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Program and Abstracts

Ediacaran (570-615 Ma) back-arc basin basaltic volcanism in the Itaiacoca Group, Ribeira Belt, Brazil: a remnant of the Adamastor Ocean

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The Itaiacoca Group comprises a metasedimentary-metavolcanic rock succession considered a major constituent of the Apiaí Terrane (southern Ribeira Belt, Brazil), and was involved in the Brasiliano-Pan African Orogeny and Gondwana assembly. Geological data, including bodies of metabasalt covered by stromatolitic dolomite, suggest the existence of oceanic islands and associated shallow water deposits. Magmatic zircon grains extracted from samples of metabasalt and metatuff yield SHRIMP U-Pb ages of 571 ± 25 and 613 ± 10 Ma. Based on the chemical composition, the metabasites are classified as basalt and basaltic andesite of tholeiitic and calc-alkaline series. Trace element data indicate a geochemical signature transitional between MORB and island-arc basalts, a characteristic of back-arc basin basalts. These include flat to slightly fractionated REE patterns (La_{cn}/Yb_{cn} of 0.9-1.9), Ti/V ratios of 16-27, depletion of HSFE and enrichment in LILE relative to MORB values. $\epsilon Nd(t)$ values from +2.3 to +3.2 indicate a dominant juvenile mantle source. Overall geochemical patterns indicate a MORB-type mantle source with contribution of the subduction components. Geological data allowed the recognition of a Statherian unit (Bairro dos Prestes Formation), previously interpreted as a part of the Itaiacoca Group. It comprises a succession of phyllite interbedded with layers of quartzite and restricted metaconglomerate and felsic metavolcanic rocks. Zircon SHRIMP U-Pb data yield a Concordia age of 1761 ± 14 Ma for a metarhyodacite with high-K calc-alkaline signature, while detrital zircons from a metavolcanosedimentary sample give youngest age of ~ 1800 Ma. Geological and geochronological data suggest that the Itaiacoca Group and Bairro dos Prestes Formation can be correlated with the Pirapora do Bom Jesus and Boturuna Formations of the São Roque Group. The Itaiacoca Group is inferred as a remnant of an arc-back-arc basin system associated with the Adamastor Ocean, and an Ediacaran suture zone between the Apiaí Terrane and the Paranapanema Craton.