1.Presentation Title: Lateral variations in the crustal stress field of continental West Africa

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3.Abstract

West Africa continues to host a growing number of low and intermediate magnitude earthquakes (M2.0-M5.0) in the interior and on the edges of the West African Craton, the Sahara Metacraton, and the Central and West African Mobile Belt. Earthquake activity in these stable regions raises the need to comprehend the causes and the tectonic controls that drive the seismicity. Unfortunately, such studies are rare, and focal mechanism catalogs remain limited to large events, e.g., the historical *1983 M6.3* Guinea event, and the two 1939 M6.(1,5) Accra events. This shortcoming is mainly due to the sparsity of seismic stations. Here, we apply single-station inversion techniques to constrain our focal mechanism catalog, following the same computational technique used for marsquake focal mechanism inversions. The method relies on a grid search of focal mechanism parameters while conducting a waveform fitting of the vertical channel compressional and transverse channel shear wave coda modeled using instaseis synthetic waveforms. We reviewed the available seismic records for ~318 M2.0-5.0 earthquakes from 1990 to 2021 and compiled useful waveforms using an automatic phase picking algorithm to identify the highest signal-to-noise ratio for both compressional and shear phases. We identified twelve events suitable for single-station multimode body-wave inversion and two events suitable for the application of first P-motion polarity inversions. The details of our new focal mechanism catalog provide the first comprehensive description of the connection between seismicity, the contemporary stress field, and the styles of brittle reactivation of tectonic structures in West Africa. Our result spotlights the heterogeneity of faulting styles and the lateral variation of the crustal stress regime in continental West Africa.

4.Figure 1: