Mission Report –Multi-Beam sonar survey at Lake Manoun–

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In this fieldwork from October to November in 2014, we carried out multi-beam seminar and survey so that Cameroonian researchers can do survey by themselves. Firstly, to understand a basic procedure, we programmed three sections for three weeks; seminar, survey and data processing. Furthermore, we retried same procedure to review at 4th week. In this report, we will describe the contents of each section.

Section 1. Seminar (From 21st to 30th Oct. and 5th to 7th Nov.)

HYPACK software is essential to do multi-beam survey. There are many functions and information to understand. Examples of functions are following; survey planning, boat controlling, data acquisition, data processing and mapping. Before fieldwork, firstly, we started a fundamental seminar to make an outline of multi-beam survey. This seminar is consisted by 5 chapters. Details of each chapter are shown in Table 1. Chapter 1 and 2 were opened mainly in the former period and remain chapters were held in later period. Besides this fundamental seminar, we also had training about cable connection procedure and an explanation of note points. Basic connection procedure is described in an appendix file.

Section 2 Survey (From 31st Oct. to 4th Nov.)

Before carrying out multi-beam survey, we need to prepare some data files. These files were prepared in the former seminar. On 1st Nov., we start to set up multi-beam sonar. That setting was proceeded under the leadership of Cameroonian researchers. At this time, we have done survey for 3 days and the total length of data line reached to 34 km. Due to the capacity of our boat, we all could not board. Then, we made some groups consisted mainly by Cameroonian researchers and conducted our survey. On 3rd Nov., Cameroonian researchers tried to do basic procedure of the survey, setting multi-beam on the boat and getting data, by themselves and their survey was succeeded. The results of sailing and data mapping are shown in Fig. 1, 2,3 and 4.

Section 3 Data processing and Mapping (From 5th to 7th Nov.)

Raw data of multi-beam survey contains some irregular spikes. Then, we need to remove

these data and correct in order to make more accurate mapping. This procedure, noise removing, is one of the main data processing. This procedure is not so complicate to do on computer, however, it is difficult to identify if each data is appropriate or not. Also, we need to consider the condition of survey; for example, sound velocity, tide data and patch test. Then, we started seminar about data processing (Table 1). In this seminar, we checked the basic procedure, including procedure of noise removing, which is listed in Table 1. After this, we repeated to same procedure to master them. At the result, Cameroonian researcher could do these procedures smoothly. After data processing, we moved to next step, mapping. HYPACK software has some applications to help for mapping. At this time, we had a lecture of creating the bathymetry map and TIN model (triangulated irregular network). Furthermore, we received a seminar about CUBE software, which is installed in the latest HYPACK and is used for data correction and processing. As described above, it is necessary to review many times in order to master data processing procedure.

Section 4 Review (From 10th to 14th Nov.)

In this period, we retried same procedure without survey on field. Cameroonian researcher tried to do all procedure with their knowledge, their note of the seminar and the manual. From their procedure, we could conclude that Cameroonian researcher mastered a basic procedure. But, some processing was not carried out accurately. To master all things, it is essential to try many times.

Section 5 Suggestions

This time, we found some problems about multi-beam survey.

Firstly, we need to prepare the new manual for HYPACK 2014. Before Japan team came to Cameroon, we prepared the manual for HYPACK 2011 which was pre-installed. Actually, HYPACK 2014 has various advantages and we can do many things with smooth. However, some points are not described in our present manual. So, we try to make new manual for HYPACK 2014.

Secondly, more powerful controlling PC is essential. HYPACK 2014 software can be used on 64bit version PC. However, PC in our possession for multi-beam survey, Shield Pro, is 32bit PC. At this time, we used private 64bit PC of survey participants. HYPACK 2014 software needs powerful CPU and enough memory to work smoothly and it is recommended that other software is not installed. In fact, PC with core i5 CPU did not work well in several times when we tried to do data processing. That PC did not have any other software. This matter may suggest that more powerful CPU, for example core i7, may be suitable for multi-beam survey and data processing. We also recommend for IRGM to buy such a powerful PC only for multi-beam survey.

Moreover, as mentioned above, a repeat training is necessary to understand and use multi-beam sonar. At this time, many researchers joined to multi-beam seminar. We are eager for them to review the seminar contents. Also, we recommend strongly for IRGM to go to survey many times. To go field and repeat a survey is the most helpful way for multi-beam users to understand and carry out survey by themselves.

