

สภาพการแปรสัณฐานของพื้นที่คิตากามิตอนใต้ ประเทศญี่ปุ่น นิพนธ์จากชั้นตะกอน  
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TECTONIC SETTINGS OF THE SOUTHERN KITAKAMI AREA, JAPAN,  
DEDUCED FROM DETRITAL CHROMIAN SPINELS OF  
MIDDLE TO UPPER PALEOZOIC BEDS

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

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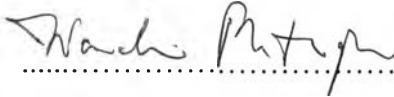
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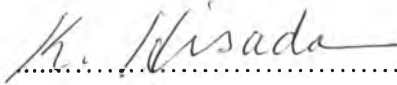
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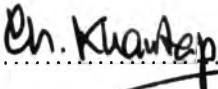
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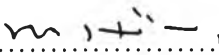
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ชิตกร บรรยงค์กุล: สภาพการแปรสัณฐานของพื้นที่ตาดากามิตอนใต้ ประเทศญี่ปุ่น นිරนัยจากชั้น  
ตะกอนโครเมียนสปีเนลของชั้นหินมหายุคพาลีโอโซอิกตอนกลางถึงปลาย, อ. ที่ปรึกษา: ผศ. ดร.  
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พื้นที่ตาดากามิตอนใต้ ประเทศญี่ปุ่น ประกอบด้วยหินในกลุ่มลักษณะปรากฏตะกอนชายฝั่ง (shelf-facies) ตั้งแต่ยุคไซลูเรียนจนถึงครีเทเชียส ซึ่งส่วนใหญ่ประกอบด้วยหินตะกอน และมีหินอัคนีและหินแปรบ้าง บางส่วน ตัวอย่างหินตะกอนเนื้อผสมจำนวน 79 ตัวอย่างจากยุคดีโวเนียนจนถึงครีเทเชียส และหินบะซอลต์และแอนดีไซต์จำนวน 4 ตัวอย่างจากยุคคาร์บอนิเฟอรัสได้ถูกนำมาทำการศึกษาทางด้านศิลาวรรณาซึ่งพบว่า หินทรายชนิดลิทารีไนต์ ลิทารีไนต์มีเฟลด์สปาร์ และอาร์โคสชนิดลิกทิกเป็นหินทรายหลักในยุคดีโวเนียนและคาร์บอนิเฟอรัส ขณะที่หินอาร์โคสเป็นหินทรายหลักในยุคเปอร์เมียนจนถึงครีเทเชียส การวิเคราะห์ทางด้านปริมาณแร่ของตัวอย่างหินทรายจำนวน 35 ตัวอย่างชี้บ่งว่า แหล่งกำเนิดของหินทรายยุคดีโวเนียนและคาร์บอนิเฟอรัสคือแนวโค้งภูเขาไฟ ส่วนแหล่งกำเนิดของหินทรายยุคเปอร์เมียนถึงครีเทเชียสคือพวกฐานหินที่มีการยกตัว องค์ประกอบออกไซด์หลักของตัวอย่างหินทรายจำนวน 12 ตัวอย่างจากยุคดีโวเนียน เปอร์เมียน ไทรแอสซิก และจูแรสซิกแสดงให้เห็นว่า หินทรายเหล่านี้ได้รับตะกอนซึ่งถูกพัดพามาจากหินอัคนีชนิดเฟลซิกและอินเตอร์มีเดียที่แตกหลุดมาจากแหล่งกำเนิดที่เป็นเกาะโค้ง ชั้นตะกอนโครเมียนสปีเนลหลายขนาดถูกค้นพบในหินทรายและหินทรายแป้งยุคดีโวเนียน คาร์บอนิเฟอรัส และไทรแอสซิก ศิลาวรรณาและธรณีเคมีของชั้นตะกอนโครเมียนสปีเนลเหล่านี้ ยกเว้นพวกที่มาจากหินทรายยุคไทรแอสซิกซึ่งยังไม่ได้วิเคราะห์องค์ประกอบทางเคมีโดยวิธี EPMA บ่งชี้ว่าพวกมันถูกพัดพามาจากหินบะซอลต์และเพอริโดไทต์ซึ่งเกิดที่บริเวณส่วนหน้าของเกาะโค้ง นอกจากนี้โครเมียนสปีเนลยังถูกพบในหินบะซอลต์ยุคคาร์บอนิเฟอรัสอีกด้วยซึ่งศิลาวรรณาและธรณีเคมีของโครเมียนสปีเนลนี้ก็ยืนยันสภาพการแปรสัณฐานของพวกมันเป็นเกาะโค้งหรือส่วนหน้าของเกาะโค้ง

