

# GORISK

**The combined use of Ground-Based and Remote Sensing techniques as a tool for volcanic risk and health impact assessment for the Goma region (North Kivu, DRC)**

Belgian Federal science policy & Luxembourg – NRF support

STEREO II

“support to Earth Observation”

## **Coordination of the project :**

- Royal Museum for Central Africa (RMCA)

## **Project partners :**

- National Museum of Natural History of Luxembourg (NMNH)
- University of Luxembourg (UniLux)
- Second University of Naples (UniNap)
- Goma Volcanological Observatory (GVO)
- Volcanic Risk Mitigation Program (UNOPS)
- Centre scientifique et médical de l'ULB pour ses activités de coopération (CEMUBAC)



- **Objectives**

- Implementation of the monitoring capacity
- Contribution to improve the risk management
- Assessing the impact on the environment and health
- to ensure the sustainability of the methods
- To improve the autonomy of the users = capacity building

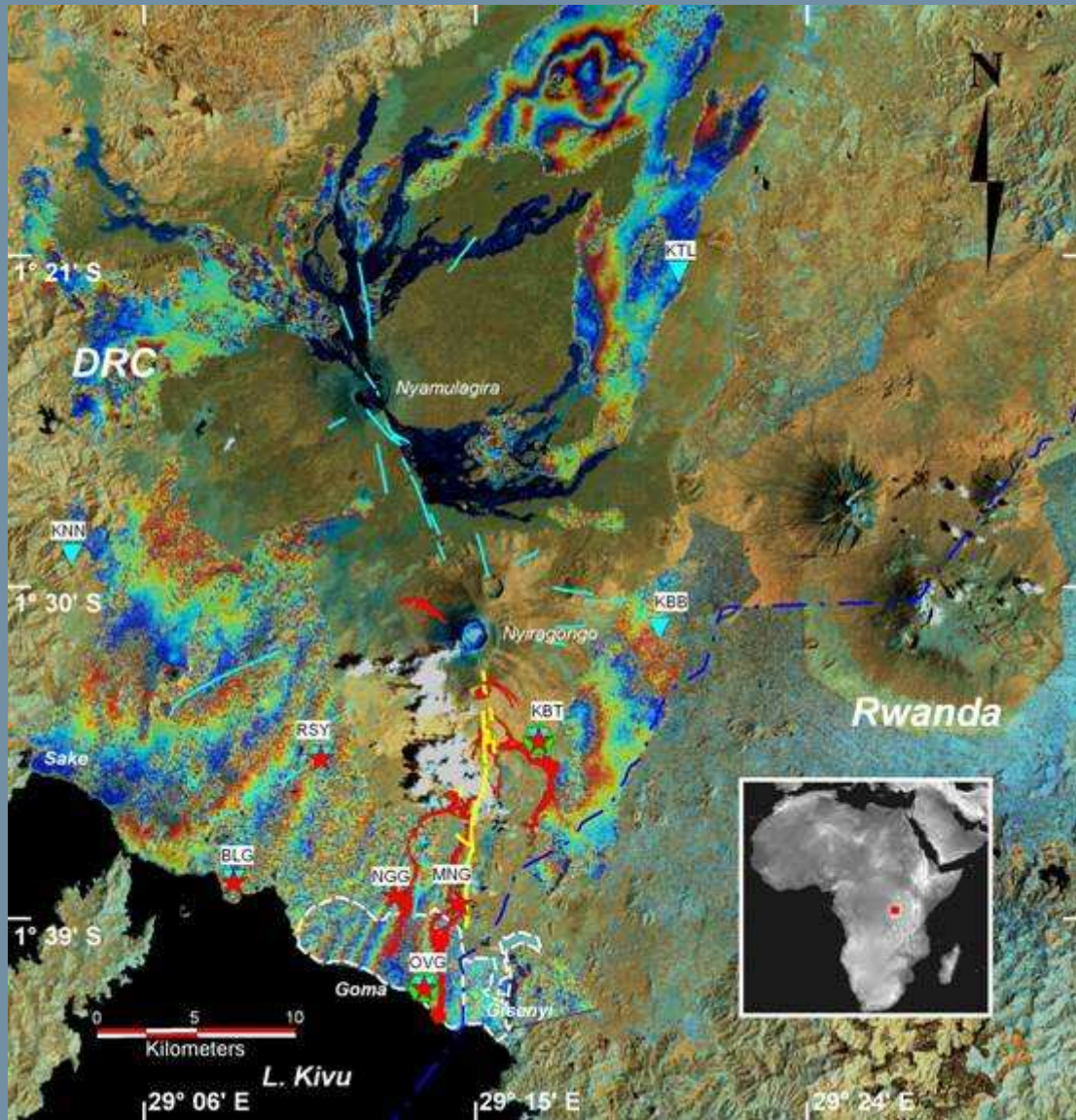
- **End users oriented**

- Connects 3 local actors active in the region
  - Goma Volcanological Observatory**
  - UNOPS:** Volcanic Risk Management
  - CEMUBAC:** belgian NGO dealing with public health

