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### **Geological map of the southern margins of the Afar: The Dire Dawa area (Ethiopia)**

Mauro Coltorti, *Università di Siena (Italy)*  
 Alberto Pizzi, *Università di Chieti (Italy)*  
 Giuseppe Pomposo, *Università di Chieti (Italy)*  
 Abebe Bekele, *Addis Ababa University (Ethiopia)*  
 Leonardo Disperati, *Università di Siena (Italy)*  
 Dario Firuzabadi, *Università di Siena (Italy)*  
 Anna Gandin, *Università di Siena (Italy)*  
 Laura Pontarelli, *Università di Chieti (Italy)*  
 Giorgio Sacchi, *Università di Siena (Italy)*  
 Riccardo Salvini, *Università di Siena (Italy)*

A 1: 50,000 scale geological map was made along the southern margins of Afar, in the Dire Dawa area (Ethiopia), during two field seasons in 2006 and 2007. The area is located at the boundary between the Somalian Plateau and the southern margin of the Afar. A detailed field survey was carried out in conjunction with a photogeological investigation. The aim is to characterise the style of faulting and Plio-Quaternary evolution of this rift margin. Late Triassic sandstones (Adigrat Formation, Upper Triassic) and a carbonate sequence (Antalo Group) lie unconformably over the pre-Cambrian metamorphic basement. The thickness of the former lithostratigraphic unit changes spatially and locally it is missing.

The Antalo Group (Upper Jurassic) includes the Antalo Limestones, the Dire Dawa Limestones and Marls, the Daghani Shales and the Gildessa Limestones described by Bosellini et al. (2001). These rocks are unconformably covered by Early Cretaceous continental and transitional sandstones and conglomerates of the Amba Aradom Formation. A further unconformity preceded the emplacement of a thick sequence of Flood Basalt (Trap series) during the Oligocene to which the intrusion of many mainly doleritic bodies were connected (dikes, sills, necks, laccolites). The Trap basalts crop out only at the top of the plateau at an elevation up to 3500 m. The older sequence rest on the metamorphic basement and crops out along the Rift escarpment displaced by a series of closely spaced ca. E-W oriented extensional faults. Faulted blocks are commonly tilted in counter slope up to ca 60°. The occurrence of footwall anticline-hanging-wall syncline pairs, adjacent to many of the block-bounding and intra-block faults testify to fault-propagation folding in an extensional regime. Kinematic indicators measured along the fault planes commonly show a slight left lateral component providing a ca. NNW-SSE direction of extension, most probably as a consequence of the propagation of the Aden rift toward the Afar.

During the Pleistocene the Afar Stratoid Basalts were emplaced at the feet of the escarpment on top of a major pediment whose remains, deprived of any cover, are also found on top of the faulted blocks. The faults were erased during its modelling but many of them have been reactivated allowing a two fold division (pre and post Afar Stratoid Basalts) of the fault activity in this sector. Along the valleys that deeply dissect the pediment, a series of calcareous tufa and fluvial sediments have been mapped. Wide flat coalescent alluvial fans occupy the central northern part of the area. Recently all these sediments have been deeply incised and constitute a major terraced unit. The geological map allows a clear reconnaissance of the rift geometry, the timing of the fault activity and the evolution of this sector of the East Africa Rift system.

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