ผลของการศึกษาทั้งหมดประกอบกับผลการศึกษาในอดีตนำมาสู่บทสรุปที่ว่า พื้นที่ตาดากามิตอนใต้ถูกเชื่อว่าเป็นส่วนหนึ่งของจุลทวีปแยงซี (Yangtze microcontinent) ที่อยู่ทางตะวันออกของผืนแผ่นดินคอนดัวนา และมีสภาพการแปรสัณฐานแบบแตกเป็นร่อง (rifting) และเคลื่อนตัว (drifting) บริเวณส่วนหน้าของเกาะโค้ง โดยมีการมุดตัวหลายครั้งเป็นลักษณะเด่น อย่างน้อยตั้งแต่ยุคไซลูเรียนจนอาจจะถึงยุคไทรแอสซิก

ภาควิชา ..... ธรณีวิทยา ..... ลายมือชื่อนิสิต ..... ชิตกร บรรยงค์กุล.  
สาขาวิชา ..... ธรณีวิทยา ..... ลายมือชื่ออาจารย์ที่ปรึกษา .....  
ปีการศึกษา ..... 2542 ..... ลายมือชื่ออาจารย์ที่ปรึกษาร่วม ..... K. Nisada

THITIKORN BUNYONGKUL: TECTONIC SETTINGS OF THE SOUTHERN KITAKAMI AREA, JAPAN, DEDUCED FROM DETRITAL CHROMIAN SPINELS OF MIDDLE TO UPPER PALEOZOIC BEDS. THESIS ADVISOR: ASSIST. PROF. PUNYA CHARUSIRI, Ph.D. THESIS CO-ADVISOR: ASSOC. PROF. KEN-ICHIRO HISADA, Ph.D. 180 pp. ISBN 947-333-389-4

Southern Kitakami area, Japan, is occupied mainly by shelf-facies of Silurian to Cretaceous sedimentary rocks, with some igneous and metamorphic rocks. 79 samples of Devonian to Cretaceous clastic rocks, with 4 samples of Carboniferous basalts and andesites were collected for petrographic investigation. Litharenite, feldspathic litharenite, and lithic arkose are the dominant sandstones of Devonian and Carboniferous while arkose is the major type in Permian to Cretaceous. Modal analysis of 35 sandstone samples indicate undissected and transitional magmatic arcs as the provenances of Devonian and Carboniferous sandstones, and these provenances were later on changed to be basement uplift supplying sediments for Permian to probably Jurassic sandstones. Major oxide contents of 12 sandstone samples from Devonian, Permian, Triassic, and Jurassic show that the provenances of these sandstones are felsic to intermediate igneous rocks of oceanic island arc region. Detrital chromian spinels are discovered from Devonian, Carboniferous, and Triassic sandstones and siltstones. Except for the detrital chromian spinels from Triassic sandstone which have not been analysed by EPMA yet, petrography and geochemistry of these detrital minerals indicate that they were derived from both basalt and peridotite occurring in the fore-arc region. Additionally, chromian spinels are also discovered from Carboniferous basalt which their petrography and geochemistry also confirm the island arc (fore-arc) as their tectonic setting.

All results of this study together with previous investigations lead to the conclusion that the Southern Kitakami area is inferred as part of Yangtze, eastern Gondwanaland, originating with rifting and drifting tectonic settings in the fore-arc region dominated by multiple subduction since at least Silurian to probably Triassic.

ภาควิชา ..... ธรณีวิทยา ..... ลายมือชื่อนิติด ..... *ชิตกร บุญงักกุล*  
สาขาวิชา ..... ธรณีวิทยา ..... ลายมือชื่ออาจารย์ที่ปรึกษา ..... *พญ. ชญน*  
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