PERMIAN UNIT EXPOSED IN THE HOPANG AREA, WA SELF-ADMINISTERED DIVISION, NORTHERN SHAN STATE, MYANMAR

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Abstract

The investigated area is situated in Hopang Township, Wa Self-Administered Division, northern Shan State, Myanmar. The Plateau Limestone of the study area mainly consisted of medium-to thick-bedded, light grey to grey limestone. Most fossils found are fragmentary; complete fossils are rare or absent. The lithology is not much changed except fossils become more complete than the lower. They contain crinoid stems and unidentifiable shells of gastropod, fragments of bryozoan, *Syringopora*, and solitary corals. It is followed by medium-bedded limestone with more fossil fragments appear in the fusuline horizon composed of gastropods, crinoid stems, corals and a small number of chert nodules. The abundant *Cancellina* species were found in the Hopang limestone. The associating genera include *Pseudofusulina, Parafusulina, Nankinella and Toriyamaia*. The dominance of *Cancellina* and absence of both *Misellina* and *Neoschwagerina* indicate a Kubergandian (Late Kungurian) age.

Keywords: Permian, Plateau Limestone, Fusuline, Hopang

Introduction

Location of the study area

The investigated area is situated in the Hopang Township, 'Wa' Self-Administered Division, northern Shan State. It is located about 156 km NE of Lashio City. Lashio-Chinshwehaw Highway passes through the northern part of the Hopang Area. The Permian unit of the research area is exposed at (23º 24' 03.9"N, 98º 45' 30.7"E) near Hopang City, the eastern part of Thanlwin River or along the road between Hopang to Hpa-lin Mine. The location map of the research area is shown in (Fig.1).

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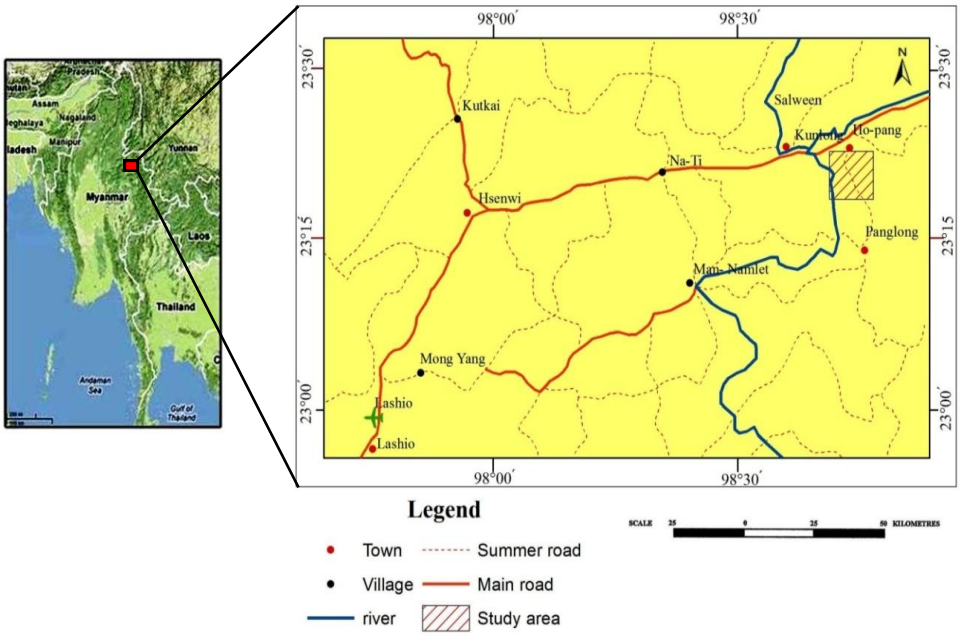

Figure1: Location map of the research area.

Method of Study

A detailed geological field investigation of lithologic contacts, structural trends and fossils locality of the research area was carried out by using a Brunton compass, GPS and data were plotted on the UTM topographic map sheets No.2398 (11,15). Representative samples were cut into thin section and these were studied under a microscope and identification of micro fossils.

