

# NORSAR

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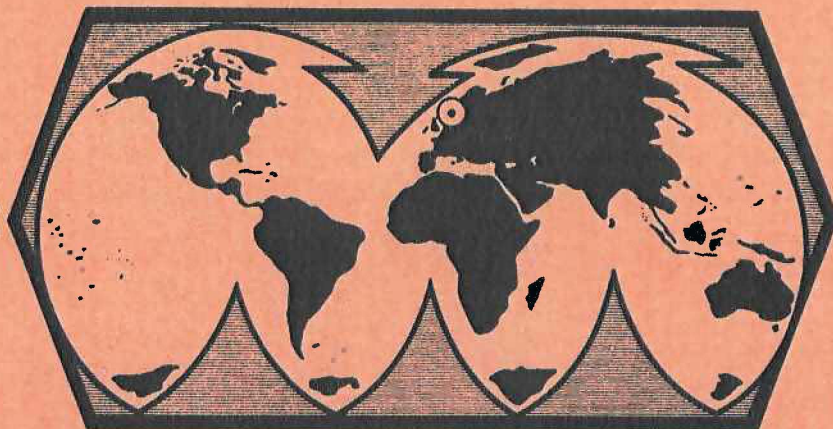
## SEMIANNUAL TECHNICAL SUMMARY

1 October 1978—31 March 1979

By  
H. Gjøystdal (Ed.)

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#### VI.4 Microearthquake Results from Tanzania

In the previous semiannual report a description was given of a new seismic array for microearthquake studies which now is in operation in Stiegler's Gorge, Tanzania (with NTNF/NORSAR as seismological consultants). Since then, a good amount of high-quality data have been received (although operational problems are frequent too), and the results show that there is a considerable microearthquake activity. In Fig. VI.4.1 we have plotted the epicenters of 80 earthquakes occurring in the area between 23 September 1978 and 5 February 1979, and we have also plotted the seismic stations and the rivers in the area. The proposed dam site is shown just SE of station 2, and we see that the site is surrounded by a large number of events. This activity is striking NW-SE and is connected to a prominent fault system called Tagalala. Connected to this fault system is also a prominent eastward-facing escarpment and several hot springs. A composite fault plane solution for the Tagalala earthquakes is presented in Fig. VI.4.2, where the plane striking  $N26^{\circ}W$  and dipping  $46^{\circ}E$  fits very well to the above-mentioned geologic information. The solution is furthermore supported by the hypocentral depths, these are all in the range 0-25 km with the deepest events to the east. The fault plane parameters for the N-S trending events near stations 5 and 6 are clearly different from those of Tagalala, which shows that the tectonic regime in the area is fairly complicated. It is moreover interesting to note that the events plotted in Fig. VI.4.1 are the only ones recorded within the area covered by the map.

The magnitudes of the Stiegler's Gorge events have not so far been studied in any detail (a magnitude scale will be developed), but we have fairly good indications that most of the magnitudes are in the range from 0 to 4 ML units. Another interesting question which remains to be answered is to what extent the Stiegler's Gorge seismic activity can be considered a part of the general N-S epicenter trend in this part of Tanzania, and as such may be interpreted as an extension of the Gregory Rift.

The digital data recorded so far comprises a large number of earthquakes at all distances from 0-15 degrees. We plan to analyze some of these events further with the aim of developing regional signal attenuation characteristics for Central and Southern Africa.

