CARBON ISOTOPIC STUDY OF LAKES QARHAN AND FROME SEDIMENTS

Huang Qi
(Qinghai Institute of Salt Lake, Academia Sinica, Xining)
J. M. Bowler, H. A. Polach and J. Head
(Australian National University)

Qaidam Basin is located in the west of China (Fig. 1), it is surrounded by Kunlun Mountains, Altun Mountains and Qilian Mountains. The mountainous plateau is usually of 4000 to 5000 m above sea level, and a few of mountain ranges are more than 5000 m in altitude. Along the southern margin of the basin lie the Kunlun Mountains in the Hercynian folded zone; in the west of the basin are Altun Mountains in the Caledonian folded zone; and the Qilian Mountains are in the north of the basin in the Caledonian folded zone.

There are thirty two lakes altogether, seven of which are brackish water lakes and the rest are salt lakes. In addition, there also exist playas, such as Qarhan, Yiliping, Mahai, Kumteyi and Dalangtan and so on. Lake Qarhan is the largest one among them. Lake Qarhan area is located in the east of the basin, 2766 metres above sea level. Yet it is in the lowest surface relief, hence one of the main catchment basin. The lake area is 168 km long from west to east, and 20—40 km wide from north to south. The lake region covers an area about 5860 km², and the broad lake area is covered by bare salt layer forming hard salt crust. According to the meteorological data of 1968, the average temperature of the lake area is 11°C from April to November, with the highest being 31.2°C and the lowest being —5°C. The average temperature from November to March next year is —7°C, with a high of 1.7°C and low of —22.2°C. Annual rainfall is 30 mm, annual evaporation is 2860 mm, the evaporation is about 100 times of the rainfall. The Lake Qarhan deposits are compound of silt, clay, and inexhaustible gypsum and halite from lower layer to upper layer, the salt beds in the lake area are generally about 50 m, the maximum thickness being 75 m. The Radiocarbon Laboratory of Qinghai Institute of Salt Lake has determined radiocarbon ages of the samples collected respectively from CK2022, CK1308, CK826, CK659, CK1/80 and CK5/80 cores on the Lake Qarhan, date of the former four cores have been published. In 1981, the Qinghai Institute of Salt Lake and the Australian National University took CK1/81 and CK2/81 cores in Lake Qarhan, the cores locations are shown in Fig. 3.

Lake Frome is situated in the southeast of south Australia (Fig. 2). An expedition led by Captain E. C. Frome reached the shores of the lake in 1843. At that time the lake was assumed to be connected to Lake Torrens around the northern end of the Flinders Ranges. When it was established in 1862 the lake was a separate entity named after Frome. The lake is a large playa, approximately 100 km long, 45 km wide, covering an area of some 2700 km².

1) Chen Kezao, 1981. A general description of Qarhan Lake area in Qaidam Basin.
Fig. 1 The distribution of saline in Qaidam Basin

1 Boundary of Basin Foreland; 2 Saline lakes; 3 Salt marsh (playa); 4 Playa Qarhan.
1—Lake Gaskula; 2—Lake Mangtai; 3—Lake Gasen; 4—Lake Dalangtan; 5—Lake Danqitjian; 6—Lake Xitatijn; 7—Lake Cenec; 8—Lake Danbicle; 9—Lake Xiaobicle; 10—Lake Dabuxun; 11—Lake Tuanjie; 12—Lake Nanzhuobuxun; 13—Lake Beihuobuxun; 14—Lake Xiezuoe; 15—Lake Dangling; 16—Lake Kunteyi; 17—Lake Niulanzhlinu; 18—Lake Balongmahai; 19—Lake Dezunmahai; 20—Lake Daqaidam; 21—Lake Xiaoqaidam; 22—Lake Gahai; 23—Lake Ulan; 24—Lake Koko; 25—Lake Caka.