AfricaArray Background

- **Started in 2004**
  - founding partners: Penn State, Univ. of the Witwatersrand (Wits), Council for Geoscience (aka Geol. Survey of South Africa (CGS) (+ IRIS support)

- **Goal: establish a public-private partnership to support capacity building and research in the geosciences (Earth, Atmospheric and Space sciences) in Africa, with and initial focus on solid earth geophysics and Wits University**

- **"AfricaArray" = array of training programs + array of research projects + array of partnerships and collaborations + array of scientific observatories (networks)**

- **Key components to a multifaceted initiative:**
  - **1) seismic, GPS, weather networks in Africa**
  - **2) Graduate research and education programs (Africa and US)**
  - **3) Diversity programs (Africa and US)**
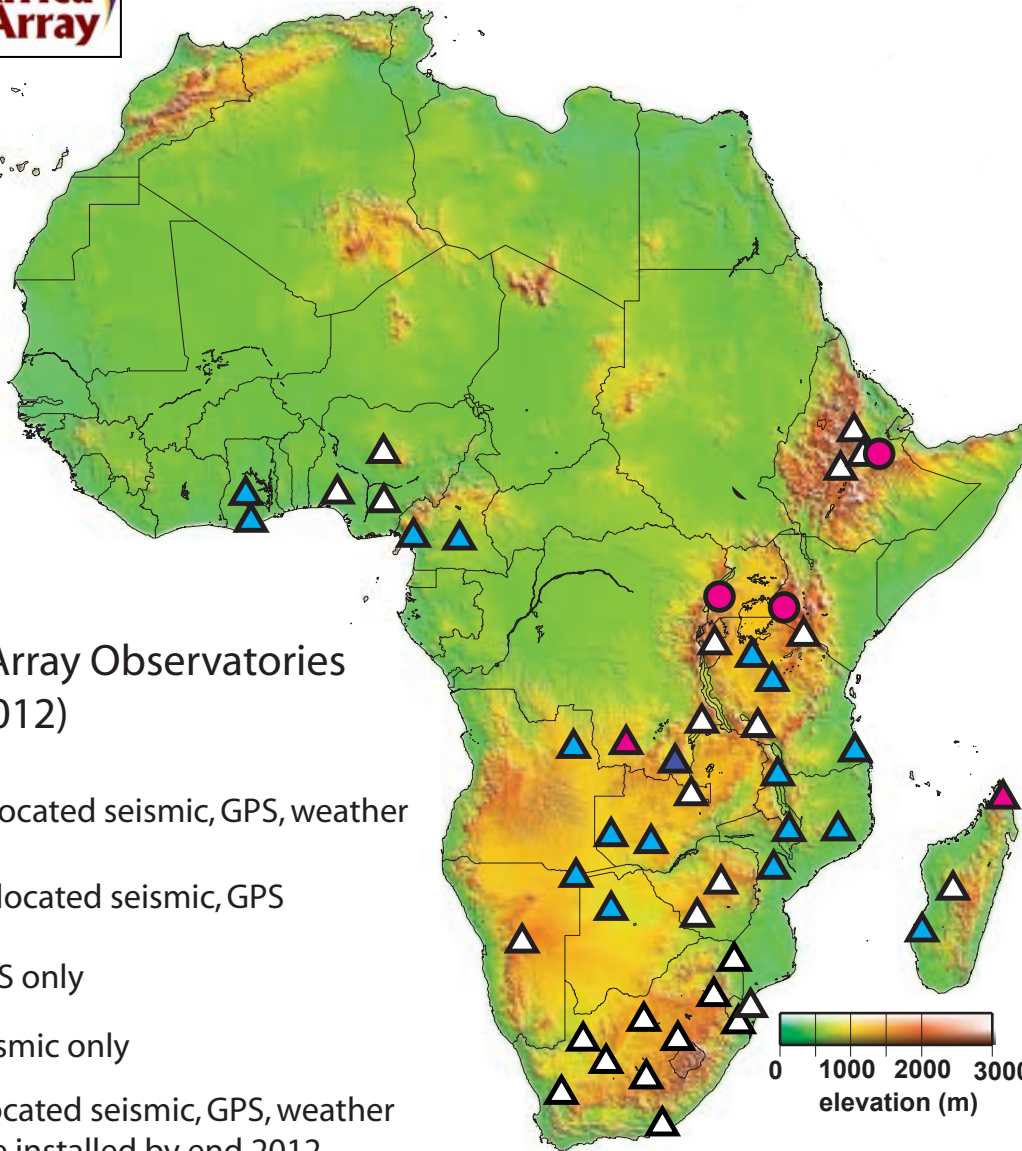 - **4) public-private partnership base (academic, gov't, industry)**

