

STRATIGRAPHY, GEOCHEMISTRY AND PETROGRAPHY OF VOLCANIC ROCKS  
IN THE CHATREE GOLD MINE, CHANGWAT PICHIT



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A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Science Program in Geology

Department of Geology

Faculty of Science

Chulalongkorn University

Academic Year 2008

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ลำดับชั้นหิน ธรณีเคมีและศิลาวรรณของหินภูเขาไฟ  
ในเมืองทองธานี จังหวัดพิจิตร

นายทวีวัฒน์ นาคไชยะ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

สาขาวิชาธรณีวิทยา ภาควิชาธรณีวิทยา

คณะวิทยาศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2551

ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

510939

Thesis Title STRATIGRAPHY, GEOCHEMISTRY AND PETROGRAPHY OF  
VOLCANIC ROCKS IN THE CHATREE GOLD MINE,  
CHANGWAT PICHIT

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Field of Study Geology

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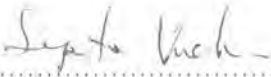
Accepted by the Faculty of Science, Chulalongkorn University in Partial  
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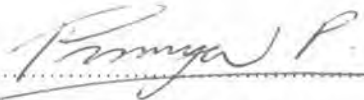
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 ในเหมืองทองคำชาติรี จังหวัดพิจิตร (STRATIGRAPHY, GEOCHEMISTRY AND  
 PETROGRAPHY OF VOLCANIC ROCKS IN THE CHATREE GOLD MINE,  
 CHANGWAT PICHIT ) อ.ที่ปรึกษาวิทยานิพนธ์หลัก : รศ.ดร.ปัญญา จารุศิริ,  
 อ.ที่ปรึกษาวิทยานิพนธ์ร่วม : น.ส. สุพัตรา วุฒิชชาติวานิช, 145 หน้า.

เหมืองทองคำชาติรีในจังหวัดพิจิตรทางภาคกลางตอนเหนือของประเทศไทยวางตัวอยู่ในแนวภูเขาไฟ  
 เลเย-เพชรบูรณ์-นครนายกในยุคเพอร์โม-ไทรแอสสิก ทางตอนเหนือของเหมืองทองคำชาติรี ได้เก็บตัวอย่างหิน  
 ภูเขาไฟอายุเพอร์โม-ไทรแอสสิก ซึ่งจัดทำโดยกรมทรัพยากรธรณี พื้นที่ศึกษาอยู่ในบ่อ C-H ในเหมืองทองคำชาติรี  
 ตัวอย่างหิน 44 ตัวอย่าง ได้ถูกนำมาจำแนกทางศิลาวรรณาและวิเคราะห์ทางธรณีเคมีเพื่อทำการลำดับชั้นหิน  
 หินภูเขาไฟบริเวณนี้สามารถจำแนกได้เป็น 2 หน่วยหินหลัก ได้แก่ หน่วยหินcoherent และหน่วยหินnon-  
 coherent

จากการศึกษาทางศิลาวรรณาและในภาคสนามพบว่าหน่วยหิน coherent มีความหนาอย่างน้อย 80  
 เมตร ประกอบด้วยหินแอนดีไซต์และหินบะซอลติกแอนดีไซต์เป็นส่วนใหญ่ มีแร่แพลจิโอเคลสและฮอร์นเบลนด์  
 เป็นองค์ประกอบหลักและประกอบด้วยเนื้อหินที่เป็นเนื้อดอกและเนื้อเศษหิน การเปลี่ยนแปลงสภาพของหินแสดงโดย  
 การปรากฏของแร่ควอร์ต ไฟโรต์ คลอไรท์และอีพิโดท หน่วยหิน non-coherentมีความหนาเฉลี่ยประมาณ 80  
 เมตร และจำแนกได้เป็นหินกรวดเหลี่ยม monomictic, polymictic และ fiamme โดยที่หินกรวดเหลี่ยม  
 monomictic มีความหนาประมาณ 20 เมตร และแสดงลักษณะเฉพาะคือประกอบด้วยเศษหินภูเขาไฟเพียง  
 ชนิดเดียว ในขณะที่หินกรวดเหลี่ยมpolymictic หนาประมาณ 30 เมตร และประกอบด้วยเศษหินภูเขาไฟ  
 มากกว่า 2 ชนิด และหินกรวดเหลี่ยม fiamme มีความหนาประมาณ 30 เมตร และแสดงลักษณะการยึดตัวของ  
 แร่คลอไรท์และ แก้วภูเขาไฟที่ยึดตัวเป็นรูปเลนส์และผลึกดอกของแร่แพลจิโอเคลส หินทั้ง 2 หน่วยหินแสดงการ  
 เปลี่ยนสภาพจากน้ำแร่ร้อนสูงที่สัมพันธ์กับการเกิดแหล่งแร่ทองและเงิน