Finally, we appreciate all of Cameroonian colleagues for their kind cooperation. If any problem occurred and requests, please let us know.

Table 1　Seminar contents

1 Preparation for survey
・Make new project
・Setting of geodetic paramater
・Input og background file
・Make Line editor
・Setting of matrix
2 Survey
・Setting of hard ware
・Operete of durring survey
・Should collect data during survey
3 Data post processing
・Processing of tide data
・Processing of sound velocity
・Post processing by use of MB Max
・Patch test
・Processing of XYZ data
4 CUBE
Post processing by use of CUBE
5 Final data processing
・Processing of bathymetric chart
・Processing of final matrix data
・Processing of TIN-model

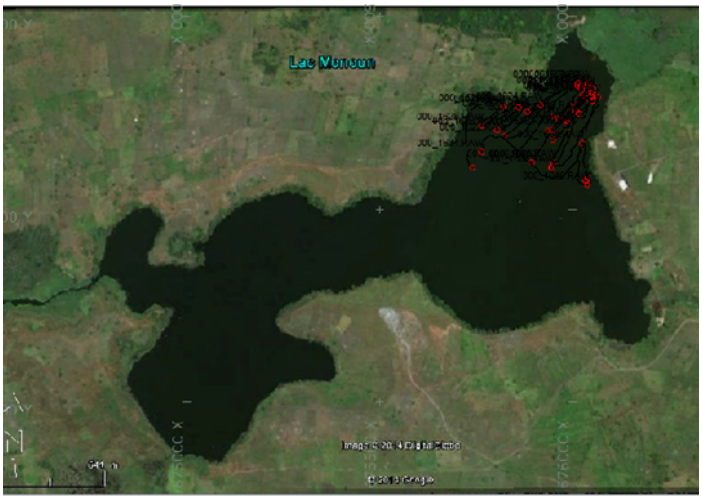

Fig1 Survey route on 1st Nov.

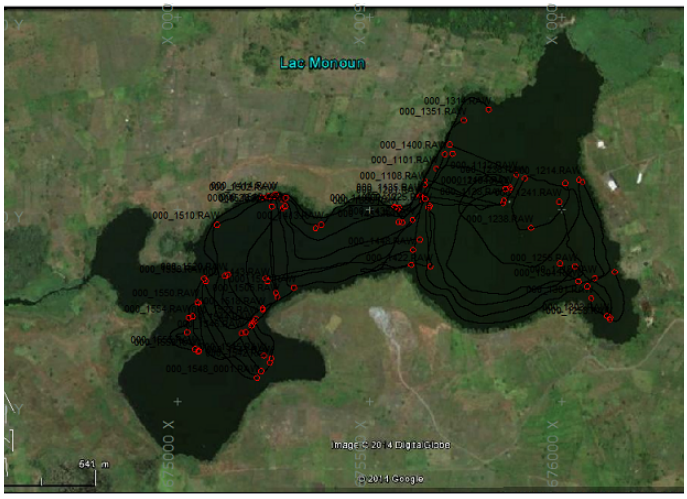

Fig2 Survey route on 2nd Nov..

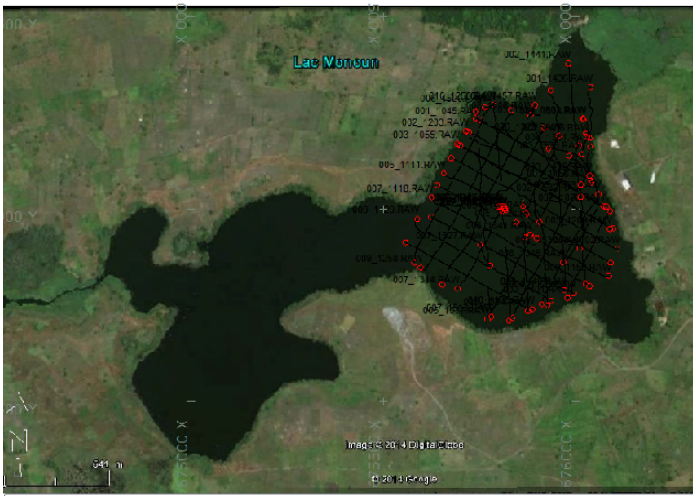

Fig 3 Survey route on 3rd Nov..

