Mission Report of the Field trip to Lakes Monoun and Nyos, March 11th to 18th, 2014

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1. Inspection of a solar power-driven deep water removal system at Lake Monoun

The solar power driven deep water removal system installed in December 2013 is working well. We added chain and turn buckles to reinforce the connection of the two rafts. We measured the flow rate of water at the output of drainage pipe. It ranged from 2.21 to 2.58 m^3/h, with a mean value of 2.36 m^3/h or about 25 m^3/daytime. The flow rate fluctuated slightly depending on the solar intensity. Water flow through the annulus between pipe and pump was estimated to be greater than that of the pump. This was caused by gas self-lift that was strengthened by our solar power driven deep water removal system. Currently the daily removal rate of deep water is estimated to be >100 m^3.

Fig. 1. Measurement of flow rate of deep water at the pipe mouth.

2. Measurement of CO_2 concentration by the YY-method at Lake Monoun

On 13 March we measured CO_2 concentration by the YY-method at the work-raft. Depth of the lake bottom there was 98.9 m. The measurement started from the depth of 98.3m and ended at 81 m where gas self-lifting ceased (Fig.2). The results are shown in Fig. 3.

Fig. 2 YY-method at Lake Monoun

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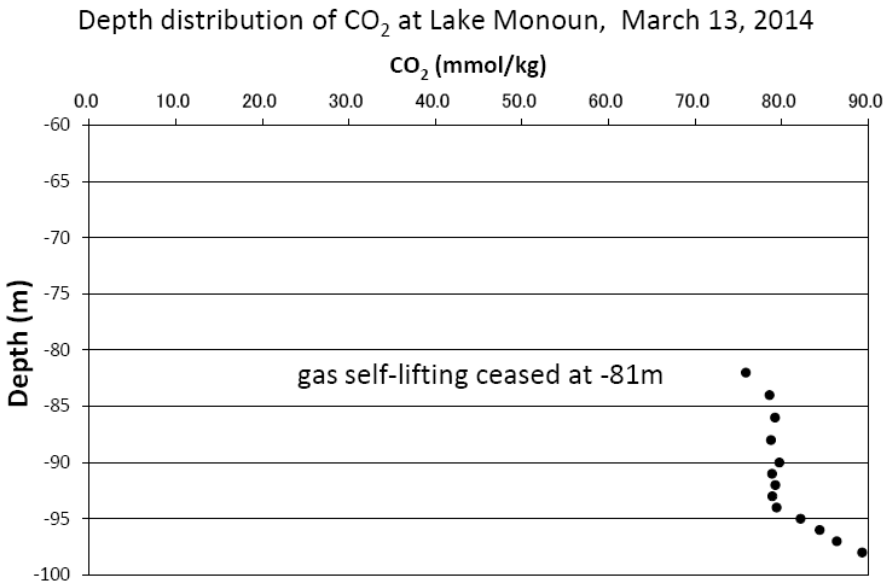

Fig. 3. CO_2 distribution of Lake Monoun in March 2014 measured by the YY-method.

3. Measurement of CO_2 concentration by the YY-method at Lake Nyos

On 15-16 March we measured CO_2 concentration using the YY-method at the Lake Nyos work-raft. Depth of the lake bottom there was 209.5 m. The measurement started from the depth of 209.5 m and ended at 110 m where gas self-lifting ceased (Fig. 4). The results are shown in Fig. 5. The highest CO_2 concentration was found ~150 mmol/kg at the deepest point. Compared to the previous data, the current CO_2 concentrations showed the minimum values at all depths, suggesting steady progress of degassing.

Fig. 4 YY-method at Lake Nyos

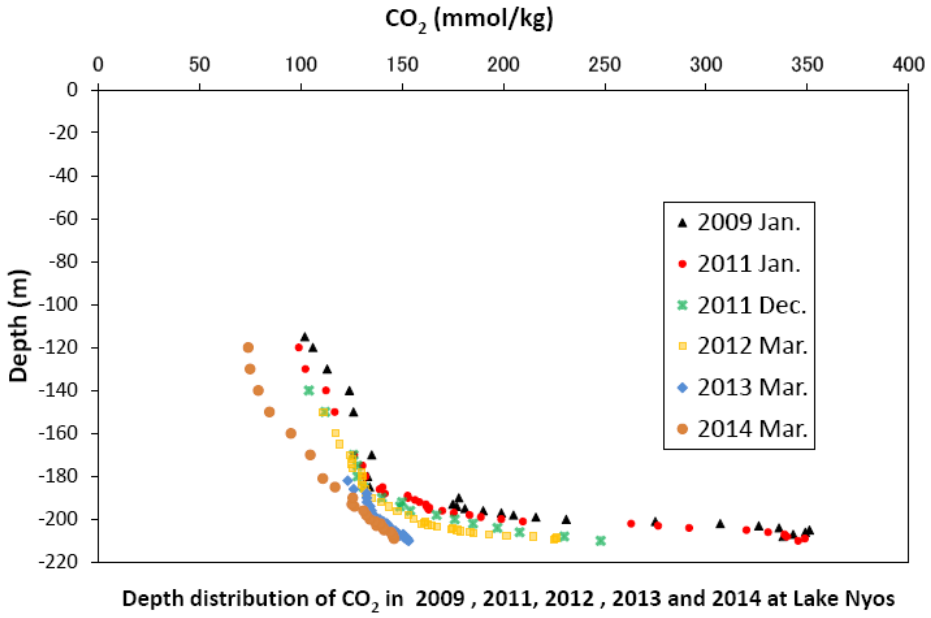

Fig. 5 CO_2 distribution of Lake Nyos measured by the YY-method

4. Maintenance of boat engines and generator

Transfer of technology about maintenance of boat engines and generator was made to local workers of Lakes Nyos and Monoun. This was intended to prepare accidental drowning of the engines in water.

A fine tuning of the yellow generator that supplies power to our lodges at Lake Nyos was made. A starter rope of the generator was replaced with a new one. How to maintenance of the generator was also instructed to workers.

5. Work log

8th March 2014: Y. Yoshida, M. Kusakabe and K. Nishio arrived at Yaounde in late evening.

9th March 2014: YY, MK and KN visited the Nkolbisson laboratory to pick up some materials necessary for the field work.

10th March 2014: JCC

11th March 2014: YY, MK, KN and Djomou moved from Yaounde to Foumbot. Stayed at Hotel du Stade.

12th March 2014: Check the solar energy-powered bottom water removal system and set up the measurement system of YY-method.

13th March 2014: Measurement of CO2 by YY-method. Boat engines maintenance.

14th March 2014: Move to Nyos.

15th March 2014: YY-method and maintenance of boat engines.

16th March 2014: YY-method, maintenance of generator and Nishio's ceremony (Wum).

17th March 2014: Move to Yaounde

18th March 2014: Preparation of the Mission report

19th March 2014: We visited IRGM, and discussed about the plan for the next JCC and capacity building.

20th March 2014: Check materials of J-team at Nkolbisson. YY, MK and KN left Yaounde for Japan in late evening.