Construction of rafts for Nyos-Monoun Degassing Project

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1. Introduction

Since gas disasters of Lakes Nyos and Monoun in mid-1980s, many scientific studies of these lakes have been carried out, and mechanisms of accumulation and sudden release of CO_2 gas have been made clear. As CO_2 gas is still accumulating in bottom waters, the lakes have a potential to explode again. In 1999, the degassing project was funded by USAID Office of Foreign Disaster Assistant (OFDA). Since then, detailed technical examination of man-controlled degassing and related scientific monitoring of the lakes have been conducted as Nyos-Monoun Degassing Project (NMDP). The rafts were built as an essential part of these degassing and monitoring systems.

2. Types of rafts

From 1999 till 2003, six rafts of three types were made in this project. They were installed at Lakes Nyos and Monoun. The outline of the rafts is given in Table 1.

Table 1. History of installation and outline of rafts built in OFDA supported degassing project.

Installation	Location	Type	Size	Frame material	Weight	Floats	Buoyancy
Oct. 1999	Lake Nyos	Climate station	2.5m * 2.5m	Wood	250kg	4(large) + 4(small)	900kg
Nov. 1999	Lake Monoun	Climate station	2.5m * 2.5m	Wood	250kg	4(large) + 4(small)	900kg
Jan. 2001	Lake Nyos	Degassing pipe raft	3.55m * 3.0m	Zinc-coated steel	740kg	8 (large urethane filled)	2,240kg
Jan. 2001	Lake Nyos	Instrument raft	3.55m * 3.0m	Zinc-coated steel	650kg	8 (large urethane filled)	2,240kg
Jan. 2003	Lake Monoun	Degassing pipe raft	3.55m * 3.0m	Zinc-coated steel	740kg	8 (large urethane filled)	2,240kg
Jan. 2003	Lake Monoun	Instrument raft	3.55m * 3.0m	Zinc-coated steel	650kg	8 (large urethane filled)	2,240kg

The raft for the climate stations is relatively small in size. Except for some parts, most of the materials were purchased in Cameroon. Although the main frame was made of wood, the rafts at Lakes Nyos and Monoun are still working as of January 2006. A pair of rafts, one for the degassing pipe and another for the control unit, were built. They were assembled in Japan. After inspection, the rafts were transported and reassembled at lakeside. No electric or engine power was used for reassembly. After launching, the pipe raft was combined with the degassing pipe prepared by French engineers. Finally, pipe raft and instrument raft were fixed on the deepest point of each lake.

3. Characteristics of the rafts

The rafts needed to meet the requirements that they should be (1) endurable under tropical climate, (2) light and compact for easy transportation, and (3) easy to reassemble onsite where no electricity and heavy tools were available. Thus wood was chosen as materials for the rafts used for the climate station, and zinc-coated steel was chosen as frame materials for the pipe- and instrumental rafts. The steel frame was assembled using stainless steel bolts and nuts only. Buoyancy was calculated so as to support the weight of the instrument, pipe and control unit. Urethane-filled floats were used for the pipe- and instrumental rafts, since these floats were light but hardly collapse.

* Three pictures of rafts are shown in the next page.

photo 1. Climate station on Lake Nyos

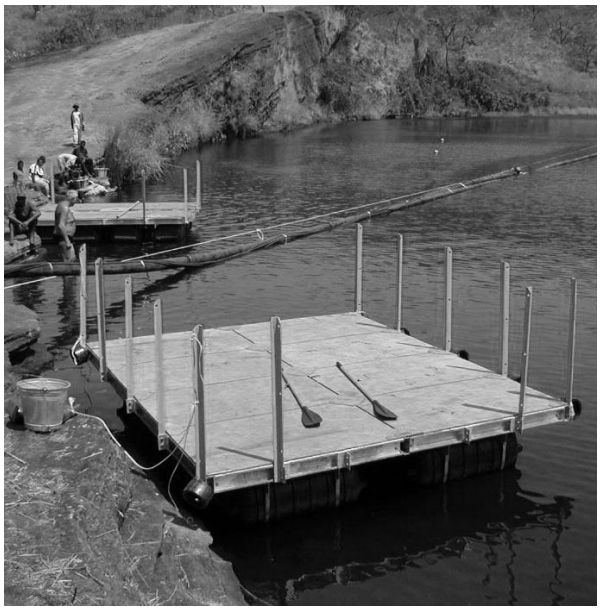

photo 2. Rafts at Nyos lakeside

photo 3. Recent degassing fountain and pipe raft at Lake Nyos (Jan. 2006)