Previous Works

The stratigraphic succession of northern Shan State had been investigated and described by Datta (1900), Reed (1906), La Touche (1913), Chhibber (1934), Pascoe (1959), Brunnschweiler (1970), Amos (1975), Garson (1976), Mitchell et al. (1977), IGCP (1980), Bender (1983), Wolfart et al. (1984), Thura Oo et al. (2002) and Aye Ko Aung (2012).

La Touche (1913) carried out the geology of the northern Shan State. Brunnschweiler (1970) described the contributions to the post-Silurian geology of Burma (northern Shan State and Karen State). Amos (1975) mentioned the stratigraphy of some of the upper Paleozoic and Mesozoic carbonate rocks of the Eastern highlands, Burma. Mitchel et al. (1977) also carried out Geology and exploration geochemistry of the Yadanatheingi and Kyaukme-Longtawkno areas, northern Shan State, Burma. IGCP (1980) studied the stratigraphic Committee field excursion in the Maymyo-Yadanatheingi-Hsipaw and Bawdwin areas. Wolfart et al. (1984) documented the stratigraphy of the western Shan Massif, Burma. But the geological investigation of the Hopang area had not been yet detailed.

Regional Geology of the study area

The study area lies in the Shan-Taninthayi Block (Mg Thein, 2014). It is situated in the Shan Plateau which generally trending NNW-SSE direction. This area lies in the northeastern part of the Lashio Basin. Major lineament identified from satellite image of the area is Momeik Fault, trends approximately ENE-WSW in direction. Moreover, the area lies between the Momeik Fault (Nanting) in the north and Lashio Fault in the south. The Hopang area is mainly composed of various lithologic units ranging in age of the pre-Paleozoic to Mesozoic sediments are shown in (Fig.2). Good exposures can be observed along the road cutting side.

They are Precambrian Chaungmagyi Group (near Nan-pi and Pan-kauk Villages), Ordovician Sitha Formation (near Har-phyat Village), Silurian Nyaungbaw Formation (Narzayet-Pangmong car-road), Permo-Triassic Plateau Limestone (Hen-na Village and car-road between Hopang and Hpa-lin mine) and Nwabangyi Dolomite Formation (car road between Hopang to Chushwe, near Naung-san and Hpa-kyut Villages), and Cretaceous Hsipaw Red Bed (Naung-hate and Na-za-yet villages). The porphyritic granite boulders are well exposed along the stream of the eastern part of Thanlwin River (along the Hpa-lin and Chu-shwe). Some metamorphosed limestones are well observed in Hpa-lin mine and Pan-kauk Village.

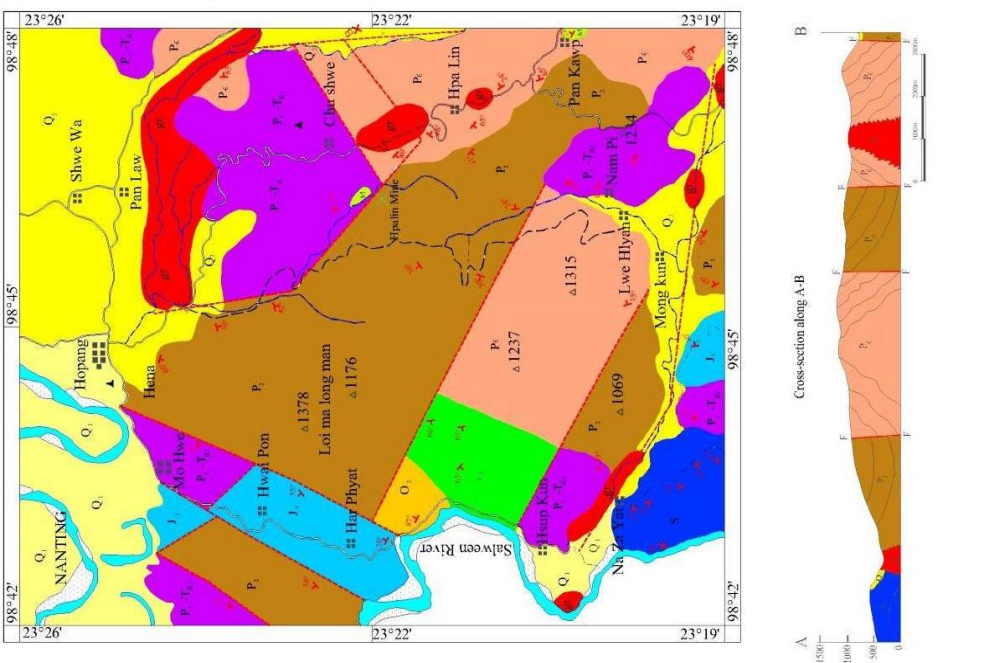

Figure 2:Geological map of the study area, Hopang Township, northern Shan State.

General Geology of the study area

The Permian carbonate sequence of the Eastern Myanmar is part of a widespread stratigraphic unit, which extends through western Thailand into northwestern Malaysia, and through western Yunnan into central Tibet (Thura Oo et al., 2002). From the Myanmar-China frontier area in the northern Shan State, the limestones extend southwards and westwards, through Thipaw (Hsipaw) and Pyin Oo Lwin (Maymyo) Townships into Pindaya Township in the southern Shan State (Thura Oo et al., 2002). Rocks of unbounded Permian age in Myanmar form part of a Late Paleozoic carbonate sequence which has been described as the 'Plateau Limestone' covering the greater part of eastern Myanmar.

Aye Ko Aung (2012) described the Paleozoic stratigraphy of Shan Plateau, Myanmar. He designated the Permian unit of western part of northern Shan State as the 'Tonbo Limestone' and the eastern part of the northern Shan State as 'Plateau Limestone'.

However, the name 'Plateau Limestone' is now preferred to use because of its realistic and more complete description in the study area. The highest peak of Loi ma long man Taung (1378 m) is located in the western part of the study area (Fig.3). Morphology view of the study area is shown in (Fig. 4) and (Fig.5).

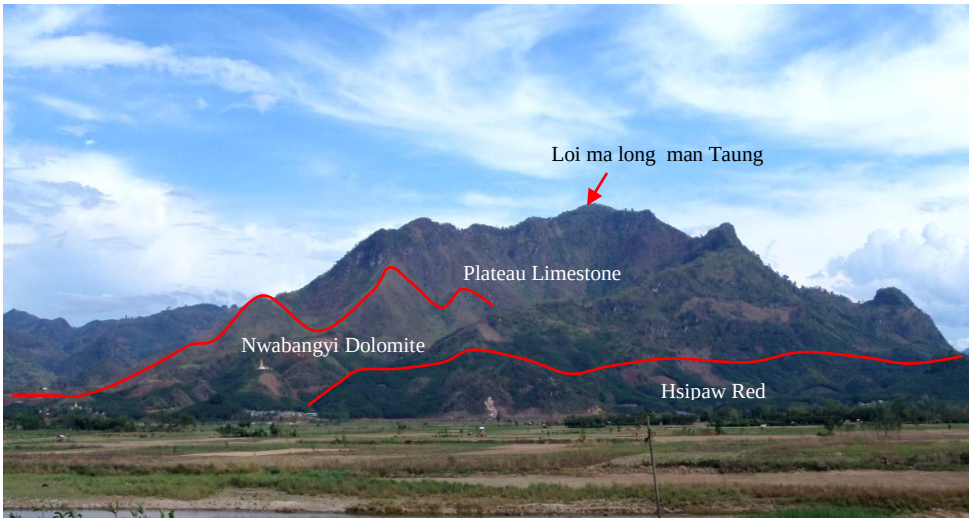

Figure 3: Panoramic view of the study area (looking South-East).

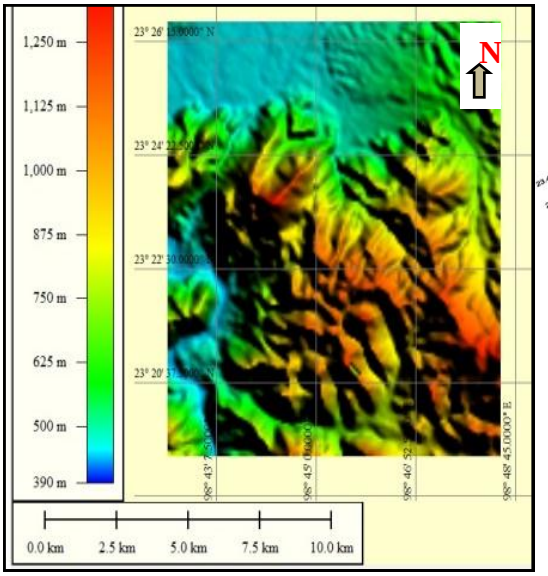

Figure 4: Two dimensional view of the study area. (SRTM image with atlas shader)

