ON THE GEOLOGICAL AGES OF PRE-CAMBRIAN CRANITES IN SOUTH MANCHURIA

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Geological Introduction

This paper has been written as a part of the Pre-Cambrian Stratigraphy of South Manchuria studied during a systematical surveying to Manchuria in 1933-1946. It is very important to make clear the ages of the granite intrusions, because the granite is a criteria of the correlation to the Pre-Cambrian Groups. The auther is intended to find the sequence of the Pre-Cambrian of South Manchuria based on thh stratigraphical positions of the granites.

1. Relation to Granites.

In 1933 I[1] reported that in Anshan and Penhsi Iron Mine, South Manchuria, Kungchangling Granite is overlain unconcormably by Chaoyutai Quartzite, the basal part of Hsiho Series belonging to Sinian System. Later in 1934 I[2] found Tuimienshan Granite unconformalby covered by Anshan Series. The Anshan Series are intruded by KungchangIing Granite and overlain unconformably by Chaoyutai Quartzite.

In 1940-1943 I have been surveyed Tieling Prefecture and divided the Pre-Cambrian into the following series, couching from the upper they are;

(1) R. SAITO: Bull. Geol. Inst. Manchuria Vol. 93, 1933.
(2) R. SAITO: Bull. Geol. Inst. Manchuria Vol. 97, 1939.

Huishihtun Series	quartzite, slate, limestne	750—1000m
	Clinouncouformity	
Tieling Series	dolomite, slate, quartzite	1200—1400m
Chaoho, Series	quartzite, dolomite, slate	1800—2000m
Sanchiatzu Series	dolomite, slate	2200—2500m
	Clinounconformity	
Hsianglushan Granite		
Huishan Series	dolomite, quartzite slate in alt.	2300—2500m
	Clinounconformity	
Siaolikuo Granite		
Chungkuangtun Series	dolomite	500— 700m
	Clinounconformity	
Tuimienshan Granite		

There are three different ages of Pre-Cambrian Granite in Tieling Prefecture as above described. Of these granites, the younger two ones, Hsianglushan Granite and Siaolikuo Granite, are very similar petrographically to Kungchangling Granite and the older one to Tuimienshan Granite.

In Manchuria there are known to occur three times of granite intrusions in Pre-Cambrian Era.

2. Character of Granites.

The microscopic observation of Pre-Cambrian Granites are worked by G. Asano Geological Institute of Manchuria.

Tuimienshan Granite is cataclastic and leucoclatic rock and composed of quartz, albite and few amount of microcline (4—5%) Accessory minerals in rock are apatite, and sphene. The Granite belong to Leuco-Sodaclate Tonalite or Leuco-Tonalite to adapt Iohansen's classification. The Kungchangling Granite also cataclastic and composed of quartz, plagioclase (albite-oligoclase) miclocline (20—25%) and few micas. These two types of granite are easily distinguished from each other by the amount of the microcline. It is very interesting in correlation of granites by means of microcline contents. Such a method

already been tried by T. TOMITA[1] on Pre-Cambrian Granites of North China.

3. Age of Granites

In 1943 J. TAKUBO and T. MINATO have published the chemical analysis of the ferrugusonite from Peikuo, Haicheng prefecture. It was known to occur by H. KUNO and me that the mineral they treated may be extracted from the pegmatite accompaning to the Kungchangling Granite. According to TAKUBO and MINATO[2] the chemical analysis of the ferrugusonite is as follows;

SiO_2	0.17	Ce_2O_3	0.39
ThO_2	1.87	Ce rare earth	0.00
SnO_2	0.22	Y rare earth	35.30
Ta_2O_5	47.00	Al_2O_3	0.00
Na_2O_5		TiO_2	1.46
CaO	1.74	U_3O_8	7.26
MgO	0.09	H_2O (−)	0.35
PbO	0.77	H_2O (−)	2.16
MnO	0.05	TOTAL	100.06
Fe_2O_3	1.07		

They calculated the years of the mineral appling the B. W. LAWSON's formula. The mineral represents 770×10^6 of years. The years calculated above also indicate that Kungchangling granite and its pegmatite, belonging to the proterozoic in ages. Recently J. YOSHIMURA and HENMI found the same results analising the uranium minerals from the pegmatite near Haicheng.

4. Tentative Correlation of Granitse of South Manchuria, China and Korea.

According to T. TOMITA Pre-Cambrian granites of North China divided into three granites, Taoke granite, Taishan granite and Oldest Greissose Rock. S. MATSUSHITA[3] tried to apply Tomitas result to the classification of Pre-Cambrian granites of Manchuria and Korea.

(1) T. TOMITA : Jour. Geogr. (Tokyo), LIV. 1942, LV. 1943.
(2) J. TAKUBO & T. MINATO : Sci. Report of Kyoto Univ. Vol. 2, 1943.
(3) S. MATSUSHITA : Men. Coll. Sci., Univ. Kyoto, Ser. B, Vol. XIX, No. I, 1947.

It seems to me that the Taishan Granite petrographically and stratigraphically correspond to Kungchangling Granite, and Tuimienshan Granite to Oldest Gnesissose Rock. The Taoke Granite petrographically similar to the Tuimienshan Granite. The Taoke Granite petrographically similar to the Tuimienshan Granite, but different stratigraphically from the latter. The Taoke- and the Taishan Granite may by correspond stratigraphically to the Hsianglushan- and the Siaolikuo Granite respectively.

I propose the tentative correlation table of the Pre-Cambrian in Asia as shown the Table.

age		South Manchuria	North China	Korea
Infra Camb.		Nanshan Ser.	Talinshu Ser.	Kuken Ser.
Proterozoic	upper	Fuchou syst.: Wuhsingshan Ser. / Hsiho Ser.	Sinian syst.: Chaopehu Ser. / Singliangshan Ser.	Shidogu Ser. / Chokken Ser.
		Hsianglushan Gr.	Taoke Gr.	Seikoshin Gr.
	lower	Nuchen syst.: Huishan Ser. / Siaolikuo Gr. / Chungkuantun Ser.	Huto syst.: Tingsiang Ser. / Taishan Gr. / Chitung Ser.	? / Kokulian Gr. / ?
Archeozoic		Tuimienshan Gr. / Liaoho system / ? / Liaotung system	Oldest Gneissose Rock / Wutai system in part	? / Matentei syst.

Note : Broken lines indicate unconformities.

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