

REPORT OF THE PANAFGEO WP-E TRAINING SESSION

Geohazards and environmental management of mines, held in Moanda, Gabon: 26th March – 1st April 2023

Venue: Ecole des Mines et de la Metallurgie de Moanda

The Geohazards & Environmental Management of Mines (WP-E) training session in Moanda, Gabon took place from 27 March to 1 April 2023 and did cover a range of important topics related to geohazards and environmental management in mining.

The elaboration of the training programme was coordinated by the WP-E leader Dr Jonas Satkunas and WP-E co-leader Dr Souleymane Diop. The Deputy co-leader Mrs Florence Tchoffo (Ministry of Mines, Industries and Technological Development, Republic of Cameroon) managed all logistic aspects (e.g. selection of communication with trainees, arrangement for visa, accommodation, etc.). Mr Christian Boupassia, Director General Ecole des Mines et de la Metallurgie de Moanda (E3MG), with the kind help of E3MG's staff undertook all logistical arrangements of the course (invitations, visas, venue, accommodation, transportation, etc.) and contributed with lectures and field guiding. The training was performed in French.

The training was attended by 31 participants (9 women and 22 men) out of 82 applicants. The 24 participants were supported by the PanAfGeo project while the remaining 7 additional participants were supported by the Ministry of Mines and Geology of Gabon. The trainees were from: Burkina Faso 1, Burundi 1, Cameroon 2, Central African Republic 1, Chad 1, Comoros 1, Congo Republic 1, Democratic Republic of Congo 2, Cote d'Ivoire 2, Djibouti 1, Gabon 13, Madagascar 1, Niger 2, Senegal 2. All participants had an opportunity to introduce themselves during the first day.

Lecturers / instructors of the WP-E course:

- Souleymane Diop, Council for Geoscience of Republic of South Africa (CGS);
- Giuseppe Delmonaco, Geological Survey of Italy (ISPRA);
- Francesco Traversa, Geological Survey of Italy (ISPRA);
- Monica Serra, Geological Survey of Italy (ISPRA);
- Wołkowicz Stanisław, Polish Geological Institute – National Research Institute (PGI-NRI);
- Joanna Fajfer, Polish Geological Institute – National Research Institute (PGI-NRI);
- Hugues Christian Ekogha, Department of Raw Materials of the Ministry of Mines and Geology in Gabon;
- Dieudonne Mouketou-Tarazewicz, Université Omar BONGO, Gabon, Université Varsovie, Poland;
- Jonas Satkunas, Lithuanian Geological Survey (LGT).

The opening ceremony featured speeches from distinguished guests, including:

- Bernard Moulonda, the Mayor of Moanda;

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- Christian BOUPASSIA, the Director General of the School of Mines and Metallurgy in Moanda (E3MG);
- Hon. Elvis OSSINDJI, Minister, the Ministry of Mines and Geology in Gabon;
- Hugues Christian Ekogha, the Director General of the Department of Raw Materials of the Ministry of Mines and Geology in Gabon;
- Souleymane Diop, Co-leader of PanAfGeo-2 WP-E.

The audio recording of the WP-E introductory training session was featured on a local radio station's interview and the video coverage produced by a Gabonese TV, [click here](#).



The opening ceremony (L). Group photo of all participants in the front of the Ecole des Mines et de la Metallurgie de Moanda (R).

The following lectures were delivered on 27th March, Monday, after the opening ceremony:

- Life with geohazards. *Souleymane Diop and Jonas Satkunas*;
- Minerals and mining in Gabon. *Hugues Christian Ekogha*;
- Slope stability/landslides in mines. *Giuseppe Delmonaco/Francesco Traversa*;
- Geohazards in Gabon. *Dieudonne Mouketou-Tarazewicz*.

28th March, Tuesday and 29th March, Wednesday

Technical field trips to mines of manganese in Moanda (Bangombe), uranium mines in Mounana (rehabilitated), Oklo natural reactor (led by Mr Christian Boupassia) were carried out.

Particular attention was also given to the huge landfills of extractive waste (photos below), sampled by the participants and which could possibly be re-evaluated as materials to be reprocessed, based on the mineralogical content and according to a circular economy perspective.

Training on slope stability measurements at the landslide site in Mont Moanda was conducted by Giuseppe Delmonaco, Francesco Traversa and Souleymane Diop.

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Post-mining waste (L). Trainees collect manganese ore crumbs at a post-mining landfill (R).



The landslide at Mount Moanda (L). Training on slope stability measurements (R).



Training on rock stability measurements (L). The Ecole des Mines et de la Metallurgie de Moanda provided very good facilities for lecturing and discussing (R).



Practical exercises of slope stability evaluation using HYRCAN 2.0 software.

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Lectures on 30 March, Thursday:

- Mining and geohazards, South Africa. *Souleymane Diop*;
- Geocontamination, impacts on human health. *Stanislaw Wołkowicz*;
- Management of mines, reuse of waste minerals. *Monica Serra*;
- The role of post-mining and post-processing waste in a circular economy. *Joanna Fajfer*;
- Monitoring of post-mining (post-exploitation) and post-processing waste dumps as a tool to assess the environmental impact of deposited waste. *Joanna Fajfer, Stanislaw Wołkowicz*.

31st March, Friday:

- Desktop exercises on slope stability. *Giuseppe Delmonaco/Francesco Traversa*;
- Valorisation of mining and post-processing waste; conflict metals (Au, Ta, W, Sn) and ASM *Stanislaw Wołkowicz*;
- Post-mining and post-processing waste: useless waste or raw material? *Joanna Fajfer, Stanislaw Wołkowicz*;
- Good and bad practices in the rehabilitation of post-mining areas. *Joanna Fajfer, Stanislaw Wołkowicz*.

Summary of the training:

The training was performed in full planned scope and was of great interests for the School of Mine and Metallurgy in Moanda (E3MG) and the Ministry of Mines and Geology in Gabon. Trainees were satisfied with contents and materials of training, although all participants encountered logistical problems related to connection flights from Libreville to M'Vengue and back.

The training also triggered a project to investigate the landslide of Mount Moanda, including slope stability measurements, geotechnical investigations and digital elevation modelling in order to publish a scientific paper and demonstrate a pattern and model for aerial slope stability mapping applicable for Gabon. Further plans of technical cooperation between PanAfGeo WP-E team and E3MG were also discussed.