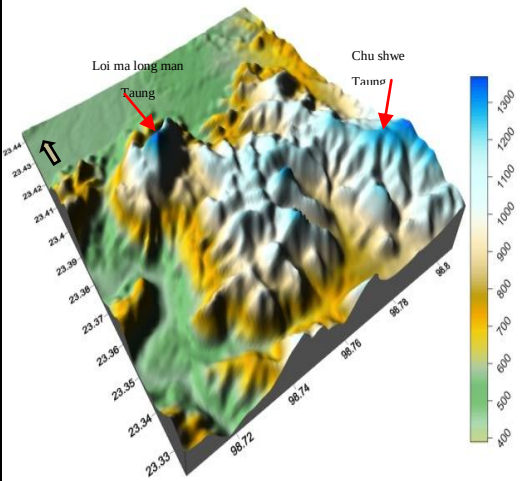

Figure 5: Three dimensional view of the topography of the study area. (SRTM image with atlas shader)

Lithology

The logged section of Plateau Limestone comprises 65 m of exposed strata. Below this, a stratigraphically the lower part of the Plateau Limestone was destroyed during quarry for road construction before it could be investigated. Therefore the lower part of this unit is not exposed in the area. The unit is dominated by light grey to grey, thick-bedded to massive hard and compact limestone. In this part, most fossils found are fragmentary; complete fossils are rare or absent in (MH-1) outcrop.

In the upper part, the lithology is not much changed except fossils become more complete than the lower, containing crinoid stems and unidentifiable shells of gastropod, fragments of bryozoan, syringopora, solitary corals are scattered on the bedding surface of (MH-2) section (Fig.6A). It is followed by medium-to thick-bedded limestone with more prominent fossil band (Fig.7). This limestone with more fossil fragments appears in the fusulinid horizon and consists of gastropods, crinoid stems and corals in (MH-3) section (Fig.6B) and (Fig.8). The small amount of chert

nodules occur along the road side between Hopang to Hpa-lin Mine in (MH-4) outcrop (Fig.6C,D).

Figure 6: (A) Outcrop nature of the Fossils-bearing Sample MH-2; (B) Outcrop nature of the of Fusulinid-bearing Sample MH-3 (Exsitu sample); (C) Fusulinid-bearing outcrop in the Rubber plantation along the road side between Hopang to Hpa-lin Mine; (D) Close up view of Fusulinid-bearing outcrop. (N 23º 24' 03.9" & E 98º 45' 30.7")

Figure 7: Light grey to dark grey, medium-to thick- bedded fossiliferous limestone showing well bedded nature; view to NE.

