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## **PARTICLE SIZE DISTRIBUTION AND MINERAL COMPOSITION OF THE GAL-OYA RIVER SEDIMENTS, SRI LANKA: SOURCES AND CONTROLS**

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The sediments of the Gal-Oya River basin were investigated in order to identify the mineral compositions and depositional environments, as the river crosses the Highland-Vijayan litho-tectonic (HC-VC) boundary of Sri Lanka. A total of 14 surface sediment samples were collected representing both HC and VC. Grain size analysis was performed on all samples and consequently, the grain size parameters were calculated following the standard procedures. SEM analysis was performed on selected quartz grains to interpret the micro-textures to relate to the depositional environment. Heavy liquid mineral separation and magnetic separation were used in mineral separations and petrographic analysis was performed in identification. The results revealed an assemblage of heavy minerals dominated by garnet, tourmaline, rutile, monazite, spinel, and zircon, indicative of high-temperature-pressure metamorphic sources. The high concentrations of heavy minerals in the samples collected beyond the HC-VC boundary suggest its contribution to the enrichment of the heavy mineral contents in the basin. The identified garnet variety- hessonite may be an indicator for the possible gem accumulations, which requires further investigation. In addition, the presence of graphite nodules might be due to the carbon influences in the metasedimentary processes of the source rocks or hydrothermal influences during metamorphism. Most probably, the Senanayake reservoir may act as a sediment trap for such mineral contents. The grain size distribution exhibits the poorly sorted (1.3–1.7) and coarse skewed (-0.8 to -0.2) nature which suggests high energy and mixed energy environments for sediment deposition in the region. The mechanical surface micro-textures of the quartz grains such as medium to large conchoidal fractures, cracks, graded arcs, and arcuate steps also reveal the high energy transportation and depositional conditions in the basin. The gradient of the mountain ranges in the southeastern region of the central highlands and the rectangular drainage pattern may contribute to the mixed energy environments observed in the sedimentation process. Further studies of the sediments in the Senanayake reservoir are recommended to understand the trapping nature of valuable heavy minerals, which have already been identified in the eastern coastal areas and deposited before the construction of the reservoir.

**Keywords:** Depositional Environment, Grain Size Analysis, Heavy Minerals, Highland-Vijayan Boundary, Quartz Micro-textures