

AfricaArray: A Public-Private Partnership for Building Geoscience Capacity

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Outline



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- Overview of AfricaArray
 - Key elements of the AfricaArray education and research program
 - Partnerships

AfricaArray - a model for a successful African science network

- based on a PPP that is win-win for all stakeholders - academic institutions, government agencies and corporations

- aligned with NEPAD requirements for continent-wide cooperation in capacity building



AfricaArray - A public-private partnership supporting capacity building and research in the geosciences for Africa's natural resource sector

- to support in-situ training and research programs to help build a scientific workforce --initially in geophysics
- to use a network of shared scientific observatories (initially seismic recording stations) to promote education, research, and community building

"AfricaArray" = array of training programs + array of research projects + array of partnerships and collaborations + array of scientific observatories



Implementation (3 phases over 10 years)

Phase 1 (years 1-3, Jan. 2005 - Dec. 2007)

- Improve and expand the geophysics program at the University of the Witwatersrand, South Africa
- Create a seismic network by upgrading seismic monitoring infrastructure in participating countries (southern and eastern Africa)
- Use data from the seismic stations for student research
- Archive and distribute the data openly
- Develop a public-private funding partnership



Implementation

Phase 2 (years 4-6) & Phase 3 (years 7-10)

- Support centers of excellence in geophysics regionally at other African universities
- Expand network of observatories and add other sensors (GPS, meteorological, hydrologic, other environmental sensors)
- Expand educational and research activities into other science fields linked with the expansion of the observatory network



Progress since Jan 2005

- Funding: Raised \$10M
 - \$3M in-kind support
 - \$7M grants and contracts
- Education: (students from 12 African countries)
 - 34 BSc Honors students (4th year)
 - 13 MSc students (4 graduated)
 - 10 Ph.D. students (1st two will graduate in 2009)
 - 5 postdocs
- Observatory Network:
 - 31 permanent seismic stations in 13 countries
 - 3 temporary (project-specific) networks
- Partners:
 - Universities in Africa 15
 - Universities in US and Europe 13
 - Gov't agencies in Africa 21
 - Gov't agencies in US and Europe 5
 - companies 17

