



Passive seismic experiment in the Olduvai Gorge and Laetoli region (Ngorongoro Conservation Area), Northern Tanzania.

Laura Parisi, Luigi Lombardo, Zheng Tang, and P. Martin Mai

PSE Division, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia (laura.parsi@kaust.edu.sa)

The Olduvai Gorge and Laetoli basins, located within the Ngorongoro Conservation Area (NCA), are a cornerstone for understanding the evolution of early humans and are two paleo-anthropological excavation sites of global importance. NCA is located at the boundary between the Tanzanian Craton and East African Rift (EAR), in the vicinity of Ngorongoro Crater and other major volcanic edifices. Thus, understanding the geology and tectonics of the NCA may shed light onto the question why early Hominins settled in this region.

Environmental and geological conditions in the Olduvai and Laetoli region that promoted human settlement and development are still debated by geologists and paleo-anthropologists. Paleo-geographical reconstructions of the study area of the last 2 million years may take advantage of modern passive seismology. Therefore, we installed a dense seismic network covering a surface of approximately 30 x 40 km within the NCA to map the depth extent of known faults, and to identify seismically active faults that have no surface expression. Our ten seismic stations, equipped with Trillium Compact 120 s sensors, started to operate in June 2016 and will continue for a total of 2 years. At the end of the first year, other 5 stations will densify our network.

Here we analyse data quality of the first four months of continuous recordings. Our network provides good quality 3-C waveforms in the frequency range of 0.7–50 Hz. Vertical component seismograms record frequencies reliably down to 8 mHz. Preliminary results of the seismicity obtained with standard location procedures show that NCA is characterised by frequent tectonic seismicity (not volcano-related) with M_l between 0.5 and 2.0. Seismic activity is more frequent in the South (Laetoli region) where major fault systems have not been recognised at the surface yet.