หินที่คัดสรรจำนวน 19 ตัวอย่างได้ถูกเลือกเพื่อวิเคราะห์เคมี โดยพิจารณาจากหินที่มีการเปลี่ยนแปลงและ  
 ผุพังน้อยที่สุด เพื่อวิเคราะห์หาปริมาณธาตุหลักและธาตุรองโดยใช้วิธี XRF และ ICP-OES มี 3 ตัวอย่างได้ถูก  
 เลือกเพื่อวิเคราะห์หาธาตุหายากโดยวิธี ICP-MS ในไดอะแกรมแบ่งแยกหินด้วยธาตุรองและธาตุพบน้อย  
 ตลอดจนรูปแบบธาตุหายาก แสดงว่าหินภูเขาไฟที่เหมืองชาติรีจัดเป็นหินแคล-อัลคาไลภูเขาไฟเป็นชั้นที่เกิดใน  
 แนวมุดตัวซับซ้อนในสภาพแนวโค้งภูเขาไฟในยุคเพอร์โม-ไทรแอสสิก

ภาควิชา ธรณีวิทยา.....

สาขาวิชา ธรณีวิทยา.....

ปีการศึกษา 2551.....

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ลายมือชื่ออ.ที่ปรึกษาวิทยานิพนธ์ร่วม.....

##4872296123 : MAJOR GEOLOGY

KEYWORDS : COHERENT/ NON-COHERENT/ VOLCANIC ARC/CALC-ALKALINE

TAWEEWATH NAKCHAIYA : STRATIGRAPHY, GEOCHEMISTRY AND PETROGRAPHY OF VOLCANIC ROCKS IN THE CHATREE GOLD IN THE CHATREE GOLD MINE, CHANGWAT PICHIT. ADVISOR: ASSOC. PUNYA CHARUSIRI, Ph.D. CO-ADVISOR: SUPATRA VUDICHATIVANICH, 145 pp.

Chatree gold mine in Phichit Province, north-central Thailand, situated within the Loei-Phetchabun-Nakhon Nayok volcanic belt. In the northern part of the Chatree gold mine, the Permo-Triassic volcanic rocks mapped by Department of Mineral Resources were collected from the C-H pit. Forty-four samples were petrographically classified and geochemically analyzed to remap for their stratigraphy. Two types of volcanic rocks are recognized, coherent and non-coherent units in which the former is older on the basis of stratigraphic succession. Several lines of evidence suggest that the studied volcanic rocks occurred nearby the volcanic edifices and were dominated by debris flows of submarine environment.

Based on petrographic and field investigations, the coherent unit has the minimum thickness of about 80 m and is composed mainly of andesite and basaltic andesite. Both rocks contain largely plagioclase and hornblende, as major constituents, and have principally porphyritic and microlithic textures. Alterations are indicated by the presence of quartz, pyrite, chlorite and epidote. The non-coherent rocks have the average thickness of about 80 m and are classified into monomictic, polymictic, and fiamme breccias. Monomictic breccia (20 m-thick) is characterized by the only one kind of volcanic fragments whereas more than two kinds of fragments characterize polymictic breccia (30 m-thick). Fiamme breccia (30 m-thick) is represented by the presence of stretched chlorite, lenticular glassy material and plagioclase phenocrysts. Both of the coherent and monomictic units show strong hydrothermal alteration with associated Au-Ag mineralization.

