

G3FMC

# Geophysical, geochemical, and geological studies of the French Massif Central :

from Variscan orogeny to modern intra-plate volcanism

in the framework of ANR projects  
MACIV and GERESFAULT,  
and within the PEPR  
Sous-sol, bien commun

PROGRAMME

March  
26-28  
2024

Clermont-Ferrand

WORKSHOP





# DAY 1

## 8h30-8h40 – INTRODUCTION

### Theme 1 – Tectonics and geology

#### 1.1. European Cenozoic Rift System (CF) (Chairman – O. Vanderhaeghe)

- 8h40-9h10 Laurent Jolivet (ISTeP) et al. – Rifting and mantle convection, comparison of the East African Rift and the West European Rift.
- 9h10-9h35 Massimo Coltorti, Federico Casetta & Barbara Faccini (Univ. Ferrara) et al. – Intra-plate vs. subduction-related metasomatism in the central-eastern European Subcontinental Lithospheric Mantle.
- 9h35-10h00 Andrea Rizzo (Univ. Milano) et al. – Noble gas and CO<sub>2</sub> composition in central-eastern European SCLM.

## 10h00-10h30 – COFFEE BREAK

#### 1.2. Large-scale lithospheric structure and inheritance from Variscan orogeny (Chairman – D. Laporte)

- 10h30-10h50 Michel Grégoire (GET) et al. – Nature and evolution of the upper mantle of the French Massif Central: An inventory
- 10h50-11h10 Jean-Marc Lardeaux (GEOAZUR) et al. – Geology of the French Massif Central basement in the tectonic-geodynamic context of the Variscan orogeny
- 11h10-11h30 Olivier Vanderhaeghe (GET) et al. – Petrological model of the Variscan basement in the Pontgibaud sector
- 11h30-11h50 Michaël Heap (ITES) et al. – Permeability of geothermal reservoirs: a laboratory perspective

### 11h50-12h30 – Discussion Theme 1 (Chairman – O. Vanderhaeghe & D. Laporte)

## 12h30-13h30: LUNCH TIME

## Theme 2 – Magmatism, volcanism, and present-day volcano-tectonic activity

### 2.1. French Massif Central magmatism and volcanism (Chairman G.Boudoire)

- 13h30-13h50 Didier Laporte (LMV) et al. – In search of the primary magmas of Cenozoic volcanism in the French Massif Central: case study of the Bas-Vivarais volcanic province.
- 13h50-14h10 Nicolas Cluzel & Guillaume Boudoire (LMV) et al. – Magma evolution beneath the youngest volcanoes (Pavin's Group of Volcanoes) of the French Massif Central : new insights from melt and fluid inclusions.
- 14h10-14h35 Lydéric France (CRPG) et al. – Plumbing system architecture, igneous processes, and kinetics of eruption triggering in a monogenetic volcanoes province: the Example of The Chaîne des Puys (French Massif Central).
- 14h35-14h55 Etienne Médard (LMV) et al. – A petrologic view of the magma storage system underneath the Chaîne des Puys distributed volcanic field.

### 14h55-15h30 – COFFEE BREAK

### 2.2. Present-day volcano-tectonic activity of the Massif Central (seismicity, hydrothermal activity, diffusive degassing) (Chairman – L. Guillou-Frotier)

- 15h30 – 15h50 Jean Battaglia (LMV) et al. – Seismicity in Auvergne
- 15h50 – 16h10 Frédéric Gal (BRGM) et al. – Gas emissions (CO<sub>2</sub>, Rn) in urban and rural areas of Auvergne: spatial and temporal aspects
- 16h10 – 16h30 Guillaume Martelet (BRGM) et al. – New airborne geophysical data update the geological knowledge of Massif Central

