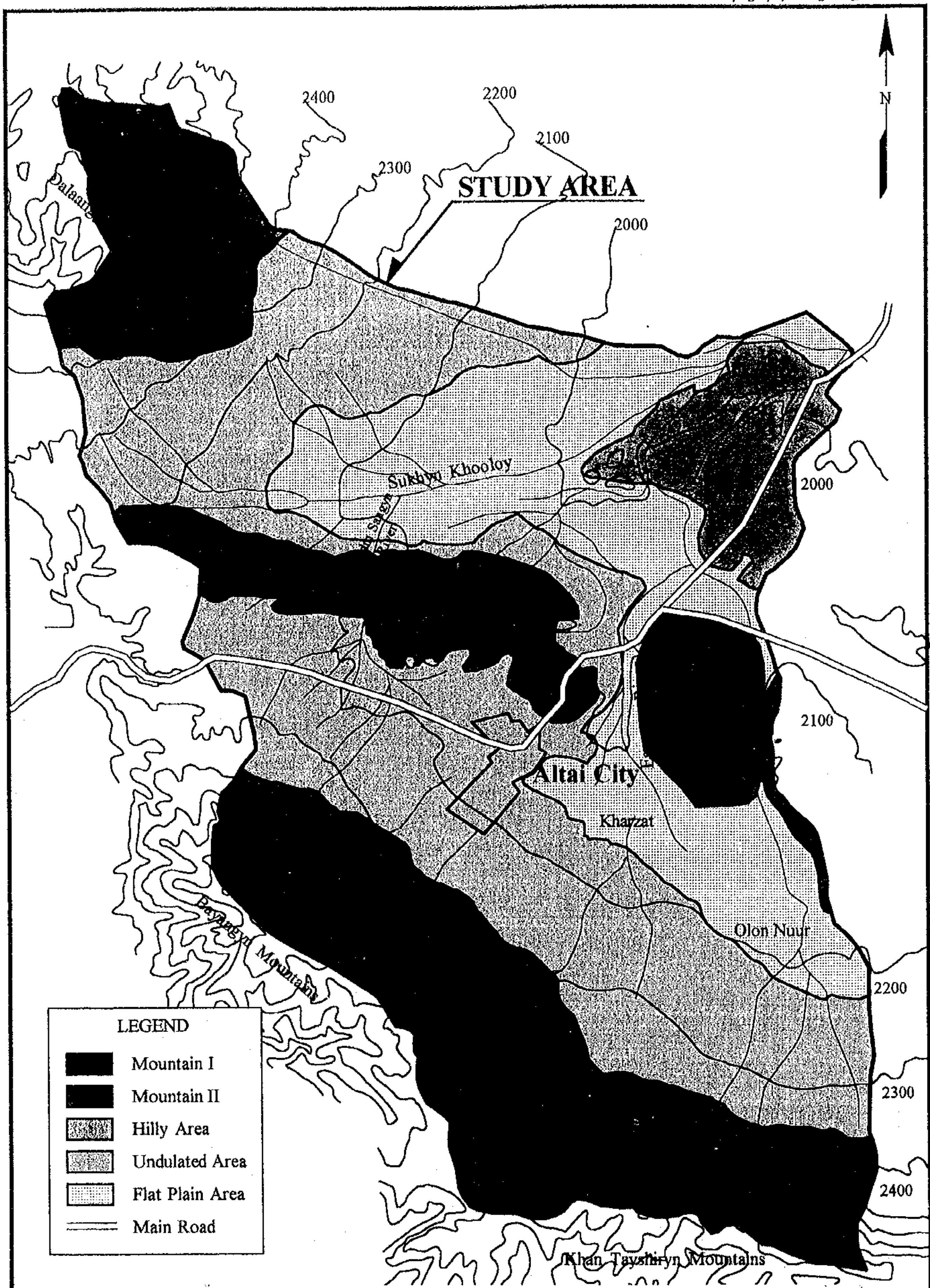


Figure 4.5 Topographic Classification Map

JICA	The Study on Groundwater Development for Altai City

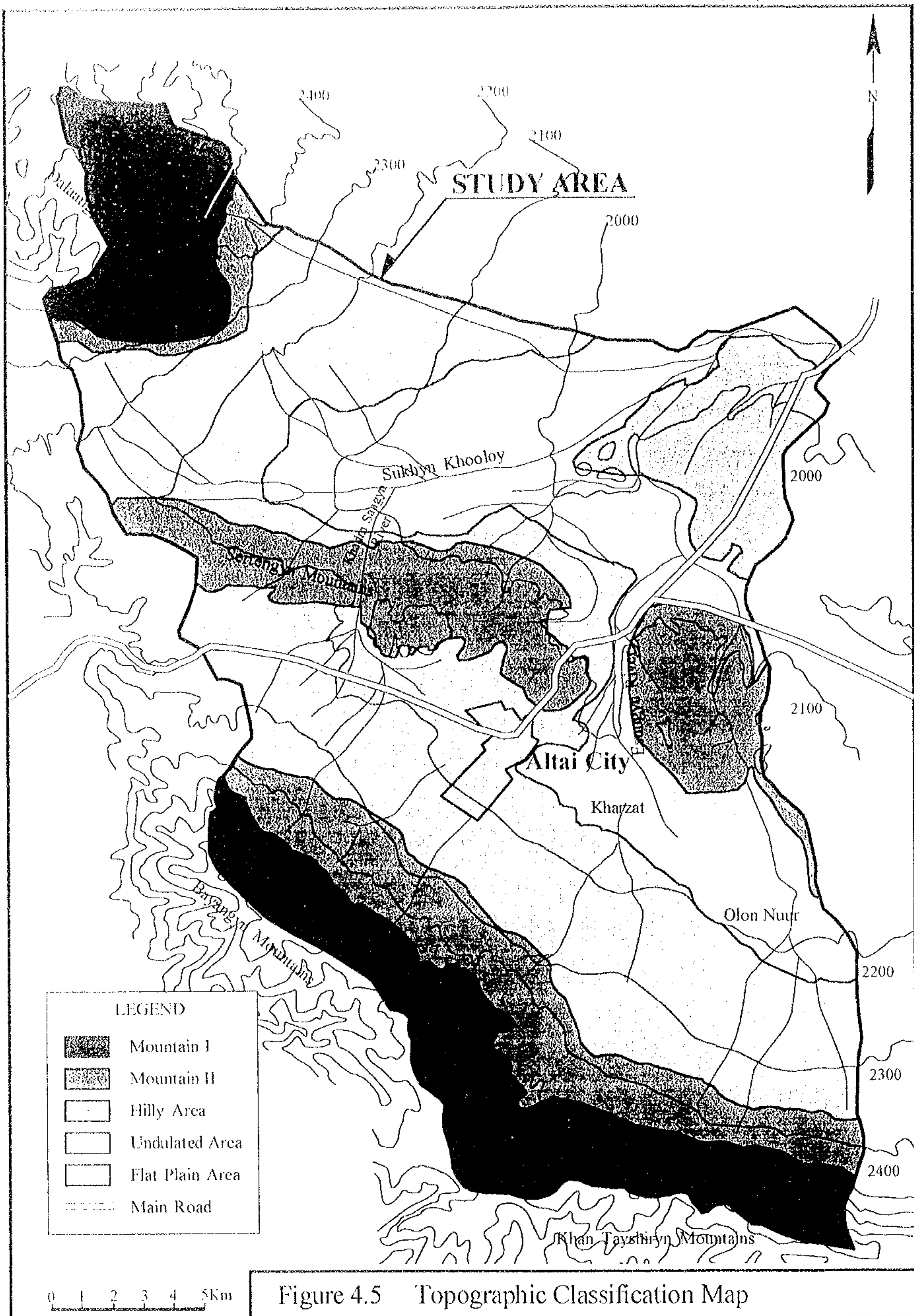
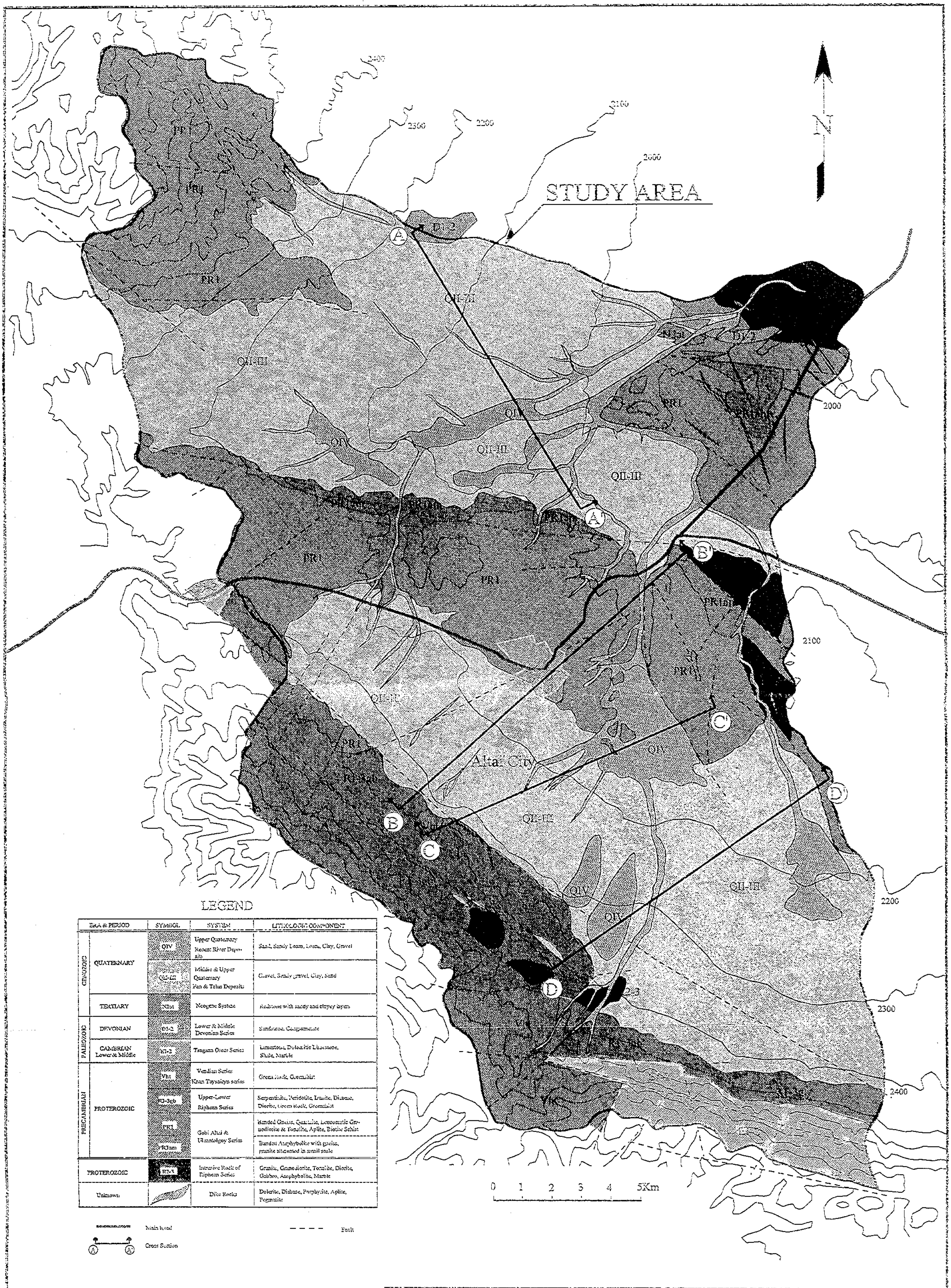


Figure 4.5 Topographic Classification Map	
JICA	**The Study on Groundwater Development for Altai City**



LEGEND

ERA & PERIOD		SYMBOL	SYSTEM	LITHOLOGIC COMPONENT
CENOZOIC	QUATERNARY	QIV	Upper Quaternary Recent River Deposits	Sand, Sandy Loam, Loam, Clay, Gravel
		QII-III	Middle & Upper Quaternary Fan & Talus Deposits	Gravel, Sandy gravel, Clay, Sand
	TERTIARY	N2bt	Neogene System	Redstone with sandy and clayey layers
PALEOZOIC	DEVONIAN	D1-2	Lower & Middle Devonian Series	Sandstone, Conglomerate
	CAMBRIAN Lower & Middle	€1-2	Tsagaan Oloni Series	Limestone, Dolomitic Limestone, Shale, Marble
PRECAMBRIAN	PROTEROZOIC	Vht	Vendian Series Khan Taysaiyn series	Green Rock, Greenschist
		R1-3gb	Upper-Lower Riphean Series	Serpentinite, Peridotite, Dunite, Diabase, Diorite, Green Rock, Greenschist
		PR1	Gobi Altai & Ulaantolgoy Series	Banded Gneiss, Quartzite, Leucocratic Granodiorite & Tonalite, Aplite, Biotite Schist
		PR1am	Gobi Altai & Ulaantolgoy Series	Banded Amphybolite with gneiss, granite alternated in small scale
PROTEROZOIC		R1-3	Intrusive Rock of Riphean Series	Granite, Granodiorite, Tonalite, Diorite, Gabbro, Amphybolite, Marble
Unknown			Dike Rocks	Dolerite, Diabase, Porphyrite, Aplite, Pegmatite

Main Road — Fault — Cross Section (A – A')