Geochemically, nineteen samples of the least altered and least weathered volcanic rocks were analyzed for major, minor, and trace elements by using XRF and ICP OES methods. Of these, three rock samples were analyzed for rare-earth element (REE) concentrations by using ICP MS method. Discrimination diagrams of minor and trace elements and REE pattern reveal that the volcanic rocks at Chatree mine are regarded as calc-alkaline strato-volcano occurring in the subduction zone complex of volcanic arc setting during Permo-Triassic Period.

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## ACKNOWLEDGMENTS

This research was granted by Chulalongkorn University. The author would like to give sincere to his research advisor, Assistant Professor Dr. Punya Charusiri, and Co-advisor, Miss Supatra Vudhichativanich and Department of Mineral Resources for supporting this thesis in geological data, maps and instruments on researching. Almost all of the geologists of Bureau of Mineral Resources who assisted and supported this thesis.

Cordially appreciation is given to Professor Tashio Mitzuta, Professor Daizo Ishiyama, Professor Isao Takashima, Akita University, Japan for their kind helps and constructive suggestion in XRF, ICP-OES, ICP-MS and Isotope analysis.

## CONTENTS

	Page
Abstract (Thai) .....	IV
Abstract (English) .....	V
Acknowledgments .....	VI
Contents .....	VII
List of Tables .....	IX
List of Figures .....	X
Scope of work .....	XVII
 CHAPTER	
I Introduction .....	1
1.1 General statement .....	1
1.2 Location and accessibility .....	2
1.3 Objective .....	2
1.4 Previous works .....	2
II Geology .....	9
2.1 Regional Geology .....	9
2.2 Geology of the Chatree gold mine .....	12
2.3 Detailed Geology .....	14
III Volcanic Stratigraphy OF C-H PITS .....	23
3.1 Subdivision and Criteria .....	23
3.2 Detailed stratigraphical units .....	26
3.3 Altheration and Minerlization .....	52
IV Petrography .....	58
4.1 Classification .....	58
4.2 Coherent units .....	58
4.3 Non-Coherent units .....	62

CHAPTER	Page
V	Geochemistry ..... 76
	5.1 Whole-rock chemical analysis ..... 76
	5.2 Isotope geochemistry ..... 95
VI	Discussion ..... 99
	6.1 Volcanic Vent, Unit Association, and Depositional Setting ..... 99
	6.2 Alteration, Mineralization and Ages ..... 101
	6.3 Tectonic setting ..... 102
REFERENCES	..... 108
APPENDICES	..... 114
APPENDIX A ( Isotope sample)	..... 115
APPENDIX B ( ICP-OES caribation)	..... 119
APPENDIX C ( Abstract in GRACE)	..... 123
APPENDIX D ( Figure photomicrograph)	..... 135
BIOGRAPHY	..... 145



## LIST OF TABLES

Table	Page
4.1 (A) Descriptive names used for subdivision of coherent lava (after McPhie et al. 1993).....	59
4.1 (B) Descriptive names used for subdivision of volcanic clastic (after McPhie et al,1993).....	60
5.1 Major-oxide contents of the Chatree volcanic rocks determined using XRF method.....	80
5.2 Trace and selected REE concentrations of the Chatree volcanic rocks determined using ICP OES method.....	81
5.3 Trace and REE concentrations of the Chatree volcanic rocks determined using ICP MS method.....	82
5.4 Result of C- and O- isotope analyses for the C-H pit, Chatree gold mine, Phichit.....	97

