SCIENCES & BIOENGINEERING SCIENCES

The Research Group
**Physical Geography**

has the honor to invite you to the public defense of the PhD thesis of

# Blaise Mafuko Nyandwi

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

## Volcanic risk mitigation in Goma: Risk perception, protective actions, awareness raising before and after the 2021 eruption of Nyiragongo (East DR Congo)

**Promotors:**
Dr. Caroline Michellier
(Royal Museum for Central Africa)
Prof. dr. Matthieu Kervyn (VUB)
Prof. dr. François Muhashy Habiyaremye
(University of Goma, DR Congo)

The defence will take place on Thursday, October 12, 2023 at 16h at the Royal Museum for Central Africa, Meeting Room 1, Welcome Pavilion
Please register HERE if you plan to attend in person
For online attendance ZOOM link

**Members of the jury**
Prof. dr. Benoît Smets (VUB, chair)
Prof. dr. Tom Vanwing (VUB, secretary)
Prof. dr. Iris Stiers (VUB)
Prof. dr. Jenni Barclay
(University of East Anglia, UK)
Prof. dr. Carmen Solana
(University of Portsmouth, UK)

## Curriculum vitae

Blaise Mafuko Nyandwi has a bachelor in mining geology from the University of Goma and a MSc degree in Environment management from the University of Burundi. He has benefited from a PhD scholarship in the framework of HARISSA project funded by the development cooperation programme of the Royal Museum for Central Africa with support of DGD. He has published one scientific article from his PhD research.

He has supervised several bachelor's and master's students theses. His research interests are in risk mitigation of natural hazards' impact and environmental geology.

## Abstract of the PhD research

Volcanic eruptions are related to earth's internal processes and cannot be prevented. Risk mitigation is thereby the most efficient protective strategy. However, it depends on the population risk mitigation commitment. In this research we investigate (i) the risk perception as well as (ii) the protection motivation of Goma population (east of DR Congo) before the 2021 Nyiragongo eruption and (iii) how they decided to evacuate. In addition, (iv) we assess the impact of two activities in raising student risk awareness. We use multiple approaches: questionnaire survey, interviews, focus group and writing compositions.

Based on the Protection Motivation Theory, we analyse spatial differences and factors influencing the individual volcanic risk perception as well as the protection motivation of 2,224 adults. Before the eruption, the risk perception was high and varies less with demographic and contextual factors than with cognitive and psychological factors. The protection motivation was also high and mainly controlled by self-efficacy and response efficacy. In addition, it was negatively influenced by the interest in seeking information and a high-risk perception (risk mitigation paradox). Spatial analysis indicates that respondents from the eastern neighbourhoods, affected by the 2002 eruption, demonstrated a significantly higher level of risk perception as well as of the protection motivation than participants living in the west.

As the eruption was not predicted, the population in the north-eastern neighbourhoods evacuated spontaneously on the night of the eruption and females were likely to evacuate than males. The decision to evacuate was not mostly influenced by an individual risk assessment, but by the family safety. During second evacuation due to a potential dyke intrusion, some households evacuated twice and others not, considering the risk to be lower and manageable. Heuristics play a strong role in inhibiting the evacuation intention. The awareness raising activities through the Hazagora game sessions, and the visits of the volcano museum are complementary in raising risk awareness which was initially very low. However, students are interested in these activities. The results of this thesis highlight that informing people of the risk they face is not directly sufficient for risk mitigation commitment. Building a prepared community to volcanic risk in Goma requires more awareness raising efforts.