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Is there active tectonics at the Nile cataracts in Sudan? An archaeoseismological study

Miklos Kazmer^{1,2}, Nada Bushra El Tahir³, Krzysztof Gaidzik⁴, and **Balázs Székely**⁵

¹Eotvos University, Department of Paleontology, Budapest, Hungary (mkazmer@gmail.com)

²MTA-ELTE Geological, Geophysical and Space Science Research Group, Budapest, Hungary

³University of Khartoum, Department of Geology, Khartoum Sudan

⁴University of Silesia, Department of Earth Sciences, Sosnowiec, Poland

⁵Eotvos University, Department of Geophysics, Budapest, Hungary

The Nile is the longest river on earth, accordingly with huge drainage and major floods, regulated by the African monsoon. Significant amount of sediment is carried by the river; its deposition forms alluvial plains along most of its course. However, in Upper Egypt and northern Sudan there are six major and several minor cataracts totalling 327 km in length. There the river flows directly on bedrock, and a multitude of islands and rocks in the riverbed makes navigation hard or impossible throughout much of the year. Obviously, the Nile is unable to remove these obstacles from its flow (despite its ability to carve a deep canyon in the African continent during Messinian lowstand of the Mediterranean Sea). It has been suggested that the Cataract Nile is in a youthful stage, flows along structurally controlled turns and that earthquakes in southern Egypt prove that portions of the Nubian Swell are still tectonically active (Thurmond et al., 2004). However, the Sudan part of the river does not show any seismic activity. An archaeoseismological study is in progress to locate evidence of past earthquakes preserved in monumental architecture erected during the past 3500 years. Pyramids in Meroe display masonry shifted in plane of the wall: this was caused by one or more earthquakes of intensity $I_0 = 9$ on the Archaeological Intensity Scale. We suggest that an ongoing systematic study of monumental stone and adobe buildings along the Nile in the region of the Nubian Swell will find further evidence of major earthquakes in the region, contributing to a better understanding of seismic hazard in Sudan.

Reference

Thurmond, A.K., Stern, R.J., Abselsalam, M.G., Nielsen, K.C., Abdeen, M.M., Hinz, E. (2004): The Nubian Swell. - *Journal of African Earth Sciences* 39, 401-407.