Figure 4.6 Geological Map of the Study Area

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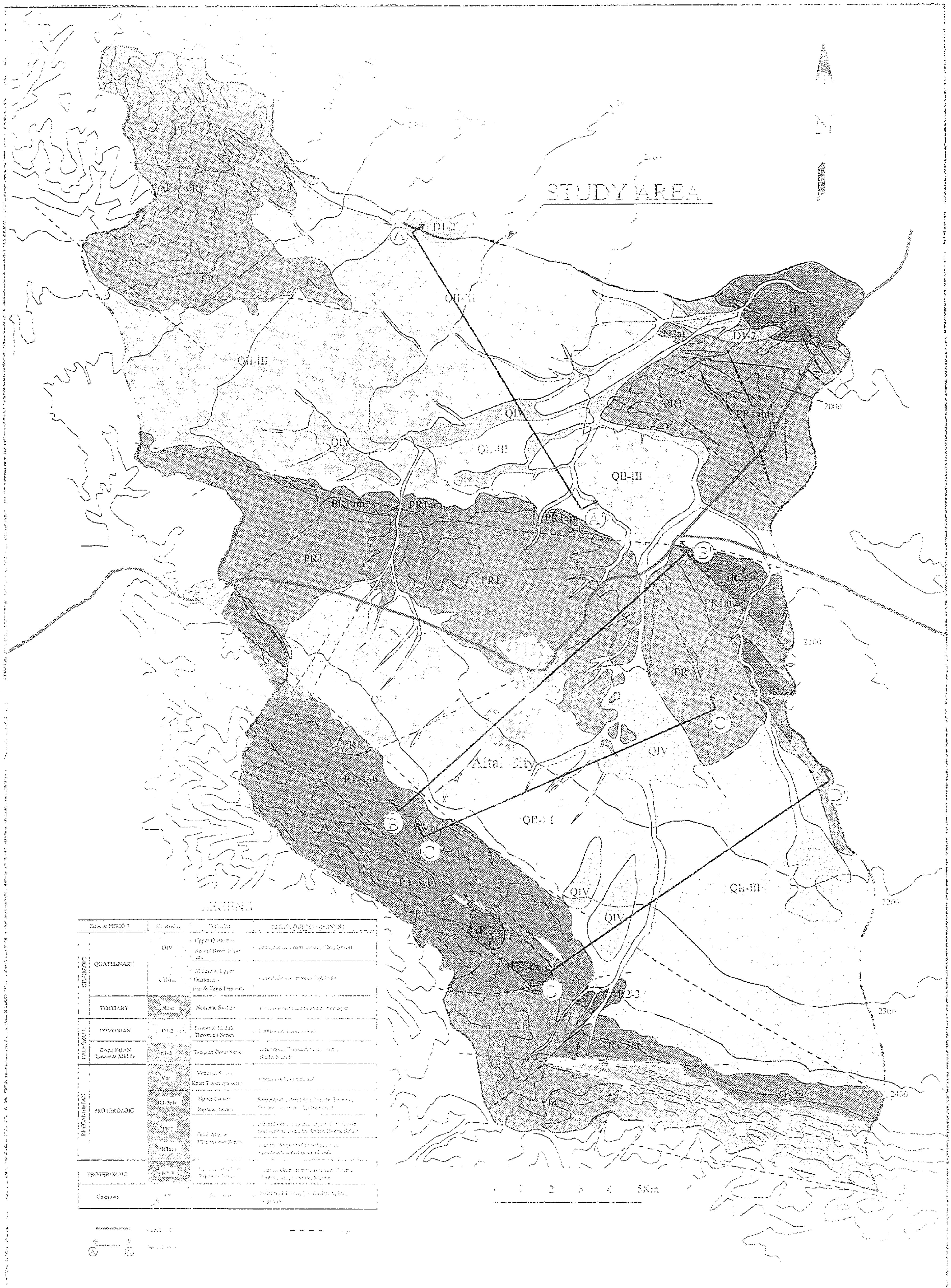

Figure 4.6 Geological Map of the Study Area

JICA The Study on Groundwater Development for Altai City

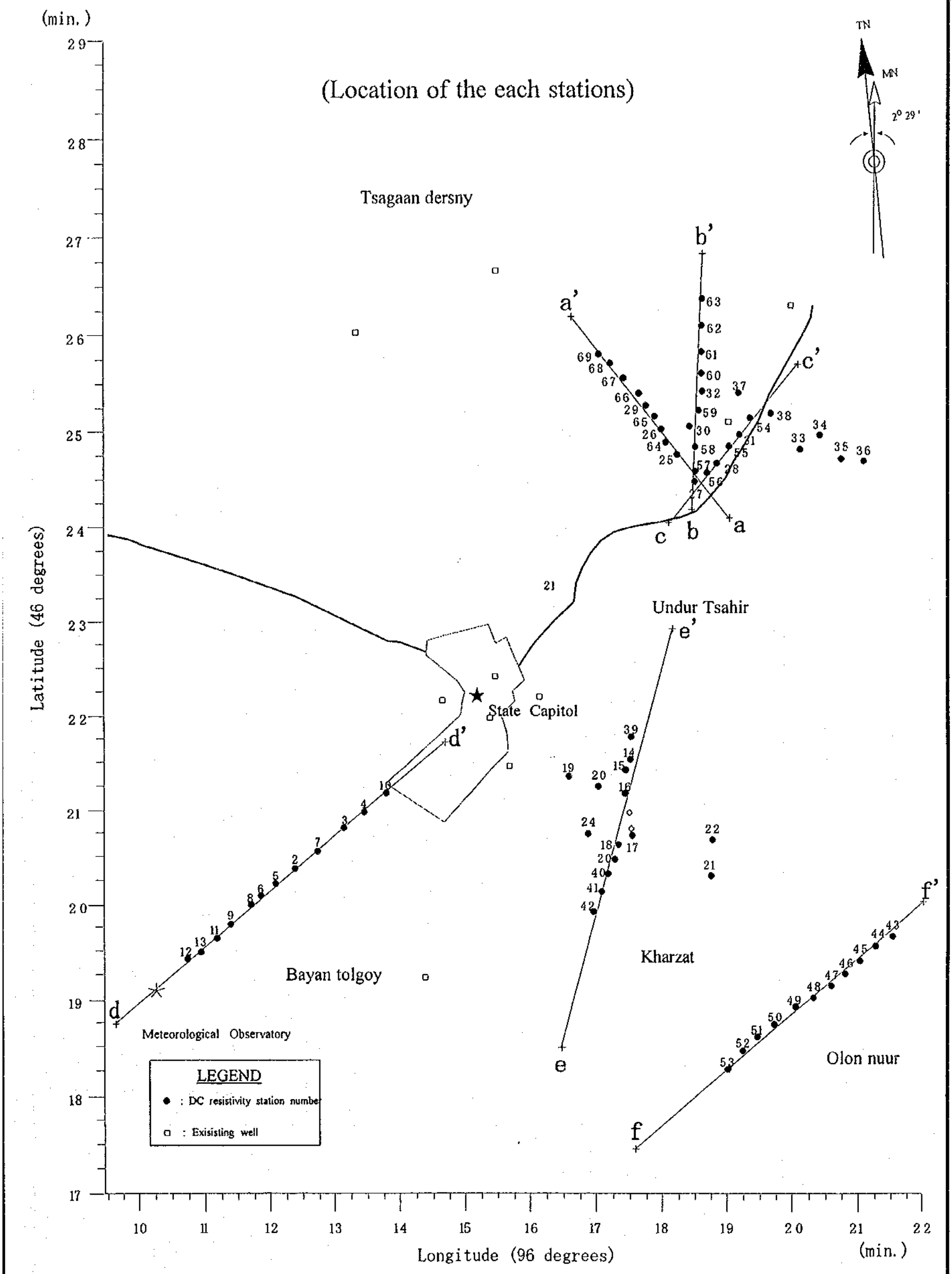

Figure 4.7 DC Resistivity Stations	
JICA	The Study on Groundwater Development for Altai City

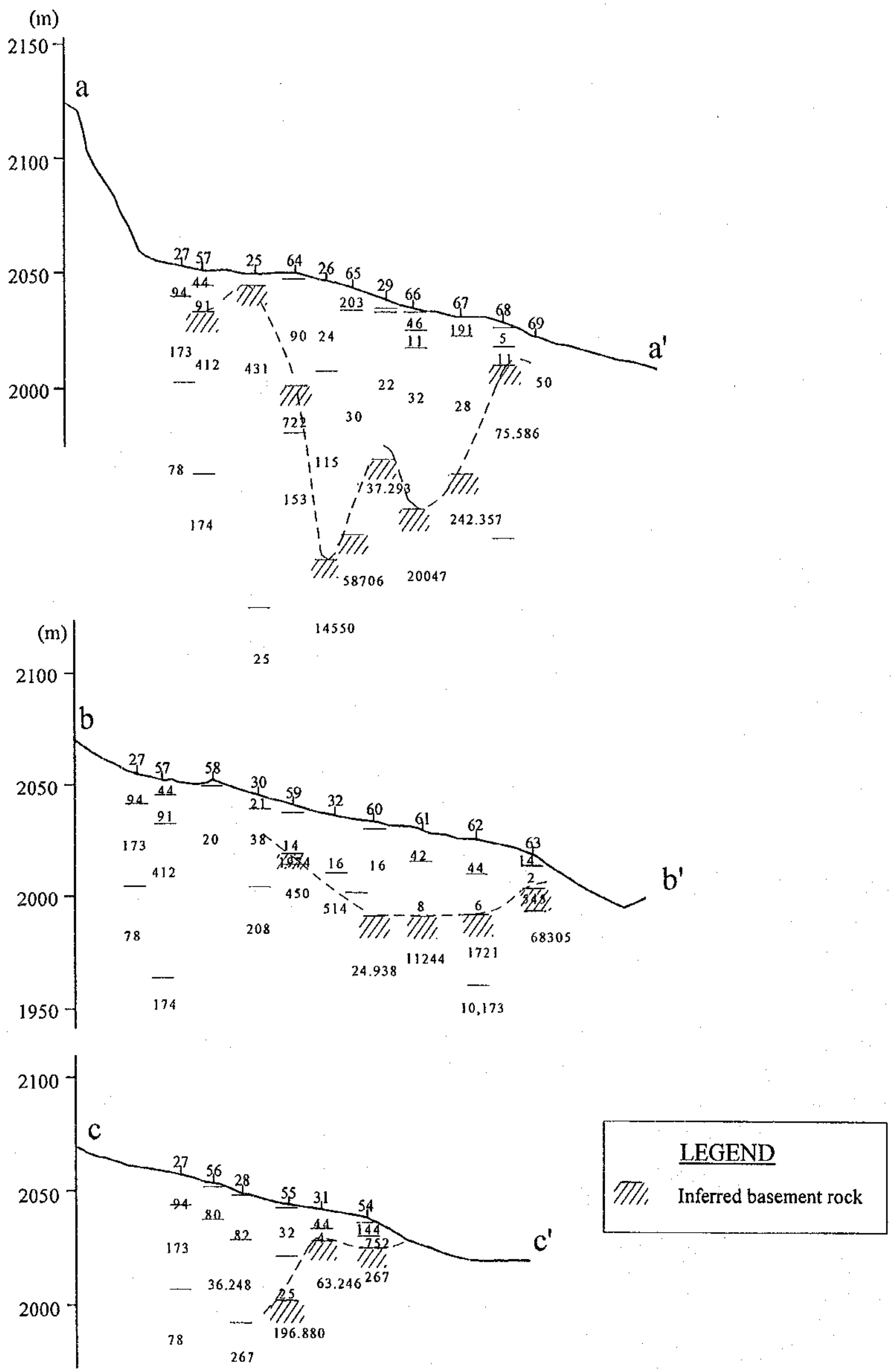

Figure 4.8 (1)	Resistivity Section in Undur Tsahir
JICA	The Study on Groundwater Development for Altai City