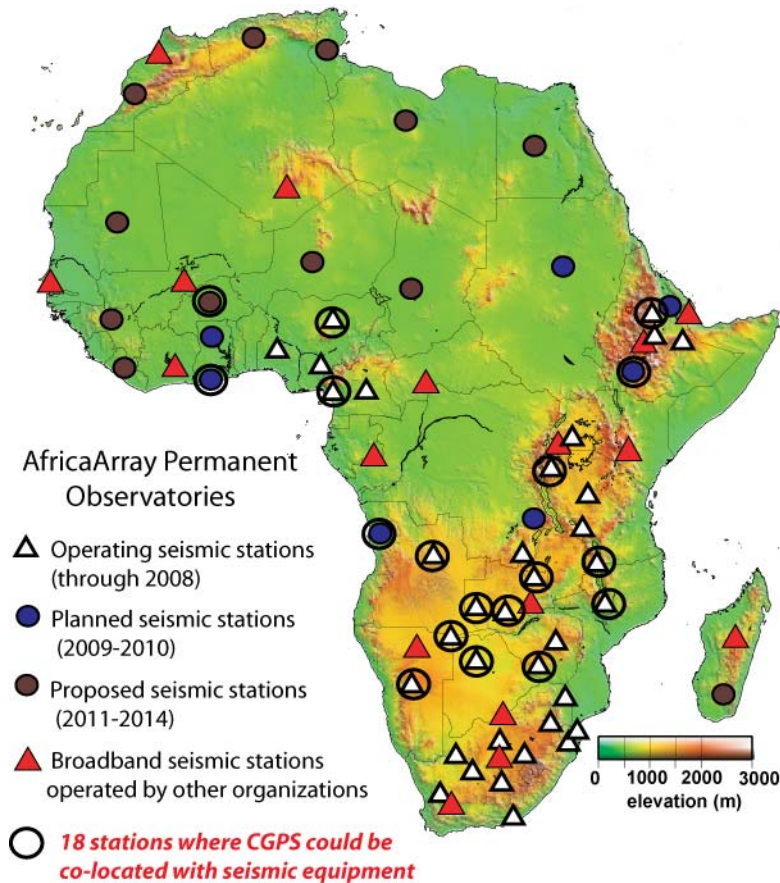
AfricaArray Seismic Network

31 seismic stations

13 countries

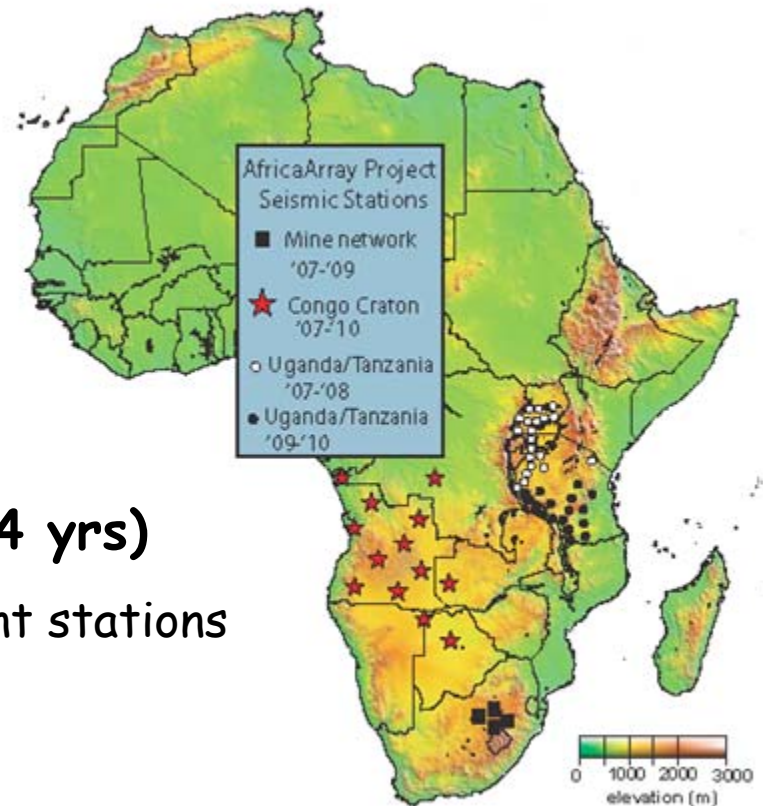
Continuous recording

Data recovery 70-80%



Temporary stations (2-4 yrs)

