

EPISODIC CRUST FORMING EVENTS RECORDED IN THE GOIÁS MAGMATIC ARC, CENTRAL BRAZIL: TECTONIC IMPLICATIONS FOR NEOPROTEROZOIC CRUSTAL GROWTH

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RESUMO: Major events of crustal growth during Earth evolution are related to Archean times. However, the presence of several segments of Neoproterozoic juvenile terrains records episodic crust forming events through time. The Goiás Magmatic Arc, one of the largest occurrences of juvenile rock units around the world, makes up the western part of the Neoproterozoic Brasília Belt, Tocantins Province, central Brazil. The Goiás Arc was formed by the accretion of island arc systems to the western margin of the São Francisco continent during ca. 400 Ma, since ca. 910 Ma until ca. 520 Ma. The juvenile terrain is divided into two sections: Mara Rosa arc in the north and Arenópolis arc in the south. Together they underlie an area of approximately 50.000 Km². The earliest magmatic activity represented by juvenile rocks with intraoceanic arc geochemical and isotopic signatures was dated at approximately 910 Ma in the Mara Rosa area and at ca. 900 Ma in the Arenópolis Arc. Recent ID-TIMS, SHRIMP, and LA-ICPMS with laser ablation U-Pb dating of metavolcanic rocks, tonalitic and other granitoid orthogneisses, as well as mafic intrusions, demonstrates that there were two main episodes of crustal growth during the Neoproterozoic in central Brazil. The older, between ca. 910 and 800 Ma, was marked by the generation of tonalitic and gabbroic/dioritic plutonism with associated calc-alkaline volcanic sequences (e.g. the Arenópolis and Mara Rosa sequences). This was followed by a period of quiescence and the development of a back arc rift, where three large layered complexes formed (Barro Alto, Niquelândia and Canabrava complexes). A high grade metamorphic event followed, at ca. 760 Ma, that might represent the final amalgamation of the island arc to the edge of the São Francisco continental plate. The younger crustal growth event is represented by calc-alkaline metavolcanic rocks with continental arc geochemical and isotopic signatures, and dominant metasedimentary units of the Santa Terezinha de Goiás Sequence. This event took place roughly between 670 and 600 Ma, coeval with the closure of the Brasilides ocean basin. Final closure was followed by rapid uplift, mantle melting, generation of mafic magmas and partial melting of the newly formed juvenile continental crust, leading to late- to post-tectonic bimodal association of gabbro/diorite and granite intrusions. A late event of arc magmatism records the closing of the marginal ocean basin developed between the newly formed magmatic arc and the Amazonian continent, adding calc-alkaline volcanic and plutonic material to the western margin of the arc at ca. 570-520 Ma. Thus, the Goiás Arc is a large Neoproterozoic crustal segment in central Brazil, showing several crust forming events.

PALAVRAS-CHAVE: PROVÍNCIA TOCANTINS; FAIXA BRASÍLIA; ARCO MAGMÁTICO DE GOIÁS.