



# Synergy



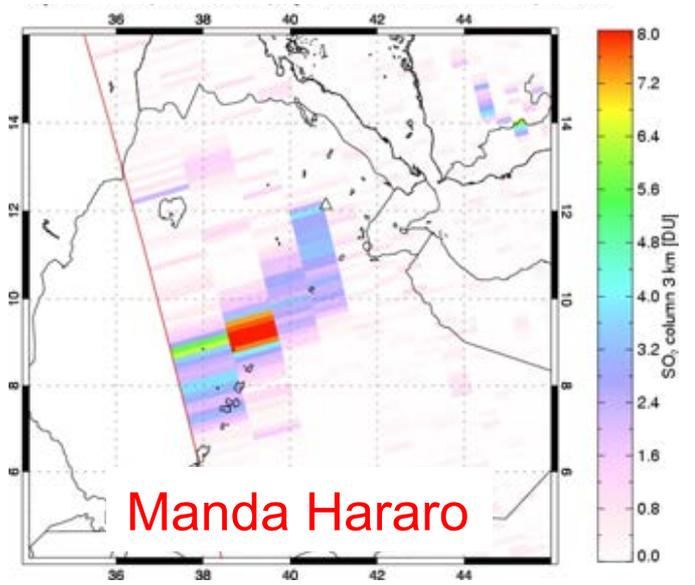
