



## **Report on the 1<sup>st</sup> SGA-SEG-UNESCO-IUGS Short Course on African Metallogeny in Ouagadougou, Burkina Faso, 12-18<sup>th</sup> March 2012**

**Hartwig E. Frimmel, course coordinator**

*Institute of Geography and Geology, University of Wuerzburg, Am Hubland, D-97274 Wuerzburg, Germany, e-mail: hartwig.frimmel@uni-wuerzburg.de*

After many months of planning and rising excitement, the 1<sup>st</sup> Short Course on African Metallogeny was held from 12<sup>th</sup> to 18<sup>th</sup> March 2012 in Ouagadougou, Burkina Faso. Having been the first event of this kind and of what is planned to become an annual series of courses, it was naturally an experiment with initially uncertain outcome. With hindsight it can safely be said that it was a huge success and a major milestone in the extra-university training of mine and exploration geologists in Africa.

The principle idea behind the Short Course followed the model of the highly successful UNESCO-SEG-SGA Latin American Metallogeny Courses that have been run annually in different locations in South America for the past three decades. The African continent is well endowed with mineral resources and yet much of Africa's mineral riches remain to be discovered. Mining has played a pivotal role in the economy of many African countries with contributions to foreign exchange earnings exceeding 50 % in many instances. There is no doubt that the exploitation of mineral deposits could form a substantial, if not the strongest, platform on which to base the future uplifting of the African economy. At the same time Africa is moving more and more into the focus of the global mining industry, especially gold miners. This became particularly evident at the recent PDAC Meeting in Toronto where discussions revolved around the growing number of junior companies producing gold in Africa and growing space of acquisitions in countries like Burkina Faso or Ivory Coast.

The discovery of new deposits as well as the economic and sustainable exploitation of known deposits requires skills that are not as readily available in many areas of Africa as they might be in other parts of the world. Thus, not surprisingly, the wish to organize some kind of training courses for young African geoscientists in the specific field of metallogeny, i.e. practical aspects of the genesis of ore deposits that can be applied in the formulation of future exploration strategies, has been voiced repeatedly by numerous companies and organizations, foremost the Geological Society of Africa (GSAf), SGA and SEG. As an aftermath of the IGCP's 40<sup>th</sup> anniversary celebrations, an Earth Science Education Initiative in Africa was launched and, as the concept of running professional short courses for African geoscientists fits perfectly into this initiative, it was no surprise that UNESCO and the IUGS swiftly welcomed the plan

of Short Courses on African Metallogeny. Under the leadership of SGA, the course was organized with help from the Institut de recherche pour le développement (IRD) in Toulouse, financial contributions from SEG and IUGS and sponsorship (in kind) from UNESCO and the GSAf.

The decision to run this first short course on African metallogeny in Burkina Faso, a country that is known to many foreigners as “Burkina what?”, was guided by a currently extraordinary interest by many exploration companies in the West African Craton as exemplified by WAXI, the West African Exploration Initiative, and a keen interest by local geologists to host the course there. Burkina Faso is one of the poorest countries in the world where the hopes for a better future are fuelled by the expectation to discover new ore deposits. Just in the past five years five gold mines opened in the country and the national gold production rose from close to zero in 2006 (based merely on artisanal mining) to 33 t in 2011 when gold overtook cotton as the country’s most important export product. Several projects stand a good chance of becoming mines in the foreseeable future. Apart from gold there are also promising prospects in manganese and several other commodities. The largely covered bedrock geology is dominated by Palaeoproterozoic granite-greenstone belts (Birimian) adjacent to an Archaean craton further west. Taking into consideration the regional geological setting and current exploration interests,

### **“Precious and Not-so-precious Metals in Old Cratons”**

was chosen as theme for the course.

The course was hosted by Teng Tuuma Geoservices (TTG), a young company in Ouagadougou that provides exploration services as well as a brand new training centre. In fact, this course was the very first event staged by TTG in their new building, which became finished literally on the day before the opening of the course. The managing director of TTG, Dr Morou Francois Ouedraogo, deserves much of the credit for the success of the course. Together with his staff he organized all the logistics on site, supported the delegates from their first steps into the country at the airport all the way through to taking care of food and drinks during the course and providing a well equipped, comfortable lecture theatre. Without his engagement and the tremendous work done by his wife and all the TTG staff this short course would not have been possible.

The course attracted considerable interest from the Burkina Faso government. Thus the opening ceremony on Monday, 12<sup>th</sup> March, was attended by Mr Nombre, representative of the Minister of Mines of Burkina Faso, who expressed his gratitude to the organizers for the initiative to train young geoscientists in Burkina Faso, and by Mr Koala, Executive Secretary of the Chamber of Mines of Burkina Faso. On the next day, Mr Salif Kaboré, Burkina Faso’s Minister of Mines, Carriers and Energy himself, honoured our meeting with his presence and expressed his thanks for this initiative but also his hope for a continuation of the training of West African geoscientists in the years to come.

The theoretical part of the course covered a wide range of lectures. Following an introduction to the principal requirements for the formation of an ore deposit and an introduction to the regional geology, specific topics that were addressed in greater detail included hydrothermal ore-forming processes, structural control on mineralization, orogenic gold deposits in general and geochemical exploration tools for such deposits in particular, IOCG deposits in Archaean rocks, Palaeoproterozoic granite-hosted gold deposits (with examples from Brazil), Archaean palaeoplacer deposits, rare metal deposits in pegmatites,

genesis of iron formation and their significance in the reconstruction of palaeoenvironmental conditions, and iron ore as well as manganese ore deposits. These contributions were presented by Pasi Eilu from the Geological Survey of Finland, Roberto (alias "Aleluia") Xavier from the University of Campinas, Brazil, Lenka Baratoux and Marieke van Lichtervelde, both from the Institut de recherche pour le développement (IRD) in Toulouse, France, Nic Beukes from the University of Johannesburg, South Africa, and Hartwig Frimmel from respectively the University of Wuerzburg (Germany) and the University of Cape Town (South Africa). Towards the end of the week, Peter Williams from Curtin University and partner in TTG provided insights into geophysical exploration methods, with many real-life examples, and Morou Francois Ouedraogo explained numerous examples of exploration successes in Burkina Faso. Finally, the course was concluded by an outlook on future availability of georesources by Hartwig Frimmel.

