

INTRODUCTION

Tetsuya TORII*

The many small ice-free areas which are scattered throughout the Antarctic are often called the Antarctic Oases because of the unique fact that there are numerous meltwater lakes of relatively high temperatures compared with the surrounding white desert. They are of special scientific interest because in contrast with the rest of the continent they display large outcrops of bedrock and sediments through which the geological history of the continent can be seen. The largest oasis is the McMurdo Oasis situated in the southern part of Victoria Land, having an area of about 2500 km². It is composed mainly of glaciated ice-free valleys which are called the Dry Valleys on account of their extreme aridity. In addition to arousing scientific interest, the proximity of these valleys to Ross Island, on which two large observation station—McMurdo and Scott—are located, have made it possible to carry out substantial field research in that region since the IGY.

Three large glacial troughs, which were once occupied by huge outlet glaciers have been named the Victoria, Wright and Taylor Valleys, and constitute the main part of the McMurdo Oasis. They have many alpine glaciers independent of the glacial plateau, receding outlet glaciers as well as many lakes some of which contain highly saline water with enormous amounts of glacial and fluvio-glacial deposits. These Dry Valleys and the lakes in them are shown in Figs. 1 and 2, respectively.

Before the Dry Valley Drilling Project, Japanese scientific participation in the McMurdo Sound region dates from December of 1963 when a hydrogeochemical survey was conducted. During successive seasons, many field surveys of the area were carried out by Japanese summer parties. This research was pursued as a program of the Polar Research Center, National Science Museum headed by Masayoshi MURAYAMA from 1972. Since 1973 the research was carried out as the project of the National Institute of Polar Research, with Takeshi NAGATA as Director. This research, from 1963 to 1974, is summarized in Table 1. It should be noted that calcium chloride hexahydrate was found in one of the lakes—Don Juan Pond—in 1963 and named antarcticite as a new mineral.

In 1968, a drilling project in this region was proposed by Tetsuya TORII to clarify the material balance of chemical elements and the Cenozoic history of the continent. In 1971 the National Science Foundation decided to coordinate the drilling project, and scientists from Japan and New Zealand joined with those from the United States to form the international project now called the Dry

* Chiba Institute of Technology, Narashino-shi, Chiba-ken.

