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Seismotectonic Implications of the 20 May 1990 South Sudan Earthquake

The south Sudan earthquake of May 20, 1990 is so far among the three strongest (Mw ≥ 7.0) earthquakes to occur in the eastern part of Africa since 1910 and was accompanied by two aftershocks on May 24, 1990 (Mw = 6.5 and 7.1). Results of teleseismic body-waves inversion show that the best solution for the May 20, 1990 south Sudan earthquake consists of only one event on a fault having strike, dip and rake of 315o/84o/-3o, and the fault plane is characterized by left-lateral strike-slip fault mechanism. The left-lateral strike-slip fault mechanism which is consistent with that of the January 6, 1928 Subukia earthquake in central Kenya (Ms = 6.9), as well as the distribution of historical earthquakes from south Sudan through central Kenya shows NW-SE alignment of epicenters. The NW-SE alignment of epicenters is characterized by earthquakes of local magnitude Ml ⊠ 4.0, except the January 6, 1928 Subukia earthquake, consistent with the trend of Aswa-Nyangia transform fault zone. From these results, it is evident that these two earthquakes are not necessarily due to the normal faulting of the East African Rift System but rather due to the strike –slip fault motion of the NW-SE trending fault zones.

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