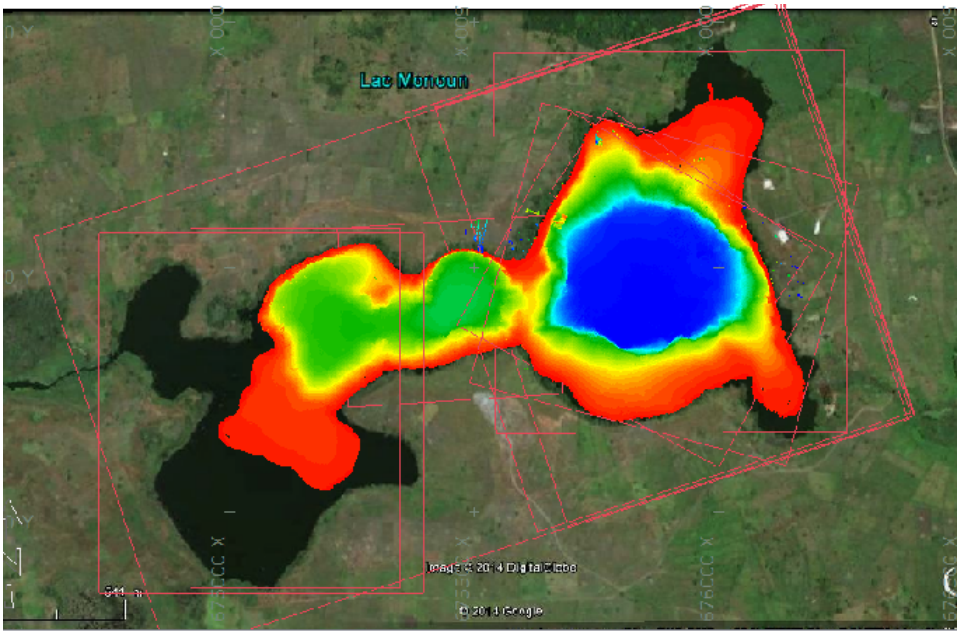

Fig4 Final getting data

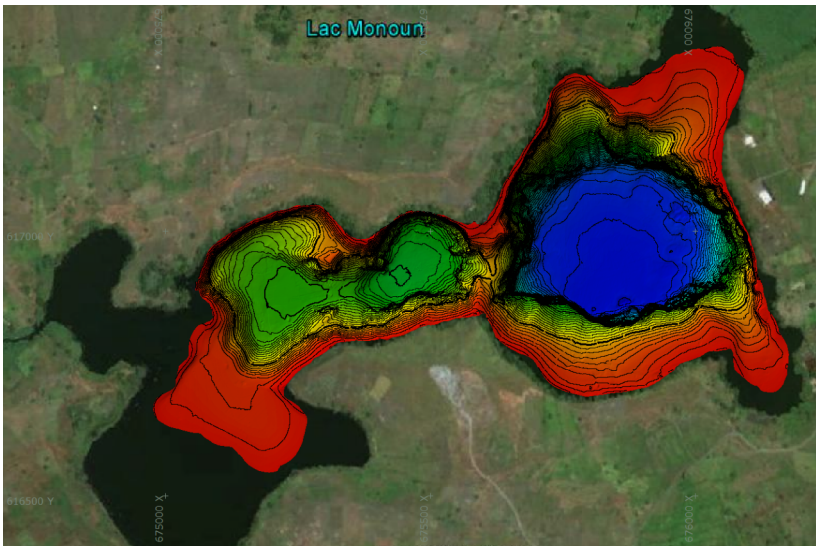

Fig5 Depth counter diagram

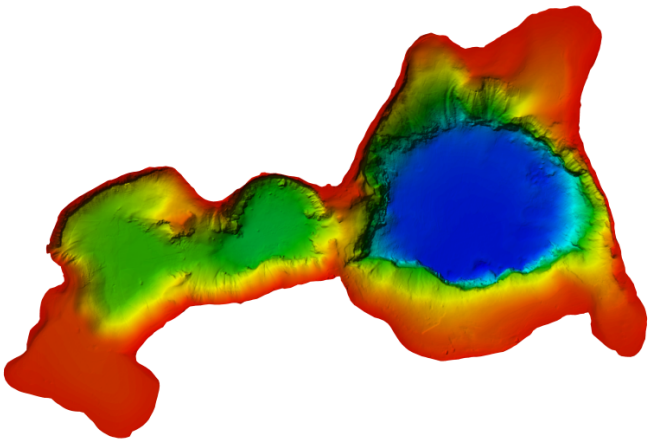

Fig6 TIN model