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Recent Seismicity and volcanism in Afar and the Main Ethiopian Rift

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The process that controls continental rifting and formation of new oceanic crust is not well known as the timescales of these natural occurrences is geologic and the extent of our observation is very limited. On the other hand, most of the rifting episodes occur in submarine environments which are not easily accessible for direct observation. The Afro-Arabian rift system is one of the ideal natural labs on the planet that attracted strong international collaborations to study active rift process in the region.

It is known that the Red Sea and Gulf of Aden Oceanic Rifts meet with the East African Rift System (EARS) in the Afar Depression to form a triple junction but with no clearly defined location. The Afar region is a highly-extended region which is in transition to be a prototype oceanic crust on a dry land. With the advent of modern space and ground based geophysical equipment corroborated with state-of-the-art computational techniques, our understanding of the rift process is improving. In the last 15 years, we have witnessed several rifting episodes in the Afar region in general to some extent in the Main Ethiopian.

Several Broadband seismic experiments were conducted in Afar and the main Ethiopian rift since 1999. The Strasbourg (France), IRIS/PASSCAL (USA), EAGLE (UK and USA) and Afar Rift Consortium (UK and US) seismic experiments are major investigations carried out to study the crust and upper mantle structure. The seismicity captured recently using all stations including permanent networks show that most of the activity is related with magma dynamics in the region. It is not only the occurrence of rifting events which are episodic but also the international collaborations and extent of investigations in the region which brings a likely chance of missing some relevant activities of research interest. This demands a coordinated effort by groups of interested researchers in different disciplines to continuously study rift processes so as to better understand the mechanisms of continental breakup in the Afro-Arabian rift system.