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Fig.3-5-2 Composite map of zoning of hot spring - fumarole and geochemical geothermo-temperature



Fig.3-5-2 Composite map of zoning of hot spring - fumarole and geochemical geothermo-temperature

# LEGEND

	Type	hot water	(geochemical geochermo	fumeloic gos	(detected)
I	vopor – dominated type sulfate spring	in the	(unknown)	<b>A</b> (	H2, CH4 H25, 502)
R	water - vopor - mixed common solt spring (	type a)	( > 200°C)	<b>A</b> (	( SØ2 )
I	water – dominated fy common sait spring (	(b) O	{ < 200°C}	A	
	simple spring	0	(< 200°C)		
V	water — dominated tyj Ca – Mg bicorbonate spring	•	(<200°C)	• •	
		boundary by chem	r of clossificat	ion of ha	ət sörinğ

boundary of existence of fumorole



Fig.3-6-1 Synthetic interpretation map of geologic structure

L	E	G	E	N	Ð
	<b>6</b>	Ý	•••	• •	Υ.

(Geology)



 Iox gravity area

 gravimetric incoment

 (distinct)

 gravimetric incoment

 (indistinct)

 gravimetric anticline

Cound temperature & Geochemistry)

> trend of anomalies (distinct)

trend of anomalies
 ( indistinct )

(Geothermal manifestation)

hot spring

fumorote



Fig.3-6-2 Composite map of zoning of hot spring-fumarole and geochemical geothermo-temperature



Fig.3-6-2 Composite map of zoning of hot spring-fumarole and geochemical geothermo-temperature

![](_page_4_Figure_2.jpeg)

(Geothermal manifestation)

boundary of classification of hot spring by chemical composition

boundary of existence of fumarate

hot water)	(furnalak gas	•)		(geochemicot geothermo-) femperature
R	A	Ι	vapor-dominated type sulfate spring (unknown )	)
0	A	I	water • vapor — mixed type common soit spring (a)	(> 200°C)
0	٨	X	water — doministed common salt spring (b)	( < 200°C)
٠		M	water — dominated type Ca-Mg bicarbonate spring	( <sup>-</sup> < 200*C)

(Ground temperateue & Geochemistry)

trend of anomalous area

![](_page_4_Figure_10.jpeg)

residual ground temperature

Hg-concentration

![](_page_4_Figure_13.jpeg)

CO2-concentration

(thick ----- distinct thin ----- indistinct

![](_page_4_Figure_16.jpeg)

![](_page_4_Figure_17.jpeg)

![](_page_5_Figure_1.jpeg)

---> E

N₩----

![](_page_6_Figure_1.jpeg)

Fig.3-6-4 Kodel of circulation mechanism of geothermal fluid and geothermal reservoir structure (2)

-→SE

Y-2 ŀ∕-í Pleistocene-Pliocene Tertiory <u>\_M\_</u> Mesozoic Basement +Gd+ Domoyo complex roin woter circulation of ground Moler i, circulation of geothermat fluið supply of heet shallan hát mater reservoir V deep geothermot fluid reservoir ų fracture

LEGEND

Pleistocene

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4. The Third Phase Survey

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![](_page_9_Figure_0.jpeg)

Fig.4-1 Location map of the third phase survey

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2,000 V.p (m/sec)		*** * ****	· · · · · · · · · · · · · · · · · · ·		· · · · · ·						•					Minimum overgge Maximum				matic columnar section of sonic vel
Lithology	Rhyolite	Dacife	* Dacific tutt breccia	Welded tuff	Andesitic tuff breccio Scoria tuff	Andesite	Andesite	Andesific fuff breccio	Sandstone, Mudstone	Tuft	Sandatone, Limestone	Sandstone, Mudstone (Basalt)	Andesite , Basalt	Pyrociostic rocks	Granodiorite	Metomorphic rocks	Aplite	Andesite dyke	Granodiorite parphery	Fig 4-1-1 Sche
Formation Thick (m)	Valeonica		Co. Domo200	F, Sierra	de Fiores	F. Atreuco	001	Andesite 200	001	F. Tordillo <sup>2</sup>	F. Auquitco	500	F. Chocay	00'1		Basement		-	Dyke	
49•	UG A	sioce:	1000	UG LÀ	190061 160061 0018 -	Terli OuQ Pliot	UG UG- UA	oiltel Pioce Sooil Sooil			oit Molun	-	1980	×0						

