



PanAfGeo

*Geoscientific Knowledge & Skills
in African Geological Surveys*



Call for Applications for a PanAfGeo Training

« WP7 – Geoscientific information Management »
**WP7-C Multilayer 3D geological modelling using dedicated
geoscience software**

15 January - 26 January 2018 – Dakar, Senegal
in French

1. MAIN CONTEXT OF PANAFGEO

“PanAfGeo” for “Pan-African Support to the EuroGeoSurveys-Organisation of African Geological Surveys (EGS-OAGS) Partnership” is a project which supports the training of geoscientific staff from African Geological Surveys through the development of an innovative training programme that includes the acquisition and development of important professional skills that complement their qualifications and technical skills. The training programme is carried out by world-class geoscientific experts coming from African and European Geological Surveys.

PanAfGeo is co-funded by the European Commission (Directorate-General of Development and International Cooperation) and by a Consortium of 12 European Geological Surveys coordinated by the French Geological Survey (BRGM).

This programme allows trainees to acquire a state-of-the-art tool kit that contains methods and/or field work from eight geoscientific domains:

- WP1 – Geoscientific Mapping
- WP2 – Mineral Resources Assessment
- WP3 – Artisanal and Small-Scale Mining
- WP4 – Environmental Management of Mines;
- WP5 – Geohazards
- WP6 – Geoheritage
- WP7 – Geoscientific Information Management
- WP8 – Communication and Promotion

The “PanAfGeo Charter for Trainees” provides the general quality framework for selection of trainees who will attend the training sessions carried out in the frame of the PanAfGeo Project. This Charter is awarded for the full duration of the PanAfGeo Project. Implementation of the Charter will be monitored and violation of any of its principles and commitments may lead to its withdrawal by the PanAfGeo Project Coordination.

The overall objective and impact of PanAfGeo is to improve the governance and sustainable use of African mineral resources and related infrastructures. The specific objective and outcome is to strengthen the knowledge and skills in Africa’s mining sector and specifically of African Geological Surveys, to make them able to contribute – in their respective countries – with their expertise and data to informed decision-making and good governance as well as sustainable use of mineral resources and reinforcing the capacity of the Organisation of African Geological Surveys (OAGS).



Co-funded by the
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THE AFRICA-EU PARTNERSHIP
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2. CONTENT & METHODOLOGY OF THE “WP7 – GEOSCIENTIFIC INFORMATION MANAGEMENT” TRAINING

Geological data, including maps and mineral resources inventories are the essential basis for assessing the potential for mineral projects and granting exploration and mining licenses. Thus, comprehensive geological and mineral databases provide governments with informed decision-making options and the capacity to negotiate sustainable mineral development contracts with local and foreign investors. The information technology (IT) equipment and staff support the spatial data infrastructure which enables each Geological Survey Organisations to fulfil its missions regarding the geoscientific information. These include (i) collect, (ii) store and manage, (iii) valorise, and (iv) ensure the availability of reliable georeferenced data to several target groups i.e. other government organisations, national and regional communities, planners, private sector, education and citizens.

As part of the PanAfGeo Project, “WP7 – Geoscientific Information Management” aims to improve and/or strengthen capabilities among the staff employed by the African Geological Survey Organisations (existing and recruited) in the field of geoscience information management and related information technologies at operational level, with adaptation to the local context and the sustainability potential.

“WP7 – Geoscientific Information Management” is coordinated by the Geological Survey of France (BRGM) in collaboration with the Geological Survey of Burkina Faso (BUMIGEB) and the Geological Survey of Djibouti. Along with a close technical and scientific assistance, the training support is provided by BRGM, the Geological Survey of Denmark and Greenland (GEUS) and the Geological Survey of Slovenia (GeoZS).

- Number of attendants: max 20
- Duration: 10 days
- Trainers: 2 European trainers + 2 African co-trainers

The WP7 programme proposes three (3) independent modules:

- WP7-A: Database management, handling of spatial data and GIS interface;
- WP7-B: Spatial data infrastructure - Data modelling - Interoperability standards - Data dissemination;
- **WP7-C: Multilayer 3D geological modelling using dedicated geoscience software.**

IMPORTANT NOTE: The field of “Geoscientific information management” being rather wide, WP7 training scheme proposes three different modules instead of one general overview in order to offer an in-depth coverage of each of the three themes. Each module aims at strengthening the operational skills of dedicated professionals, e.g. database managers, SDI architects, database developers, geoscientists, GIS specialists, 3D modelling geologists. Then, these three modules are meant to be applied for by the same trainee profiles.

