Sr ISOTOPIC EVOLUTION OF GRANITOID ROCKS AS AN INDICATOR OF CRUSTAL EVOLUTION: THE PRECAMBRIAN OROGENIC PROVINCES OF BRAZIL

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The Sr isotopic composition of crustal materials has been, for long time, generally used as petrogenetic indicator. Although it is not inequivocal, based on isotopic Sr evidence, to make distinction between magmas mantle-derived and those formed by partial melting of lower continental crust, it is possible to suggest reworking processes when high Sr initial ratios are obtained. On the other hand, the origin of the magmatic source of igneous or metamorphic rock in areas of complex evolution can be well defined if complementary Nd or Pb isotopic studies are available.

More than 15 years of geochronological systematic work on brazilian Precambriam rocks, are considered in this outline, with emphasis on the Sr isotopic studies. Selected whole rock isochrons from single outcrops and reference isochrons from the same geologic unit are combined with well defined Sr initial ratios in order to delineate the crustal evolution through geological precambrian time.

Twenty theree geochronological-geotectonic provinces can be established within the Brazilian territory based on the present scheme. The domains are made up by cratonic units and mobile belts and the identification of cratonic events, periods of both crustal formation and reworking processes, as well as plutonism, supracrustal sequences and underformed sedimentary covers are presented. The juvenile materials are characterized by Sr initial ratios lower than 0.703 while initial Sr values higher than 0.708 are considered as reworked materials.

The geochronological evolution is consistent with two main periods of cratonization during the early and upper Proterozoic times. Archaean relicts are well preserved in many provinces and suggest a paleoexistence of a large primitive crust in Brazil. A similar conclusion can be reached for the early Proterozoic time, in special for the Amazonian and São Francisco cratons. In turn, the middle and upper Proterozoic can be characterized mainly by reworked materials, however an important plutonism is typical for large domains of the eastern part of Brazil where the Late Proterozoic Brasiliano cycle had developed.