



UFZ-Seminar "Water and Environment"



22 May 2018, 3 p.m.

Seminar Room 1, Brückstr. 3a, Magdeburg

Augusta Umutoni

Lake Kivu Management Programme, Ruanda

will give a talk on:

LAKE KIVU MONITORING PROGRAM

Lake Kivu is a unique lake in an exceptional natural and socio economic context. The lake is important for the livelihoods of more than two million people as a source of drinking water, for fisheries and for transportation. Furthermore, large reserves of gases (mainly methane and carbon dioxide) are dissolved in the deep water of the lake. The water of Lake Kivu is disposed in layers of different density. The water from one layer does not mix with water from other layers, what makes the lake very stable. If no external forces intervene, the stability of the lake would last at least 50 more years.

Gases contained in Lake Kivu are very important for socio economic development of the region. In particular methane gas which has various uses: production of electricity, for cooking, production of fuel for automotives... It is in that regard that the government of Rwanda has invested big efforts in the extraction methane gas from Lake Kivu to produce electricity: in 2008, the first on-shore pilot plant to extract methane was constructed in Rubavu, it is operating since 8 years and produces electricity which is injected in the national grid. In 2015, a bigger methane gas extraction plant was completed in Karongi. Since January 2016 it produces 25 MW. This is something noticeable since both plants show that it is possible to have proper technology to extract gas from Lake Kivu.

Methane gas extraction technology is not easy to get because it does not exist anywhere in the world. Methane gas operators have to invent themselves their technology according to the properties of the lake and of its dissolved gases.

In 2008, when the first pilot plant of methane gas extraction (3 MW) started its operations, the Ministry of Infrastructure (MININFRA) created a unit in charge of monitoring the impact of methane gas extraction on the Lake, known as Lake Kivu Monitoring Program (LKMP), to make sure that methane gas extraction will not have any harm on the lake or/and on its environment. From 2007 to 2009, a team of international experts developed prescriptions that should be used to design and operate methane gas facilities.

The main objectives of the Lake Kivu monitoring are:

- To protect the lake's stability by ensuring that water of different layers are maintained in their respective layers and not mixing up within other layers.
- To ensure safety of users of the lake and of the staff working on methane gas extraction plants
- To preserve the lake's ecosystem ensuring that methane gas extraction doesn't harm living organisms in the biozone (by killing them because of gas intoxication or multiplication of unwanted organisms that can invade the whole lake as it happened in Lake Victoria)
- To ensure that methane gas resources are not wasted: this is possible through dilution of gas resources by degassed water if it is reinjected at inadequate depth.

The Lake Kivu Monitoring Program has a laboratory in Rubavu, where they carry out water, gas, nutrients and plankton analysis to monitor any impact that can be caused by methane gas extraction. Scientists from LKMP carry out studies near methane gas extraction facilities by following up the behavior of the plume of reinjected water. In fact, if reinjection of degassed water is done at inappropriate depth; it can rise up or sink in deeper layers, mixing up water from different layers, what would compromise the lake's stability. The team, through its inspections also makes sure that water that comes from deep water is not reinjected in- or near- the biozone what would affect living organisms (including fish) as explained above.

The LKMP cooperate with international and regional researchers to promote research studies on the lake. This will increase the understanding of the lake and have a significant impact on sustainable management of the lake's resources.