WP7-C: Multilayer 3D geological modelling using dedicated geoscience software:

a) Approach and training method

The course will present and describe in details the methods, approaches, tools, procedures and requirements for building 3D geological models in multilayer contexts (sedimentary basins, mineralised veins).

The course is aimed at staff from the Geological Survey Organisations including the department of Geology, Hydrogeology, Georesources, Environment and Natural Hazards.

The course will apply an interactive mode of learning through lectures and practical exercises on computer using GDM-MultiLayer software package developed by BRGM.

b) Course content

Topic 1	Introduction to geological modelling Management of geological data in GDM software
Topic 1.1: Introduction	<ul style="list-style-type: none"> • What is 3D geological modelling • Principle of main modelling methods: explicit and implicit methods, pixel based and object based methods • Main steps for building a geological model
Topic 1.2: Data	<ul style="list-style-type: none"> • The different types of data • How they can be used in geological modelling • Managing data in GIS and in geological software
Topic 1.3: Managing data (in GDM software)	Overview of GDM software: <ul style="list-style-type: none"> - Type of data taken into account - Connecting drill hole data and DTM (Digital Terrain Model) - Drawing strip logs, maps, sections
Topic 2	Management of geological data in GDM software (continued) Data preparation for geological modelling Data check and control
Topic 2.1: Strip logs	Building simple and complex strip logs, including lithological data or log data.
Topic 2.2: Maps and sections, 3D views	<ul style="list-style-type: none"> • Using 2D maps and sections to check data consistency • Digitising geological interpretation on maps or sections • Building enhanced 3D views to visualise and understand data.
Topic 3	Overview of geostatistical methods for building geological models Application to modelling a layer or a vein
Topic 3.1: Interpolation and basic geostatistical tools	<ul style="list-style-type: none"> • Quick overview of geostatistics concepts • Focus on application to data checking and interpolation of layer tops, thickness, or petrophysical parameters • Practical exercises on paper and on computer
Topic 3.2: Modelling a layer and/or a vein	<ul style="list-style-type: none"> • Modelling a layer and/or a vein, including the estimation of layer property (example: a grade) • Combining thickness and accumulation to get the grade content (or other property)
Topic 4	MultiLayer modelling: main concepts and practice
Topic 4.1: Principle of multilayer modelling	<ul style="list-style-type: none"> • Main concepts: handling the geological pile, interpreting and combining the different sources of data • Taking into account “true” data and “inequality data”. Checking geological consistency of various types of data.
Topic 4.2: Practice of multilayer modelling	<ul style="list-style-type: none"> • Practical work on computer to illustrate previous concepts. • Building multilayer models using drill hole data, geological map, DTM, faults • Comparison of different modelling strategies • Procedures for data control • Check of model consistency • Deriving isopachs maps, cross sections, 3D views, computing volumes from the model, exporting the model for visualisation in GIS or for use in other software <p>These topics will be illustrated through exercises using GDM-MultiLayer software.</p>
Topic 5	Summary and practice
Topic 5.1: Summary	Summary and refresh of all concepts, according to participants needs
Topic 5.2: Practice	<p>Two days of practice on datasets provided by the trainers and, if possible, using case studies in African context.</p> <p>Participants will work independently to practice and apply most of</p>

	the concepts shared over the previous days.
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c) Exercises

Each topic will be followed by hands-on exercises. The European trainers will propose prepared data sets to illustrate the concepts and to be used to build a geological model. Should it be possible, several data sets may also be prepared in collaboration with the African co-trainers using case studies in the African context.

d) Computer equipment

The training room will be equipped with adapted computer hardware (Windows 10) and selected software. Only Open Source software is proposed to be used to implement the hands-on training sessions of WP7-C:

- LibreOffice
- QGIS
- PDF reader
- Notepad++

Moreover, regarding the training module WP7-C “Multilayer 3D geological modelling using dedicated geoscience software”, BRGM proposes to use at no cost a software developed and commercialised by BRGM (30-year experience):

GDM (Geological Data Management) and its module dedicated to geological modelling in layered geological formations or veins: GDM-MultiLayer extension.

d) Languages, locations and dates

WP7 includes three independent modules. Each module will be delivered three times: two in English and one in French. Depending on the number of Portuguese speaking applicants, module WP7-A may be taught in Portuguese in 2019.