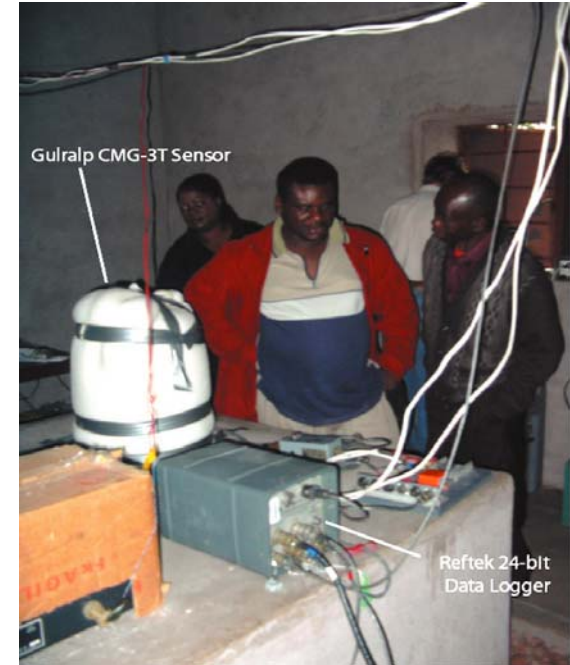
• many will become permanent stations





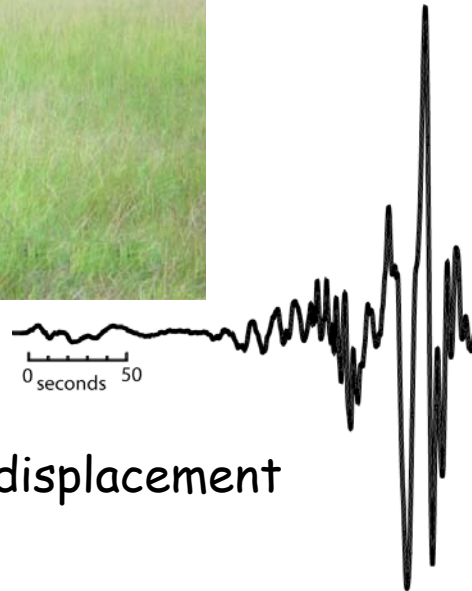
Itezhi-Tezhi, Zambia

- Installed Jan. 2006

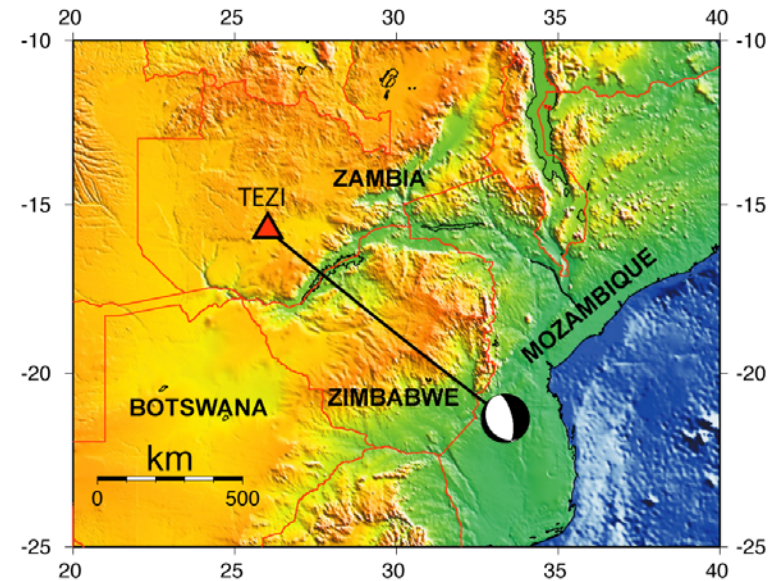


Mozambique Earthquake

- 22 February, 2006
- Mag 7.0



TEZI, Zambia
Vertical ground displacement



Partners



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- What do they do?
 - Provide financial support, contribute equipment and data management, offer technical assistance, provide access to data sets or research sites, supervise students, support interns
 - What do they get?
 - Acquire knowledge and data, share in the development of new techniques, build partnerships, recruiting advantage, increased capacity
 - How to become a partner?
 - Organization must have some link to Africa's natural resource sector
 - Sign a generic MoU
 - Or negotiate a contract
 - Or provide a letter of support

Partners



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- **Founding Partners**
 - Provided in-kind support to launch AfricaArray
 - Equipment, educational programs, admin support
 - Scholarships and support for research projects
 - **Sponsoring Partners**
 - Provide financial support - grants, contracts, gifts
 - Provide access to data sets and research sites
 - Provide technical assistance and equipment
 - Provide internships and scholarships
 - **Affiliated Partners**
 - Engaged in AfricaArray educational and research activities
 - Provide in-kind support - technical and equipment and infrastructure
 - Provide logistical support, operate observatories



Founding Partners

- **University of the Witwatersrand (Johannesburg)**
 - Geophysics Department - primary academic unit
- **Council for Geoscience (formerly the Geological Survey of South Africa)**
 - Seismology unit - main network operator for AfricaArray
- **Penn State University**
 - College of Earth and Mineral Sciences
 - Department of Geosciences - primary support unit for both the educational and research activities
 - Other key partner: Incorporated Research Institutions for Seismology (IRIS)
 - data management, equipment