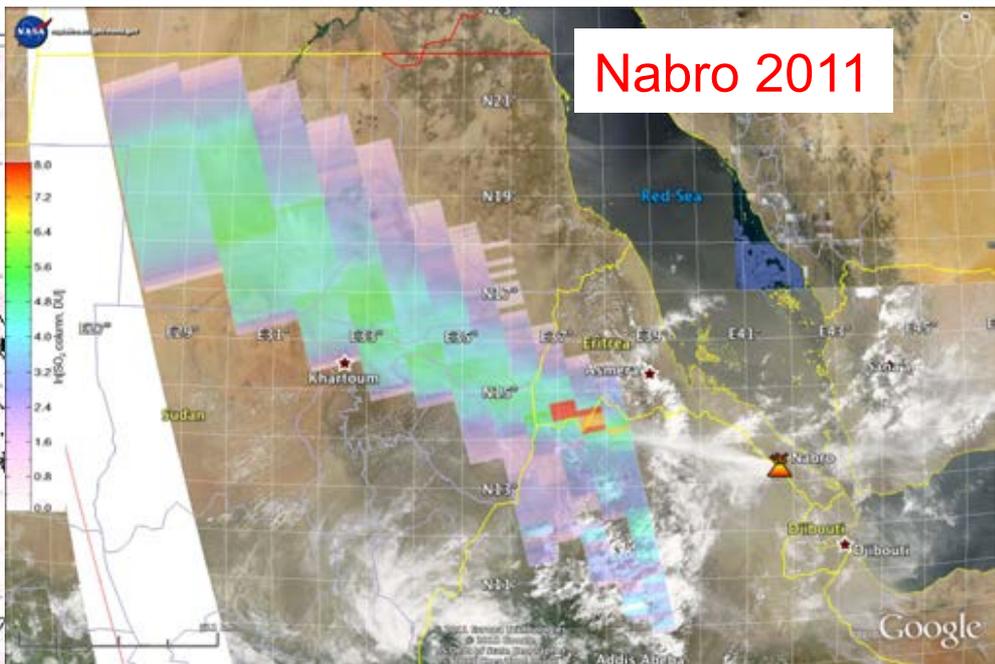
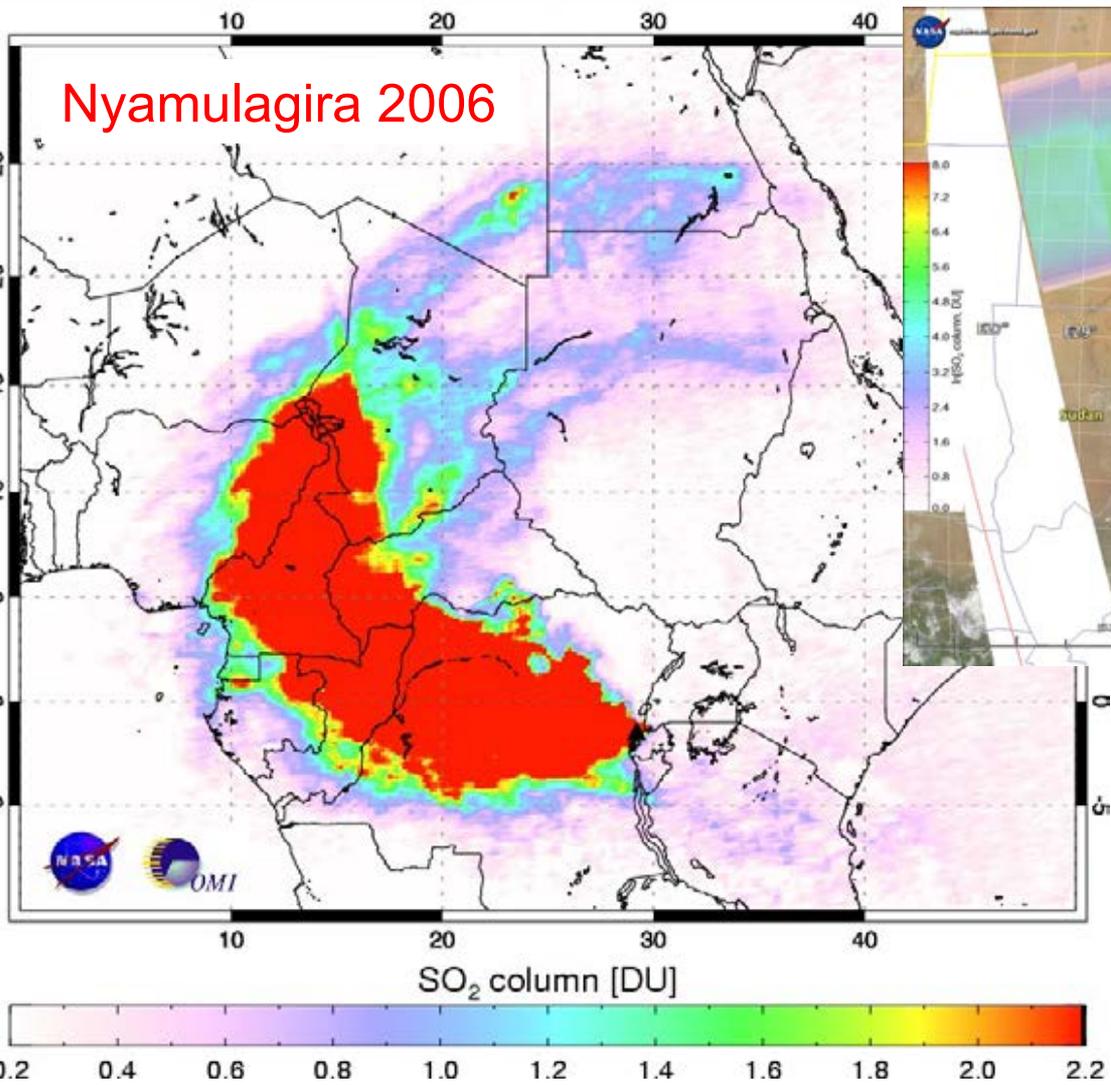
Simon Carn

