GEOMORPHOLOGICAL MAPPING AND LANDFORMS CLASSIFICATION IN ATTANAGALU OYA RIVER BASIN

G. N. Kaushalya[1*], T.W.M.T.W. Bandara [2], and V. P. I. S. Wijeratne[3]
[1]*PGIHS, University of Peradeniya, Sri Lanka.*
[2]*Department of Geography, University of Peradeniya, Sri Lanka.*
[3]*Department of Geography, University of Colombo, Sri Lanka*
[*]*gnnipuni011@gmail.com*

Geomorphological mapping and landform classification are essential for understanding the processes shaping the Earth's surface, managing natural resources, planning land use, and assessing natural hazards. Previous research studies stated that the Attanagalu Oya River basin is a vulnerable area for geomorphological changes. This work aims to present a geomorphological mapping and landform classification of an area in the Attanagalu Oya River Basin, based on morphometric analysis of Digital Elevation Models (DEMs), and terrain analysis while classical methods focus on photo interpretation. Further, the study focused on identifying the geomorphologically changing hotspots in the river basin and exploring the factors contributing to the changes in geomorphology using spatial analysis. All the analysis and digitized maps for the years 1981, 2001 and 2021 were generated using ArcGIS 10.8 and Google Earth Pro software. The secondary data used in this study were obtained from global open-source databases and institutions. Maps, data tables and analytical diagrams were used to interpret the findings. Total area of the Attanagalu Oya River basin is 839 Km². Based on the analysis, five primary types of geomorphological landforms by their origin were identified in the Attanagalu Oya River Basin area. They are structural origin landforms, denudational origin landforms, fluvial origin landforms, coastal origin landforms and anthropogenic origin landforms. Geomorphological classification was developed based on these main types of origins. Fluvial origin landforms and anthropogenic origin landforms are the main dynamic types of geomorphological landforms in this area. The hotspot areas of geomorphological changes were located in the middle and lower Attanagalu Oya sub basin along with coastal areas. Rainfall, slope, disaster impact and land use and land cover changes were identified as physical factors that contribute to the changes in geomorphology in this area. The contribution of those factors are higher in the middle and lower Attanagalu Oya sub basin along with the coastal area when compared to other areas. Moreover, human factors such as population growth, urbanization, infrastructure development, and disaster management practices were identified as factors that contribute to the changes in anthropogenic geomorphology in the Attanagalu Oya River basin. This kind of study enables us to explore the landscape dynamics to effective watershed environmental management for sustainable development practices.

Keywords: Geomorphological mapping, landforms classification, environmental management, geomorphological changes