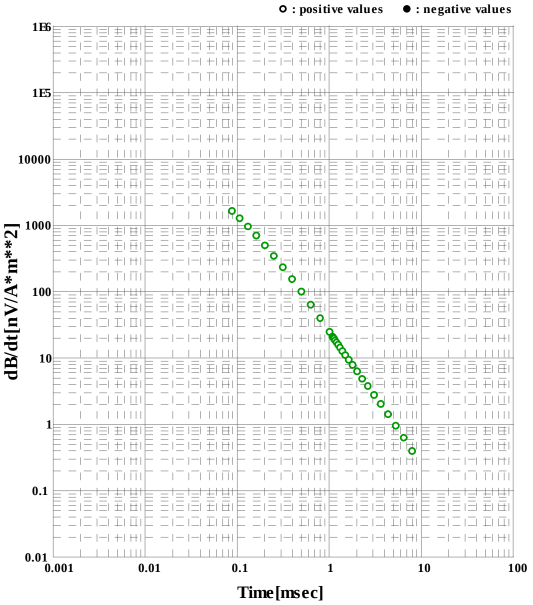
AZZ **site : 070N010E** **[68]**

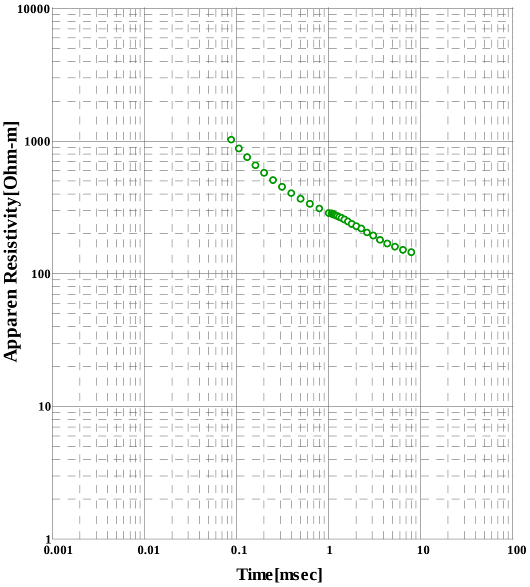
○ : positive values ● : negative values



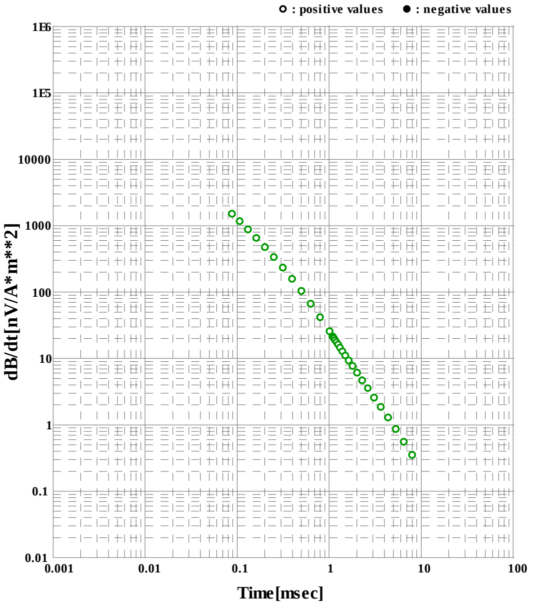


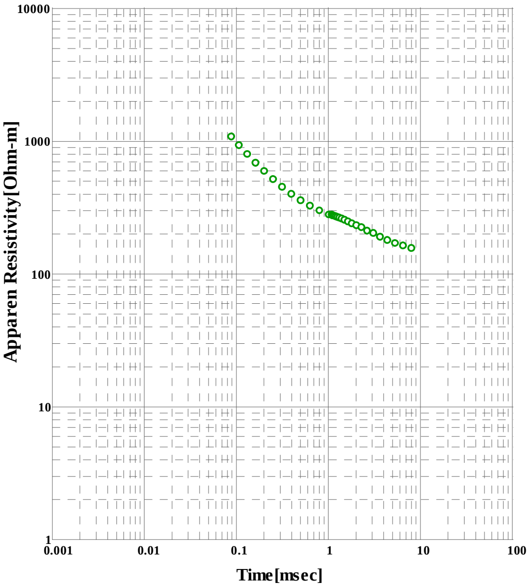
AZZ **site : 070N020E [69]**



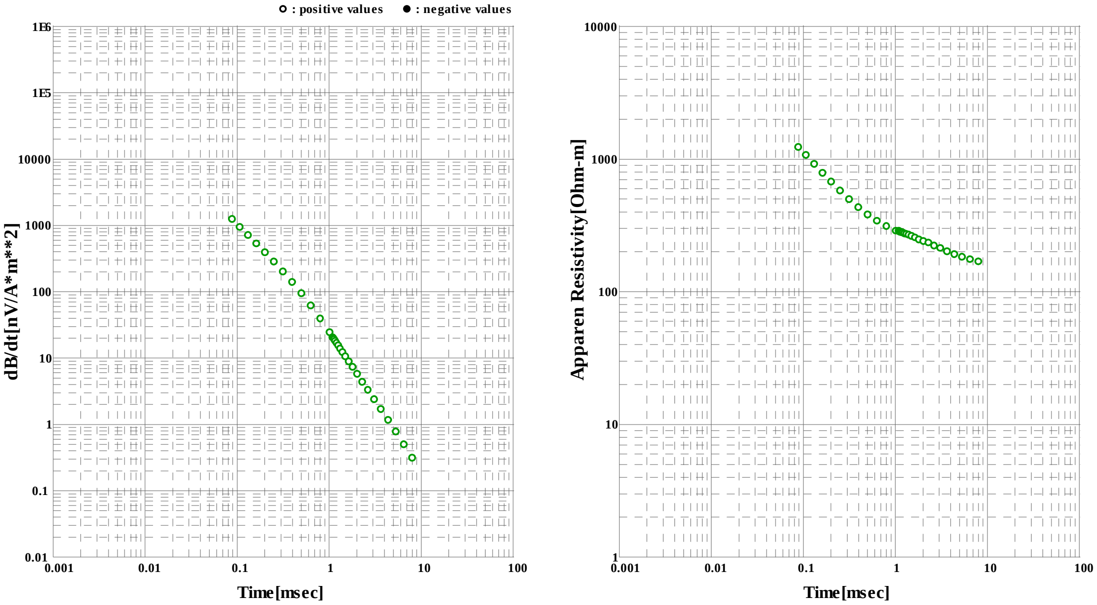


AZZ **site : 070N030E [70]**

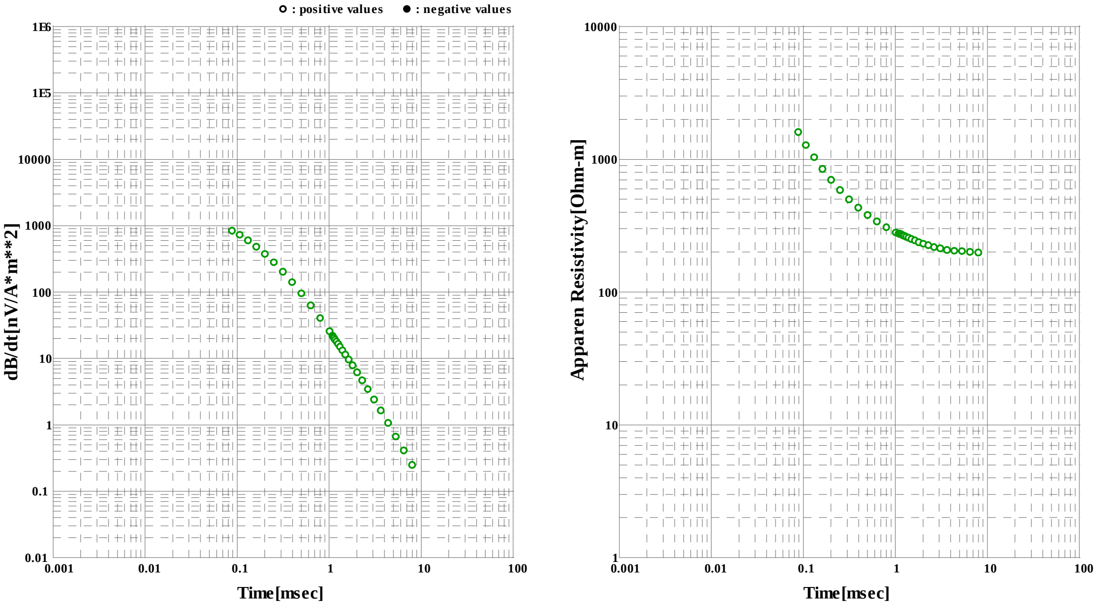




AZZ **site : 070N040E** **[71]**

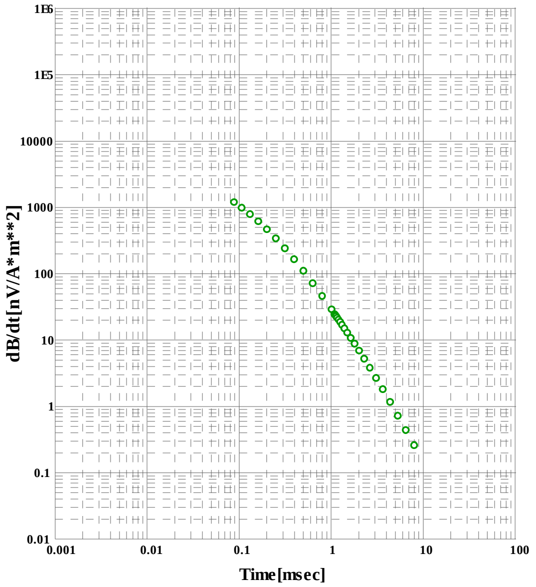


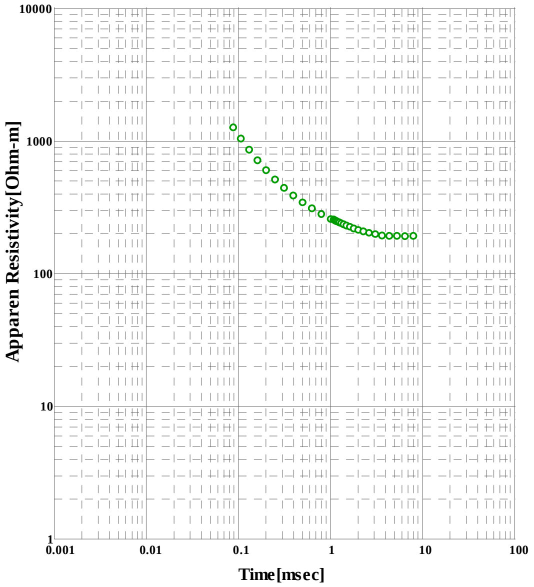
AZZ **site : 070N045E** **[72]**



AZZ **site : 070N050E** **[73]**

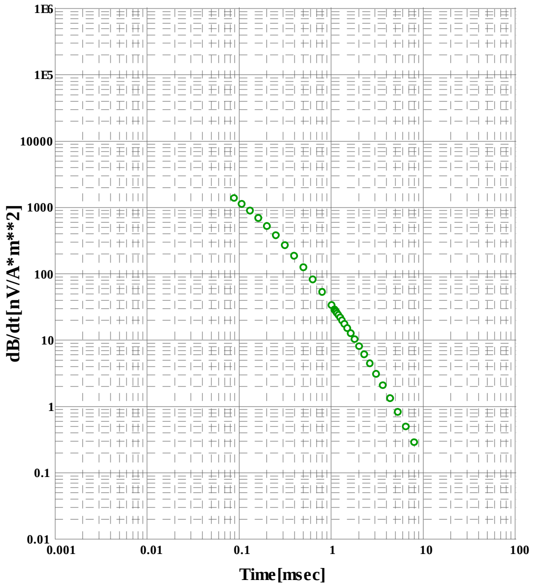
○ : positive values ● : negative values

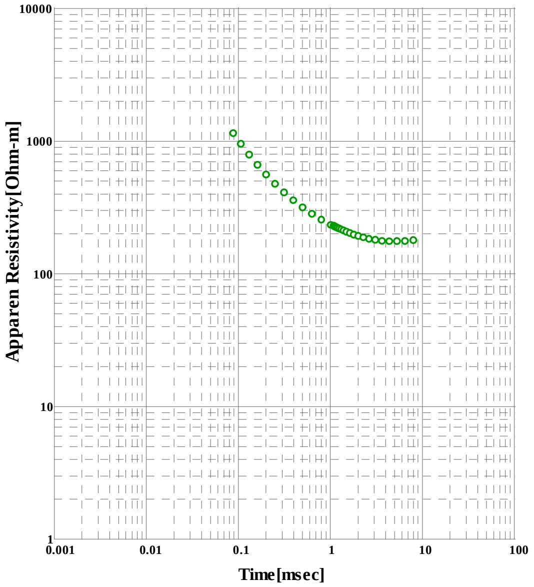




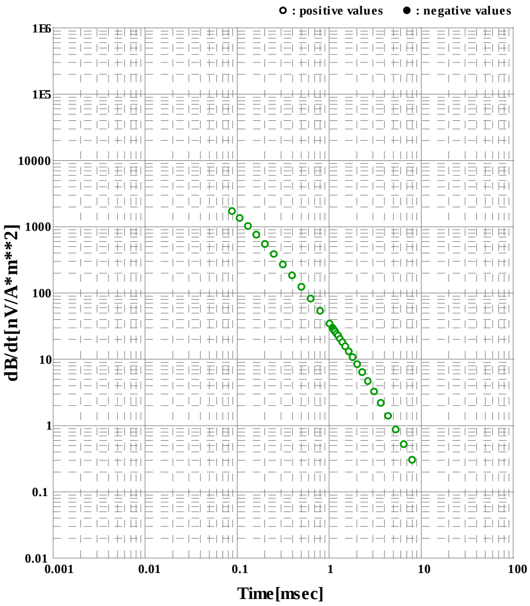
AZZ **site : 070N060E** **[74]**

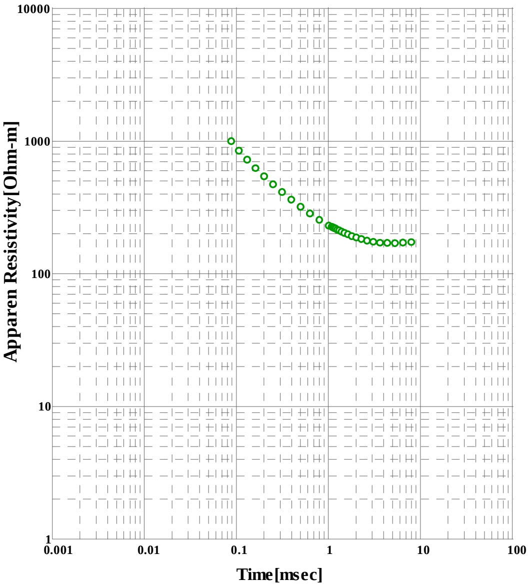
○ : positive values ● : negative values



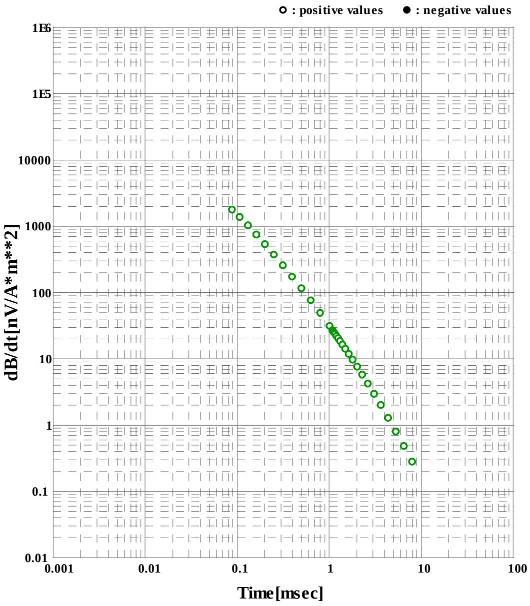


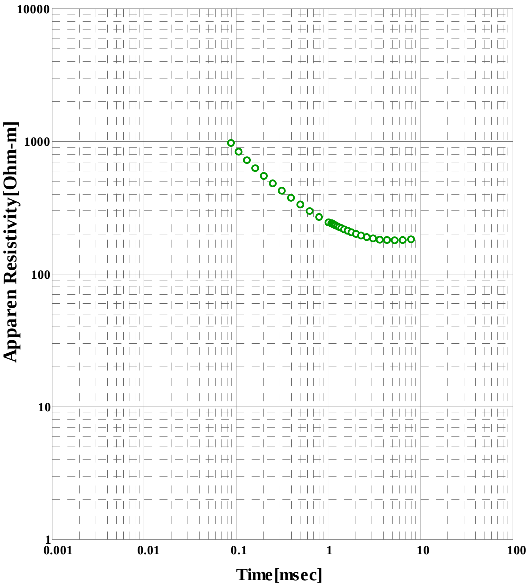
AZZ site : 070N070E [75]



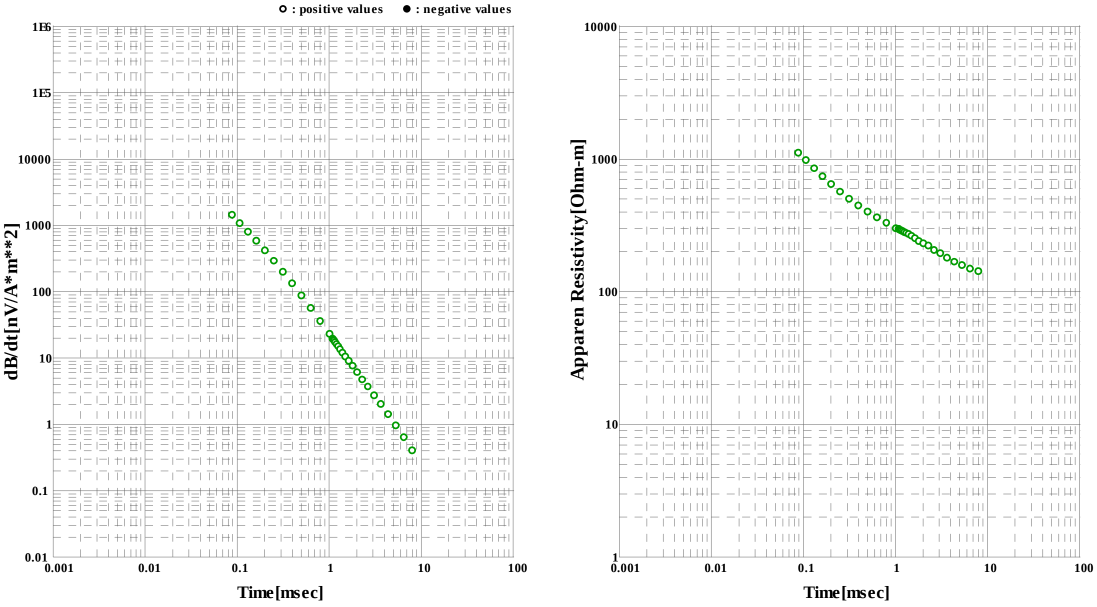


AZZ site : 070N080E [76]

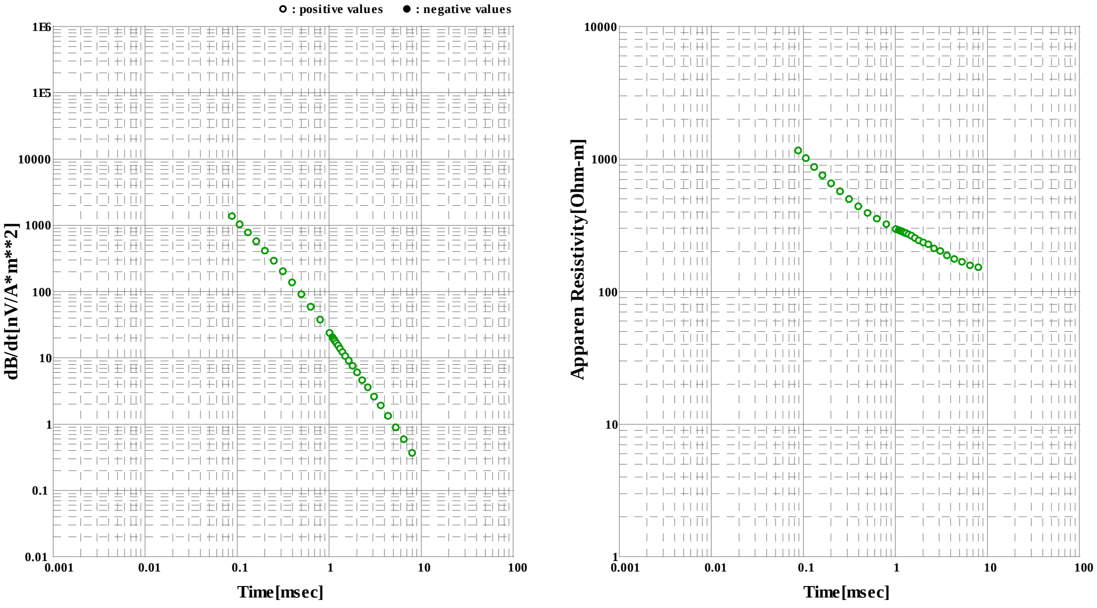




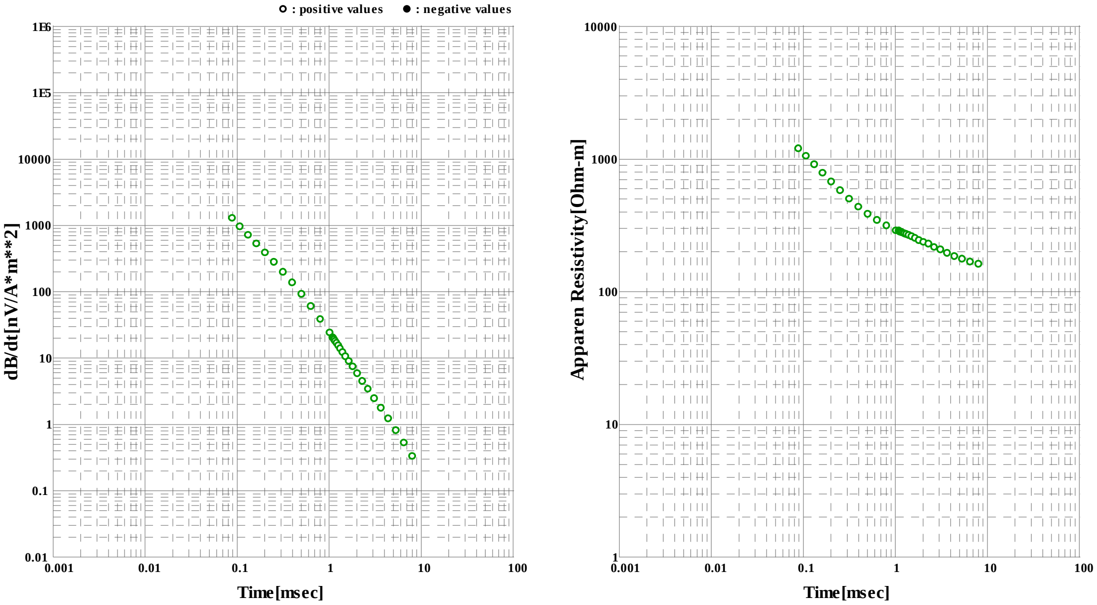
AZZ site : 080N010E [77]



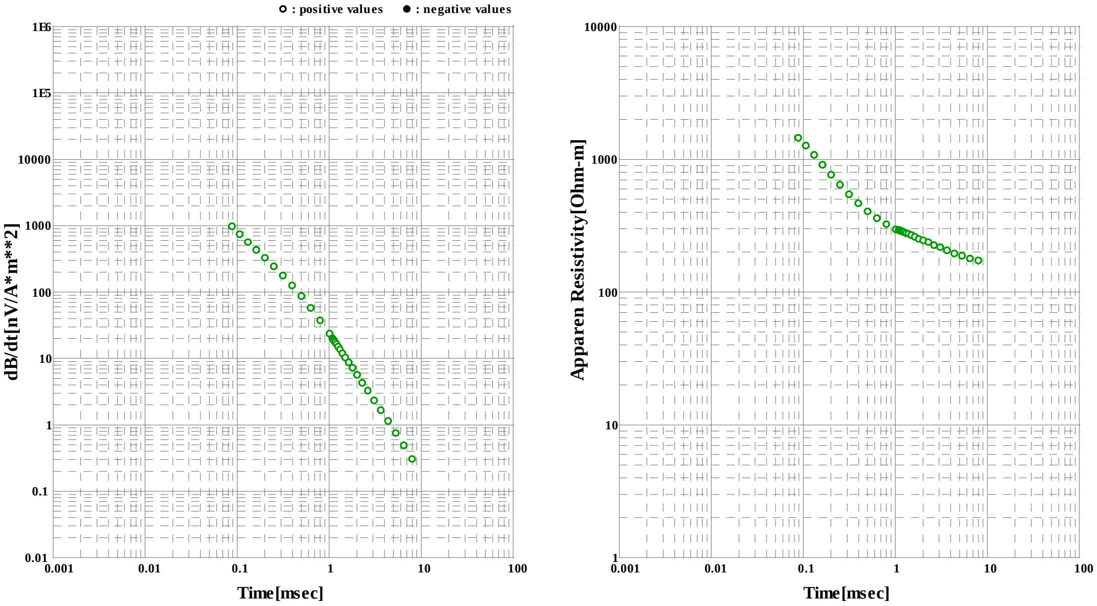
AZZ site : 080N020E [78]



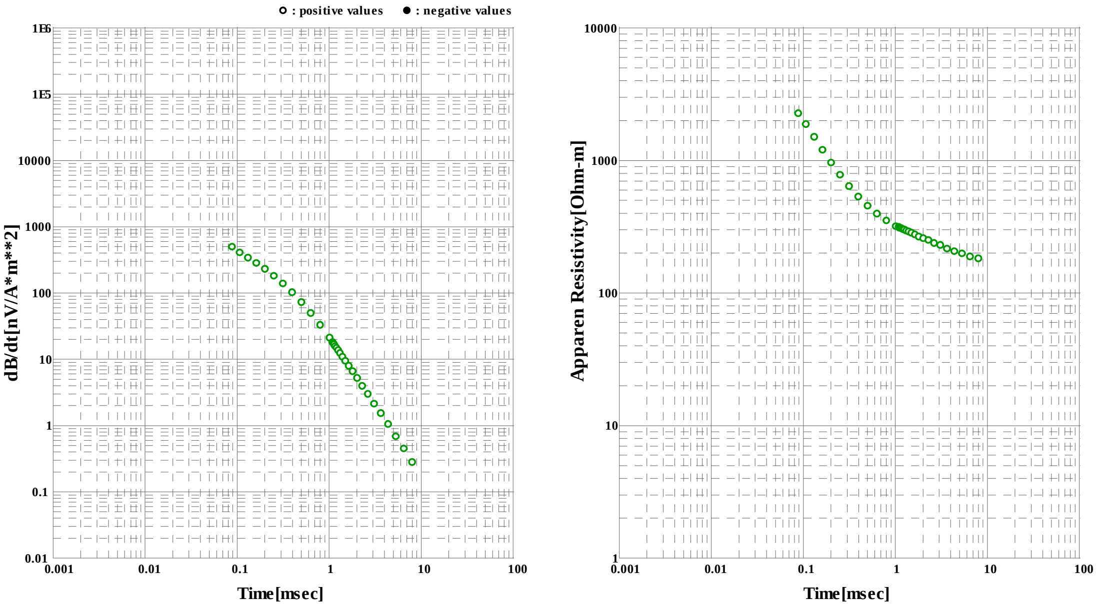
AZZ **site : 080N030E** **[79]**



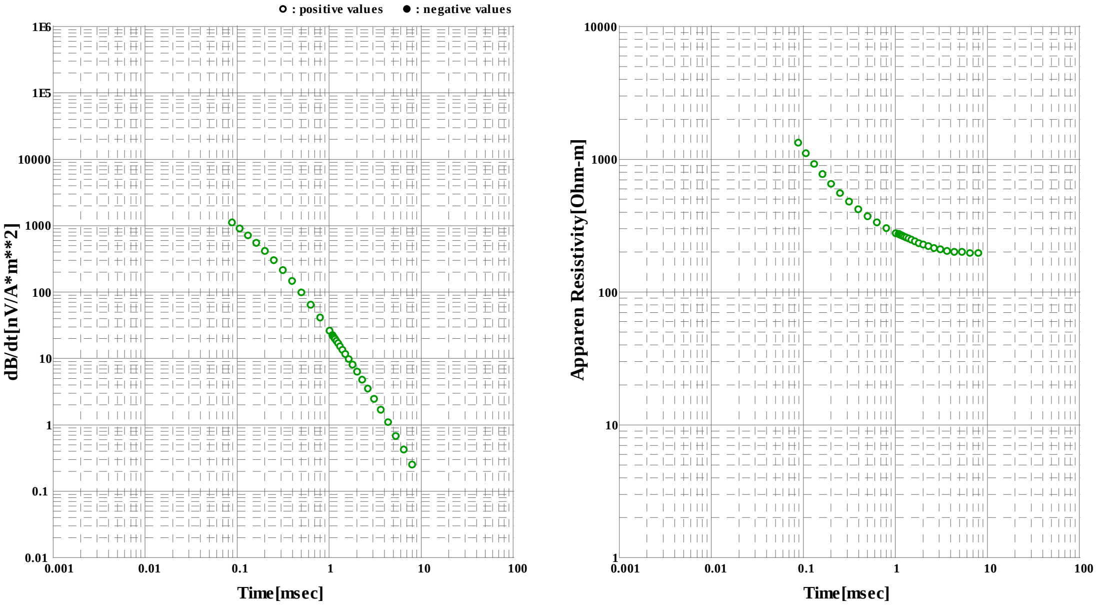
AZZ **site : 080N040E** **[80]**



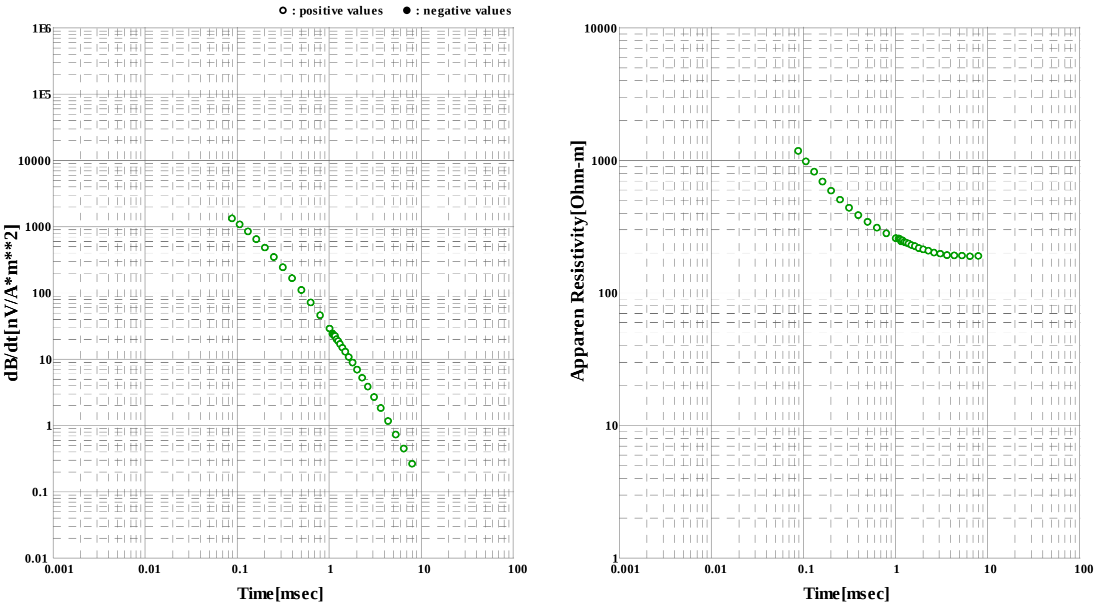
AZZ site : 080N045E [81]



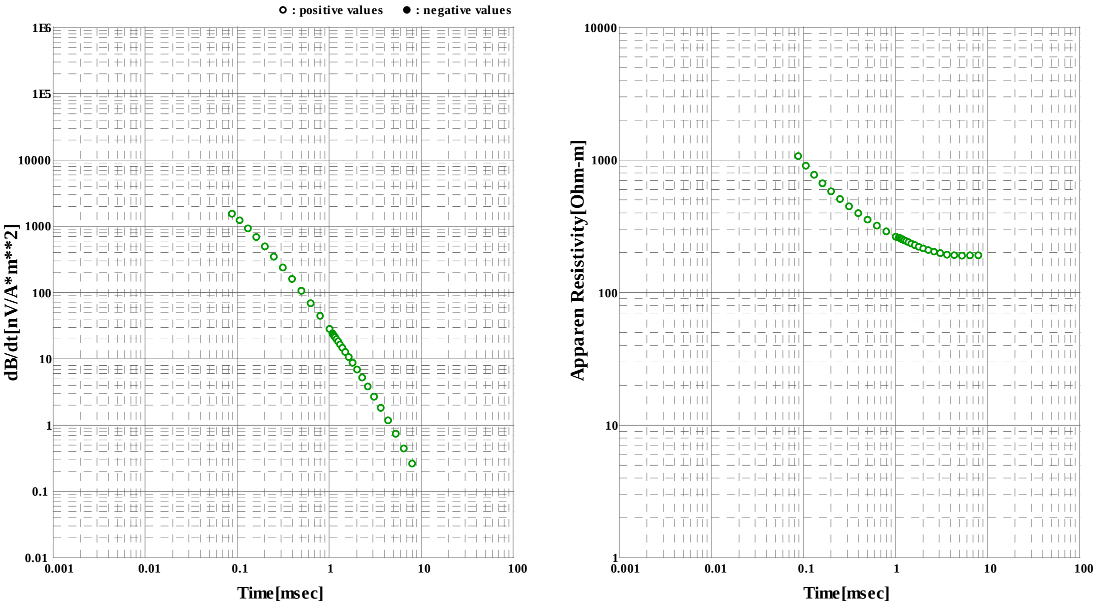
AZZ site : 080N050E [82]



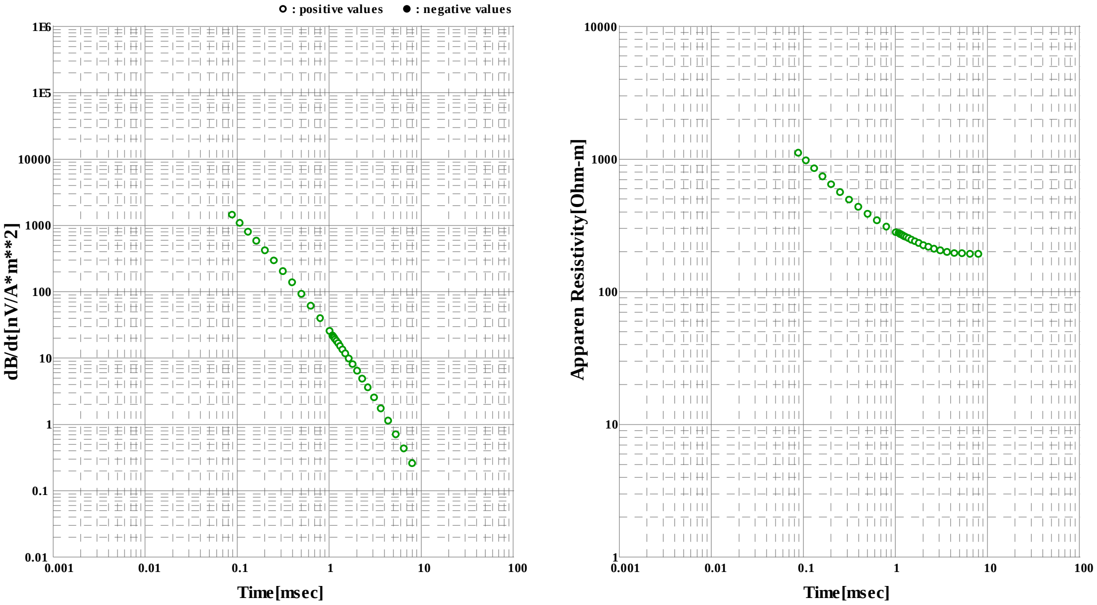
AZZ **site : 080N060E** **[83]**



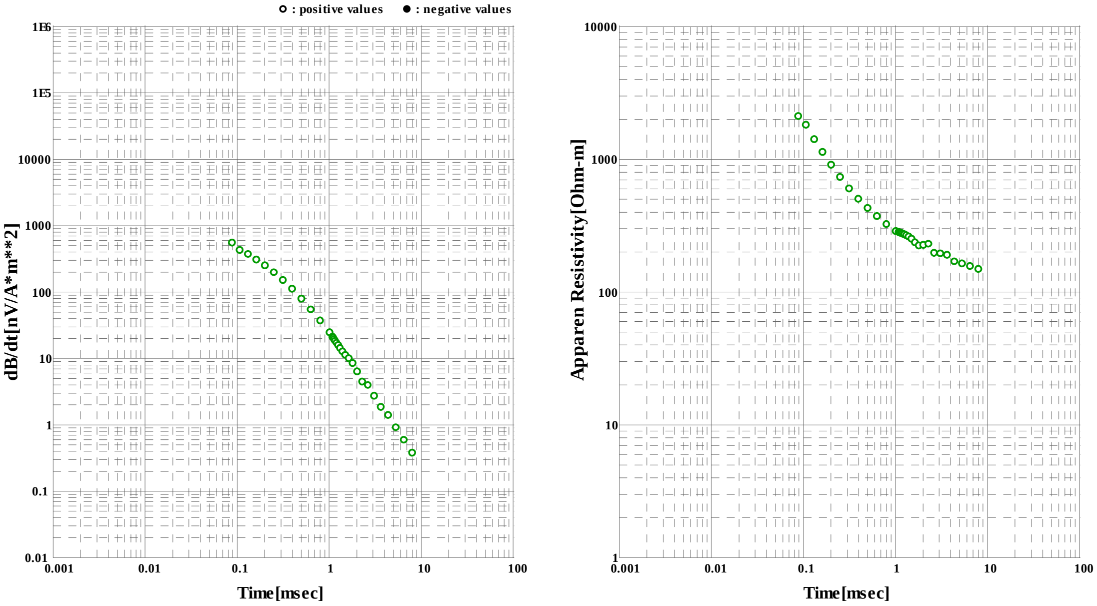
AZZ **site : 080N070E** **[84]**



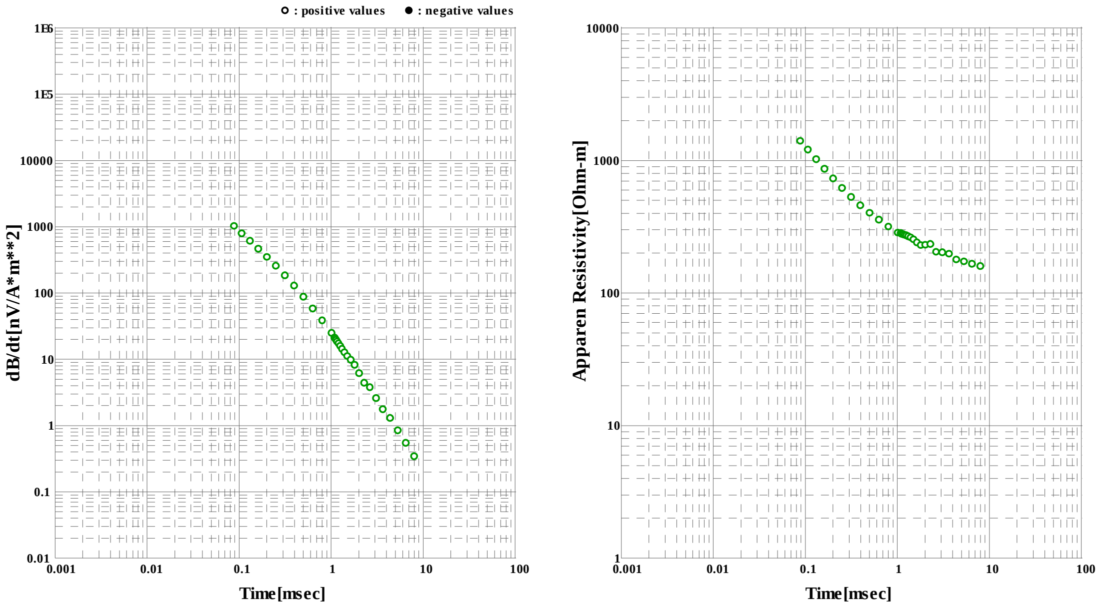
AZZ site : 080N080E [85]



