



## ADVANCES IN PROTEROZOIC CRUSTAL EVOLUTION BASED ON IGCP-426 STUDIES OF PROTEROZOIC GRANITE SYSTEMS

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Major goals of IGCP-426: Granite Systems and Proterozoic Lithospheric Processes, included: defining properties of Proterozoic granites from known tectonic settings; interpretation of processes that formed Proterozoic granites; genesis of metallogenic enrichments associated with granites; and use of granite systems to constrain terrane correlations for Proterozoic continental reconstructions. Research relevant to tectonic settings still commonly uses geochemistry as a defining data set, rather than a derivative data set, since there continues to be dispute about the origin of many Proterozoic terranes. Iterative models using both geochemistry and regional geology are converging in some cases, showing that common geochemical discriminant methods are valid in the Proterozoic, although field relationships may be necessary for resolving ambiguities. Research on individual granites has focused on many A-type occurrences, including those having rapakivi affinities. A major and still unsolved problem is that of the tectonic regimes which produced extensive A-type suites in North America, Baltica, and Amazonia. Precise geochronology is aiding in relating some of these suites to tectonic events elsewhere in their cratons or cratonic margins, and geochemical and petrologic studies are providing greater insights into magma genesis, with growing appreciation for the role that mafic underplating played in producing them and their commonly associated mafic and anorthositic rocks. IGCP-426 has contributed substantially to understanding tectonic settings and their relevance to continental reconstructions in the SW Amazonian craton and its potential pre-Rodinia correlations to Laurentia and Baltica, and in the Borborema Province of NE Brazil and correlatives in

the Pan African belt of west-central Africa (Cameroon). Precise geochronology, isotopic geochemistry, and petrologic geochemistry are developing pictures of long-lived accretionary continental-margin systems in the first instance and complex collision of continental and microcontinental masses in the second instance. Many Proterozoic granites have significant economic deposits associated with them. Studies in Rondônia, SW Amazonian craton suggest that the thermal regime due to successive episodes of bimodal magmatism might be an important control on rare-metal (e.g., Sn, Nb, Ta) pre-concentration. In the Tapajós gold province recent studies have defined its geochronology, although its relationship to regional crustal evolution is still not fully understood.