39. Discovery of the Pleistocene Glaciation on Daisetsu Volcano, Hokkaido and its Significance in Connection with Lake Biwa Stratigraphy

By Shoji HORIE
Otsu Hydrobiological Station, University of Kyoto
(Communicated by Teiichi KOBAYASHI, M. J. A., March 12, 1977)

In discussing the Pleistocene glaciation in the Japanese Islands, one noteworthy point is the question of glacial feature concerning the volcanoes which are considerably abundant in the islands. As Otsuka (1931) suggested, the main reason for it is that so far as these volcanoes are the constructions of the late Pleistocene or the Holocene, the existence or non-existence of these glacial phenomena may demarcate the upper limit of the glacial age. It has long been said that the Japanese volcanoes have no glacial morphology. The glacial age has been surmised to have preceded the construction of the bodies of the volcanoes and to be referable to the late Pleistocene Epoch. According to the writer’s glacial geologic field work, however, radiocarbon age of pieces of wood contained in glacial deposits of Mt. Shirouma-dake is quite young* and even when they are found on overlapped nivation moraines, the young stage of dissection of the older underlying glacial moraines denotes the latest Pleistocene or Holocene glaciation. In addition to this, the most recent work in the Hidaka Mountains reveals that the actual glacial advance correlated to the writer’s Moraines III and IV is dated 15,000–12,000 years B.P. by Eniwa-a pumice-fall deposit (Ono and Hirakawa, 1975).

Since 1947, the writer has been engaged in his extensive field work for glacial features in all parts of Japan. As a result, the conclusion he has reached is that at least six groups of glacial moraines can be recognized (Horie, 1965, 1974, 1975, 1976). Among them the two groups V and VI moraines are tentatively assigned to the so-called post-glacial ice advances. The idea of this age determination is supported by the above-mentioned tephrachronological and also paleolimnological evidences found in Lake Biwa. If so, it is considered that the glacial feature might also be recognized in some volcanoes of high altitude. However, no such evidences were found on Mt. Fuji and Mt. Norikura. The reason must be that on

* Age of driftwood contained in boulders which cover Moraine V is 380±100 years B.P.
these mountains there was non-resistant substance against erosion and weathering and that also in some cases, later eruption may have destroyed the proof of such small scale expansion of glaciers.

From this point of view, the writer has started his new field work at Daisetsu Volcano in the central part of Hokkaido. This volcano is close to the Hidaka Mountains where a distinct morphology and deposits of glacial origin have already been confirmed (Horie, 1976 unpublished). And there in the summer of 1976 the writer discovered the former glacial evidence. It shows a clearly excavated morphology with a steep wall facing north (Fig. 1) and the moraine in front of the flat bottom of the cirque floor. This could only be interpreted by glacial action, the similar feature of which is well preserved in other high mountains as has already been reported by the writer (Horie, 1965, 1974, 1975, 1976).

To be more exact, the actual feature was located in the north-eastern part of Mt. Pippu-dake (2,197 m above sea-level). This topography shows its cirque floor, 1,000 m in length, 1,500 m in altitude which is on the same level with the cirque floor altitude in the Hidaka Mountains and 500 m in breadth, with a flat bottom forming a contrast to the steep cirque wall of 300 m in relative height. In front of this cirque, only one moraine is located showing vegetation on it and the age seems to be that of III・IV in the writer's classification.

Fig. 1. Map showing the glaciated area in Daisetsu Volcano.
(16,000–10,000 years B.P.) since it is not dissected yet. Its surface is flat and the thickness of till on the bed rock of Tenmaku-zawa seems to be at least 200 m. No other moraine was found. That is to say, that one moraine group is the only compound moraine of the III and IV age. *)

Aside from the above-mentioned glacial feature, the writer could not find any glaciated topography on the other mountains around Mt. Pippu-dake, such as Mt. Ryōun-dake (2,125 m), Mt. Keigetsu-dake (1,938 m) and Mt. Kuro-dake (1,984 m). Although some incomplete features resembling a mound or a flat bottom of a valley are occasionally found, these are not evidences of the former glacial existence.

The writer, however, noticed that some pseudo-morphology (more similar to glacial topography) does exist on the northern ridge of Mt. Ryōun-dake. The morphological feature of the same kind is frequently found in the central Japanese high mountains and the Hidaka Mountains having a gentle slope inside a relatively steep wall but no morainic evidence can be seen. This is considered, therefore, to be due not to glaciation but to nivation. In the present case, the lower mound was 100 m high above its valley floor and the upper mound 40 m high above the lower mound.

From these facts, the writer considers that glaciation of Moraine III and IV age of 16,000–10,000 years B.P. by Lake Biwa chronology took place on Daisetsu Volcano constructed already during the Pleistocene Epoch.

Therefore, the writer must further study the actual existence of similar feature in the other parts of Daisetsu Volcano and other high mountains besides the Hidaka Mountains hitherto regarded as the only glacial district in Hokkaido.

This is the first report of glacial evidence on Japanese volcanoes, active or dormant and both evidences found in Lake Biwa stratigraphy and Daisetsu morphology suggest more possibility of the existence of glacial evidences on the other volcanoes in the Japanese Islands.

References


*) There are not V and VI moraines on the Hidaka Mountains as the writer has already reported (Horie, 1965). The same is true of Daisetsu Volcano in the central part of Hokkaido.

** There are some misprints in p.181.