

Theme 13. Provenance of sediments – from source to sink**Special Session 13.3.** Quantitative study for source-to-sink system

Oral presentation

Provenance of Piauí Formation (Parnaíba Basin, Brazil) and effects of hydraulic segregation on heavy minerals assemblage

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The Parnaíba Basin is a large intracratonic basin (600,000 km²) located in northeast Brazil that registers the sedimentation history during Paleozoic to Mesozoic Eras. Balsas Group deposition (Pennsylvanian to Upper Triassic interval) occurs within arid environment context associated with the 30° latitude arid belt. The Pennsylvanian Piauí Formation, focus of this study, shows aeolian crescent dunes and damp interdune with hyper-concentrated fluvial discharges. This work aims to compare the fluvial and aeolian heavy minerals assemblages to evaluate a possible reworking and hydraulic sorting process. Logging of the fluvial–aeolian strata of outcrops of the Piauí Formation at Floriano area was carried out and channel-fill facies, with planar and tangential cross stratification sandstones, and aeolian dunes dominate. Four samples from fluvial strata and one sample of an aeolian dune were collected. To check the hydraulic sorting along the different grain size classes, we sieved three distinct fractions, larger than 180 µm, between 180–100 µm, and smaller than 100 µm. Quantitative petrography and SEM-EDS analysis reveal a predominance of zircon in the finer grain-size fraction (<100 µm), zircon and Fe-Ti oxides in the 180–100 µm class, and tourmaline and garnet in the coarser fraction (>180 µm). The aeolian sample displays a lower proportion of heavy minerals over light minerals (0.038%) compared to the intermediary fluvial strata (0.141% to 0.069%). The mean heavy mineral grain size remains similar; however, the proportion of Fe-Ti oxides increases over zircon. The basal fluvial sample also shows depletion on heavy minerals proportion (0.014%). The fluvial paleocurrent overall flows from east to west, so the up- to downstream samples display a depletion of coarser heavy minerals (> 180 µm). Based on this preliminary dataset, we inferred that: (1) the hydraulic sorting tends to decrease the coarser heavy mineral proportion along a transect from up- to downstream; (2) the aeolian rework of fluvial strata tends to deplete the ZTR index in favor of heavier oxides.