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GEOPOWER AFRICA

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U.S. Partner: Cynthia Ebinger, University of Rochester
Project Dates: September 2014 to August 2017
Amount: \$300,000 (DKUT: \$122,000; AAU: \$112,000; GST: \$60,000)

BACKGROUND:

Satellite and ground-based studies of the Kenya sector of the East African rift system (EAR) reveal active magmatic and/or aqueous fluid movement beneath 40 percent of the volcanoes, and similar results are emerging from systematic mapping along the Ethiopian and Tanzanian rift sectors with numerous surveys on geothermal energy.

PROJECT SUMMARY:

The project has two aims: the first is to map the small but multiple geothermal areas and the second is to identify new forms of geothermal exploitation along the EAR. These sites are small-size units combining power and heat applications from medium to low enthalpy resources (70-150°C) and their application for powering groundwater pumping. In parallel, the expected results from the project will inform nascent volcanic and earthquake hazard mitigation programs in Ethiopia, Kenya, and Tanzania. The project thus requires an interdisciplinary approach including geology, hydrogeology, fluid geochemistry, shallow crustal geophysics, power engineering (notably ORC units) applied in cascade use of energy (greenhousing, food drying, thermal bathing, green tourism). A survey of geothermal fields that could supply these innovative units will be carried out along the EAR (Afar through Kenya to Rungwe Province, Tanzania, using existing data from numerous reports from past geothermal exploration programs not presently available in the international journals as well as newly emerging data from two active NSF projects—CRAFTI and SEGMENTS). Thus, the team will build a strong regional framework for scientific and technological exchange, while at the same time empowering and educating local communities, particularly in pastoralist regions where resources are sparse. In parallel, their training and research exchange program will engage researchers in Africa, the United States, and Europe, with the aim of determining the necessary conditions and local training for such applications to be deployed in test sites in Ethiopia, Kenya, and Tanzania.

PROJECT GOAL:

The expected major impact of the project, having mapped the potential of geothermal systems in East Africa for supplying small-sized units, will be to establish systems for replication of the

initiatives at community level to provide power to the local community in areas not connected to the electric grid presently or in the near future. The power generated from these small units will also be used to increase drinking water supply for human and livestock. With the identification of both groundwater and hydrothermal resources on each site and socioeconomic conditions to be met for success, the project will determine the conditions for development of new irrigated land; production of local combined energy production devices; and hydrothermal fluid production for bathing, medical, and other sanitary applications, including sustainable tourist developments. These activities are expected to eventually contribute to improved socioeconomic conditions for communities living around the sites where the geothermal activities will take place.