

Structural Architecture of the Lufilian Arc: Arc-Scale Structural Controls on Mineralization Based on a New GIS Compilation

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A GIS-based structural overview of the Lufilian Arc, based on 65 georeferenced maps from research, technical reports and geophysical surveys, allows for a review of its structural evolution and the development of Cu/Co-mineralized zones. Regional-scale “bedding boudinage” or “foliation boudinage”, depending on the grade of metamorphism and position within the arc, concomitant with the arc’s flexure, created dilational zones into which mineralized fluids were channelled. These zones acted as “sumps” for detritus (olistostromes) shed from and pushed ahead of advancing thrust units. The base of these were poorly supported probably saturated, Roan Breccia-filled dilational zones, resulting in local delamination of disharmonically-folded, highly-fractured, pervasively-veined and mineralized lower portions of the Mines Subgroup (écaille or fragments), which slumped into these zones at various attitudes and positions. The new model does not exclude the role of halite-rich fluids in transporting mineralization or in facilitating thrusting, but proposes deformation mechanisms that do not require physical, en masse fragment transportation by salt. The new model accounts for the absence, in the Lufilian Arc, of features typically associated with salt diapirism, such as diapiric uplift, radial fracturing and drainage patterns, salt extrusion, salt mines, salt playas, brine or sulphur springs, and changes in vegetation or carapaces.