Jurassic-Cretaceous paleogeography of Central-West Parnaiba Basin, NE Brazil - stratigraphy and sedimentary provenance of detrital zircons

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The Phanerozoic Parnaíba Basin occupies 600,000km² in northeast Brazil, covering cratons and Neoproterozoic belts. Its Central-West region is mostly represented by the Jurassic-Cretaceous Sequence (Mosquito, Corda Grajaú, Codó and Itapecuru formations) recording magmatic events from the Central Atlantic Magmatic Province, with depocenters migrations and shifts on depositional environments related to Pangea breakup. This work discusses the Jurassic-Cretaceous siliciclastic units testing possible sedimentary source areas with U-Pb and combined Lu-Hf data on detrital zircons, using LA-ICP-MS. The basalts from Mosquito Formation are dated at +/- 198Ma and the Codó Formation present accurate Aptian fossil data. This formation records a hypersaline lake system, succeeded by a transgression that represents pioneer marine ingression within an intracontinental rift. The other units (Corda, Grajaú and Itapecuru) are constituted by siliciclastic sediments involved in intracontinental sub-environments. The Corda Formation consists of aeolian system, sand sheets and wadis deposited in a desertic setting. The contact between the subsequent Grajaú Formation is abrupt, represented, at the base, by thick coarse braided river facies grading laterally and upwards to ephemeral channels in association with low amplitude Aeolian dunes, evidencing still arid conditions. Interlayered beds of fluvial and aeolian sandstones within lacustrine deposits, indicates that Codó and Grajaú formations consists the same seasonal fluvial-lacustrine system. The last Itapecuru Formation, is represented by a thick red sandstone succession deposited in a deltaic system. Paleocurrents measurements below Codó Formation (i.e. Corda and lower Grajaú) points a W-NW sense of direction, whereas paleocurrents above Codó Formation (i.e. upper Grajaú and Itapecuru) presents a regional sense to E-NE. Detrital zircons geochronology analysis helped to identify the source area of sediments through the comparison of the main ages of possible uplifting tectonic terranes. The preliminary results revealed that sandstones below Codó Formation shows a major Neoproterozoic population (56, 41% to 40%) with age peaks at 583 and 628 Ma; and also Paleoproterozoic (43, 48% to 35,05%); Archean (4,35%) and Paleozoic (2,61%) populations. Sandstones above Codó Formation, also show a Neoproterozoic major detrital zircon population (40% to 37,12%) with 625, 665 and 783 Ma age peaks. Two other populations are present: Paleoproterozoic (22.68% to 20%) with peaks at 1749 and 1881 Ma, and Archean (24,45% to 15,47%). This last source has a greater contribution than in the formations below the Codó maker. We envisaged that the shift from W-NW to E-NE sandstones paleocurrent is coherent with the rise on Archean contribution, possibly related to the Amazon
Craton to the West. In addition, the youngest Phanerozoic detrital zircons obtained in all samples are minor (6.66% to 6.18%). The integration of field stratigraphic analysis, paleocurrents and detrital zircon provenance studies corroborate to the hypothesis that Codó Formation must represent a Cretaceous stratigraphic datum for the transition of a rift and post-rift phase, thus the change of source areas is consistent.

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