

RIFTING EVENTS IN THE CONGO-SÃO FRANCISCO PALAEOCONTINENT: ISOTOPIC EVIDENCE FROM THE BOMA REGION, WEST CONGO BELT

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ABSTRACT: The West Congo belt together with its counterpart located in Brazil, the Araçuaí orogen, represents a Pan African-Brasiliano orogenic system developed within an embayment shaped into the Congo-São Francisco palaeocontinent. From the Bas-Congo region, an ENE-verging segment of the West Congo belt was thrust onto the Sangha aulacogen, making up a prominent salient into the Congo craton foreland. This salient is rich in anorogenic igneous rocks hosted by the Kimezian basement. Our study, based on zircon U-Pb (SHRIMP) and Lu-Hf (LA-ICP-MS) analysis, focuses on the Boma sector at the westernmost Bas-Congo region, where the Shinkakasa plutonic complex intruded the Kimezian basement. The Shinkakasa intrusions mostly include weakly to non-metamorphosed granitic to syenitic and gabbroic rocks, displaying magma mixing features. The gray syenogranite (sample 166101) and quartz syenite to alkali granite (117590) of the Shinkakasa intrusion are rich in brown biotite and bluish green amphibole, displaying igneous flow, whilst the foliated monzogranite (166102) and the foliated syenogranite rich in pink K-feldspar (166104) are rocks very poor in mafic minerals. The Shinkakasa granitic rocks are alkaline (K_2O+Na_2O : 8.55–10.46 wt%; CaO : 0.53–1.08 wt%), ferroan (FeO_t/MgO : 13.64–22.63), within-plate anorogenic granites, showing chemical attributes (Y/Nb : 1.51–1.86; $Zr+Nb+Ce+Y$: 394–583 ppm; and Ga/Al relations) of A2-type granites. The isotope analytical data are (sample number followed by MCA, magmatic U-Pb age in Ma; TDM, Lu-Hf model age in Ga; ϵHf , epsilon $Hf_{(t)}$): sample #166103, granodioritic orthogneiss representing the Kimezian basement (MCA, 2069 ± 17 ; TDM, 2.47–2.59; ϵHf , -0.71 to -4.06); samples from Shinkakasa granites, #166104 (MCA, 869 ± 14 ; TDM, 1.94–2.29; ϵHf , -8.31 to -18.10), #166101 (MCA, 911 ± 13 ; TDM, 1.90–2.01; ϵHf , -7.10 to -11.02), #166102 (MCA, 909 ± 25 ; TDM, 1.89–2.36; ϵHf , -7.98 to -19.89), and #117590 (MCA, 880 ± 13 ; TDM, 1.89–2.06; ϵHf , -7.64 to -10.98). Negative ϵHf in zircon together with an Archaean inheritance and a calc-alkaline magnesian signature suggest a continental magmatic arc setting for the Kimezian basement (ca. 2069 Ma). Lithochemical and Lu-Hf signatures from the Shinkakasa rocks suggest distinct magma evolutions. Samples 166101 and 117590 record relatively less evolved magmas, probably including melt contribution from the Kimezian basement. Samples 166102 and 166104 represent more evolved magmas, including older crustal components. Our results together with compiled data from the literature suggest an important event of anorogenic magmatism in the Tonian (940–870 Ma). This event includes the Shinkakasa, Seke-Banza, Zadinian-Mayumbian and Mayumba magmatic rocks, located in the West Congo belt, and the Ilhéus-Pau Brasil dike swarm of the eastern São Francisco craton, as well as the Capelinha, Pedro Lessa, Pedra Preta, Planalto de Minas and Salto da Divisa suites of the Araçuaí orogen. This large anorogenic province represents one of the Neoproterozoic rifting events that preceded the Araçuaí-West Congo orogen, namely: the Early Tonian event (Noqui granites, ca. 1000 Ma), the Tonian event (ca. 940–870 Ma), and the Late Tonian–Cryogenian event (ca. 735–675 Ma; represented by igneous rocks related to the Lower Diamictite and Nyanga basin of the West Congo belt, and the South Bahia Alkaline Province).

PALAVRAS-CHAVE: ANOROGENIC MAGMATISM; TONIAN; WEST CONGO BELT