

PROVENANCE OF THE HEMATITIC METADIAMICTITE FROM THE RIACHO POÇÕES MEMBER (NOVA AURORA FORMATION)

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Diamictitic iron formations in the north of Minas Gerais State are attributed to the Riacho Poções Member (RPM), part of the Nova Aurora Formation (NAF), the basal unit of the Macaúbas Group. The RPM is interpreted to be glacio-marine deposits of the Criogenian and the iron deposit of the Rapitan type. The ferruginous metadiamictite of the RPM is characterized by the abundance of hematite rich to magnetite rich matrix. In this work is presented the first U-Pb ages and Lu-Hf isotopic data determined on detrital zircons separated from the hematitic metadiamictite of the RPM. A sample (MRP1) composed by dark to light grey hematitic metadiamictite with specularite rich sandy clay matrix was collected from representative drill cores aiming to better constrain the sedimentation period of the ferruginous metadiamictite. Clasts are mainly of quartzite and locally with specularite rich bands. Seventy-eight zircon grains, ranging from 85 to 345 μm in length were obtained from this sample. The grains are mostly rounded to sub-rounded, suggesting transport, but there are also euhedral crystals. Oscillatory zoning and homogeneous internal structures can be observed in the CL images. The U-Pb age peaks are at 924, 995, 1214, 1546, 1791, 1958, 2122 and 2239 Ma. The youngest peak, at 924 Ma, marks the maximum deposition age of the RPM, similar to another sample (NA-1) of the NAF, where the youngest zircon is 939 Ma. In sample MRP1, 28 zircons from Tonian to Calymmian (720 to 1600 Ma) age were analyzed for Lu-Hf isotopes. The predominance of positive ϵ_{Hf} values in some the Calymmian (1400 to 1600 Ma) zircons allied the T_{DM} ages suggest that those zircons come from juvenile sources, while the zircons with slightly negative ϵ_{Hf} and greater variations in T_{DM} ages could reflect heterogeneous crustal contamination of the juvenile magmas or different sedimentary sources. The different Hf characteristics of the zircons of the Ectasian and Stenian (1200-1400 and 1400-1600 Ma) periods suggest a probable derivation from different magmatic sources. The crustal signature, given by the negative ϵ_{Hf} values, observed for the Tonian (720 to 1000 Ma) zircons can be due to the reworking of older rocks of the basement in the Neoproterozoic. Comparison between the MRP1 and NA-1 shows that, beyond the similar maximum depositional age, that in the first sample, zircons older than 2.5 Ga are absent, and that the oldest zircon is from the Siderian period. Both samples show an important age peak in the Rhyacian-Orosirian periods. Sample MRP1 has a significant contribution of zircons from the Statherian to the Stenian periods, but a very small concentration of Tonian zircons, while in sample NA-1 the inverse is observed. Even though the maximum depositional age agrees with the age found for a typical metadiamictite of the NAF the differences in the pattern of distribution of the detrital zircons in samples MRP1 and NA-1 could reflect either the changes in the evolution during the opening of the Macaúbas Basin, exposing and/or hiding source areas and changing the importance of their sedimentary supplies, or that the ferruginous metadiamictite and the regional metadiamictite deposited in different conditions in the same basin.