### 16h30-17h30 – Discussion Theme 2 (Chairman – G. Boudoire & L. Guillou-Frottier)

### 19h30 : WORKSHOP DINNER

# DAY 2

## Theme 3 - Active processes and geophysical observations

### **3.1. Seismological imaging (past results and MACIV plans) (Chairman – N.Shapiro)**

- 8h20-8h40 Anne Paul & Aurélien Mordret (ISTerre) et al. – Status and expected results from the ANR MACIV
- 8h40-9h00 Sébastien Chevrot (GET) et al. – Passive imaging of western Europe by full waveform inversion of teleseismic body waves and surface wave Helmholtz tomography
- 9h00-9h20 Ahmed Nouibat (ITES) et al. – Towards an unbiased, high-resolution Vs model of the western European lithosphere: Focus on the Massif Central
- 9h20-9h40 Torsten Dahm (GFZ) et al. – Integrated monitoring concept and field activities for the volcanic region of the Eifel

### **9h40 -10h15 – COFFEE BREAK**

### **3.2. Other geophysical studies (Chairman – A. Paul)**

- 10h15-10h35 Julien Bernard (BRGM) et al. – Geological interpretations of airborne geophysical data : examples from contrasted geological settings in the Massif Central
- 10h35-10h55 Mickaël Laumonier (LMV) et al. – Snapshot of the lithospheric structuration and magmatic systems beneath the Chaîne des Puys and Monts Dore volcanic provinces (French Massif Central): a 3D magnetotellurics perspective

## Theme 4 - Applications

### 4.1. Geo-resources (Chairman – O. Vanderhaeghe)

- 10h55-11h15 Mathieu Bellanger (TLS) et al. – Assessment of the geothermal potential of crustal fault zones on the scale of the French Massif Central and Europe
- 11h15-11h35 Hugo Duwiquet (ENGIE) et al. – Crustal Fault Zones as geothermal systems : Contribution of numerical modeling and comparison with natural systems
- 11h35-11h55 Laurent Guillou-Frottier (BRGM) et al. – Thermal regime and fluid flow in faulted zones of the French Massif Central
- 11h55-12h15 Anthony Pochon (BRGM) et al. – Mineral resources of the French Massif Central

### 12h15-13h00 – Discussion Theme 3-4 (Chairman – N. Shapiro, A. Paul & O. Vanderhaeghe)

### 13h00-14h00 – LUNCH TIME

### 4.2. Natural hazards and implications for risk assessment (Chairman G.Boudoire)

- 14h00-14h20 Remy Jubertie & Lucia Gurioli (LMV) et al. – Facies analysis as a useful tool for reconstructing the eruptive dynamics of a maar in Auvergne: the example of the maar de Jaude
- 14h20-14h40 Andrew Harris (LMV) et al. – Down-system changes in dynamics and architecture for lava flows moving off of the Massif Central: the cases of Tiretaine and Grave Noire
- 14h40-15h00 Guillaume Boudoire & Lydie Gailler (LMV) et al. – The 2021-2022 seismic swarm beneath the Monts Dore: processes and prospects in future monitoring strategies
- 15h20-15h40 Anne Lemoine & Agathe Roullé (BRGM) et al. – Impact of a seismovolcanic crisis on a moderate seismic hazard zone : the example of Mayotte and seismic risk in Auvergne

### 15h40 -16h15 – COFFEE BREAK

### **4.3. Geosciences/Resources and Society (Chairman – D. Laporte)**

- 16h15-16h35 Saïd Mourtada & Fabrice Fillias (Vulcania) et al. – How does Vulcania contribute to making geological heritage an element of tourist attraction ?
- 16h35-16h55 Tessa Bonincontro (IMT Alès) et al. – Societal issues from the mining legacy in the Cévennes
- 16h55-17h15 Cyril Aumar (LMV) et al. – Geometry and functioning of volcanic aquifers in the Chaîne des Puys : coupled contributions from geophysical and hydrochemical methods

### **17h15-18h15 – Discussion Theme 4 (Chairman – G. Boudoire & D. Laporte)**

## **DAY 3**

### **One-day field excursion**

Bus to visit some key sites in the Monts Dore volcanic province : local geology, recent eruptive and volcano-tectonic activity, and risk assessment.





# Lieu du workshop

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