

Diatom assemblage of Pliocene in the Iturup, Kuril Islands

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Introduction

Diatomaceous mudstone, that was picked at the Iturup Island of Kuril Islands by Dr. T. Nemoto in 1940, is being kept in the Hokkaido Branch of Geological Survey of Japan. Author thinks that clarification of original formation of geologic sample, the mudstone, and correlation of Tertiary between Hokkaido and Kuril Islands are important to make clear the geologic history of marginal Islands, active area in geological structure, in the northwest Pacific Ocean.

This paper indicates diatom assemblage of the sample and the correlation to the other Pliocene based on diatom zone.

Location of sample and diatom zone

The memorandum about the sample says that T. Nemoto collected the sample from the Tertiary distributed in near the Lake Toshimoi located in central part of the Iturup Island (Fig. 1) being one of the Kuril Islands extended southwest to northeast next to the Hokkaido.

Well preserved diatom fossils are yielded from the sample by diatom analysis, same as Sagayama & Hoyanagi (1993). Main identified species from the sample are the *Neodenticula kamtschatica* (31.5%), *Thalassiosira eccentrica* (12%) and *Thalassionema nitzschioides* (11%) etc. (Table 1). A few *Neodenticula koizumii*, important specimen to clarify diatom zonation, is yielded too. This assemblage indicates to be related to the *Neodenticula kamtschatica-Neodenticula koizumii* Zone (2.50-3.70 Ma) by Koizumi (1985) or (3.5-4.0~2.6-2.7 Ma) by Barron & Gladenkov (1995), and geologic age the late Pliocene.

Discussion

In the Kamchatka, Gladenkov & Shantser (1990) named regiostage of the Upper Pliocene the Ust-Limimteveyamian, and fauna in this stage shows north boreal assemblage with *Astarte diversa*. In Hokkaido, Pliocene indicates the *N. kamtschatica-N. koizumii* Zone is the upper part of Tate Formation in the Oshima Peninsula, the Mochikubetsu Formation in northern district, the upper part of Shiranuka Formation in eastern district, the Rikushibetsu Formation in the Shiretoko Peninsula.

Geological map drawn by Nemoto (1959) shows the Rubetsu Formation and the Shana Formation are distributed in around the Lake Toshimoi. The Rubetsu Formation, mentioned as Miocene, consists of mudstone with marine mollusks. The Shana Formation, mentioned as Pliocene, overlapped on the Rubetsu Formation, is composed of tuff and agglomerate with lava and tuffaceous sandstone. It is considered that geologic relationship between the those formations is conformity, because there is no letter "unconformity" in a space between them