The first session of each module is planned as follows:

- WP7-B: mid-October, 2017 – Dar Es Salaam, Tanzania (*in English*)
- WP7-A: mid-November, 2017 – Accra, Ghana (*in English*)
- WP7-C: mid-January 2018 – Dakar, Senegal (*in French*)

Thereafter, it is proposed to hold the six (6) remaining sessions in 2018-2019 in Burkina Faso, Nigeria, Egypt, Cameroon, Kenya, Ethiopia, Zambia, Namibia, Botswana and Mozambique. These, however, have not been confirmed to date.

It is recommended that the applicants consider their language/country preferences when choosing to which of the nine (9) training sessions they apply for.

3. MAIN EXPECTED LEARNING OUTCOMES OF THE COURSE

The overall objective is to train the participants through theory and practice on 3D geological modelling, mainly in the case of multi-layered geological formations (sedimentary basins, mineralised veins ...).

By the end of the course, the participants will be able to:

- Understand the key terms and methods used for 3D geological modelling;
- Be aware of key steps: data preparation, procedure for data quality control, data analysis, including the use of basic geostatistical tools, main steps and options of the building of geological models, model quality check;

- Build geological models using different options available in GDM-MultiLayer software, and combining different types of data: drill holes, geological maps, outcrop data, geophysical profiles;
- Visualise data and results in 1D (strip logs), 2D (maps and sections) and 3D;
- Export the results toward other software (GIS, flow simulation ...).

4. TIME SCHEDULE

Date of training session	15 January to 26 January 2018
Location	Dakar, Senegal
Application deadline	30 September 2017

5. WHO CAN APPLY?

The PanAfGeo “WP7 – Geoscientific Information Management” training session is open to all persons who are eligible according to the conditions of the “**PanAfGeo Charter for Trainee**”.

Moreover, in order to be able to follow the proposed training in “WP7-B Spatial data infrastructure - Data modelling - Interoperability standards - Data dissemination” and fully benefit from the new knowledge and skills delivered over the ten day-course, the applicants **must justify of the required education and experience level** as follows:

- Basic scientific knowledge, in particular statistics and mathematics;
- Basic knowledge on geology (know what is a geological formation, a fault, a geophysical profile, ...);
- Good practice of computer using Windows
- Good practice of Excel and/or Access software will be appreciated;
- Basic knowledge in GIS (ArcGIS, QGIS or other).

6. FUNDING OF THE TRAINING

The PanAfGeo “WP7 – Geoscientific Information Management” training session is supported through funds of the European Commission.

The following expenses will be covered for each trainee:

- Travel costs: flight and ground travel in Africa, according to the programme of the training;
- Accommodation, breakfast, catering and joint meals during the training session;
- A daily training allowance of 30 EUR.

7. APPLICATION AND SELECTION PROCEDURE

In order to be considered, applicants for the PanAfGeo Training Session entitled “WP7 – Geoscientific information Management” must complete the documents listed hereafter:

- 1 - Applicant Form for a PanAfGeo Training;
- 2 - Letter of Commitment signed by your employer;
- 3 - Letter of Motivation.

Please complete these documents and send them to WP7 Leader Marc URVOIS (BRGM) m.urvois@brgm.fr, WP7 Co-Leader Abdoulaye OUEDRAOGO (BUMIGEB) abdouloued@gmail.com and WP7-C Training Module Leader Bernard BOURGINE (BRGM) b.bourgine@brgm.fr.

before the **Application Deadline: 30 September 2017**.

The selection process will take into account regional-national representation and a gender balance following the aim of strengthening skills of African Geological Surveys geoscientific staff.

All applicants will be informed about the result of the selection process approximatively on 1st November 2017. The Invitation Letter will be sent out immediately in order to allow time for Visa processing and delivery.

Information about the PanAfGeo Programme can be found via the internet address:

<http://panafgeo.eurogeosurveys.org>

Questions regarding PanAfGeo should be addressed to EuroGeoSurveys via the email address:

info@eurogeosurveys.org

Or to the Organisation of African Geological Surveys (OAGS) via the email address:

oags@geoscience.org.za

Questions regarding practical issues on the course should be addressed to the training coordinators via email as follows: m.urvois@brgm.fr, abdouloued@gmail.com, b.bourgine@brgm.fr.

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