H. Bungum

B. Kr. Hokland

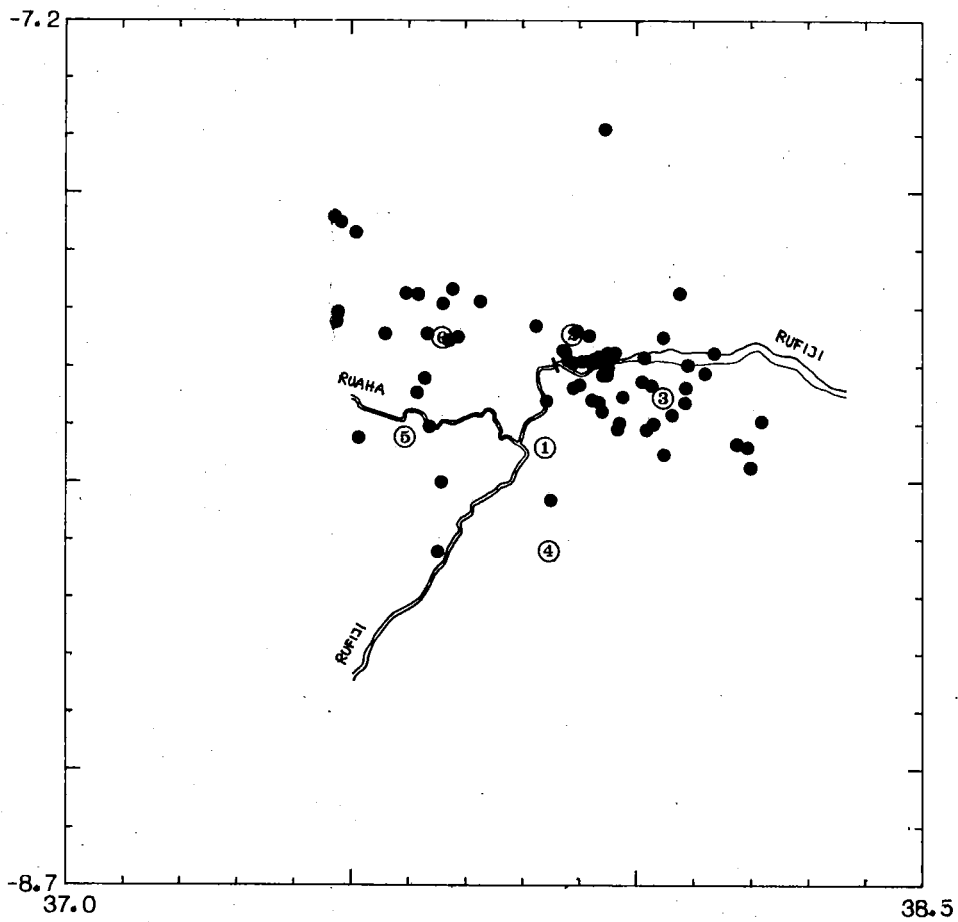


Fig. VI. 4.1 Epicenter locations for 80 earthquakes near Stiegler's Gorge, Tanzania. The 6 stations in the microearthquake network are marked with encircled numbers, and the proposed dam site is indicated with a bar crossing the Rufiji river just SE of station 2.

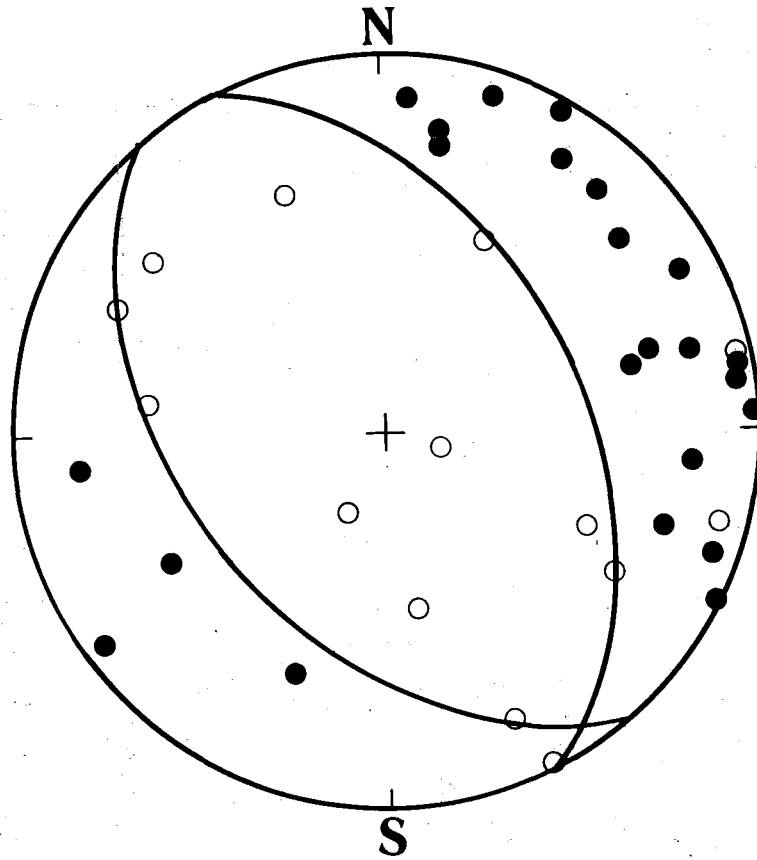


Fig. VI.4.2 Composite fault plane solution based on first motion readings from 7 earthquakes of the Tagalala fault system (near stations 2 and 3 in Fig. VI.4.1). Solid and open circles represent compressions and dilatations, respectively, plotted in a lower hemisphere stereographic projection. Strikes/dips for the two planes are  $140^{\circ}/45^{\circ}\text{W}$  and  $154^{\circ}/46^{\circ}\text{E}$ , with the latter one most probably being the faulting plane.