## LIST OF FIGURES

Figure	Page
1.1 Index map of northern half of Thailand showing volcanic belts, their distribution, and Note that the sutures and faults are also shown (modified from Jungyusuk and Khositanont, 1992, Charusiri et al., 2006).....	5
1.2 Topographic map showing location of the study area in the Chatree gold mine, Phichit province. Note that the mine pits are surrounded by fly plain.....	6
1.3 Orthographic Ikonos aerial photograph showing location of major open pit (C and H) of Chatree gold mine , Phichit province. Note that the mine pits are surrounded flat alluvial fly plain.....	7
1.4 Flow chart showing the methodology used in this thesis work.....	8
2.1 Geology of the Chatree gold mine and its surrounding region based on the 1:250,000 DMR geological map of by Chonglakmani and Satayarak (1979).....	17
2.2 Geologic map of C-H pit in the Chatree gold mine, Phichit Province, central Thailand (modified after Nakchaiya et al, 2008).....	19
2.3 (A) Cross section NE-SW trend.....	21
2.3 (B) Cross section E-W.....	22
3.1 (A) Rock slab (a) photomicrograph (b) of porphyritic dacite that represent coherent facies from McPhie et al. (1993).....	30
3.1 (B) Rock slab (a) photomicrograph (b) of porphyritic andesite showing hornblende (H) and plagioclase (P) phenocryst are euhedral and unbroken that represent coherent facies from McPhie et al. (1993).....	31
3.2 (A) Rock slab (a) photomicrograph (b) of non-coherent facies that represent polymictic and monomictic breccia unit from McPhie et al.(1993) ..	32
3.2 (B) Smooth rock slab (a) photomicrograph (b) of non-coherent facies that represent fiamme breccia unit. The lenticules are glassy wisps (P) and quartz (Q) from McPhie et al. (1993).....	33

Figure	Page
3.3 Stratigraphy of the C-Pit, Chatree gold mine, Phichit, central Thailand, from geological survey and drill hole data.....	34
3.4 Stratigraphy of the H-Pit, Chatree gold mine, Phichit, Central Thailand from geological survey and drill hole data.....	35
3.5 Volcanic stratigraphy corelation of the C-H Pit, Chatree gold mine, Phichit, central Thailand, fromgeological survey and drill hole data.....	36
3.6 Coherent volcanic unit in the C pit, Chatree gold mine, Phichit, showing (A) location of the unit in the stratigraphic sequence, (B) nature of exposure , view looking southwest, and (C) a close-up view of andesite.....	37
3.7 Polymictic breccia unit in the C pit, Chtree gold mine, Phichit, showing (A) location of the unit in the stratigraphic sequence, (B) exposure of polymictic breccia, view looking northeast, and (C) a close-up view of polymictic breccia with various sizes and vari-colors of volcanic fragments (arrowed).....	38
3.8 Fiamme breccia unit of the C pit showing (A) location of the unit in the stratigraphic sequence (B), exposure of fiamme Volcanic, view looking NS (200°) and (C) a close-up view of breccia, showing tenticular glasseous fragment....	39
3.9 Coherent volcanic unit in the H pit, Chatree gold mine, Phichit, showing (A) location of the unit in the stratigraphic sequence, (B) nature of exposure with splitting joints dipping to the west. and (C) a close-up view of andesite.....	40
3.10 Monomictic breccia unit in the H pit, Chatree gold mine, Phichit, showing (A) location of the unit in the stratigraphic sequence, (B) showing exposure and contact between monomictic breccia (bottom) and polymictic breccia(top), view looking south, and (C) a close-up view of monomictic breccia with various sizes of dark-colored fragments (arrowed).....	41
3.11 Polymictic breccia unit in the H pit, Chtree gold mine, Phichit, showing (A) location of the unit in the stratigraphic sequence, (B) exposure of polymictic breccia, view looking southeast, and (C) a rock slab of polymictic breccia with various sizes of vari-colored volcanic fragments (arrowed).....	42

Figure	Page	
3.12	Epicylastic unit in the H pit, Chtree gold mine, Phichit, showing (A) location of the unit in the stratigraphic sequence, (B) exposure of epicylastic unit showing the 10 m thick epicylastic unit, lying between the fiamme unit (top) and polymictic unit (bottom), and (C) hand-speciment of fine-grained clastic rock with thin film of gold-barren calcite vein.....	43
3.13	Fiamme breccia unit of the H pit showing (A) location of the unit in the stratigraphic sequence (B), exposure of fiamme volcanic view looking SE (150 <sup>o</sup> )and (C) a rock slab of fiamme breccia.....	44
3.14	Chill margin crowd, occurring at coherent, in the H pit, Chatree gold mine, Phichit Province.....	45
3.15	Flow structure observed in the coherent unit in the H pit, Chatree gold mine, Phichit Province.....	46
3.16	(A) Mafic dike rocks (1 m thick) with almost vertical dip direction cross cutting the polymictic breccia unit, in the H pit, Chatree mine, Phichit, (view looking east).(B) Handspecimen of dike rock in H pit showing amphibole phenocrysts.....	49
3.17	Chill margin crowd, occurring at coherent, in the H pit, Chatree gold mine, Phichit Province.....	50
3.18	Flow structure observed in the coherent unit in the H pit, Chatree gold mine, Phichit Province.....	51
3.19	Simplified geologic map of the C-H pit showing simplified geology and mineralization styles (Salam et al., 2006).....	56
3.20	Northwest-southeast geologic cross section of the C-H pits showing the relationship between mineralization and host rocks, Chatree gold mine, Phichit Province (modified after Salam ,2006). : Note that mineralization zone is to some extent concentrated in the monomictic breccia unit.....	57
4.1	Slab of andesite (sample no. A-1) at the Chatree gold mine, Phichit.....	63