Michigan Technological University, Houghton, MI

# NASA Earth Science Research Opportunities

- **ROSES 2012 solicitation:** <http://nspires.nasaprs.com/external/>
  - **Earth Surface and Interior** (next solicitation in 2013?)
    - The goal of the Earth Surface and Interior focus area is to assess, mitigate and forecast the natural hazards that affect society, including earthquakes, landslides, coastal and interior erosion, floods and volcanic eruptions.
  - **Earth Science Applications: Disasters**
  - **Rapid Response in Earth Science** (eruptions, earthquakes)
  - **SERVIR Applied Science Team**
- Projects must use NASA satellite or airborne data

# Measurements of volcanic SO<sub>2</sub> emissions using NASA data



- Aura Science Team
- Atmospheric Chemistry Modeling and Analysis

# NASA Earth Surface and Interior Program

- <http://solidearth.jpl.nasa.gov/>

- Scientific challenges:

- What is the nature of deformation at plate boundaries and what are the implications for earthquake hazards?

- How do tectonics and climate interact to shape the Earth's surface and create natural hazards?

- What are the interactions among ice masses, oceans, and the solid Earth and their implications for sea level change?

- How do magmatic systems evolve and under what conditions do volcanoes erupt?

- What are the dynamics of the mantle and crust and how does the Earth's surface respond?

- What are the dynamics of the Earth's magnetic field and its interactions with the Earth system?

NASA/  
USAID

The screenshot shows the SERVIR East Africa website. At the top, there are navigation links for 'Login', 'Register', 'Help', and 'Contact'. Below these are the logos for 'USAID' and 'NASA'. A search bar is located to the right of the logos. The main navigation menu includes 'GLOBAL', 'MESOAMERICA', 'EAST AFRICA' (highlighted), 'HIMALAYA', and 'MyCOE Opportunities'. A secondary menu below it lists 'Home', 'Our Work', 'Maps & Data', 'About', 'News', and 'GEOSS Themes'. The page title is 'SERVIR-East Africa'. The main content area features a paragraph about the program's mission, followed by two columns: 'Features' and 'Current Conditions'. The 'Current Conditions' section includes a map of East Africa with a 'View in Interactive Mapper' button and a 'Last Updated' timestamp. At the bottom, there are sections for 'Success Stories' and 'Latest News', each with a 'View All' link.

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Home :: East Africa

## SERVIR-East Africa

SERVIR integrates satellite observations and predictive models with other geographic information (sensor and field-based) to monitor and forecast ecological changes and respond to natural disasters. In 2008, NASA and CATHALAC partnered with the Regional Center for Mapping of Resources for Development (RCMRD) based in Nairobi, Kenya, and together they began setting up SERVIR's East Africa hub. The SERVIR-Africa project builds upon RCMRD's existing strengths and augments RCMRD's data management and training capability. Efforts complement RCMRD's core mission and provide a springboard for the development of applications customized for RCMRD's 18 member states.

### Features

SERVIR's Africa Ecosystems Clip, Zip, & Ship Tool

Read more about the tool [here](#)

The CREST Viewer for Hydrologic Analysis

Read more about CREST [here](#)

### Current Conditions

View in Interactive Mapper Last Updated: Oct 25, 2012 7:02 AM UTC-5

The evolving SERVIR regional visualization and monitoring platform has been established in East Africa to improve scientific knowledge and decision-making in a range of application areas (e.g., biodiversity conservation, disaster management, agricultural development, climate change adaptation, etc.).

**Partner Countries:** Botswana, Burundi, Comoros, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Somalia, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia

### Success Stories

[View All](#)

### Latest News

[View All](#)

The overarching goal of the SERVIR initiative is to *'integrate satellite observations, ground-based data and forecast models to monitor and forecast environmental changes and to improve response to natural disasters'* [[http://www.nasa.gov/mission\\_pages/servir/index.html](http://www.nasa.gov/mission_pages/servir/index.html)].

- **Themes:** Biodiversity, **Climate**, Agriculture, **Disasters**, Ecosystems, Health, Water, Weather
- **East Africa hub:** Regional Center for Mapping of Resources for Development (RCMRD), Nairobi, Kenya
- **SERVIR-Africa projects**
  - Biodiversity mapping (<http://servir.rcmrd.org/geoapps/biodiversity/>)
  - CREST hydrological model (<http://41.206.34.124/crestviewer/>)
  - 30 m Resolution Land Cover Dataset for East Africa
  - SERVIR Wireless Sensor Networks
  - Capacity building

# SERVIR proposal – EARS volcanic eruption monitoring

The overarching goal of the SERVIR initiative is to *'integrate satellite observations, ground-based data and forecast models to monitor and forecast environmental changes and to improve response to natural disasters'* [[http://www.nasa.gov/mission\\_pages/servir/index.html](http://www.nasa.gov/mission_pages/servir/index.html)].

