



## Program

# 5<sup>th</sup> 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 – 14<sup>th</sup> October 2018**



School of Mines and Metallurgy, Moanda, Gabon

## Program

### 5<sup>th</sup> Workshop on African Metallogeny Moanda, Gabon

10<sup>th</sup> – 14<sup>th</sup> 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

9H45-10H15: Introduction to the geology and metallogeny of Gabon  
(Francis, Maya-Mikolo, Direction Générale de la Géologie et de  
la Recherche Minière (DGGRM), Gabon)

10H15-10H45: Geology and Metallogeny of the Francevillan Basin  
(Matthieu Moussavou, University of Science and Technology,  
de Masuku, Franceville)

Coffee break

#### Day 1 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

11H00-12H00: Mn ore deposits: an introduction (*Beate Orberger*)

12H00-13H00: Sediment hosted Mn deposits in Southern Africa and DCR (*Thierry de Putter*)

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 Mathurin Ango*)

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 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.

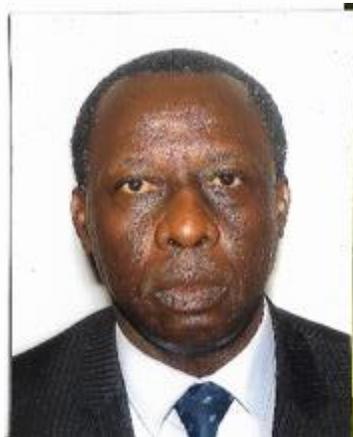


**Jacques THIRY** is chemical engineer graduated from Ecole Nationale Supérieure Chimie – Toulouse. He worked for AREVA in many positions during his career. He was Process Engineer and heap leaching uranium plant manager in SOMAIR (Niger) and Process Engineer in the Lodeve (France) alkaline process plant. 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 Director of the Areva BU Mines in charge of the Process and Mining studies for scoping or prefeasibility 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 Mathurin Ango** 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. At present, he is councilor for the president of Gabon for the mineral resource sector.



**Thierry De Putter** is Head of the Geodynamics and Mineral Resources Unit at the Royal Museum for Central Africa (RMCA), Tervuren, Belgium. He has been for 7 years (2006-2013) co-Chair of a task force of the Belgian Foreign Affairs on good governance in the mining sector in D.R. Congo. His present research focuses on the world-class Neoproterozoic sediment-hosted Cu-Co-U deposits in the Katanga Copperbelt (DRC); on the mineral wealth of the Kasai Block (Congo Craton), including the poorly-known Paleoproterozoic manganese deposit at Kisenge, Western Katanga; and on the timing of the formation of recent supergene deposits in southeastern DRC. He also published on the role of natural resources in the persistence of conflicts in Eastern DRC, and on the development in DRC.



**Francis MAYAGA-MIKOLO** holds a Ph. D, Geology and Geochemistry, Clermont-Ferrand University, France (1996), with a strong support and collaboration of Bureau de Recherches Géologiques et Minières (BRGM, France). From 1999-2004 he was De Beers Deputy Exploration Project Manager in Gabon and other ventures. He served as a Director of Geological Survey Division (2004-2011), then took the position of the Deputy General Manager of Geology and Mining department (2011-2015). Since 2015 he is the General-Director of Geological Survey of Gabon (since 2015) and Scientific and technical coordinator for the latest edition of Gabon Geological and mineral resources map (2009).



**Professor M. Moussavou** (University of Science and Technology, de Masuku) is Head of the Department of Geology. His research is focused on the environments of sedimentary rocks, petrology and metallogeny of the Paléoproterozoic, in particular of the Francevillan Basin.

**Three lecturers (COMILOG)** will present the metallurgy of the Manganese oxide ore.