Figure	Page
4.2 Photomicrograph of andesite (sample no. A-1) showing relict prismatic hornblende replaced by chlorite and quartz. Microlite and devitrified glass served as essential groundmass (XPL). The long axis of photo is about 3 mm.....	63
4.3 Slab of porphyritic andesine (sample no. AP-8) showing abundant stubby feldspar phenocrysts with faint foliation at the Chatree gold mine, Phichit.....	64
4.4 Photomicrograph of porphyritic andesite (sample no. AP-8) showing relict hornblende phenocryst partly replaced by chlorite and plagioclase phenocryst replaced by clay and micaceous minerals (XPL). The long axis of photo is about 3 mm.....	64
4.5 Slab of mononictic andesitic breccia (sample no.MMAB-1)showing only one type of dark-colored volcanic fragment at the Chatree gold min, Phichit. Note that the breccia rock was cross cut by calcite vein.....	65
4.6 Photomicrograph of monomictic andesitic breccia (sample MMAB-1) showing similar type of mafic volcanic fragment (XPL). The long axis of photo is about 3 mm.....	65
4.7 Photomicrograph of monomictic andesitic breccia (sample MMAB-1) showing hornblende phenocryst with relict texture (Hb). Note that chlorite almost entirely replace hornblende (XPL). The long axis of photo is about 3 mm.....	66
4.8 Slab of polymictic rhyolitic breccia (sample no PMRB-2) showing various sizes and kinds of volcanic fragments at the Chatree gold mine, Phichit.....	67
4.9 Photomicrographs of polymictic volcanic breccia showing different kinds and sizes of volcanic fragments; (A) showing large subhedral laths of altered plagioclase (Pl) and rather felsic fragment (C); (B) showing similar felsic fragment (C) and the fragment with altered plagioclase (Pl) on the left (XPL).The long axis of photo is about 3 mm.....	70

Figure	Page
4.10 Slab of polymictic andesitic breccia (sample no PMAB-7) at the Chatree gold mine, showing various kinds and sizes of volcanic fragment set in the groundmass of more felsic composition.....	71
4.11 Photomicrograph of polymictic andesite breccia (sample no PMAB-7) showing different kinds of rock fragments, A= mafic fragment with slight foliation and B = felsic volcanic fragment (XPL).....	71
4.12 Slab of green fiamme breccia (sample no FBG-9.) at the Chatree gold mine, Phichit, showing graded bedding and some alteration texture (green-colored mineral).....	72
4.13 Photomicrograph of fiamme breccia (sample no FBG-9), showing felsic volcanic fragment (F) and stretched lenticular volcanic glass (gl), Chatree gold mine, Phichit (XPL). The long axis of photo is about 3 mm.....	72
4.14 Slab of red fiamme breccia (sample no.FBR1) at the Chatree gold mine. Phichit, showing slight graded bedding. Note that the rock consists more mafic groundmass and more felsic volcanic fragments.....	75
4.15 Photomicrograph of red fiamme breccia (sample no.FBR-1) showing stretched chlorite (Cl) conginally volcanic glasscous material, felsic volcanic fragment (F) and mafic volcanic fragment (M) hight Fe-Mg groundmass (XPL). The long axis of photo is about 3 mm.....	75
5.1 Harker diagrams of major oxide and trace elements versus Zr for volcanic rock at the Chatree gold mine, Phichit.....	83
5.2 Harker diagrams of major oxide and trace elements versus MgO for volcanic rocks at the Chatree gold mine, Phichit.....	84
5.3 Harker diagrams of major oxide and trace elements versus TiO <sub>2</sub> for volcanic rocks at the Chatree gold mine, Phichit.....	85
5.4 Harker diagrams of major oxide and trace elements versus SiO <sub>2</sub> for volcanic rocks at the Chatree gold mine, Phichit.....	86



