

ENVIRONMENT OF IBARÉ OPHIOLITE FORMATION AND ACCRETION TO THE BRASILIANO OROGEN BASED ON DETRITAL ZIRCON U-Pb-Hf ISOTOPES FROM A VOLCANICLASTIC ROCK

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ABSTRACT: Ophiolites from the juvenile São Gabriel Terrane, southern Brasiliano Orogen, are significant markers of oceanic crust formation and accretion. The environment of accretion can be described from the rock association that contains the ophiolite. We describe the U-Pb-Hf isotopic data of zircon from the Ibaré ophiolite because it comprises a volcano-sedimentary succession similar to a volcanic arc, with voluminous ultramafic rocks (Corticeira Formation). The juvenile arc was initially deformed in the greenschist facies of orogenic metamorphism but displays a strong overprint of contact metamorphism by the intrusion of the Santa Rita Granite. The arc (Bela Vista Formation) has mostly intercalated phyllite, quartzite, meta-arkose, metagraywacke, metarhythmite, metasiltite, meta-andesite and volcanoclastic rocks. The volcano-sedimentary rocks are interlayered. The stratigraphic relationships are complex, due to folding. In the Ibaré volcanoclastic rock (IB1 sample), 174 zircon grains were documented in backscattered electron (BSE) images and all show patchy zoning. The grains are subhedral to anhedral and have aspect ratio 4:1 to 1:1 but mostly 2:1. The length of grains is between 50-185 μm and mostly <100 μm , one grain with 200 μm . The grains are rounded, fractures are present, rims are discontinuous and recrystallized. Embayments and dissolution features are present. Euhedral apatite inclusions are common in the cores of zircon crystals. LA-ICP-MS U-Pb isotopic analyses ($n = 111$ concordant) of zircon show a spread of ages between 530-1030 Ma, but the most significant peak is between 700-910 Ma. Several analyses plot near 600 Ma. We interpret the data as resulting from detrital zircon deposition in an intra-arc basin younger than 700 Ma. Ages near 600 Ma were probably caused by zircon resetting during intrusion of the Santa Rita Granite. Previous studies of zircon from an albitite by Karine da Rosa Arena placed the Ibaré ophiolite formation in the beginning of the Tonian (920 Ma). This late Tonian age of the dated intra-arc basin indicates a long period (210 Ma) between ophiolite generation at 923 Ma and formation of the island arc at 910-700 Ma. Zircon Hf isotopes and geochemistry indicate an environment transitional between oceanic and continental. We have thus established the geological environment and age of formation of the Ibaré island arc, essential for the classification of the Ibaré ophiolite as supra-subduction zone type. This parameter can be determined in other ophiolites from the Brasiliano Orogen to contribute to the understanding of the evolution of Rodinia and Gondwana.

PALAVRAS-CHAVE: IBARÉ OPHIOLITE, BRASILIANO OROGEN, ZIRCON