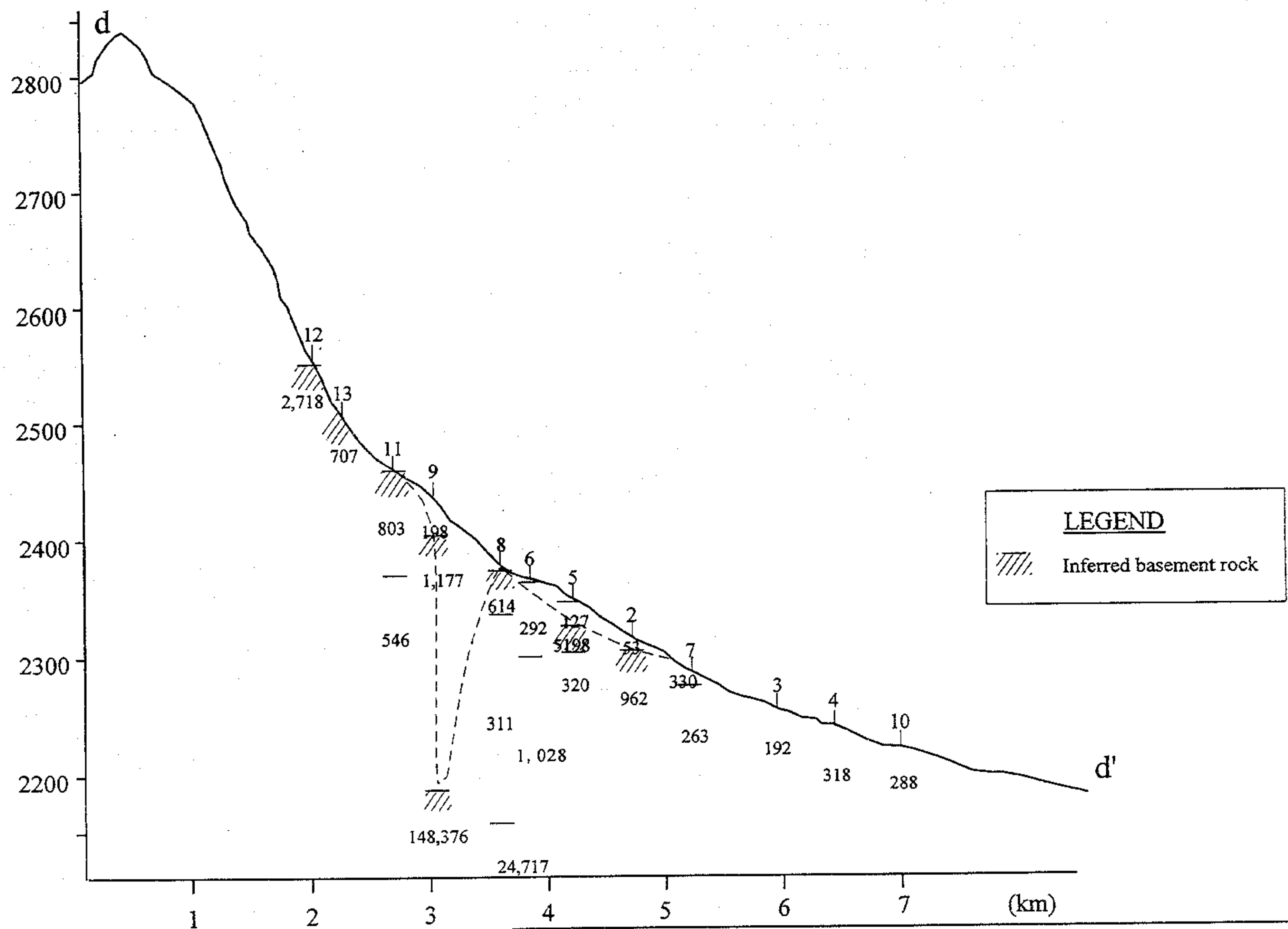

Figure 4.8 (2) Resistivity Section in Bayan Tolgoy

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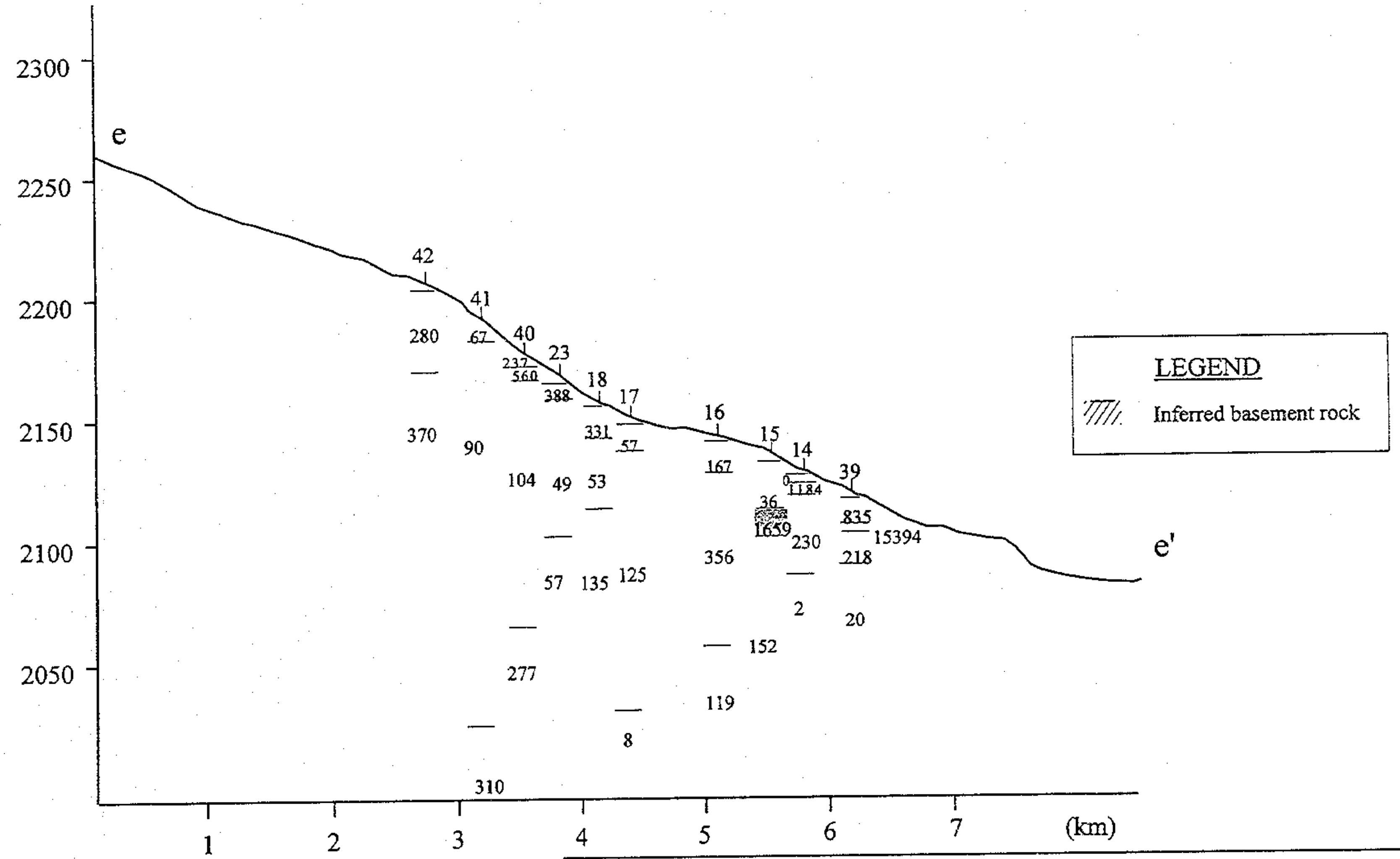

Figure 4.8 (3) Resistivity Section in Kharzat

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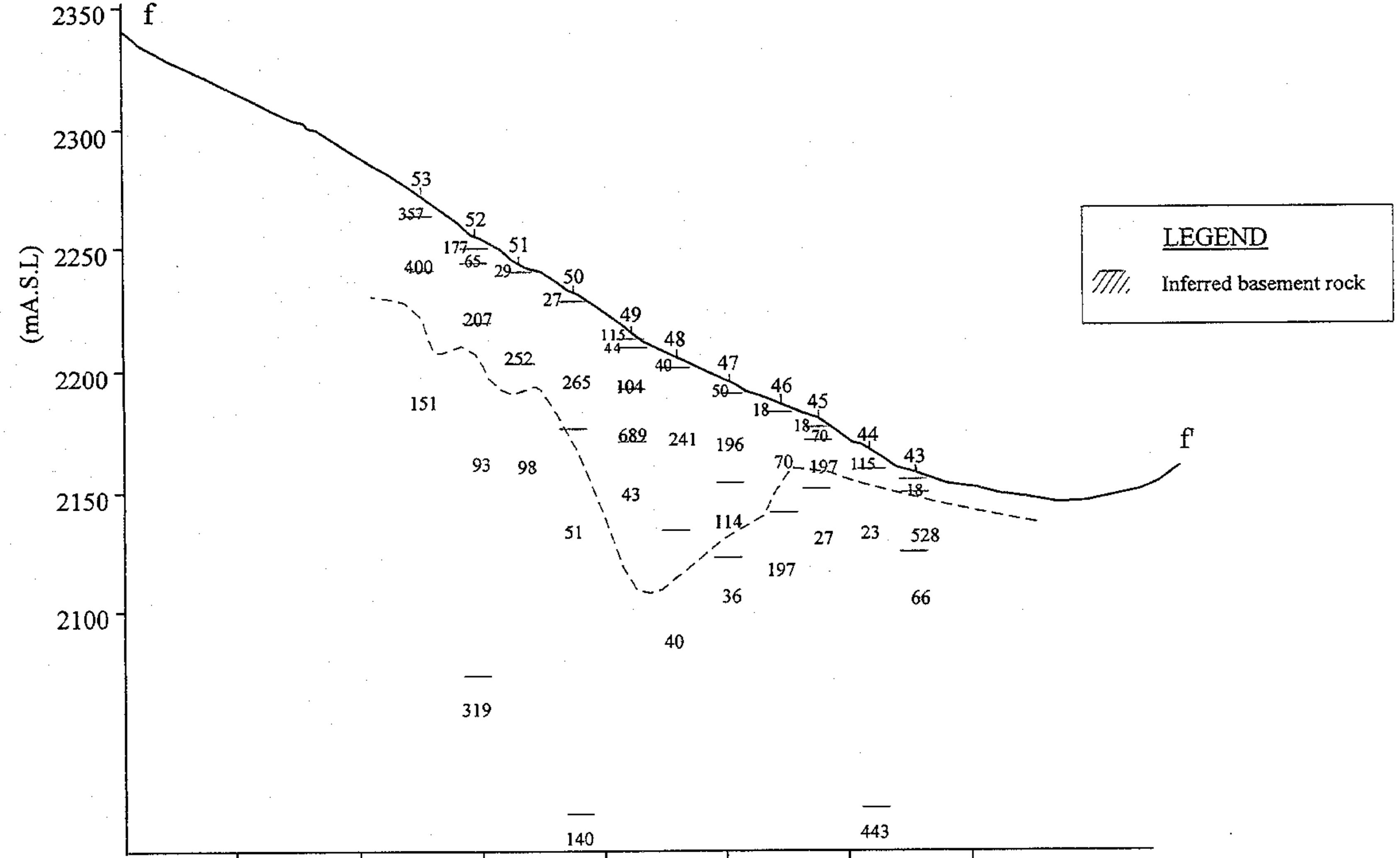

Figure 4.8 (4) Resistivity Section in Olon nuur

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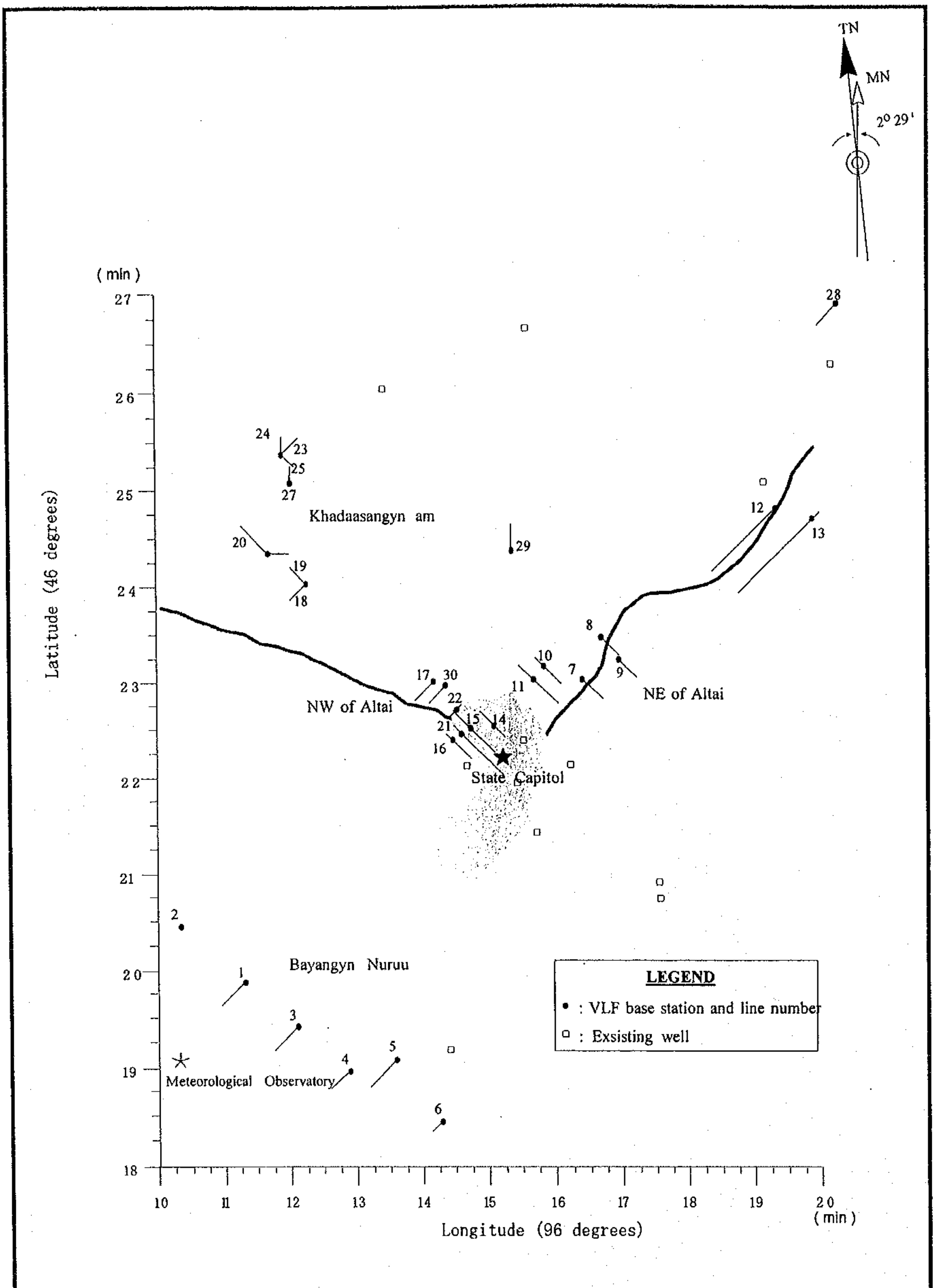

Figure 4.9 VLF Survey Stations and Lines

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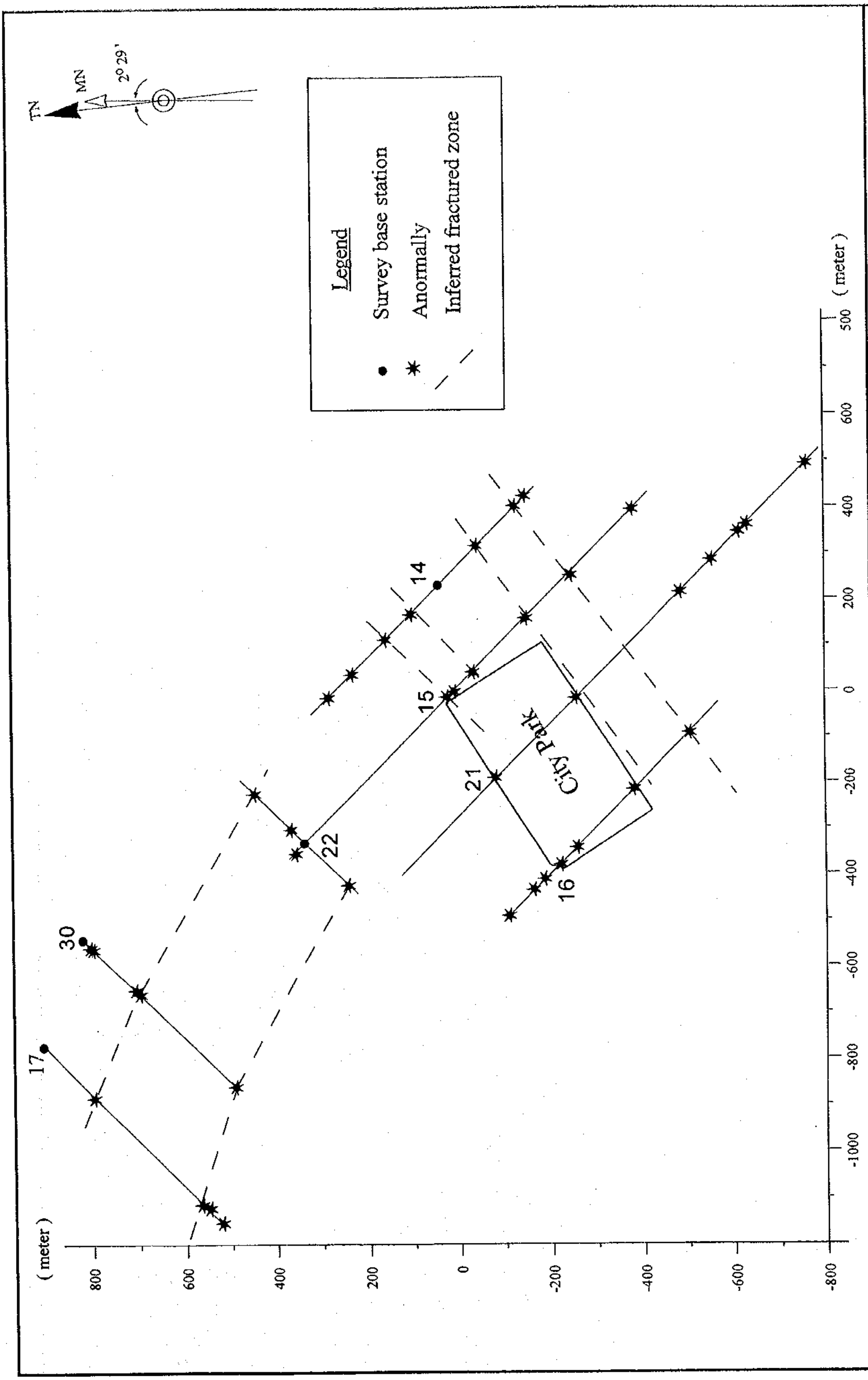

