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Lufilian Arc: long record of brittle tectonics in relation to moving plates

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The Lufilian Arc of Katanga (DRC) and northern Zambia formed in response to the interaction between the Kalahari and the Congo-Tanzania cratonic plates during the late stages of the Pan-African amalgamation of Gondwana. If the general structure and stratigraphy are relatively well known, the deformation history during the long period spanning the peak of fold and thrust emplacement and the present-day extensional context related to the development of the east African rift system remains poorly known. We present new fault-kinematic field observations and paleostress inversion results from 21 important mines, quarries and outcrops spread over the Lufilian arc, its Kundelundu foreland and Kibaran margin. The results allow to propose a brittle evolution model with successively compressional to transpressional stages related to the Lufilian orogeny, transtensional to extensional stages related to late orogenic relaxation and extensional collapse, post-orogenic transpressional inversion and rift-related extension. These brittle deformations contributed significantly to the remobilization of mineral elements and their concentration into economic deposits.