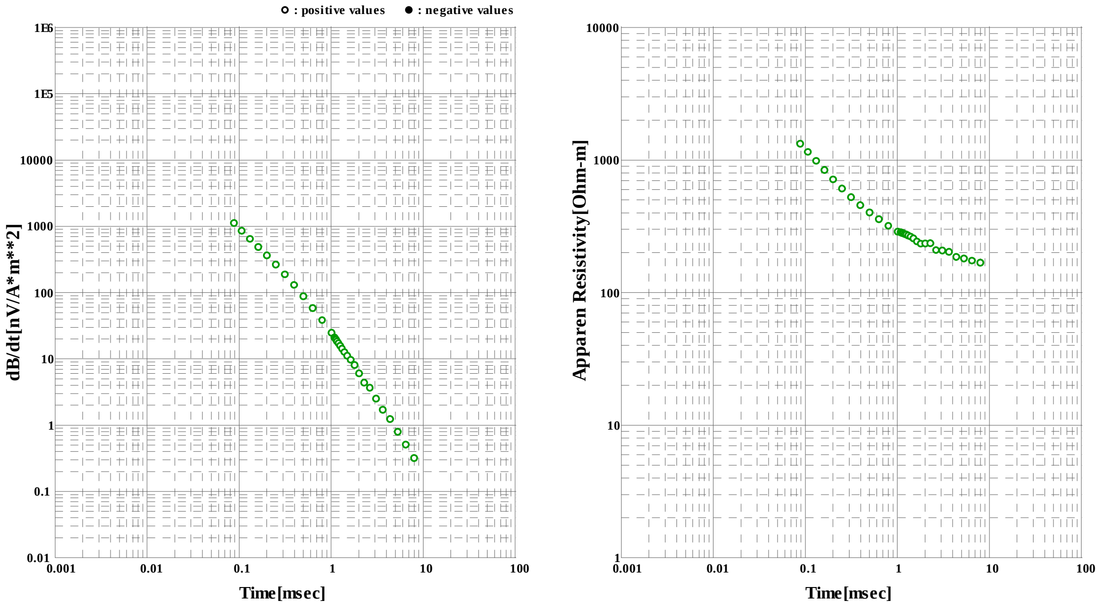
AZZ site : 090N010E [86]



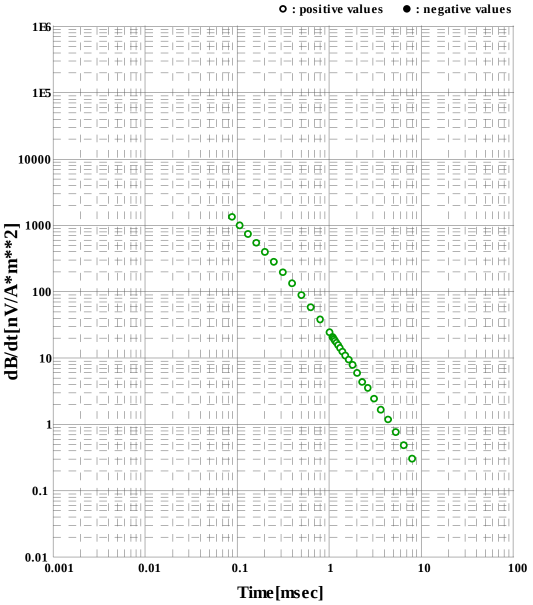
AZZ site : 090N020E [87]

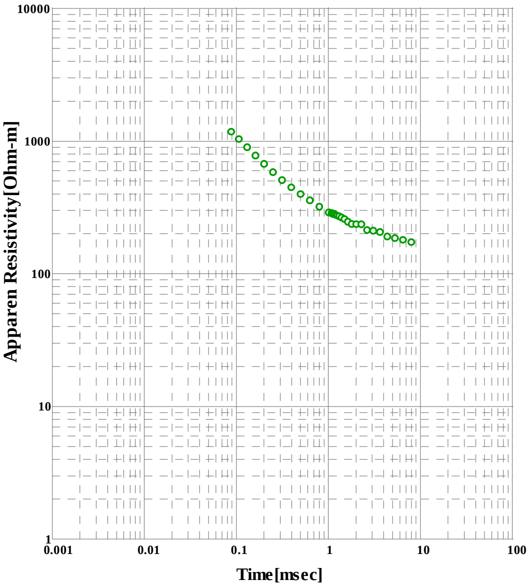


AZZ site : 090N030E [88]

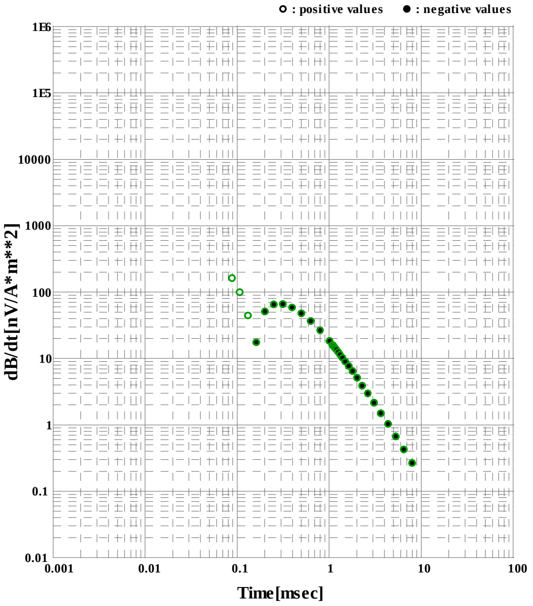


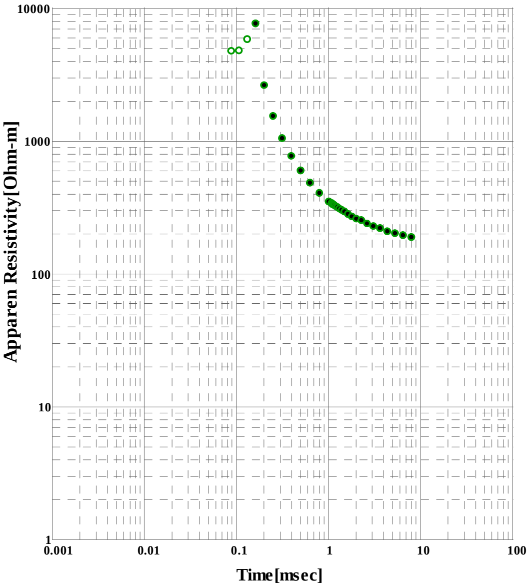
AZZ **site : 090N040E** **[89]**





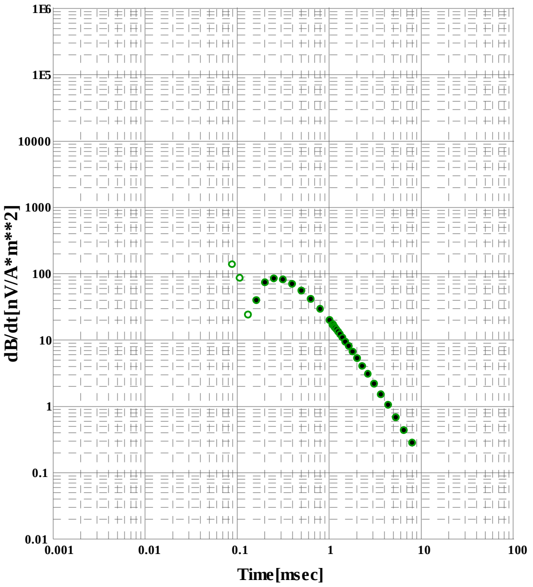
AZZ **site : 090N045E** **[90]**

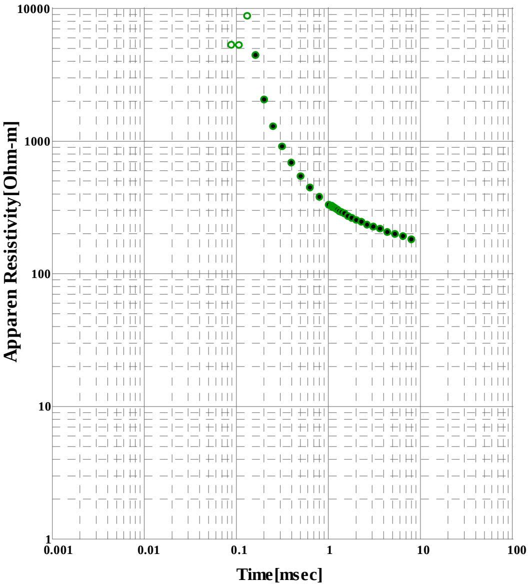




AZZ **site : 090N050E** **[91]**

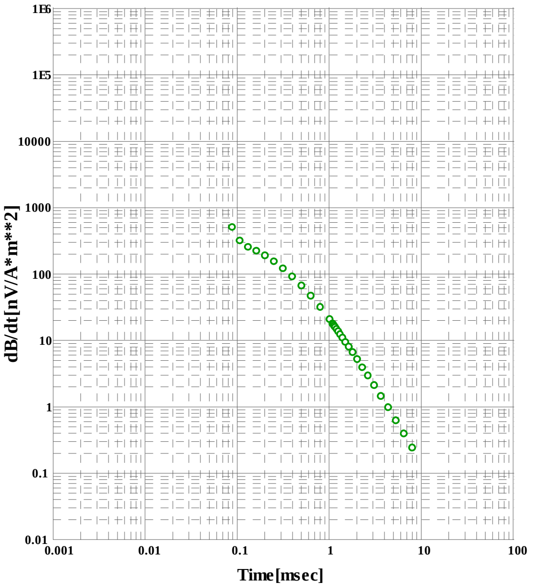
○ : positive values ● : negative values

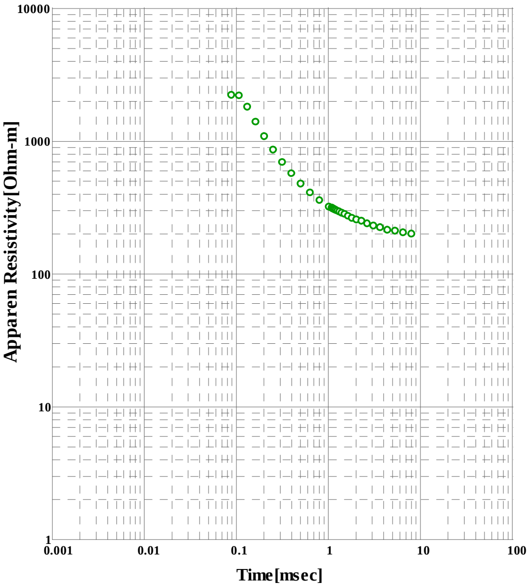




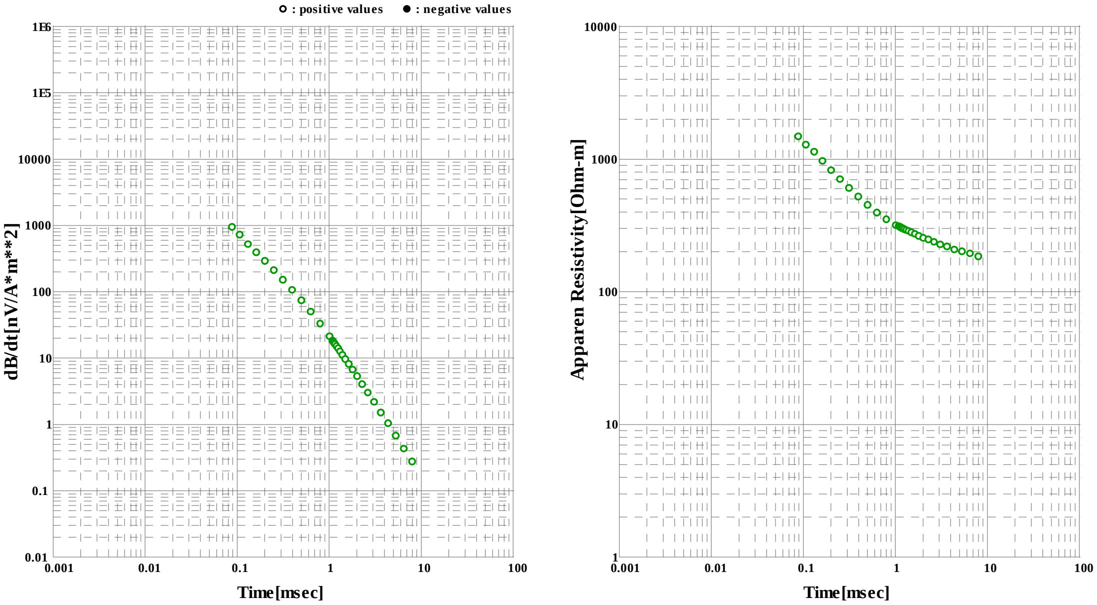
AZZ **site : 090N055E** **[92]**

○ : positive values ● : negative values

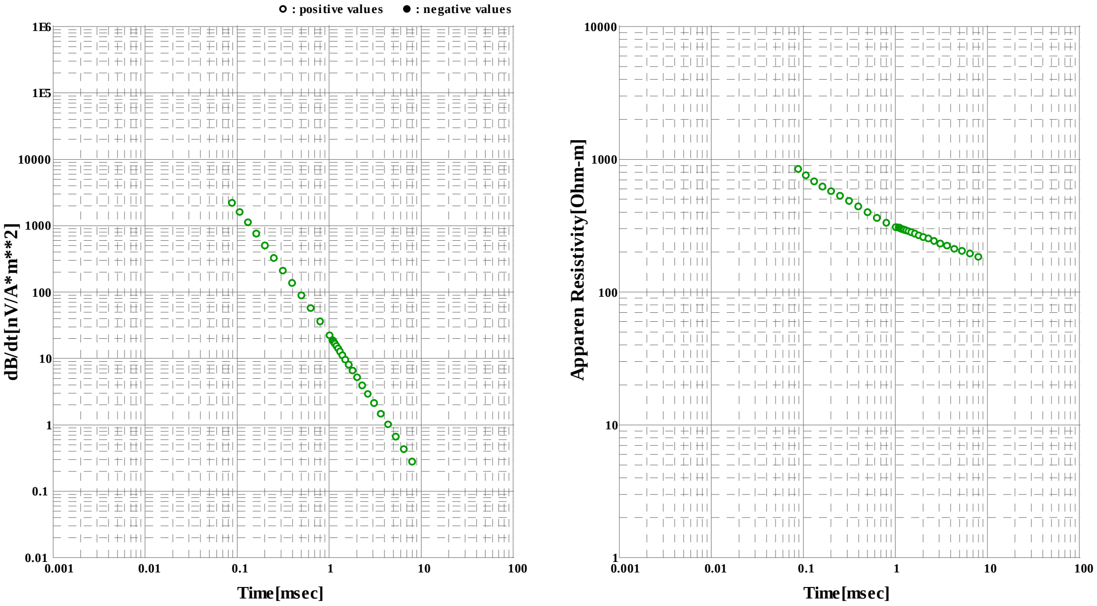




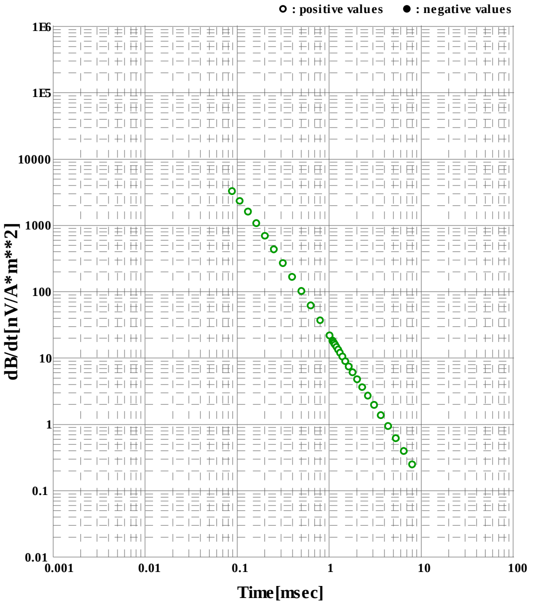
AZZ site : 090N060E [93]

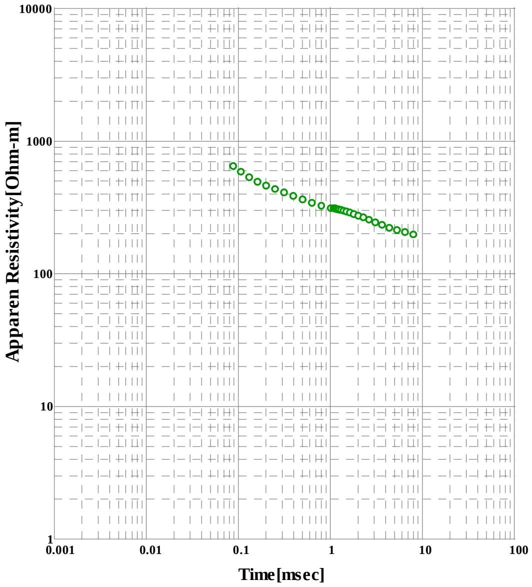


AZZ site : 090N070E [94]

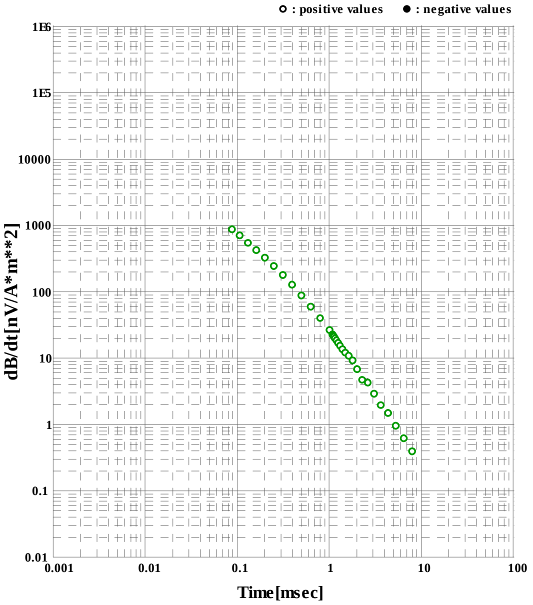


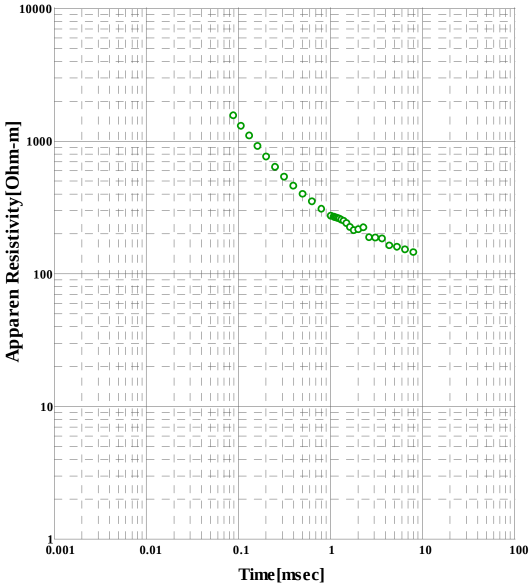
AZZ **site : 090N080E** **[95]**





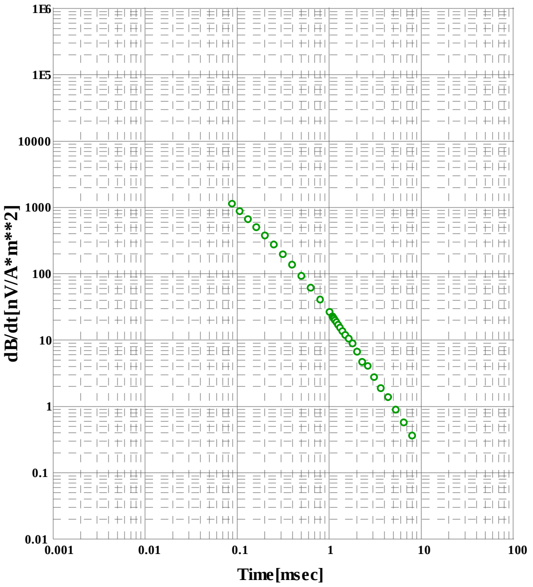
AZZ **site : 100N010E** **[96]**

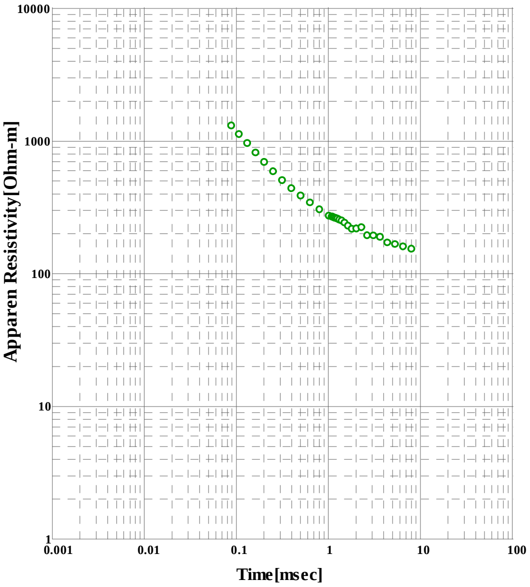




AZZ **site : 100N020E** **[97]**

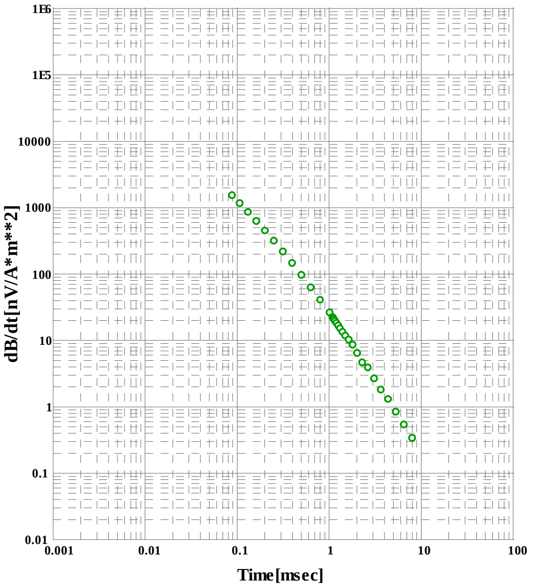
○ : positive values ● : negative values

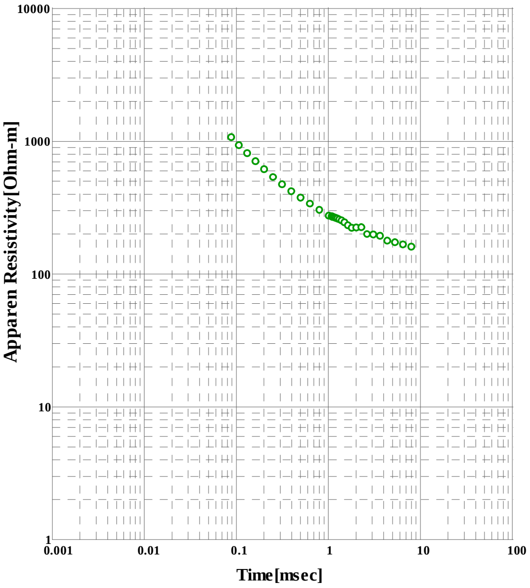




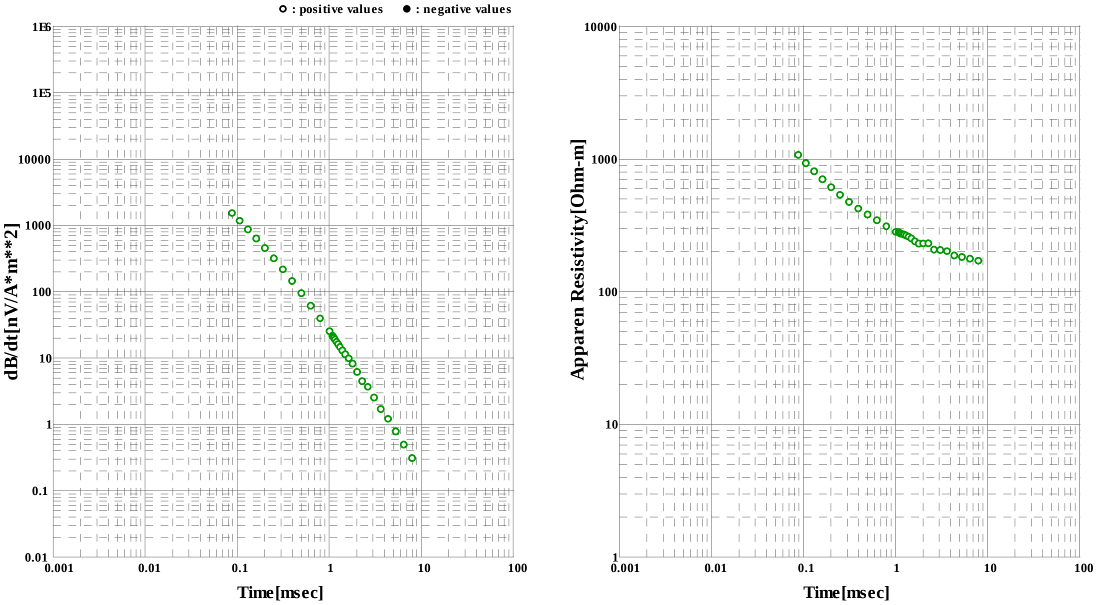
AZZ **site : 100N030E** **[98]**

○ : positive values ● : negative values

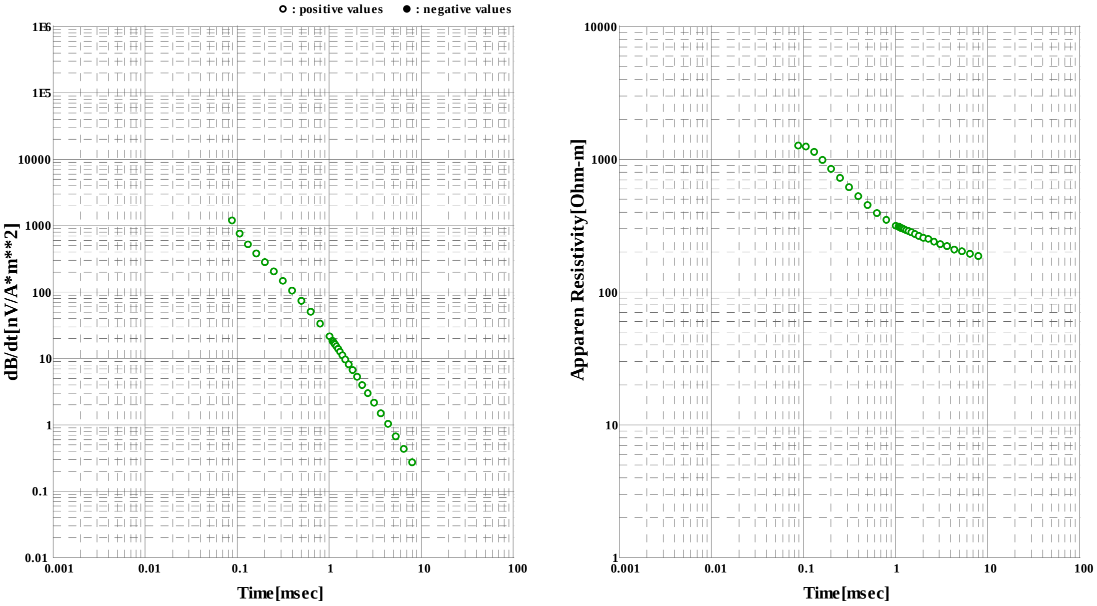




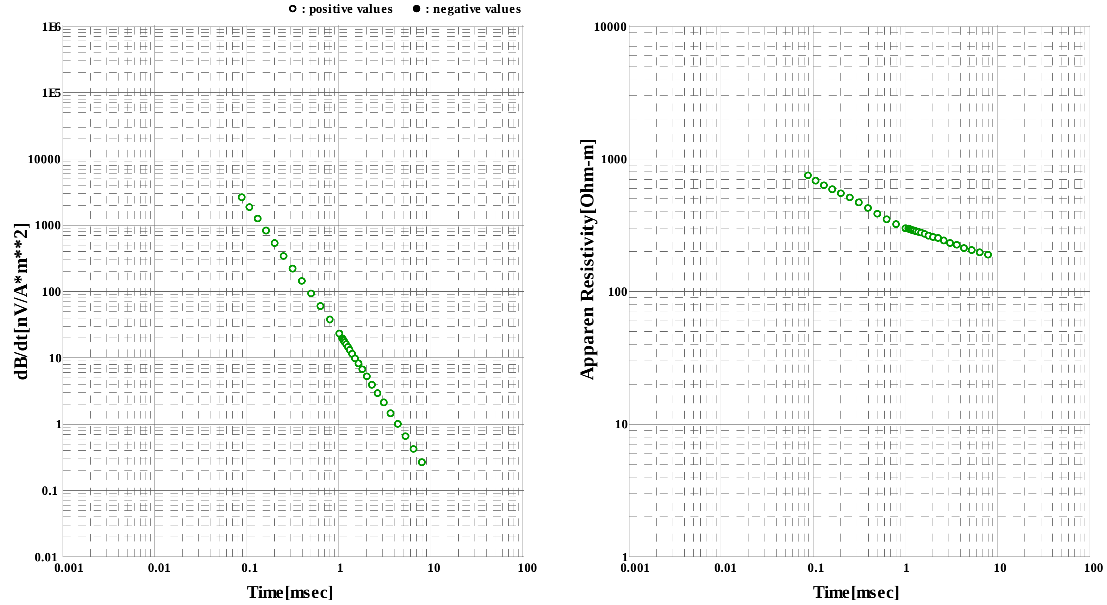
AZZ site : 100N040E [99]



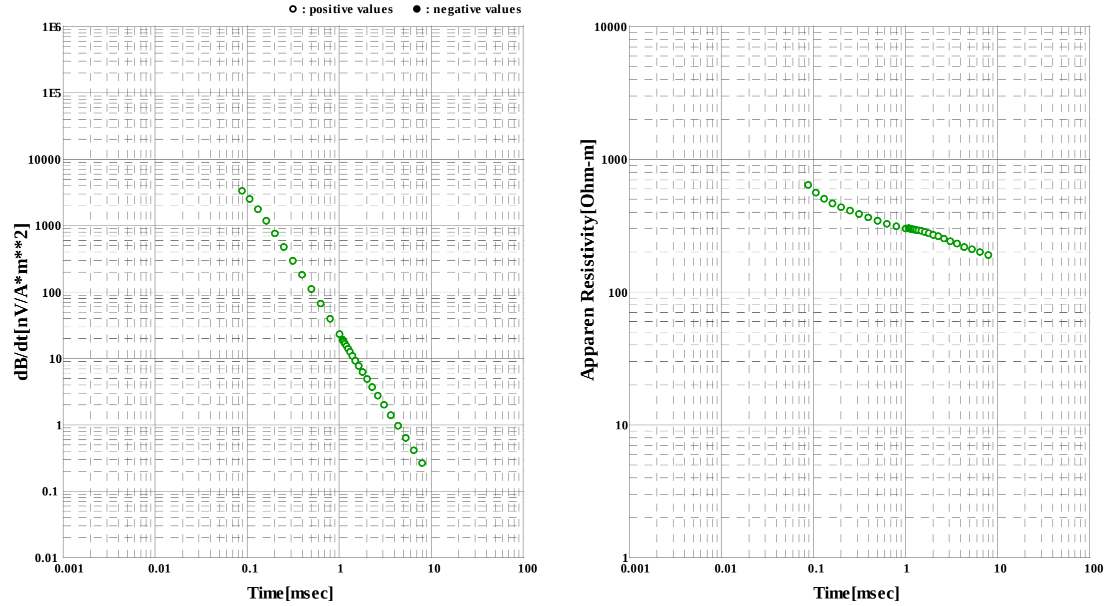
AZZ site : 100N050E [100]



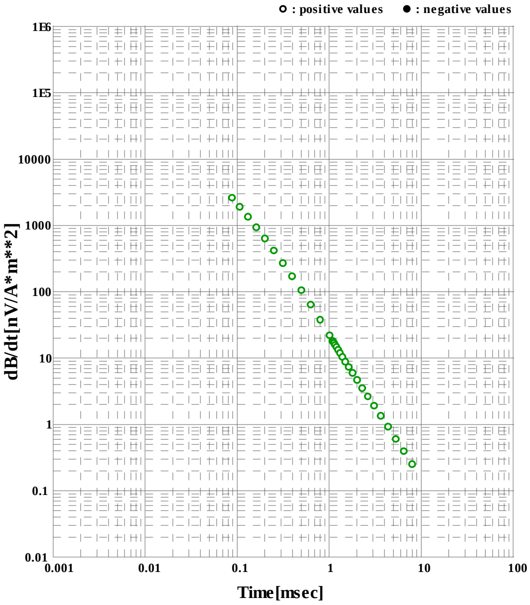
AZZ site : 100N060E [101]

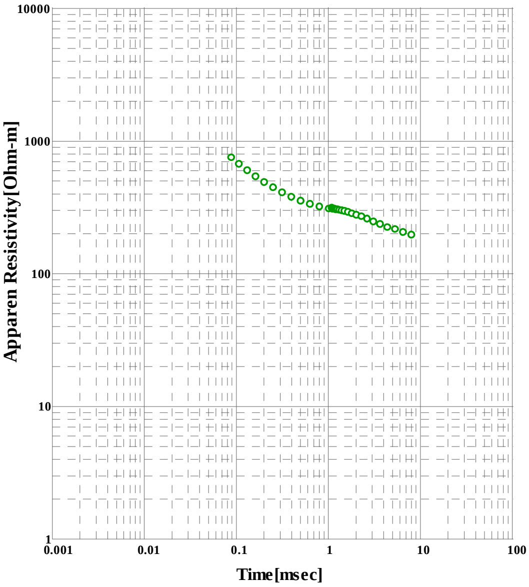


AZZ site : 100N070E [102]

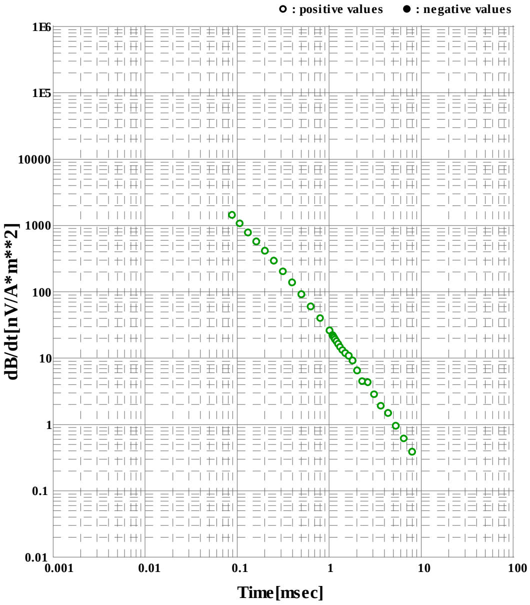


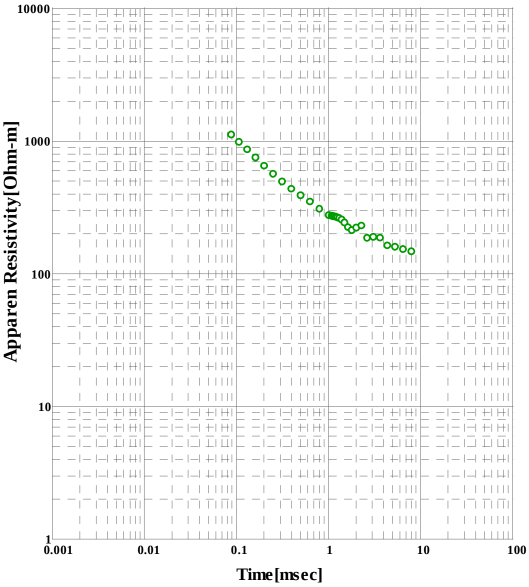
AZZ site : 100N080E [103]



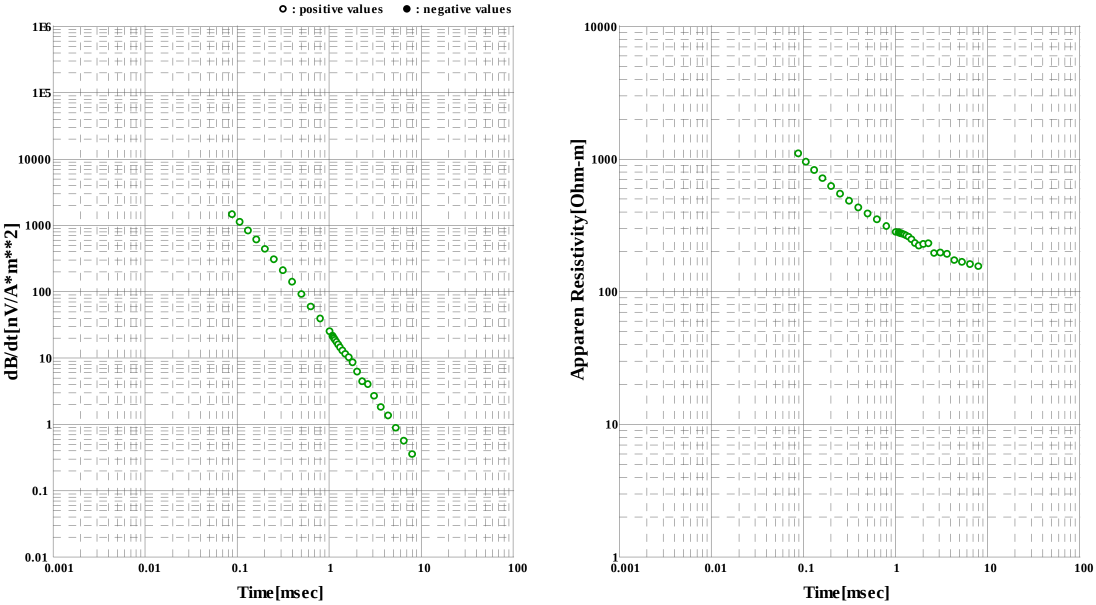


AZZ site : 110N010E [104]

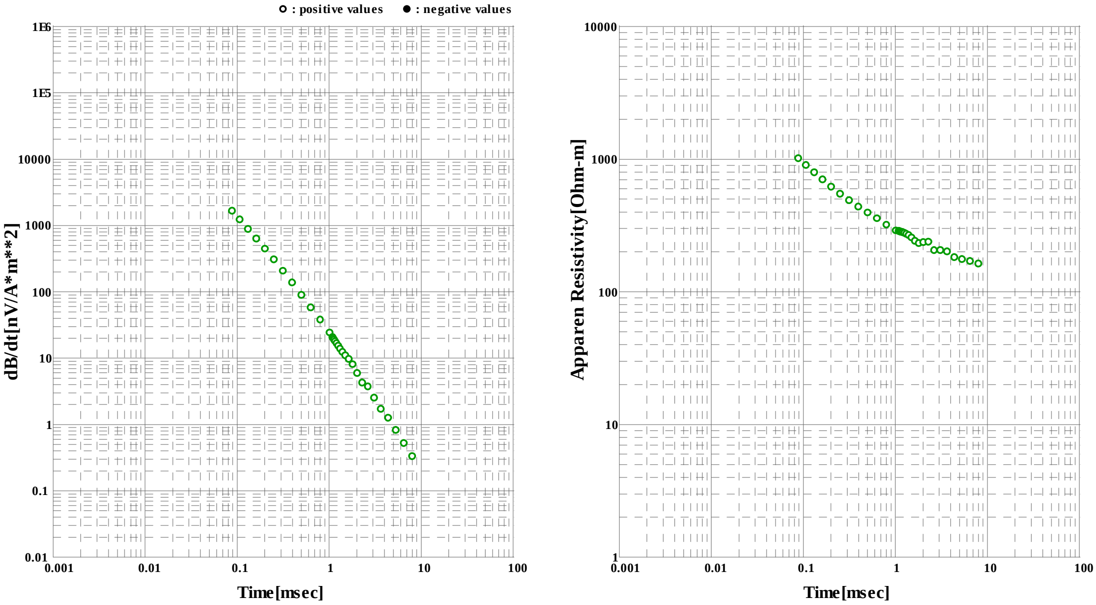




AZZ site : 110N020E [105]

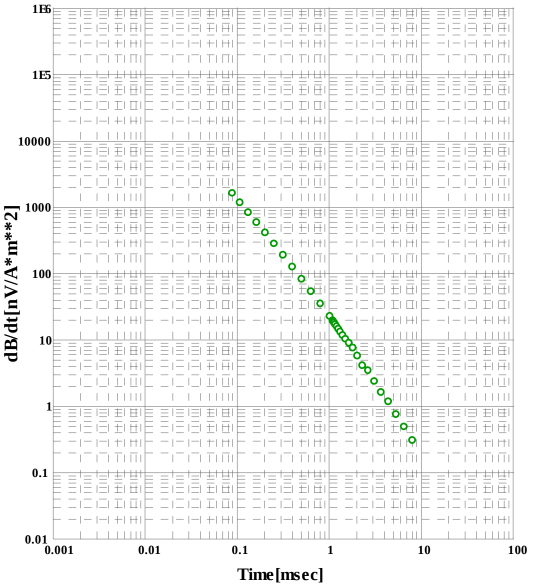


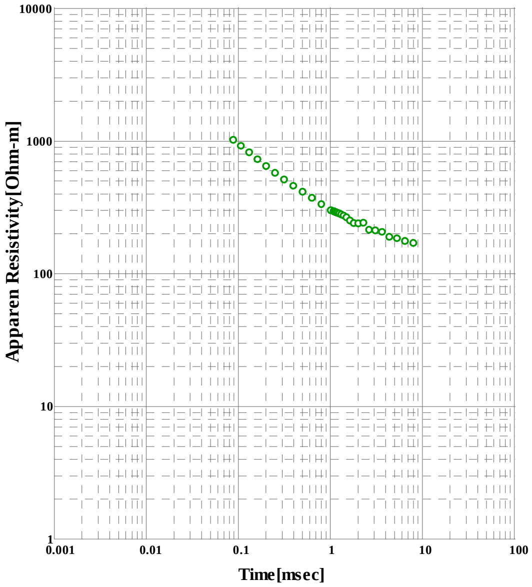
AZZ site : 110N030E [106]



AZZ site : 110N040E [107]