Figure 4.10 VLF Anomalies around the City Park

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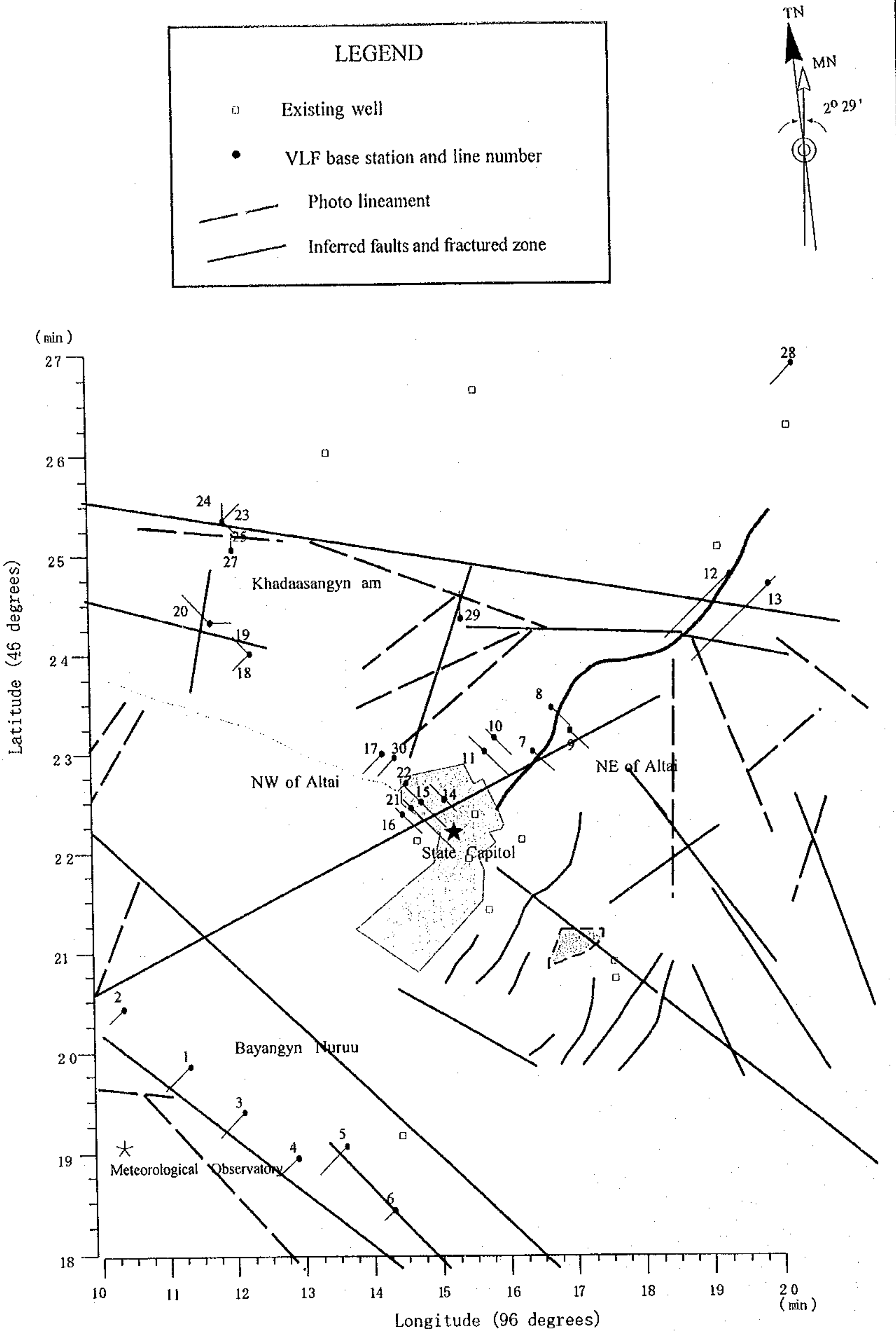

Figure 4.11	Distribution of Fault and Fractured Zone
JICA	The Study on Groundwater Development for Altai City

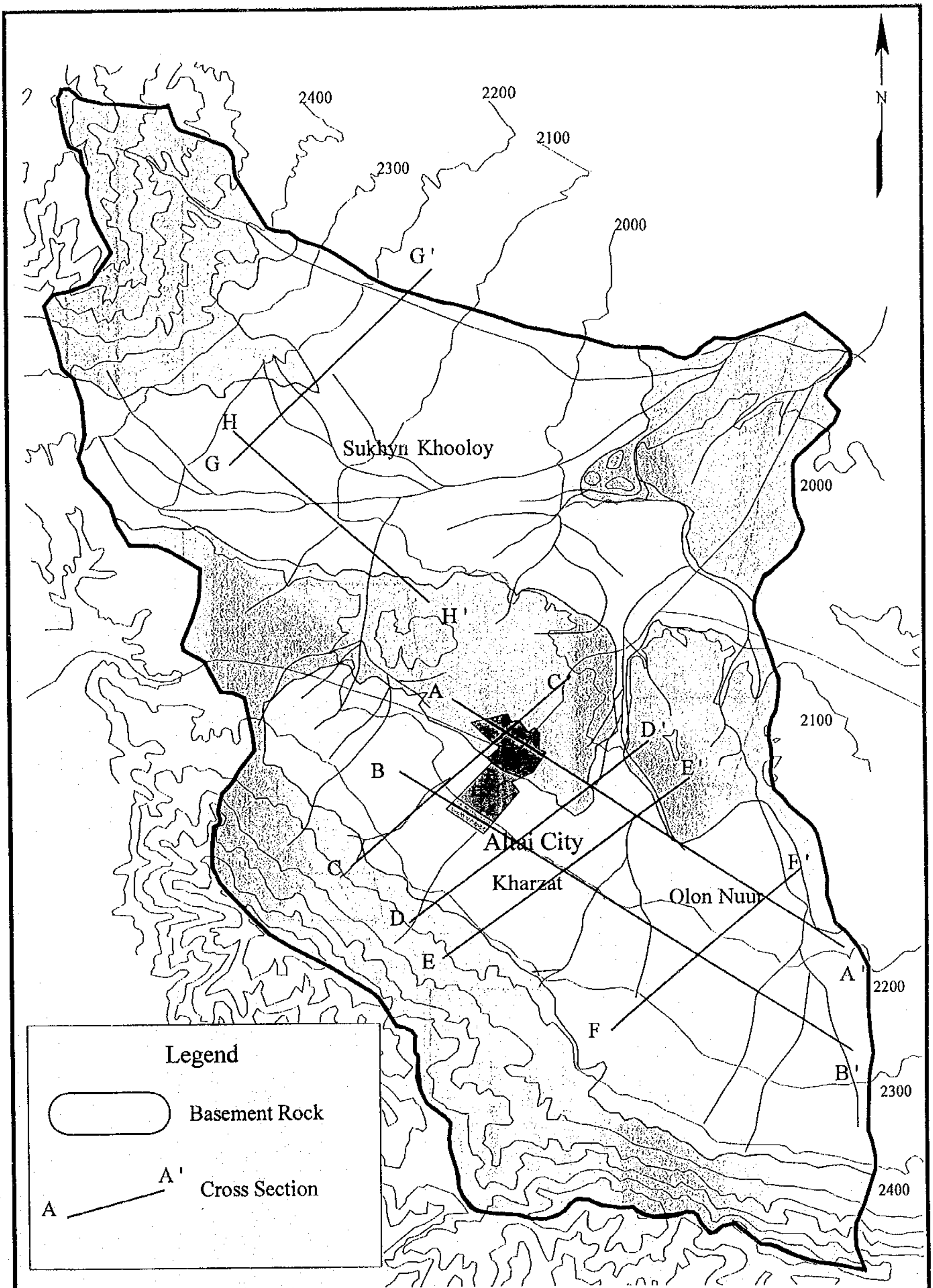

Figure 4.12 (1) Location of Geological Cross Section

JICA	The Study on Groundwater Development for Altai City

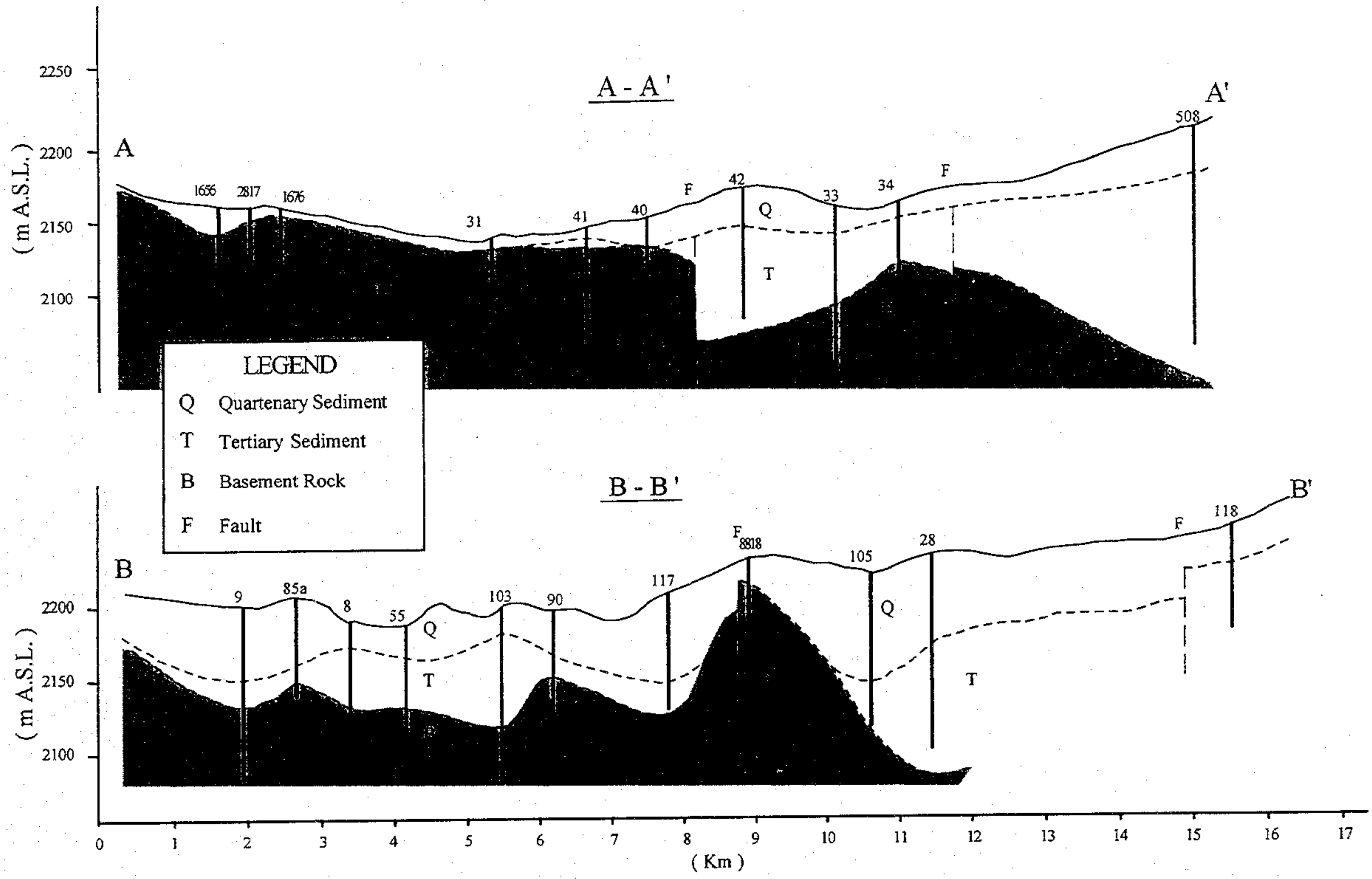

Figure 4.12 (2) Geological Cross Section	
JICA	The Study on Groundwater Development for Altai City