Affiliated Partners

- ***Academic Institutions in Africa***· Addis Ababa University (Ethiopia)· Agostinho Neto University (Angola)· Obafemi Awolowo University (Nigeria)· University of Botswana (Botswana)· University of Yaounde (Cameroon)· University of Lubumbashi (DRC)· University of Nairobi (Kenya)· University of Antananarivo (Madagascar)· University of Namibia (Namibia)· University of Lagos (Nigeria)· University of Ibadan (Nigeria)· University of Cape Town (South Africa)· University of Dar es Salaam (Tanzania)· University of Zimbabwe (Zimbabwe)· National University of Science and Technology (Zimbabwe)
- ***Academic Institutions Outside of Africa***· Arizona State University (USA)· Carnegie Institute, Washington (USA)· Dublin Institute for Advanced Studies (Ireland)· Geoforschungszentrum (Germany)· Incorporated Research Institute for Seismology (USA)· International Institute for Geo-Information Science and Earth Observation (ITC), Enschede (Netherlands)· Jackson School of Geosciences, The University of Texas at Austin (USA)· Massachusetts Institute of Technology (MIT) (USA)· North Carolina Agricultural and Technical State University (USA)· Royal Museum for Central Africa (Belgium)· State University of New York, Stony Brook (USA)· Uppsala University (Sweden)· University of Lisbon (Portugal)



Affiliated Partners

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- ***Government Agencies in Africa***· Centre de Recherche en Science Naturalles (CRSN) (Democratic Republic of Congo)· Council for Scientific and Industrial Research (CSIR), Division of Mining Technology (South Africa)· Geological Survey of Algeria· Geological Survey of Botswana· Geological Survey of Malawi· Geological Survey of Namibia· Geological Survey of Nigeria· Geological Survey of Rwanda· Geological Survey of Tanzania· Geological Survey and Mines, Uganda· Geological Survey of Zambia· Geological Survey of Zimbabwe· Institute for Geological and Mining Research (IGMR) (Cameroon)· Institute of Scientific and Technological Research (IRST) (Rwanda)· Komati Basin water authority (Swaziland)· National Director of Geology (Mozambique)· National Space Research and Development Agency (Nigeria)· Petroleum Development Corporation (Tanzania)
 - ***Government Agencies Outside of Africa***· Lawrence Livermore National Laboratory (USA)
 - ***Academic and Industry Societies***· Geological Society of South Africa· International Association of Seismology and Physics of the Earth's Interior (IASPEI)· South African Geophysical Association· Society for Exploration Geophysicists· Society of Petroleum Engineers



Sponsoring Partners

- ***Industry***· African Rainbow Minerals· Anglo American· AngloGold Ashanti· Anglo Platinum· BHP Billiton· British Petroleum· De Beers· ExxonMobil· Great Northern· Integrated Seismic Systems International, Ltd. (ISSI)· London Bullion Market Association· Mineral Education Trust Fund (South Africa)· Schlumberger· The Society of Exploration Geophysicists Foundation (SEG)· Sonangol· Rio Tinto· Total, and The Total Professors Association
- ***Government***· Belgium Technical Cooperation Agency· Council for Scientific and Industrial Research (South Africa)· Department of Minerals and Energy (South Africa)· Department of Science and Technology (South Africa)· National Nuclear Security Administration, Department of Energy (US)· National Science Foundation (US)· National Research Foundation (South Africa)· Royal Museum for Central Africa (Belgium)
- ***Universities***· International Institute for Geo-Information Science and Earth Observation (ITC), Enschede (Netherlands)· Jackson School of Geosciences, The University of Texas at Austin· The Pennsylvania State University· University of the Witwatersrand



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- 5th Annual AfricaArray Workshop, Univ. Wits, Jburg
July 6-7, 2009

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