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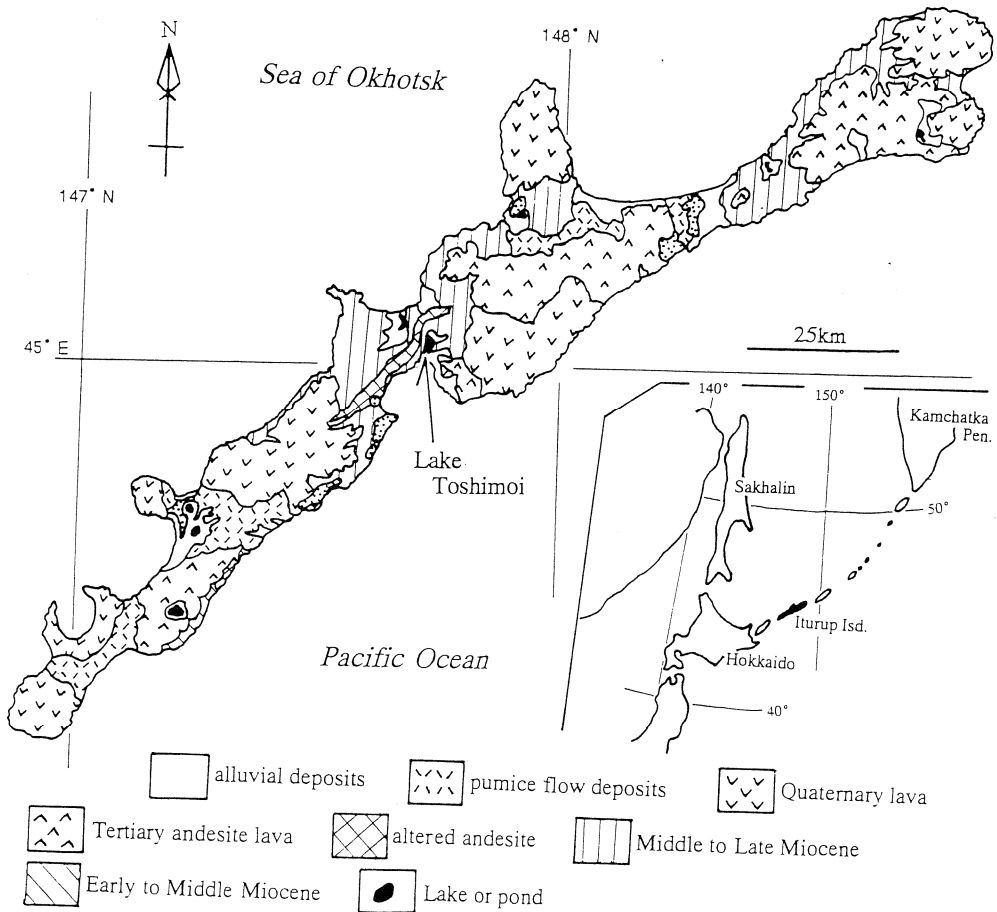


Fig. 1 Sample location and geological map of the Iturup Island. Geological map was compiled from Takahashi (1985).

in legend of the geological map. According to the geologic age, author thinks the sample is collected from the Shana Formation.

Pliocene in the Shiretoko Peninsula, where continues the Kuril Islands geologically and geographically, is the Ikushina Formation and Rikushibetsu Formation ascending order. The Ikushina Formation consists of mudstone and sandy mudstone, and diatom zone of this formation is the *Thalassiosira oestrupii* Zone. The other hand, the Rikushibetsu Formation mainly consists of fine sandstone and tuffaceous sandstone with conglomerate, sandy mudstone, tuff, tuff breccia and lava. Diatom zone is the *Thalassiosira oestrupii* Zone in basal part and *N. kamtschatica-N. koizumii* Zone in main part of the Rikushibetsu Formation (Sagayama, 1987). The relationship between those formation is conformity (Sugimoto et al., 1962).

Based on diatom zone and lithofacies, the Pliocene, Shana Formation, near the Lake Toshimoi is correlated to the Rikushibetsu Formation (Fig. 2). It is inferred that the Rubetsu Formation is correlated with the Ikushina Formation. Both areas, the Iturup Island and the Shiretoko Peninsula, seem to have almost same geologic history in the Pliocene, because in the

Table 1 List of diatom fossil from the diatomaceous mudstone collected from the Iturup Island.

Species of diatom	valves
<i>Actinoptychus senarius</i> (Ehr.) Ehr.	1
<i>Bacterosira fragilis</i> (Gran) Gran	1
<i>Cocconeis costata</i> Greg.	2
<i>C. scutellum</i> Ehr.	4
<i>Coscinodiscus endoi</i> Kanaya	4
<i>C. marginatus</i> Ehr.	4
<i>Melosira albicans</i> Sheshukova-Poretzkaya	14
<i>M. sol</i> (Ehr.) Kutz.	1
<i>Neodenticula kamschatica</i> (Zabelina) Akiba et Yanagisawa	63
<i>N. koizumii</i> Akiba et Yanagisawa	2
<i>Nitzshia cylindrus</i> (Grun.) Hasle	1
<i>N. grunowii</i> Hasle	6
<i>Proboesia barboi</i> (Brun) Jordan et Priddle	1
<i>Pyxidicula zabelinae</i> (Jouse) Makarova et Moiseyeva	3
<i>Raphoneis</i> cf. <i>ischaboensis</i> (Grun.) Mertz	2
<i>Rhizosolenia</i> sp.	3
<i>Stephanopyxis</i> spp.	11
<i>Thalassionema nitzschioides</i> (Grun.) H. et M. Peragallo	22
<i>T. nitzschioides</i> var. <i>parva</i> Heiden et Kolbe	1
<i>Thalassiosira antiqua</i> (Grun.) Cl. -Euler	7
<i>T. eccentrica</i> (Ehr.) Cl.	24
<i>T. lineata</i> Jouse	2
<i>T. manifesta</i> Sheshukova-Poretzkaya	1
<i>T. nidulus</i> (Temp. et Brun) Jouse	3
<i>T. oestrupii</i> (Ostenfeld) Proshkina-Labrenko	11
<i>T. trifulta</i> Fryxell	2
<i>Thalassiothrix longissima</i> Cl. et Grun.	4
Total	200