![](_page_11_Figure_0.jpeg)

Fig. 4-2-1 Period of drilling and measuring ground temperature

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![](_page_12_Figure_0.jpeg)

1X

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![](_page_12_Figure_4.jpeg)

![](_page_12_Figure_5.jpeg)

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Bole So. 14

Hole No.1

![](_page_13_Figure_1.jpeg)

Hole No.2

![](_page_13_Figure_3.jpeg)

Fig. 4-2-3 (I) Geological logs (No.1 & No.2)

Hole No.3

![](_page_14_Figure_1.jpeg)

Hole No.4

![](_page_14_Figure_3.jpeg)

Fig. 4-2-3 ( 1) Geological logs (No.3 & No.4)

Hole No.5

![](_page_15_Figure_1.jpeg)

### Hole No.6

	Depta	Geologic colum			Temperature(°C) Geothermal gradient(°C/10m)
0	(•)	Col-	Rock	Descriptions	10 20 30 40 -5 0 5 10
Ű	5	9.9	Soil		
		° • •		Sandy in part	
20	21-	5 J 4 5 5 J 7 5	Scoria tuff	Associated with dacite rubbles Partly welded, altered.	
40	51	Psc		Porous in part.	
60	0	* *		in clayey matrix	
80		* *	-		
100				Increase of sandy to clayey facies	

![](_page_16_Figure_0.jpeg)

![](_page_16_Figure_1.jpeg)

### Hole No. 9

![](_page_16_Figure_3.jpeg)

)

Fig. 4-2-3(N) Geological logs (No.7 & No.9)

![](_page_17_Figure_0.jpeg)

Hole No.10

Hole No.11

![](_page_17_Figure_3.jpeg)

Fig. 4-2-3 ( y ) Geological logs (No.10 & No.11)

Hole No.12

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2

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l	Depth		Ceologic	column	Temperature (°C)					[	Geothermal				
0	(•)	Col- 624	Rock	Descriptions	10	per	20	ле( 30	V) 4		810 -9	i o o	u u	10	
	6.	· · · · ·		Weathered	1			Ĩ							
20	7	^ ^		Associated with reddish lasts.											
	Alter		Altered in part.		-							ļ			
40	- 41 <sub>-</sub>	Pan ^	Andesíte lava	A14		•		-					]		
	53.	^ ^	-	vellovish brown in color									]		
60	_	^ ^ ^		With andecitic clasts		<b>\</b>								<u> </u>	
	75			Loss of drilling fluids											
80		۵		Kodérately porous									0.9	<u> </u>	
	-	▲ Pat ▲	Andesitic valcanic												
100	101	<u>ه</u>	breccia						ļ				<u> [</u>		

## Hole No.14

![](_page_18_Figure_3.jpeg)

Fig. 4-2-3 (N) Geological logs (No.12 & No.14)

![](_page_19_Figure_0.jpeg)

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![](_page_21_Figure_0.jpeg)

Fig.4-2-5 Distribution map of ground temperature at the 100m depth

![](_page_21_Figure_2.jpeg)

![](_page_21_Figure_3.jpeg)

![](_page_22_Figure_0.jpeg)

Fig. 4-2-6 Distribution map of the geothermal gradients

![](_page_22_Figure_2.jpeg)

![](_page_22_Figure_3.jpeg)

![](_page_22_Figure_4.jpeg)

![](_page_23_Figure_0.jpeg)

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Fig.4-2-7 Distribution map of heat flow

![](_page_23_Figure_2.jpeg)

![](_page_23_Figure_3.jpeg)