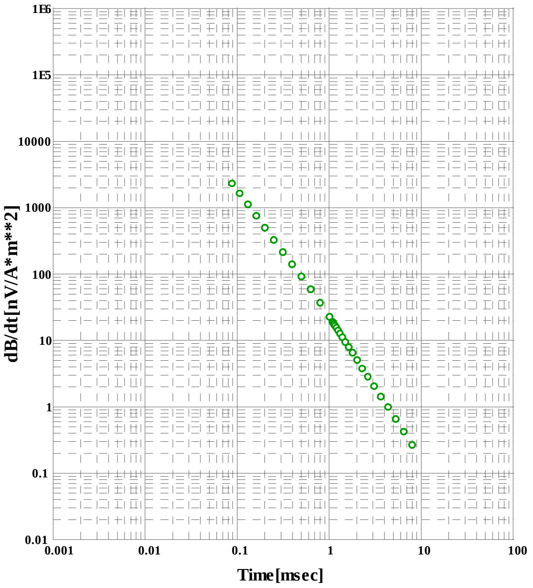
○ : positive values ● : negative values

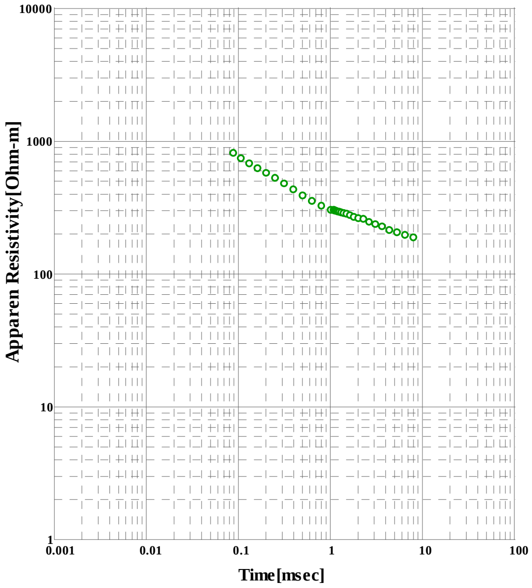




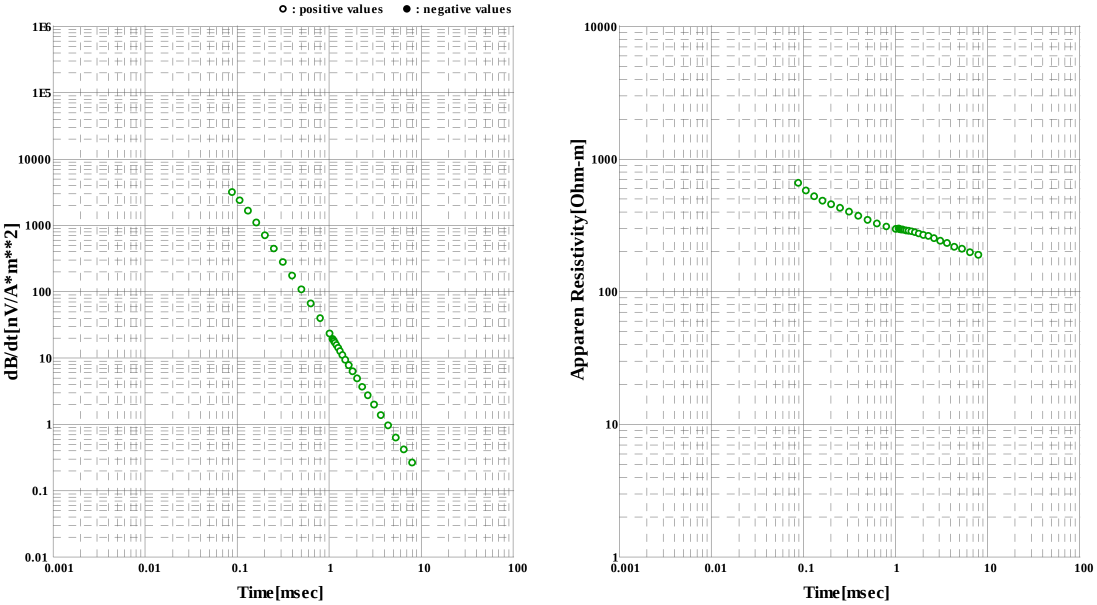
AZZ site : 110N050E [108]

○ : positive values ● : negative values

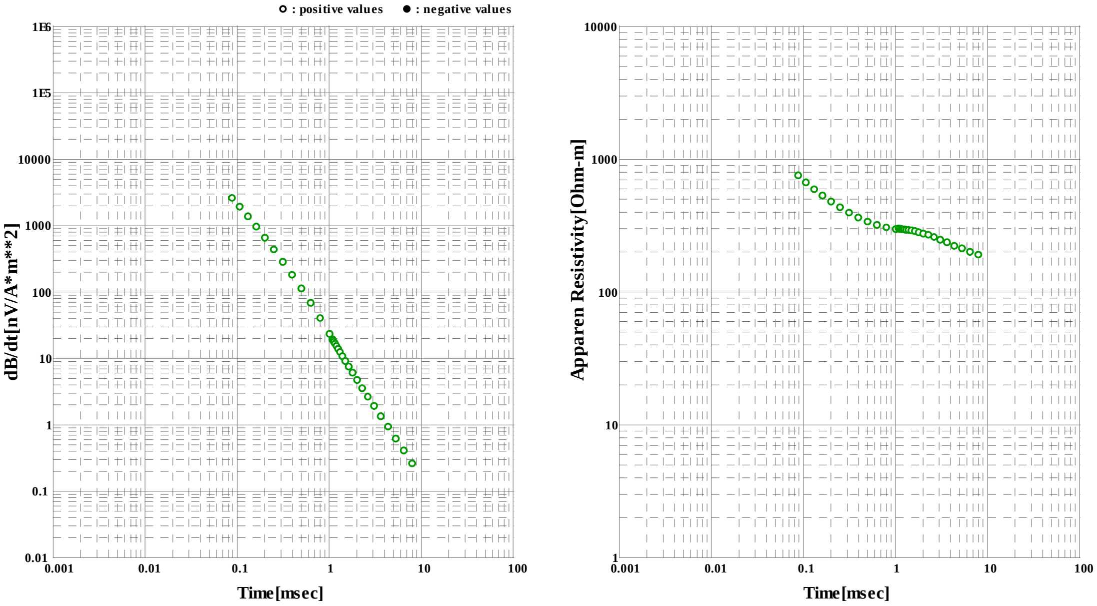




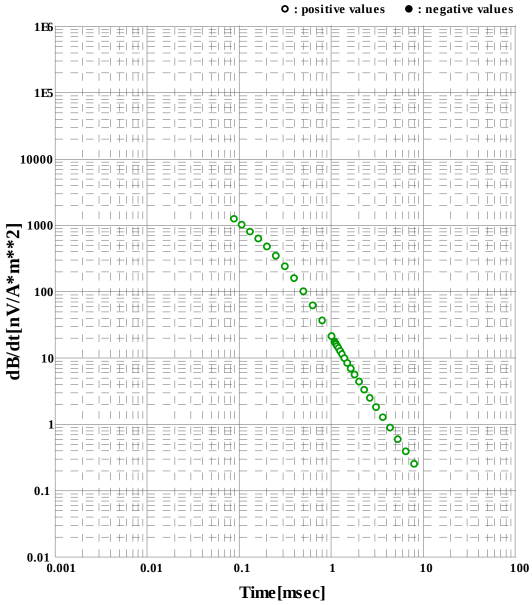
AZZ site : 110N060E [109]

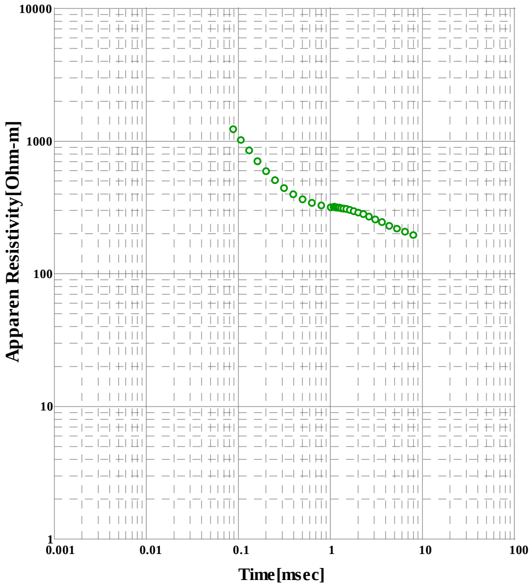


AZZ site : 110N070E [110]

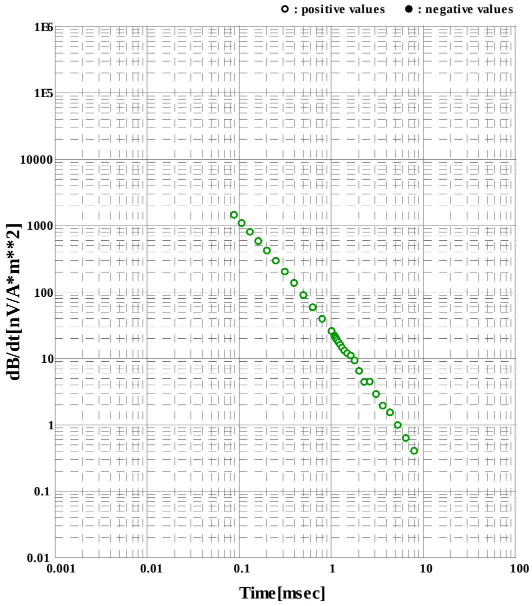


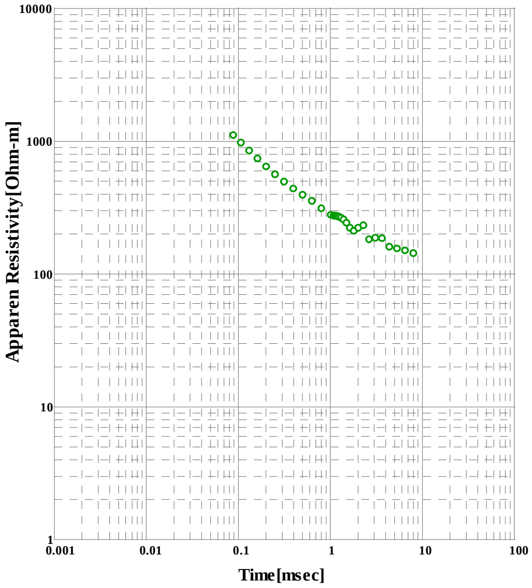
AZZ **site : 110N080E** **[111]**



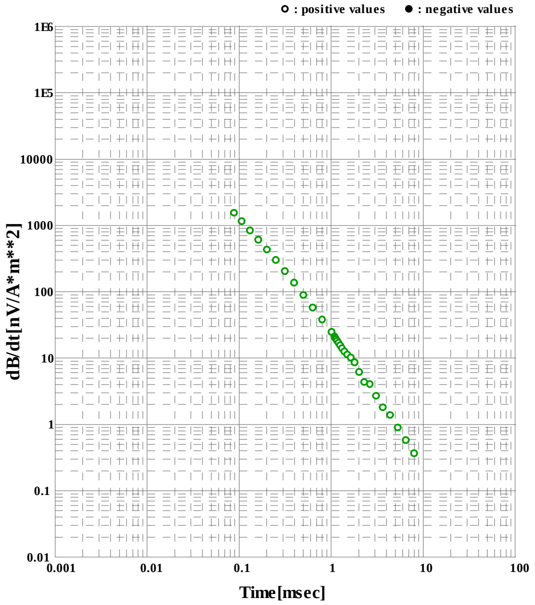


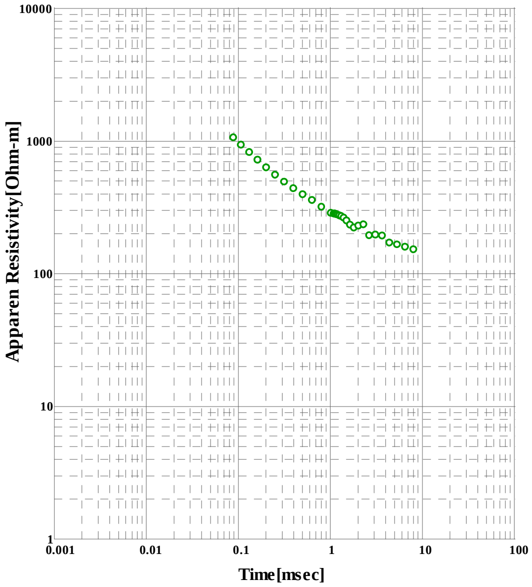
AZZ **site : 120N010E** **[112]**



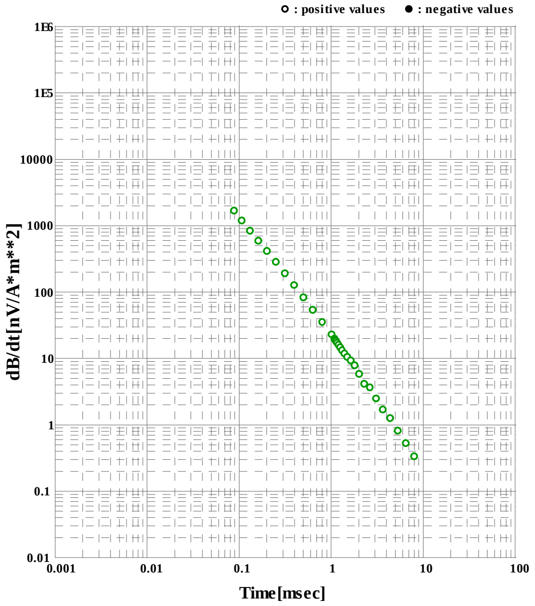


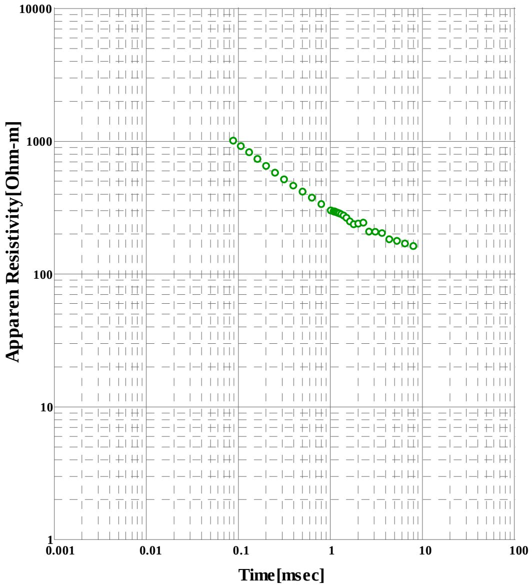
AZZ **site : 120N020E** **[113]**



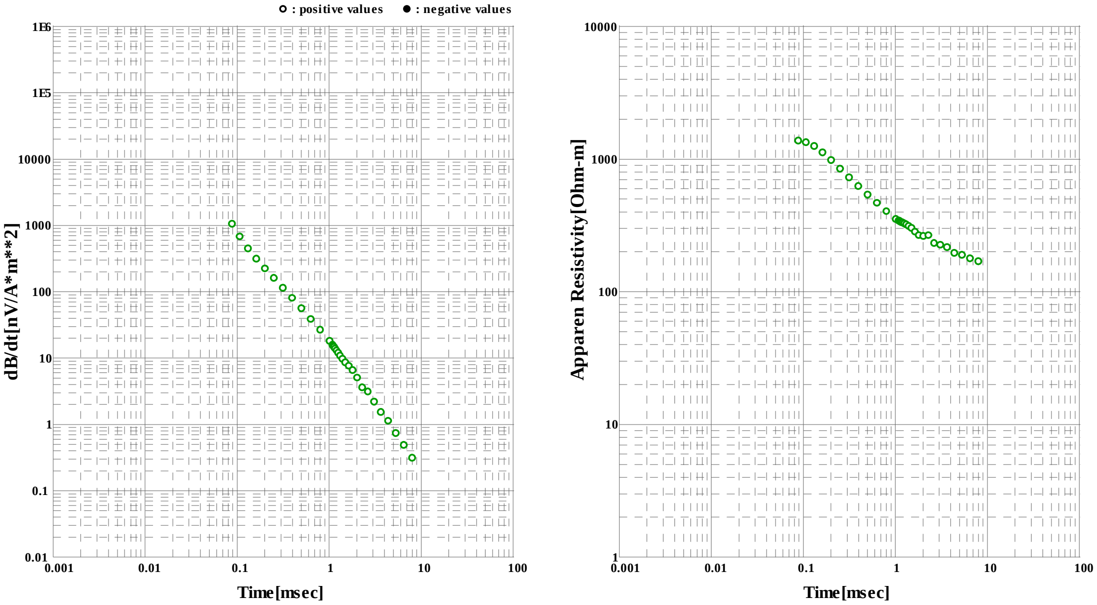


AZZ **site : 120N030E** **[114]**

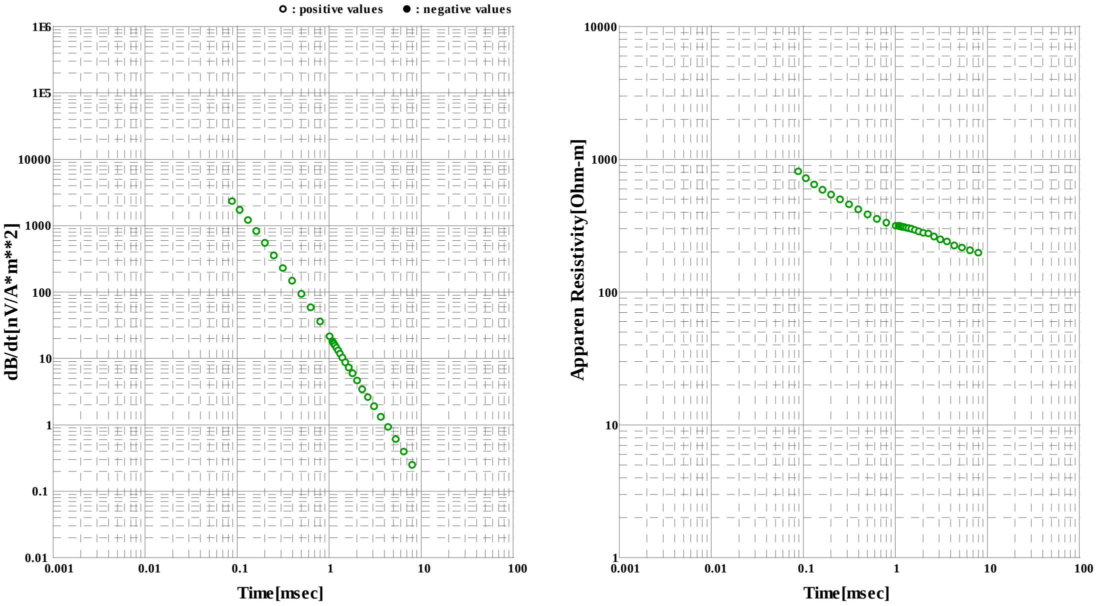




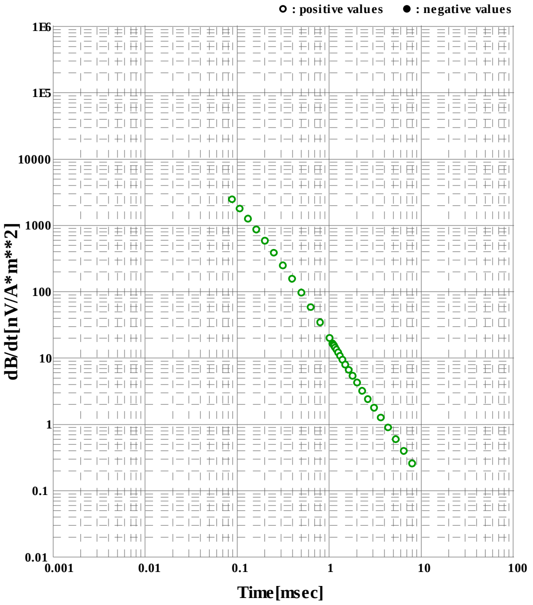
AZZ site : 120N040E [115]

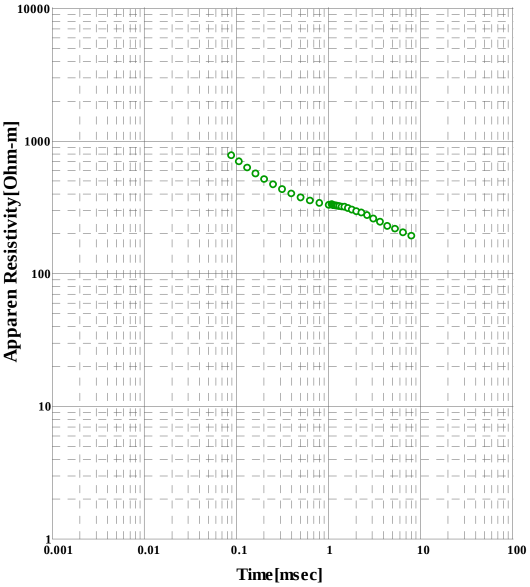


AZZ site : 120N050E [116]

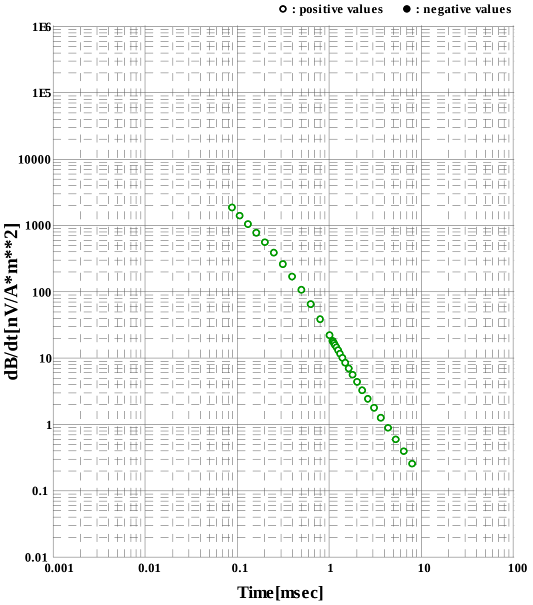


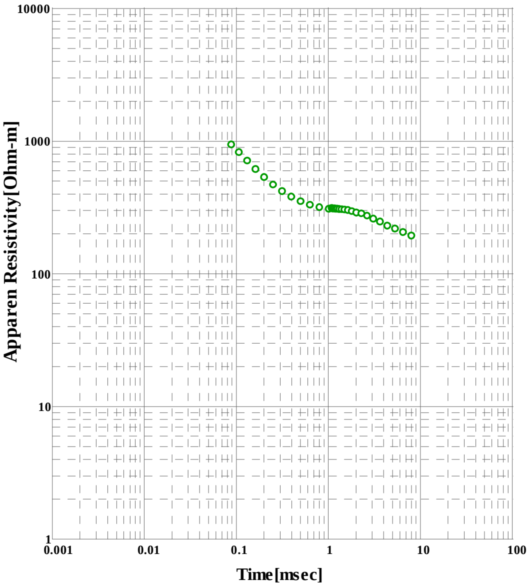
AZZ **site : 120N060E** **[117]**



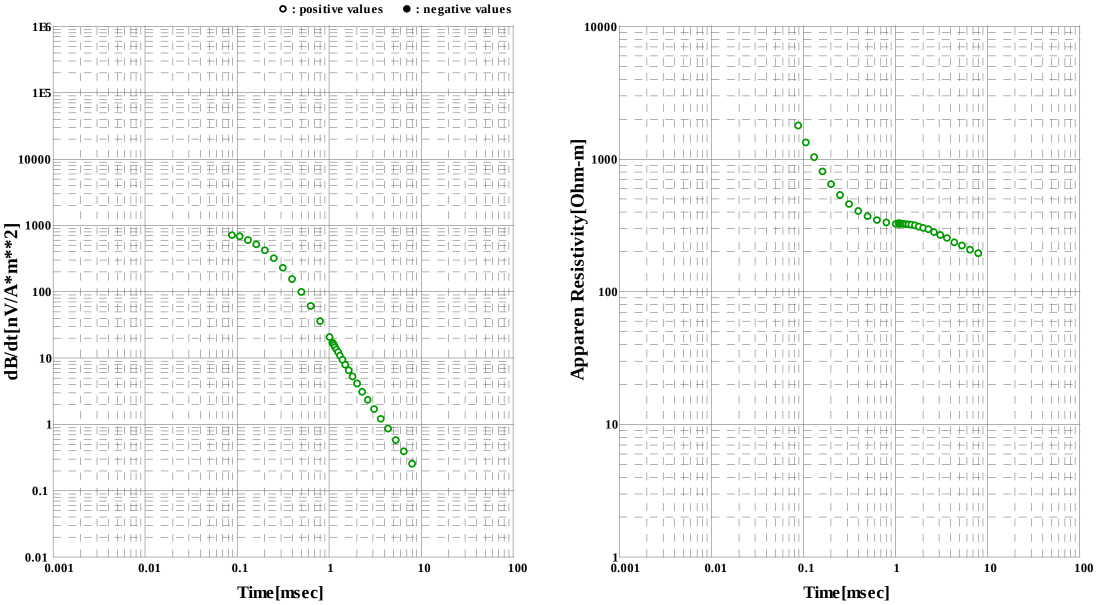


AZZ **site : 120N070E** **[118]**

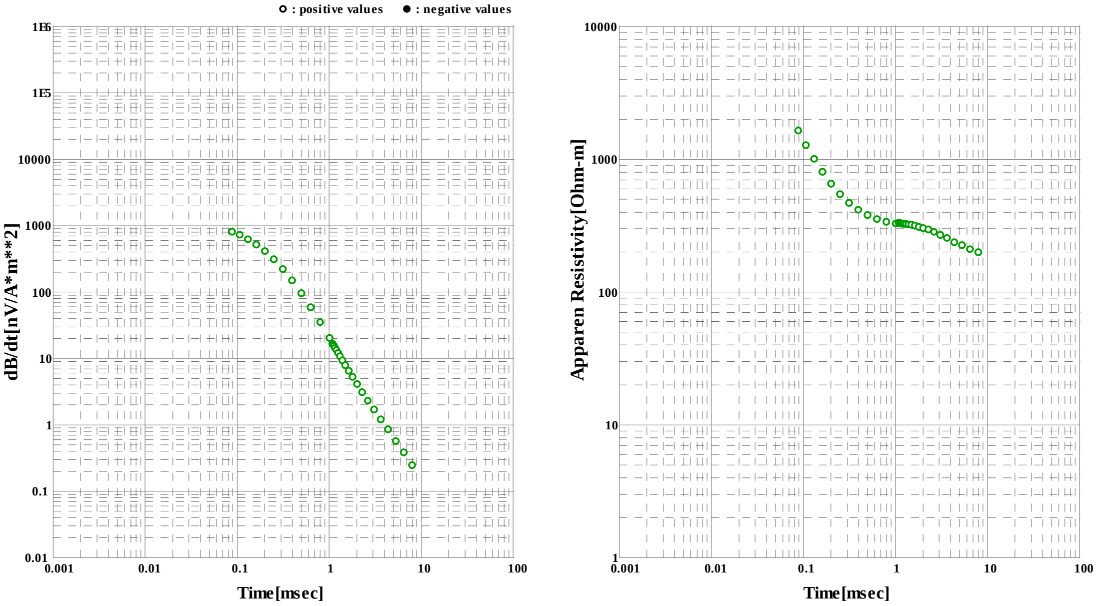




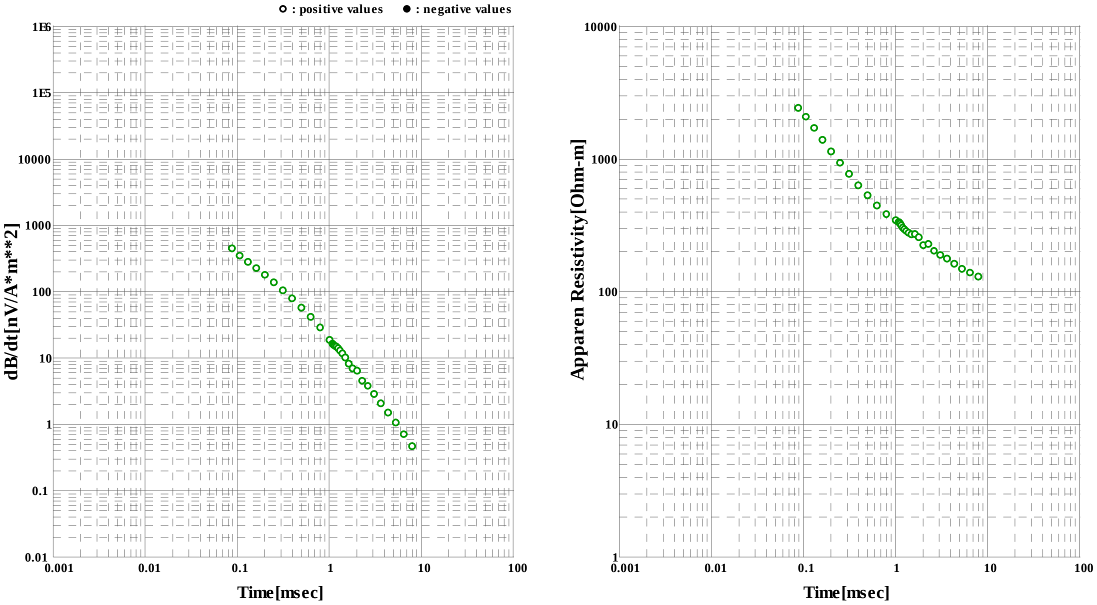
AZZ **site : 120N080E** **[119]**



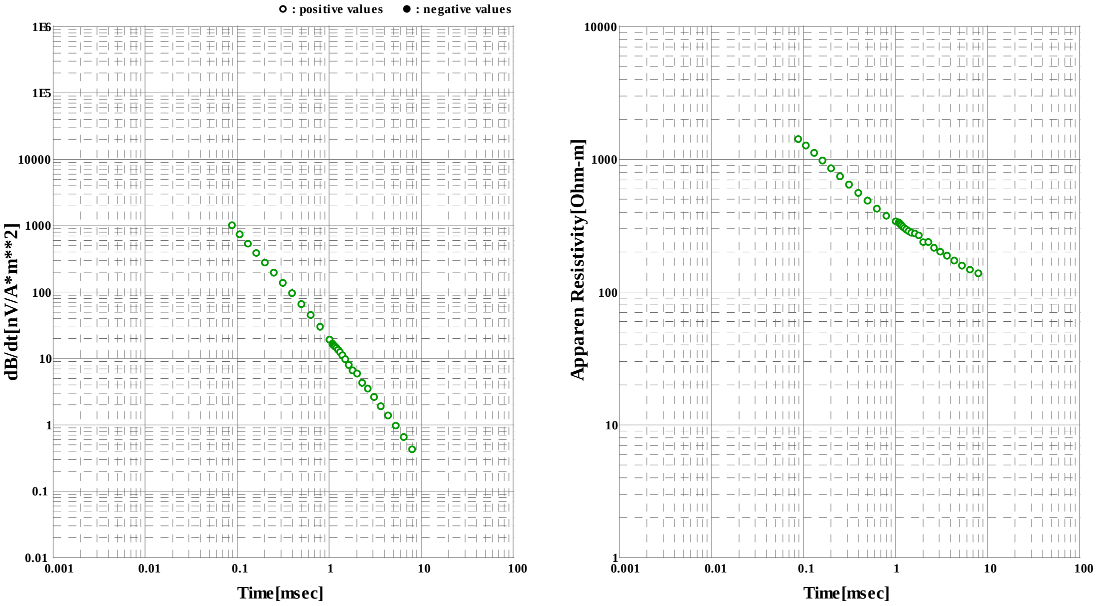
AZZ **site : 120N085E** **[120]**



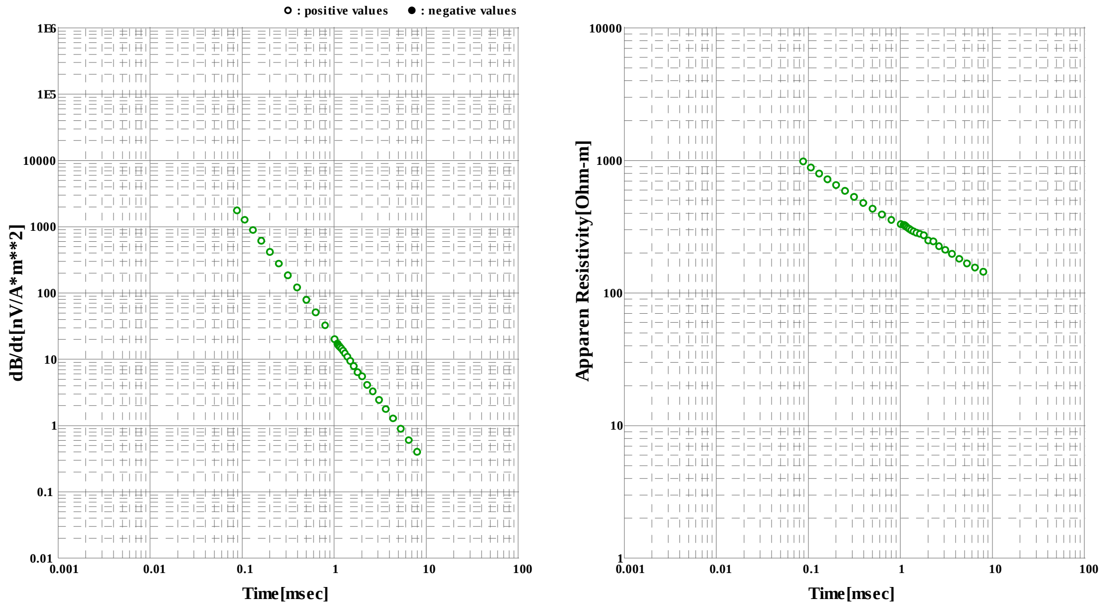
AZZ **site : 130N010E** **[121]**



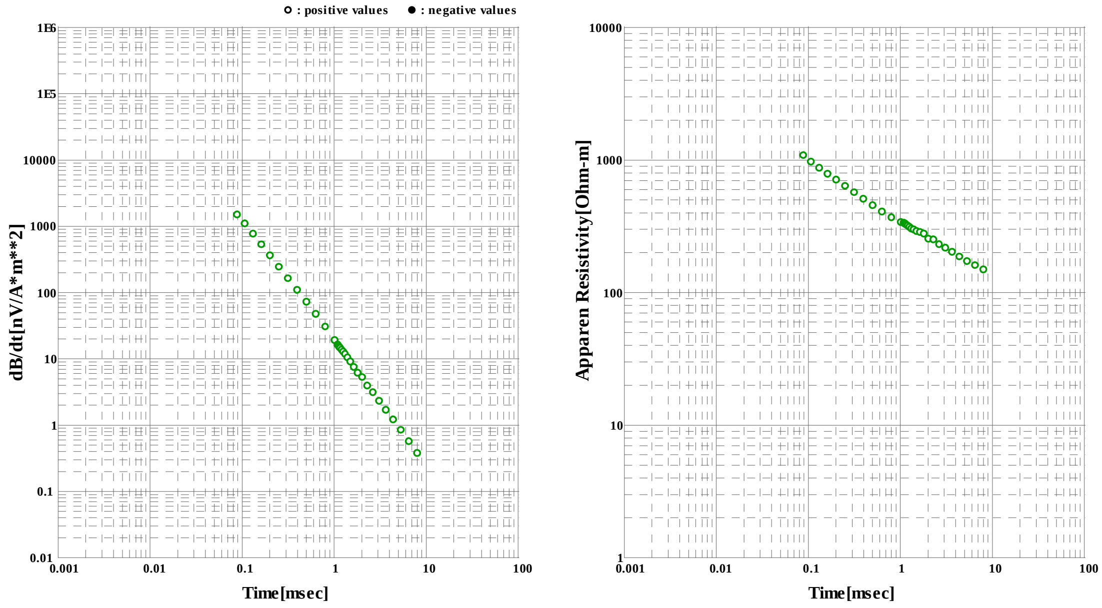
AZZ **site : 130N020E** **[122]**



AZZ **site : 130N030E** **[123]**

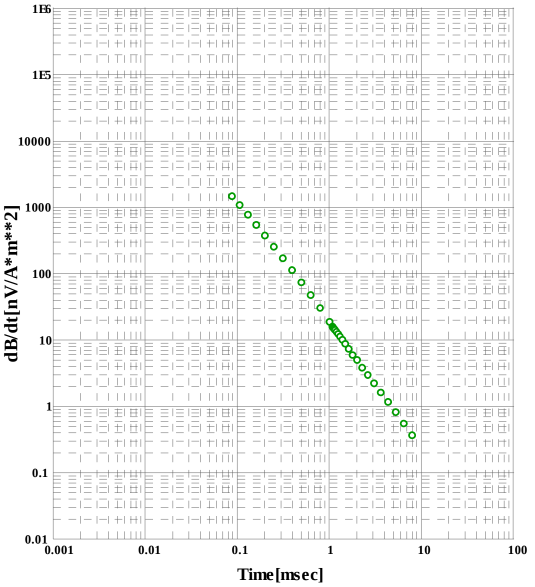


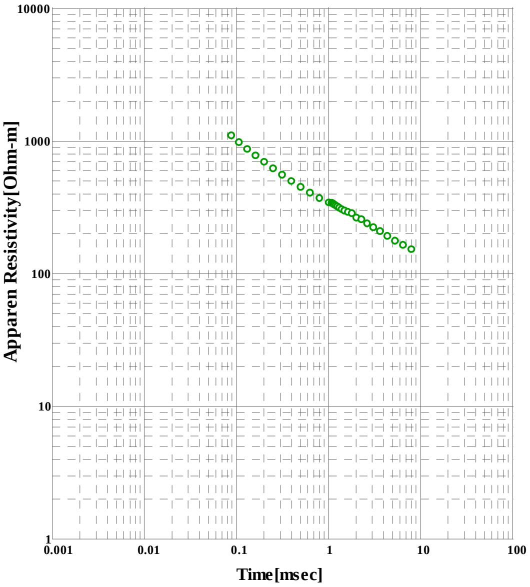
AZZ **site : 130N035E** **[124]**



AZZ **site : 130N040E** **[125]**

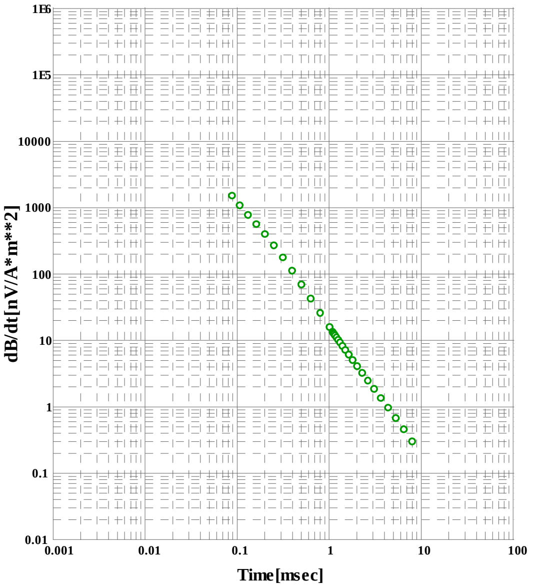
○ : positive values ● : negative values

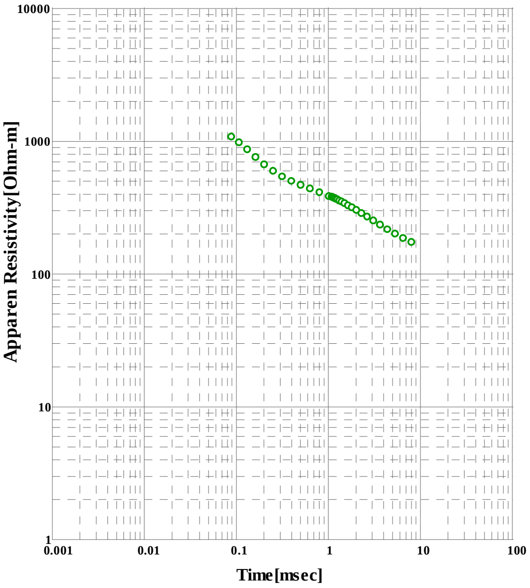




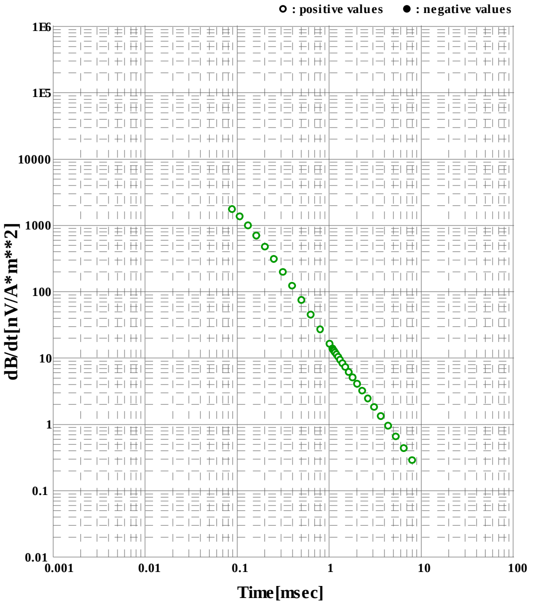
AZZ **site : 130N050E** **[126]**

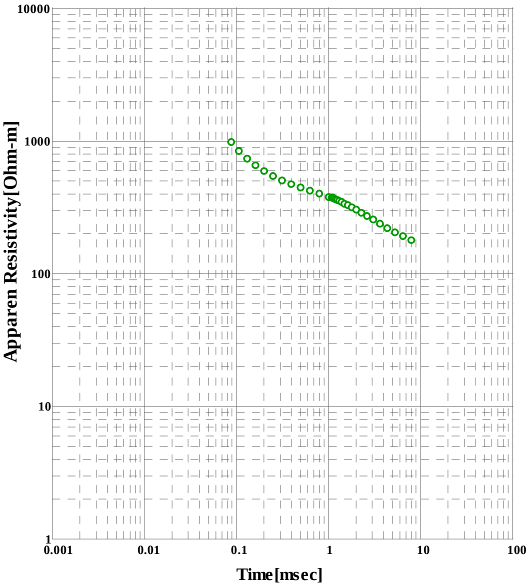
○ : positive values ● : negative values



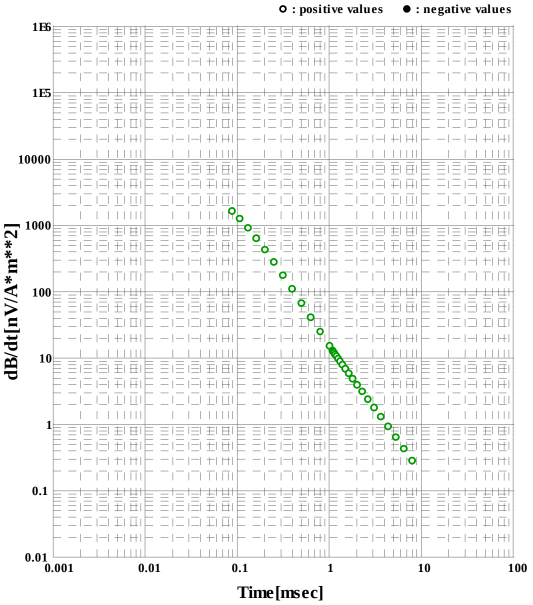


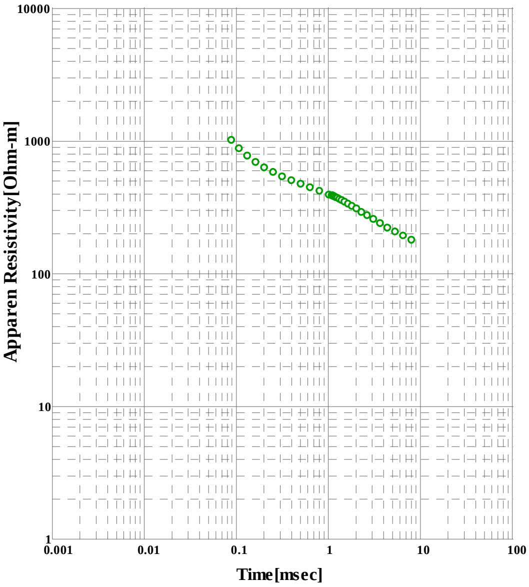
AZZ **site : 130N060E** **[127]**





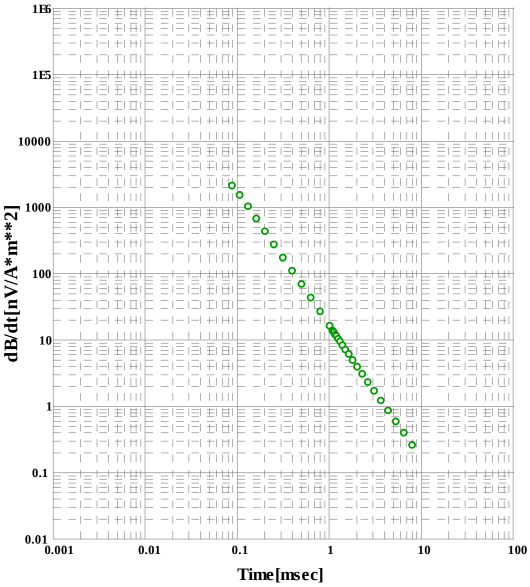
AZZ **site : 130N070E** **[128]**

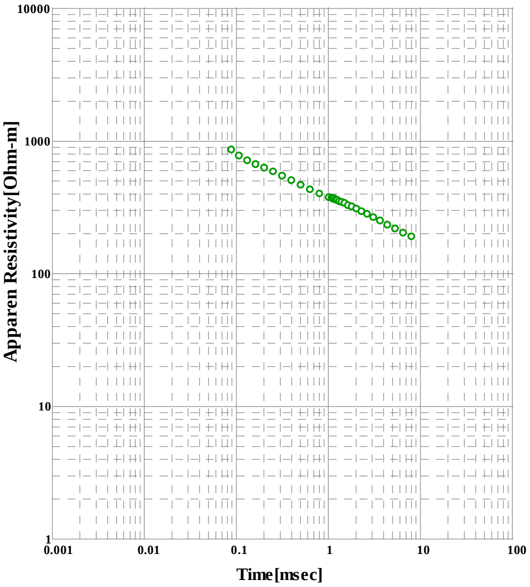




AZZ site : 130N080E [129]

