

OBSIP Experiment Archive

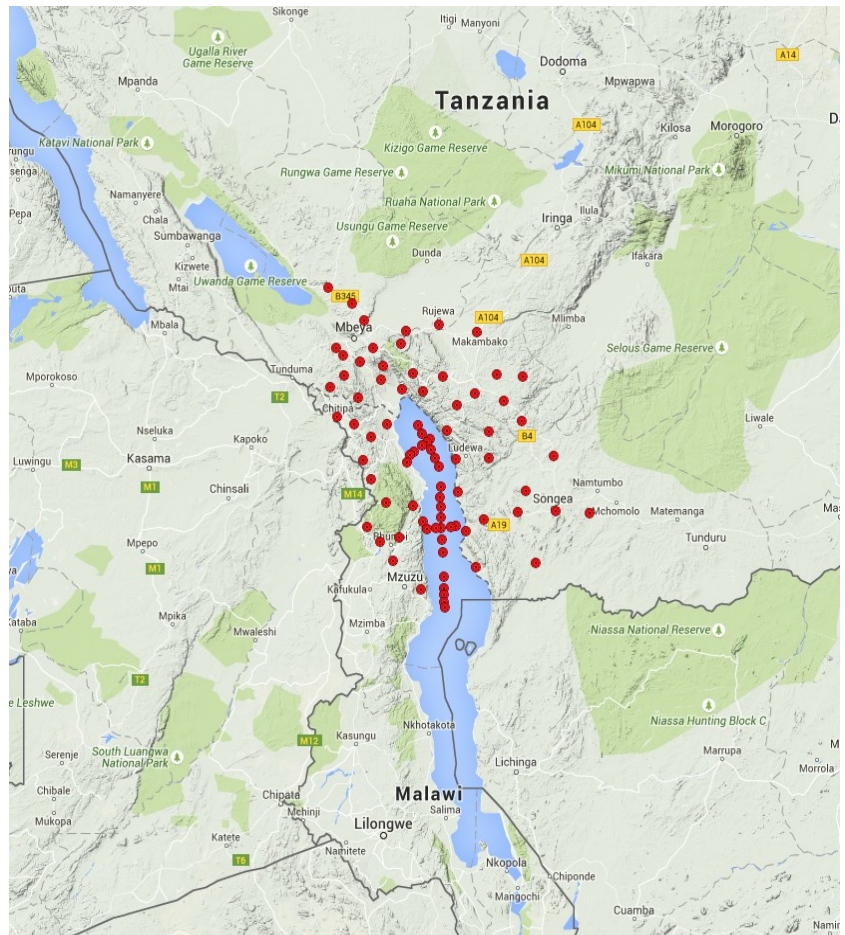
Year:	2015
Experiment Name:	Study of Extension and magmatism in Malawi and Tanzania (SEGMENT)
Principal Investigator(s):	Donna Shillington (LDEO) Scott Nooner (UNC Wilmington) Cornelia Class (LDEO) Jim Gaherty (LDEO)

Experiment Summary: (Taken from the NSF Abstract): The primary scientific goal of this project is to examine the emergence and early evolution of two fundamental features of all divergent plate boundaries: magmatism and segmentation. Magmatism accommodates a significant percentage of plate separation at most mid-ocean ridges and late-stage rifts. Likewise, transform faults demarcate discrete spreading segments in mid-ocean ridges, which are broadly characterized by more robust magmatism at their centers than at their edges. Well-developed magmatic and tectonic segmentation is also observed in late-stage rifts and new ocean basins. However, little is known about the controls on the initiation and development of magmatism and segmentation in young rifts. Specifically, the PIs seek to address the following questions:

When, where and why does magmatism initiate in rifts, and what is its role in accommodating extension?

What controls the development of tectonic segmentation in early-stage rifts? How is it manifested in 4D patterns of magmatism and deformation.

The project consists of an integrated geophysical, geochemical and geological study of the northern Lake Malawi region in the East African Rift System (EARS) to address these questions.



Stations that are deployed as part of SEGMENT (red circles).

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Experiment Summary: ...This is one of the few places in the world that has all of the

Cruises:

2/21/2015 - 3/21/2015:

34 short period and 7 long period OBSIP ocean-bottom seismometers are deployed in Lake Malawi on board the R/V Ndunduma. Onshore broadband seismometers are also deployed in Malawi, Tanzania in August 2013 and June/July 2014.

4/15/15 - 4/27/2015:

33 short period instruments are recovered as the active source component of the experiment comes to an end. The R/V Katundu was outfitted with equipment to tow a seismic streamer over the array in March 2015.

10/1/15 - 10/10/2015:

7 long period seismometers are recovered. One short period instrument was unable to be recovered.

Data:

Data from all OBSIP instruments deployed is archived under temporary network code [YQ](#) and assembled data set ID #[16-010](#) at the IRIS DMC.

ingredients necessary for a comprehensive study of early rifting. Active and passive seismic data and MT data will reveal the 3D structure of the crust and lithosphere at a variety of length scales, from the architecture of border faults and accommodation zones to the distribution of deformation and magma (if present) in the mantle lithosphere. Surface deformation, seismicity, and rift stratigraphy, as well as geochronology, thermobarometry and geochemistry of volcanic rocks, will yield constraints on the origin of magmatism and the evolution of deformation and magmatism at a range of time scales, including possibly variable contributions from sub-lithospheric versus lithospheric sources. Comparisons of active and cumulative deformation patterns will enable the evaluation of the importance of episodicity, seismicity and magmatism in accommodating extension and how they relate to segmentation. This powerful combination of temporal and spatial constraints will produce unique insights into the initiation of segmentation and magmatism during continental rifting.

Downloads/Links:

[SEGMeNT Website](#)

[SRL Data Mine Article](#)

[Articles on SEGMeNT Fieldwork](#)

[State of the Planet Article](#)