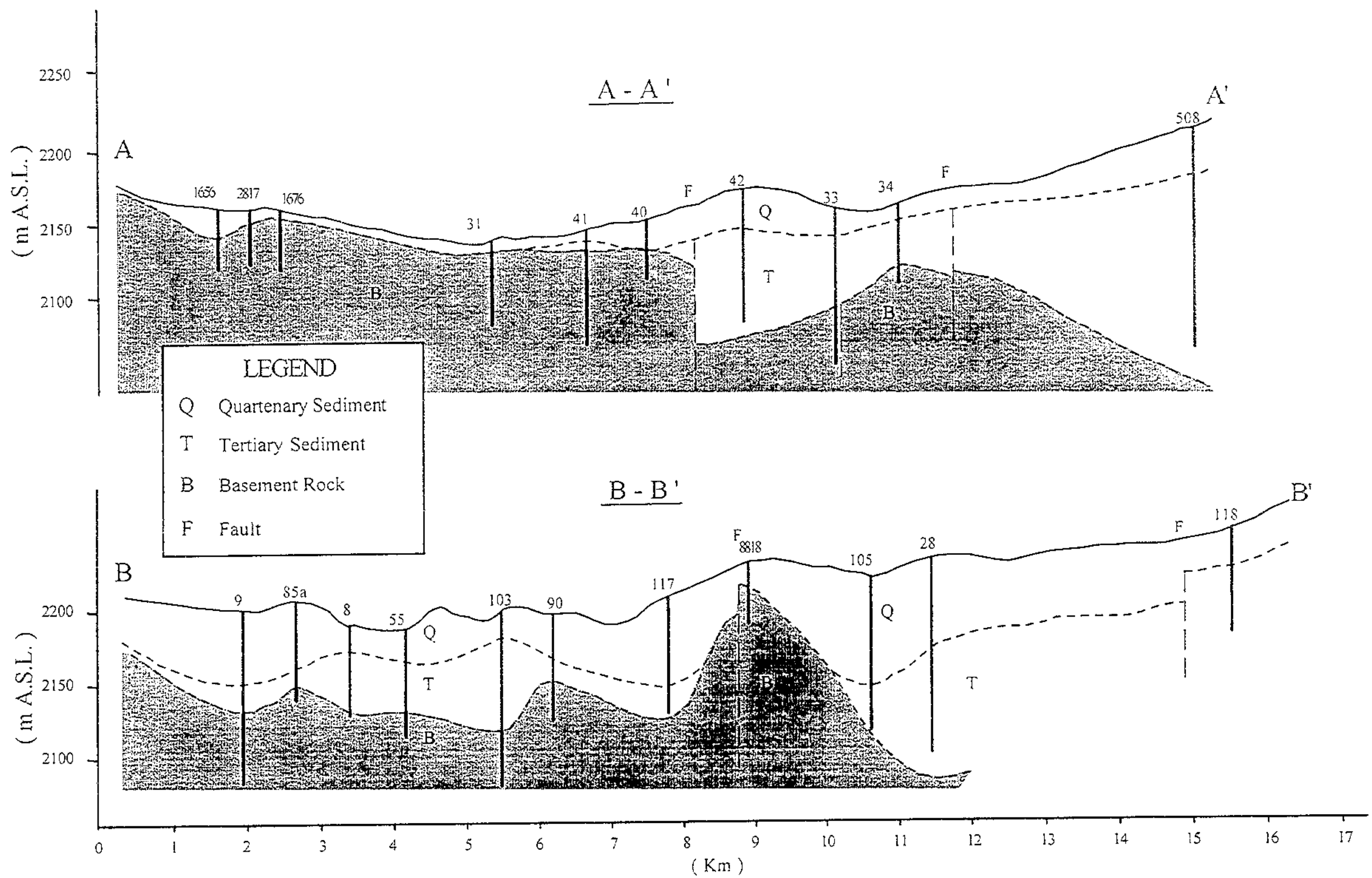

Figure 4.12 (2)	Geological Cross Section
JICA	The Study on Groundwater Development for Altai City

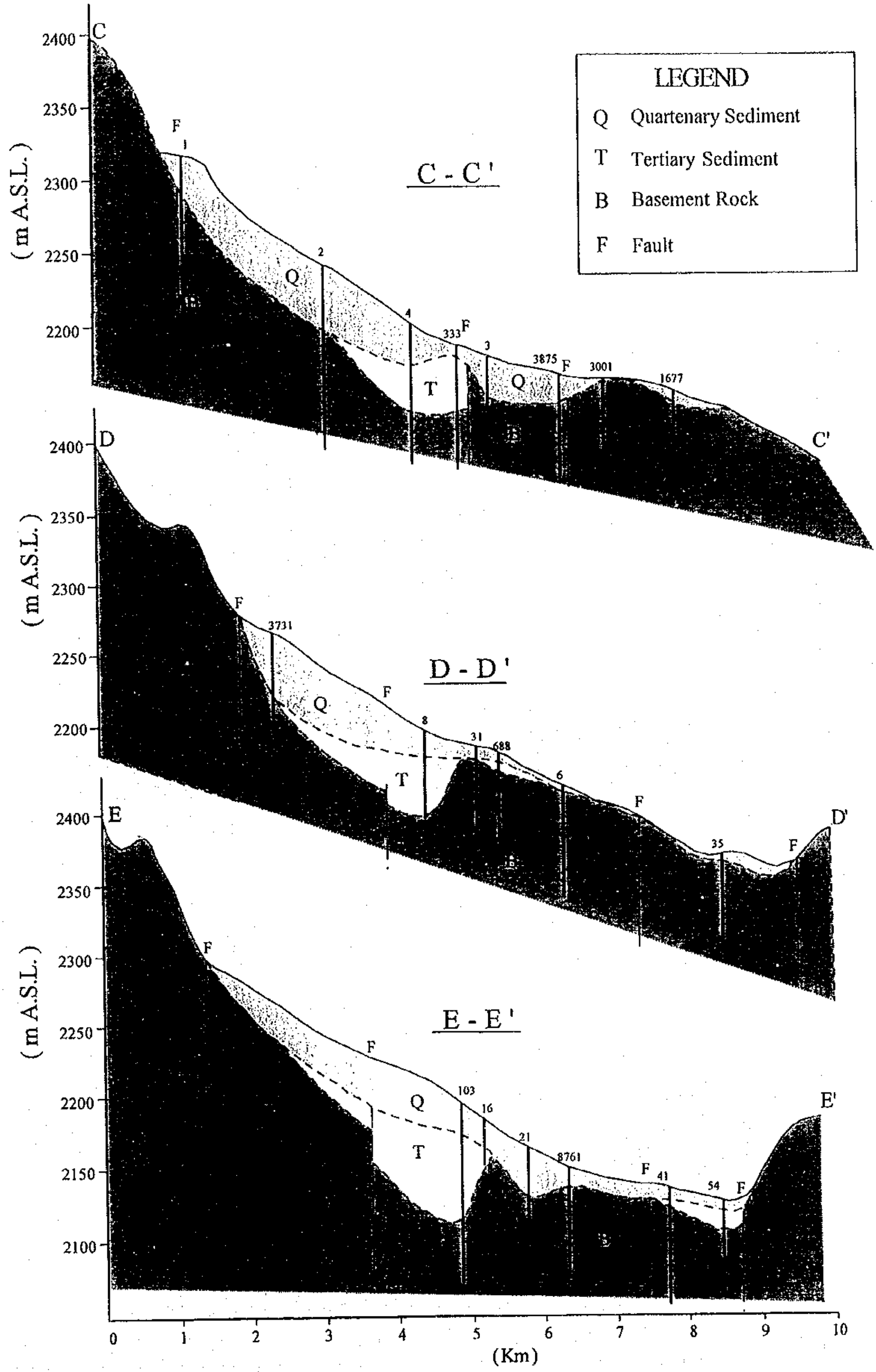

Figure 4.12 (3) Geological Cross Section	
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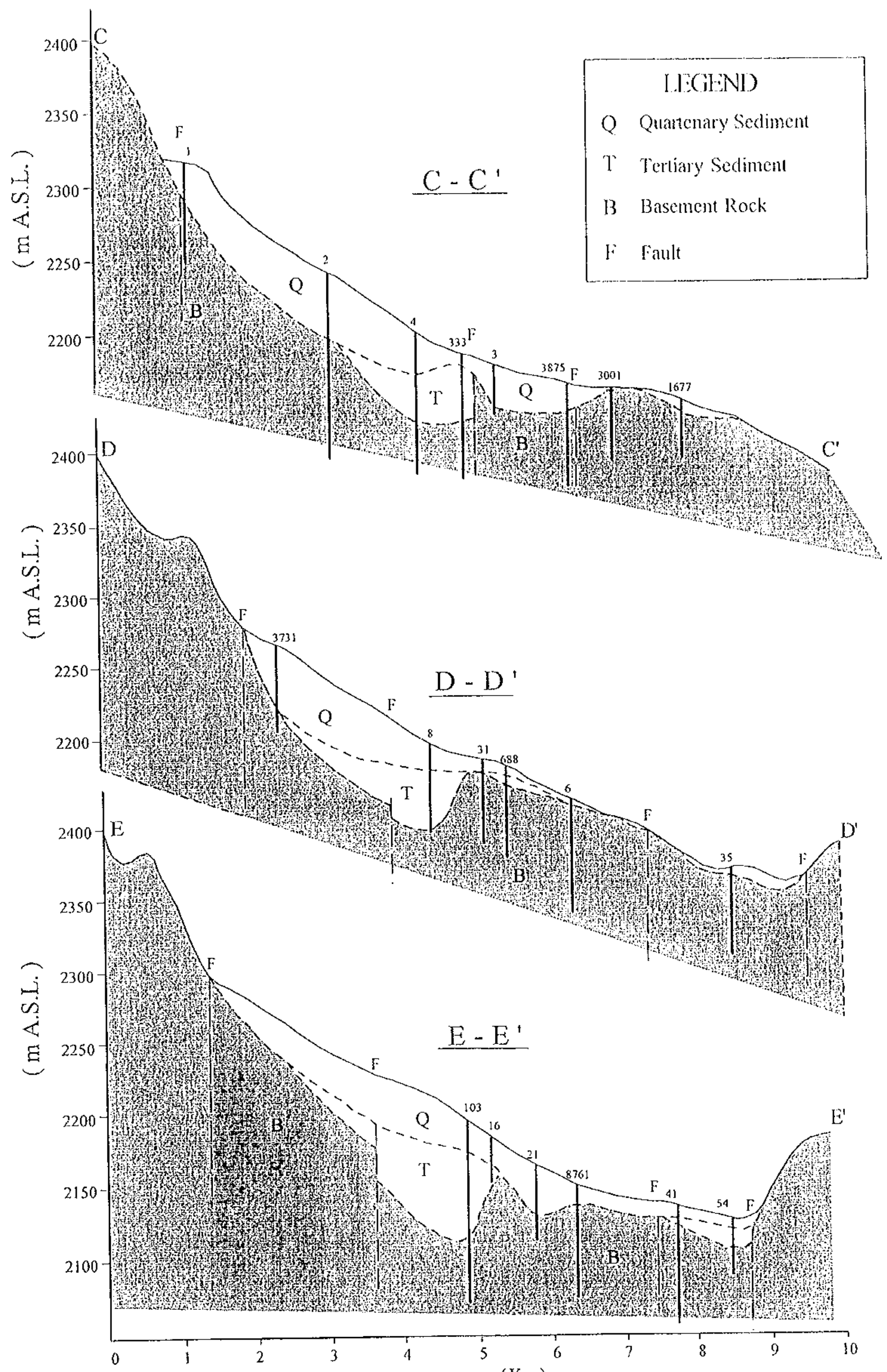

Figure 4.12 (3) Geological Cross Section	
JICA	The Study on Groundwater Development for Altai City