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			42	<u>8</u>	8	<b>6</b>	8-	8	8-1 8-1	8	Ξ	0,000 Resistivityű	Ê
A9*	Formation	Thema	Lithelogy	°	•		e	_ <u>v</u>	- :	- E		100 BOYONIY(%)	
			Rhyolitte						·	-			
1601) 9261)	vercenter	8 ~~	000110										
1050 1050	Ce. Domo	1.200-	Dacitic tutt breccio				•					- Resistivity (D-	Ê
4	r R. Sierro	ş	Welded full									Porosity (%)	
ceus (eusa (au)	• 0 0 0 0	<b>}</b> ~	Andemiric tuff breadlo Scorio tuff										
oira 200	F. Arreugo	000'	Andenite										
-928 119	9.1	<u>8</u> -	Åndente								1-		T
11191 20219	Pudesite	~ <b>8</b>	Andesitic tuff breccio	 									T
		<u>8</u> ~	Sandstone, Mudstone				    	-					
	F. TOTGILLO	0 4	Tups	J				L 					
۲۹ ÷ ۲۹ کړد	F. Auguiloo	8.8	Sandstone . Limestone		 								Ī
11 — 78142		8	Sandstone, Mudstone (Basait )										T
3699	R. Chooy Mulahue	~	Andesite , Basalt		 ļ								1
3		80.	Pyrociostic rocks										T
			Grenodiorite		X	_							
<u> </u>	Bosement		Metomorphic rocks					•					
			Aplite		 I								
			Andesite dyke		 								
	Dyke		Granodiante porphery		 	1							

Schematic columnar section of resistivity and effective porosity F1g. 4-3-1

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![](_page_26_Figure_0.jpeg)

Fig.4-3-2 (i) Apparent resistivity sections, (Line A, B & C)

![](_page_27_Figure_0.jpeg)

LINE E

![](_page_27_Figure_2.jpeg)

Fig.4-3-2 (ii) Apparent resistivity sections, (Line D & E)

2

![](_page_28_Figure_0.jpeg)

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![](_page_30_Figure_0.jpeg)

Fig.4-3-4 (i) Plan map of apparent resistivity, AB/2:250m

LEGEND Resistivity (B-m) <10 IÒ ~ 25 **7**77 25 ~ 60 50 ~100 100 ~250  $\square$ 250 ~ 500 500 ~1,000 >1,000

![](_page_31_Figure_0.jpeg)

Fig. 4-3-4 (ii) Plan map of apparent resistivity (AB/2=500m)

![](_page_31_Figure_2.jpeg)

![](_page_32_Figure_0.jpeg)

Fig. 4-3-4 (iii) Plan map of apparent resistivity (AB/2=1000m)

![](_page_32_Figure_2.jpeg)

![](_page_33_Figure_0.jpeg)

' Fig.4-3-4 (IV) Plan map of apparent resistivity, AB/2:1,500m

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	<	ю						
$\boxtimes$	10	~	25					
	25	~	60					
$\boxtimes$	\$Ò	~	100					
[[]]	190	~	250					
	250	~	500					

![](_page_34_Figure_0.jpeg)

![](_page_34_Figure_1.jpeg)

Fig.4-3-5 (i) Resistivity sections, (Line A, B & C)

![](_page_34_Figure_3.jpeg)

![](_page_35_Figure_0.jpeg)

![](_page_35_Figure_1.jpeg)

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ಃ 25,000 ಕ್<u>ಕ್ರಿಯಾ</u>

Fig.4-3-5 (ii) Resistivity sections, (Line D & E)

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![](_page_36_Figure_0.jpeg)

Fig.4-3-6 Structural map of the resistivity basements

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	Oeptà (	(m)
	< 20	0
	200 ~	400
	400 ~	600
	600 m	· 800
	> 8	90
	Foult	cieor
<u>. 0 Å</u> .	Foult	toir

![](_page_37_Figure_0.jpeg)

![](_page_37_Figure_1.jpeg)

![](_page_37_Figure_2.jpeg)

![](_page_38_Figure_0.jpeg)

![](_page_38_Figure_1.jpeg)

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Fig. 4-4-2(1) Seismic interpretation depth sections (Line A, B & C)

![](_page_38_Figure_3.jpeg)