- **Methodology**

- Ground deformations monitoring (InSAR, tiltmetry)
- Ground based gas and water monitoring
- Volcanic plume monitoring (VISOR, NOVAC)
- Study of health data
- Results interpretation and GIS integration
- End users validation

# Ground Deformation Monitoring



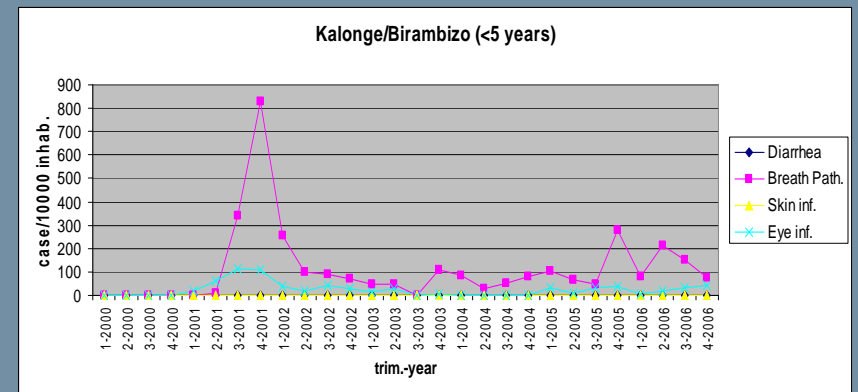
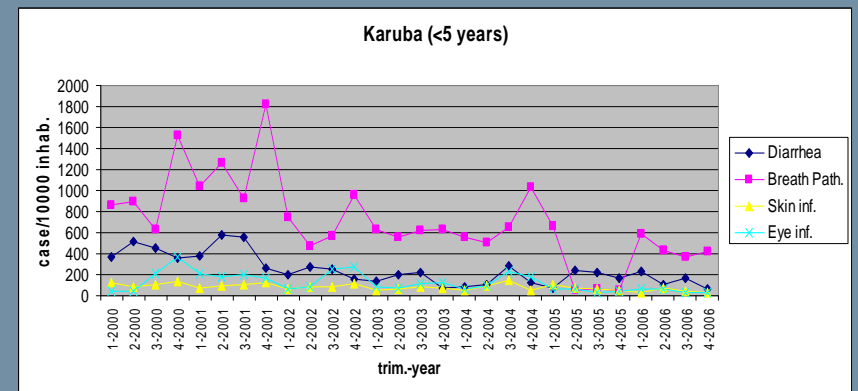
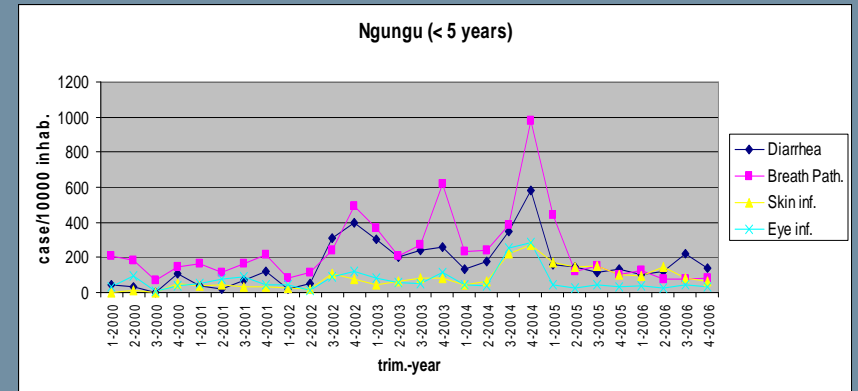
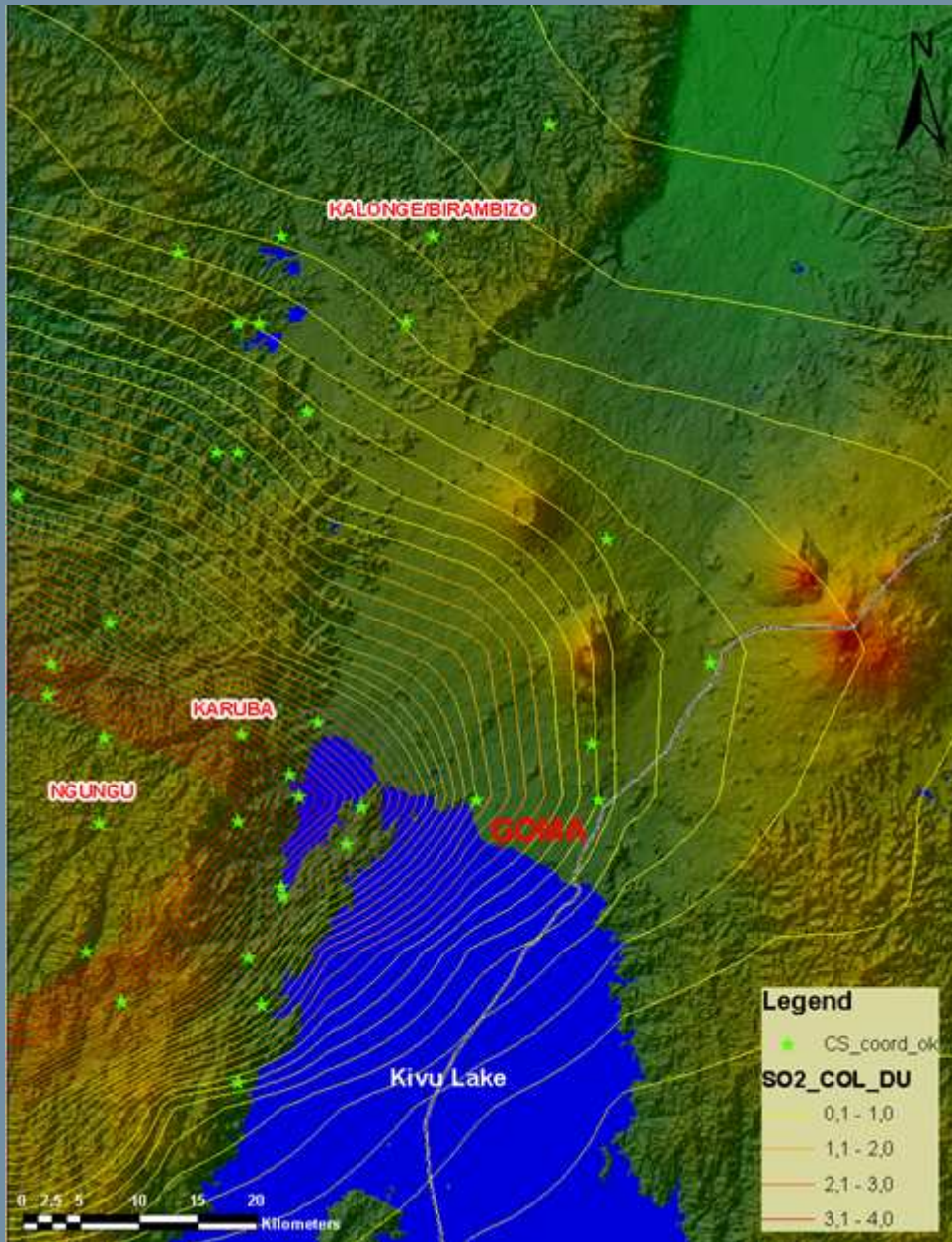
- **InSAR**  
Radar interferogram wrapped on a LANDSAT image (4,5,7 as RGB)  
Deformation associated to the Nyiragongo January 2002 eruption
- **Ground based Networks**
  - Tiltmeters
  - GPS (not planned initially, loaned by NMNH of Lux).
  - Existing GVO seismometers

