5th SGA-SEG-UNESCO-IUGS Short Course on African Metallogeny

SEDIMENT HOSTED Mn-Fe-U deposits: from exploration to metal

organized by
Society for Geology Applied to Mineral Deposits (SGA)
in cooperation with
Ministry of Mines of Gabon
School of Mines and Metallurgy, Moanda
University of Science and Technology, de Masuku, Franceville
Université Paris Sud, France

supported by
SEG, UNESCO and IUGS

to be held in

Moanda, Gabon, 10 – 14th October 2018

School of Mines and Metallurgy, Moanda, Gabon

Sediment-hosted ore deposits are widespread all over Africa. Many were formed during the Proterozoic (e.g. Central African Copperbelt, Kalahari Mn-fields…).

Gabon's sedimentary basins are located around Archean magmatic and metamorphic rocks. The Proterozoic Francevillan Basin in the southeastern part of the country hosts one of the world's famous manganese deposits. Uranium was mined in the same region until 1999.

Gabon is the 2nd largest Mn producer in the world after South Africa where Mn is mined from the famous, time-equivalent Kalahari Mn-fields, the world's largest on-shore Mn-deposits.

COMILOG, belonging to ERAMET Group, was founded in 1953. It has been operating the mine in Gabon since 1962 in Moanda, about 50 km from Franceville. Manganese (production of ~4 Mt/year) is exploited from laterites with an average grade of 46 % Mn. The ore is sintered and transported over 600 km by rail to the port of Owendo, close to Libreville, and shipped for steel production to clients in Europe, USA and China. Manganese metal is also produced at Moanda for the chemical industry.

Gabon has been a significant uranium supplier in the past. Uranium has been produced (In total about 28,000 t U) from the famous Mounana and Oklo deposits, discovered in 1956 and 1968, respectively, mined from 1960 to 1999. The Oklo deposit (total production 14,000 tU), is famous for its fossil nuclear reactors, which operated naturally in the wet sandstone orebody about two billion years ago.

Iron ore is not yet mined in Gabon, but the Bélinga iron ore deposit in NE-Gabon hosts estimated resources of ~384 Mt of high grade ore (Fe > 60% and P < 0.09%), and more than 1 Gt at grades of Fe > 50% and P < 0.18% (Kondja et al. 2017).

In 2016, the School of Mines and Metallurgy (http://e3mg.ga/) was founded at Moanda by the Gabon government and Comilog. There engineering students from all over Africa are educated in the field of exploration, extraction and metallurgy to insure high qualification for the African mining and metallurgical industries.

The aim of the 5th Short Course on African Metallogeny is to train geoscientists and engineers on metallogeny, including the metallurgy of Mn and U, for the purpose of providing skilled workers in academia and industry for future exploration, mining and processing.

With great pleasure, we announce this 5th international workshop, which is being organized by the Society for Geology Applied to Mineral Deposits (SGA), in close collaboration with the Ministry of Mines of Gabon, the School of Mines and Metallurgy at Moanda, Comilog-Eramet, the University of Sciences and Technologies of Masuku, Franceville, supported by UNESCO, IUGS and SEG. Following the four successful courses organized in Burkina Faso, Zambia, Morocco and Rwanda, this course will take place in Moanda, Gabon from Tuesday 10th to Saturday 14th of October. (These dates were chosen to coincide with the flight connections for all participants from Libreville to Franceville and the transfer to Moanda, as there are no flights on Saturday).

The course will comprise five days of training with lectures, practical exercises and field excursions and visits to the Mn-mine and metallurgical plants (see program below).

Venue
The five-day short course will be held in Moanda and the surrounding Mines and plants. The lectures will be held in the School of Mines and Metallurgy.
An optional visit to the port of Owendo will be organized. A touristic excursion to the National park close to Moanda can be organized upon request.

Number of participants
A maximum of 45 participants is set for logistic reasons and in order to ensure maximum benefits for each participant. It is expected that participants from industry meet and exchange with academia (researchers, lecturers and students).

Accommodation
45 rooms are available at the School of Mines and metallurgy. The rooms are equipped with air conditioning, shower and toilettes. This accommodation is included in the inscription fees.

A 3-star hotel: Heliconia Moanda (12.5 km from mining school) can be booked on request.

Costs:

1000 €: The course fees include the five-day workshop, lectures, field trips, course material, full-board accommodation (except alcoholic beverages), excursions (meals included), flight Libreville-Moanda, hotel and transport in Librevile.

500 €: The course fees include the five-day workshop, lectures, field trips, course material and full-board accommodation (except alcoholic beverages), excursions (meals included).

VISA: After inscription and payment, a formal letter will be sent for VISA application.

