Kinematic pattern of Lufilian salt tectonics, late-to post-orogenic extension and inversion

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This research deals with the brittle tectonic evolution along a NE-SW transect across the Lufilian fold-and-thrust belt (Katanga, DR Congo). Pan-African orogenic processes in Central Africa involve intracontinental collision but also late-orogenic and intraplate processes that occurred in dominantly brittle conditions and can be documented by fault kinematic analysis and paleostress reconstructions. The Congo and Tanzania cratons in Central Africa are surrounded by Pan-African orogenic belts which all entered almost synchronously in collision stage in the early Paleozoic. While their tectonic history up to the collision stage is increasingly better documented by ductile deformation and metamorphic studies, their late evolution remain poorly known as soon as they enter in the brittle deformation regime. This results in an incomplete understanding of the orogenic processes, especially when the transition from ductile to the brittle regime occurred at the end of the orogenic compression. In this case, the last compressional stages and the entire late orogenic extension and extensional collapse stages remain undocumented. This is the case for the Lufilian orogeny which developed along the southern margin of the Congo Craton in Central Africa during the pan-African and was marked by a collisional event with crustal thickening and white schist formation at 550-530 Ma. The Lufilian Arc which forms the external part of the Lufilian orogeny developed as an arcuate fold-and-thrust belt. Its foreland is formed by the Kundelungu plateau, between the Bangweulu block and the Kibara belt. This entire region is also tectonically active, as part of the incipient SW branch of the East African rift system. The long period between the paroxysm of the Lufilian orogeny and the late Neogene to Quaternary rifting has been investigated by fault-kinematic analysis and paleostress reconstruction in open mines spread over the entire arc and foreland. Paleostress tensors were computed from 23 sites totalling 1900 fault-slip data by interactive stress tensor inversion and data subset separation, and a succession of 8 brittle deformation stages established. They evidence the late stages of the Lufilian orogeny, including orogenic bending and orogenic collapse, an intraplate early-middle Mesozoic transpressional inversion and late Cenozoic rifting.