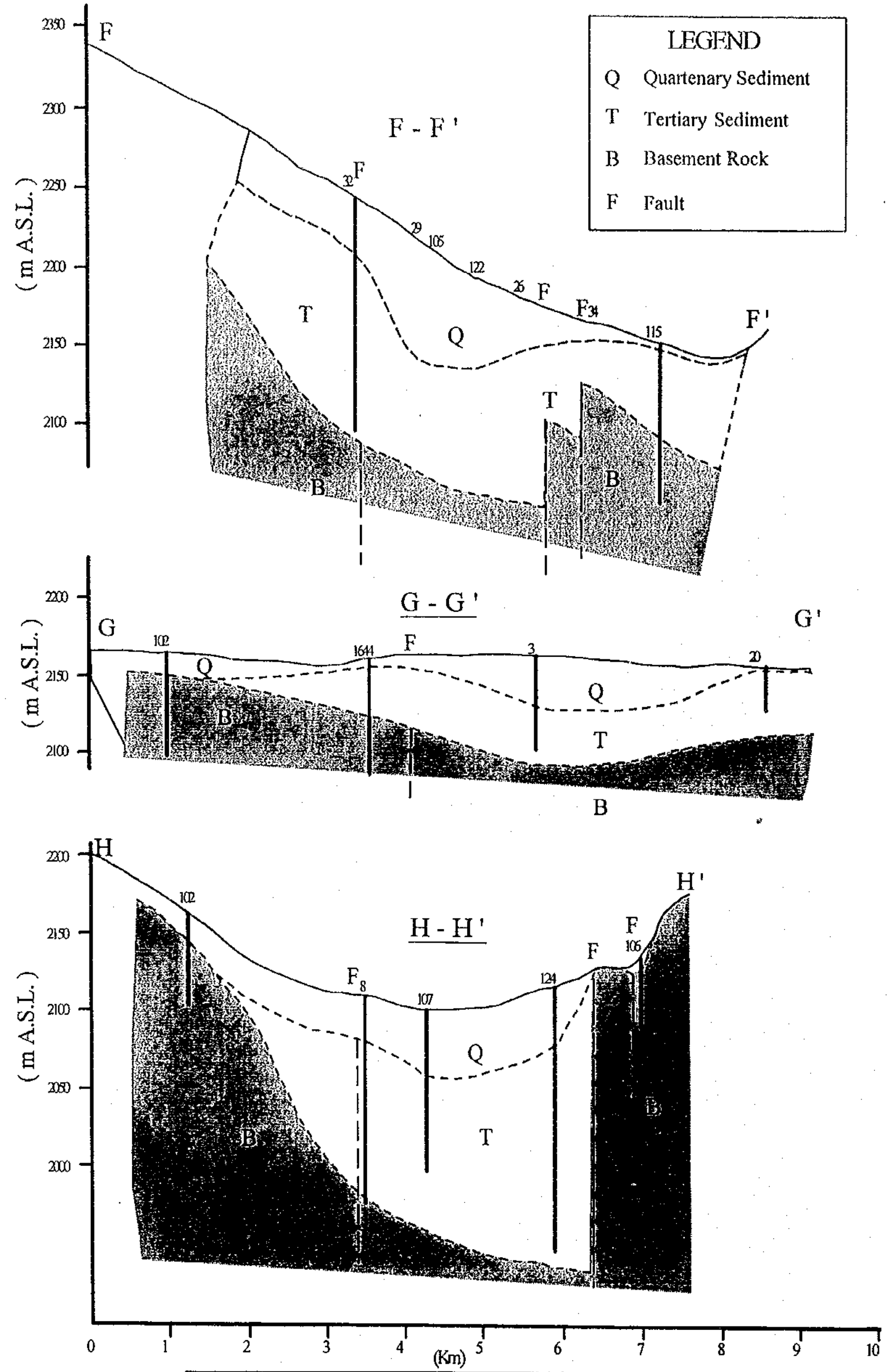

Figure 4.12 (4) Geological Cross Section

JICA	The Study on Groundwater Development for Altai City

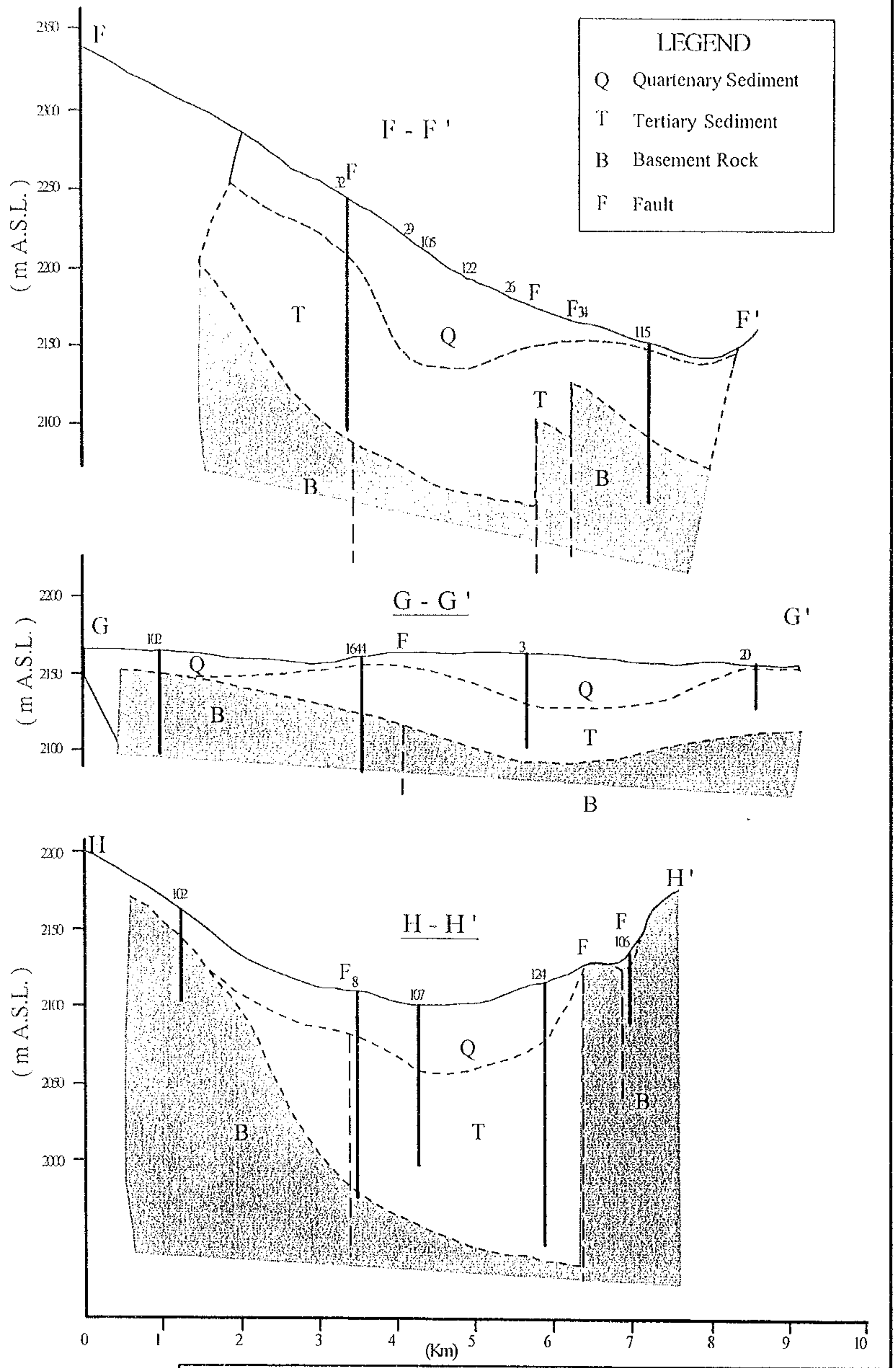

Figure 4.12 (4) Geological Cross Section

JICA	The Study on Groundwater Development for Altai City

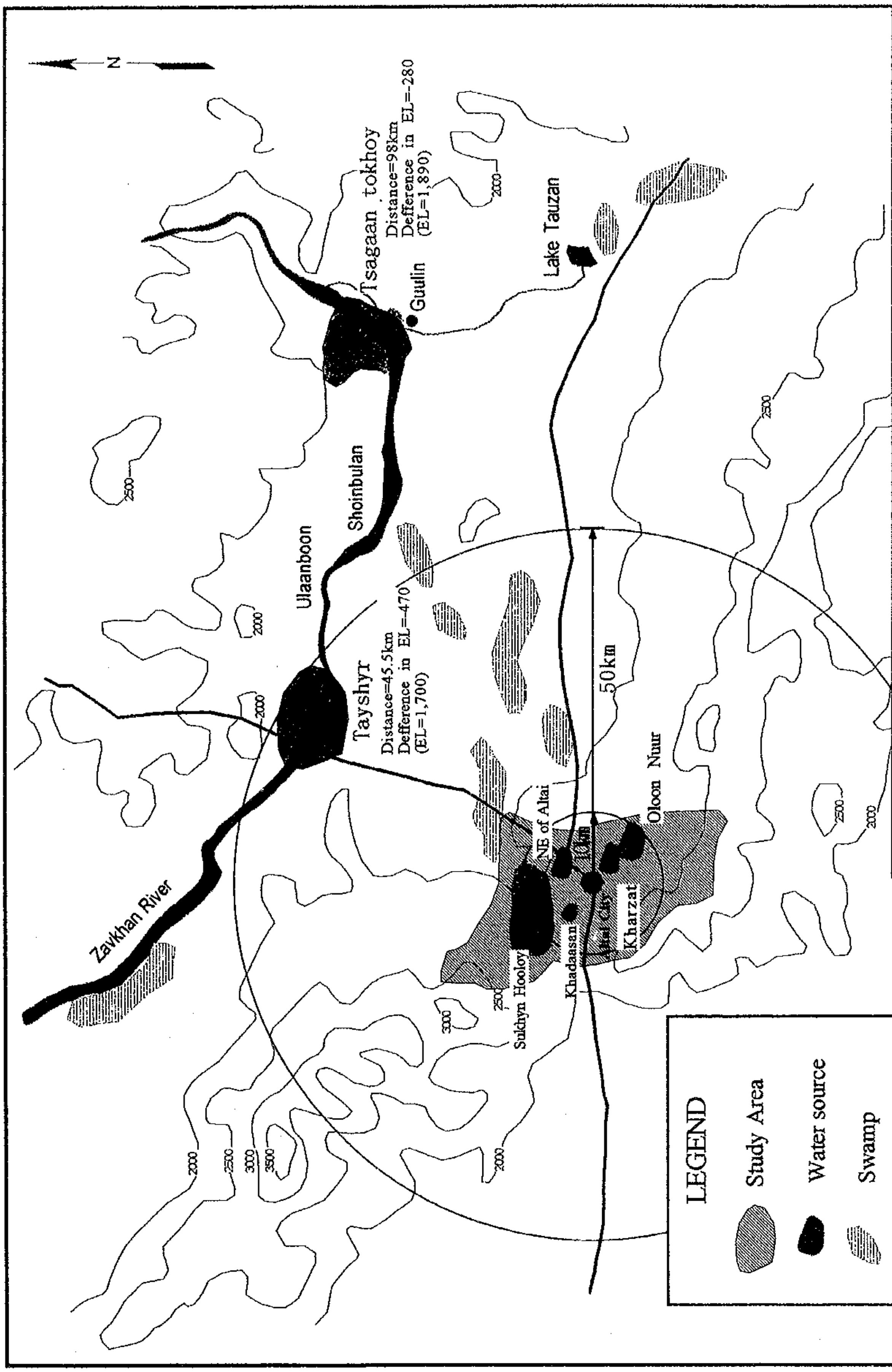

Figure 4.13 Location of the water sources

JICA	The Study on Groundwater Development for Altai City

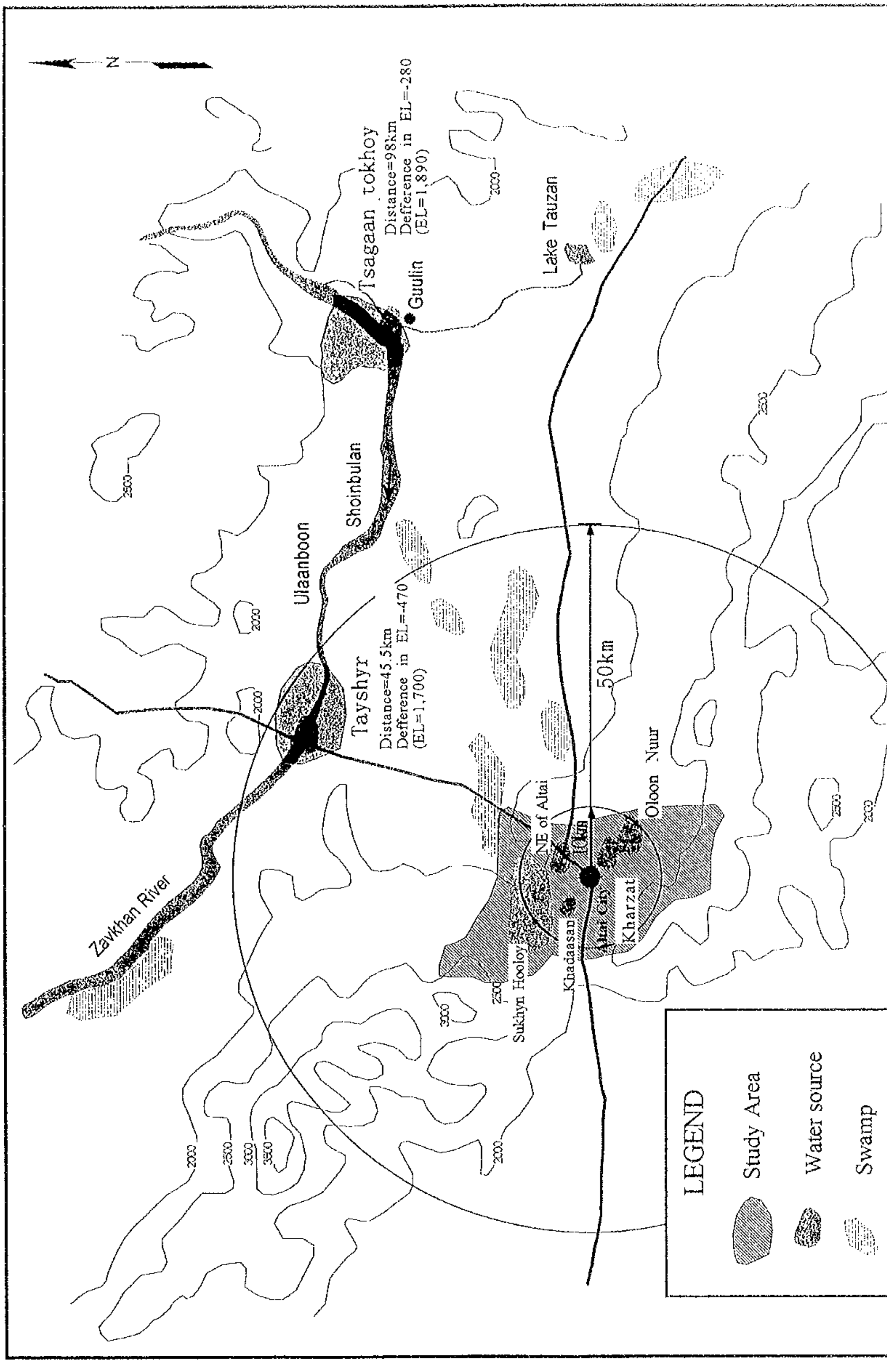

Figure 4.13 Location of the water sources

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5 TEST WELL CONSTRUCTION

5.1 LOCATION OF WELLS

A total number of ten wells were drilled in this study. The location of each test well was determined based on the results of satellite image and aerial photograph interpretation, geophysical survey and field survey at each site. Some other aspects that were taken into account when deciding the sites are, type of rocks at the sites, surrounding environment and distance from the city center. Two out of the ten wells were drilled beside the residential area of Altai City and other eight wells were drilled relatively far from the city center (more than five km).

The test wells are classified into two different categories, A series and B series, in terms of their target aquifer. A series wells target fissure aquifer as their principal water source while B series target alluvial aquifer as its main water source. Since A series wells aims at fissure aquifer in hard basement rocks, they were drilled by a Japanese drilling rig and are relatively deeper than B series wells while B series wells were drilled by the drilling rigs of the local drilling company.

The location of the test wells is plotted on Figure 5.1 and expressed in coordination in Table 5.1 along with other relevant information and .

5.2 LITHOLOGY OF WELLS

Lithology of each test well is compiled in Annex V in Data Book together with well logging results and boring information. Naturally lithology of the boreholes reflects the geology of the sites. However, it is sometimes difficult to predict what exactly lies underground and how deep the basement rock is even with the help of geophysical survey. In this test well study also, the lithology and the structure of some boreholes turned out to be a little different from what were expected.

Generally speaking lithological variation within a single borehole, especially in the basement rocks, is not so great. This is because all of the wells are drilled in a similar sedimentary setting and because the dip of the basement rocks are steep or nearly vertical.

For example, typical overlaying layers are that of quaternary alluvial sediments. They are alternation of thin sand layers and gravel layers some of which thin out laterally. The sorting of usually angular to sub-angular pebble and gravel is moderate but the matrix of the sand and gravel layers contains yellowish silt and clay to some extent. On the other hand All of the A series wells penetrated hard basement rocks of Gobi-Altai and Ulaanlolgoy series that typically outcrop in and around Altai City. Deformation structures such as small faulting, kink folding and boudinage are common although all of which are old ones and consequently don't accompany open cracks.