## Eruption detection

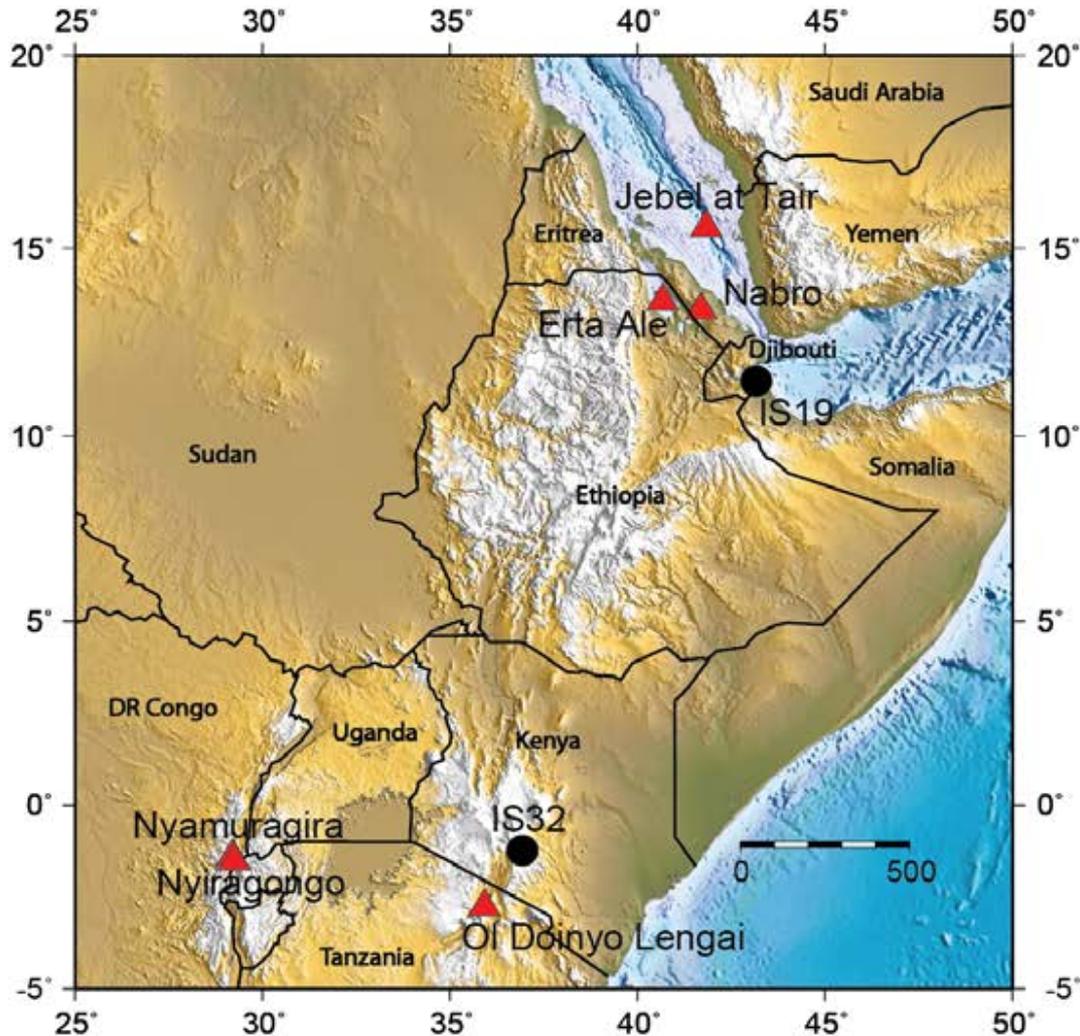
Infrasound, SO<sub>2</sub>, thermal IR

## Plume dispersion modeling (Puff)

Initialized with infrasound data

## Plume tracking

Satellite SO<sub>2</sub> and ash data



SERVIR East Africa 'hub' in Nairobi, Kenya  
Regional Center for Mapping of Resources for Development  
(RCMRD)

# Pertinent NASA satellite missions

- **DESDynI (Deformation, Ecosystem Structure and Dynamics of Ice)**
  - 12-16 day revisit time
  - L-band radar (vegetation)
  - Near-IR LiDAR
  - Mission budget cut in FY2012. Future uncertain.
- **ICESat – GLAS (Geoscience Laser Altimeter System)**
  - ICESat-2 set for launch in 2016
- **Volatiles**
  - **SO<sub>2</sub>**: OMI, OMPS, AIRS, CrIS, MLS
  - **CO<sub>2</sub>**: OCO-2
- **Thermal IR**: MODIS, ASTER, VIIRS, ALI



The End