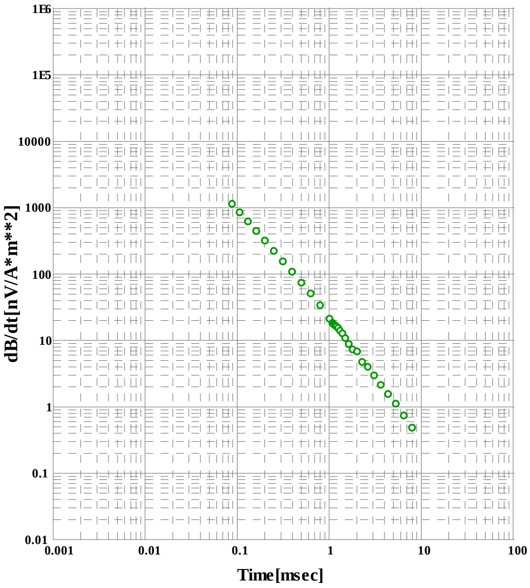
○ : positive values ● : negative values

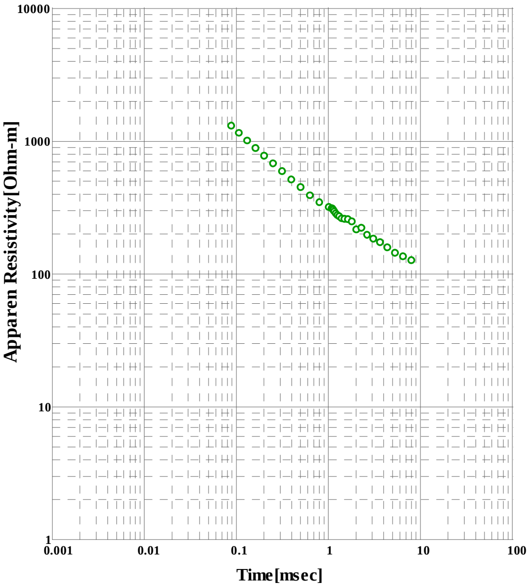




AZZ site : 140N010E [130]

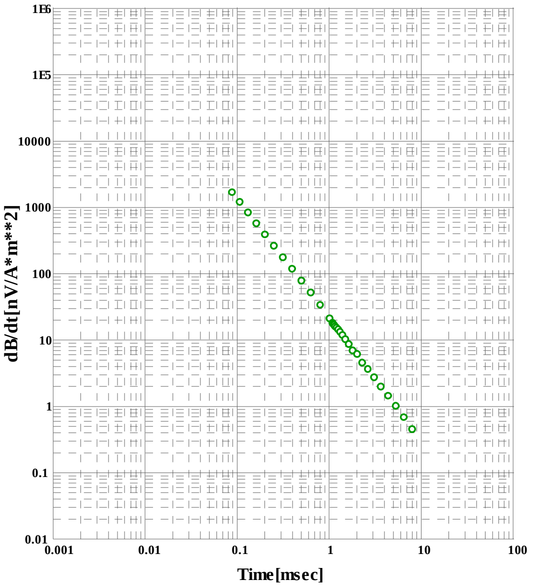
○ : positive values ● : negative values

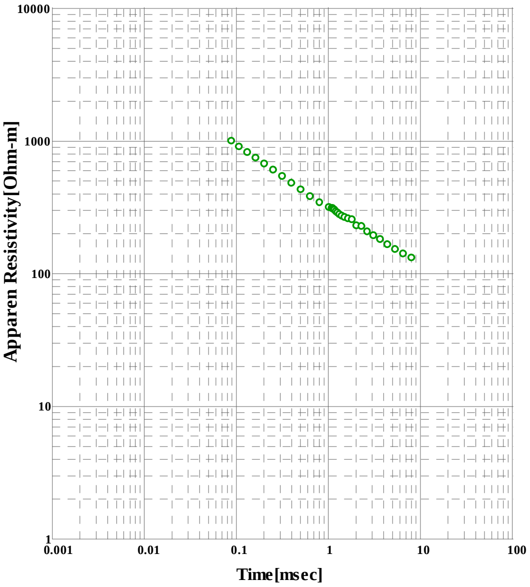




AZZ **site : 140N020E** **[131]**

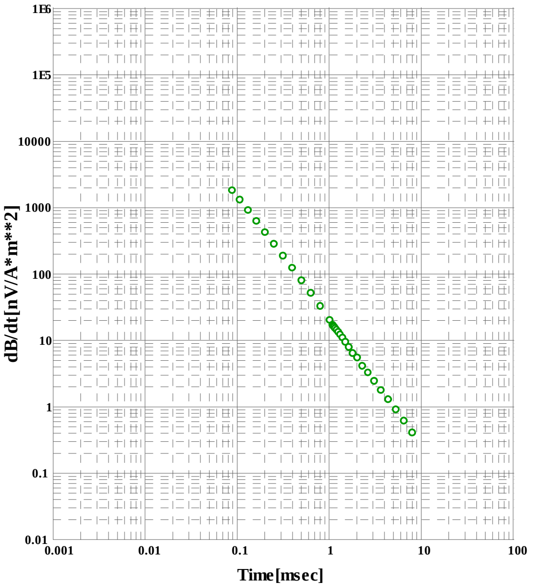
○ : positive values ● : negative values

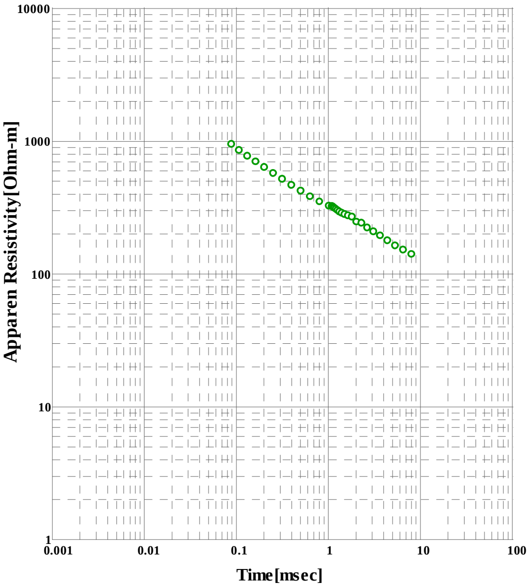




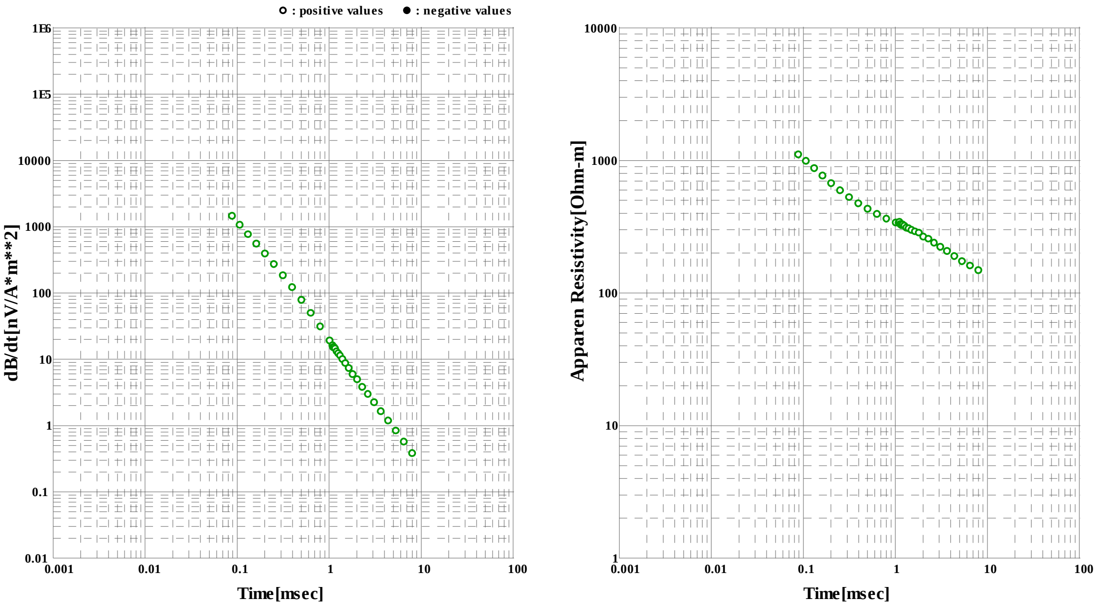
AZZ **site : 140N030E** **[132]**

○ : positive values ● : negative values

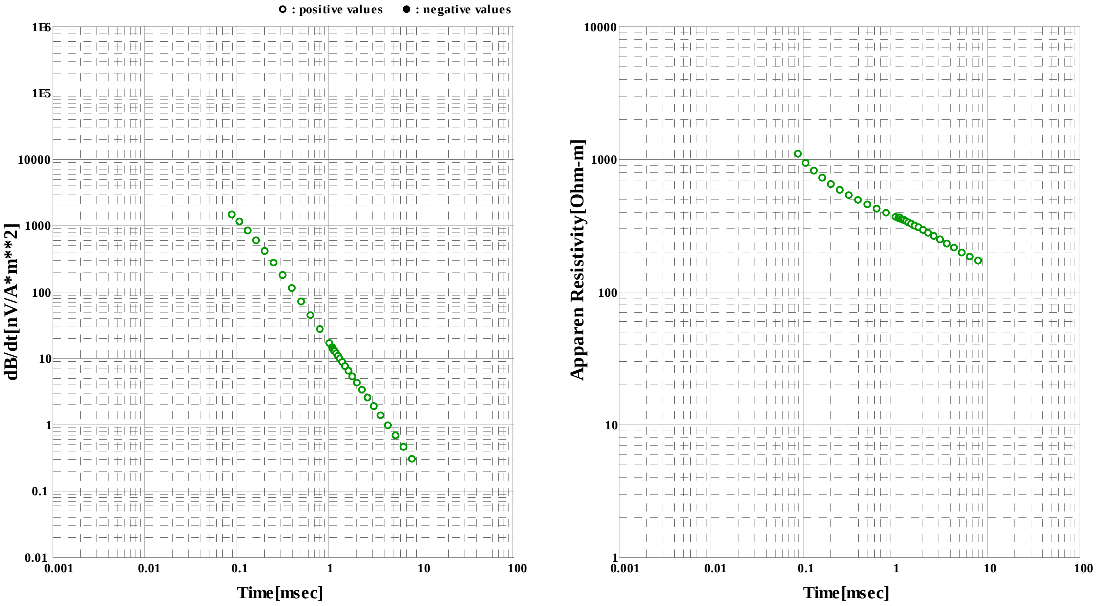




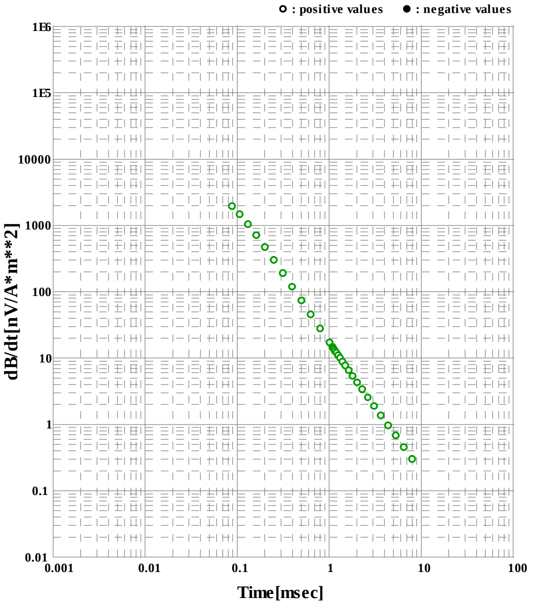
AZZ **site : 140N040E** **[133]**

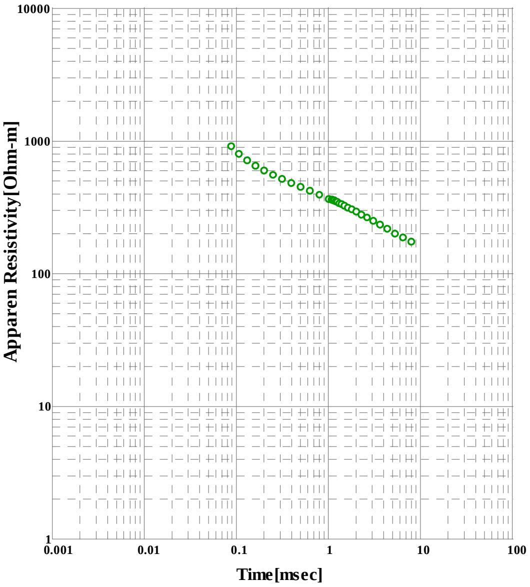


AZZ **site : 140N050E** **[134]**

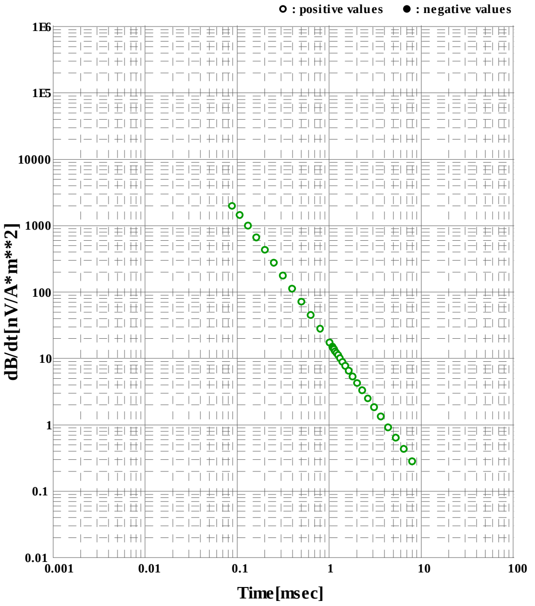


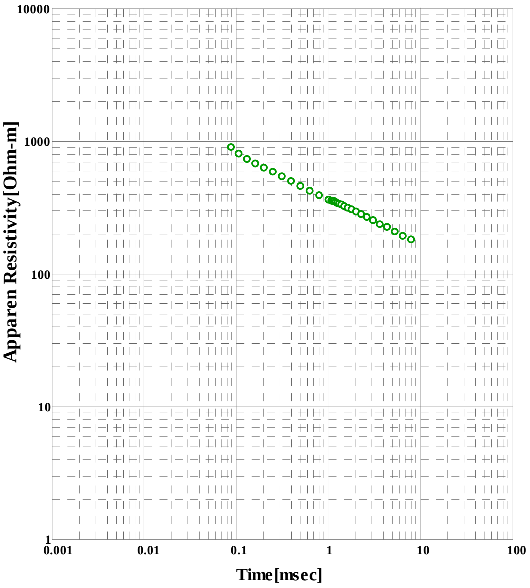
AZZ site : 140N060E [135]



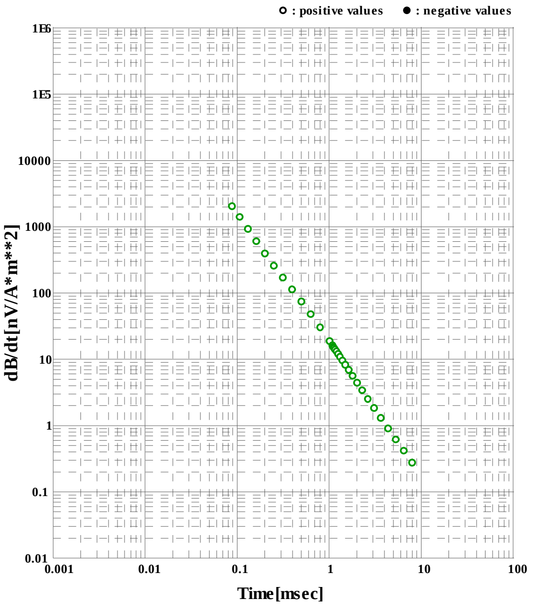


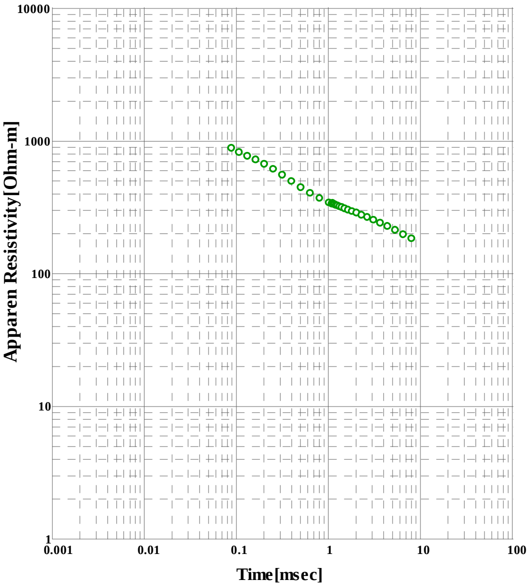
AZZ site : 140N070E [136]