Figure	Page
5.5	SiO <sub>2</sub> -Na <sub>2</sub> O+K <sub>2</sub> O plot indicates that Chatree volcanic rocks are in subalkaline (fields after Irvine and Baragar, 1971)..... 87
5.6	FeO-Alk-MgO variation triangular diagram showing data of the Chatree volcanic rocks plotted in mainly calc-alkaline. Diagram from Irvine and Baragar (1971)..... 87
5.7	Plots of Zr/TiO <sub>2</sub> versus SiO <sub>2</sub> for the Chatree volcanic rocks are very dispersed varying from subalkaline basalt to dacite fields based on the diagram of Winchester and Floyd (1977)..... 88
5.8	Plots of Nb/Y versus Zr/TiO <sub>2</sub> for the Chatree volcanic rocks are mainly limited to subalkaline basalt and alkaline basalt based on the diagram of Winchester and Floyd (1977)..... 88
5.9	TiO <sub>2</sub> -K <sub>2</sub> O-P <sub>2</sub> O <sub>5</sub> variation triangular diagram (Pearce et al., 1975) showing data of the Chatree volcanic rocks plotted in the field of continental..... 89
5.10	Plots of Y versus Cr for the Chatree volcanic rocks in the field of volcanic arc basalt based on the diagram of Pearce (1982)..... 91
5.11	Ce/Sr versus Cr plot indicates the volcanic rocks are in the arc field. (diagram based on Pearce, 1982)..... 91
5.12	Plots of Zr versus Zr/Y for the Chatree volcanic rocks are mostly in volcanic arc basalt fields based on the diagram of Pearce and Norry (1979)..... 92
5.13	Th-Ta-Hf/3 variation triangular diagram showing data of the Chatree volcanic rocks plotted in the field of volcanic-arc basalts. (diagram from Wood, 1980)..... 92
5.14	2Nb-Zr/4-Y variation triangular diagram showing data of the Chatree volcanic rocks plotted in the field of volcanic-arc basalts. Diagram from Meschede, 1986..... 93
5.15	Ti/1000 -V plot indicates the Chatree volcanic rocks are in the arc field. (Diagram from Shervais, 1982)..... 93
5.16	Ta/Yb -K <sub>2</sub> O/Yb plot indicates the Chatree volcanic rocks are in the volcanic arc and calc alkaline fields. (Diagram from Pearce, 1982)..... 94

Figure	Page
5.17 Chondrite-normalized REE patterns for the volcanic rocks from 3 samples of the Chatree gold mine in comparison with Mayon and Taal volcanic rocks which is the field of subduction.....	95
5.18 $\delta^{18}\text{O}$ vs $\delta^{13}\text{C}$ plot showing the C-H pit calcite vein in volcanic host are located in the field of carbonate. and possibly mixing origin (diagram from Rollingson, 1983).....	98
6.1 Schematic diagram of composite – cone volcano with (1) silicified volcanic breccia and lava, fragmenting andesite and basalt flows and (2) debris (slurry) flows down slope, Chatree gold mine, (modified from Cumming et al., 2006).....	104
6.2 (A) Schematic model for the volcanic activity events and mineralization of the C-H pit in the Chatree gold mine (modified from Cumming et al., 2006).....	105
6.2 (B) Block diagram showing order of events for the Chatree volcanism in the Paleotethys submarine environment.....	105
6.3 Tectonic setting at Chatree gold mine.....	106



## Scope of work

This work is based on the results of detail field, petrographic and geochemical investigations for indentifying the stratigraphy, preliminary, ore genesis and tectonic setting. The structure analysis is not included in the scope of study. Age datings were taken from literatures and formed part of interpretation on tectonic history. Part of ore forming process is done bared upon the result of preliminary isotope analysis and does not include fluid inclusion study. Alteration of rocks is based mainly on the results of petrography and geochemical data.