## Legend

- ★ : Tiltmeters
- : GPS stations
- ▼ : Seismic stations
- : Nyiragongo lava flows 2002
- : Fractures network 2002
- : Previous fractures networks

After « InSAR monitoring of the Nyiragongo – Nyamuragira volcanoes (DR of Congo). Study of the Nyiragongo January 2002 - and Nyamuragira November 2006 eruptions. » N. d'Oreye, F. Kervyn, V. Cayol, C. Wauthier and the GVO team  
Proc. 'Envisat Symposium 2007', Montreux, Switzerland 23–27 April 2007 (ESA SP-636, July 2007)  
CD-2, Session 4B4, abstr. 462685do, pp1-6

# Volcanic Plume Monitoring – Health data



# PROJECT STATUS

**2 years project**

## **Feb 07 - March 2008: deployment**

- networks deployed successfully
- capacity building
  - seminars organized in Goma for training the local staff
  - 2 staff members of GVO trained in RMCA during 4 months

## **March 2008 - March 2009: routine monitoring**

- Monitoring of
  - Ground deformation
  - Water and gas
  - Volcanic plume (NOVAC, VISOR)
- Refinement of the epidemiological study
- Data Integration in the GIS platform
- End users validation
- Capacity building

**GORISK = Most of the current tools available at GVO for permanent volcano monitoring**

## Current tools available at GVO

- Ground based continuous monitoring networks :
  - telemetred seismic network: installed by INGV
  - telemetred tilt network: installed by GORISK
  - telemetred permanent GPS network: installed by GORISK-MNHN
  - ground emanating gas and water monitoring network: installed by GORISK
  - volcanic plume : NOVAC (EU)
- Space borne systematic monitoring :
  - InSAR: by GORISK
  - volcanic gas plume : VISOR (NSF)