PanAfGeo

Pan-African Support to Geological Sciences and Technology Africa-EU Partnership

Appui panafricain aux géosciences du partenariat Afrique-UE

Apoio pan-africano às geociências da parceria África-UE

Call for Applications

for PanAfGeo-2 Training Session

Training "WP-G – Geoscientific Information Management"

Module WPG1b-EN: "*GIS Interface and Spatial Data infrastructure – Database modelling and management – Interoperability standards – Data dissemination*"

Basic Level

1. MAIN CONTEXT OF PANAFGEO

"**PanAfGeo**" for *"Pan-African Support to Geological Sciences and Technology Africa-EU 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 implemented by world-class geoscientific experts coming both from African and European Geological Surveys. PanAfGeo-2 is a continuation of the well-established PanAfGeo Project.

PanAfGeo is co-funded by the European Commission (Directorate-General for International Partnerships) and by a Consortium of eleven 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:

- WP-A – Geoscientific Mapping
- WP-B – Mineral Resources Assessment
- WP-C – Artisanal and Small-Scale Mining
- WP-D – New frontiers in Geosciences (Geoheritage and Geothermal energy)
- WP-E – Geohazards & Environmental Management of mine
- WP-F – Georesources Governance & OAGS/GSOs Institutional Strengthening
- WP-G – Geoscientific Information Management
- WP-H – Communication, Dissemination and Dialogue

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.

One of the overall objectives and impacts 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).

2. CONTENT & METHODOLOGY OF THE *"WP-G – 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, "WP-G – 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.

"WP-G – Geoscientific Information Management" is coordinated by the Geological Survey of France (BRGM) in collaboration with the Geological Survey of Burkina (BUMIGEB). Along with a close technical and scientific assistance, the training support is provided by BRGM, the Geological Survey of Denmark and Greenland (GEUS), the Geological Survey of Slovenia (GeoZS) and the National Laboratory of Energy and Geology (LNEG) in Portugal.

This session is organised jointly by BRGM and the Botswana Geoscience Institute (BGI).

- Number of attendants: max 20
- Duration: 10 days
- Trainers: 4 European trainers + 2 African co-trainers

The WP-G programme proposes several modules:

- **WP-G1b: GIS Interface and Spatial Data infrastructure – Database modelling and management – Interoperability standards – Data dissemination (Basic - English)**
- WP-G1a: GIS Interface and Spatial Data infrastructure – Database modelling and management – Interoperability standards – Data dissemination (Advanced - English)
- WP-G2: Database management, handling of spatial data and GIS interface (Portuguese and French)
- WP-G3: Data modelling - Interoperability standards - Data dissemination (Portuguese)
- WP-G4: Geological data management and 3D modelling using a dedicated geoscience software (French)

IMPORTANT NOTE: *The field of "Geoscientific information management" being rather wide, WP-G training scheme proposes different modules instead of one general overview in order to offer an in-depth coverage of each of the 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 independent modules are not meant to be applied for by the same trainee profiles.*

WP-G1b: GIS Interface and Spatial Data infrastructure – Database modelling and management – Interoperability standards – Data dissemination:

a) Approach and training method

The course will present and describe the methods, approaches, tools, procedures and requirements for database, GIS, data modelling, data management, interoperability standards, and data publishing.

The course will apply an interactive mode of learning through lectures and practical exercises on computer using QGIS, PostgreSQL, PostGIS, DbSchema, GeoServer, GeoKettle, GeoNetwork, etc.

The course is aimed at staff from the Geological Survey organisations, primarily from the Geo-Information Division. Candidates from the department of Geology, Hydrogeology, Georesources, Environment and Natural Hazards may apply if they can justify skills in digital geoscience such as GIS, databases and web-based technologies (also refer here after).

***IMPORTANT NOTE**: The present call for application is for a training program at basic level. A second one at advanced level will be organised later in 2023.*

b) Course content

Topic 1	***Introduction***
Topic 1.1: Introduction	• Introduction to Module WP-G1b • Overview of content of Module WP-G1b
Topic 1.2: Data	• The different types of geological data • How they can be used in data modelling • Managing data in GIS software
Topic 1.3: Software	• Overview of software to be used in the course (QGIS, PostgreSQL, PostGIS, DbSchema, GeoServer, GeoKettle, GeoNetwork, etc.)
Topic 2	***Spatial data infrastructure***
Topic 2.1: Overview	• What is SDI • An overview of global SDIs • Status and trends in the field of SDIs
Topic 2.2: African geological surveys and SDI*	• Relevance to the African geological surveys • Application to the network of African geological survey information systems ** supervised by African national/regional experts/trainers*
Topic 3	***Interoperability concepts, standards and methodologies***

Topic 3.1: Interoperability standards	• Introduction to different types of interoperability concepts, standards and methodologies
	  ○ OGC
	  ○ ISO
	  ○ INSPIRE (European case study)
	• Use of standards in the field of geoscience (mineral resources, hydrogeology, natural risk, etc.)

Topic 4	**Data modelling: main concepts and practice**
Topic 4.1: Data	• Data standards (rules, types, formats, collection, integration) • Data modelling (from concept to database)
Topic 4.2: Standards	• Standard for interchanging data (GML, XML, UML, etc.) • Standards applied to geoscientific data context These topics will be illustrated through exercises using DbSchema
Topic 4.3: Mapping	• Mapping of file-based and database-based data into common models using thematic dedicated GML models (GeoSciML, EarthResourceML, etc.) These topics will be illustrated through exercises using GeoKettle, PostgreSQL, GeoServer and other software.