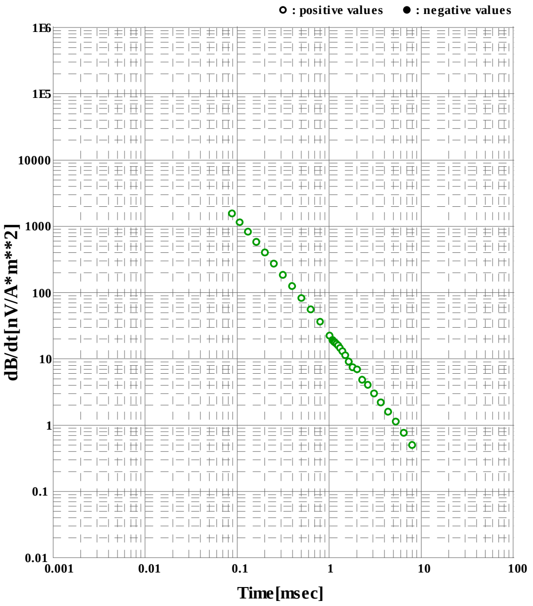


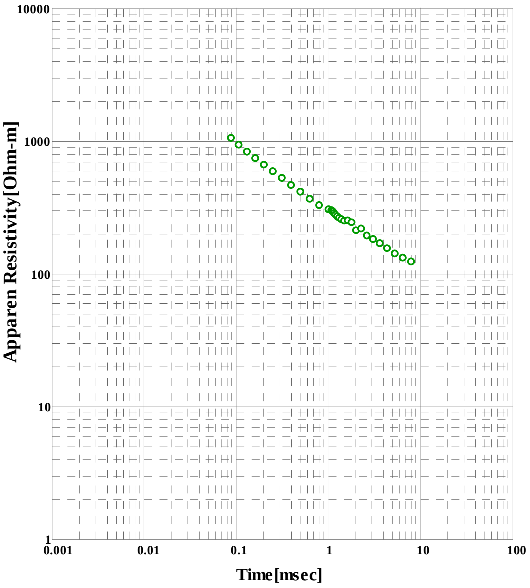
AZZ **site : 140N080E** **[137]**



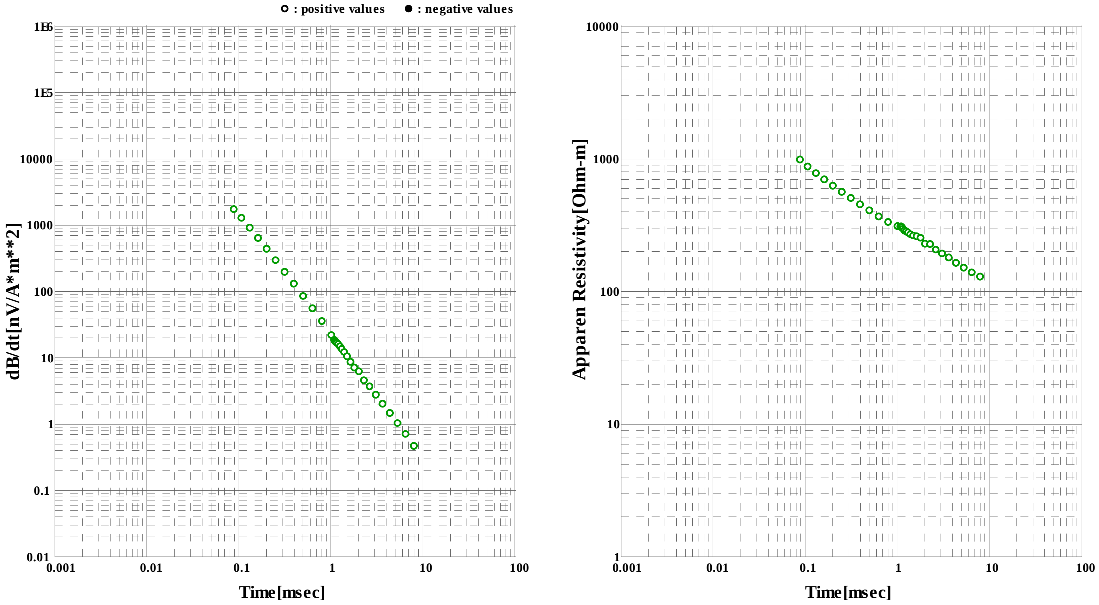


AZZ **site : 150N010E** **[138]**

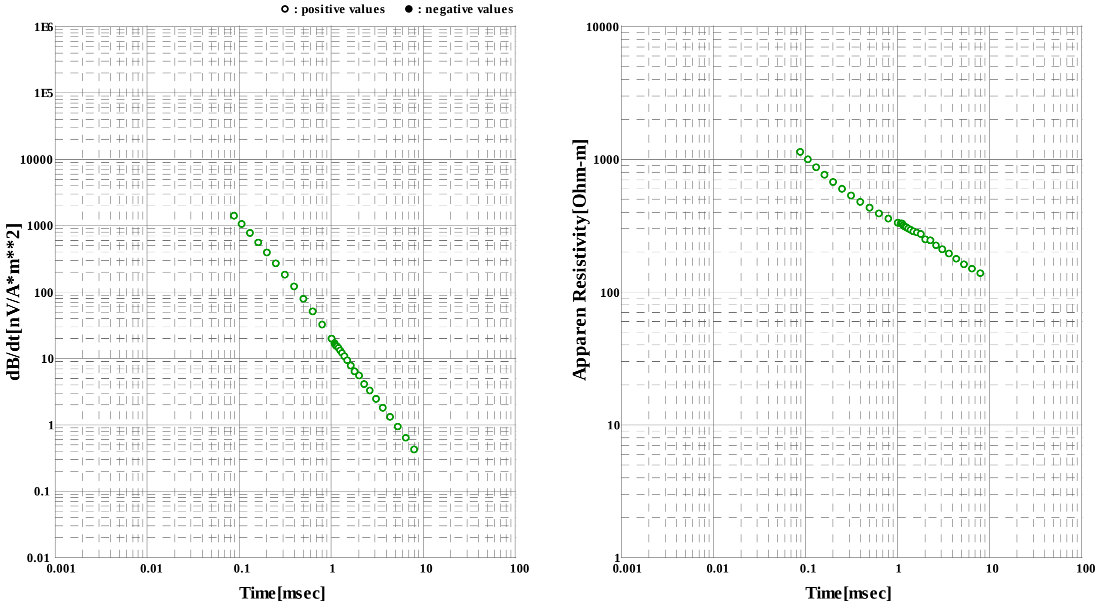




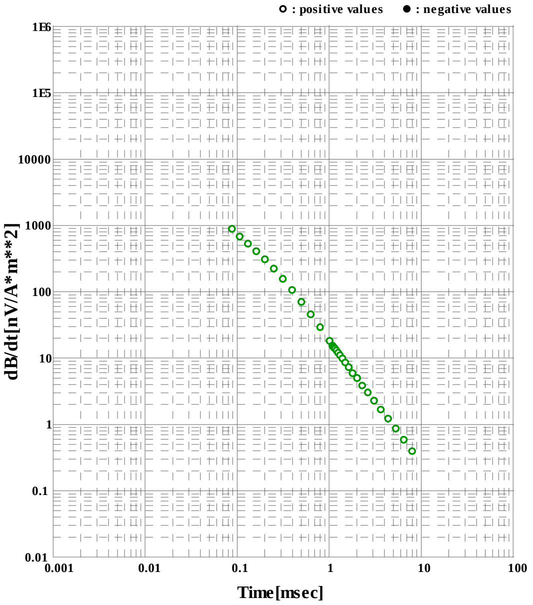
AZZ **site : 150N020E** **[139]**

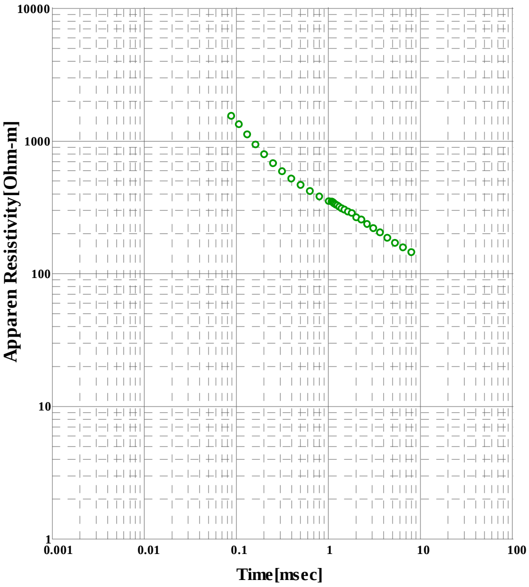


AZZ **site : 150N030E** **[140]**

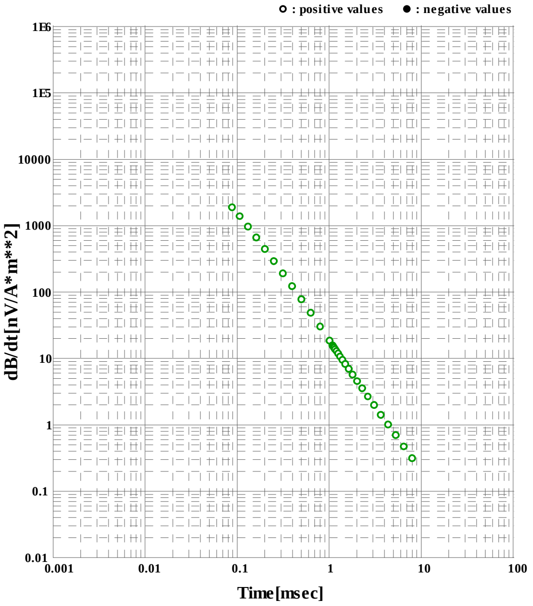


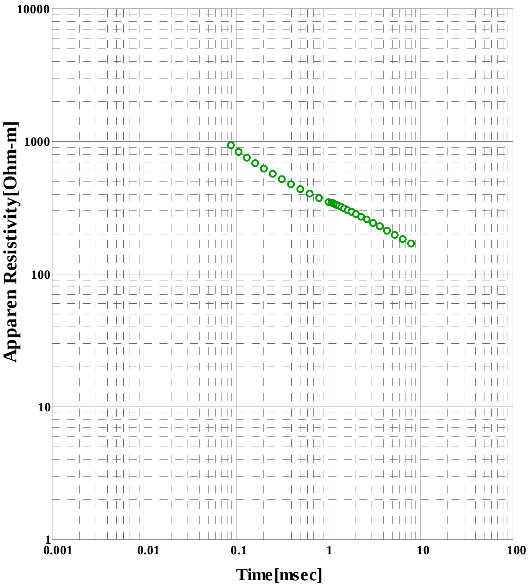
AZZ **site : 150N040E** **[141]**



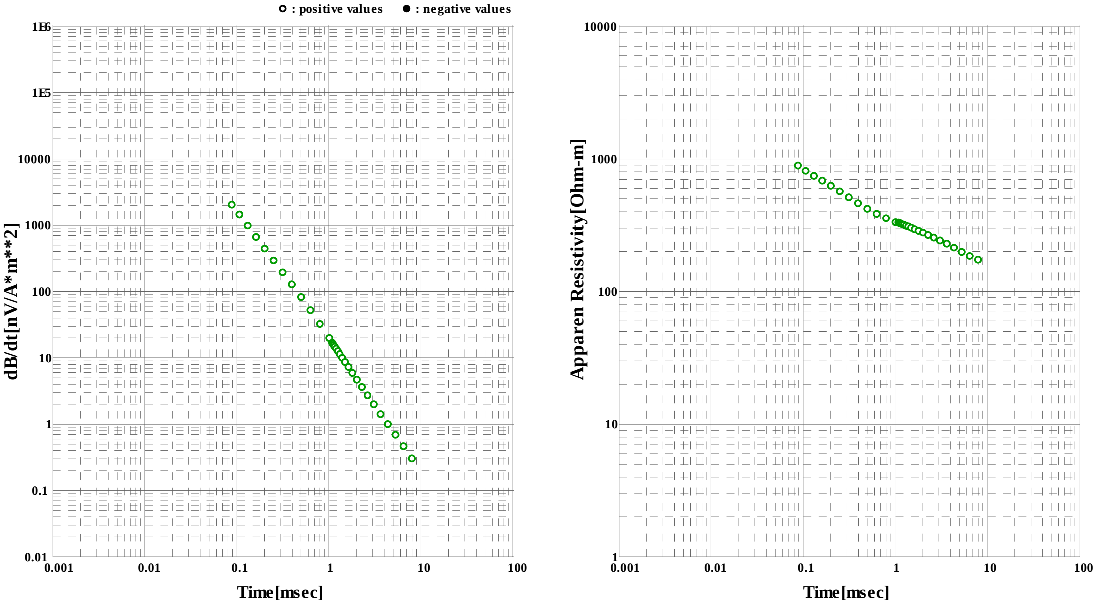


AZZ **site : 150N050E** **[142]**

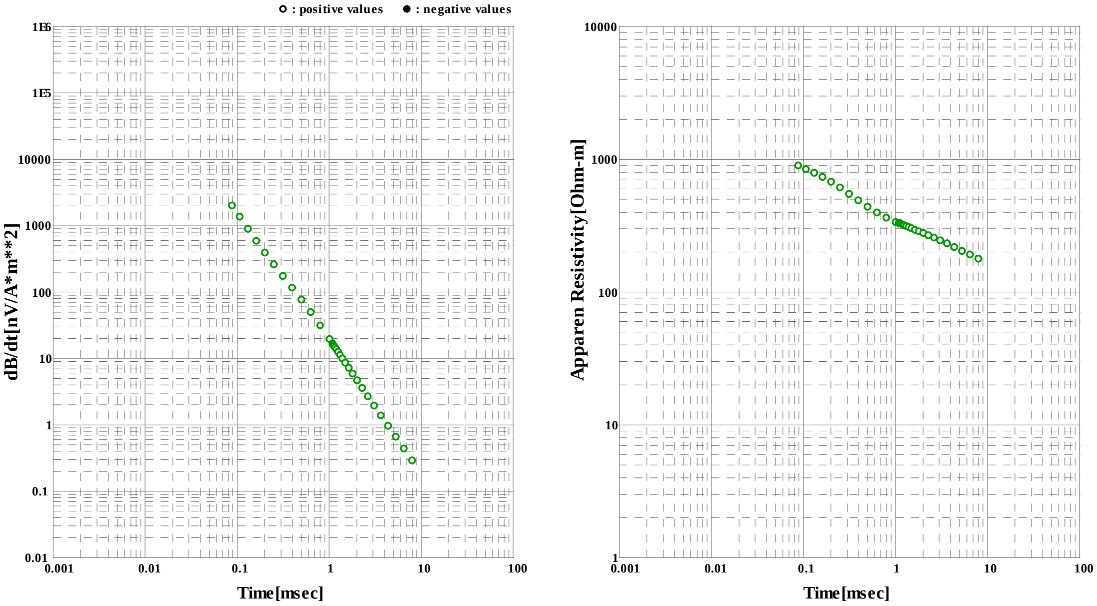




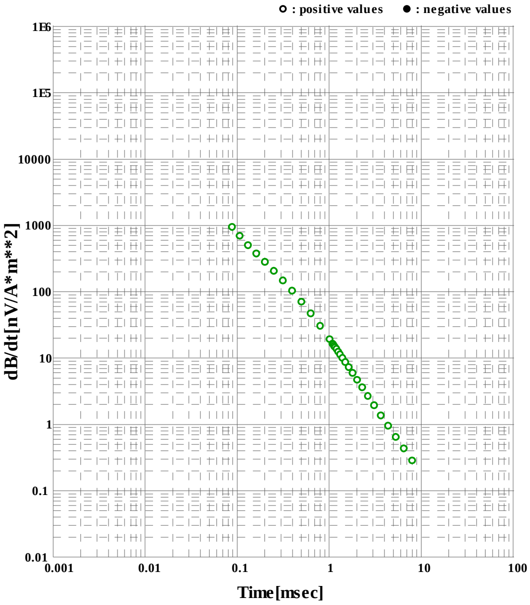
AZZ **site : 150N060E** **[143]**

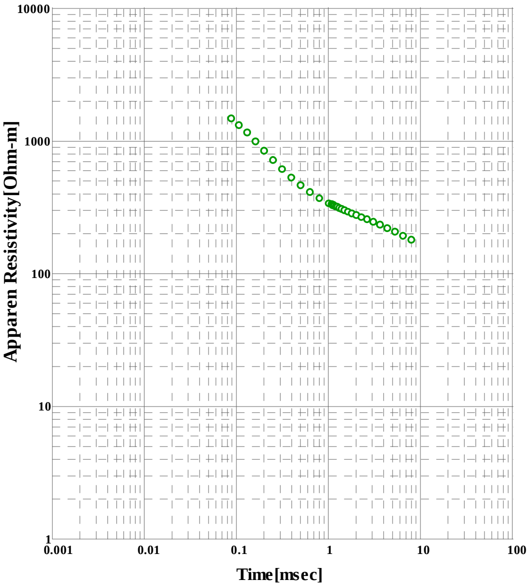


AZZ **site : 150N070E** **[144]**

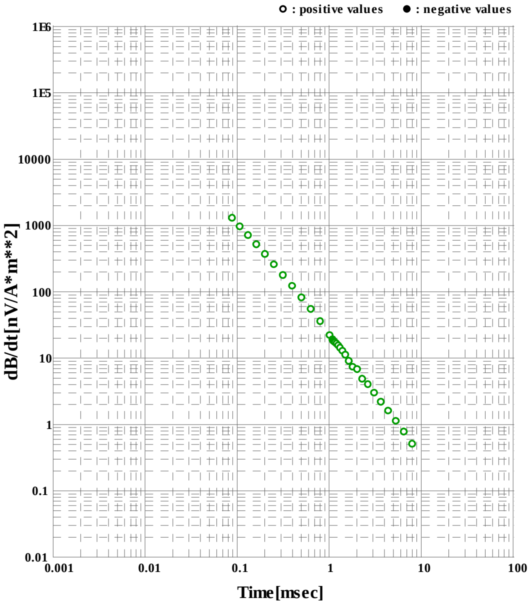


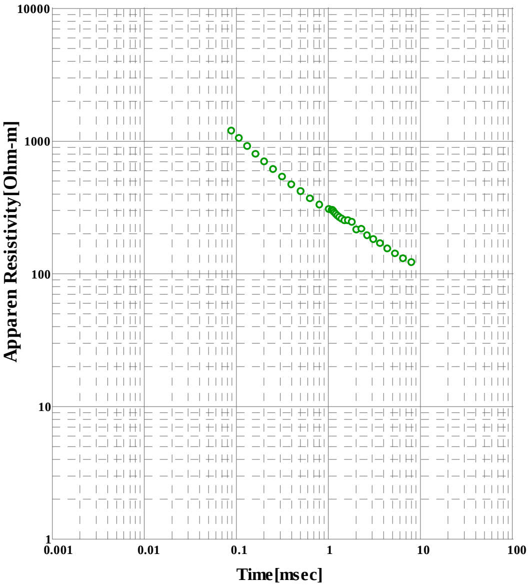
AZZ **site : 150N080E** **[145]**



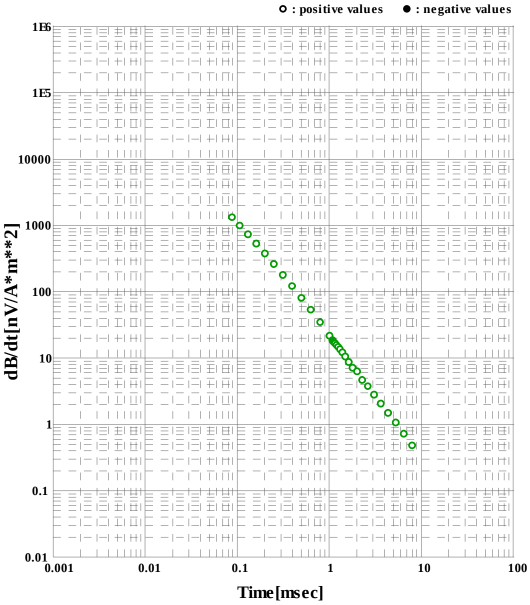


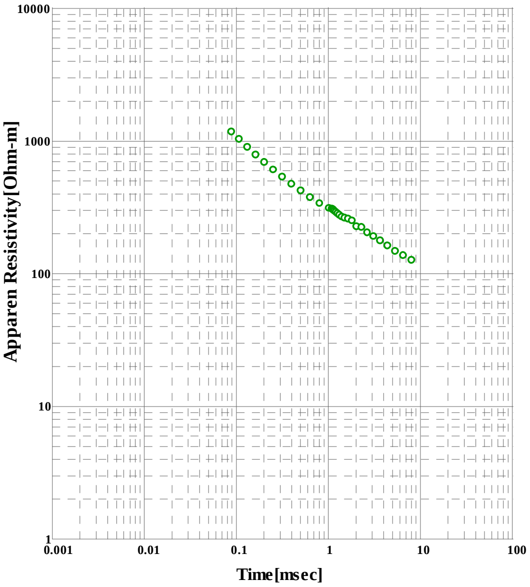
AZZ **site : 160N010E** **[146]**



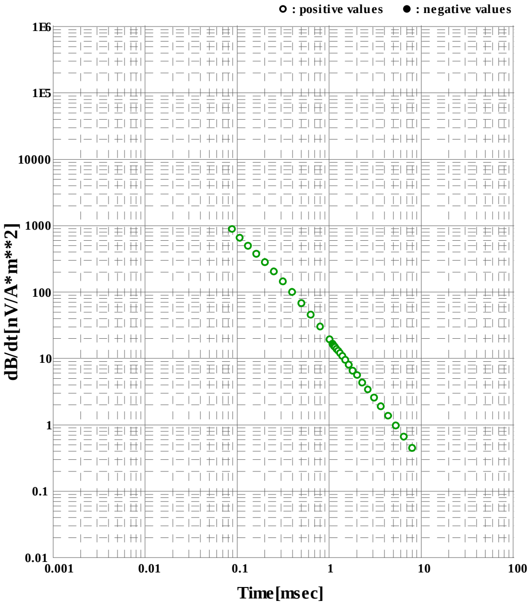


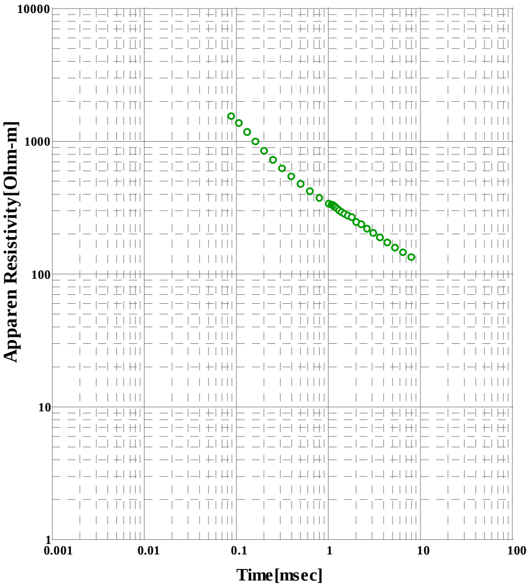
AZZ **site : 160N020E** **[147]**



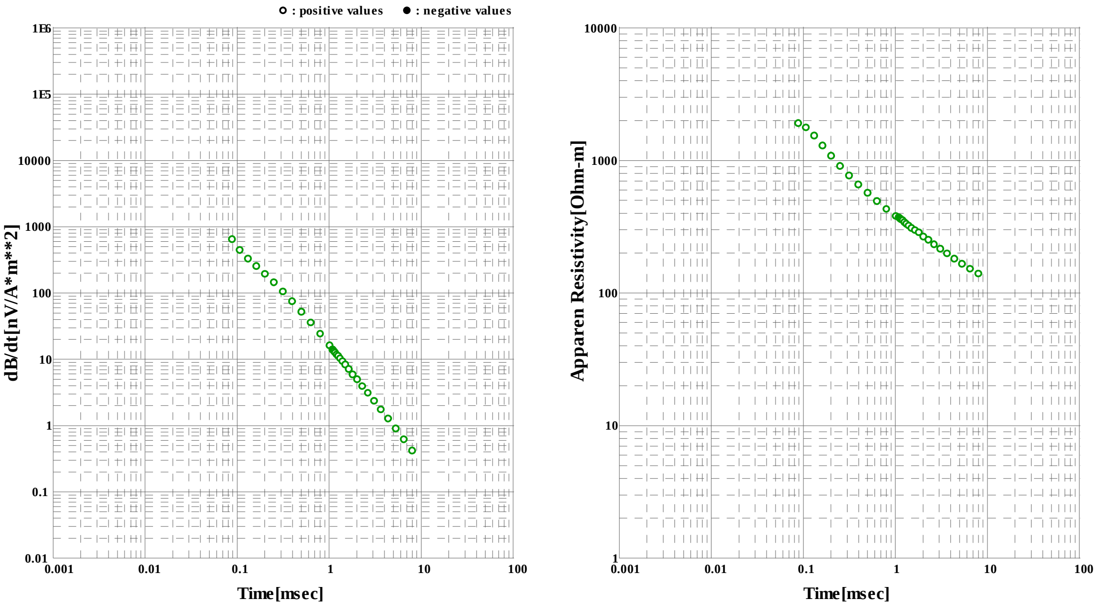


AZZ **site : 160N030E** **[148]**

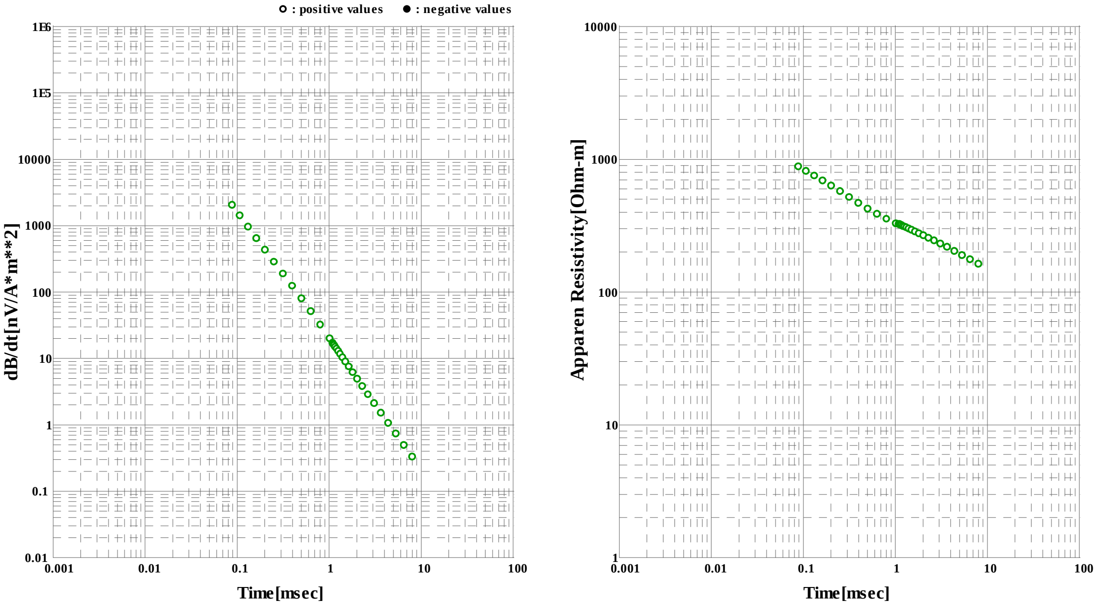




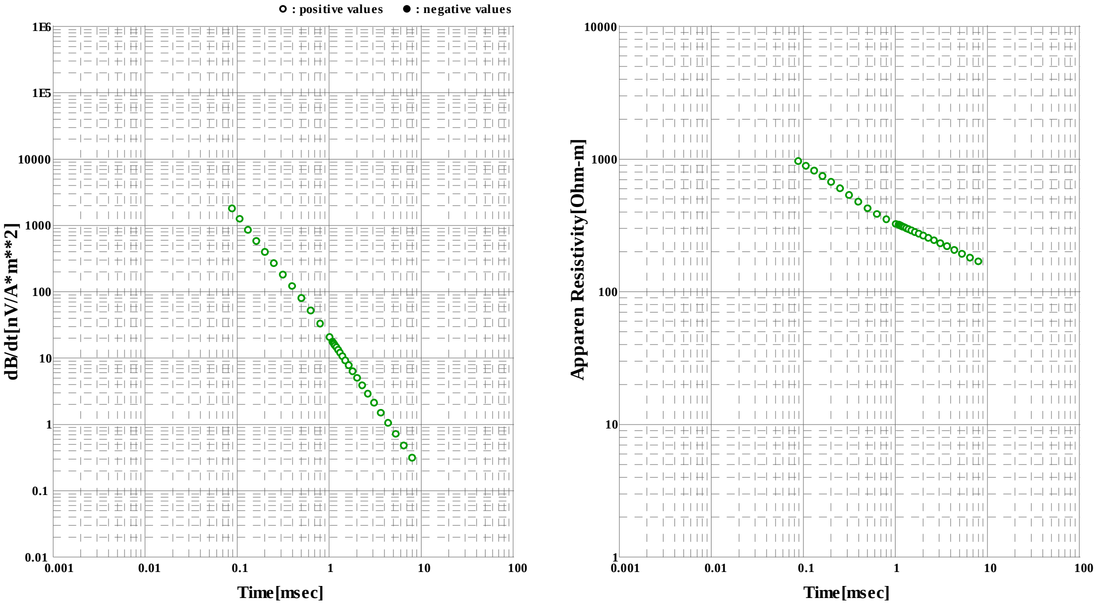
AZZ site : 160N040E [149]



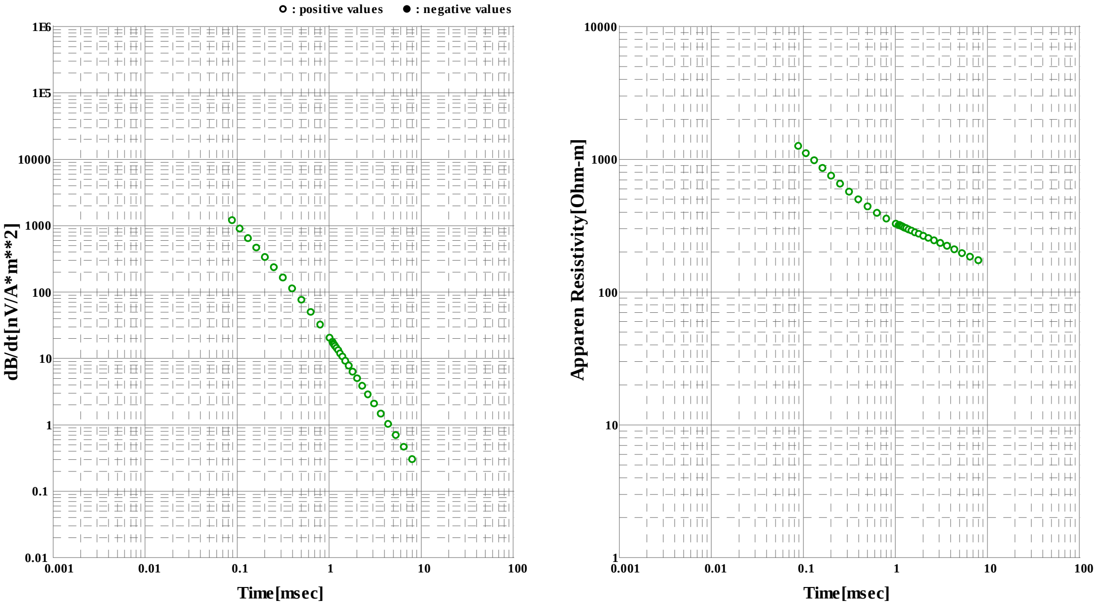
AZZ site : 160N050E [150]



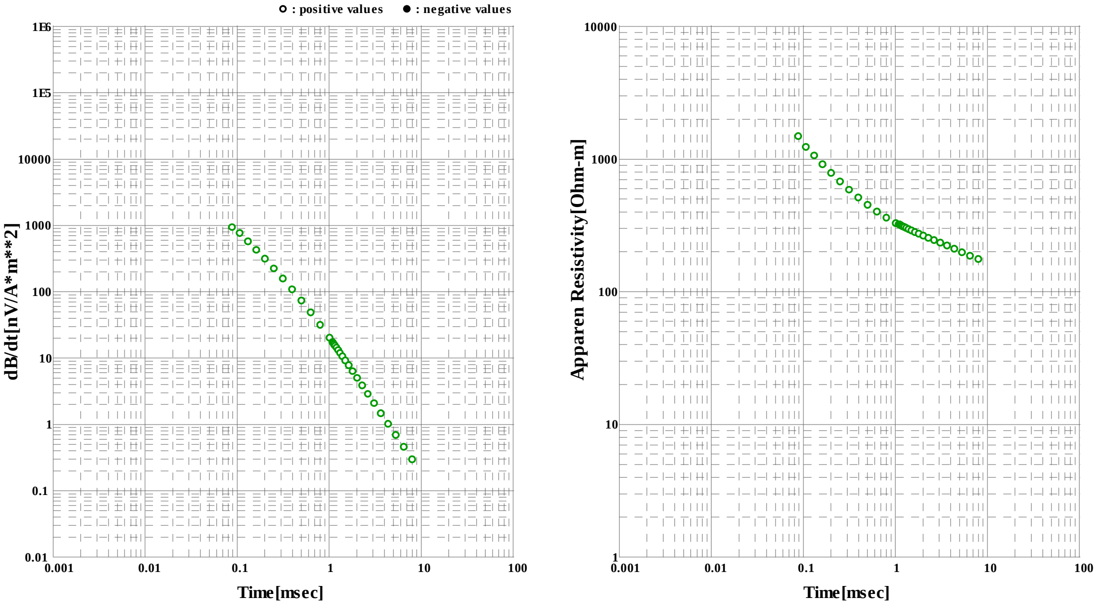
AZZ **site : 160N060E** **[151]**



AZZ **site : 160N070E** **[152]**



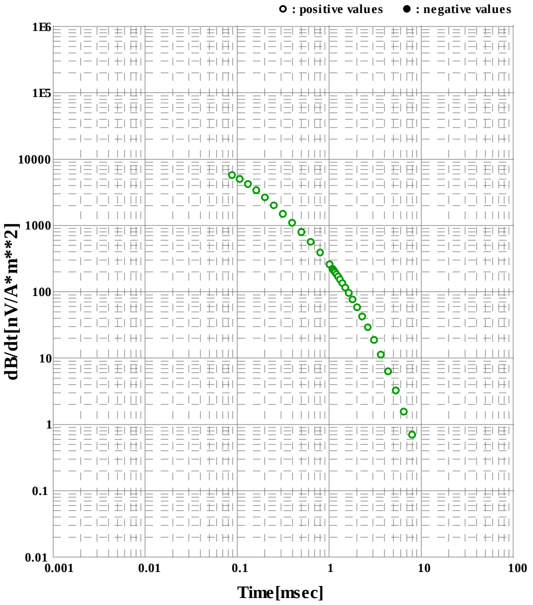
AZZ **site : 160N080E** **[153]**

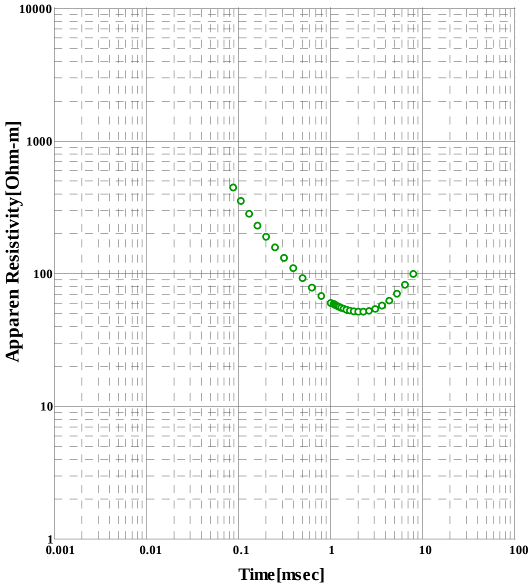


Khefawna Area

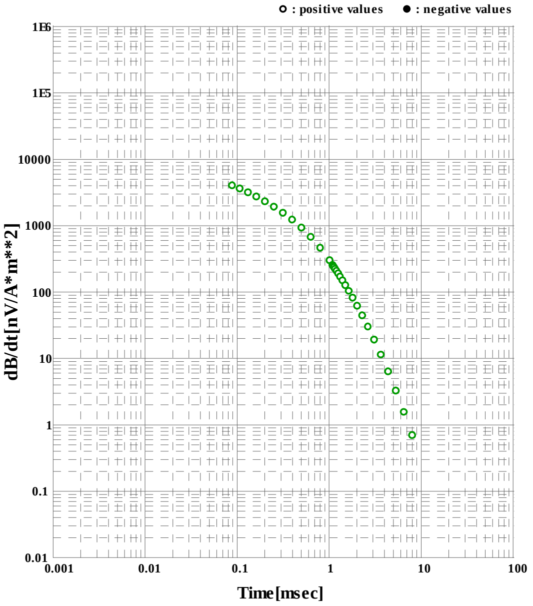
Time-Response
Time-App.Resistivity

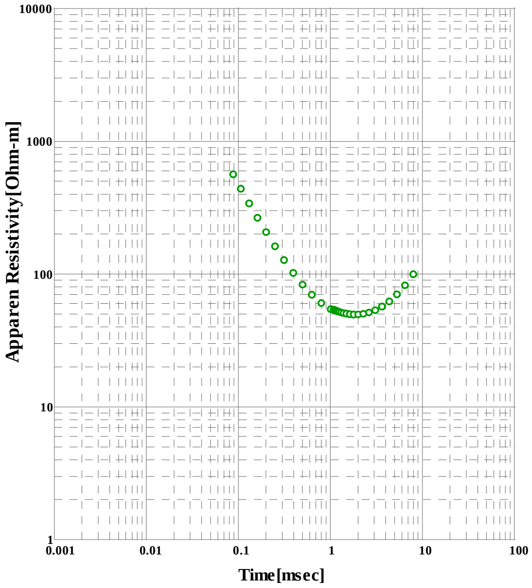
khe **site : 200N145E** **[1]**





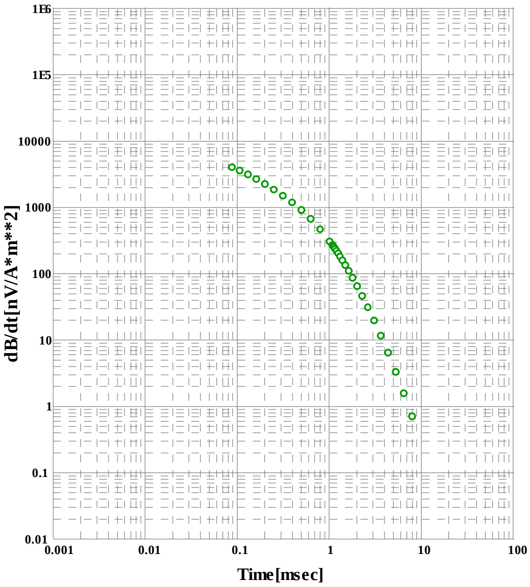
khe **site : 200N155E** **[2]**

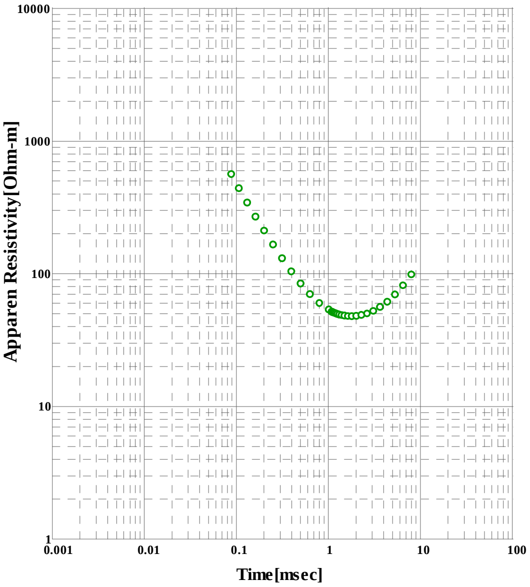




khe site : 200N165E [3]

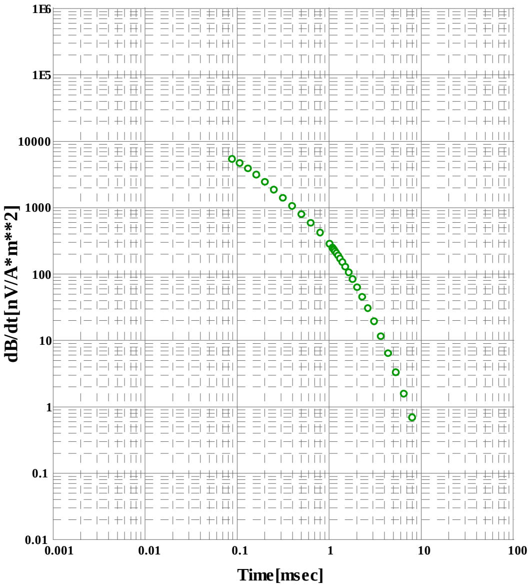
○ : positive values ● : negative values

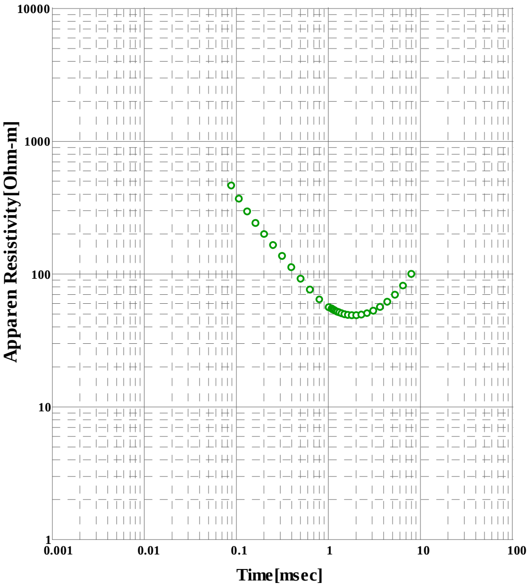




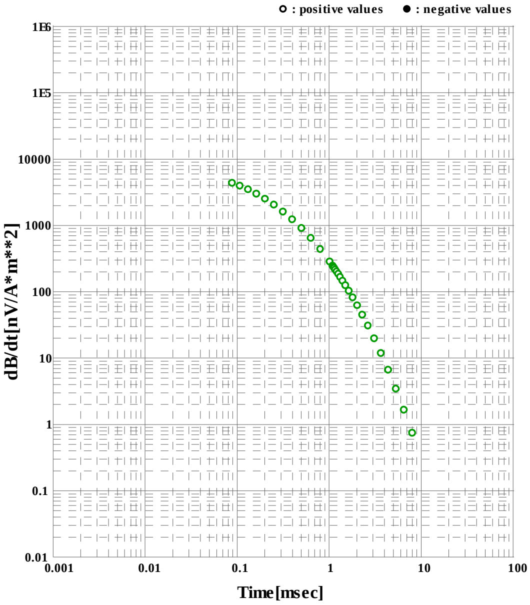
khe site : 200N175E [4]

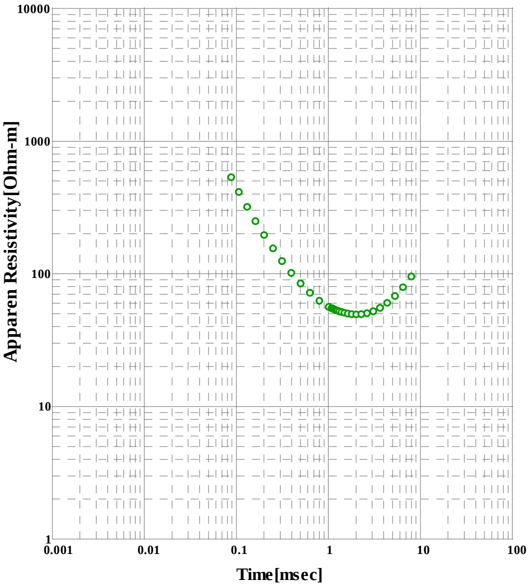
○ : positive values ● : negative values



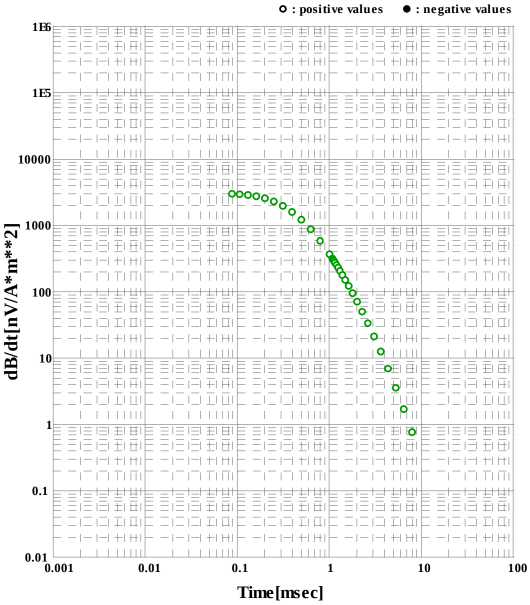


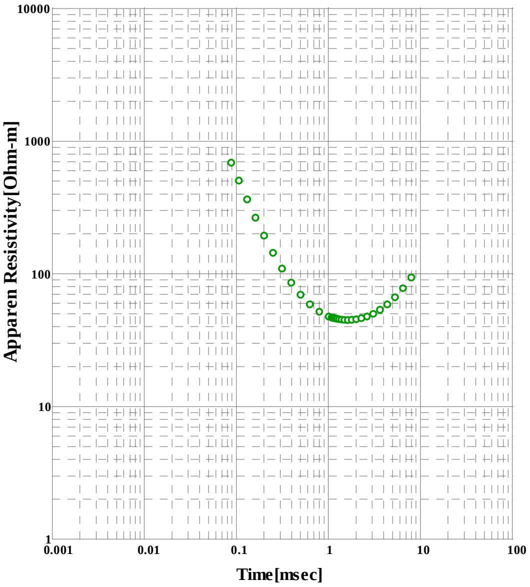
khe site : 210N145E [5]



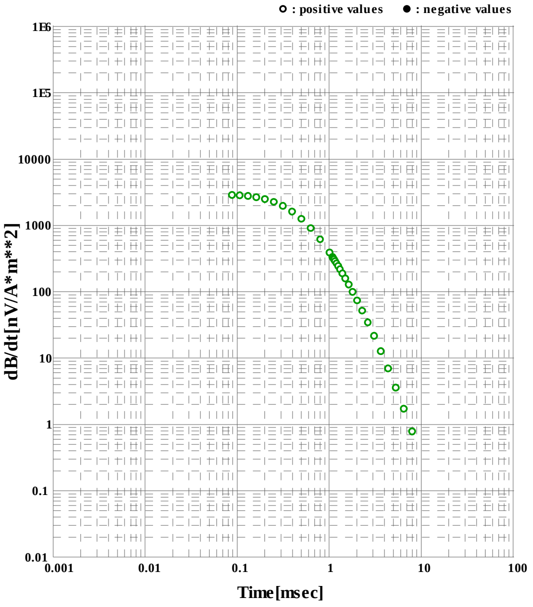


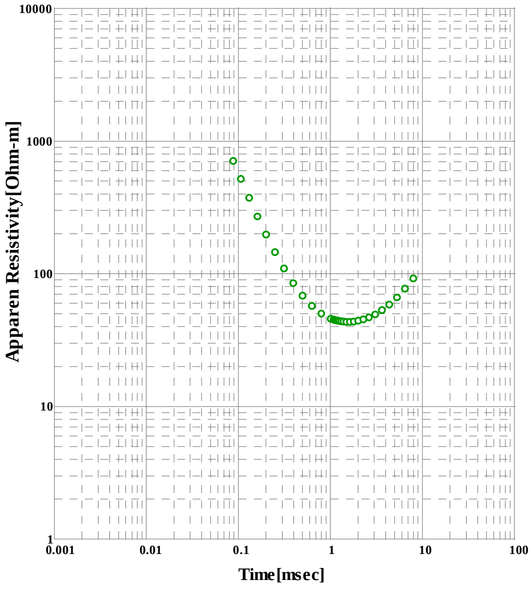
khe site : 210N155E [6]



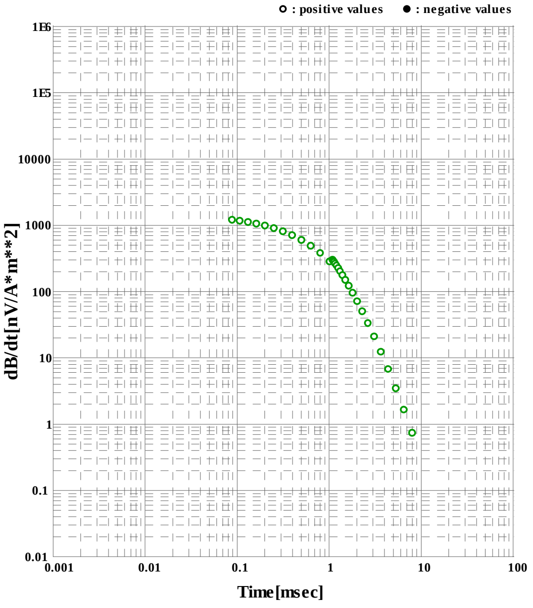


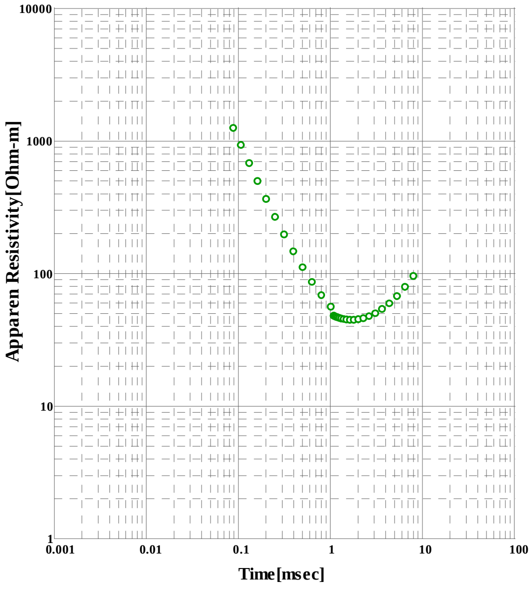
khe **site : 210N165E** **[7]**



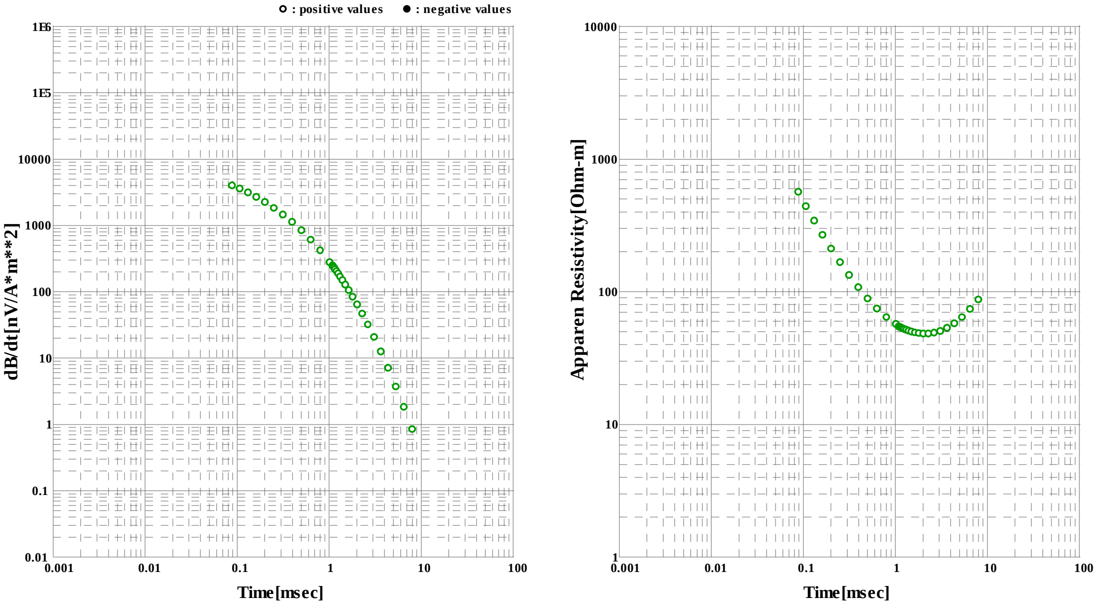


khe **site : 210N175E** **[8]**

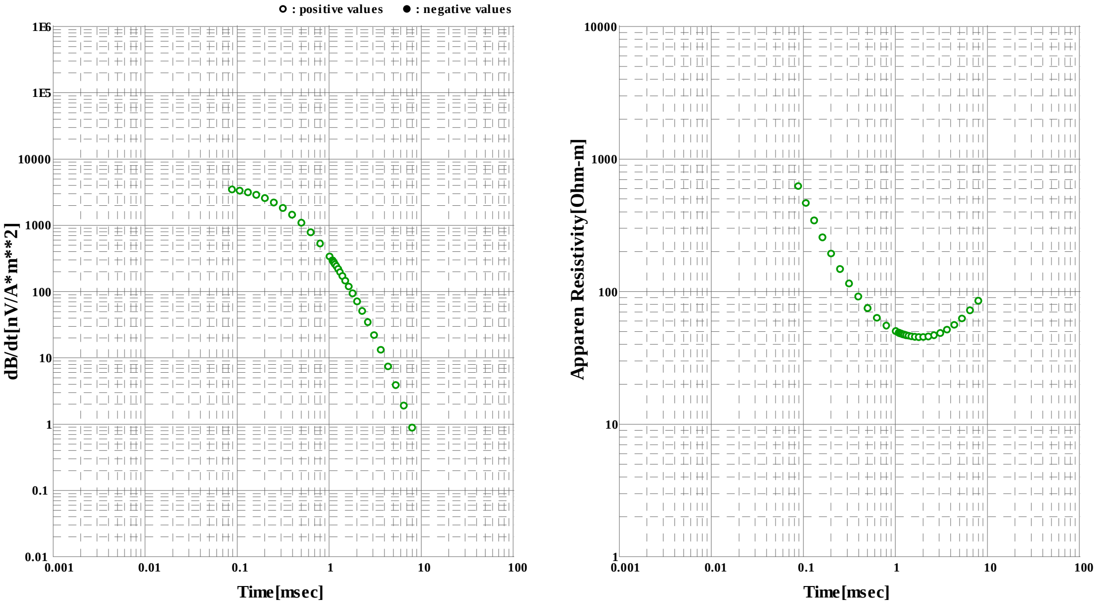




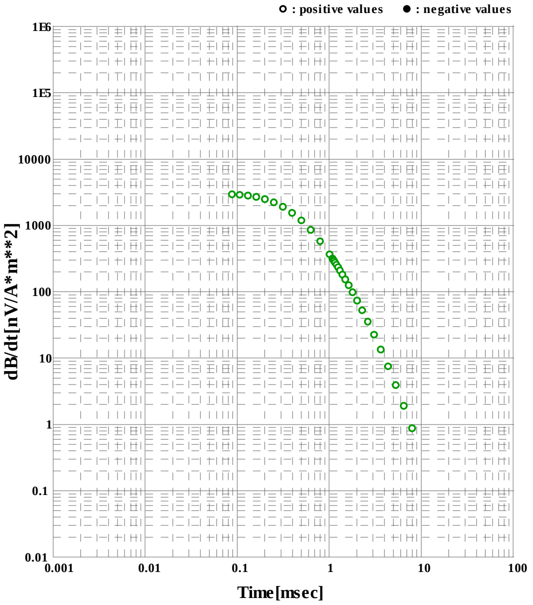
khe site : 220N145E [9]

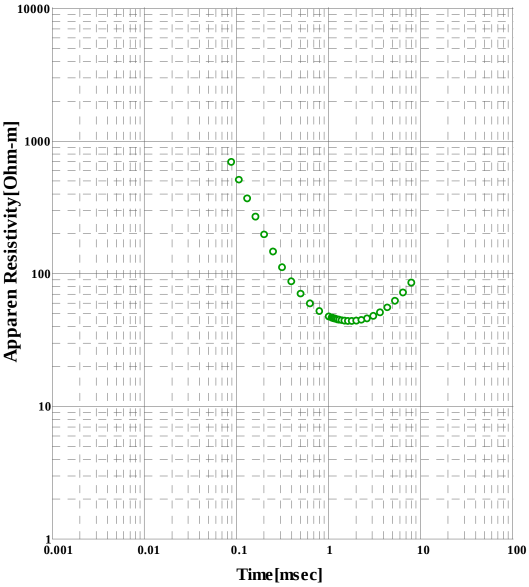


khe site : 220N150E [10]

