

HEAVY MINERALS OF GODWANA'S SEDIMENTARY SEQUENCES (PARANÁ BASIN), SANTA CATARINA: NEW INSIGHTS TO STRATIGRAPHY AND PROVENANCE STUDIES

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ABSTRACT: Sedimentary sequences of the Taciba and Rio Bonito Formations crop out along the western margin of the Paraná Basin. They include glacial and post-glacial deposits whose stratigraphic evolution have studied only by paleoenvironmental analysis. Stratigraphic and provenance studies of these deposits have never been addressed using heavy minerals (HM). This work presents HM analysis of sandstones of these to constraints on the provenance, and to apply of HM as tool to stratigraphic study. Thirty-six samples were collected from outcrops and gently disaggregated. HM grains (63–125 µm) were mounted under Canada Balsam for optical identification and proportions of them were estimated by counting 600 per sample. The ZTR and ATi e RZi indexes were determined. Grains textural surfaces were analyzed in scanning electronic microscope. Sandstones of the Taciba Fm. present zircon (33%), apatite (17%), garnet (10%), tourmaline (9%), rutile (8%), brookite (5%), pyroxene (5%), amphibole (3%), barite (3%); kyanite, hypersthene, aegerine-augite, sillimanite, andalusite, enstatite, titanite, scheelite, and barite constitute about 7%. Sandstones of the Rio Bonito Fm. include zircon (45%), amphibole (12%), tourmaline (11%), rutile (11%), barite (6%), pyroxene (6%), schelite (1%); garnet, apatite, axinite, epidote, staurolite, hornblende, topaz, aegerine-augite, sillimanite, brookite and titanite is about 8%. Four stratigraphic HM intervals were defined, and the boundaries between them coincide with genetic surfaces defined by sequence stratigraphy analysis. The HM1 interval includes glacial deposits (Taciba Formation) with decreasing ATi, RZi and ZTR index towards the top, and paleocurrent patterns from SE to NW. The HM2 comprises periglacial delta plain deposits (Taciba Formation), with low-ATi index, and decreasing of RZi and ZTR indexes towards the top. At the base of the HM2 interval a forced regression surface occurs, and at its top a subaerial unconformity. The HM3 (Triunfo Mb.) and HM4 (Paraguaçu Mb.) intervals comprise fluvial deposits at the base (which conformably overlies the Taciba Formation) to estuarine deposits at the top, respectively. They present low-ATi, increase in RZi and ZTR indexes towards the top, and paleocurrent patterns from NE to SW. Zircon morphology indicates mixing of sediments from different source-areas. Variations in ATi, RZi and ZTR indexes attest changes in provenance and diagenetic features do not indicate relevant intrastratal dissolution to alter the original mineralogy of the HM assemblage. The subaerial unconformity between Taciba-Rio Bonito Formation record the transition from Lows system tract (LST) deposits to Transgressive system tract (TST) deposits, related to the changes in the climatic and tectonic regimes. These allogeneic controls were the main factors that led to changes in the sedimentary dynamics and provenance pattern of the stratigraphic record. The LST deposits record the end of the Gondwana glaciation with northwestward-prograding of a deltaic system carryout sediment from Tijucas and Florianópolis Terrains, when glaciers could have cut deeply into the substrate, thereby accessing geological material of the hinterland. Whereas, the TST deposits present southwestward estuarine system transporting sediments from Florianópolis Terrain, Brusque Complex, Itajaí Basin and, possibly, recycled sediments from Taciba Formation. These geological domains encompass widely rock types as: acidic and basic igneous rocks, low- to medium-high-grade metamorphic rocks, pegmatites, volcanic rocks and sedimentary rocks.

Keywords: PROVENANCE, HEAVY MINERAL, SANDSTONES, GODWANA, PARANÁ BASIN.