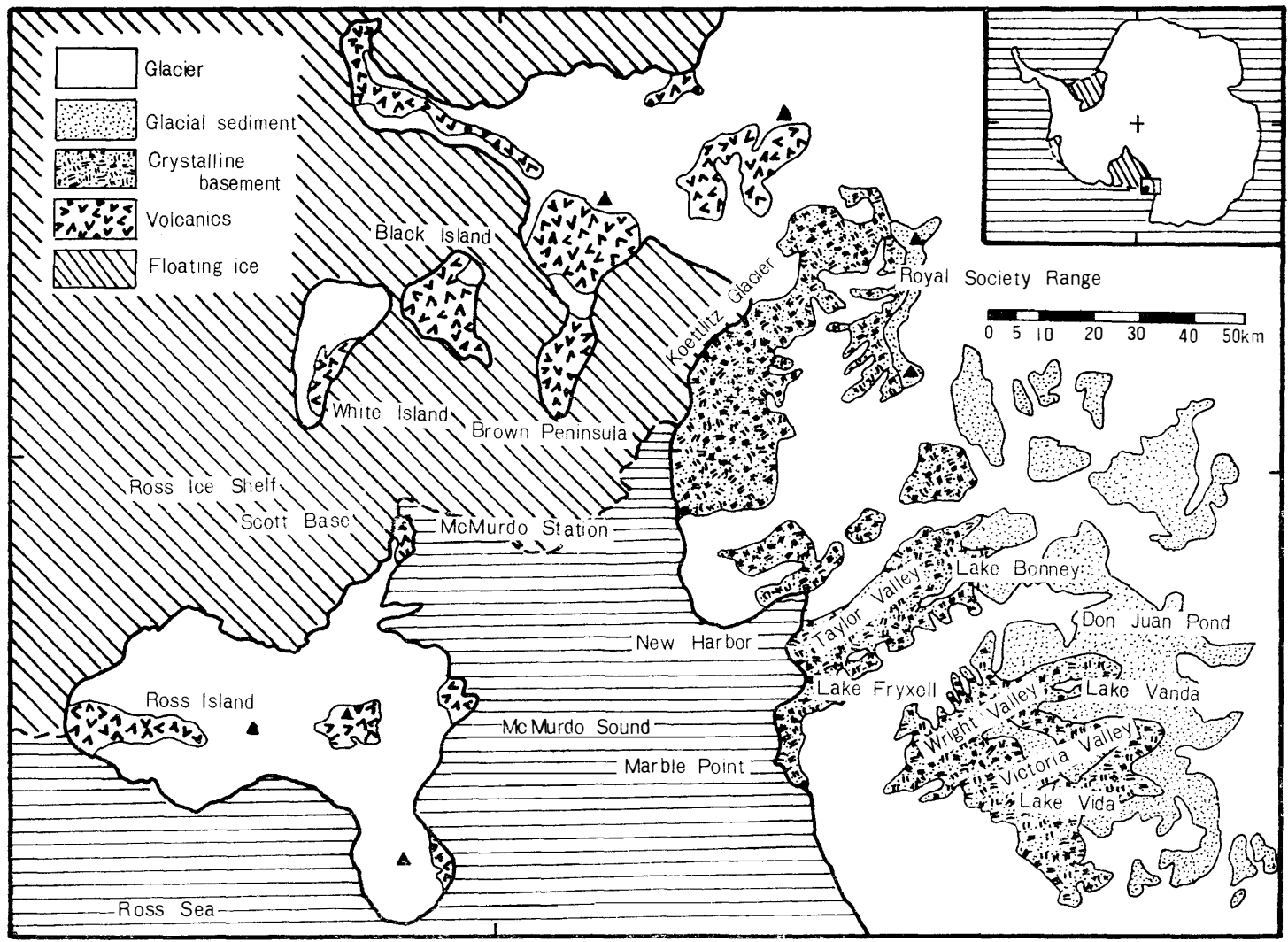


Fig. 1. General geology and physiography of the Ross Island region (after NIU Cartographic Lab.).