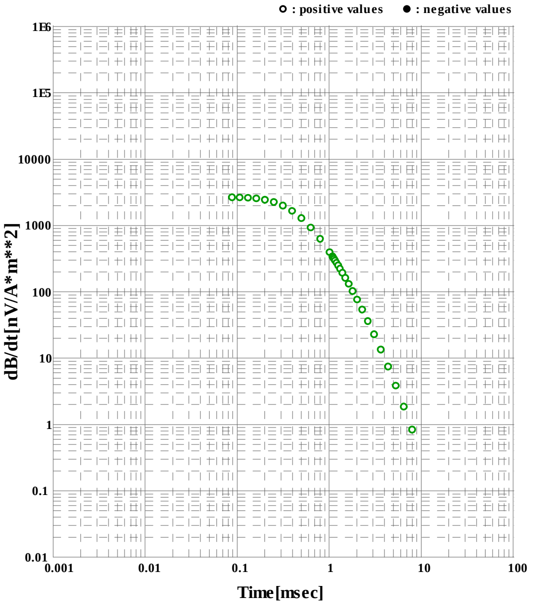


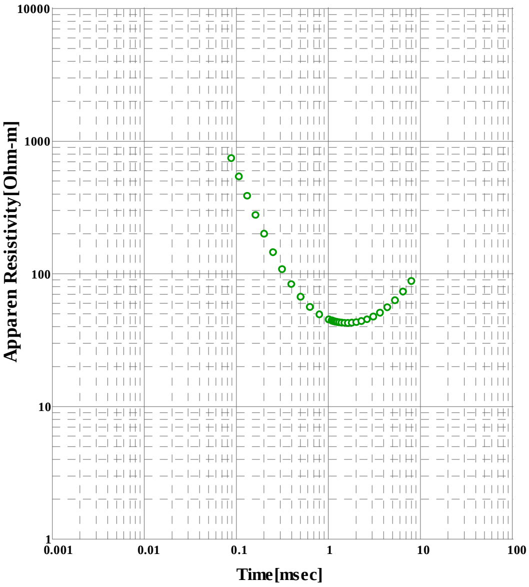
khe **site : 220N155E [11]**



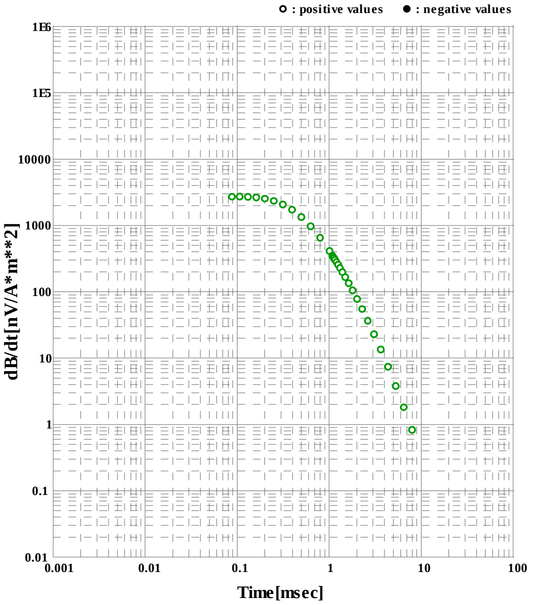


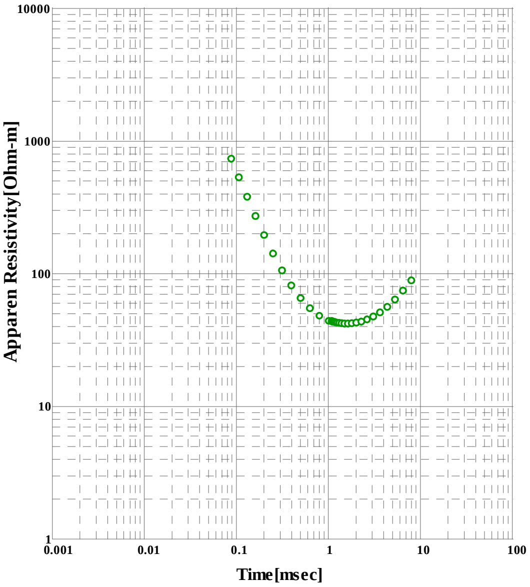
khe **site : 220N160E [12]**



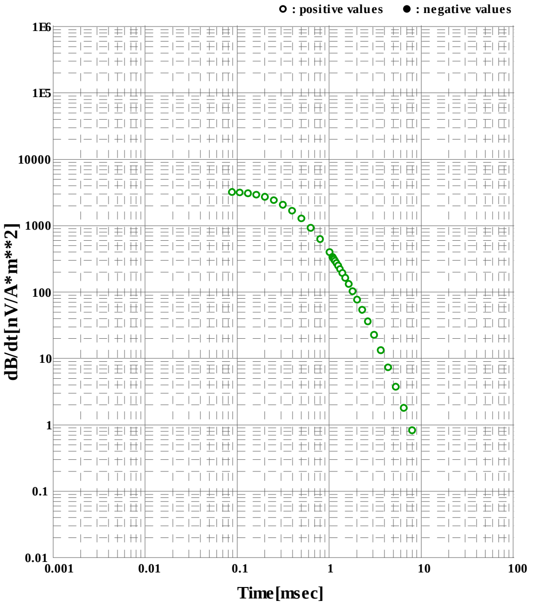


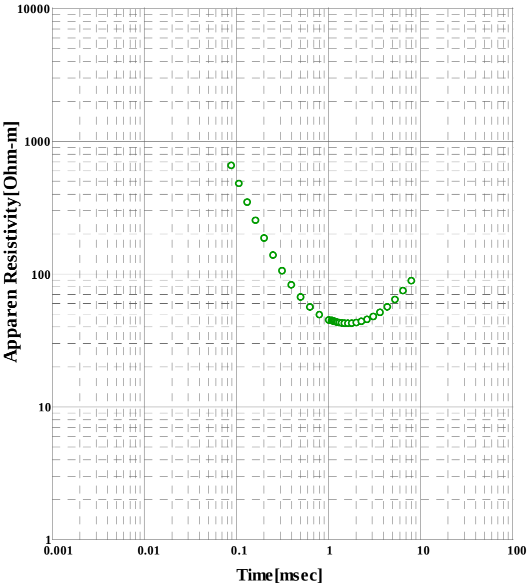
khe **site : 220N165E [13]**





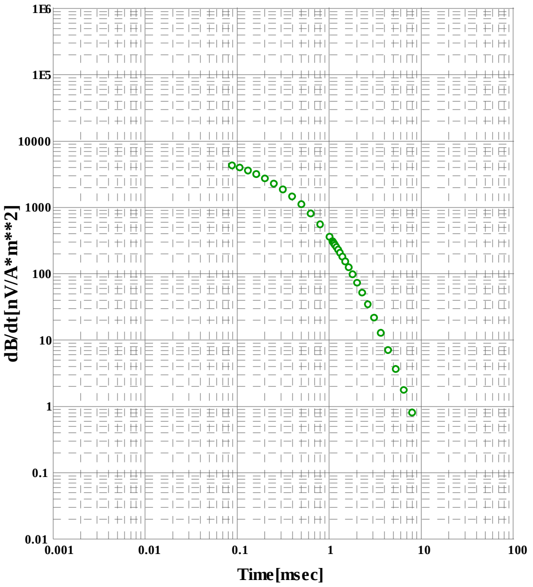
khe **site : 220N170E [14]**

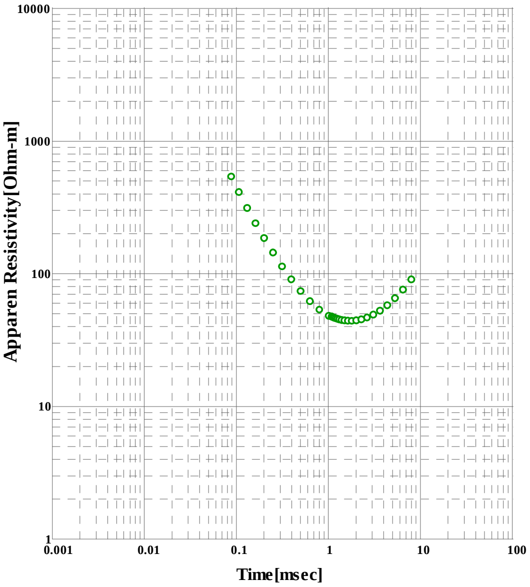




khe **site : 220N175E** **[15]**

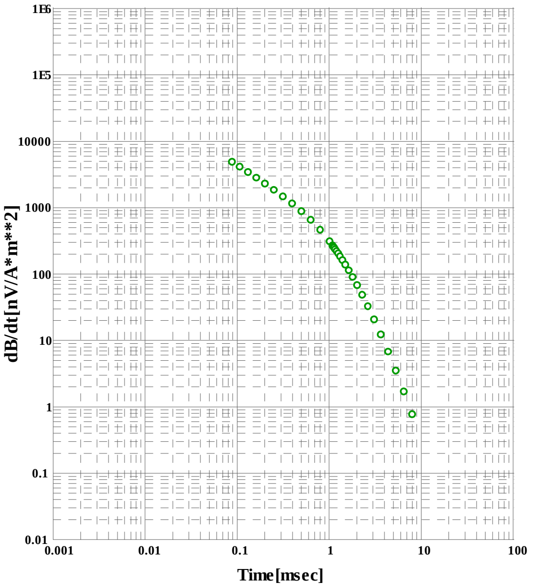
○ : positive values ● : negative values

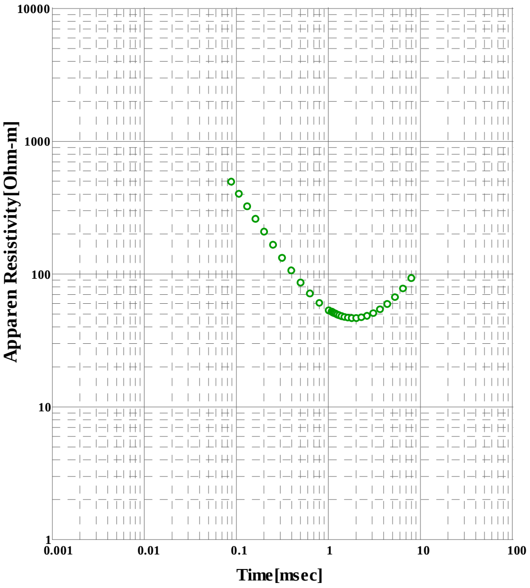




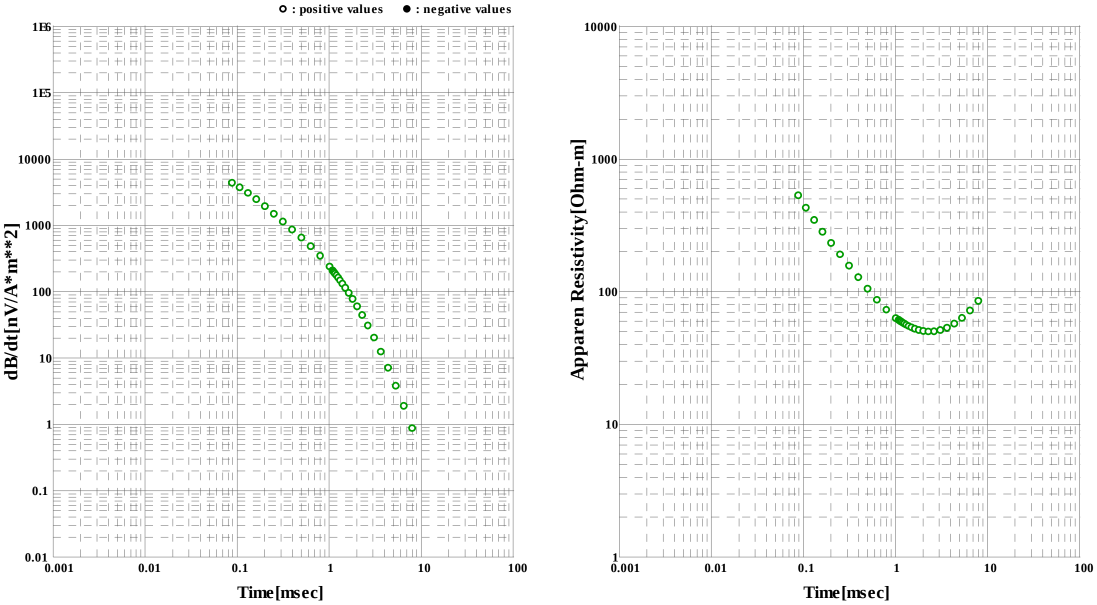
khe **site : 220N180E** **[16]**

○ : positive values ● : negative values

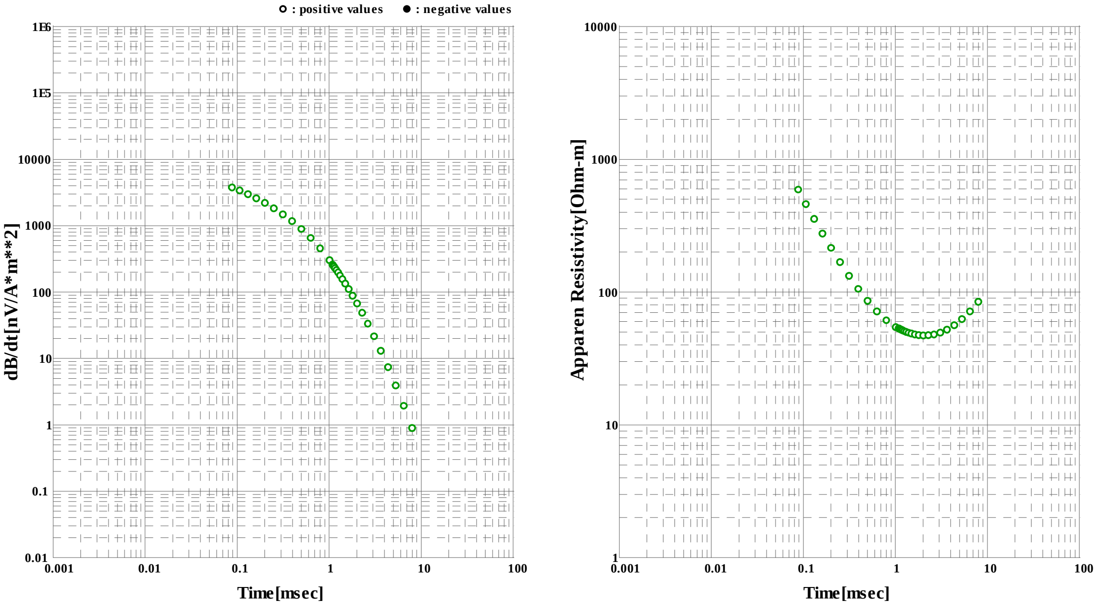




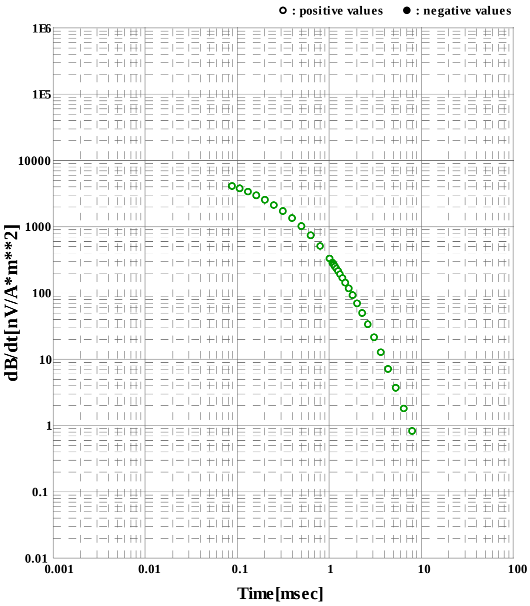
khe site : 230N145E [22]

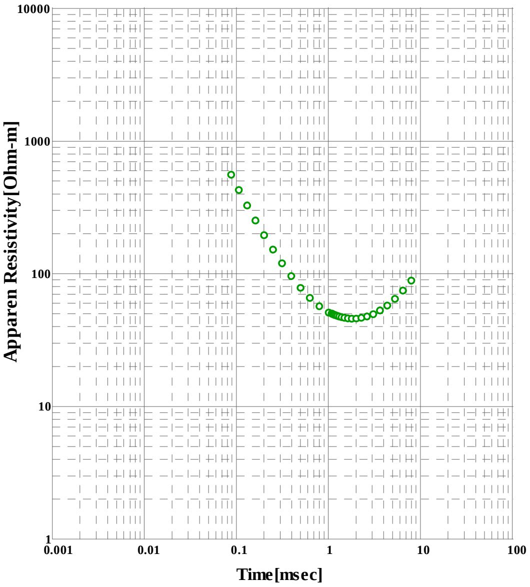


khe site : 230N155E [23]



khe site : 230N165E [24]





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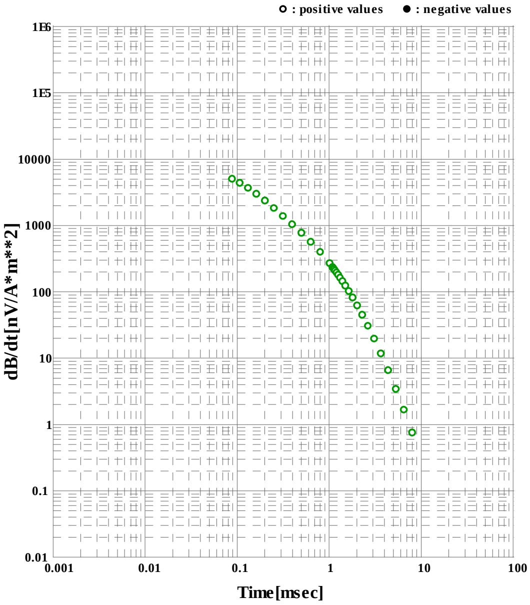

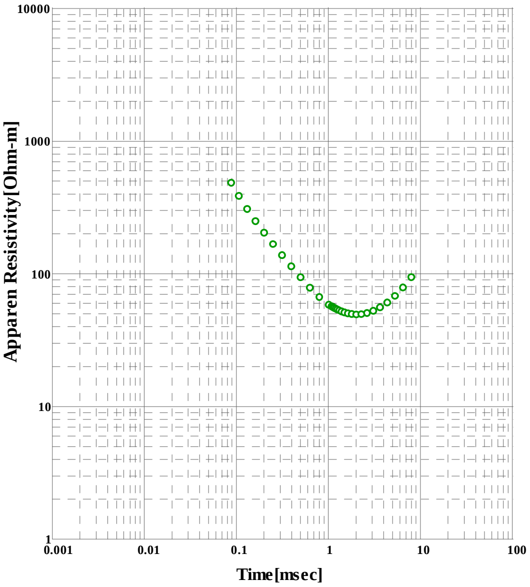

Geological Columnar Figures

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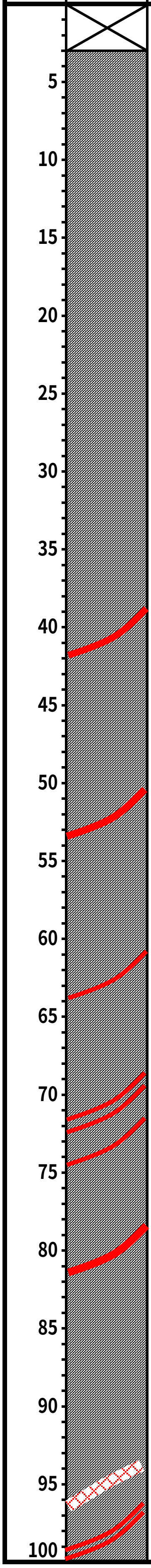

ROCK NAME

DESCRIPTION

(- 3m, Tricon)

Calcareous schist
with pelitic schist layers.
foliation:40-50°,
lamination：0-50°.
Carbonate veinlet.
Fractures.
Calcite -dolomite (?) -quartz veinlets
dominant.

31.7 -32.0m, fine tuff thin layer.40°.

39.1 -39.55m, quartz (- calcite)
vein.45°.
40.0m, fine tuff thin
layer.40°.1.5cm.thick
40.4m, calcite (- quartz) vein,
with pyrrhotite, sphalerite,
chalcopyrite.
30 -50°, 4cm width. partly pyrite?
40.5m, calcite vein.55°.width 10cm.
41.0 -41.1m,
calcite (- pyrite - pyrrhotite -
chalcopyrite
- sphalerite) vein. 25°. 11cm width.
41.1m-, barren calcite veins.
42.7 -43.1m, calcite (- chlorite)
vein.40°.
43.4 -44.3m, fine sandy tuff.40°.
44.3m- , pelitic schist- calcareous
schist.
with quartz (- calcite) network-
veinlet.
discordant to foliation.
partly fine - sandy lamination.20 -40°.

52.9m, calcite - pyrrhotite vein.40°.
width 15cm.
calcareous- pelitic schist. black.
with graphite.

56.2 -56.6m, calcite veins. 45°.
width 3 -20mm.
63.0m, calcite (-dolomite ?) vein.
with sphalerite (p).
and with parallel calcite veins.
along foliation.

Calcareous schist. foliation 30 -40°.
bedded.
laminated with micro-folding (axix?).

70.0, 70.15, 73.35m,
pyrrhotite - calcite (- chalcopyrite) vei
45°.width ：3 -30mm. along foliation.
in the lower part of the vein,
pyrrhotite - calcite vein.
width ：12 -110mm.40°.
72.4m-,
chalcopyrite - pyrrhotite - calcite veins
along foliation. 6 -10cm intervals.
width 6 -15mm.
80.0 -80.6m,
pyrrhotite - calcite vein.40°.
width ：35 -40cm. fault?
with chalcopyrite, sphalerite, (galena)
84m-, micro-folding,
and calcite veins 40cm-interval,
along foliation.
40°.width 2 -9m. Partly in R-faults.
95.5 -, pyrrhotite - calcite vein.
along foliation. 40°.width 40-80m.
sphalerite and chalcopyrite.
with similar network 80cm+ long.
99.1m, pyrrhotite - calcite vein.
40°.width ：10mm.
99.6m -, calcite - pyrrhotite vein.40°.
width ：130mm. with chalcopyrite.
brecciated at the boundary.

ALTER.

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Lim

MINER.	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
po,py											
cp,po		62.7	62.75		0.035	2.4	0.0202	0.0205	8.45	5.1	4.3
cp,po											
cp,po		76.3	76.4		0.73	6	0.0091	0.258	0.582	4.45	3.6
po		80.5	80.6		0.022	6.8	0.0787	0.318	0.405	>50	8.83
po											
		99.5	99.6		0.038	6.1	0.646	0.047	8.07	19.8	7.26
po		99.6	99.7		0.146	6	0.247	0.0586	2.15	>50	7.75

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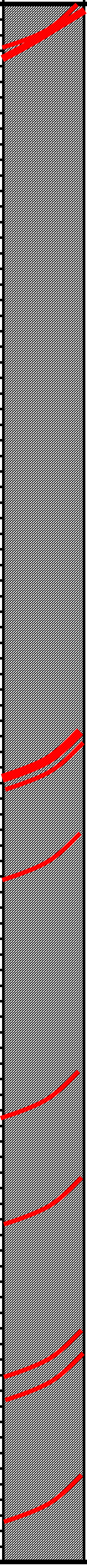
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200			Calcareous- pelitic schist	po po,py,cp	ch											
			100.4m, pyrrhotite - calcite vein.40°.20mm. 100.7m, (pyrrhotite -) calcite vein. 30 -40°.13 -40mm. with pyrrhotite - chlorite - calcite veins. 50°. 160mm. 101.2m -, pyrrhotite - chlorite - calcite vein.50°. 160mm.													
			101.6m -, chalcopyrite - pyrite - pyrrhotite vein.30°. with calcite - chlorite mass.	po	ch											
			113.65 -114.10m, chlorite - calcite - quartz vein.30°. width :35cm. with pyrrhotite and fragments of schist and tuff.													
			Calcareous- pelitic schist, altered (chlorite, sili) . foliation40 -45°. partly black (with graphite).													
			140.5m, pyrrhotite vein.25°. width 7mm. 140.9m, calcite - pyrrhotite vein. 40°.width 30mm. 142.1 -142.3m, pyrrhotite - clay mineral - calcite vein. along foliation .40°.width 110mm.													
			143.5 -143.9m, (pyrrhotite -) calcite vein.40°.width 30mm.	po												
			144.6 -144.7m, pyrrhotite - calcite network.	po												
			145.0 -150.6m, pyrrhotite - calcite veins (- networks), 15cm interval .45°. generally along foliation and with chlorite. Ex.)	po,py,cp,sp po,cp po,sp	ch		148.2	148.3		0.114	7.4	0.0483	0.0769	6.96	20.3	>10.0
			147.8 -148.0m, chalcopyrite - sphalerite - pyrite - pyrrh - chlorite - calcite vein. 45°.width 80 -100mm. sulfide dominant along edge. 148.2 -148.5m, pyrrhotite - chlorite - quartz - calcite vein. with chalcopyrite. 45°.width 210mm. 148.8 -149.0m, sphalerite - pyrrhotite - calcite vein. with chalcopyrite. 45°. 149.3 -149.6m, pyrrhotite - calcite vein.40°. with sphale													
			154.7 -154.8m, pyrrhotite - calcite vein.45°.width 130m													
			171.9m, quartz - calcite vein.25°.width 30mm. with pyrrhotite(p). pyrite dissemination		ch											
			176.7m, metasomatic calcite, with chlorite, pyrit													
			177.6m, pyrrhotite - (quartz -) calcite vein.20°. width 9 -20mm. sphalerite.	py	ch											
			182.6m, pyrite - chlorite veinlet.65°. width <1mm. 184.8m, calcite veinlets along foliation. with pyrrhotite. 30°.width <10mm													
			187.0m, pyrite - calcite vein.40°. width <3mm. (pyrite is later than calcite	po,cp												
			188.3m, chalcopyrite - pyrrhotite - calcite vein.3 3mm.													
			195.5 - 195.7m, calcite - pyrite - pyrrhotite veinlet.40°. width <3mm. 196.75m, calcite - pyrrhotite vein,15°. width 16mm.	po,py	ch											

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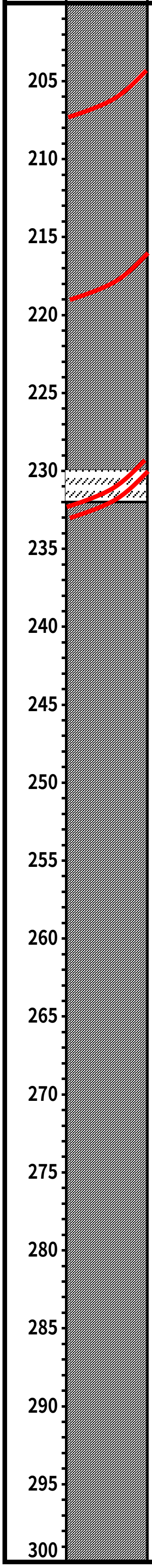

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Pelitic Schist	Pelitic- calcareous schist. lamination 10-30°. foliation 20-40°. with graphite.													
			206.3m, pyrrhotite - calcite veinlet. 75°. 2mm.													
			217.1m, pyrite - chlorite veinlet. 45°. width <1mm.													
			218.5m, pyrite - calcite network. 30° in fault (width 40mm).	py	ch											
			222.5m,bedded (sandy- pelitic), 20°. sorted. .													
			229.7m-231.9m, pale greenish gray fine tuff. silicified. chlorite.													
			230.1m, sphalerite - chalcopyrite - pyrrhotite (-quartz) -calcite vein. galena? 40°.10-40mm.													
			231.4m, pyrrhotite - chlorite - calcite veinlet. 50°. 3mm. with barren calcite veins.	po,cp,sp po	sili,ch											
			235.0m, pyrite - calcite veinlet.20°.1mm.	py												
			258m, sorted. 259.7-259.9m, barren calcite vein. 5°. Partly sandy schist. foliation20-30°. bedded 20-40°.													
			272.1m, chalcopyrite - pyrite - calcite vein. 35-40°. 11mm.													
			277.3-281.3m, fault. with shered zone.													
			Pelitic- (sandy-) calcareous schist. with graphite. foliation 30-45°. bedded 30-50°.													
			277.3-281.3m, pyriteと chalcopyrite in fault. shered .													
			293.7m, calcite network. with pyrite.													

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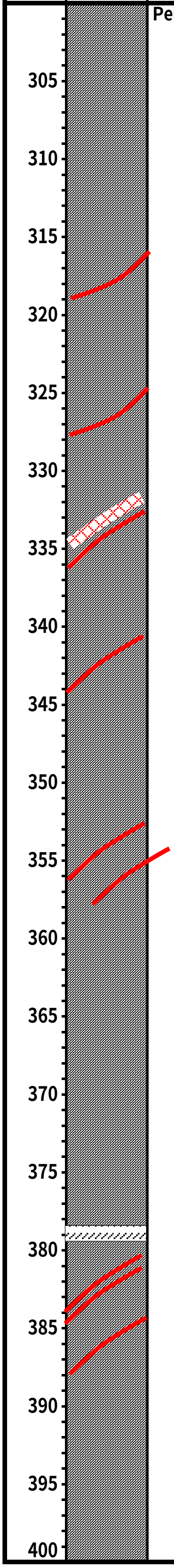
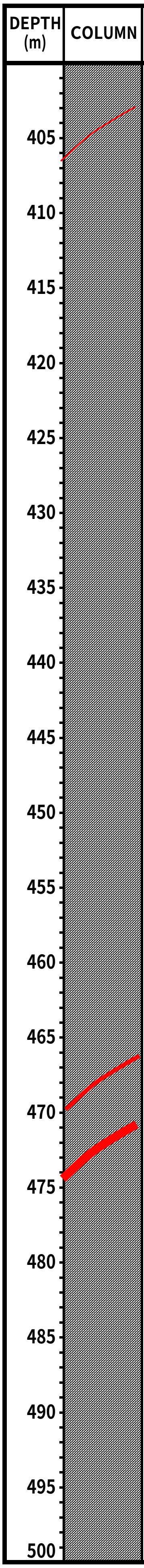


DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Pelitic Schist	Pelitic- calcareous schist. foliation40°.bedded 10-30°. Partly calcite network.													
			307.0-307.3m, chlorite (-dolomite?) - calcite - quartz vein.35°.20cm.													
			307.3-307.4m, fine tuff thin layer.30°. chlorite. pyrite diss.	py	ch											
			317.5-319.9m, pyrrhotite - calcite veins along foliation.with chalcopyrite.	po												
			Pelitic- calcareous schist. foliation15-50°. bedded 15-40° in general.				319.2	319.4		0.033	18.7	0.121	1.51	2.58	38.3	9.32
			326.85m, pyrrhotite vein.35° width :7-16mm. with calcite and pyrite along foliation.	po												
			327.05m, pyrrhotite - pyrite diss. calcite.	po,py,cp												
			327.18m, pyrrhotite - calcite veinlet. chalcopyrite.15°.width 6mm.													
			327.60m, pyrrhotite - calcite veinlet.25°.4mm.	po,cp												
			328.00m, pyrrhotite - calcite veinlet.20°.4mm.													
			332.5-332.75m, chalcopyrite - pyrrhotite - calcite network. width <8mm.													
			333.5m, chalcopyrite- (sphalerite-) pyrrhotite veinlet. 65°.width <5mm.	po,cp,sp? po,cp,sp			340.3	340.4		NSS	8.8	0.0792	0.145	0.226	>50	7.12
			337.65m, (marcasite? -) pyrite-pyrrhotite - calcite vein.65°. 30mm.													
			339.8m, chalcopyrite - pyrrhotite vein.30°.40mm.													
			340.2m-340.4m, chalcopyrite - pyrrhotite network. partly metasomatic.													
			341.1m, (sphalerite? -) chalcopyrite - calcite - pyrrhotite vein.45°.30mm. and calcite network, with chalcopyrite - pyrrhotite.	py,cp												
			342.0m, chalcopyrite - sphalerite - calcite - pyrrhotite vein. 40°.20-30mm.													
			354.6m, chalcopyrite - pyrite - calcite vein.5°, 20mm.													
			Pelitic (partly sandy) schist. foliation20-30°.bedded 20°. graphite dominant.													
			377.1-377.2m, chlorite - calcite vein. with pyrrhotite. 35°. 30mm.		ch											
			377.6m, chlorite - calcite vein. with pyrrhotite. 20°. 10mm.		ch											
			378.6-379.3m, pale greenish gray fine tu compact. 20°? metasomatic chlorite and calcite.													
			382.3m-, graphite decreases.	po												
			382.4-386.0m, pyrrhotite - calcite vein.2 width <16mm. 15cm interval.													
			Sandy - pelitic schist. foliation (p) 30-45°.bedded 20°.graphite.	po												
			386.85m, pyrrhotite - calcite vein.10°.40r													
			390.10m, pyrrhotite – calcite disseminati													
			390.20m,lamination? 10°. with calcite – pyrrhotite dissemination .													

MJTK-3



ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
Pelitic Schist	Pelitic schist. graphite. foliation 10-30°. lamination 20° in general.													
	404.3m,404.5m, (galena? -) sphalerite veinlet.25°. 2mm.	sp												
	449.5～459.4m, shered zone. fault？													
	459.4～460.0m, brecciated. dolomite？ (in matrix), pyrite, calcite, quartz.													
	464.6m～, calcareous ～silty schist. foliation? lamination～bedding 35°.													
	468.6～469.8m, fine sandy schist. with calcite veins. with quartz and pyrrhotite.													
	471.0m, chalcopyrite-sphalerite-pyrrhotite-calcite vein. 20°. 23mm. with parallel pyrrhotite－calcite veinlets.	po,sp,cp												
	472.4m, （dolomite？-）pyrrhotite-calcite vein. 20°. 70mm.	po,sp,cp,gn			473.4	473.6		0.101	10.3	0.153	1.07	3.22	31.8	>10.0
	473.2m～473.8m, galena－sphalerite－chalcopyrite－ pyrrhotite -quartz vein. cavities. 25°. 500mm. with parallel chalcopyrite－pyrrhotite－ quartz veinlets.													
	475.6m, pyrrhotite－quartz vein. 30°. 20mm.													
	476.4m, pyrrhotite－calcite vein. 30°. 25mm.													
	Pelitic ～silty ～sandy schist . foliation10～20°. lamination ～bedding folded, (generally 40°).													
	487.6m, pyrite－calcite network.													
	497.45～498.5m, sandy tuff. with calcite veinlet.													

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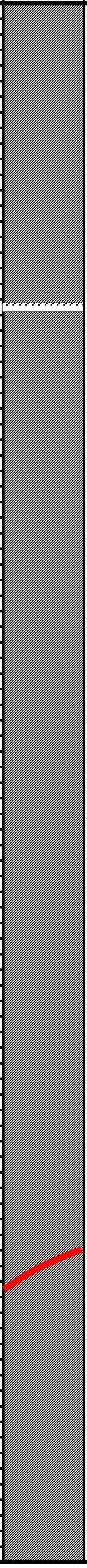
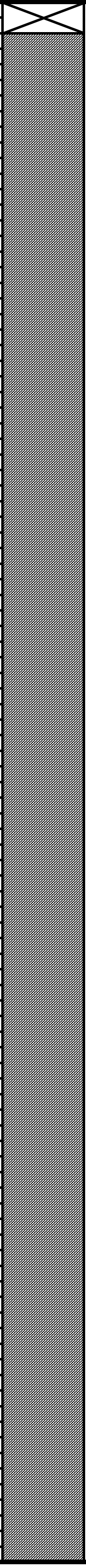
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	CHEMICAL ANALYSIS Ag (ppm)	CHEMICAL ANALYSIS Cu (%)	CHEMICAL ANALYSIS Pb (%)	CHEMICAL ANALYSIS Zn (%)	CHEMICAL ANALYSIS Fe (%)	CHEMICAL ANALYSIS S (%)
505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600		**Pelitic Schist**	Pelitic ～fine sandy schist alternation. foliation20°. bedding30～40°. with graphite. 519.4～519.6m, silty tuffaceous schist thin layer. 30°. (523.2m, silty ～fine sandy schist . foliation40°. lamination35°.) ～532.2m, pelitic schist . 533.1m ～, pelitic schist. with graphite. 534.9m～, fine sandy schist . lamination30°. foliation 40～50°. lamination45°. graphite. . Pelitic ～silty schist . foliation30-45°. lamination45°. with calcite veinlets. graphite. 545.45m, small fault. fructure zone (arround 570.10m). 576.4 - , Silty schist. Foliation 20°, Lamina 55°. 581.3～581.5m, galena - chalcopyrite - sphalerite - pyrrhotite - calcite vein. 35°, 150mm. 581.7m, chalcopyrite - galena - pyrrhotite. 35°, 10mm. 582.0m～582.15m, psamitic （tuffaceous?） schist thin layer. 35°. 582.1m - , silty schist. foliztion 40°, lamina 35°. 584.7m, fault. 60°, 10cm. 593.9m, pyrite dissemination. with calcite.	po,sp,cp,gn												

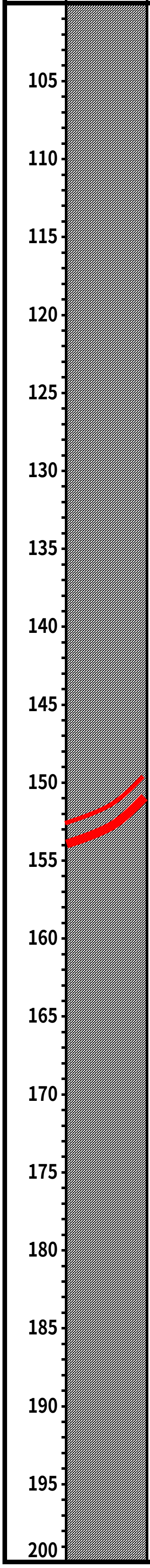
MJTK-3

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700	▨	Pelitic Schist	Silty-pelitic schist. foliation35°dip. bedded 40°dip. Around 607m-, silty-fine sandy schist alternation. foliation30°dip , beddwd 40°dip Silty-fine sandy schist. alternation. foliation40°dip. bedding 45°dip. around 609m-, silty-pelitic schist alternation. foliation40°dip , bedding 50-40°dip 619.9m, calcite vein. 10°dip. 100mm 621.2m-, pelitic schist. with graphite. friable. Pelitic-silty. Foliation(p) bedding 45° dip. with calcite veinlet. 621.5-628.3m, friable with graphite. Pelitic-silty. foliation30°dip. lamination45°dip. 650.20-650.65m, sheared zone. calcite network. In friable zone. pelitic-silty. foliation40-50°dip. lamination45°dip. calcareous 664.0-664.1m, 665.0-665.8m, tuff？ calcareous. Pelitic schist. foliation30-40°dip. lamination45°dip. With graphite. 674.80m-, sandy schist. 70°dip？ folded. 676.70m-, sheared. Pelitic schist. foliation45°dip ？(p). lamination50-80°dip (p). with calcareous. calcite veinlet. Pelitic-silty schist. foliation25°dip. Lamination 20°. 694.3-695.1m, calcite vein. 10°dip. With specularite. drilled to 701.00m														

MJTK-4

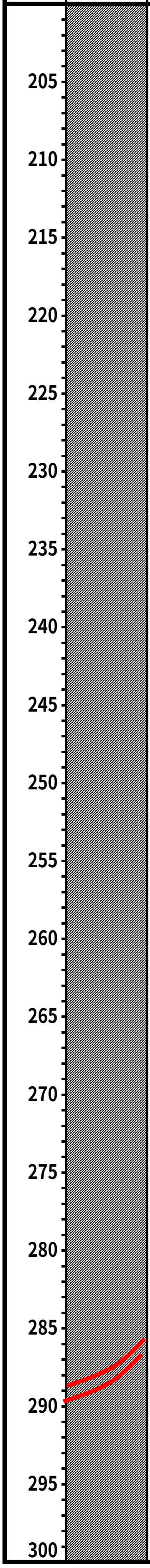
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100			- 2.10m, Tricon. (Calcareous schist.) 2.10m, calcareous schist. -5.45m, wethered. 5.45m -, foliation 45°. Limonite along foliation. Calcareous schist. lamination 30-50°.foliation40-45°. -20.3m, oxidized. calcite veinlet along foliation 31.5m-, pyrite spotted. 32.3m, calcite vein.45°.10mm. 36.4m, pyrite - calcite network. chalcopyrite. foliation：15-45°.bedded unstablely. calcite veinlets - networks. pyrite(<2mm)spotted. lamination20-45°. 85.9-86.55m, calcite vein.55°. width 30cm+. pyrite and pyrrhotite at edges. 87.1m, pyrite - calcite vein.55°. width 4-20mm. calcite network.. Calcareous- pelitic schist.foliation40-50°. bedded 15-45°. 98.5-99.1m, calcite vein.30°. width 40cm+. with pyrrhotite and sphalerite (?). 99.7-100.3m, chlorite - calcite vein.30-45°. with sphalerite, chalcopyrite, pyrite. calcite veinlet.	py po,sp? py,cp,sp	Wethered Lim											

MJTK-4



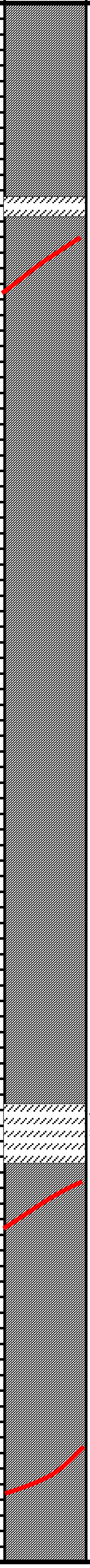
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	CHEMICAL ANALYSIS Ag (ppm)	CHEMICAL ANALYSIS Cu (%)	CHEMICAL ANALYSIS Pb (%)	CHEMICAL ANALYSIS Zn (%)	CHEMICAL ANALYSIS Fe (%)	CHEMICAL ANALYSIS S (%)
			Calcareous- pelitic schist. foliation40-50°.bedded 15-45°.													
			105.65-105.75m, fault. argilizated. 65°. shered . 108.2-108.9, calcite vein.40°. with pyrite. foliation → 30° → 40°.													
			124.7-126.0m, 1cm-6cm interval, along foliation. pyrrhotite - calcite vein. 35 -40°.													
			Calcareous - sandy - pelitic schist. foliation 35-40°. bedded 15-40°. with calcite veinlets.													
			143.75-144.40m, chlorite - calcite vein. 40°, 50cm.													
			151.05m, calcite vein. with pyrrhotite and sphalerite. 30°. 30-40mm.	po												
			152.3m-152.5m, chlorite - calcite vein, with pyrrhotite, sphalerite, chalcopyrite. 25-30°. 180mm.	po,sp,cp	ch											
			calcite veinlet - network dominant (- 158.7m).													
			Calcareous schist.foliation 20-45°. bedded 25-40°.													
			171.3m, calcite vein.25°.40mm.													
			174.4m, calcite vein.55°.15-35mm. 175.3-176.2m, calcite vein.20-40°. <40mm. with averaging 15cm interval.													

