

Abstract

This independent study aims to investigate the sedimentological characteristics, stratigraphy, and provenance of alluvial fan deposits on the western and eastern sides of the Pai Basin, Mae Hong Son Province, northern Thailand. The study focuses on sediment composition, textural characteristics, and their relationship to the source rock units exposed in the mountainous area west of the basin. The research methodology includes geological field surveys at six study sites, stratigraphic logging, spatial sampling for grain-size analysis, facies classification, and thin section preparation for petrographic analysis under a polarizing microscope. The results indicate that the deposits are predominantly very poorly sorted gravel, characterized mainly by matrix-supported gravel. The sediments consist largely of boulder and cobble size, particularly in the proximal part of the alluvial fan. Toward the medial and distal fan areas, the proportion of fine gravel and matrix increases. Clasts exhibit low to moderate sphericity and range from subangular to subrounded, suggesting relatively short transport distances. The clast composition is dominated by granite, quartz, sandstone, and shale fragments. Petrographic analysis confirms that these components are consistent with the granitic and sedimentary rock units exposed west of the Pai Basin. Some stratigraphic intervals display upward-coarsening trends and massive sediment deposits, indicating that the primary depositional processes involved debris flows associated with high-energy stream flows in an alluvial fan environment. The accumulation of these deposits is closely related to tectonic influences and uplift along the basin margin. This study provides insights into the evolution of the alluvial fan system on the western side of the Pai Basin and supports the interpretation that the sediments were derived from the mountainous terrain to the west of the basin.