The following is the brief descriptions of lithology of the test wells.

B-5, B-6:

These two wells are located in Oloon Nuur where thick blanket of alluvial sediment form virtually flat topographic feature. This alluvial sediment comprises sand and sandy gravel layers in upper part. On the other hand, tertiary reddish clay layers with some sand and gravel make up the lower part. Gravel is of angular to subangular green rock, granitic gneiss, and small amount of peridotite and carbonate rocks.

A-1, B-1:

These two wells are located at the western margin of Altai City' residential area A1 is the deepest well of all and it drilled through fine grained acidic gneiss which is made up of mainly feldspar and quartz and contains minor amount of mica. In A1 no remarkable zone of fractures was observed except for some narrow zones that are characterized by concentration of biotite and consequently show scaly texture. Occurrence of some pyrite stains indicates the passage of water through these zones. B1 borehole also encounters this rock at about 10m which is overlain by sand and gravel layers. Gravels are of granitic rocks, greenrock, black slate and peridotite.

A-3:

This well was drilled in Khadaaasan which is a small valley cutting through a small hill range toward Sukhiin Hooloi. Quaternary sediment cover is quite thin at the site. A-3 well penetrates fine grained amphibolite and basic gneiss in the upper part, and in the lower part (below 20m) it drilled through biotite gneiss. The basic gneiss shows clear thinly banded structure with amphibole rich layer and felsic layer. The felsic layer is characterized by the presence of pink feldspar. The biotite gneiss is fine grained and contains many small grains of garnet in some part. Quartz veins and volcanic intrusions of a few meters thickness are observed at some depths. Some weak zones are observed at some depths where the samples show rusty surface, scaly cleavage or crumbling nature.

A-2:

This well was drilled about six km north east of Altai City center. The sediment cover is thin with six meters. The well drilled through granitic gneiss with strong foliation. The rock type is almost the same up to the bottom with minor variation in the amount of mica-bearing layers.

A-4:

This well was drilled is located in a small depression about two km north east of Altai. The geology at the site is composed of acidic granitic gneiss, fine grained acidic gneiss and some acidic volcanic dikes. Both of the gneiss are mainly made up of quartz and feldspar and small amount of mica and foliation is remarkable in both rocks. The borehole penetrated the acidic gneiss which is less resistant to weathering and exposed at the bottom of the depression. However it is frequently alternated with quartz rich layer, which is named quartzite in the report. On hand specimen scale the rock consists of small grains of quartz and feldspar of less than a few mm in size with even smaller stains of biotite and muscovite. Foliation in the rock is moderate to strong and slightly mylonitic texture is observed.

B-2, B-3:

There two wells were drilled several km north of A-2. Although the sediment cover is much thicker than A-2 at both sites (around 40m), most of it is impermeable tertiary redish clay. However at B-3, 20 meter thick sand and gravel layers exist below the clay layer.

B-4:

This well was drilled at the far end of a small fan of in the north east of Altai. Consequently the sediment cover is very thin with about four meters. It is underlain by a coarse grained granitic basement rock with small amount of mafic minerals. The upper part of this rock is slightly weathered up to 15m.

5.3 RESULTS OF LOGGING

Well logging is quite useful in getting more details of underground layers (i.e. detecting water bearing layers). It provides more direct information while geophysical and field survey gives only indirect and rough information. The logging was carried out immediately after the end of drilling of each well using a logging machine supplied by JICA.

The device used for the logging is as follows.
Geologger 3030 Mark-2 manufactured by OYO
with electric log sonde and temperature/conductivity sonde

The items that were measured and their measuring units are as follows

Item measured	unit
resistivity short (16 inch)	ohm-m
resistivity long (64 inch)	ohm-m
natural gamma ray	cps
spontaneous potential	mV
SPR	ohms
temperature	degrees Celsius
conductivity	mS/cm

The result of logging for each well is graphed in Annex IV and is described in detail in the following.

A-1:

The logging was carried out in uncased borehole for the total length of 200.3m. For the resistivity logging, fluctuation of the graphed result generally shows great range of amplitude. The range of amplitude is from 200 ohm meters to 1800 ohm meters. Remarkably low resistivity values were recorded at the depth of 120m to 140m, 155m to 170m, and 179m to 186m. Existence of relatively highly fractured zones are expected at these depths. The results of gamma and SP logging are consistent with this resistivity result. As for the temperature and electric logging, a relatively clear fluctuation is observed in the upper part at 15m to 25m and also less clear fluctuations at 55m to 65m, 85m to 90m. All of these are considered to indicate permeable zones.

A-2:

Logging was carried out for the total length of 190.3m. Throughout the whole length, relatively low resistivity values were mainly recorded. The only high resistivity zones are at the depths of 25m to 35m and 80m to 120m. The range of the values are between 600 to 1200 ohm meters. Zones with lower resisitivity show its values ranging from several tens of ohm meters to 100 ohm meters. Although, geologically the borehole wall consists of a single rock type, gneiss, except for a few meters at the top, the resistivity value changes depndeing on the degree of weathering, mineral composition of the rock and characteristics of flow and dissolved substance in the water. The results of gamma and SP logging likewise reflect the geological changes in the borehole. Possible fissure zones interpreted from the graphed logging results are those of 90 to 105m, 110 to 120m, 129 to 138m, 154 to 167m and 172 to 185m.

A-3:

The logging was carried out for the total length of 150.3 m. The resistivity values are generally high throughout the total logging length and especially high at the depths of 40 to 60m, 90 to 105m and 120 to 155m with 1000 to 4000 ohm meters. Low resistivity zones are found among the high resistivity zones with relatively high baseline of several hundred ohm meters. Geologically the brehole wall is made up of gneiss with the presence of quartz veins at some depths and top sediment cover. The quartz veins occur at the depths of 15m and 60m, however any indication of the presence of the quartz vein was not detected by the logging data alone. Determination of the possible fissure zone was done by using in combination with the gamma and SP logging results. The zones with the depth of 10 to 35m, 60 to 70m, 108 to 115m and 138 to 142m are estimated to be fissure zones.

A-4:

The logging was carried out for the total length of 160.2m. The resistivity value decreases step-wise with depth forming three distinctive zones; high resistivity zone in the upper part (4 to 50m), medium resistivity zone in the middle (50 to 120m) and low resistivity zone in the lower part (120 to 160m). The gamma logging result is almost consistent with the general resistivity trend but shows peculiar rise in its value from 30cps to 120cps around 50m and from 60pcs to 120cps around 120m. These drastic changes are considered to reflect the difference in lithology above and below that depth. The information obtained by the observation of drilling cutings also supports the above mentioned interpretation. Geologically the borehole is made up of quartzite, acidic gneiss and acidic volcanic intrusion from the top. The possible fissure zones interpreted from the whole logging result are at the depth of 18 to 21m, 32 to 44m, 64 to 72m, 98 to 118m and 150 to 157m.

B-1:

For the total length of 56.2m the logging was conducted. The resistivity logging results revealed existence of a high resistivity zone from 17 to 23m with a resistivity value of 800 to 1500 ohm meter. The other parts can be taken as low resistivity zones in spite of their relatively high baseline resistivity values. Up to 10m from the top is composed of sediments such as sand and gravel and the deeper parts are composed exclusively of gneiss. Within this gneiss zone the amount of quartz contained in the rock seems to affect the logging results, showing high resistivity values at the zones with higher quartz content. The temperature and electric conductivity logging results both displays a clear shift, which is estimated to be a result of groundwater inflow. Taking gamma and SP logging results into consideration, possible aquifers are located at the depth of 10 to 17m, 23 to 32m, 44 to 52m.

B-2:

The logging was conducted for the total length of 73.6m. The result of resistivity logging shows roughly three distinctive ressistivity zones. From the top, they are low resistivity zone of 0 to 36m, medium resistivity zone of 36 to 55m, high resistivity zone of 55 to the end. The gamma logging indicates that the low resistivity zones are made up of clayey layers. The resistivity progressivly increases throughout the medium resistivity zone to the high resistivity zone from 200 to 400 ohm meters. The high resistivity zone seems to represent resistivity values for hard basement rocks with its value from 500 to 1000 ohm meters. As for the temperature logging, slight deviations are observed at the depth of 34 to 36m and 40 to 55m while the electric conductivity logging shows a deviation from 30 to 38m implying groundwater inflow at the depth. In combination of all the data mentioned above, the potential aquifers have been located at the depth of 29 to 45m and 49 to 60m.

B-3:

The logging was carried out for the total length of 131.00m. The resistivity logging shows overall average value of around 400 ohm meters. Zones with relatively high resistivity value were detected from 40 to 60m and 75 to 95m. Their values are from 500 to 800 ohm meters. Among these high resistivity zones are zones with low resistivity values. Those are found at the depth of 29 to 35m, 60 to 75m, 80 to 86m and 103 to 115m. Geologically the borehole is made up of unconsolidated sand and gravel until 45m. The deeper part is made up of granitic rocks. The cutting samples reveals the existence of fractured and weathered zones from 80 to 90m, which is consistent with the result of resistivity logging. In consideration of the other logging results, possible aquifers are estimated to exist at the depth of 75 to 95m, 103 to 115m.

B-4:

The logging was carried out for the total length of 41.6m. The resistivity logging distinguished two zones with different values. One is the zone with around 800 ohm meters resistivity from the top to the 20m, the other is the zone with 1000 to 1500 ohm meters from 20m to the end. The gamma logging shows similar changes to that of resistivity and its overall average is around 50cps. It also shows a characteristic shift toward lower value up to 30pcs around 18m indicating existence of a fissure zone. The SP logging result reveals anomaly around 18 to 20m and 33m. The observation of drilling cuttings tells that unconsolidated sediments (sand and gravel) is only up to a few meters and the rest is made of granitic rocks. The anomalies mentioned above occur within this granitic rocks. The analysis of all the logging data indicates that possible fissure zones are at 6 to 20m and 33 to 41m.

B-5:

The logging was carried out for the total length of 80.0m. The resistiviy logging reveals the existence of relatively high resistivity zones at the top 20m. Below this depth characteristic fluctuations are observed at the depth of 25 to 34m and 44 to 51m, with its value ranging between 40 to 110 ohm meters. As for the gamma logging, relatively high values of about 60cps is recorded from 20 to 25m and 34 to 44m. Also for 51m and deeper zones slightly higher values were recorded indicating higher content of clayey materials in the sediments. The SP logging shows minor degree of fluctuation until 20m from the top, 44 to 51m and 65m and deeper. The temperature logging reveals vague deviations around 5 to 35m, and 64 to 73m while that of electric conductivity shows some deviations around 5 to 15m and 74m. The potential aquifers estimated in consideration of the above results are zones at 25 to 34m, 44 to 51m and 64 to 74m.

B-6:

The logging was carried out for the total length of 120.0m The result of the resistivity logging shows a very similar pattern to that of B-5 borehole. There are some high resistivity zones with couple of hundreds ohm meters for the upper 45m. However below 45m up to 76m the amplitude of fluctuation decreases to the range of 50 to 150 ohm meters. The gamma logging recorded comparatively low values of 10 to 40cps at the depth of 24 to 33m, 39 to 43m and 63 to 76m. On the contrary, relatively high values of 50 to 70 ohm meters are recorded in the zones deeper than 76m. This implies existence of more clayey layers in the zones. Major shifts are observed around 10m for the SP logging, around 25m for the electric conductivity logging and around 24 to 45m, 47 to 53m and 103 to 118m for the temperature logging. As a result of an analysis of all the logging data, potential aquifers are estimated to exist at the depth of 24 to 43m, 47 to 53m, 63 to 76m and 107 to 113m.

5.4 RESULT OF PUMPING TEST

Two kinds of pumping test were carried out after the drillings were finished and the wells were cleaned. Step draw down pumping test was first carried out in order to determine the proper discharge rate for the continuous pumping test. Then the continuous pumping test was carried out with that discharge for the purpose of clarifying the characteristics of the aquifer. This is one of the most important and essential part of groundwater study because yield capacity of the well will directly affect the plan for water supply facilities.

Table 5.2 and Table 5.3 show the result of the step drawdown tests and the constant discharge tests, respectively. The result of the step drawdown tests is also summarized in Figure 5.2. The figure indicates that A-3, A-4, B-5, and B-6 are more productive than the other test wells.
Specific Capacity shows various values. The wells drilled in the north of Altai City have generally low Specific Capacity except A-4. The value of B-5 and B-6 that were constructed in near Olon Nuur are higher than the others, especially the value of B-6 is considerably high. A productive aquifer occurs most likely in this area.
The hydrological characteristics of the aquifers in which these wells were drilled are discussed in chapter 5.