MJTK-4

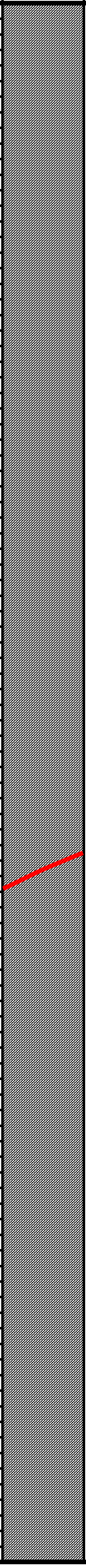


ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
Pelitic Schist	Calcareous schist. foliation 35-45°. bedded 25-45°.													
	213.00-216.00m, chlorite - calcite vein. 30-45°.250mm. 215.9m, calcite vein.45°.10mm.													
	Pelitic-silty - calcareous schist. foliation 40-60°. unstable lamination.													
	229.9-230.0m, sphalerite - pyrrhotite veinlet. 0-20°. 5mm. with calcite.	po,sp												
	233.1m, calcite vein.40°. 30mm. pyrrhotite. 233.3m-233.5m, calcite, chlorite, pyrrhotite.40°, along foliation. partly with sphalerite, chalcopyrite.	po	ch											
	241.1-246.2m, calcite veinlet. with pyrrhotite. 60°. 4mm. along foliation.	po												
		po												
	246.3m, pyrrhotite veinlet - diss. 65°. w:3mm. along foliation.													
	247m, foliation → 20° .													
	Pelitic-silty - sandy- calcareous schist. foliation 40-50°. unstable lamination. with graphite. calcite veinlet along foliation.													
	Pelitic- calcareous schist.foliation30°. Unstable lamination.													
	266.9-269.6m,graphite dominant. calcite veinlets along foliation.													
	279.9-280.1m, shered zone. 280.69m-280.73m, pyrrhotite - calcite vein.30°.30mm.													
	Pelitic ～silty ～calcareous schist. foliation40～50°. lamination20～30°. calcite network dominant. 285.8～285.95m, calcite along foliation. 287.3～287.8m, (galena -)sphalerite-chalcopyrite -pyrrhotite-pyrite-calcite vein. 50°. 30mm. (pyrrhotite : upper side, pyrite: lower side in the vein) with barren calcite veinlets. 288.4m, chalcopyrite－pyrrhotite－calcite vein. 50°. 8mm.	py,po,cp,sp py,cp												
		py	cl											

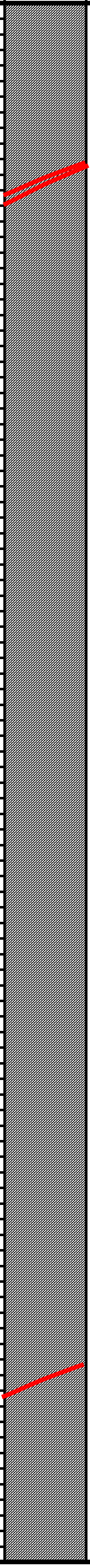
MJTK-4

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
305		Pelitic Schist	Pelitic ～silty ～calcareous schist. foliation 50°. bedding 10～30°. calcite network～veinlets. with graphite. 305.25～305.45m, sandy schist. bedding10°. 306.6m～, shered zone.	Py	Chlorite											
310 315 320			Pelitic ～silty schist . - 312.3m, shered zone. 312.4～313.8m, tuffaceous～sandy schist. calcite. silicified. 313.8～, pelitic ～calcareous schist. foliation 30°. lamination 25°. 317.85m, calcite vein. 70°. 10mm. with pyrite.		sili											
325 330			Pelitic ～silty schist. foliation 15～20°. Unstable lamination (10°?) . with graphite calcite networks. ↓ foliation steeper, (335.3m 35°).													
335 340 345			Pelitic ～silty schist . foliation45° (p) . lamination 10° in general. with graphite.													
350			343.3～343.5m, fine tuffceous～silty layer. 25°. calcite dominant.													
355 360 365 370			Pelitic ～silty schist . foliation20°. lamination20°.													
		tuffaceous schist	370.6m～, fine tuffaceous schist. calcite dominant.													
375			374.2m～, pelitic ～sandy schist. with graphite.	py												
			374.7～375.0m, fructure . pyrite diss.	po,cp												
380			Pelitic ～sandy schist . calcareous . foliation 40-50°. lamination, generally 30-45°.													
385			378.95m, chalcopyrite—pyrrhotite —calcite vein. 40°. 30mm. with graphite. foliation almost vertical.													
390			387.7m, pyrite dissemination.													
395 400			394.5m, calcite—pyrrhotite vein. 65°. 4～11mm.	po												

MJTK-4

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500		**Pelitic Schist**	pelitic ～silty schist . 406～407m, lamination folded. Partly 70°. ↓45°. Foliation (p). Lamination 45° ? . calcareous . With graphite. Foliation 40°. Lamination 25°, folded. calcareous . with graphite. 440.75m -, calcite - chlorite vein, 45°, 90mm. 452.2m, pyrrhotite diss. - veinlets. 452.2m - , medium sandy scist (-tuff?) 455.3m - 455.6m, galena - chalcopyrite - sphalerite - pyrrhotite - chlorite - calcite vein. 35°, 20cm. 455.8-, pelitic - silty schist silty schist. foliation(p). lamination∠45° dip. 456.5m, fault. ∠30°dip. And pelitic under. 464.0-464.9m, sheared zone. silty-pelitic schist. partly sandy, calcareous. foliation∠30-50°dip. lamination20-∠60°dip.	po po,sp,cp,gn	ch ch											

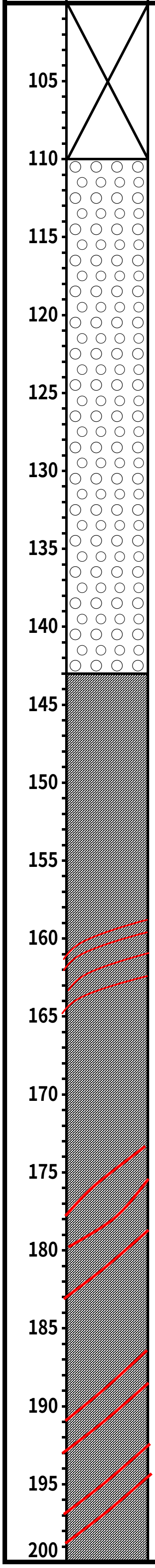
MJTK-4

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		**Pelitic Schist**	Silty-pelitic schist. partly sandy,													
			calcareous.													
			foliation∠30-50°dip. lamination20-													
			∠60°dip.													
505																
			.													
			501.8-502.2m,													
			chalcopyrite-sphalerite-pyrrhotite-													
510			calcite vein.													
			along foliation. ∠50°dip. 160mm.	po,py,sp,cp												
			Sulfides are anhedral to calcite.	py,po,sp,cp	ch											
			With parallel veinlets.													
			Silty-pelitic schist.	py												
515			foliation∠50°dip. lamination∠35°dip.													
			511.3m,													
			chalcopyrite-sphalerite-pyrite-pyrrhotite													
520			-calcite vein.													
			along foliation. ∠35°dip. 30mm.													
			511.55m, chalcopyrite-sphalerite-pyrrhotite													
525			-pyrite-chlorite-calcite vein.													
			∠40°dip. 35mm.													
			511.7m, sphalerite-pyrite-pyrrhotite-calcite vein.													
			∠25°dip. 20mm.													
530			514.0-514.5m, fault. ∠45°dip？													
			pyrite dissemination.													
			silty-fine sandy schist.													
			foliation∠30°dip (p). lamination10-													
535			∠60°dip.													
			silty-fine sandy schist.													
			foliation(p). lamination20-∠70°dip.													
			partly friable.													
540			silty schist. calcareous.													
			foliation∠20°dip. lamination∠20°dip.													
545																
550																
555			553.9m, chlorite-calcite vein.													
			∠40°dip. 200mm.													
			silty-pelitic schist. foliation∠35°dip.													
			lamination60-30-∠10°dip.													
			calcareous.													
560																
			pelitic-sandy schist. foliation∠30°dip.													
			lamination∠25°dip.													
565			calcareous. partly friable.													
570																
575																
			583.85-584.15m, tuff？layer. Fine and c													
			586.65m, pyrrhotite-calcite vein. ∠25°di													
580			588.0m, pyrrhotite-calcite veinlet. ∠30°													
			588.5-589.1m, pyrrhotite-chlorite-calcite													
			pelitic schist. alternation with partly silty													
585			foliation∠25°dip. lamination∠30°dip.													
			594.2-594.35m, fine tuff layer. ∠30°dip.	po	ch											
590			Drilled to 601.20m.													
595																
600																

MJTK-5

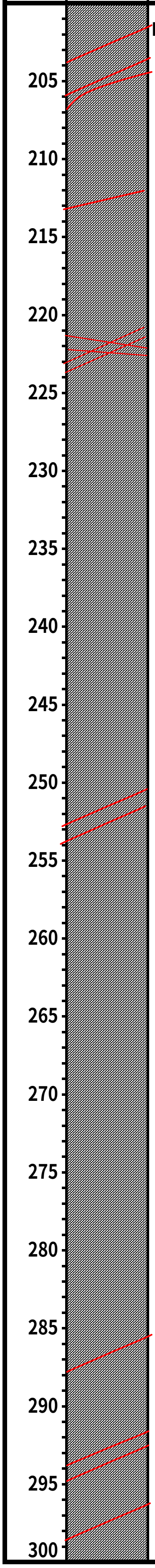
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			(- 109.6m, Tricon) Cenozoic sediment. Sand and gravels with soil and limonite.		Wethered Lim											
5																
10																
15																
20																
25																
30																
35																
40																
45																
50																
55																
60																
65																
70																
75																
80																
85																
90																
95																
100																

MJTK-5



ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	- 109.6m, Tricon. Sand and gravels with limonite.		Lim.											
	109.6m-, core drilled. Cenozoic sand and gravels (-conglomerate). Gravels: pelitic schist, sandy schist, tuffaceous schist. <35mm. matrix: sandy with limonite.													
	123m-, Boulder gravels (weathered gabbro?). Partly magnetic. partly foliated. with limonite, calcite and clay mineral in matrix.													
	142.5m-, pelitic-silty schist. foliation,60-70°. Ustable beddeing -lamination.													
	-148.6m oxidized (weathered) zone.													
	149.05m, pyrrhotite - calcite veinlet. 55°. width <5mm. 151.20m, chalcopyrite - pyrrhotite - pyrite - calcite network. foliation. 151.60m, chalcopyrite - pyrrhotite - pyrite network													
	154.45m, quartz - calcite - pyrite - pyrrhotite veinlet .60°.6mm. with parallel calcite veinlets (15cm interval).	py,cp,po												
	162.3m,162.4m,162.8m,162.9m, pyrite - pyrrhotite veinlet.60°.5mm. with branchs. 163.5-164.0m, pyrite dissemination along foliation. 164.7m,165.0m, chalcopyrite - pyrite vein. 50°. 6mm. with chlorite. 165.7m, pyrite - calcite veinlet. 60°. widt parallel veinlets. chlorite. 30cm	py po												
	Pelitic-silty schist. foliation 45° (p) . lam partly shered.													
	177.0m, pyrite - calcite vein.75°. 15mm. 178.4m, pyrrhotite - calcite vein.60°. 3m 181.8m, pyrrhotite - calcite vein.55°. <4	po po												
	Pelitic- calcareous schist. foliation 50°. weak lamination 60°.													
	186.7m-196.7m, altered (calcite, silicifie 188.3m, pyrrhotite - calcite network. 188.9m, quartz vein.10°. 11mm. 189.15m, pyrrhotite - calcite veinlets. 6 190.0m, pyrrhotite - calcite vein. 65°. <6 191.1m, 191.3m, pyrrhotite - calcite vei	po po po po												
	194.8m-195.6m, pyrrhotite - calcite vein 195.7m-196.1m, pyrrhotite - calcite vein													

MJTK-5



ROCK NAME

Pelitic Schist

DESCRIPTION

Calcareous- silty schist. graphite.
Partly tuffaceous. foliation 45°.
lamination 20-70°.
201.2m, pyrrhotite - calcite vein.5°.
23mm. lamination70°.
205.1m, pyrrhotite - calcite veinlet.
60°.5mm.
210.7m, chalcopyrite – pyrrhotite
dissemination, along foliation. calcite.
silicified? .
213.0-213.3m,
chalcopyrite - pyrrhotite - calcite
network.
220.5m-224.0m, tuffaceous psamitic
schist.
Unclear foliation and lamination.
220.6m, calcite vein.55°. 12mm.
221.0m,
chalcopyrite - pyrrhotite - calcite vein.
40°.40mm.
222.5m, chalcopyrite - pyrite - calcite
vein.
65°. 40mm.
222.8m-222.9m,
chalcopyrite-sphalerite-pyrrhotite-
calcite vein.
50°.90mm.
in pyrite dissemination zone
and sphalerite - chalcopyrite - pyrrhotite
network.
223.5-223.9m, Dolerite dyke. 60° .
Pyrrhotite - diss.
Nonmagnetic.
224.0m-,silty - fine sandy schist.
tuffaceous?
greenish by chlorite.
224.7m, pyrite - pyrrhotite network.
234.0m, foliation pyrite - calcite
veinlets,
along foliation. 50°.
234.50m, pyrite - calcite
vein.50°.<30mm.
with pyrite - calcite network.

Calcareous-silty - sandy schist.foliation5
lamination40-90°.
Calcite veinlets along foliation.

244.0m - , pyrite - calcite veinlet. 60°.
1mm. 20cm interval.
246.5-246.7m, pyrrhotite - calcite netwo
247.4m, calcite - pyrite vein. 65°. 5mm.
248.55m, small fault. 60°. 20mm. breccia
-250.3m, pyrite - calcite veinlet, 60°.
10cm interval.
252.9m,
chalcopyrite - pyrrhotite - calcite vein.
40°. 50mm.
253.5m,
chalcopyrite - pyrrhotite vein.60°.
width <6mm.
255.1m,
pyrite - pyrrhotite - calcite network.
Pyrrhotite - calcite veinlet. 60°.
width <1mm. 10cm interval.
256.2m-257.9m, pyrrhotite disseminatio
with chalcopyrite. silicified.
259.1m-,
chalcopyrite - pyrrhotite - calcite netwo
silicified. Partly chlorite.
↓
More silicified. hard. calcite network.
Calcareous ～silty schist . hard.
foliation 50°（p）. calcite network
285.8m～287.4m,
chalcopyrite－calcite－pyrrhotite vein
90°. width<70mm. cavity.
-288.3m, Pyrrhotite network. partly chlo
and （chalcopyrite－）pyrite－chlorite－
along foliation 65°.

Silty ～calcareous schist
silicified. calcite veinlet. foliation50～7
lamination unstable（p）.
292.85～292.95m,
pyrrhotite－calcite－quartz vein. 60°. 40
293.1～293.3m,

MINER.

po
po
cp,po
cp,po
cp,py
cp,sp,po
py
py
cp,po
cp,po
po
cp,po
cp,po
po,cp
po
py
po
py

ALTER.

ca
sili?
ch
ch

SAMPLE				CHEMICAL ANALYSIS						
No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	256.7	256.8		0.15	1	0.577	0.0257	0.0218	38	8.76

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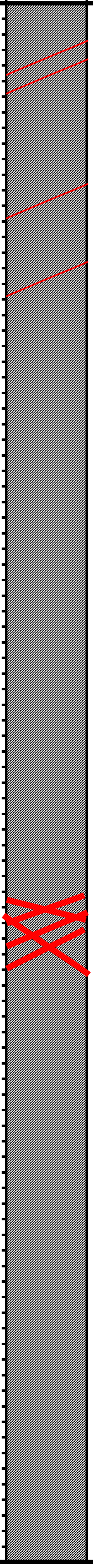
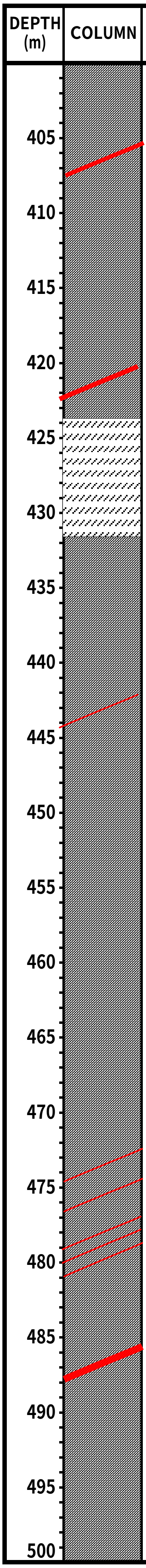
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400		**Pelitic Schist**	Silty -calcareous schist silicified. calcite veinlet. foliation50-70° (p) . lamination unstable (p) . 303.1m, calcite-pyrrhotite vein. 50°. width<11mm. network like. 303.75m, pyrrhotite vein. 10°. 6mm. 303.9m, pyrrhotite vein. 50°. width<4mm. 304.75m, pyrrhotite vein. 40°. 3mm. 307.65m, calcite-pyrrhotite vein. 30°. 4mm. 308.5m-, sandy schist, pyrrhotite-pyrite diss. along foliation (50°) . silicified. 311.0m, calcite-pyrrhotite vein. 40°. 3-10mm. 311.05m, pyrite-calcite vein. 45°. width10mm. silty schist. foliation65°. lamination55°. chlorite. tuffaceous？ 315.5m, calcite-pyrrhotite vein. 30-50°. 10mm. 315.9m, pyrrhotite vein. 50°. 8mm. 316.75m, pyrrhotite-chlorite-calcite network pyrite-pyrrhotite networks. 318.0m, chalcopyrite-pyrite vein. 50°. 4mm. 318.2-319.1m, shered zone. 319.1-, silty schist . foliation 50°. lamination60°. Partly chlorite. 321.8m, calcite vein. 70°. 32mm. with dolomite？ 325.5m, pyrite-calcite network. 329.7m, pyrite-calcite veinlet. 60°. 7mm. pyrite sissemination along foliation. ↓ foliation steeper (65°) . 334.9m, (pyrite-) pyrrhotite vein. 60°. 8m 337.75m, pyrrhotite veinlet. 60°. 3mm. 339.1m, pyrrhotite-calcite vein. 50°. 9mm 340.5m, pyrite vein. 50°. 8mm. chlorite. 342.3m, pyrite-pyrrhotite vein. 50°. 6mm with calcite. chlorite. Silty -fine sandy schist . foliation50° (p) . lamination70° ？ 343.25m-343.30m, calcite-pyrrhotite-pyrite veins. 50°. 6mm 344.4m, pyrrhotite-pyrite-calcite vein. 50°. 8mm 345.1m, (sphalerite-chalcopyrite-) pyrrhotite-pyr 55°. 12mm. 346.5m, pyrite vein. 50°. 6mm. 346.7m, calcite-pyrrhotite vein. 55°. 30m 355.1m, chalcopyrite-calcite-pyrrhotite v 50°. 10mm. 355.3m, chalcopyrite-calcite-pyrrhotite network. 356.9m, calcite-pyrrhotite network. 65°. 357.3m, chalcopyrite-pyrrhotite vein. 60°. 4mm. 357.6m, pyrrhotite vein. with calcite. 65° 358.0m, (chalcopyrite-pyrite-) pyrrhotite vein. w 65°. 9mm. with branchs. 358.75-362.0m, silicified fine sandy schist. mineralizate (sphalerite-) chalcopyrite-pyrite-pyrrho network-dissemination. pyrite, pyrrhotite, chalcopyrite, quartz Silty -fine sandy schist . foliation 50° (p) white altered. chlorite-pyrrhotite-calcite 382.3m-386.0m, micro-diorite? dyke. 70 calcite-chlorite veins. Fine sandy schist -pelitic schist alternatio quartz crystal along foliation. Silty -tuffaceous schist . foliation 45°. la with calcite chlorite. 398.4-398.6m, dolomitevein. 30° ？ 190m	po po,py py po po,cp py po,py py po,py cp,sp,po,py po,py	ch ch		358.6	359.0		0.322	1	0.216	0.0211	0.0182	29.6	7.25

MJTK-5



ROCK NAME

Pelitic Schist

DESCRIPTION

Silty -fine sandy schist .
406.2-406.3m,
pyrite-calcite vein. 70°.
100mm. foliation60°. lamination70°.
406.3m-,
silty -tuffaceous schist alternation.
silty schist dominant.
Dolomite-calcite veinlet.

421.4m-,
chalcopyrite-pyrrhotite-calcite vein.
65°. 100mm.
423.7-,
tuffaceous schist. lamination55-60°.
with silty schist -pelitic schist thin
layer.

-431.7m,
tuffaceous schist -fine sandy schist .
431.7m-,
silty -fine sandy schist. foliation45°.
bedding45°.

443.35-443.45m,
(calcite-dolomite-) quartz vein.
10°. with pyrite.
↓ lamination, 60-65°. chlorite.
446.7m, pyrite diss-network.
448.2-448.8m, calcite-quartz vein. 10°.
foliation 60°. lamination 45°.

451.2m, pyrite dissemination.

459.35m, chlorite-calcite vein.
20°. 60mm.

463.4-468.6m, pyrrhotite diss(f). with
calcite.

472.3m, chlorite.
473.35m-473.80m,
chalcopyrite-pyrite-pyrrhotite veinlet.
50°.
width<20mm. with calcite and chlorite.
475.5m, lamination65°.
pyrrhotite diss.-network
476m-, lamination50°.
478.4-478.6m, pyrrhotite network.
479.2m, pyrrhotite diss.-network.
479.4-480.8m,
(chalcopyrite-) pyrrhotite veinlets-netw
5cm interval.
50°. width<5mm. silicified. dolomite？
480.15-480.80m,
(chalcopyrite-) pyrrhotite network.
10cm interval.
481.4-481.6m, pyrrhotite network.
482.2m-,
silicified. pyrrhotite diss.-network.
with calcite and chlorite.
482.3m, quartz vein. 10°.
40mm. with pyrite, calcite and dolomite
483.30m, pyriteveinlet, >75°. 2mm.
even in quartz vein (10°, 40mm) .
pyrrhotite diss.(f).
484.80, dolomite-calcite vein. 20°. 70mm
chlorite (both of sides).
486.0-486.3m, calcite vein. 35°. 250mm.
pyrrhotite, chlorite.

493.3m, pyrrhotite network(f).

MINER.

py
po,cp
po
po,py,cp
po
po
po
po,cp
po
po
po

ALTER.

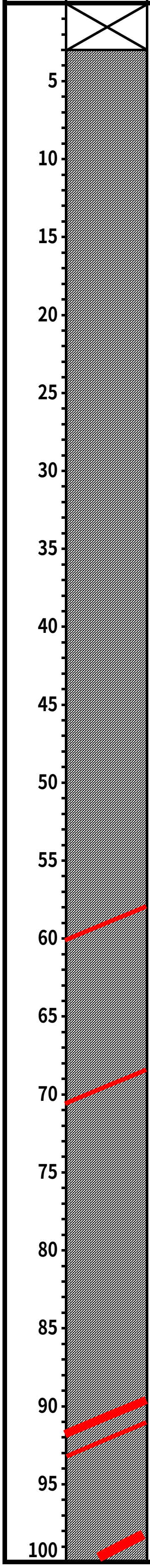
ch
ch
ch
ch

SAMPLE				CHEMICAL ANALYSIS						
No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	466.6	466.7		0.03	0.5	0.202	0.007	0.0106	25.5	7.57

MJTK-5

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	▨ 502.1	Pelitic Schist	Silty - fine sandy schist . foliation 55°. bedding-lamination unclear. 501.25m, pyrrhotite - calcite vein. 501.90m, pyrrhotite - calcite vein. 55°. 9～15mm.	po												
505																
510																
515																
520																
525																
530																
535																
540																
545																
550																
555																
560																
565																
570																
575																
580																
585																
590																
595																
600																

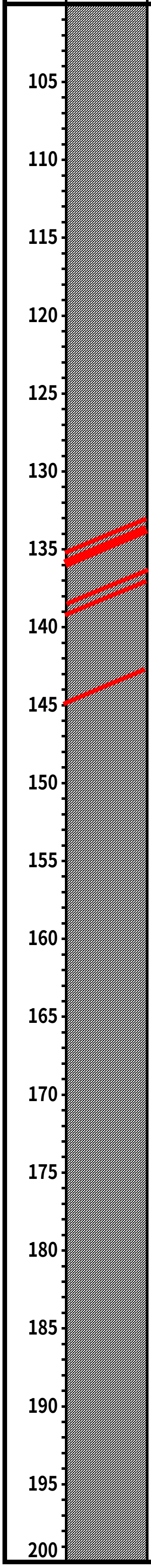
MJTK-6



DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			MJTK-6, (-3m, Tricon.)		Wethered Lim											
			Pelitic schist. foliation∠35°dip. lamination∠20°dip.													
			28.5m, calcite vein. ∠35°dip. 140mm.													
			30.5m, calcite vein. ∠35°dip. 50mm. with specularite.													
			34.0m, calcite vein. ∠35°dip. 40mm. with galena and sphalerite.													
			pelitic-silty schist. calcareous. foliation35°dip. lamination∠10-25°dip.	gn,sp												
			50.2m, sandy schist thin layer. ∠10°dip. 50mm.													
			56.5-56.7m, coarse sandy schist layer. ∠20°dip. pyrite dissemination.													
			59.0m, calcite vein. ∠35°dip. 15mm. with specularite, sphalerite？	py												
			Silty schist. calcareous. foliation∠30°dip. lamination∠20°dip.	sp?												
			69.55m, chalcopyrite-galena-sphalerite-pyrrhotite -calcite vein. ∠30°dip. 50mm.	po,sp,gn,cp												
			78.7-79.4m, sheared zone. pelitic-silty schist. alternation. foliation∠45-∠25°dip. bedding ∠45-∠25°dip.													
			90.25m, pyrrhotite -calcite vein. ∠25°dip. 12mm.													
			91.1m, chalcopyrite-galena-sphalerite-pyrrhotite -calcite vein. ∠35°dip. 200mm.			90.7	90.8			0.042	18.2	0.49	2.41	1.65	23.9	>10.0
			92.0m, pyrite-calcite vein. ∠20°dip. 40mm.	po,sp,gn,cp py												
			99.7-101.45m, mineralization. chalcopyrite-sphalerite-pyrite -chlorite-pyrrhotite-calcite vein. ∠35-40°dip. With dolomite-quartz？ And pyrrhotite network in silty schist un	po,sp,py,cp	cn											

MJTK-6

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.



Pelitic-silty schist. foliation∠25-40° dip.
Lamination unclear.

-111.6m,
(chalcopyrite-sphalerite-)pyrite
-pyrrhotite-Calcite vein.
With 3cm-50cm interval.
∠15-25° dip. 2-30mm.

po,po,sp,cp

111.6m-, pelitic schist. friable by foliation.
Foliation=lamination∠30° dip.
silty schist. calcareous. foliation∠20° dip. lamination∠25° dip.

133.95m, pyrrhotite-calcite vein.

134.25-134.80m,
chalcopyrite-galena-sphalerite-pyrite
-pyrrhotite-calcite vein. ∠20° dip.

po
po,py,sp,gn,cp

silty schist. calcareous. foliation∠25° dip.
lamination∠25° dip (=foliation).

po
po

137.9m, pyrrhotite-calcite vein.
∠25° dip. 9mm.
138.5m, calcite vein. With pyrrhotite.
∠25° dip. 30mm.

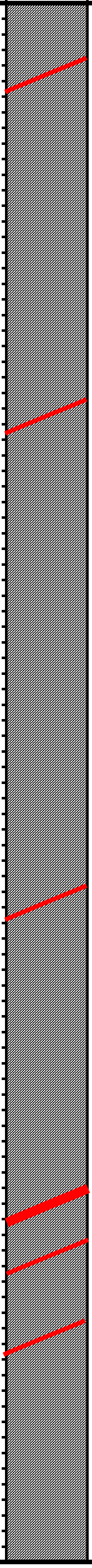
po

143.5m, calcite vein. With pyrrhotite.
∠35° dip. 25mm.

Silty-pelitic schist. calcareous.
foliation∠25° dip.
lamination∠25° dip (=foliation).
With calcite veins along foliation.

SAMPLE				CHEMICAL ANALYSIS						
No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	101.2	101.3		0.096	3	0.0429	0.241	0.33	18.3	>10.0
	125.2	125.3		0.112	3.5	0.29	0.0452	0.0993	42.1	>10.0
	134.2	134.7		0.087	19.7	0.321	0.84	0.346	25.7	>10.0

MJTK-6

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	CHEMICAL ANALYSIS Ag (ppm)	CHEMICAL ANALYSIS Cu (%)	CHEMICAL ANALYSIS Pb (%)	CHEMICAL ANALYSIS Zn (%)	CHEMICAL ANALYSIS Fe (%)	CHEMICAL ANALYSIS S (%)
205		Pelitic Schist	silty-pelitic schist. calcareous. Foliation(p). partly ∠20°dip. bedding ∠10°dip. partly with graphite.	py												
210 215 220			204.50m, small fault (∠80°dip) with pyrite-calcite vein (w:9-18mm). 211.7m-fault. ∠40°dip. 211.3〜211.7m, tuff layer, ∠15°. 215.0〜216.8m, sheared zone. pelitic schist. foliation∠20°. bedded20°. 219.0m〜, sheared zone. With quartz vein fragments. pelitic〜sandy schist. foliation∠30°. lamina〜bed 10°. Chlorite - calcite network along fractures, Pyrite dissemination.													
225			-229.0m, fractured zone 〜 sheared zone. 226.70〜226.85m, (pyrite-) chlorite- quartz- calcite vein. ∠35°.120mm. pyrite is at edge (p).	py	ch											
230			230.90m, pyrite- calcite vein.∠30°.8mm.													
235			pelitic〜 silty (partly sandy) schist. foliation∠30-45°.bedded∠45°. friable.													
240			243.6〜256.5m, fault? ∠35°.													
245 250			257.1〜257.85m, pyrite - pyrrhotite dissemination and replacement along foliation. (Silicified in the upper zone, and calcite network in the lower zone) sulfides disseminated along foliation(p).													
255 260			pelitic〜sandy schist. foliation∠25°.bedded∠25°. 260.65〜260.70m, chalcopyrite- pyrite- quartz- calcite netv friable, partly sheared. pelitic〜 silty schist. foliation∠60°.bedd	po,py												
265 270			270.1m-, sheared zone. (sheared pelitic schist, calcareous) partly spotted pyrite. pelitic schist. with graphite. 276.85〜277.40, pyrrhotite vein. With chalcopyrite (p). silicified(p). and pyrrhotite network for 25cm.													
275			Silty - fine sandy schist. foliation ∠30-3 calcite veins with chlorite. partly graphit													
280			280.6〜281.2m, calcite vein. With dominant pyrrhotite in the lower p and with chalcopyrite, pyrite and chlorit Sorted → sandy schist (calcareous). Calcite veins (w: 8〜40mm) with averag	po,cp po,cp	ch											
285			283.9m〜, silty schist. foliation = beddir 285.5m, sphalerite－pyrite－calcite vein 286.95m-, fractured and friable.	py,sp												
290			Pelitic – silty –fine sandy schist alternati Foliation= bedding∠10°. Partly friable with graphite and calcite v													
295 300			Drilled to 301.9m.													

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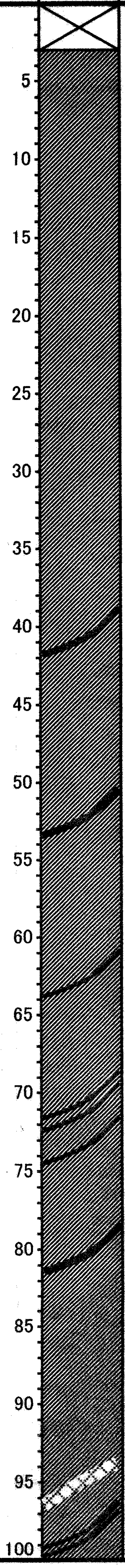

ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	(- 3m, Tricon) Calcareous schist with pelitic schist layers. foliation:40-50°, lamination : 0-50°. Carbonate veinlet. Fractures. Calcite -dolomite (?) -quartz veinlets dominant.		Wethered Lim											
	31.7 -32.0m, fine tuff thin layer.40°. 39.1 -39.55m, quartz (- calcite) vein.45°. 40.0m, fine tuff thin layer.40°.1.5cm.thick 40.4m, calcite (- quartz) vein, with pyrrhotite, sphalerite, chalcopyrite. 30 -50°, 4cm width, partly pyrite? 40.5m, calcite vein.55°.width 10cm. 41.0 -41.1m, calcite (- pyrite - pyrrhotite - chalcopyrite - sphalerite) vein. 25°. 11cm width. 41.1m-, barren calcite veins. 42.7 -43.1m, calcite (- chlorite) vein.40°. 43.4 -44.3m, fine sandy tuff.40°.	po,py												
	44.3m- , pelitic schist- calcareous schist. with quartz (- calcite) network-veinlet. discordant to foliation. partly fine - sandy lamination.20 -40°. 52.9m, calcite - pyrrhotite vein.40°. width 15cm. calcareous- pelitic schist. black. with graphite. 56.2 -56.6m, calcite veins. 45°. width 3 -20mm. 63.0m, calcite (-dolomite ?) vein. with sphalerite (p). and with parallel calcite veins. along foliation.													
	Calcareous schist. foliation 30 -40°.	cp,po			62.7	62.75		0.035	2.4	0.0202	0.0205	8.45	5.1	4.3
	bedded. laminated with micro-folding (axix?). 70.0, 70.15, 73.35m, pyrrhotite - calcite (- chalcopyrite) vein 45°.width : 3 -30mm. along foliation. in the lower part of the vein, pyrrhotite - calcite vein. width : 12 -110mm.40°.	cp,po												
	72.4m-, chalcopyrite - pyrrhotite - calcite veins along foliation. 6 -10cm intervals.	cp,po			76.3	76.4		0.73	6	0.0091	0.258	0.582	4.45	3.6
	width 6 -15mm. 80.0 -80.6m, pyrrhotite - calcite vein.40°.	po			80.5	80.6		0.022	6.8	0.0787	0.318	0.405	>50	8.83
	width : 35 -40cm. fault? with chalcopyrite, sphalerite, (galena) 84m-, micro-folding, and calcite veins 40cm-interval, along foliation. 40°.width 2 -9m. Partly in R-faults. 95.5 -, pyrrhotite - calcite vein. along foliation. 40°.width 40-80m. sphalerite and chalcopyrite. with similar network 80cm+ long. 99.1m, pyrrhotite - calcite vein. 40°.width : 10mm. 99.6m -, calcite - pyrrhotite vein.40°. width : 130mm. with chalcopyrite.	po												
	brecciated at the boundary.	po			99.5 99.6	99.6 99.7		0.038 0.146	6.1 6	0.646 0.247	0.047 0.0586	8.07 2.15	19.8 >50	7.26 7.75

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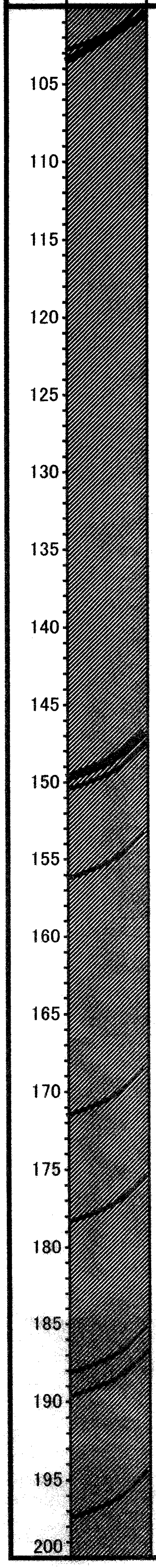

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			Calcareous- pelitic schist	po po,py,cp	ch											
			100.4m, pyrrhotite - calcite vein.40°.20mm. 100.7m, (pyrrhotite -) calcite vein. 30 -40°.13 -40mm. with pyrrhotite - chlorite - calcite veins. 50°. 160mm. 101.2m -, pyrrhotite - chlorite - calcite vein.50°. 160mm.													
			101.6m -, chalcopyrite - pyrite - pyrrhotite vein.30°. with calcite - chlorite mass.	po	ch											
			113.65 -114.10m, chlorite - calcite - quartz vein.30°. width :35cm. with pyrrhotite and fragments of schist and tuff.													
			Calcareous- pelitic schist, altered (chlorite, sili) . foliation40 -45°. partly black (with graphite).													
			140.5m, pyrrhotite vein.25°. width 7mm. 140.9m, calcite - pyrrhotite vein. 40°.width 30mm. 142.1 -142.3m, pyrrhotite - clay mineral - calcite vein. along foliation .40°.width 110mm. 143.5 -143.9m,													
			(pyrrhotite -) calcite vein.40°.width 30mm. 144.6 -144.7m, pyrrhotite - calcite network.	po												
			145.0 -150.6m, pyrrhotite - calcite veins (- networks),	po												
			15cm interval .45°.	po,py,cp,sp												
			generally along foliation and with	po,cp	ch		148.2	148.3		0.114	7.4	0.0483	0.0769	6.96	20.3	>10.0
			chlorite. Ex.) 147.8 -148.0m, chalcopyrite - sphalerite - pyrite - pyrrhc - chlorite - calcite vein. 45°.width 80 -100mm. sulfide dominant along edge. 148.2 -148.5m, pyrrhotite - chlorite - quartz - calcite vein. with chalcopyrite. 45°.width 210mm. 148.8 -149.0m, sphalerite - pyrrhotite - calcite vein. with chalcopyrite. 45°. 149.3 -149.6m, pyrrhotite - calcite vein.40°. with sphaler	po,sp												
			154.7 -154.8m, pyrrhotite - calcite vein.45°.width 130m.													
			171.9m, quartz - calcite vein.25°.width 30mm. with pyrrhotite(p). pyrite dissemination													
			176.7m, metasomatic calcite, with chlorite, pyrite 177.6m, pyrrhotite - (quartz -) calcite vein.20°. width 9 -20mm. sphalerite.		ch											
			182.6m, pyrite - chlorite veinlet.65°. width <1mm. 184.8m, calcite veinlets along foliation. with pyrrhotite. 30°.width <10mm	py	ch											
			187.0m, pyrite - calcite vein.40°. width <3mm. (pyrite is later than calcite 188.3m, chalcopyrite - pyrrhotite - calcite vein.3 3mm. 195.5 - 195.7m,	po,cp												
			calcite - pyrite - pyrrhotite veinlet.40°. width <3mm. 196.75m, calcite - pyrrhotite vein.15°. width 16mm. 196.9m, metasomatic calcite and chlorite	po,py	ch											

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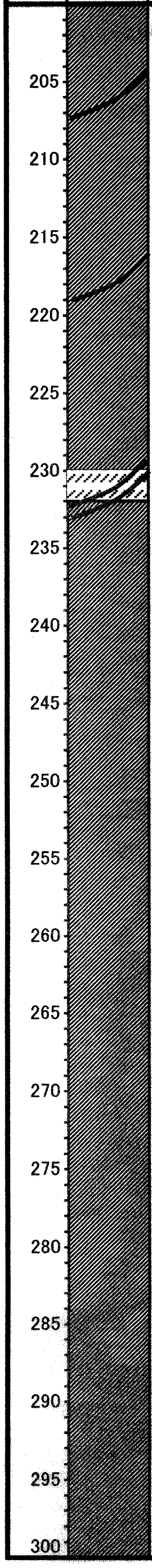

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Pelitic Schist	Pelitic- calcareous schist. lamination 10-30°. foliation 20-40°. with graphite.													
			206.3m, pyrrhotite - calcite veinlet. 75°. 2mm.													
			217.1m, pyrite - chlorite veinlet. 45°. width <1mm.													
			218.5m, pyrite - calcite network. 30° in fault (width 40mm).	py	ch											
			222.5m,bedded (sandy- pelitic), 20°. sorted. .													
			229.7m-231.9m, pale greenish gray fine tuff. silicified. chlorite.													
			230.1m, sphalerite - chalcopyrite - pyrrhotite (-quartz) -calcite vein. galena? 40°.10-40mm.													
			231.4m, pyrrhotite - chlorite - calcite veinlet. 50°. 3mm. with barren calcite veins.	po,cp,sp po	sili,ch											
			235.0m, pyrite - calcite veinlet.20°.1mm.	py												
			258m, sorted.													
			259.7-259.9m, barren calcite vein. 5°. Partly sandy schist. foliation20-30°. bedded 20-40°.													
			272.1m, chalcopyrite - pyrite - calcite vein. 35-40°. 11mm.													
			277.3-281.3m, fault. with shered zone.													
			Pelitic- (sandy-) calcareous schist. with graphite. foliation 30-45°. bedded 30-50°.													
			277.3-281.3m, pyriteと chalcopyrite in fault. shered .													
			293.7m, calcite network. with pyrite.													

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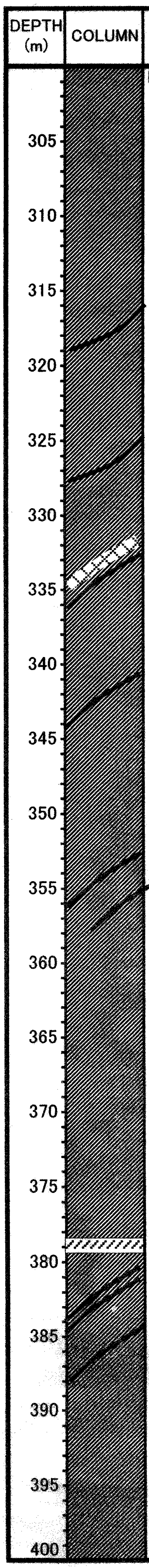

ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
Pelitic Schist	Pelitic- calcareous schist. foliation40°.bedded 10-30°. Partly calcite network.													
	307.0-307.3m, chlorite (-dolomite?) - calcite - quartz vein.35°.20cm.													
	307.3-307.4m, fine tuff thin layer.30°. chlorite. pyrite diss.	py	ch											
	317.5-319.9m, pyrrhotite - calcite veins along foliation.with chalcopyrite.	po												
	Pelitic- calcareous schist. foliation15-50°. bedded 15-40° in general.				319.2	319.4		0.033	18.7	0.121	1.51	2.58	38.3	9.32
	326.85m, pyrrhotite vein.35° width :7-16mm. with calcite and pyrite along foliation.	po												
	327.05m, pyrrhotite - pyrite diss. calcite.	po,py,cp												
	327.18m, pyrrhotite - calcite veinlet. chalcopyrite.15°.width 6mm.													
	327.60m, pyrrhotite - calcite veinlet.25°.4mm.	po,cp												
	328.00m, pyrrhotite - calcite veinlet.20°.4mm.													
	332.5-332.75m, chalcopyrite - pyrrhotite - calcite network. width <8mm.													
	333.5m, chalcopyrite- (sphalerite-) pyrrhotite veinlet. 65°.width <5mm.	po,cp,sp? po,cp,sp			340.3	340.4		NSS	8.8	0.0792	0.145	0.226	>50	7.12
	337.65m, (marcasite? -) pyrite- pyrrhotite - calcite vein.65°. 30mm.													
	339.8m, chalcopyrite - pyrrhotite vein.30°.40mm.													
	340.2m-340.4m, chalcopyrite - pyrrhotite network. partly metasomatic.													
	341.1m, (sphalerite? -) chalcopyrite - calcite - pyrrhotite vein.45°.30mm. and calcite network, with chalcopyrite - pyrrhotite.	py,cp												
	342.0m, chalcopyrite - sphalerite - calcite - pyrrhotite vein. 40°.20-30mm.													
	354.6m, chalcopyrite - pyrite - calcite vein.5°, 20mm.													
	Pelitic (partly sandy) schist. foliation20-30°.bedded 20°. graphite dominant.													
	377.1-377.2m, chlorite - calcite vein. with pyrrhotite. 35°. 30mm.													
	377.6m, chlorite - calcite vein. with pyrrhotite. 20°. 10mm.		ch ch											
	378.6-379.3m, pale greenish gray fine tu compact. 20°? metasomatic chlorite and calcite.													
	382.3m-, graphite decreases.													
	382.4-386.0m, pyrrhotite - calcite vein.2 width <16mm. 15cm interval.	po												
	Sandy - pelitic schist. foliation (p) 30-45°.bedded 20°.graphite.	po												
	386.85m, pyrrhotite - calcite vein.10°.40													
	390.10m, pyrrhotite – calcite disseminati													
	390.20m,lamination? 10°. with calcite – pyrrhotite dissemination .													

