

EVOLUTION OF ARCHEAN AND PROTEROZOIC TERRANES IN THE BRAZILIAN SHIELD

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ABSTRACT: The Brazilian Shield comprises all exposed Precambrian (some Cambrian) rocks in South America. Archean terranes cover large areas, but the most significant crustal growth occurred in the Paleoproterozoic. Mesoproterozoic terranes occur in the basement of the Andes, in Bolivia and in northwestern and northeastern Brazil, but form the unexposed basement of large tracts of the central and southern portions of the shield. Neoproterozoic terranes constitute large portions of eastern South America and may be comparable to the Himalayas orogen. Orogenic processes were dominant in the shield construction and deformation, but large regions of sedimentary and magmatic rocks are the result of plume activity in the Proterozoic. The many themes involved in the evolution of the shield include ore deposits, water, petroleum, gas, life, atmosphere, meteors, orogens, mantle plumes, basins, crystals, isotopes, paleopoles, aerogeophysics, metacraton; a few are selected for a comment. Systematic geological mapping by the Geological Survey of Brazil and locally by universities was integrated in the last decade with the U-Pb dates and Lu-Hf isotopes and some elemental geochemistry obtained mostly from zircon. Aerogeophysical surveys in several regions support geotectonic interpretations. Orogens are now better delimited and processes better understood. The remarkable extent of the Paleoproterozoic terranes in northeastern Brazil is now described and also the growth of the Archean core of the Amazon Craton by accretion of successively younger Proterozoic orogens. Efforts of correlation with Africa have delimited the evolution of Gondwana along the Atlantic Ocean coast. The description of the Araçuaí Orogen has advanced the knowledge of processes of crust formation and deformation in an extensive region of the Brasiliano Orogen. The Late Paleoproterozoic plume activity in eastern Brazil is now better known from studies in the Espinhaço Group. In addition to minor Mesoproterozoic activity in some shield regions, inherited and detrital zircon U-Pb ages and Hf model ages are described in the southern portion of the shield. Even the zircons from the Ediacaran ophiolites and Mesozoic Serra Geral Group basalts display 1.0 Ga Hf-model ages. Ophiolites register the formation and accretion of oceanic crust in the southern Brazilian Shield from zircon U-Pb-Hf isotopes in albitites and metassomatic chloritites; ages are 923-786-722 Ma (Tonian) in the Cerro Mantiqueiras and Ibaré ophiolites, and zircon has depleted mantle composition in Hf isotopes and trace elements. In the Brasiliano Orogen metacraton, a dispersed continental arc association has been described at 777-900 Ma, and a coeval juvenile association occurs in Argentina. The description of the Ediacaran-Cambrian orogenic triad (granitic core-fold and thrust belt-foreland basin in northeastern and southernmost Brazil has clarified the geological relationships in the metacraton. Collisional processes generated the Dom Feliciano Belt by reworking the La Plata Craton in the southern Brazilian Shield. The Brasiliano Orogen is now better understood, both the juvenile terranes in Goiás and São Gabriel and the dominant metacraton belts variously named Dom Feliciano, Ribeira, Brasília, Paraguai, Araguaia, Araçuaí, Sergipano and West Gondwana Orogens. The qualified description of Precambrian terranes of the Brazilian Shield may elucidate of several significant processes.

PALAVRAS-CHAVE: ARCHEAN, PROTEROZOIC, BRAZILIAN SHIELD, TERRANES