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Bringing diverse talent to the geophysics workforce, a review of the AfricaArray International Geophysics Field School

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The AfricaArray program was established in 2005, with the express purpose of fostering "continent-wide cooperation in human resources development and capacity building" [1]. One manifestation of this goal has been the development of an internationally recognized geophysics field school hosted in South Africa. This field school program developed out of the existing Honours Geophysics degree offered at the University of the Witwatersrand (Wits). By increasing the number of participants, we are able to capitalize on the huge logistical effort needed to get six different geophysical methods into the field[2].

One goal of the field school is to introduce participants to the entire workflow of a geophysical project. Thus, in the first week, participants plan their geophysical survey in the GIS computer lab. This includes forward modelling to select survey parameters, safety considerations and cost calculations. The second week moves to the field to collect data to address a variety of geological questions. In the past these have included: determining dyke parameters for loss of ground determinations on a mine, dam wall integrity, overburden thickness for open pit mine planning and mapping of an early homestead. The methods employed include: gravity, DGPS, DC resistivity, magnetics, GPR, reflection and refraction seismic.

Figure 1: Since its establishment in 2005, the AfricaArray International Geophysics field school has hosted African participants from countries highlighted in red.

In the third week, students return to the computer lab for a week of processing, interpreting and integrating the results from the various surveys. At the end of the week, the students present their results for industry sponsors.

There are four cohorts of students that participate. The Wits Honours students form the core of the program. Undergraduate students from the USA participating in a Research Experience for Undergraduates (REU) join us for three weeks of their nine week program. Professionals and students from other African institutions are sponsored by the Society of Exploration Geophysicists (SEG) Foundation and UNESCO. The fourth group are the graduate student instructors. These graduate students gain extra experience, as they are responsible for making sure all of the computer programs and equipment work long before the start of the program. This results in many levels of diversity.

This method of instruction, of learning by doing, ensures that when participants return to their home institutions they are able to use what they have learned and develop programs at their home institutions. To date a number of field schools are being developed, with the Kenyan field school having been running for three years.

References:

[1] Nyblade et al. (2011) EOS 19, 161-162
[2] Webb et al. (2015) TLE 34, 1230-1235