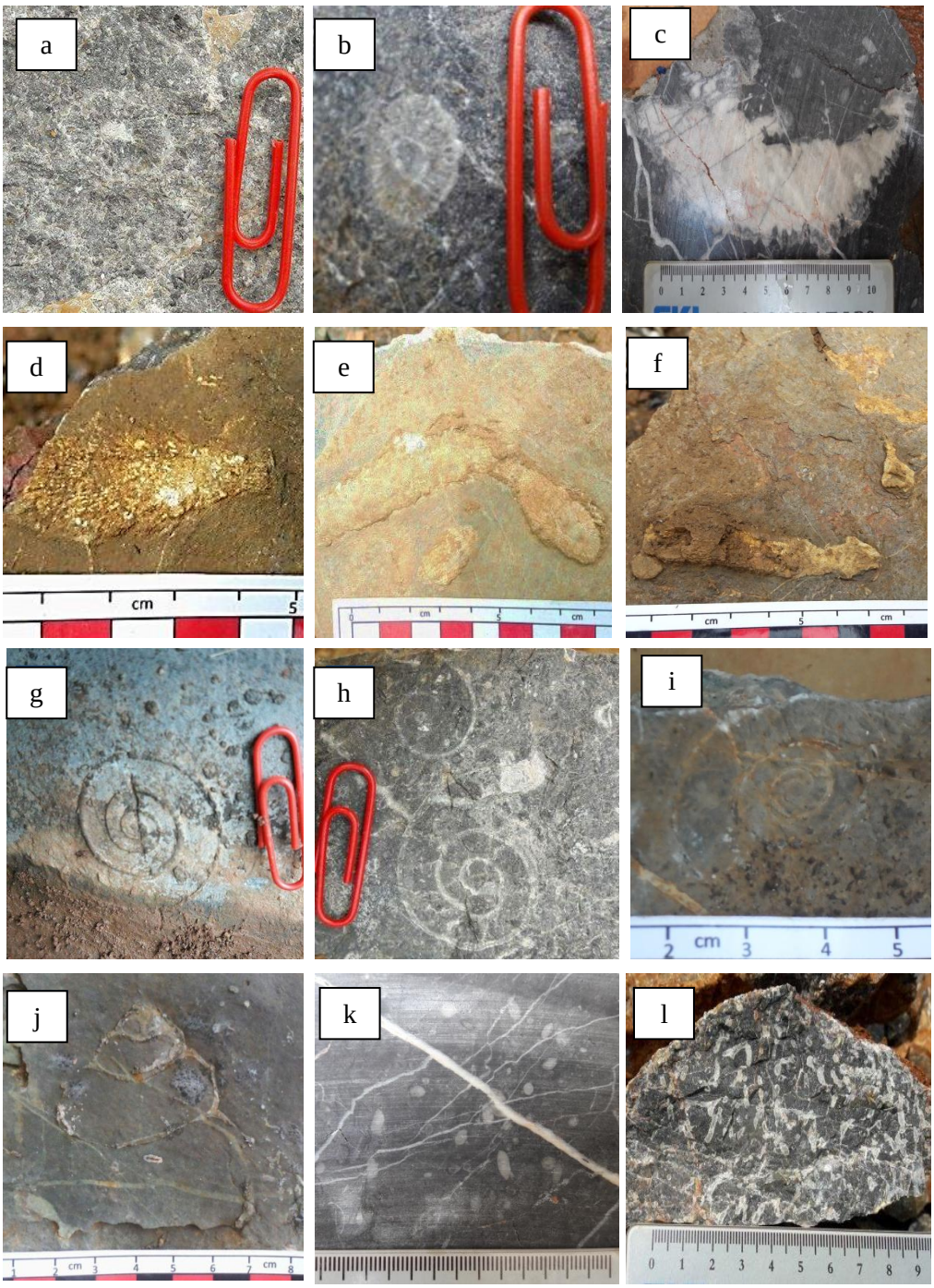

Figure 8: Macrofauna from Plateau Limestone of study area. Figures1-6 Corals. Figures 7-10 Gastrpods. Figure 11 Fusulinids. Figure 12 Syringopora.