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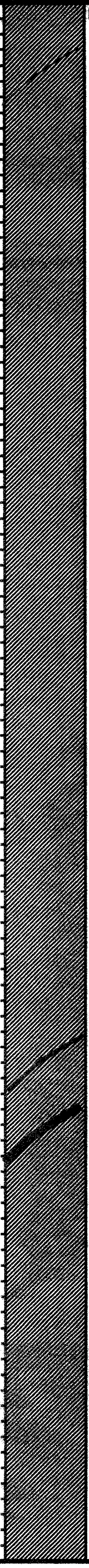
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Pelitic Schist	Pelitic schist. graphite. foliation 10-30°. lamination 20° in general.													
405			404.3m,404.5m. (galena? -) sphalerite veinlet.25°. 2mm.	sp												
410																
415																
420																
425																
430																
435																
440			449.5～459.4m. shered zone. fault ?													
445																
450			459.4～460.0m. brecciated. dolomite ? (in matrix). pyrite. calcite. quartz.													
455			464.6m～. calcareous ～silty schist. foliation? lamination～bedding 35°.													
460			468.6～469.8m. fine sandy schist. with calcite veins. with quartz and pyrrhotite.													
465			471.0m. chalcopyrite-sphalerite-pyrrhotite-calcite vein. 20°. 23mm. with parallel pyrrhotite－calcite veinlets.	po,sp,cp												
470			472.4m. (dolomite ? -) pyrrhotite-calcite vein. 20°. 70mm.	po,sp,cp,gn			473.4	473.6		0.101	10.3	0.153	1.07	3.22	31.8	>10.0
475			473.2m～473.8m. galena－sphalerite－chalcopyrite－ pyrrhotite -quartz vein. cavities. 25°. 500mm. with parallel chalcopyrite－pyrrhotite－ quartz veinlets.													
480																
485			475.6m. pyrrhotite－quartz vein. 30°. 20mm. 476.4m. pyrrhotite－calcite vein. 30°. 25mm.													
490			Pelitic ～silty ～sandy schist . foliation10～20°. lamination ～bedding folded. (generally 40°).													
495			487.6m. pyrite－calcite network. 497.45～498.5m. sandy tuff. with calcite veinlet.													
500																

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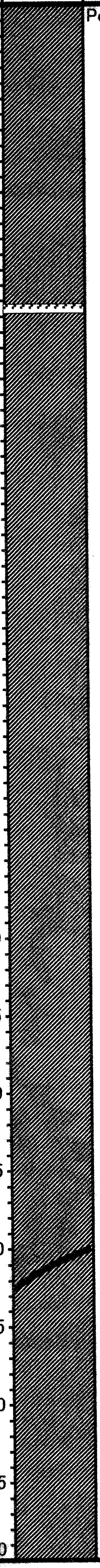
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600		Pelitic Schist	Pelitic ~fine sandy schist alternation. foliation20°. bedding30~40°. with graphite. 519.4~519.6m. silty tuffaceous schist thin layer. 30°. (523.2m. silty ~fine sandy schist . foliation40°. lamination35°.) ~532.2m. pelitic schist . 533.1m ~. pelitic schist. with graphite. 534.9m~. fine sandy schist . lamination30°. foliation 40~50°. lamination45°. graphite. . Pelitic ~silty schist . foliation30-45°. lamination45°. with calcite veinlets. graphite. 545.45m. small fault. fructure zone (arround 570.10m). 576.4 - . Silty schist. Foliation 20°. Lamina 55°. 581.3~581.5m. galena - chalcopyrite - sphalerite - pyrrhotite - calcite vein. 35°. 150mm. 581.7m. chalcopyrite - galena - pyrrhotite. 35°. 10mm. 582.0m~582.15m. psamitic (tuffaceous?) schist thin layer. 35°. 582.1m - . silty schist. foliztion 40°. lamina 35°. 584.7m. fault. 60°. 10cm. 593.9m. pyrite dissemination. with calcite.	po,sp,cp,gn												

MJTK-3

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	▨	Pelitic Schist	Silty-pelitic schist. foliation35°dip. bedded 40°dip. Around 607m-, silty-fine sandy schist alternation. foliation30°dip , beddwd 40°dip													
605			Silty-fine sandy schist. alternation. foliation40°dip. bedding 45°dip.													
610			around 609m-,													
615			silty-pelitic schist alternation. foliation40°dip , bedding 50-40°dip													
620			619.9m, calcite vein. 10°dip. 100mm 621.2m-, pelitic schist. with graphite. friable.													
625			Pelitic-silty. Foliation(p) bedding 45°dip. with calcite veinlet. 621.5-628.3m, friable with graphite.													
630																
635																
640																
645			Pelitic-silty. foliation30°dip. lamination45°dip. 650.20-650.65m, sheared zone. calcite network. In friable zone.													
650			pelitic-silty. foliation40-50°dip. lamination45°dip. calcareous													
655			664.0-664.1m, 665.0-665.8m, tuff ? calcareous.													
660			Pelitic schist. foliation30-40°dip. lamination45°dip. With graphite.													
665			674.80m-, sandy schist. 70°dip ? folded. 676.70m-, sheared.													
670			Pelitic schist. foliation45°dip ? (p). lamination50-80°dip (p). with calcareous. calcite veinlet. Pelitic-silty schist. foliation25°dip. Lamination 20°.													
675																
680			694.3-695.1m, calcite vein. 10°dip. With specuiarite.													
685																
690			drilled to 701.00m													
695																
700																

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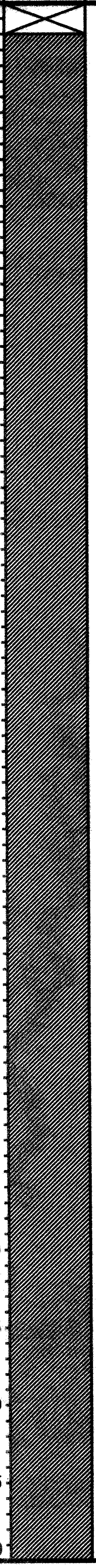
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			- 2.10m, Tricon. (Calcareous schist.) 2.10m, calcareous schist. -5.45m, wethered.		Wethered Lim											
5			5.45m -, foliation 45°. Limonite along foliation.													
10			Calcareous schist. lamination 30-50°.foliation40-45°. -20.3m, oxidized. calcite veinlet along foliation													
15																
20																
25																
30			31.5m-, pyrite spotted. 32.3m, calcite vein.45°.10mm.													
35			36.4m, pyrite - calcite network. chalcopyrite.													
40			foliation: 15-45°.bedded unstablely. calcite veinlets - networks. pyrite(<2mm)spotted.													
45																
50																
55																
60																
65			lamination20-45°.													
70																
75																
80			85.9-86.55m, calcite vein.55°. width 30cm+. pyrite and pyrrhotite at edges. 87.1m, pyrite - calcite vein.55°. width 4-20mm. calcite network..													
85			Calcareous- pelitic schist.foliation40-50°. bedded 15-45°.	py												
90			98.5-99.1m, calcite vein.30°. width 40cm+. with pyrrhotite and sphalerite (?). 99.7-100.3m, chlorite - calcite vein.30-45°.													
95			with sphalerite, chalcopyrite, pyrite. calcite veinlet.													
100				po,sp? py,cp,sp												

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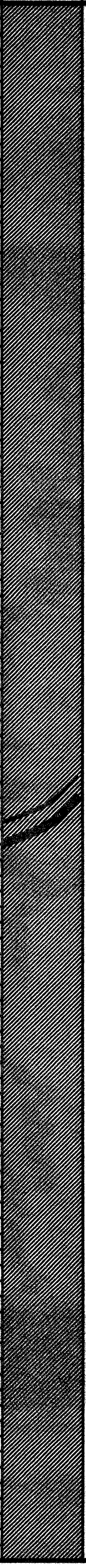

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			Calcareous- pelitic schist. foliation40-50°.bedded 15-45°.													
105																
110			105.65-105.75m, fault. argilizated. 65°. shered . 108.2-108.9, calcite vein.40°. with pyrite. foliation → 30°→ 40°.													
115																
120																
125			124.7-126.0m, 1cm-6cm interval, along foliation. pyrrhotite - calcite vein. 35 -40°.													
130			Calcareous - sandy - pelitic schist. foliation 35-40°. bedded 15-40°. with calcite veinlets.													
135																
140																
145			143.75-144.40m, chlorite - calcite vein. 40°. 50cm.													
150			151.05m, calcite vein. with pyrrhotite and sphalerite. 30°. 30-40mm. 152.3m-152.5m, chlorite - calcite vein, with pyrrhotite, sphalerite, chalcopyrite. 25-30°. 180mm.	po po,sp,cp	ch											
155			calcite veinlet - network dominant (- 158.7m).													
160																
165			Calcareous schist.foliation 20-45°. bedded 25-40°.													
170			171.3m, calcite vein.25°.40mm. 174.4m, calcite vein.55°.15-35mm.													
175			175.3-176.2m, calcite vein.20-40°. <40mm. with averaging 15cm interval.													
180																
185																
190																
195																
200																

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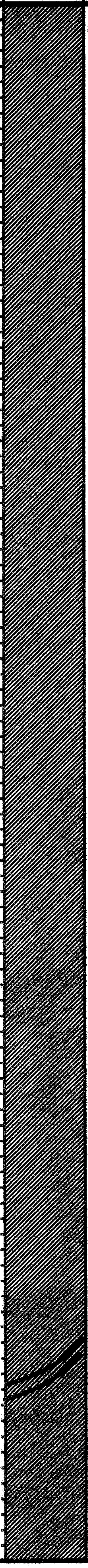
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Pelitic Schist	Calcareous schist. foliation 35-45°. bedded 25-45°.													
205																
210			213.00-216.00m, chlorite - calcite vein. 30-45°.250mm. 215.9m, calcite vein.45°.10mm.													
215																
220			Pelitic-silty - calcareous schist. foliation 40-60°. unstable lamination.													
225			229.9-230.0m, sphalerite - pyrrhotite veinlet. 0-20°. 5mm. with calcite.	po,sp												
230			233.1m, calcite vein.40°. 30mm. pyrrhotite.	po	ch											
235			233.3m-233.5m, calcite, chlorite, pyrrhotite.40°, along foliation. partly with sphalerite, chalcopyrite.													
240			241.1-246.2m, calcite veinlet. with pyrrhotite. 60°. 4mm. along foliation.	po												
245			246.3m, pyrrhotite veinlet - diss. 65°. w:3mm. along foliation.	po												
250			247m, foliation → 20° .													
255																
260			Pelitic-silty - sandy- calcareous schist. foliation 40-50°. unstable lamination. with graphite. calcite veinlet along foliation.													
265			Pelitic- calcareous schist.foliation30°. Unstable lamination.													
270			266.9-269.6m,graphite dominant. calcite veinlets along foliation.													
275			279.9-280.1m, shered zone. 280.69m-280.73m, pyrrhotite - calcite vein.30°.30mm.													
280			Pelitic ～silty ～calcareous schist. foliation40～50°. lamination20～30°. calcite network dominant.													
285			285.8～285.95m, calcite along foliation. 287.3～287.8m, (galena -)sphalerite-chalcopyrite -pyrrhotite-pyrite-calcite vein. 50°. 30mm. (pyrrhotite : upper side, pyrite: lower side in the vein) with barren calcite veinlets. 288.4m, chalcopyrite－pyrrhotite－calcite vein. 50°. 8mm.	py,po,cp,sp py,cp												
290																
295			-299.9m, calcareous .	py	cl											
300																

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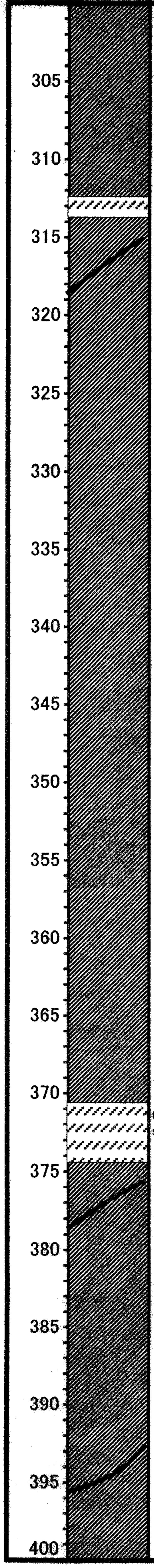

ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
Pelitic Schist	Pelitic ~silty ~calcareous schist. foliation 50°. bedding 10~30°. calcite network~veinlets. with graphite. 305.25~305.45m, sandy schist. bedding10°. 306.6m~, shered zone.	Py	Chlorite											
	Pelitic ~silty schist . - 312.3m, shered zone. 312.4~313.8m, tuffaceous~sandy schist. calcite. silicified.		sili											
	313.8~, pelitic ~calcareous schist. foliation 30°. lamination 25°. 317.85m, calcite vein. 70°. 10mm. with pyrite.													
	Pelitic ~silty schist. foliation 15~20°. Unstable lamination (10°?). with graphite calcite networks. ↓ foliation steeper. (335.3m 35°).													
	Pelitic ~silty schist . foliation45° (p). lamination 10° in general. with graphite.													
	343.3~343.5m, fine tuffceous~silty layer. 25°. calcite dominant.													
	Pelitic ~silty schist . foliation20°. lamination20°.													
tuffaceous schist	370.6m~, fine tuffaceous schist. calcite dominant.													
	374.2m~, pelitic ~sandy schist. with graphite.	py												
	374.7~375.0m, fructure . pyrite diss.	po,cp												
	Pelitic ~sandy schist . calcareous . foliation 40-50°. lamination, generally 30-45°.													
	378.95m, chalcopyrite—pyrrhotite —calcite vein. 40°. 30mm. with graphite. foliation almost vertical.													
	387.7m, pyrite dissemination.													
	394.5m, calcite—pyrrhotite vein. 65°. 4~11mm.	po												

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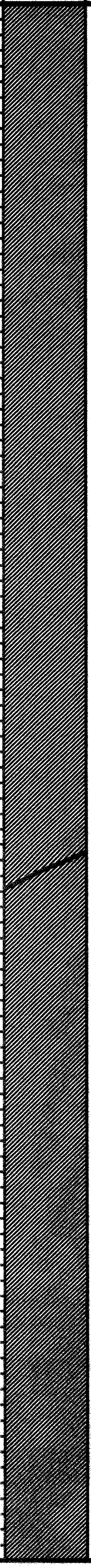

DEPTH (m)	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	CHEMICAL ANALYSIS Ag (ppm)	CHEMICAL ANALYSIS Cu (%)	CHEMICAL ANALYSIS Pb (%)	CHEMICAL ANALYSIS Zn (%)	CHEMICAL ANALYSIS Fe (%)	CHEMICAL ANALYSIS S (%)
	Pelitic Schist	pelitic ~silty schist . 406~407m. lamination folded. Partly 70°. ↓45°.													
405															
410		Foliation (p). Lamination 45° ? . calcareous . With graphite.													
415															
420															
425															
430															
435		Foliation 40°. Lamination 25°. folded. calcareous . with graphite.													
440		440.75m -. calcite - chlorite vein. 45°. 90mm.		ch											
445		452.2m. pyrrhotite diss. - veinlets. 452.2m - . medium sandy scist (-tuff?) 455.3m - 455.6m. galena - chalcopyrite - sphalerite - pyrrhotite - chlorite - calcite vein. 35°. 20cm. 455.8-. pelitic - silty schist													
450		silty schist. foliation(p). lamination∠45° dip.	po												
455		456.5m. fault. ∠30°dip. And pelitic under. 464.0-464.9m. sheared zone.	po,sp,cp,gn	ch											
460		silty-pelitic schist. partly sandy. calcareous. foliation∠30-50°dip. lamination20-∠60°dip.													
465															
470															
475															
480															
485															
490															
495															
500															

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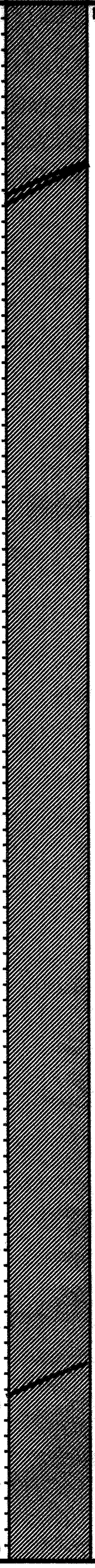
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600		**Pelitic Schist**	Silty-pelitic schist. partly sandy. calcareous. foliation∠30-50°dip. lamination20-∠60°dip. . 501.8-502.2m, chalcopyrite-sphalerite-pyrrhotite-calcite vein. along foliation. ∠50°dip. 160mm. Sulfides are anhedral to calcite. With parallel veinlets. Silty-pelitic schist. foliation∠50°dip. lamination∠35°dip. 511.3m, chalcopyrite-sphalerite-pyrite-pyrrhotite-calcite vein. along foliation. ∠35°dip. 30mm. 511.55m, chalcopyrite-sphalerite-pyrrhotite-pyrite-chlorite-calcite vein. ∠40°dip. 35mm. 511.7m, sphalerite-pyrite-pyrrhotite-calcite vein. ∠25°dip. 20mm. 514.0-514.5m, fault. ∠45°dip ? pyrite dissemination. silty-fine sandy schist. foliation∠30°dip (p). lamination10-∠60°dip. silty-fine sandy schist. foliation(p). lamination20-∠70°dip. partly friable. silty schist. calcareous. foliation∠20°dip. lamination∠20°dip. 553.9m. chlorite-calcite vein. ∠40°dip. 200mm. silty-pelitic schist. foliation∠35°dip. lamination60-30-∠10°dip. calcareous. pelitic-sandy schist. foliation∠30°dip. lamination∠25°dip. calcareous. partly friable. 583.85-584.15m, tuff ? layer. Fine and c 586.65m, pyrrhotite-calcite vein. ∠25°di 588.0m, pyrrhotite-calcite veinlet. ∠30° 588.5-589.1m, pyrrhotite-chlorite-calcite pelitic schist. alternation with partly silty foliation∠25°dip. lamination∠30°dip. 594.2-594.35m, fine tuff layer. ∠30°dip. Drilled to 601.20m.	po,py,sp,cp py,po,sp,cp py po	ch ch											

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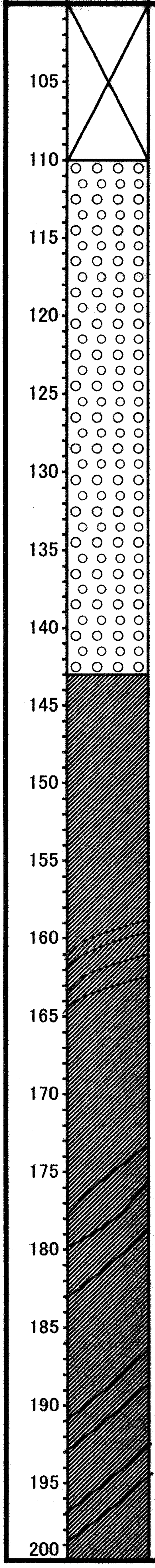
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100			(- 109.6m, Tricon) Cenozoic sediment. Sand and gravels with soil and limonite.		Wethered Lim											

MJTK-5



DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			- 109.6m, Tricon. Sand and gravels with limonite.		Lim.											
			109.6m-, core drilled. Cenozoic sand and gravels (-conglomerate). Gravels: pelitic schist, sandy schist, tuffaceous schist. <35mm. matrix: sandy with limonite.													
			123m-, Boulder gravels (weathered gabbro?). Partly magnetic. partly foliated. with limonite, calcite and clay mineral in matrix.													
			142.5m-, pelitic-silty schist. foliation,60-70°. Ustable beddeing -lamination.													
			-148.6m oxidized (weathered) zone.													
			149.05m, pyrrhotite - calcite veinlet. 55°. width <5mm. 151.20m, chalcopyrite - pyrrhotite - pyrite - calcite network. foliation. 151.60m, chalcopyrite - pyrrhotite - pyrite network													
			154.45m, quartz - calcite - pyrite - pyrrhotite veinlet .60°.6mm. with parallel calcite veinlets (15cm interval).	py,cp,po												
			162.3m,162.4m,162.8m,162.9m, pyrite - pyrrhotite veinlet.60°.5mm. with branchs. 163.5-164.0m, pyrite dissemination along foliation. 164.7m,165.0m, chalcopyrite - pyrite vein. 50°. 6mm. with chlorite. 165.7m, pyrite - calcite veinlet. 60°. widt parallel veinlets. chlorite. 30cm i													
			Pelitic-silty schist. foliation 45° (p) . lami partly shered.	py po												
			177.0m, pyrite - calcite vein.75°. 15mm. 178.4m, pyrrhotite - calcite vein.60°. 3m 181.8m, pyrrhotite - calcite vein.55°. <4	po po												
			Pelitic- calcareous schist. foliation 50°. weak lamination 60°.													
			186.7m-196.7m, altered (calcite, silicifie 188.3m, pyrrhotite - calcite network. 188.9m, quartz vein.10°. 11mm. 189.15m, pyrrhotite - calcite veinlets. 6 190.0m, pyrrhotite - calcite vein. 65°. <6 191.1m, 191.3m, pyrrhotite - calcite vei	po po												
			194.8m-195.6m, pyrrhotite - calcite vein 195.7m-196.1m, pyrrhotite - calcite vein 196.6m, pyrrhotite dissemination.	po po												

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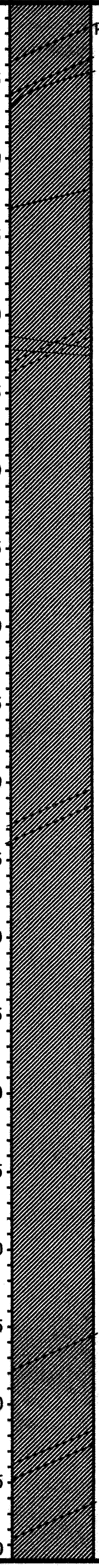

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			Calcareous- silty schist. graphite.													
		Pelitic Schist	Partly tuffaceous. foliation 45°.	po	ca											
			lamination 20-70°.													
			201.2m, pyrrhotite - calcite vein.5°.	po												
205			23mm. lamination70°.													
			205.1m, pyrrhotite - calcite veinlet.													
			60°.5mm.													
			210.7m, chalcopyrite – pyrrhotite													
210			dissemination, along foliation. calcite.													
			silicified? .	cp,po	sili?											
			213.0-213.3m,													
			chalcopyrite - pyrrhotite - calcite	cp,po												
			network.													
215			220.5m-224.0m, tuffaceous psamitic													
			schist.													
			Unclear foliation and lamination.													
			220.6m, calcite vein.55°. 12mm.													
220			221.0m,													
			chalcopyrite - pyrrhotite - calcite vein.													
			40°.40mm.	cp,py												
			222.5m, chalcopyrite - pyrite - calcite	cp,sp,po												
225			vein.													
			65°. 40mm.													
			222.8m-222.9m,													
			chalcopyrite-sphalerite-pyrrhotite-													
			calcite vein.													
230			50°.90mm.													
			in pyrite dissemination zone													
			and sphalerite - chalcopyrite - pyrrhotite													
			network.													
235			223.5-223.9m, Dolerite dyke. 60°.	py												
			Pyrrhotite - diss.													
			Nonmagnetic.													
			224.0m-,silty - fine sandy schist.													
			tuffaceous?													
240			greenish by chlorite.													
			224.7m, pyrite - pyrrhotite network.													
			234.0m, foliation pyrite - calcite veinlets,													
			along foliation. 50°.													
245			234.50m. pyrite - calcite	py												
			vein.50°.<30mm.													
			with pyrite - calcite network.													
250			Calcareous-silty - sandy schist.foliation5(													
			lamination40-90°.													
			Calcite veinlets along foliation.													
				cp,po												
			244.0m - , pyrite - calcite veinlet. 60°.	cp,po												
255			1mm. 20cm interval.													
			246.5-246.7m, pyrrhotite - calcite netwo	po			256.7	256.8		0.15	1	0.577	0.0257	0.0218	38	8.76
			247.4m, calcite - pyrite vein. 65°. 5mm.													
			248.55m, small fault. 60°. 20mm. breccia													
260			-250.3m, pyrite - calcite veinlet, 60°.	cp,po												
			10cm interval.													
			252.9m,													
			chalcopyrite - pyrrhotite - calcite vein.													
			40°. 50mm.													
265			253.5m,													
			chalcopyrite - pyrrhotite vein.60°.													
			width <6mm.													
			255.1m,													
270			pyrite - pyrrhotite - calcite network.													
			Pyrrhotite - calcite veinlet. 60°.													
			width <1mm. 10cm interval.													
			256.2m-257.9m, pyrrhotite disseminatio													
			with chalcopyrite. silicified.													
275			259.1m-,													
			chalcopyrite - pyrrhotite - calcite netwo													
			silicified. Partly chlorite.													
			↓													
280			More silicified. hard. calcite network.													
			Calcareous ～silty schist . hard.													
			foliation 50°(p). calcite network													
			285.8m～287.4m,													
285			chalcopyrite－calcite－pyrrhotite vein													
			90°. width<70mm. cavity.	cp,po												
			-288.3m, Pyrrhotite network. partly chlo													
			and （chalcopyrite－）pyrite－chlorite－	po,cp	ch											
			along foliation 65°.													
290																
			Silty ～calcareous schist	po												
			silicified. calcite veinlet. foliation50～70	py												
			lamination unstable(p).													
295			292.85～292.95m,	po	ch											
			pyrrhotite－calcite－quartz vein. 60°. 4(													
			293.1～293.3m,	py												
			calcite－quartz vein. 65°. 120mm.													
300			293.35～293.45m,													

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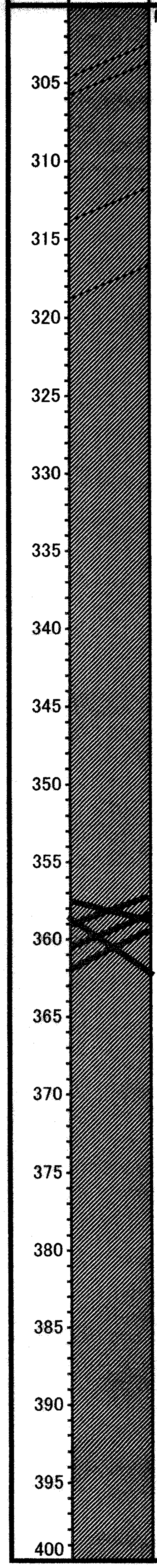

ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
Pelitic Schist	Silty -calcareous schist													
	silicified. calcite veinlet.													
	foliation50-70°(p).	po												
	lamination unstable(p).													
	303.1m, calcite-pyrrhotite vein.													
	50°. width<11mm. network like.													
	303.75m, pyrrhotite vein. 10°. 6mm.													
	303.9m, pyrrhotite vein. 50°.	po,py												
	width<4mm.													
	304.75m, pyrrhotite vein. 40°. 3mm.	py												
	307.65m, calcite-pyrrhotite vein. 30°.													
	4mm.													
	308.5m-, sandy schist,													
	pyrrhotite-pyrite diss.													
	along foliation(50°). silicified.	po	ch											
	311.0m, calcite-pyrrhotite vein.													
	40°. 3-10mm.	po,cp	ch											
	311.05m, pyrite-calcite vein.													
	45°. width10mm.													
	silty schist.													
	foliation65°. lamination55°.													
	chlorite. tuffaceous ?													
	315.5m, calcite-pyrrhotite vein. 30-50°.													
	10mm.													
	315.9m, pyrrhotite vein. 50°. 8mm.	py												
	316.75m, pyrrhotite-chlorite-calcite													
	network													
	pyrite-pyrrhotite networks.													
	318.0m, chalcopyrite-pyrite vein. 50°.													
	4mm.	po,py												
	318.2-319.1m, shered zone.													
	319.1-, silty schist . foliation 50°.													
	lamination60°. Partly chlorite.													
	321.8m, calcite vein. 70°. 32mm. with													
	dolomite ?	py												
	325.5m, pyrite-calcite network.													
	329.7m, pyrite-calcite veinlet. 60°. 7mm.	po,py												
	pyrite sissemination along foliation.													
	↓ foliation steeper(65°).													
	334.9m, (pyrite-)pyrrhotite vein. 60°. 8m	cp,sp,po,py												
	337.75m, pyrrhotite veinlet. 60°. 3mm.													
	339.1m, pyrrhotite-calcite vein. 50°. 9mm													
	340.5m, pyrite vein. 50°. 8mm. chlorite.													
	342.3m, pyrite-pyrrhotite vein. 50°. 6mm													
	with calcite. chlorite.													
	Silty -fine sandy schist . foliation50°(p).													
	lamination70° ?													
	343.25m-343.30m,													
	calcite-pyrrhotite-pyrite veins. 50°. 6mm													
	344.4m,													
	pyrrhotite-pyrite-calcite vein. 50°. 8mm	po,py			358.6	359.0		0.322	1	0.216	0.0211	0.0182	29.6	7.25
	345.1m,													
	(sphalerite-chalcopyrite-)pyrrhotite-pyr													
	55°. 12mm.													
	346.5m, pyrite vein. 50°. 6mm.													
	346.7m, calcite-pyrrhotite vein. 55°. 30m													
	355.1m, chalcopyrite-calcite-pyrrhotite v													
	50°. 10mm.													
	355.3m,													
	chalcopyrite-calcite-pyrrhotite network.													
	356.9m, calcite-pyrrhotite network. 65°.													
	357.3m,													
	chalcopyrite-pyrrhotite vein. 60°. 4mm.													
	357.6m, pyrrhotite vein. with calcite. 65°													
	358.0m,													
	(chalcopyrite-pyrite-)pyrrhotite vein. w													
	65°. 9mm. with branchs.													
	358.75-362.0m,													
	silicified fine sandy schist. mineralizated													
	(sphalerite-)chalcopyrite-pyrite-pyrrho													
	network-dissemination.													
	pyrite, pyrrhotite, chalcopyrite, quartz													
	Silty -fine sandy schist . foliation 50°(p).													
	white altered. chlorite-pyrrhotite-calcite													
	382.3m-386.0m, micro-diorite? dyke. 70													
	calcite-chlorite veins.													
	Fine sandy schist -pelitic schist alternatio													
	quartz crystal along foliation.													
	Silty -tuffaceous schist . foliation 45°. lan													
	with calcite chlorite.													
	398.4-398.6m, dolomitevein. 30° ? 190n													

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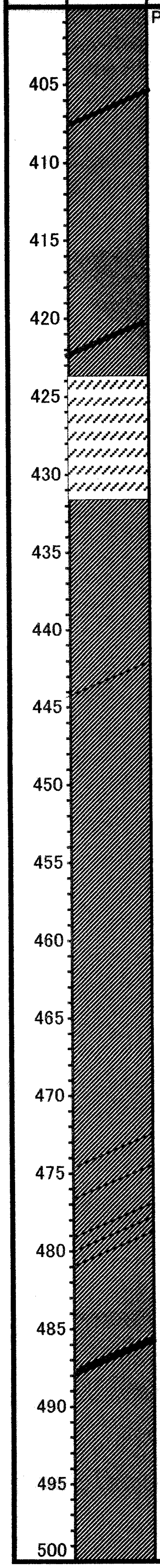

ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
				No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
Pelitic Schist	Silty -fine sandy schist .													
	406.2-406.3m,													
	pyrite-calcite vein. 70°.													
	100mm. foliation60°. lamination70°.													
	406.3m-,													
	silty -tuffaceous schist alternation.	py												
	silty schist dominant.													
	Dolomite-calcite veinlet.													
	421.4m-,													
	chalcopyrite-pyrrhotite-calcite vein.													
	65°. 100mm.													
	423.7-,													
	tuffaceous schist. lamination55-60°.													
	with silty schist -pelitic schist thin layer.													
		po,cp												
	-431.7m,													
	tuffaceous schist -fine sandy schist .													
	431.7m-,													
	silty -fine sandy schist. foliation45°.													
	bedding45°.													
	443.35-443.45m,													
	(calcite-dolomite-) quartz vein.													
	10°. with pyrite.													
	↓ lamination, 60-65°. chlorite.													
	446.7m, pyrite diss-network.													
	448.2-448.8m, calcite-quartz vein. 10°.													
	foliation 60°. lamination 45°.													
	451.2m, pyrite dissemination.													
	459.35m, chlorite-calcite vein.													
	20°. 60mm.													
	463.4-468.6m, pyrrhotite diss(f). with calcite.													
	472.3m, chlorite.													
	473.35m-473.80m,													
	chalcopyrite-pyrite-pyrrhotite veinlet.													
	50°.													
	width<20mm. with calcite and chlorite.													
	475.5m, lamination65°.													
	pyrrhotite diss.-network													
	476m-, lamination50°.													
	478.4-478.6m, pyrrhotite network.		ch											
	479.2m, pyrrhotite diss.-network.													
	479.4-480.8m,													
	(chalcopyrite-) pyrrhotite veinlets-netw													
	5cm interval.													
	50°. width<5mm. silicified. dolomite ?													
	480.15-480.80m,	po			466.6	466.7		0.03	0.5	0.202	0.007	0.0106	25.5	7.57
	(chalcopyrite-) pyrrhotite network.													
	10cm interval.													
	481.4-481.6m, pyrrhotite network.													
	482.2m-,													
	silicified. pyrrhotite diss.-network.													
	with calcite and chlorite.	po,py,cp	ch											
	482.3m, quartz vein. 10°.													
	40mm. with pyrite, calcite and dolomite	po												
	483.30m, pyriteveinlet, >75°. 2mm.													
	even in quartz vein (10°, 40mm).	po												
	pyrrhotite diss.(f).	po												
	484.80, dolomite-calcite vein. 20°. 70mm	po,cp												
	chlorite (both of sides).													
	486.0-486.3m, calcite vein. 35°. 250mm.													
	pyrrhotite, chlorite.	po												
			ch											
	493.3m, pyrrhotite network(f).	po	ch											
		po												

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DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	▨ 502.1	**Pelitic Schist**	Silty - fine sandy schist . foliation 55°. bedding-lamination unclear. 501.25m, pyrrhotite - calcite vein. 501.90m, pyrrhotite - calcite vein. 55°. 9～15mm.	po												
505																
510																
515																
520																
525																
530																
535																
540																
545																
550																
555																
560																
565																
570																
575																
580																
585																
590																
595																
600																

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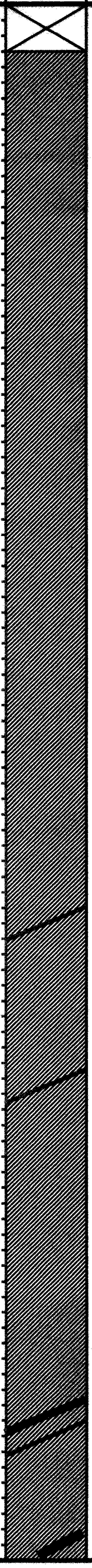

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			MJTK-6. (-3m. Tricon.)		Wethered Lim											
5			Pelitic schist. foliation∠35°dip. lamination∠20°dip.													
10																
15			28.5m. calcite vein. ∠35°dip. 140mm.													
20			30.5m. calcite vein. ∠35°dip. 50mm. with specularite.													
25			34.0m. calcite vein. ∠35°dip. 40mm. with galena and sphalerite.													
30																
35			pelitic-silty schist. calcareous. foliation35°dip. lamination∠10-25°dip.	gn,sp												
40																
45			50.2m. sandy schist thin layer. ∠10°dip. 50mm.													
50			56.5-56.7m. coarse sandy schist layer. ∠20°dip. pyrite dissemination.													
55			59.0m. calcite vein. ∠35°dip. 15mm. with specularite. sphalerite ?	py												
60			Silty schist. calcareous. foliation∠30°dip. lamination∠20°dip.	sp?												
65			69.55m. chalcopyrite-galena-sphalerite-pyrrhotite -calcite vein. ∠30°dip. 50mm.													
70				po,sp,gn,cp												
75			78.7-79.4m. sheared zone. pelitic-silty schist. alternation. foliation∠45-∠25°dip. bedding ∠45-∠25°dip.													
80																
85			90.25m. pyrrhotite -calcite vein. ∠25°dip. 12mm. 91.1m. chalcopyrite-galena-sphalerite-pyrrhotite -calcite vein. ∠35°dip. 200mm.													
90			92.0m. pyrite-calcite vein. ∠20°dip. 40mm.	po,sp,gn,cp py		90.7	90.8			0.042	18.2	0.49	2.41	1.65	23.9	>10.0
95			99.7-101.45m. mineralization. chalcopyrite-sphalerite-pyrite -chlorite-pyrrhotite-calcite vein. ∠35-40°dip. With dolomite-quartz ? And pyrrhotite network in silty schist un													
100				po,sp,py,cp	ch											

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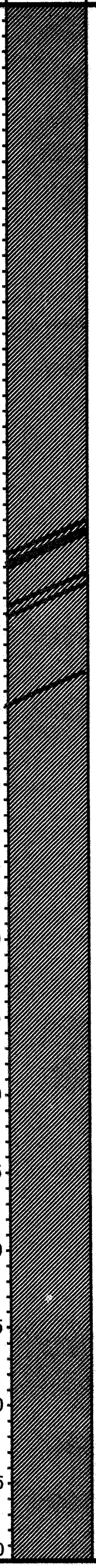

DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			Pelitic-silty schist. foliation∠25-40°dip. Lamination unclear. -111.6m, (chalcopyrite-sphalerite-)pyrite -pyrrhotite-Calcite vein. With 3cm-50cm interval. ∠15-25°dip. 2-30mm.				101.2	101.3		0.096	3	0.0429	0.241	0.33	18.3	>10.0
105																
110			111.6m-, pelitic schist. friable by foliation. Foliation=lamination∠30°dip. silty schist. calcareous. foliation∠20° dip. lamination∠25°dip.	po,po,sp,cp												
115																
120																
125			133.95m, pyrrhotite-calcite vein. 134.25-134.80m, chalcopyrite-galena-sphalerite-pyrite -pyrrhotite-calcite vein. ∠20°dip.				125.2	125.3		0.112	3.5	0.29	0.0452	0.0993	42.1	>10.0
130			silty schist. calcareous. foliation∠25° dip. lamination∠25°dip (=foliation).	po po,py,sp,gn,cp			134.2	134.7		0.087	19.7	0.321	0.84	0.346	25.7	>10.0
135				po po												
140			137.9m, pyrrhotite-calcite vein. ∠25°dip. 9mm. 138.5m, calcite vein. With pyrrhotite. ∠25°dip. 30mm.	po												
145			143.5m, calcite vein. With pyrrhotite. ∠35°dip. 25mm.													
150																
155																
160																
165			Silty-pelitic schist. calcareous. foliation∠25°dip. lamination∠25°dip (=foliation). With calcite veins along foliation.													
170																
175																
180																
185																
190																
195																
200																

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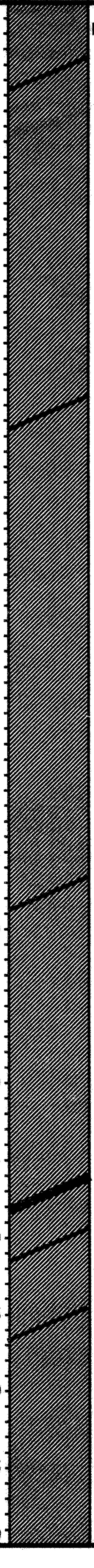
DEPTH (m)	COLUMN	ROCK NAME	DESCRIPTION	MINER.	ALTER.	SAMPLE				CHEMICAL ANALYSIS						
						No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Pelitic Schist	silty-pelitic schist. calcareous. Foliation(p). partly ∠20°dip. bedding ∠10°dip. partly with graphite.	py												
205			204.50m, small fault (∠80°dip) with pyrite-calcite vein (w:9-18mm). 211.7m-fault. ∠40°dip. 211.3～211.7m. tuff layer. ∠15°.													
210			215.0～216.8m, sheared zone. pelitic schist. foliation∠20°. bedded20°. 219.0m～, sheared zone.													
215			With quartz vein fragments. pelitic～sandy schist. foliation∠30°. lamina～bed 10°. Chlorite - calcite network along fractures.													
220			Pyrite dissemination. -229.0m, fractured zone ～ sheared													
225			zone. 226.70～226.85m, (pyrite-) chlorite- quartz- calcite vein. ∠35°.120mm. pyrite is at edge (p).	py	ch											
230			230.90m, pyrite- calcite vein. ∠ 30°.8mm.													
235			pelitic～ silty (partly sandy) schist. foliation∠30-45°.bedded∠45°. friable. 243.6～256.5m, fault? ∠35°.													
240			257.1～257.85m, pyrite - pyrrhotite dissemination and replacement													
245			along foliation. (Silicified in the upper zone, and calcite network in the lower zone)													
250			sulfides disseminated along foliation(p). pelitic～sandy schist. foliation∠ 25°.bedded∠25°.													
255			260.65～260.70m, chalcopyrite- pyrite- quartz- calcite netw friable, partly sheared. pelitic～ silty schist. foliation∠60°.bedd	po,py												
260			270.1m-, sheared zone. (sheared pelitic schist, calcareous) partly spotted pyrite. pelitic schist. with graphite.													
265			276.85～277.40, pyrrhotite vein. With chalcopyrite (p). silicified(p). and pyrrhotite network for 25cm.													
270			Silty - fine sandy schist. foliation ∠30-3 calcite veins with chlorite. partly graphite 280.6～281.2m, calcite vein.													
275			With dominant pyrrhotite in the lower p and with chalcopyrite, pyrite and chlorit Sorted → sandy schist (calcareous). Calcite veins (w: 8～40mm) with averag	po,cp												
280			283.9m～, silty schist. foliation = beddin 285.5m, sphalerite－pyrite－calcite vein. 286.95m-, fractured and friable.	po,cp	ch											
285			Pelitic – silty –fine sandy schist alternatio Foliation= bedding∠10°.	py,sp												
290			Partly friable with graphite and calcite v Drilled to 301.9m.													
295																
300																