Table 5.1 Drilling Data for the Wells

New No.	Location (Lat, Long.) (deg, min, sec)	Remarks	Dia. (mm)	Total Depth (m)	S.W.L GL- (AGLm	ground level (m)	casing stickup (m)	casing position, material (m)		Screen position,	Scr. Total (m)	Gravel pack	Drilling method	Rig	sampling date	*comple. date	Pump. test (cont.) D.W.L/Disch	Water Quality (hardness)
A1	N 46, 22, 19 E 96, 14, 50	East of the Park	244	200.3	11.12	2165	0.29	200	FRP	56-68, 86-92, 104-116, 128-140, 152-170, 182-194	72	yes	DTH, Rotary	SM-300H	8th Sep	3rd Sep.	87.91m/200l/mi	1000
A2	N 46, 24, 19 E 96, 18, 19	North of the bridge	244	193.0	2.6	2060	0.18	193	FRP	91-103, 109-127, 133-139, 157-169, 175-187,	60	yes	DTH, Rotary	SM-300H	6th Aug	4th Aug	7.8m/60l/min	373
A3	N 46, 24, 29 E 96, 11, 39	Upstreem of Khadaasan	244	150.3	3.91	2150	0.29	150	FRP	12-36, 60-72, 108-114, 138-144	48	yes	DTH, Rotary	SM-300H	13th Oct.	10th Oct.	64.58m/600l/mi	363
A4	N 46, 22, 50 E 96, 16, 42	Across the oil reservoir	244	160.2	4.61	2120	0.18	160	FRP	16-22, 28-40, 64-70, 100-118, 148-154	48	yes	Rotary	SM-300H	5th Oct.	23rd Sep.	16.1m/1000l/mi	1875
				703.8							228							
B-1	N 46, 22, 10 E 96, 14, 17	West of the park	244	56.2	20.14	2175	0.23	56	FRP	8-20, 26-38, 44-50	30	yes	Rotary	URB-2A	17th Sep.	5th Sep.	32.52m/74l/min	875
B-2	N 46, 25, 36 E 96, 18, 12	Easten edge of Sukhiin hooloi	244	73.6	11.67	2030	0.2	73	FRP	31-43, 49-61	24	yes	Rotary	URB-3A	15th Aug	8th Aug	22.61m/30l/min	845
B-3	N 46, 24, 55 E 96, 18, 26	Easten edge of Sukhiin hooloi	244	131.0	25.7	2050	0.33	130	FRP	76-94, 106-118	30	yes	Rotary	URB-3A	6th July	10th July	116m/80l/min	1950
B-4	N 46, 26, 04 E 96, 19, 38	on a dry river	244	41.6	4.2	2020	0.1	41	FRP	5-23, 29-41	30	yes	Rotary	URB-2A	2nd July	20th June	14.8m/75l/min	900
B-5	N 46, 20, 24 E 96, 19, 01	on a ex-riverbase	244	80.0	3.08	2157	0.2	80	FRP	26-38, 44-56, 68-74	30	yes	Rotary	URB-2A	19th July	10th July	23m/40l/min	225
B-6	N 46, 19, 11 E 96, 20, 45	outskirt of a fan on a small stream	244	120.0	24.51	2190	0.2	120	FRP	24-42, 48-54, 60-78 108-114	48	yes	Rotary	URB-2A	24th Sep.	5th Aug.	25.05m/605l/mi	258
				502.4							192							
				1206.2							420							

* Completion date: defined as the date when the rig was removed

Table 5.2 The Result of Step Drawdown Test

A-1 (Depth: 200 m) Altai Park
S.W.L 11.48 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	50	1.67	43.1
2nd step	100	5.95	24.2
3rd step	200	42.43	6.8
4th step	250	112.60	3.2

A-2 (Depth: 193 m) NE of Altai
S.W.L 2.82 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	20	0.61	47.2
2nd step	40	1.38	41.7
3rd step	60	3.41	25.3
4th step	80	6.94	16.6

A-3 (Depth: 150 m) Khadaasan
S.W.L 4.07 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	152	1.83	119.6
2nd step	300	6.33	68.2
3rd step	455	16.95	38.7
4th step	594	34.32	24.9

A-4 (Depth: 150 m) NE of Altai
S.W.L 4.61 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	200	0.98	293.9
2nd step	500	2.90	248.3
3rd step	750	5.99	180.3
4th step	1000	10.68	134.8

B-1 (Depth: 54 m) Altai Park
S.W.L 20.7 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	25	0.89	40.4
2nd step	50	2.35	30.6
3rd step	75	7.81	13.8
4th step	100	13.10	11.0

B-2 (Depth: 73.6 m) Downstream of Esuitiin Sair
S.W.L 12.37 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	30.4	14.85	2.9
2nd step	49.3	49.83	1.4

B-3 (Depth: 131 m) Downstream of Esuitiin Sair
S.W.L 26.06 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	20	5.98	4.8
2nd step	40	27.82	2.1
3rd step	60	33.30	2.6
4th step	80	89.94	1.3

B-4 (Depth: 41.6 m) Downstream of Esuitiin Sair
S.W.L 4.36 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	15	0.46	47.0
2nd step	50	1.31	55.0
3rd step	57	3.21	25.6
4th step	74	8.62	12.4
5th step	100	24.52	5.9

B-5 (Depth: 80 m) Olon Nuur
S.W.L 3.53 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	40	1.48	38.9
2nd step	60	2.00	43.2
3rd step	80	2.55	45.2
4th step	100	3.18	45.3
5th step	120	3.82	45.2
6th step	143	4.27	48.2
7th step	177	6.81	37.4
8th step	222	8.32	38.4
9th step	300	12.05	35.9
10th step	353	15.42	33.0
11th step	419	18.94	31.9
12th step	502	24.10	30.0

B-6 (Depth: 120 m) Olon Nuur
S.W.L 24.56 m

	Q (l/min.)	ds (m)	Sc (m²/day)
1st step	150	0.08	2700
2nd step	300	0.29	1490
3rd step	450	0.57	1137
4th step	600	0.88	982

Table 5.3 The Summarized Result of Constant Discharge Test

New	Ground level	Drilled Dia.	Depth	Screen Pipes		S.W.L	S.W.L	P.W.L	Discharge rate	Drawdown	Specific capacity	Transmissivity (m2/day)				Hydraulic conductivit
				Total length	I.D						Sc	Cooper-Jacob	Huntush	Recovery	Average	
No.	(m.asl)	(mm)	(m)	(m)	(mm)	GL-m	m.asl	GL-m	Q (l/min)	ds (m)	(m^2/day)					(m/day)
A1	2165	244	200.3	(190)	(244)	11.12	2153.88	84.59	200	73.47	3.9	1.4	1.5	1.0	1.3	0.01
A2	2060	244	193.0	60	155	2.60	2057.40	7.62	59.6	5.02	17.1	10.6	10.9	9.7	10.4	0.17
A3	2150	244	150.3	(140)	(244)	3.90	2146.10	64.03	594	60.13	14.2	9.3	8.9	2.9	7.0	0.05
A4	2120	244	160.2	(150)	(244)	4.16	2115.84	15.65	1000	11.49	125.3	212	157	246	205	1.37
B-1	2175	244	56.2	34	155	20.15	2154.85	32.53	74	12.38	8.6	3.7	2.9	3.1	3.2	0.10
B-2	2030	244	73.6	24	155	11.67	2018.33	22.61	30	10.94	3.9	5.3	4.5	5.6	5.1	0.21
B-3	2050	244	131.0	30	155	25.22	2024.78	57.77	40	32.55	1.8	1.7	1.7	0.4	1.3	0.04
B-4	2020	244	41.6	(35)	(244)	4.20	2015.80	14.70	74	10.5	10.1	4.5	4.1	2.4	3.7	0.10
B-5	2157	244	80.0	30	155	3.22	2153.78	22.45	402	19.23	30.1	36.4	34.7	46.5	39.2	1.31
B-6	2190	244	120.0	42	155	24.01	2165.99	25.05	605	1.04	837.7	39456	16704	38016	31392	747

In brackets:open hole

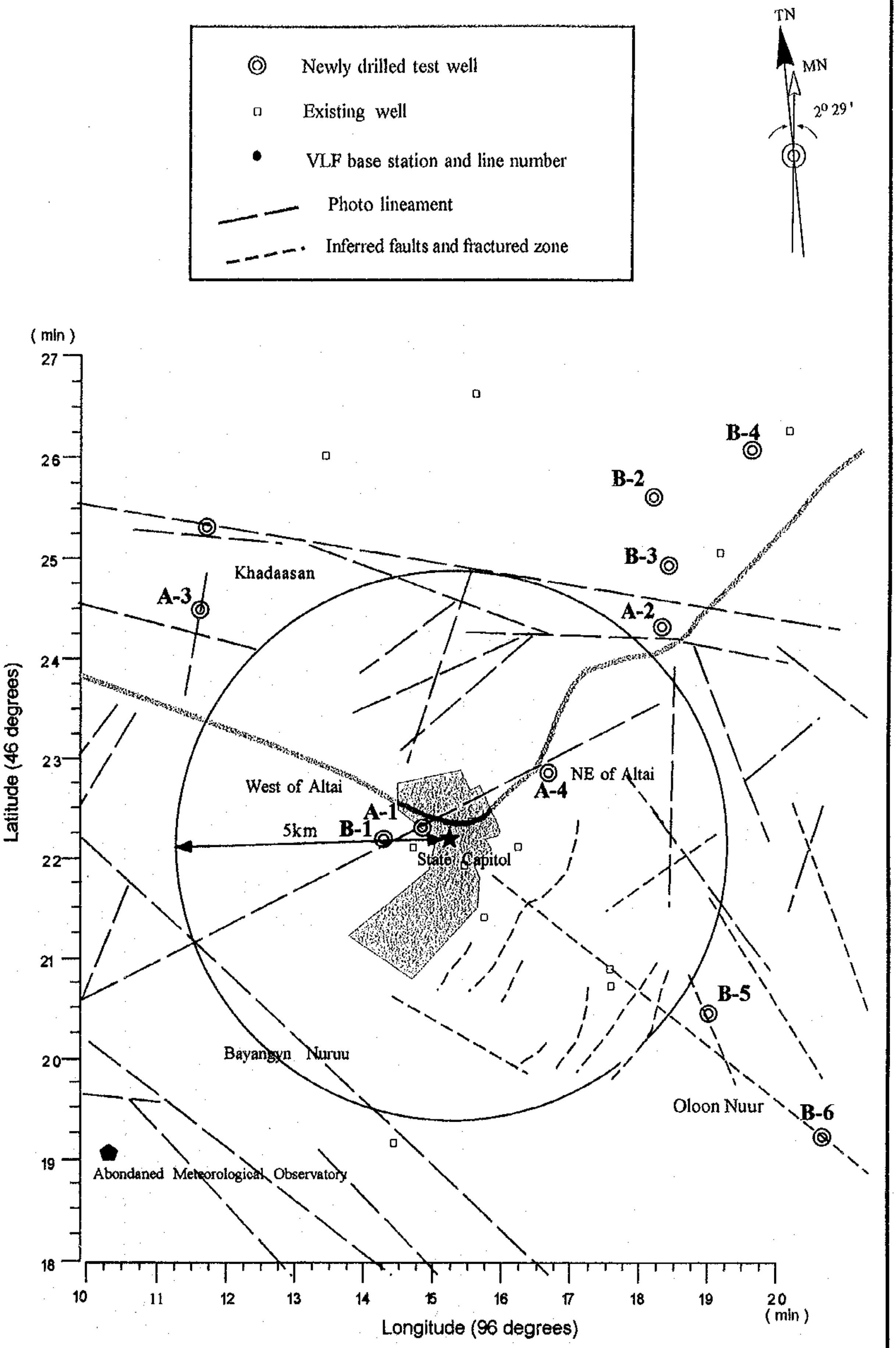

Figure 5.1	Location for Test Well
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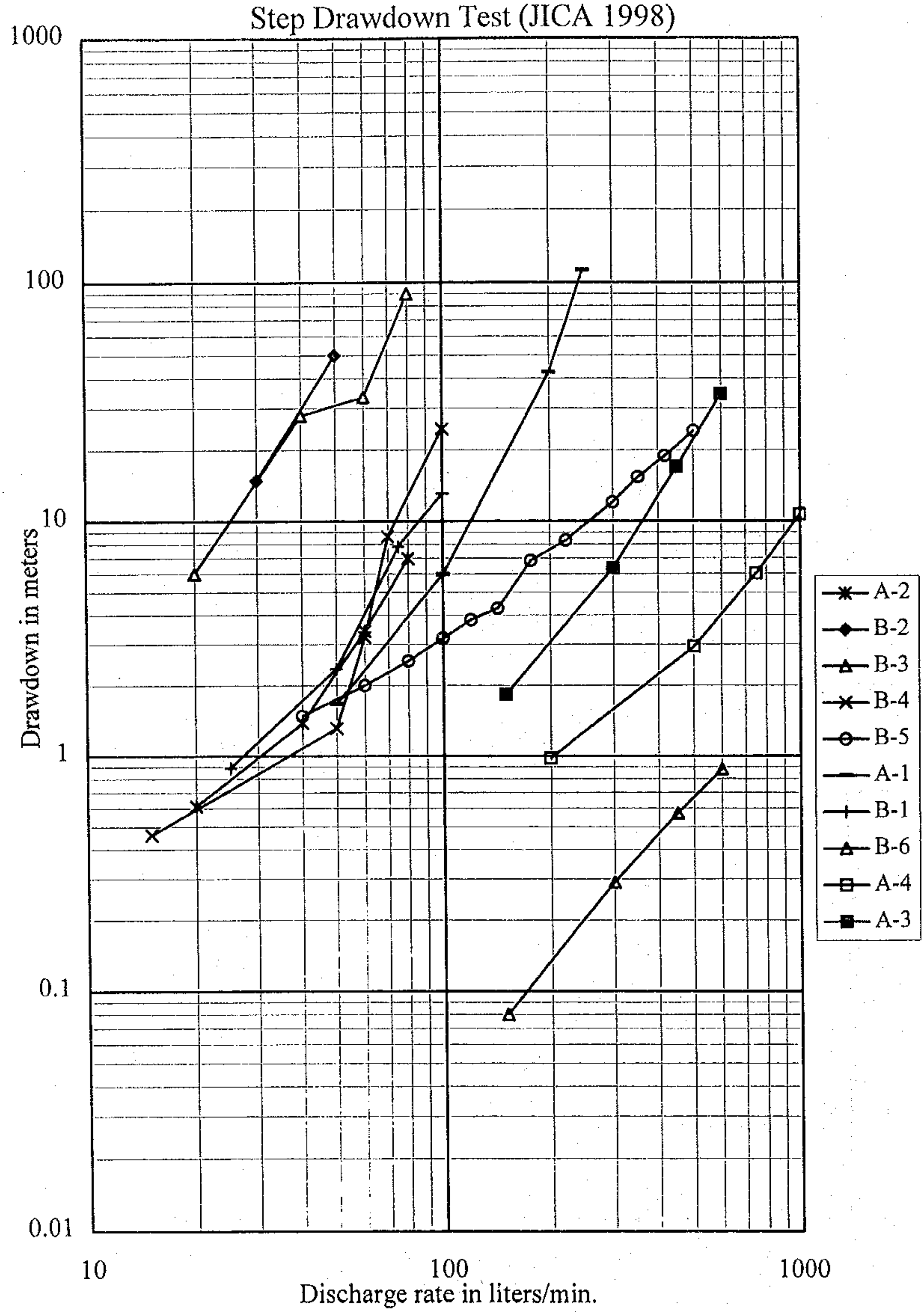

Figure 5.2 Result of Step-Drawdown Test for the Test Wells	
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