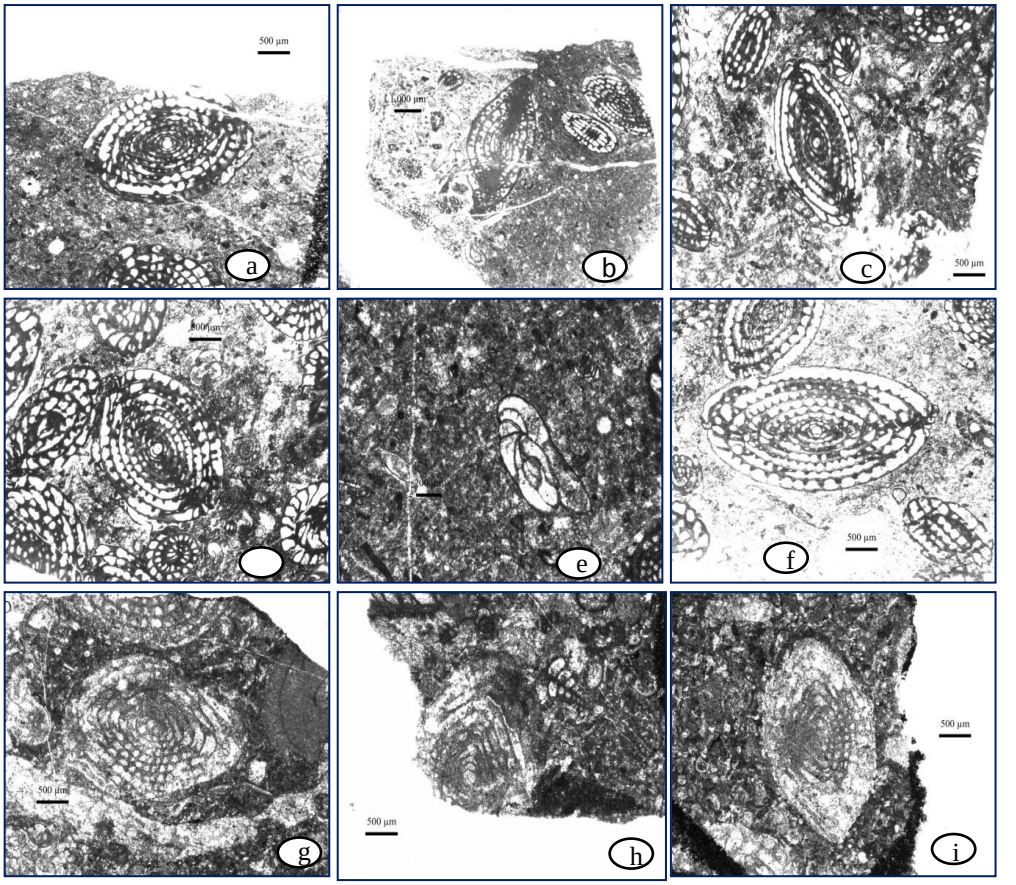

Figure 9: Fossils collected from Plateau Limestone of study area. (N 23° 24′ 03.9″, 98° 45′ 30.7″) Fig.(a) *Cancellina primigena* sp., MH-3. Fig.(b) *Chusenella ellipsoidalis* sp., MH-3. Fig.(c) *Cancellina tobensis* sp., MH-3. Fig.(d) *Cancellina primigena* sp., MH-3. Fig.(e) *Toriyamaia s*p., MH-3. Fig.(f) *Cancellina tobensis* sp., MH-3. . Fig.(g) *Nankinella regularis* sp., MH-4. Fig.(h) *Nankinella regularis* sp., MH-4. Fig.(i) *Nankinella hunanensis* sp., MH-4. Scale bar represents 500µm.

The numerous Permian fauna including *Cancellina primigena* sp., *Chusenella ellipsoidalis* sp., *Cancellina tobensis* sp., *Cancellina primigena* sp., *Toriyamaia s*p., *Nankinella regularis* sp., *Nankinella hunanensis* sp., were found in the Plateau Limestone of Hopang area. The associating genera and dominance of *Cancellina* species indicate Kubergandian (Late Kungurian) age, tethyan type fusulines (Personal communication with Prof. Z.Yichun, 2017) preserved in research area.

According to the stratigraphic position, lithology and faunal assemblages, the Plateau Limestone of study area can be correlated with the Upper Plateau Limestone of (La Touche, 1913), the Tonbo Limestone of the northern Shan State (Brunnschweiler, 1970), Thitsipin Limestone Formation occupies in southern Shan State (Garson et.al., 1976) and Plateau Limestone of Aye Ko Aung (2012).

Conclusion

The Plateau limestone was discovered during conducting a traverse along the road side between Hopang to Hpalin mine site. This limestone section is about 65 m thick consisting of hard and compact, medium to thick-bedded, light grey limestone. In the study area, abundant *Cancellina* species were found in the Permian Plateau limestone. The associating genera include *Pseudofusulina*, *Parafusulina*, *Nankinella* and *Toriyamaia.* The dominance of *Cancellina* and absence of both *Misellina* and *Neoschwagerina* indicate a Kubergandian (Late Kungurian) or (late Early Permian) age. But, this assemblage was not reported from the Shan State of Myanmar, which is a main part of the Sibumasu Block.

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