Continental growth: an overview of the Proterozoic in western and central Africa

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The westAfrican craton (WAC) stable since 2 Ga is surrounded by Neoproterozoic belts delimited by major tectonic contacts and sutures. In the WAC, U-Pb zircon ages and Sm-Nd data support the model of a vertical accumulation of juvenile mafic to felsic volcanics, volcaniclastic rocks and intrusive magmas above oceanic plateaus during the 2.3-2.1 Ga period. Cratonization occurred through docking and lateral assembly of displaced terranes, without significant crustal thickening, above an assumed soft lithosphere.

The Neoproterozoic pan-African belt is characterized by trans-continental N-S shear zones matching those of NE Brazil, which delimit elongate terranes of variable age, origin and evolution. Basement inliers share a pre-2 Ga common evolution with the WAC, but they were burried below a thick cratonic to peri-cratonic, mainly quartzitic cover predating 1.7-1.8 Ga old rift sequences with A-type magmatism. Continental fragmentation and opening of oceanic domains occurred during the 900-750 Ma period. Late Neoproterozoic volcanic graywackes and calc-alkaline plutono-volcanic assemblages represent significant crustal additions of juvenile and recycled material in subduction settings.

The main pan-African episode (630-530 Ma) resulting from plate convergence and NE-SW continental collision produced major nappes and crustal thickening. UHP, coesite-bearing rocks exhumed from□100 km depth along the main suture zone document eastward continental subduction of the WAC. In contrast, large continental areas from the central zones that include remobilized Archean crust were decratonised under a relaxed geotherm, with little evidences of crustal thickening.