Language: the workshop will be held in French

CONTACT: ***Beate Orberger (beate.orberger@u-psud.fr)***

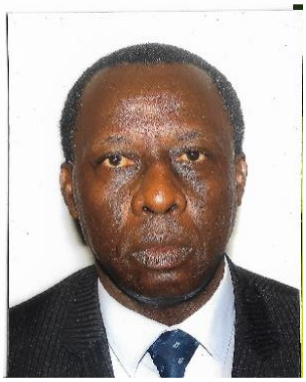
Lecturers

Maurice Pagel is emeritus professor at the University of Paris Sud, Orsay, France. Prior to his position as university professor, he was a senior scientist at CNRS (Centre National de la Recherche Scientifique, 1976 à 1977) at the famous Centre de Recherche sur la Géologie de l'Uranium (CREGU, Nancy). His research concerns unconformity-type and sediment-hosted uranium deposits. Maurice Pagel's research contributed significantly to the role of accessory minerals in granites and fertile volcanic rocks, the effect of radiation on these minerals, fluid mineral interactions, and the thermal history of U-mineralized basins. At present, he co-directs a French national project (CNRS, CEA, AREVA) on U-resources.

Jacques THIRY is chemical engineer graduated from Ecole Nationale Supérieure Chimie – Toulouse. He worked for AREVA in many positions during his carreer. He was Process Engineer and heap leaching uranium plant manager in SOMAIR (Niger) and Process Engineer in the Lodeve (France) alcaline process plant. He managed the R&D and Technical Services Department of Areva Mines (SEPA), the Metallurgical Processes and Plants Department. At the end of his career he was Technical Directior of the Areva BU Mines in charge of the Process and Mining studies for scoping or prefeasability phase. He was awarded as fellow expert in the Areva (now Orano) group from 2011 for its uranium's ore processes knowledges and skills. He retired from

the Company in September 2017, but is still President of a working Group within the French Industrial Mining Society for Ore Processing and Hydrometallurgy.

Beate Orberger is Associate Professor at the University of Paris Sud, Orsay, France and president of Catura Geoprojects (Geoscience Conseil). She has 30 years of experience in economic geology and geometallurgy, mainly on sediment-hosted Iron and Manganese deposits (Brazil, Australia, South Africa, Zimbabwe, Gabon), but also on Ni and Mn laterites. She worked for 5 years for ERAMET and co-directed a PhD thesis financed by COMILOG on the Mn-carbonates at Moanda. Her major research contributions are in the field of metal transfer and trapping during fluid circulation (magmatic, hydrothermal and weathering processes). At present, she is scientific coordinator of several EU financed projects (H202, EIT) constructing combined drilling and on-line-on-mine-real time analytical expert systems to increase resource efficiency during exploration, mining and processing.



Antoine Ango Marthurin is an engineering geologist, at present counselor at the Ministry of Mines in Gabon, in charge of the iron ore deposit at Belinga since 2005. As administrator of the SOSEM society, he directs the work on future mining activities on gold and related metals. During his career, he worked on the uranium mine at Oklo. Directing the exploration work, he was head of the department of geology and drilling at COMUF and managed the mine development of ETEKE for the Canadian society Golden Star in joint venture with the Australian company Lafayette Mining. He also held the position of the director general of the Ministry of Commerce and industrial development of Gabon.

Two lecturers will be appointed for lecturing the Economic geology of Gabon and the Metallurgy of the Mn-ore.

Program

5th Workshop on African Metallogeny
Moanda, Gabon

10th – 14th October 2018
arrival/departure: Sunday and Monday
(flights: Libreville-Franceville and transfer from Franceville to Moanda)

Sediment-hosted Mn-Fe-U deposits: from exploration to metal

Day 1:
9H00-9H45: Welcome

9H45-10H30: Introduction to the geology and metallogeny of Gabon
(Univ. of Science and Technology, Franceville)

Coffee break

URANIUM

11H00-12H00:	Physico-chemical properties of uranium and natural fission reactors (Oklo) *(Maurice Pagel)*
12H00 – 13H00	Uranium deposits (*Maurice Pagel)*
13-14h:	Lunch
14H00-15H00:	Unconformity-type uranium deposits (*Maurice Pagel)*
15H-16H00:	Uranium deposits of Niger (*Maurice Pagel)*

Coffee break

16H30 – 18H30:	Metallurgy of Uranium: from ore to yellow cake *(Jacques Thiry)*

Day 2 Manganese

9H00-10H30:	Physico-chemical properties of Manganese and Iron Mn- Fe ore types *(Beate Orberger)*

Coffee break

11H00-13H00:	Sediment hosted Mn-Fe deposits in Southern Africa and Brazil *(Beate Orberger)*

13H00-14H00: Lunch

14H00-15H30: The Manganese deposit of Gabon: from Mn-rich black shales to Mn-laterites *(Beate Orberger)*

Coffee break

16H00-18H30: Metallurgy: from Mn-oxide to product (COMILOG)

Day 3: Iron Ore

9H00-10H30: Iron ore BELINGA *(Antoine Ango Mathurin)*

Coffee Break

11H00-12H00: Perspectives and Conclusions

Lunch and preparation for departure

Afternoon
Excursion: Visit the famous fossils (2.1 Ga) in the black shales close to Moanda-(Franceville) – and the COMILOG plant
(depending on the number of participants 2 groups)

Day 4
Morning: EXCURSION Comilog Plant

Lunch

Afternoon: Mn-Mine Comilog

Day 5
Morning: Mine visit and closure of the short course

Visit of Animal Park