AfricaArray Observatory Network

- 44 seismic stations
- 18 GPS/met stations
- 2 GPS stations
- 3 seismic/GPS/met in const.
- 18 countries
- Continuous recording
- Data recovery 70-80%
- Data retrieval:
  - S. Africa, Mozambique, Botswana, Kenya - real-time using cell modems and internet
  - Elsewhere – manual
  - 2013 focus – getting more stations online

AfricaArray Observatories (Oct 2012)

△ collocated seismic, GPS, weather

△ collocated seismic, GPS

△ GPS only

△ seismic only

⬤ collocated seismic, GPS, weather to be installed by end 2012

elevation (m)
0 1000 2000 3000

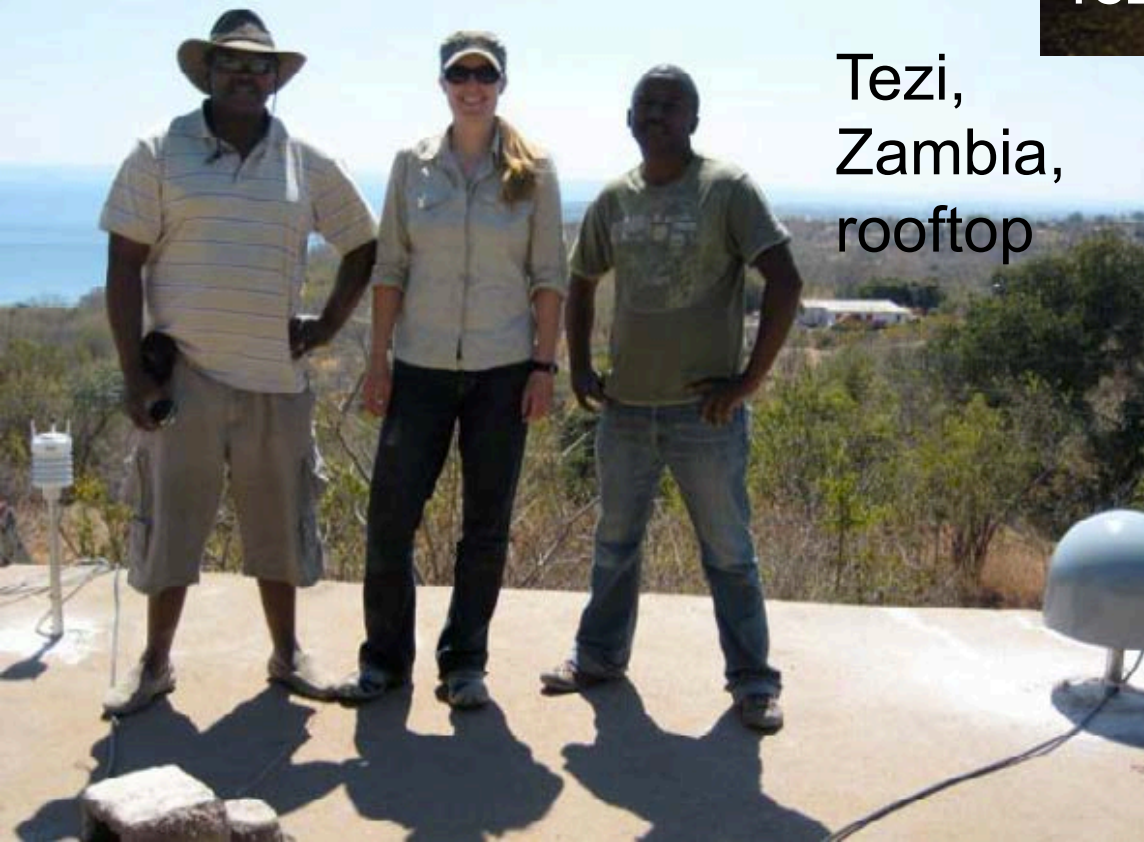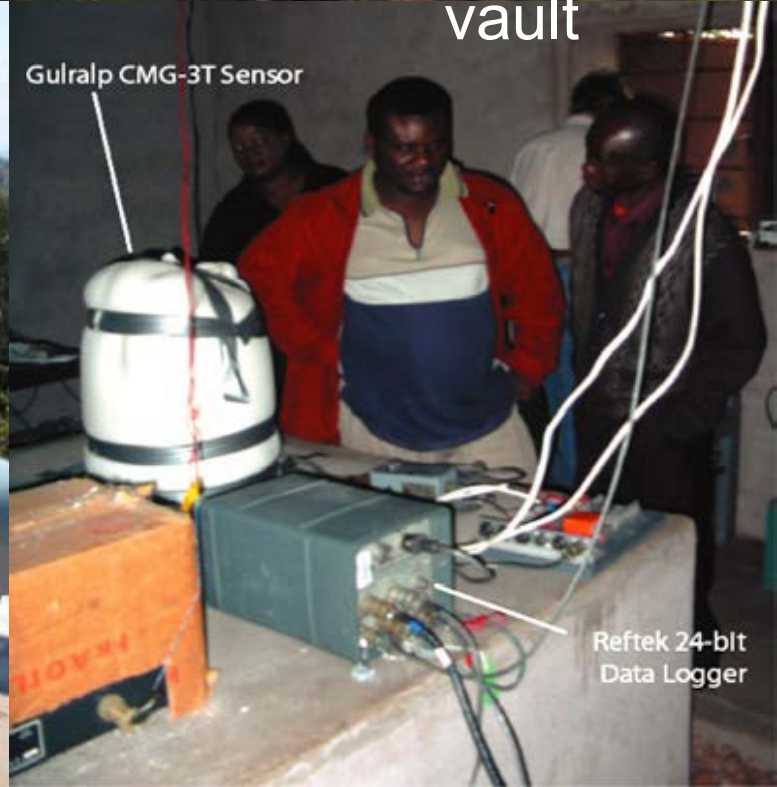Mongu, Zambia

