The development of a Meso- to Neoarchean rifting-convergence-collision-collapse cycle over an ancient thickened protocontinent, south São Francisco craton, Brazil

Mariana Brando Soares[1], Atlas Vasconcelos Corrêa Neto[2], Wendell Fabricio-Silva[3]

[1]Universidade Federal do Rio de Janeiro, Brazil (mbrandosoares@gmail.com)
[2]Universidade Federal do Rio de Janeiro, Brazil (correa.neto@geologia.ufrj.br)
[3]Universidade de Brasília, Brazil (wendellfabricio@gmail.com)

The south São Francisco craton (SSFC) in Brazil is one of the few areas which are key to unveil the Archean evolution in South America due to its significant uncovered extension. Despite the economic interest dating back into the 18th century, the SSFC has not been studied in detail until the beginning of this present decade. The two main greenstone belts in the SSFC, Rio das Velhas (RVGB) and Pitangui (PGB), have been traditionally considered to represent a single Archean basin. Here, integrated new geochemistry and geochronology data from both greenstone and TTG-granite rocks suggest both belts have evolved as separate domains marked by distinct komatiite geochemistry indicating the PGB evolved as a back-arc rift on a thick lithosphere section at 2.86 Ga. 100 Ma latter, this section transitions to a calc-alkaline dominated setting coeval to the emplacement of two large TTG igneous bodies at the margins of a poly-recycled ancient terrain marked by extremely low ƐHf, implying on flat-subduction or melting at the base of a thickened crust owing to compressional movements. Contrastingly, the RVGB basin develops at the neighboring of an exotic juvenile TTG terrain. The dominating strong crustal signature of the SSFC Archean rocks implies on the existence of an anomalous over-thickened crust, or a Meso- to Neoarchean protocontinent, suggesting modern-style tectonics or similar processes such as “dripduction” was already operating in this area prior to 3.0 Ga, which is considered a hallmark for the establishment of a thick continental crust regime and horizontal tectonics Late TTG magmatism at the PGB suggests protracted melting or delamination at the base of this thick lithosphere in response to collision, which turned the PGB into an ophiolitic section. This is coeval to K-rich magmatism at the RVGB, considered to mark the collapse of the same orogen further east, corroborating with a diachronic evolution of both belts.