Topic 5	**Web services**
Topic 5.1: Web services	• Introduction to web services (WMS, WFS, WCS) • Generating web services (publishing) These topics will be illustrated through exercises using GeoServer and QGIS software.
Topic 5.2: GIS applications and map viewers	• Integration of web services in GIS applications These topics will be illustrated through exercises using OpenLayers and QGIS software.
Topic 6	**Metadata**
Topic 6.1: Overview	• Introduction • Standards used (ISO, INSPIRE, etc.)
Topic 6.2: Editing/Publishing	• Editing metadata and catalogues using standard methodologies and tools • Publishing metadata and catalogues using standard methodologies and tools These topics will be illustrated through exercises using GeoNetwork software.
Topic 7	**Summary and practice**
Topic 7.1: Summary	Summary and recap of all concepts, according to participants needs
Topic 7.2: Practice	Two days of practice on datasets provided by the trainers and, if possible, using case studies in African context**. Participants will work independently to practice and apply most of the concepts shared over the previous days. *** supervised by African national/regional experts/trainers*

c) Exercises

Each topic will be followed by hands-on exercises. The European trainers will propose prepared data sets to illustrate the concepts of building SDI. Should it be possible, several contents may also be prepared in collaboration with the African co-trainers using case studies in the African context (e.g. Topic 2.2., Topic 7.2.).

In addition, the trainees are strongly encouraged to bring their own data sets. Before the training session starts, they can contact the co-leaders to inquire about the acceptable contents and formats.

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 implement the hands-on training sessions of WP-G1:

- LibreOffice
- PostgreSQL
- PostGIS
- GeoKettle
- QGIS
- PDF reader
- DbSchema
- Notepad ++
- Web browser
- GeoNetwork
- GeoServer
- OpenLayers

e) Return-to-work plan

During the session, each trainee will have to prepare and present a Return-to-Work Plan. It is to design a short-term application of the newly acquired knowledge through a project of interest for the Geological Survey and to be possibly implemented over a period of 6 months to 1 year after the

training (e.g. reorganising the existing data sets into newly created databases and SDIs, multi-criteria data processing applied to a geoscientific research project, training and raising the awareness internally and in connection with the Earth Sciences department at university, etc.).

f) Languages, locations and dates

WP-G includes several modules to be delivered in three languages. The first ones are planned as follows:

- WPG1b-EN: mid-September, 2022 – Lobatse, Botswana *(in English)*
- WPG2-PT: early November, 2022 – Location to be confirmed *(in Portuguese)*
- WPG2-FR: March 2023 – Location to be confirmed *(in French)*

Thereafter, a second round of sessions will be delivered again in English and Portuguese (2023), and French (early 2024).

It is recommended that the applicants consider their language/country preferences when choosing to which of the 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 GIS tools and interface, spatial data infrastructure, data modelling, as well as interoperability standards and data dissemination.

By the end of the course, the participants will have a basic level of knowledge on:

- Understanding the basic principles of GIS tools and spatial data infrastructure,
- Basics of databases to store relational and spatial data,
- Data modelling: main concepts and practice in data standards, data modelling, standards for interchanging data (Shapefile, GeoPackage, GML, XML, UML, etc.),
- Different types of interoperability concepts, standards and methodologies and their use in the field of geology,
- Metadata,
- Visualisation of data in GIS applications,
- Use standard web services for publishing public spatial data on Internet.

4. TIME SCHEDULE

Date of training session	From 12 September 2022 to 23 September 2022
Location	Lobatse, Botswana
Application deadline	**10 June 2022**

5. WHO CAN APPLY?

The PanAfGeo *"WP-G – 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 WPG1b-EN "GIS Interface and Spatial Data infrastructure – Database modelling and management – 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:

- Knowledge of, and skills in, working with GIS (ArcGIS, QGIS or other), databases (SQL or other) and web (HTML).
- Good practice of computer using Windows.
- Good practice of Excel software will be appreciated.
- Basic knowledge on geology (recommended).

6. Funding of the Training

The PanAfGeo *"WP-G – 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
- Entrance visa fee against a receipt (*original receipt with the trainee's name)*
- 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 *"WP-G – Geoscientific information Management"* must complete the documents listed hereafter:

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

After filling out these documents, please register here: **https://panafgeo.eurogeosurveys.org**

and upload them **in form of 3 separate files (PDF format only - label of all application files must include the applicant's first name in latin letters**)

before the **Application Deadline: 10 June 2022**.

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 8 July 2022. The Acceptation Letter will be sent out immediately in order to allow time for visa processing and delivery.

Questions regarding practical issues on the course should be forwarded to the training coordinators via email as follows: **fsc@geus.dk, spela.kumelj@geo-zs.si, m.urvois@brgm.fr, abdouloued@gmail.com,**

Information about the PanAfGeo Programme can be found via the internet address:
http://panafgeo.eurogeosurveys.org

Questions regarding PanAfGeo should be forwarded 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

Ms Špela Kumelj

WPG1b Training Module Co-Leader
Geoscientific Information Systems Specialist
Geological Survey of Slovenia (GeoZS)

MR FRANDS SCHJØTH
WPG1b Training Module Co-Leader
Geoscientific Information Systems Specialist
Geological Survey of Denmark and Greenland (GEUS)

DR MARC URVOIS
WP-G – Geoscientific Information Management Leader
Project Manager – Geoscientific Information Systems Specialist
Geological Survey of France (BRGM)

MR ABDOULAYE OUEDRAOGO
WP-G – Geoscientific Information Management Co-Leader
Director of Geological and Mining Research
Geological Survey of Burkina (BUMIGEB)