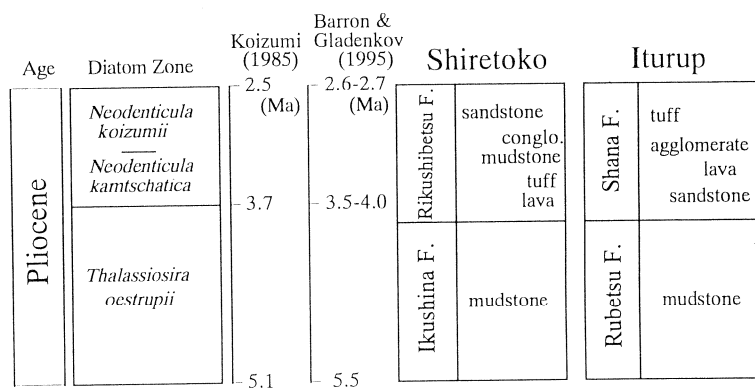


Fig. 2 Geologic correlation of the Pliocene in the Iturup Island and the Shiretoko Peninsula.

both areas there are successively Pliocene sequences with conformity and volcanic activities in about 3 Ma.

In the Sakhalin, next north of Hokkaido, the Late Pliocene correlated with the *N. kamtschatica-N. koizumii* Zone is distributed in west of the Yuzhno Sakhalinsk (Sagayama, 1993), and the formation correlated with the *N. koizumii* Zone (1.89-2.50 Ma) is distributed in sea bottom, 230-270 meter in depth, at the south of Terpenia Bay (Sagayama & Kimura, 1989).

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* In Japanese with English abstract.

** In Japanese.

地名および地層名

Iturup	……………	択捉	Tate Formation	……………	館層
Toshimoi	……………	年萌	Mochikubetsu Formation	……………	茂築別層
Shiretoko	……………	知床	Shiranuka Formation	……………	白糠層
Oshima	……………	渡島	Rikushibetsu Formation	……………	陸志別層
Rubetsu Formation	……………	留別層	Ikushina Formation	……………	幾品層
Shana Formation	……………	斜名層			

要 旨 地質調査所北海道支所には、千島列島択捉島の年萌湖周辺に分布する新第三系から1940年に根本忠寛博士により採取された珪藻質泥岩の地質試料が保管されている。珪藻分析の結果、本試料は*Neodenticula kamschatica*-*Neodenticula koizumii*帯を示す。Nemoto (1959) の地質図によれば年萌湖周辺の新第三系は貝化石を含む泥岩主体の留別層と、これを整合で覆い凝灰岩、凝灰質砂岩や溶岩を伴う集塊岩からなる斜名層が分布する。知床半島基部における同珪藻帯相当の地層は陸志別層である。年萌湖周辺との地質対比では、留別層は越川層または幾品層、斜名層は陸志別層に相当する可能性があり、珪藻質泥岩からなる地質試料は斜名層から採取されたと考えられる。択捉島と知床半島基部のいずれもの中～下部鮮新統の連続的堆積、すなわち整合および約3 Maでの火山活動という地質的關係は、両地域が5 Ma～2 Maにかけてほぼ同じ地史をたどったことを推定させる。

