

## **Report PanAfGeo2 Work Package-E Training Session Geohazards and Environmental Management of Mines**

**Held in Rwanda 20–24 November 2023,**

Venue: Nobleza Hotel, Kigali-Nyamata Road, KK 15 Rd

The Geohazards & Environmental Management of Mines (WP-E) training session in Kigali, Rwanda, took place from 20 November to 24 November 2023 and covered a range of important topics related to geohazards and environmental management in mining.

The elaboration of the training program 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) was dealing with selection and communication with trainees. Mr Tite Niyitegeka, Rwanda Mines, Petroleum and Gas Board (RMB), with the kind help of RMB staff undertook all logistical arrangements of the course (invitations, site visits, transportation, etc.) and contributed with lectures and field guiding. Mrs. Céline Andrien, EuroGeoSurveys, kindly contributed with logistics (delivery of allowances, gadgets) and communications. The training was performed in ENGLISH.

The training was attended by 23 participants (one participant cancelled his attendance due to health problem). Gender balance: 12 women and 11 men. Participants were selected out of 70 applicants. The trainees were from: Eritrea 1, Nigeria 1, Cameroon 2, Liberia 3, Malawi 2, Rwanda 2, Botswana 1, Ghana 1, Kenya 1, Sudan 1, Ethiopia 1, Uganda 1, Namibia 3, South Africa 3. All participants had an opportunity to introduce themselves during the first day.

### **Lecturers/instructors:**

- Jonas Satkunas, Lithuanian Geological Survey (LGT)
- Souleymane Diop, Council for Geoscience of Republic of South Africa (CGS)
- Tite Niyitegeka, Rwanda Mines, Petroleum and Gas Board
- Giuseppe Delmonaco, Geological Survey of Italy (ISPRA)
- Francesco Traversa Geological Survey of Italy (ISPRA)
- Luca Maria Puzzilli, Geological Survey of Italy (ISPRA)
- Duska Rokavec, Geological Survey of Slovenia (GeoZs)
- Petra Gostincar, Geological Survey of Slovenia (GeoZs)
- Stanisław Wołkowicz, Polish Geological Institute (PGI)
- Dieudonné Mouketou-Tarazewicz, Université Omar Bongo, Gabon, Université Varsovie,
- Jean Claude Ngaruye. Geological Society of Africa, Rwanda Mines, Petroleum and Gas Board.

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The opening ceremony featured speeches from distinguished guests, including:

- Ivan Twagirashema, Deputy CEO of Rwanda Mines, Petroleum and Gas Board (RMB)
- Julie Hollis, Secretary General of EuroGeoSurveys (EGS)
- Michela Tomasella, Head of Cooperation, Delegation of the European Union to Rwanda



*Group photo of all participants - after the opening ceremony.*

The following lectures were delivered on **20<sup>th</sup> November, Monday**, after the opening ceremony:

- Life with geohazards. *Jonas Satkunas and Souleymane Diop*;
- Mining and geohazards in Rwanda. *Jean Claude Ngaruye*;
- Mining and land subsidence. *Souleymane Diop*;
- Slope stability/landslides in mines. *Giuseppe Delmonaco and Francesco Traversa*;
- Applied geophysics to landslides. *Luca Maria Puzzilli*;
- Geohazards in the region, introduction for the field trip. *Tite Niyitegeka*.
- Introduction of participants

### **21<sup>st</sup> November, Tuesday:**

A technical field trip to Gatumba quarry for mapping geohazards and practical trainings on slope stability evaluation was carried out. This training was performed by Giuseppe Delmonaco,



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Francesco Traversa and Luca Maria Puzzilli. Later along the way to Muzandze all group observed and discussed number of landslides and reinforcement facilities.



*All group in Gatumba quarry*



*Practical trainings on slope stability evaluation. Giuseppe Delmonaco (right) is giving instruction.*



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*Going to observe large landslide in Hindiro.*

### **22<sup>nd</sup> November, Wednesday:**

The visit to kasiterite-Rutongo Mine, lead by guide Sam Ryumugabe, was arranged. The Rutongo Mines Ltd provided well organised introduction on mining of cassiterite, safety instructions, supplied safety equipment and provided visit to mining and processing units.



*Instruction before visit to the Rutongo mine.*



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*Processing unit of Rutongo mine.*



*At the entrance of the underground mining unit of the Rutongo mine.*

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*Practical exercises of slope stability evaluation using HYRCAN 2.0 software.*

### Lectures on 23<sup>rd</sup> November, Thursday:

- Practical exercises on geohazards. *Souleymane Diop*;
- Geocontamination, impacts on human health. *Stanisław Wołkowicz*;
- Remediation of mining areas for prevention of environmental impacts. Waste as raw material. *Duska Rokavec*;
- Under mud and water. Analysis of a geohazard event in Slovenia. August 2023. *Petra Gostinčar and Duska Rokavec*;
- Practical methods of analysis of earthquake-induced effects on the ground (including field applications). *Luca Maria Puzzilli*.

### Program 24<sup>th</sup> November, 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 *Stanisław Wołkowicz*;
- Slope mass movements. Earth observation data and geohazard management. *Petra Gostinčar*;
- General discussions; Return-to-work plan; Questionnaires; Certificates and Closing ceremony.

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*Certificates distributions to the trainees.*

## Summary of the training:

The training was conducted according to the planned scope and generated great interest among all participants. The trainees expressed satisfaction with the training contents, materials, field trip guides, and impeccable logistics, including the training venue and transport arrangements to and from the airport. In the concluding general discussions, each participant eagerly shared their impressions and outlined their plans for implementing the newly acquired knowledge upon return to work. Every participant received comprehensive training materials on USB sticks and Field trip books.

The training also triggered discussions within the RMB about establishing a unit dedicated to geohazards inventory and landslide susceptibility mapping, with the assistance of the PanAfGeo WP-E group.

The field trip guide for Rwanda has been uploaded to the PanAfGeo website under the handbooks section: <https://panafgeo.eurogeosurveys.org/media/publications/>.

Photos in this report by *Stanisław Wołkowicz and Jonas Satkunas*





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A brochure outlining the aims and plans for PanAfGeo-2 can be found [here](#).

For more information, visit: <http://panafgeo.eurogeosurveys.org/>

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