The five-day short course was followed by a two-day field trip to several exploration projects in the area near Gaoua in the southwestern part of Burkina Faso near the border to the Ivory Coast. This field visit was led by Morou Francois Ouedraogo and Athanase Nara, chief geologist of Volta Resources. The participants were able to examine the style of mineralization (mainly Cu and Au) in field outcrops, trenches and drill core, and gained a good insight into the principle controls of Cu and Au mineralization in that greenstone-dominated area, reaching the conclusion that an early porphyry Cu-type of mineralization was followed and overprinted by syn-Birimian orogenic gold mineralization along a major north-south trending shear zone. The field trip was generously supported by Volta Resources who sponsored a final dinner that was also attended by Mr Jean Baptiste Kambou, the mayor of Gaoua, and Mr Bernard Y. Sawadogo, the chief commissioner of the Southwest Region. Special thanks go to our host there, the country manager of Volta Resources, Mr Raphael Goama Zoungrana, for his great hospitality.

For logistic reasons the number of participants was initially set to not more than 50 for the theoretical part of the short course and not more than 20 for the post-workshop field trip. The demand for this course was, however, so overwhelming that, although several (late) applicants had to be turned down, a total of 61 delegates ended up for the short course, most of whom came along for the field trip as well. Altogether 14 different exploration companies were present. The country origin of the participants reflected perfectly the overall African (with focus on West African) flavour of the course, with delegates not only from Burkina Faso but also from as far afield as Australia, Botswana, Cameroon, Congo, France, Ghana, Guinea, India, Ivory Coast, Liberia, Niger, Nigeria, South Africa, and Sweden.

The entire short course was presented in English. A dominance of delegates from francophone countries led to initial concerns that language could be a stumbling block. Our French-speaking colleagues very quickly proofed, however, that their language skills had been underestimated and that they could follow the English-speaking presenters perfectly well, in spite of having to deal with a variety of dialects and styles of pronunciation.

A principal goal of this and hopefully all following Short Courses on African Metallogeny has been and will remain the provision of a platform for further training of young geologists who have difficulties in obtaining such training in the fields of ore deposit research and exploration due to financial constraints or the lack of capacity at their home institutions. This will be possible only for as long as sufficient funding for sponsoring students and professionals from economically disadvantaged backgrounds can be

generated. Although professional societies, such as SGA and SEG, and organizations, such as UNESCO or the IUGS, can help to some extent, the onus of providing the required funds will continue to rest with the mining and exploration industry. To achieve a win-win situation for all parties, delegates from industry are expected to cross-subsidize with their course fees those delegates who do not have access to sufficient funds. Although this 1<sup>st</sup> Short Course on African Metallogeny saw a healthy mix of delegates from industry, academia and government institutions, the proportion of delegates from the exploration industry was higher than expected. This made it possible to accumulate some money that will form the beginning of an educational fund to be used to support a greater number of students (and some academics from economically disadvantaged institutions) in future courses. Thus the 1<sup>st</sup> Short Course on African Metallogeny was not only a great success for those who participated but also for those who plan to conduct, or participate in, similar courses on the African continent in the years to come.

Finally, it cannot be emphasized enough that the success of such a Short Course lies not only in the hands of an organizing society, such as SGA, but hinges completely on the cooperation, efficiency and willingness of a local partner. The whole team of TTG has set a high standard, for which we all owe them greatly. Now other groups in Africa are invited to take up the challenge to host one of the next Short Courses on African Metallogeny. Applications to stage such an event are called for and anyone interested is invited to submit a proposal to the SGA Executive Secretary Dr Jan Pašava ([jan.pasava@geology.cz](mailto:jan.pasava@geology.cz)).

Thanks to our local sponsors in Burkina Faso, Teng Tuuma Geoservices and Volta Resources!



A few impressions from the course ....



Dr Morou Francois Ouedraogo (left) is opening the short course in the presence of the Mr Koala, Executive Secretary of the Chamber of Mines (background left) and Mr Nombre, representative of the Minister of Mines (middle) and Prof. Frimmel, course coordinator (right).



Mr Salif Kaboré, the Minister of Mines, Carriers and Energy of Burkina Faso in the middle with Dr Morou Francois Ouedraogo (to his left), surrounded by the lecturers and TTG staff in front of the TTG training centre.



Lenka Baratoux explains the intricacies of geological structures and their role in mineralization.



Morou Francois Quedraogo provides insights into the regional geology of Burkina Faso.



An enthusiastic Roberto Xavier explains the principles of hydrothermal ore formation.



Delegates trying to solve an orogenic gold exploration exercise.



A happy round of lecturers during coffee break (from left: Nic Beukes, Roberto Xavier, Lenka Baratoux, Marieke van Lichtenvelde, Hartwig Frimmel, Pasi Eilu)



Some of the delegates gathering for a “family” photo around Mr Koala, Executive Secretary of the Chamber of Mines and Mr Nombre, representative of the Minister of Mines (middle left).



Peter Williams sharing his vast experience in geophysical exploration in West Africa .



Location of the short course: the Teng Tuuma Geoservices Training Centre in Ouaga 2000.



Delegates following the old-timers' tracks in the search for copper near Gaoua.