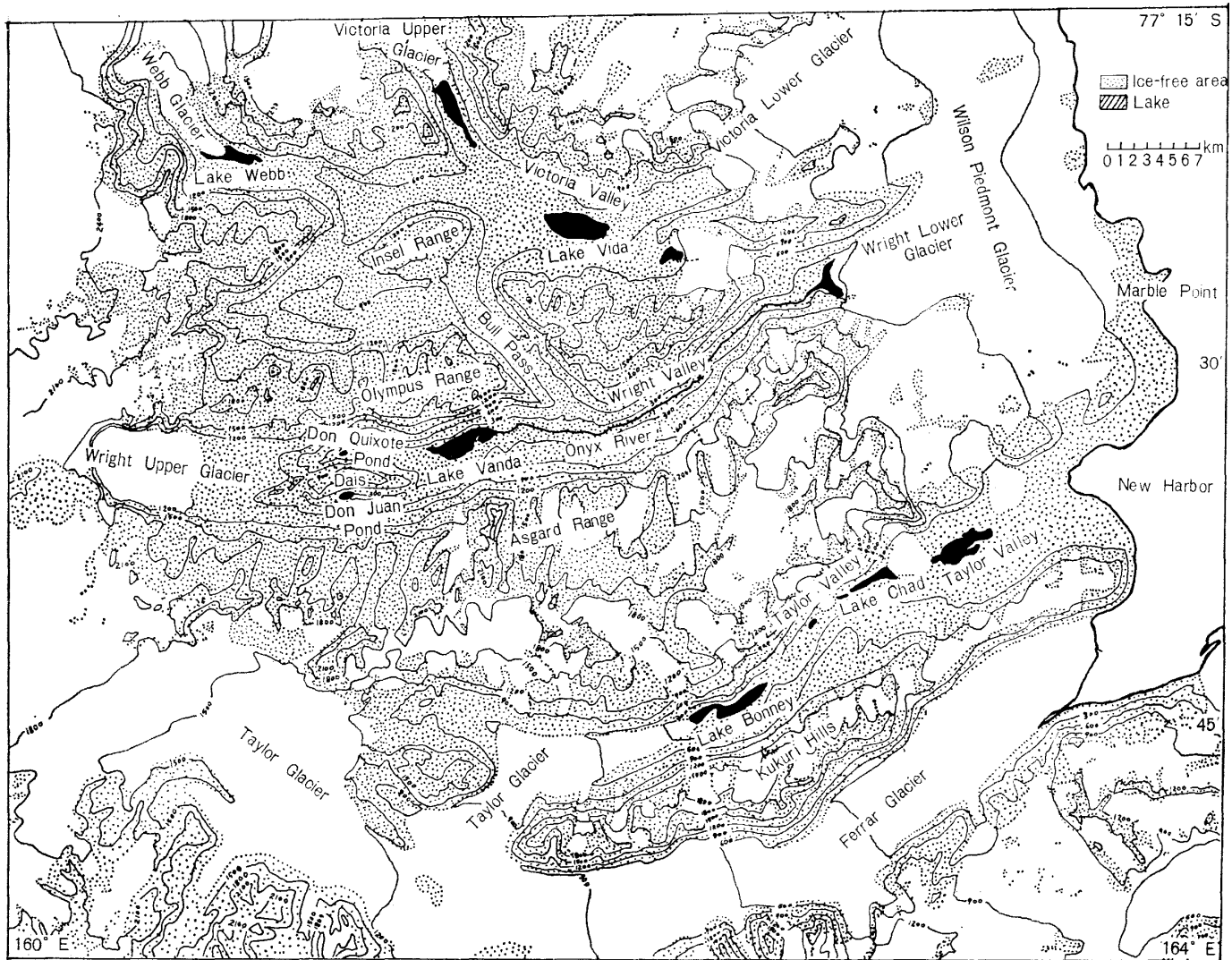


Fig. 2. Map of ice-free area in southern Victoria Land (after Colin BULL).

Table 1. Japanese activities in the Dry Valleys.

Season	Research objective	Participants
1963-64	Hydrogeochemistry, geomorphology	Tetsuya TORII, Noboru YAMAGATA, Tsurahide CHO, Yoshio YOSHIDA
1964-65	Geochemistry	Tetsuya TORII, Tsurahide CHO, Yoshio YOSHIDA, Junta SUGIYAMA, Zenkichi HIRAYAMA
1965-66	Geochemistry	Tetsuya TORII, Noboru YAMAGATA, Makoto SHIMA, Akito KOGA
1968-69	Limnology	Tetsuya TORII, Noboru YAMAGATA
1970-71	Geochemistry, geophysics, geomorphology	Tetsuya TORII, Yoshio YOSHIDA, Yuki YUSA, Kiichi MORIWAKI
1971-72	Geochemistry, geophysics	Tetsuya TORII, Takeo HASHIMOTO, Kinshiro NAKAO, Yuki YUSA, Koichi NAKAYAMA
1972-73	Geochemistry, geophysics	Tetsuya TORII, Yoshio YOSHIDA, Takeo HASHIMOTO, Shyu NAKAYA
1973-74	DVDP geochemistry, petrology, mineralogy	Tetsuya TORII, Nobuyuki NAKAI, Hajime KURASAWA, Kunihiro WATANUKI, Shoichi OONO, Hideki MORIKAWA, Yoshio YOSHIDA, Koichi NAKAYAMA

Valley Drilling Project.

Initially the plan was to explore the physical, chemical and biological regimen of the subsurface in the arid and enigmatic ice-free valleys. As it evolved though, the project has been expanded to explore the valleys, the Ross Island volcanics, and the McMurdo Sound sediments. Besides the National Science Foundation it has been supported by the Division of Science and Industrial Research of New Zealand, and the National Institute of Polar Research, Japan.

The present paper covers the reports of the geophysical and geochemical research undertaken in the Dry Valleys and the record of the Dry Valley Drilling Project.