Met sensor

GPS

Tezi, Zambia

Seismic vault

Tezi, Zambia, rooftop

Gulralp CMG-3T Sensor

Reftek 24-bit Data Logger

Data archiving and access

GPS/Met data available from UNAVCO – all open

Seismic data available from IRIS – 12 stations open to anyone; all open to projects with African collaborators; 3 yr embargo on others

Annual AfricaArray Workshop

- **The next workshop will be Jan. 17-18, 2013 at Wits University in Jburg, S. Africa**

- **A technician training course will be held Jan 15,16 prior to the workshop for AA station operators**

- **Registration form can be downloaded from the AA website (www.africaarray.org)**

- **Deadline for requesting travel support is Nov 9, 2012**

Progress so far

- **Education:**
  - In Africa: 50 BSc honors, 17 MSc, 9 PhD, 2 Postdocs supported

- **Network:**
  - 44 permanent seismic stations in 17 countries; 16 stations with GPS/met

- **Partners:**
  - Universities in Africa 15
  - Universities in US, Europe, Australia 14
  - Gov't organizations in Africa 17
  - Gov't organizations outside Africa 8
  - companies 19
  - Academic and industry societies 6

- **Research:**
  - Journal publications: >40

Network operation

- **Funding for equipment: NSF, academic institutions, gov't agencies**

- **Operations and maintenance**
  - Baseline support comes from station operators in each country
  - Technical staff based in S. Africa for major repairs
  - Network Manager providing oversight (Damien Delvaux)

- **Role of station operators in each country**
  - Who are they? Universities, Geological Surveys, Meteorological Agencies
  - Station construction, routine maintenance, downloading data
  - Security
  - Covering costs of technical staff, t

- **Benefits to station operators**
  - technical training
  - degree training
  - access to data from the network
  - access to support network

Uses of network data relevant to development in Africa

- **GPS/Met**
  - Weather (in cases of real-time data transmission)
  - Climate and human dimensions of global change
  - Atmospheric water vapor
  - Soil moisture
  - Space weather
  - Surveying

- **Seismic**
  - Seismicity (location, magnitude, frequency)
  - Ground shaking (attenuation, site amplification)
  - Earth structure related to mineral resources

- **Capacity building for science and technology in Africa**

  - **human capacity building**
    - **effective training program for scientists and technicians**
    - **focus on diversity**

  - **Observing network infrastructure**
    - **provides new data sets for students, postdocs, scientists**

  - **Partnerships**
    - **building a science community around a shared facility – an environmental monitoring network**